CALIBRATION METHODOLOGY FOR THE SCRIPPS $^{13}C/^{12}C$ AND $^{18}O/^{16}O$ STABLE ISOTOPE PROGRAM, 1992-1996

A Report Prepared for the Global Environmental Monitoring Program of the World Meteorological Organization

by

A. F. Bollenbacher, P. R. Guenther, C. D. Keeling, E. F. Stewart, M. Wahlen, and T. P. Whorf

Scripps Institution of Oceanography
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Glossary of Terms

Archived Sample

A sample saved for later analylsis in order to provide information on stability of stored samples or of analytical methods. Archived samples extracted at different times from natural-air secondary standards have been analyzed together to ascertain the stability of the standards.

Calibration

Standardization, absolute or relative, or of a measurement system.

Cryogenic Extraction

Method of passing air through a very low temperture trap (cooled with liquid nitrogen) to separate the condensable gases, including CO_2, N_2O, and H_2O, from the non-condensable gases, primarily nitrogen, oxygen and argon. Further transfers between traps cooled with dry ice (solid CO_2) and liquid nitrogen remove water from the remaining CO_2 and N_2O.

Correction

Adjustment applied to mass spectrometer measurement to improve accuracy, e.g., application of calibration results. The following three corrections are applied to isotopic data:

Craig Correction The ion correction to account for the contribution of the isotope ^{17}O to measurements by mass spectrometry, as formulated by H. Craig [Craig, 1957; Clark and Fritz, 1997, pp. 15,16].

NBS Correction Correction of results to agree with the assigned values of standards from the National Institute of Science and Technology (Formerly National Bureau of Standards). A calibration equation is determined from a linear fit of calibration measurements of three NBS standards, Nos. 16, 17 and 19.

Daily Correction An additive correction determined from the daily results of stable secondary standards in comparison to their assigned values.

Drift

Change with time of a measurement system, usually implying a systematic change in one direction. In particular, change with time of mass spectrometric measurements of stable secondary standards.

Differential Drift A consistent change in the differences between mass spectrometer measurements of natural-air secondary standards (containing N_2O) and pure-CO_2 secondary standards.

Extraction Line

Glass vacuum system used to perform cryogenic extractions of natural-air samples and of natural-air secondary standards.

Manual Extration Line Original system (used from 1978 until 1998) with manually operated glass stopcocks. Nearly 100% of each air sample was extracted.

Automated Extraction Line New system (used from 1997 to the present) equipped with programmed pneumatically operated stopcocks, automated liquid nitrogen trap, and electric fuser to seal flame-off tubes. Samples are not extracted below a pressure of approximately 200 torr.

Fill

Set of CO_2 extractions of atmospheric secondary standards. Reference is to the filling of six five-liter flasks at one time with natural air from a high pressure gas cylinder in which the standard is stored. Each flask is then extracted separately following the same procedure for extracting CO_2 from natural-air samples. A single fill number is assigned to eighteen extractions of atmospheric secondary standards, six from each of the three standards.

Flame-off Tube

A borosilicate-glass ampoule used to store CO_2 extracted from air, seawater, or a standard. It is made of a 1/4" O.D. medium-wall tube 5-10 cm in length, with the open end flame-sealed after the sample has been frozen into the tube under vacuum.

Isotopic Ratio

In general, the ratio of the rare stable isotope to the more common one. For CO_2, ^{13}C's natural abundance is 1.1% and ^{18}O, 0.2%.

$^{13}C/^{12}C$ General term for the stable isotopic ratio of ^{13}C.

$^{18}O/^{16}O$ General term for the stable isotopic ratio of ^{18}O.

δ45/44 The mass ratio of 45 to 44 expressed as a "reduced" ratio, relative to the machine standard.

δ46/44 The mass ratio of 46 to 44 expressed as a "reduced" ratio, relative to the machine standard.

$\delta^{13}C$ The "reduced isotopic ratio" of ^{13}C, the relative variation in $^{13}C/^{12}C$ from that of the carbonate standard "PDB," as given by the formula:

$$\delta^{13}C = (R/R_s - 1) * 1000$$

where R denotes the $^{13}C/^{12}C$ of the sample, and R_s the $^{13}C/^{12}C$ of the standard, assigned as 0.0112372 [Craig,1957]. The $\delta^{13}C$ is expressed in "per mil PDB" (‰ PDB).

$\delta^{18}O$ The "reduced isotopic ratio" of ^{18}O in the CO_2, formulated in the same way as the $\delta^{13}C$. The $^{18}O/^{16}O$ of the standard, PDB, has been assigned as 0.002079 [op. cit.].

Merge

Adjust the isotopic ratio of a standard to that of another standard so that both sets of measurements may be averaged together for calibration

purposes. Merging is done by applying an offset between the two standards obtained by averaging a number of differences between the standards when analyzed on the same day, or by applying a fit (usually linear) of one standard data set versus another.

Mole Fraction [X]

The concentration (symbol "X") calculated from manometric measurements of reference gases, or from infrared measurements calibrated manometrically. Also termed a "mixing ratio," a dimensionless quantity.

Natural Air

Air samples collected directly from the atmosphere, either low-pressure (*ca.* one atmosphere) samples collected in glass flasks, or high-pressure standards pumped into gas cylinders.

NBS Standard

Standard for stable isotopic measurements, provided by the National Institute of Standards and Technology, with assigned $^{13}C/^{12}C$ and $^{18}O/^{16}O$ ratios (relative to PDB). In particular, the gaseous standards NBS 16 and NBS 17, and the carbonate standard, NBS 19.

Offset

Average difference in $^{13}C/^{12}C$ and $^{18}O/^{16}O$ ratios between mass spectrometric measurements of two stable secondary standards, used to merge the two data sets into one.

PDB

"Pee Dee Belemnite," a carbonate from a particular fossil formation used as the standard for $^{13}C/^{12}C$ and associated $^{18}O/^{16}O$ measurements. By definition, its $\delta^{13}C$ and $\delta^{18}O$ are equal to zero. Although the standard material no longer exists, NBS 19 was calibrated against it.

(Sample) Standard Deviation [s_i]

Statistical quantity that estimates the dispersion, or imprecision, of a set of measurements, assuming the normal law of error. For a set of repeat measurements, the equation used to calculate s_i is as follows:

$$s_i = \left[\frac{\Sigma d_i^2}{(n-1)} \right]^{1/2}$$

where d_i is the difference of an individual measurement from the mean of n measurements.

Secondary Standard

A gas with stable $^{13}C/^{12}C$ and $^{18}O/^{16}O$ ratios in its CO_2, and that is analyzed along with natural samples as a daily reference. Values of $\delta^{13}C$ and $\delta^{18}O$ are assigned relative to NBS standards. Assignments of two standards may be related by sets of measurements made on the same days, using average offsets.

Atmospheric Secondary Standard Natural-air standard compressed in high-pressure cylinders. Aliquots are removed and the CO_2 (and N_2O) extracted for mass spectrometric measurement. An atmospheric secondary standard may alternatively be a bulk sample of CO_2 (with N_2O) that had been extracted continuously from a large amount of air, e. g. one high-pressure cylinder of natural air.

Oceanic Secondary Standard Pure CO_2 standard (without N_2O) derived from carbonate or the like. These standards may exist as bulk standards (e. g. GS19, GS20) or as a set of flame-off tubes (e. g. GEA4).

Stable Isotope

A long-lived (non-radioactive) naturally-occurring isotope measured by analysis in a mass spectrometer. Here we refer to the stable isotopes ^{12}C,

^{13}C, ^{16}O, and ^{18}O.

Term

Additive correction for daily $\delta^{13}C$ and $\delta^{18}O$ measurements derived from relative performance of secondary standards analyzed during the day.

Air Term Refers to daily correction applied to isotopic ratios measured in natural-air samples.

Sea Term Refers to daily correction applied to isotopic ratios measured in natural sea water samples.

Working Reference Standard

Reference standard installed on one inlet of a dual-inlet stable-isotope mass spectrometer. A measurement of a sample (unknown or standard) consists of a number of comparisons between it and the working or "machine" standard. The instrument software will calculate the $\delta^{13}C$ and $\delta^{18}O$ of an unknown with reference to the assigned values of the machine reference standard, in ‰ PDB.

Introduction

Stable isotopic measurements for $^{13}C/^{12}C$ and $^{18}O/^{16}O$ at global sampling sites have been carried out by Dr. C.D. Keeling at Scripps Institution of Oceanography (SIO) since 1978. These isotopic measurements complement the continuing global atmospheric and oceanic CO_2 measurements initiated by Dr. Keeling in 1958. The isotopic program began as a joint project between Dr. Keeling and Dr. Willem Mook at the Centrum voor Isotopen Onderzeok (CIO) at the University of Groningen, The Netherlands, and continued for fourteen years. Beginning in 1992 the Scripps isotopic program became a joint project with Dr. Martin Wahlen, also of SIO. This report will describe the methodology of calibrating and combining the isotopic data sets from the two joint projects. We will identify the Mook data set as "CIO" and as "Mook" and the Wahlen data set as "SIO" and as "Wahlen."

During the fourteen-year relationship with CIO, cryogenically extracted CO_2 samples were shipped to Dr. Mook at the University of Groningen, and were analyzed using two VG Instrument Inc. Sira mass spectrometers. Final results were calculated and reported back to Dr. Keeling, leaving details of mass spectrometer performance and calibration methods up to Dr. Mook. Since 1992 we have performed the analyses ourselves at SIO using Dr. Wahlen's VG Prism II dual-inlet stable isotope ratio mass spectrometer, and have been directly involved in the calibration process. We have calibrated the VG Prism II against several internationally accepted NBS standards, and have characterized and developed a daily correction scheme based on the performance of six secondary standards for both $^{13}C/^{12}C$ and $^{18}O/^{16}O$. We report here the daily correction scheme for measurements on the VG Prism II mass spectrometer from April 1992 to November 1996.

In order to combine the CIO data set and the SIO data set, a relationship between the two had to be determined based on the performance of duplicate samples analyzed at both locations. Samples of CO_2 cryogenically extracted from natural air contain

N_2O (approximately 0.1%), while samples extracted from sea water samples contain only trace amounts of N_2O (.001%). The two types of samples were considered separately for the comparison between the CIO and SIO data sets.

The symbol $\delta^{13}C$ is used to refer to the "reduced isotopic ratio," the relative variation in $^{13}C/^{12}C$ isotopic ratio from that of the carbonate standard "PDB", as given by the formula:

$$\delta^{13}C = (R / R_S - 1) * 1000$$

where R denotes the $^{13}C/^{12}C$ of the sample, and R_S the $^{13}C/^{12}C$ of the standard, assigned as 0.0112372 [Craig, 1957]. The $\delta^{13}C$ is expressed in "per mil PDB" (symbol, ‰ PDB).

The symbol $\delta^{18}O$ in the same way is used to refer to the relative variation in $^{18}O/^{16}O$ isotopic ratio from that of the standard "PDB."

NBS Calibration of the Wahlen VG Prism II Mass Spectrometer

In early 1994, Dr. Wahlen used three NBS standards (NBS16, NBS17 and NBS19) to calibrate his VG Prism II mass spectrometer. NBS16 and NBS17 are pure carbon dioxide, and do not require preparation. NBS19, a limestone, is reacted at 25.0°C with 100% phosphoric acid (H_3PO_4) to evolve carbon dioxide gas. In December of 1993, six batches of NBS19 were prepared by Bruce Deck. All batches were stored in 100 cc glass flasks with o-ring stopcocks. Four of the batches (2, 3, 5 and 6) were used for the 1994 calibration, along with NBS16 and NBS17. All NBS standards were run against the "machine" working reference standard MW1 in January and February, 1994. Linear calibration equations relating the measured mass spectrometer data to the assigned NBS values of the standards were found.

We routinely refer to "measured values" of $\delta^{13}C$ and $\delta^{18}O$ as those after application of the ion, or Craig, correction [Craig, 1957; Clark and Fritz, 1997, pp. 15,16]. This correction converts the measurements of $\delta 45/44$ and $\delta 46/44$ mass ratios ("reduced" or relative ratios, as described above) made on the mass spectrometer to $\delta^{13}C$ and $\delta^{18}O$, accounting for the contribution of the isotope ^{17}O to the measured $\delta 45/44$ and $\delta 46/44$ mass ratios. All of these quantities are expressed in the units ‰ PDB. The NBS calibration properly must be made using the $\delta 45/44$ and $\delta 46/44$ ratios.

Table A(1) lists the data used in the 1994 calibration. The measured values of $\delta 45/44$ and $\delta 46/44$ were first averaged for each NBS standard. The three pairs of data were then fit using least squares to obtain linear equations relating the measured $\delta 45/44$ and $\delta 46/44$ values to the assigned values of the NBS standards. Figure 1 displays the data and the fit line, in the form of a difference plot. The following three steps detail the application of the Craig correction and the 1994 NBS calibration to measured data:

1. Remove the Craig correction:

$$\delta 45/44 = (\delta^{13}C_{craig} + 0.0338 * \delta^{18}O_{craig}) / 1.0676$$

$$\delta 46/44 = (\delta^{18}O_{craig} + 0.0021 * \delta^{13}C_{craig}) / 1.001$$

2. Apply the 3-point NBS correction (1994):

$$\delta 45/44' = (0.995034 * \delta 45/44) + 0.05901$$

$$\delta 46/44' = (1.00758 * \delta 46/44) + 0.21137$$

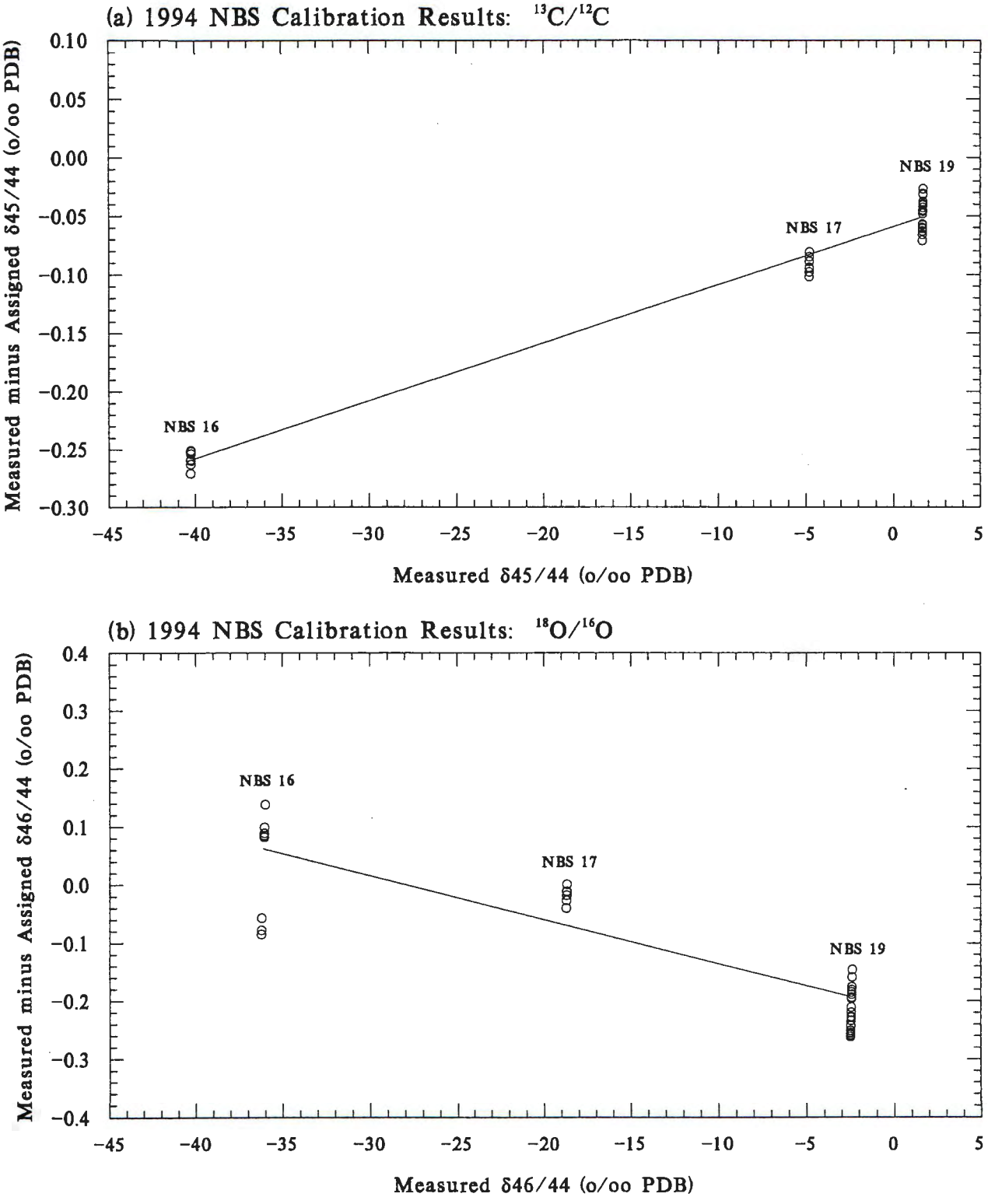

Figure 1. 1994 NBS 3-point calibration of VG Prism II mass spectrometer. NBS standards 16, 17 and 19 were analyzed on 12 January, 19 and 20 January, and 9 and 10 February, 1994. The measured values are plotted versus the measured values minus the NBS assigned values (without Craig correction). The plotted lines are linear fits of the average values of the data for each NBS standard. (a) is a plot of the δ45/44 data and (b) is a plot of the δ46/44 data for the same analyses. Data are from Table A1.

3. Re-apply the Craig correction:

$$\delta^{13}C_{nbscorr} = ((1.0676 * \delta 45/44') - (0.0338338 * \delta 46/44')) / 0.99992902$$

$$\delta^{18}O_{nbscorr} = ((1.001 * \delta 46/44') - (0.00224196 * \delta 45/44')) / 0.99992902$$

In Table A(2) the 1994 NBS calibration equation is applied to the calibration data. Averages of the fully corrected data are listed, along with the daily corrections for each measurement (described later in this report). Comparison of the averages to the assigned $\delta^{13}C$ and $\delta^{18}O$ values in Table A(1) shows that the $\delta^{13}C$ values agree to within 0.01‰ PDB and the $\delta^{18}O$ values to within 0.06‰ PDB.

In 1996 three fresh batches of NBS19 (numbers 7, 8, 9) were prepared by Bruce Deck. All six secondary standards were run along with batches 7 and 9 of NBS19 against the reference standard MW1 on 9, 13, and 14 February 1996. The corrected data for these 1996 measurements, reported in Tables B(1) to B(3), confirmed that the six secondary standards had not drifted or changed over time, and verified that the 1994 NBS calibration had not changed significantly.

The working reference standard MW1 was generated by expanding gas from a cylinder containing grade 4 (99.99% purity) liquid carbon dioxide (Airco Industrial Gases) into a very clean CC size (ca. 27 liter) aluminum cylinder. This cylinder was filled to ca. 2 atmospheres in 1989 and 1-liter aliquots withdrawn and cross- calibrated with itself (so-called "zero enrichment" runs), NBS19, NBS16, NBS17, and the CO_2 secondary standards when needed.

The composition of the working reference standard MW1 is:

$\delta 45/44 = -40.599$‰ PDB

$\delta^{13}C = -42.405$

$\delta 46/44 = -27.828$

$\delta^{18}O = -27.767$

Description of Secondary Standards

In order to monitor the daily performance of the mass spectrometer, we measure secondary standards along with the unknown samples extracted from atmospheric and ocean water samples.

There are two types of secondary standards. The "atmospheric" secondary standards consist of three high pressure cylinders of compressed natural air. Samples of CO_2 gas cryogenically extracted from these cylinders contain approximately 0.1% N_2O gas (typical of natural air). CO_2 and N_2O have the same average molecular weght (44.01) and the same basic mass numbers (44, the most prevalent, as well as 45 and 46), and thus cannot be distinguised by mass spectrometry. Their physical properties are so similar that the cryogenic extraction of natural-air samples cannot separate the gases, and the extractions thus contain both species. The concentrations of N_2O in the three atmospheric standards have been determined using gas chromatography by Frederick van Woy of Ray Weiss' research group at SIO to be approximately 312 parts per billion by volume. The three "oceanic" secondary standards are pure CO_2 gases which contain only trace amounts of N_2O, and are used to assess the performance of the mass spectrometer for CO_2 samples extracted from sea water samples.

Atmospheric Secondary Standards. In March of 1991 three steel high pressure gas cylinders were filled at SIO with natural air. Cylinders 39382, 75635 and 75859 were designated for use as atmospheric secondary standards for the SIO isotopic program. The mole fraction of CO_2 in each of these standards has been determined by repeated infrared analysis, as summarized in the following table:

Atmospheric Secondary Standards

Cylinder No.	Mole Fraction CO_2 ("X_{99}") (ppm)
39382	360.27
75635	361.96
75859	360.20

Each month, a set of standards (referred to as a "Fill") was extracted from these three cylinders. Six 5-liter glass flasks were filled simultaneously to ½ atmosphere pressure with gas from each of the cylinders. The air in each of these six flasks was extracted separately using the same cryogenic technique employed for regular atmospheric samples. This process was repeated for each of the three cylinders resulting in 18 samples of CO_2 gas (six from each cylinder), each about 1 cc. in size. The extracted CO_2 samples were routinely contained in ¼" O.D. Pyrex glass tubes of approximately 10 cm length that have been flame-sealed. We designate these containers "flame-off tubes." Each set of 18 samples was assigned a fill number in order to track the chronology of extractions. Table C lists the measurements of atmospheric secondary standards by fill number. The $\delta^{13}C$ and $\delta^{18}O$ values listed in the table are measured machine values, with only the Craig correction applied. One tube from each group of six flame-off tubes was archived for later use; for example, samples can be analyzed at later dates to check the stability of the three air standards over time.

Samples of the three atmospheric secondary standards were sent to CIO and analyzed there from June 1991 to January 1993. Approximately 18 tubes of each standard were analyzed at CIO; these data were used to determine the calibration offset between CIO and SIO atmospheric isotopic data. The atmospheric secondary standards have been run more frequently on the Wahlen VG Prism II mass spectrometer. The average of approximately 160 measurements for each standard, through April 19, 1996,

was used for the comparison with CIO.

Oceanic Secondary Standards. The presence of N_2O in atmospheric samples interferes with $\delta^{13}C$ analysis and must be corrected for. It is important to have a suite of secondary standards which can be used to characterize the mass spectrometer's response to both atmospheric (with N_2O) and oceanic (without N_2O) samples. In June of 1992 two pure CO_2 standards were purchased from Dr. Mook at CIO for use as oceanic secondary standards. GS19 and GS20 arrived at SIO in 0.5 liter stainless-steel flasks with double Nupro-valves, filled to 2 atmospheres pressure.

Prior to purchasing GS19 and GS20, we attempted to use aqueous sodium bicarbonate ($NaHCO_3$) standards made up in batches of 20 to 50 liters for use as working titration alkalinity standards. Each batch provided about 10 samples for isotopic calibration purposes. Extractions of CO_2 gas from three batches of these bicarbonates were analyzed at both CIO and SIO. Approximately ten samples each from bicarbonate batches 15, 16 and 18 provided information about the relationship between CIO and SIO data. Other bicarbonate standards have been analyzed on the SIO VG Prism II only. Each batch has a different $\delta^{13}C$ signature, which makes it difficult to use these samples as long-term checks on the system. The measurements of bicarbonate standards exhibit daily variations similar to those of the GS19 and GS20 standards.

A third type of oceanic standard was prepared in October of 1995 by Guy Emanuele. Approximately 20 grams of $NaHCO_3$ was acidified under vacuum with 40% H_3PO_4 to evolve carbon dioxide gas. This gas (known as GEA4) was collected and dried, and then stored in a 5-liter glass flask. Aliquots of 1-2 cc of CO_2 from this flask have been put into more than 1500 flame-off tubes for use as daily secondary standards. GEA4 standards have been run daily on the VG Prism II since October of 1995, and exhibit daily variations similar to GS19 and GS20.

Daily Correction Scheme for SIO Measurements on VG Prism II Mass Spectrometer

The behavior of the six secondary standards, three atmospheric (cylinder numbers 39382, 75635, 75859) and three oceanic (GS19, GS20, GEA4), was used to determine daily corrections for the performance of the mass spectrometer. All data used for the determinations have first been NBS corrected according to the three-point 1994 calibration. Corrections for N_2O have *not* been applied to the secondary standard data discussed here.

All of the measurements at SIO of secondary standards are listed in chronological order in Table D, separated by week number. This table includes the measured (and Craig-corrected) $\delta^{13}C$ and $\delta^{18}O$ values and also the NBS-corrected values.

Table E is a summary of the suite of six secondary standards, along with other standards. The "Experimental" values of $\delta^{13}C$ and $\delta^{18}O$ listed on the right side of the table are the mean values of these standards determined by measurements made in the Wahlen laboratory throughout the period of this report. These measurements have been completely corrected according to the scheme presented in this report. The sample standard deviation of an individual measurement, s, is listed for each standard, as calculated from N measurements.

It is apparent from time-series plots of the measured $\delta^{13}C$ and $\delta^{18}O$ of the secondary standards (Figures 2 and 3), that the VG Prism II drifts to lighter (more negative) values with time. The drift in $\delta^{13}C$ is approximately $-0.09‰$ / year for atmospheric standards, and approximately $-0.05‰$ / year for oceanic standards. We can characterize this drift, and thus correct for it, by using the daily offset of our six secondary standards from their assigned values, relative to the 1994 NBS calibration.

The correction scheme described in the following pages, although focused on $\delta^{13}C$, is identical for both $\delta^{13}C$ and $\delta^{18}O$. Assigned values, offsets, and daily correction terms have been calculated in the same way for both isotopes from the same data

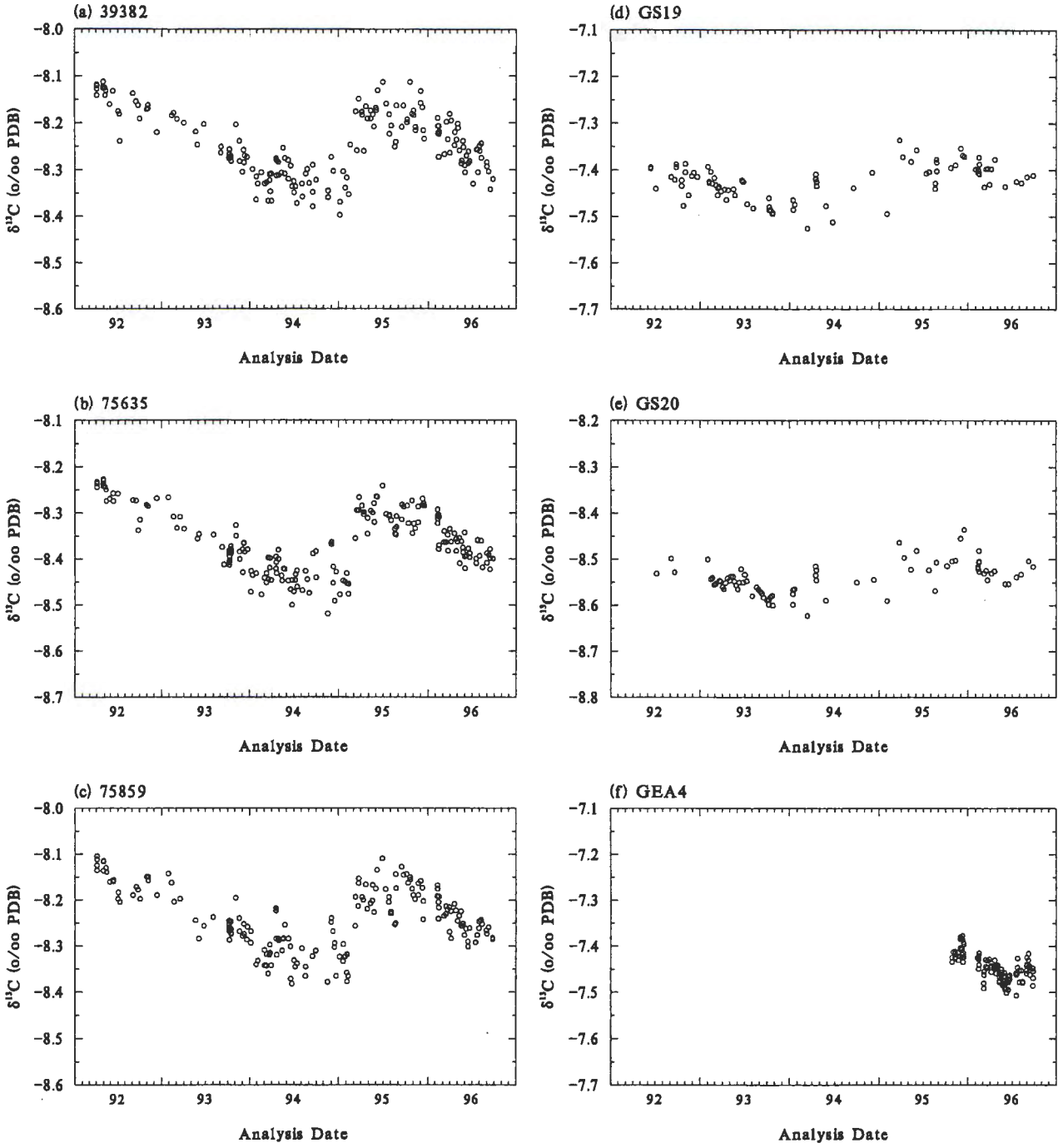

Figure 2. NBS corrected $\delta^{13}C$ measurements of secondary standards. Data are plotted versus date of analysis on VG Prism II mass spectrometer. (a), (b), (c) are natural air ("atmospheric") standards stored in high pressure cylinders. Extractions of gas containing 99.9% CO_2 and 0.1% N_2O were analyzed. (d), (e), (f) are pure CO_2 gas ("oceanic") standards. GS19 and GS20 are stored in 0.5 liter stainless steel flasks, and GEA4 samples are stored in glass flame-off tubes. Data are from Table D.

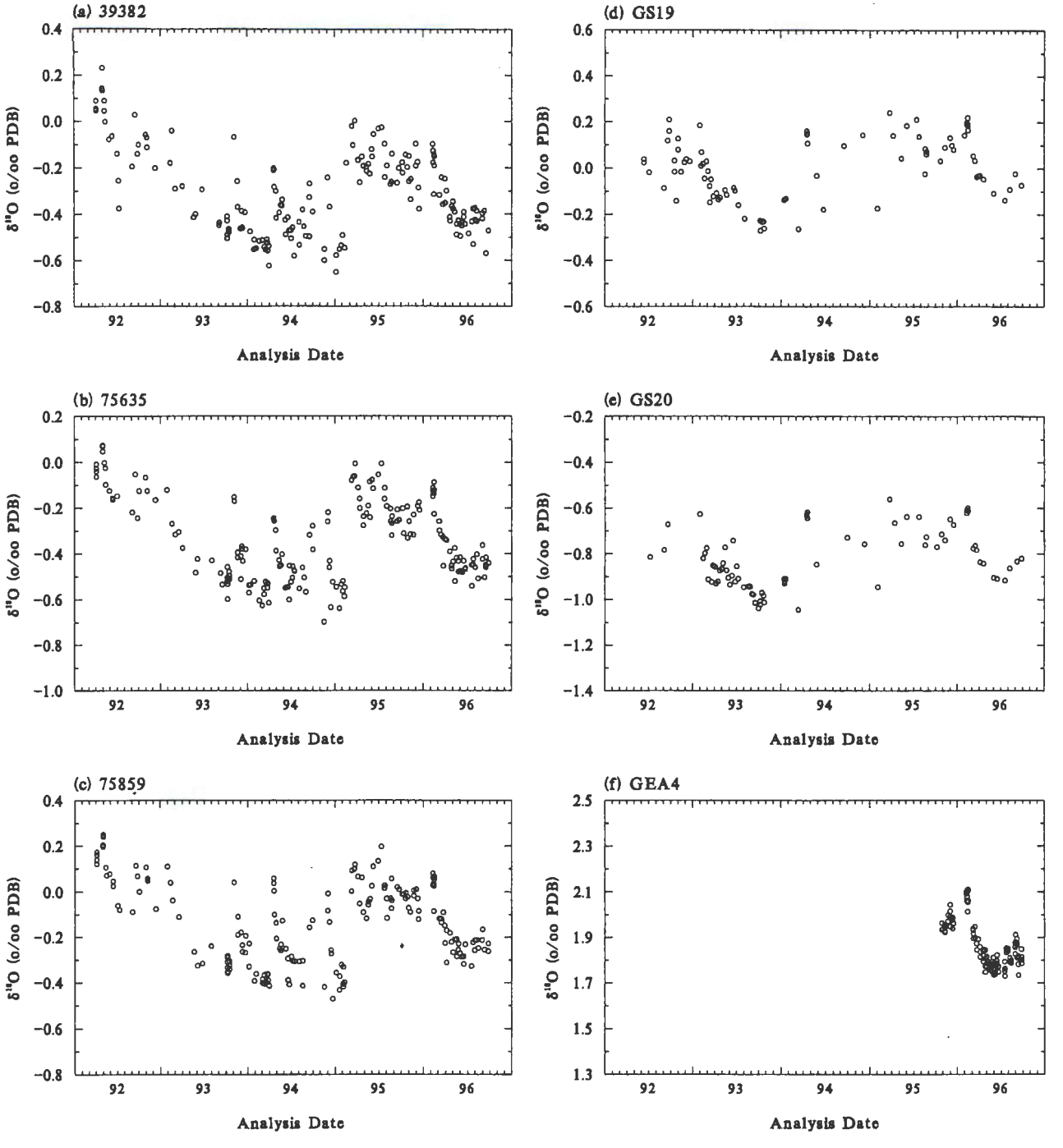

Figure 3. NBS corrected $\delta^{18}O$ measurements of secondary standards. Data are plotted as in Figure 2. Data are from Table D.

sets.

Determination of Relative Stability of Secondary Standards. If the six secondary standards are stable (in relation to each other), then the data can be combined to provide the maximum number of data points for the determination of daily correction values. The combination of data was desirable because all standards were not measured on every analysis day. Figures 4 and 5 plot the differences of each secondary standard, for $\delta^{13}C$ and $\delta^{18}O$ respectively, from each other on each measurement day (when both are measured). The oceanic standards are compared to GS19 and the atmospheric standards to 39382. When there is more than one comparison on a day, data are averaged to obtain one daily difference. Table F lists the results of these comparisons. The slopes of the linear fits made for these time series indicate that relative drifts in $\delta^{13}C$ were negligible. Thus the atmospheric standards were in fact stable in relation to each other, and likewise the oceanic standards to each other. Note that for the comparisons of standards 39382 and 75635 (Figures 4(b) and 5(b)), the 1992 data were omitted from consideration because they were offset in time from the body of the data, as well as slightly skewed when computing the mean offsets.

Merged Atmospheric and Oceanic Secondary Standard Data. In order to maximize the utility of the secondary standard data, we combined together all of the atmospheric standard data, and separately, all of the oceanic data. To accomplish this, the average offsets of the atmospheric standards 75635 and 75859 from 39382, as detailed in Table F, were used to merge all the atmospheric standard data together. These merged data are plotted in Figure 6. Similarly, the oceanic secondary standard data were merged together, using the average offsets of GS20 and GEA4 from GS19, also detailed in Table F. The results are plotted in Figure 7.

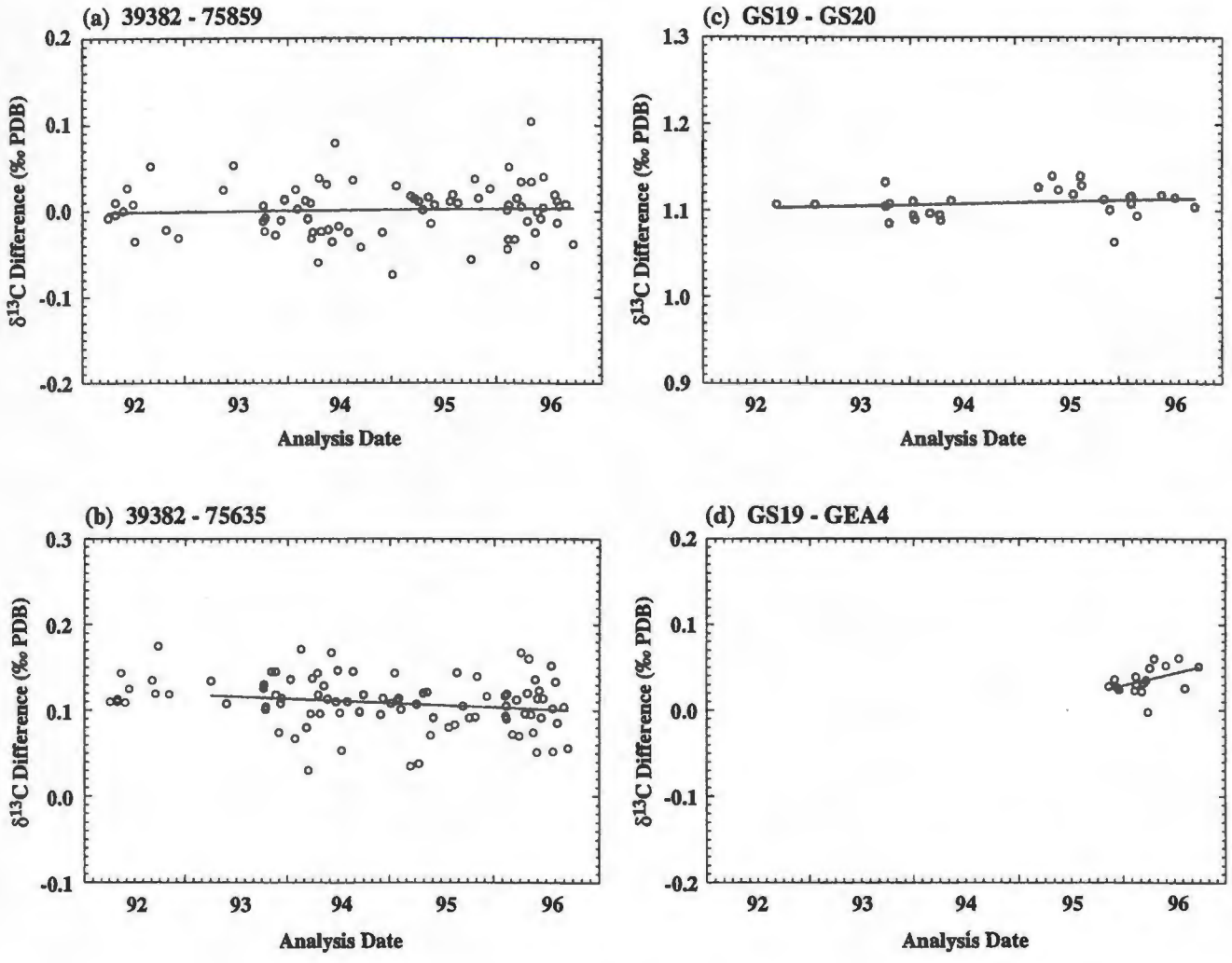

Figure 4. Secondary standard offsets for $\delta^{13}C$. Differences between NBS-corrected $\delta^{13}C$ of standards measured on the same analysis day are plotted versus the dates of analysis. The lines are linear fits to the data. (a) atmospheric standards 39382 minus 75859; (b) atmospheric standards 39382 minus 75635 (the 1992 data are not included in the fit); (c) oceanic standards GS19 minus GS20; and (d) oceanic standards GS19 minus GEA4.

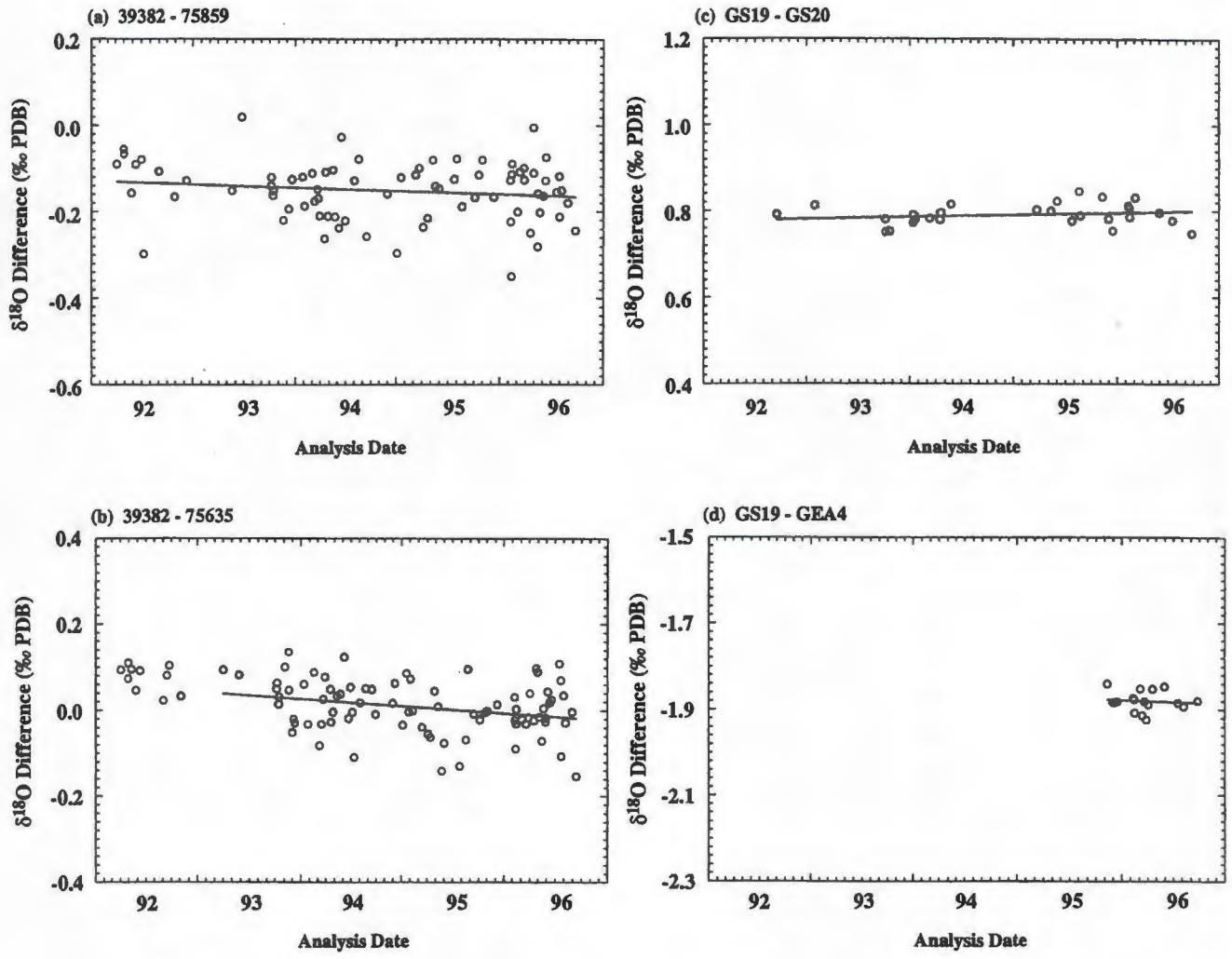

Figure 5. Secondary standard offsets for $\delta^{18}O$. Differences are plotted as in Figure 4.

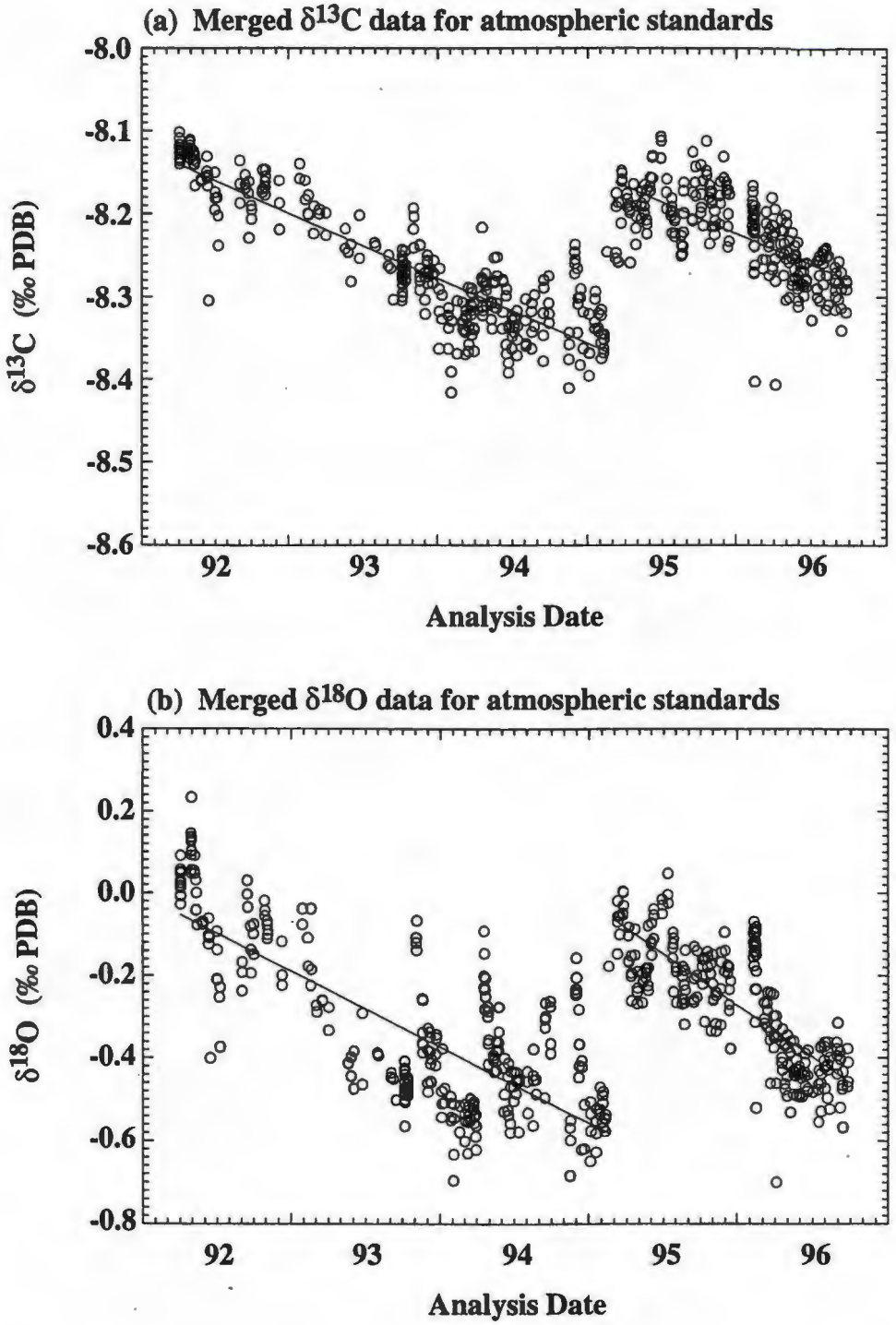

Figure 6. Merged atmospheric secondary standard data. Data for standards 75635 and 75859 have been adjusted to 39382, using the average offsets, and are plotted along with 39382 data versus the dates of analysis. (a) is a plot of the $\delta^{13}C$ data, and (b) is a plot of the $\delta^{18}O$ data for the same analyses. The lines are linear fits to the data before and after the valve change in February, 1995. Data are from Table D.

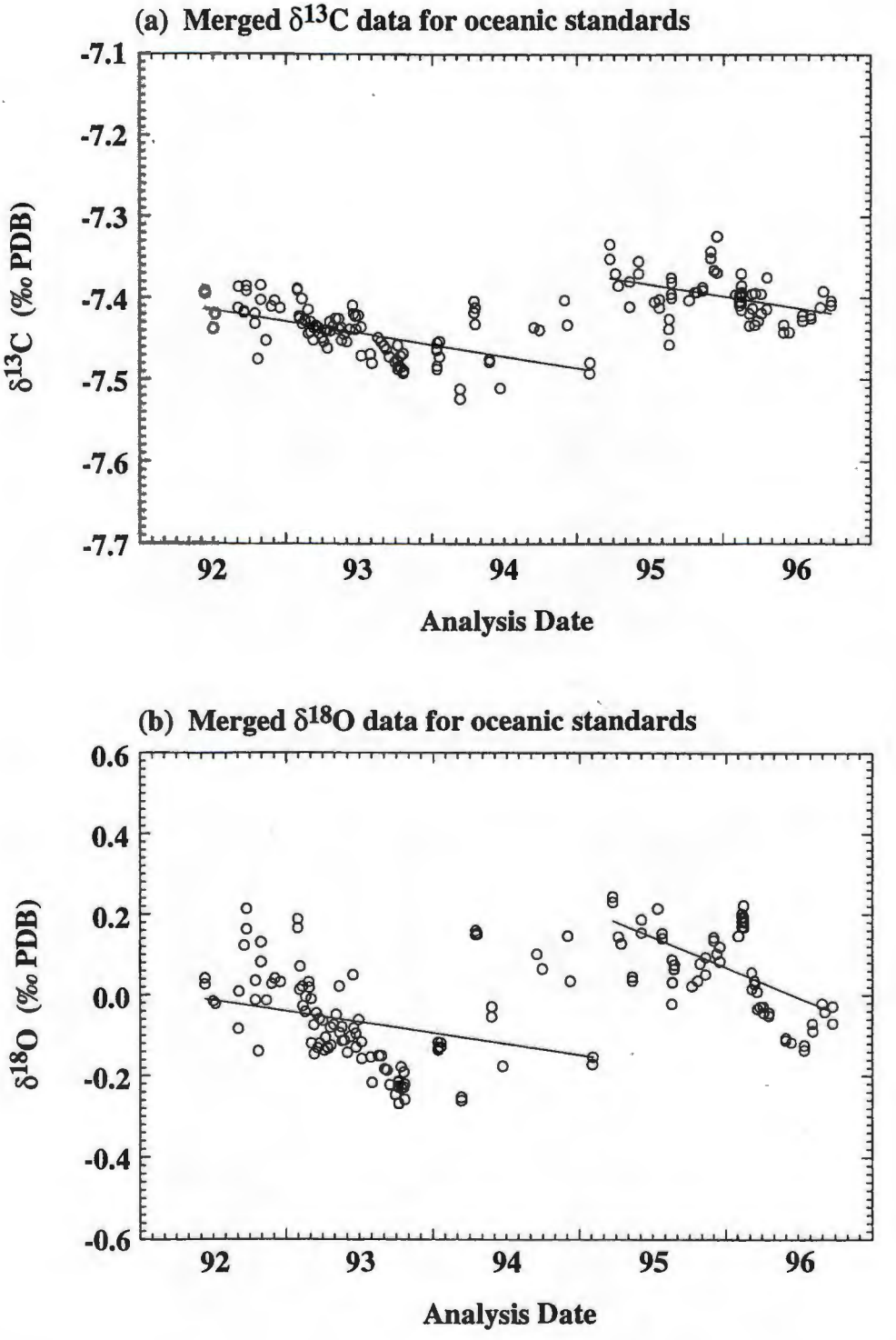

Figure 7. Merged oceanic secondary standard data. Data for standards GS20 and GEA4 have been adjusted to GS19, using the average offsets, and are plotted along with GS19 data versus the dates of analysis. (a) is a plot of the $\delta^{13}C$ data, and (b) is a plot of the $\delta^{18}O$ data for the same analyses. The lines are linear fits to the data before and after the valve change in February, 1995. Data are from Table D.

Figures 6 and 7 clearly display the difference in the rate of drift between the atmospheric secondary standards and the oceanic secondary standards. Comparison of Figures 6(a) and 7(a) show this result for $\delta^{13}C$, and of Figures 6(b) and 7(b) for $\delta^{18}O$.

Merged Secondary Standard Data Sets and Differential Drift Determination. The merged atmospheric and the merged oceanic standard data were compared to calculate the difference in their drift rates over time. The GEA4 standard was omitted from this atmospheric/oceanic drift differential analysis due to its relatively short history (1 year), but GEA4 data were used in the calculation of daily additive corrections ("terms"). The difference between the atmospheric standards (adjusted to 39382) and the oceanic standards (adjusted to GS19) was plotted versus the date of each day of analyses. The resulting drift relationships (Table G) were used to combine atmospheric and oceanic data into one complete data set. On 28 February 1995, the SC change-over valve was replaced in the VG Prism II mass spectrometer. After this replacement, all standards shifted to heavier values for both $\delta^{13}C$ and $\delta^{18}O$. The shift required the use of separate differential drift functions for the periods before and after the valve change, as plotted in Figures 8 and 9 and shown in Table G.

Linear fits of the data produced the following differential drift functions:

(Before valve change)

$$\delta^{13}C(\text{oceanic}) - \delta^{13}C(\text{atmospheric}) = 0.049068*\text{Decimal Year} - 3.797$$

$$\delta^{18}O(\text{oceanic}) - \delta^{18}O(\text{atmospheric}) = 0.102087*\text{Decimal Year} - 9.307$$

(After valve change)

$$\delta^{13}C(\text{oceanic}) - \delta^{13}C(\text{atmospheric}) = 0.051226*\text{Decimal Year} - 4.561$$

$$\delta^{18}O(\text{oceanic}) - \delta^{18}O(\text{atmospheric}) = 0.073192*\text{Decimal Year} - 6.717$$

where

$\delta^{13}C$, $\delta^{18}O$(oceanic) are secondary standards adjusted to GS19

$\delta^{13}C$, $\delta^{18}O$(atmospheric) are secondary standards adjusted to 39382

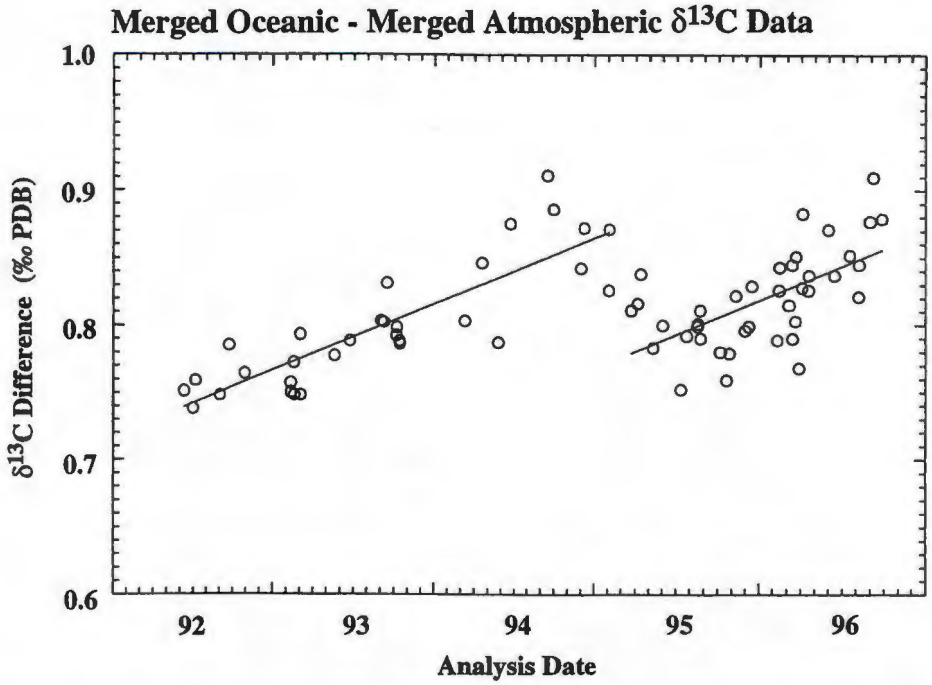

Figure 8. Differential $\delta^{13}C$ drift between oceanic and atmospheric standards. For each analysis day, the average difference in $\delta^{13}C$ between oceanic standards (all adjusted to GS19) and atmospheric standards (all adjusted to 39382) is plotted versus analysis date. The lines are linear fits to the data before and after the valve change in February, 1995.

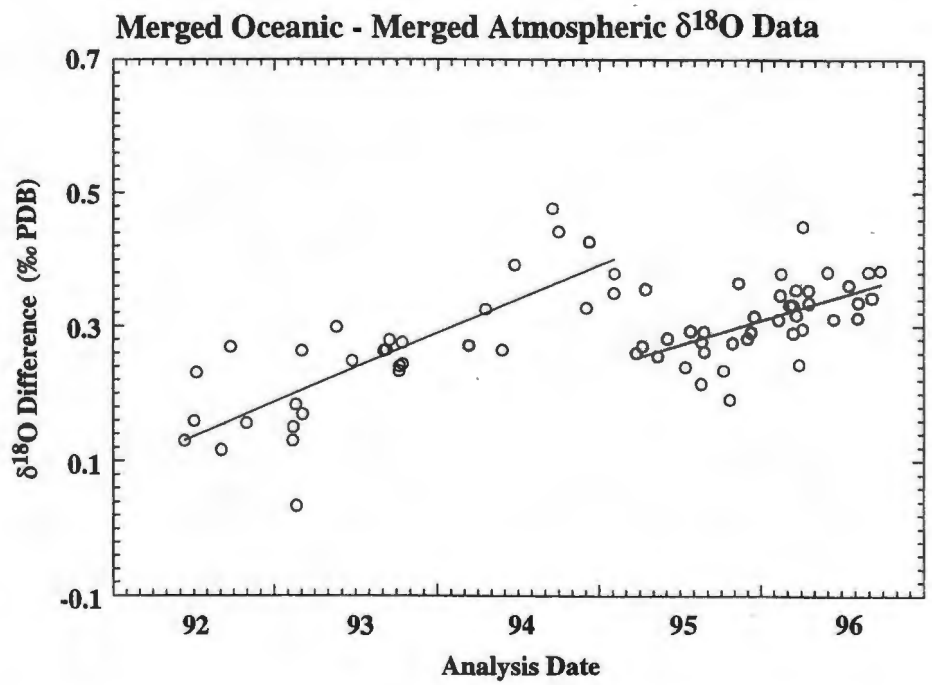

Figure 9. Differential $\delta^{18}O$ drift between oceanic and atmospheric standards. Differences in $\delta^{18}O$ are calculated and plotted as in Figure 8, for the same analyses.

Decimal Year in format YY.xxxxx (xxxxx is Julian day ÷ 365.25)

The slopes for the two periods were found to be very close, i.e. the difference in the rates of drift for $\delta^{13}C$ between atmospheric and oceanic standards remained the same before and after the valve change.

Using the offsets between like standards and the differential drift between the two sets of unlike standards, all secondary standard data were merged to produce two data sets, one with the standards adjusted to the atmospheric standard 39382 and the other adjusted to the oceanic standard GS19 (see Table D and Figures 10 and 11).

The detailed procedure for merging data is as follows: 1) To merge an atmospheric secondary standard relative to 39382 (Figure 10), the average offset from 39382 on Table F is added to the (NBS-corrected) value; 2) To merge an oceanic secondary standard relative to 39382 (Figure 10), the average offset from GS19 on Table F is added and then the differential drift equation (Table G) is applied; 3) To merge an oceanic secondary standard relative to GS19 (Figure 11), the average offset from GS19 on Table F is added; 4) To merge an atmospheric secondary standard relative to GS19 (Figure 11), the average offset from 39382 on Table F is added and then the differential drift equation (Table G) is applied.

Determination of Assigned NBS-Corrected Values for Secondary Standards. Both GS19 and GS20 were measured during the NBS calibrations made in 1994. We decided to reference the NBS assignment of all secondary standards to GS19. In order to increase the number of GS19 measurements from two to four, the two GS20 measurements were adjusted to GS19 using the average offset over the five year period (in Table F). The four measurements were then averaged to calculate the assigned value for GS19 determined by the 1994 NBS calibration. This calculation is shown in Table H. The assigned values for GS20 and GEA4 were calculated using their average offsets from GS19 for the five year period, shown in Table F and plotted in Figures 4

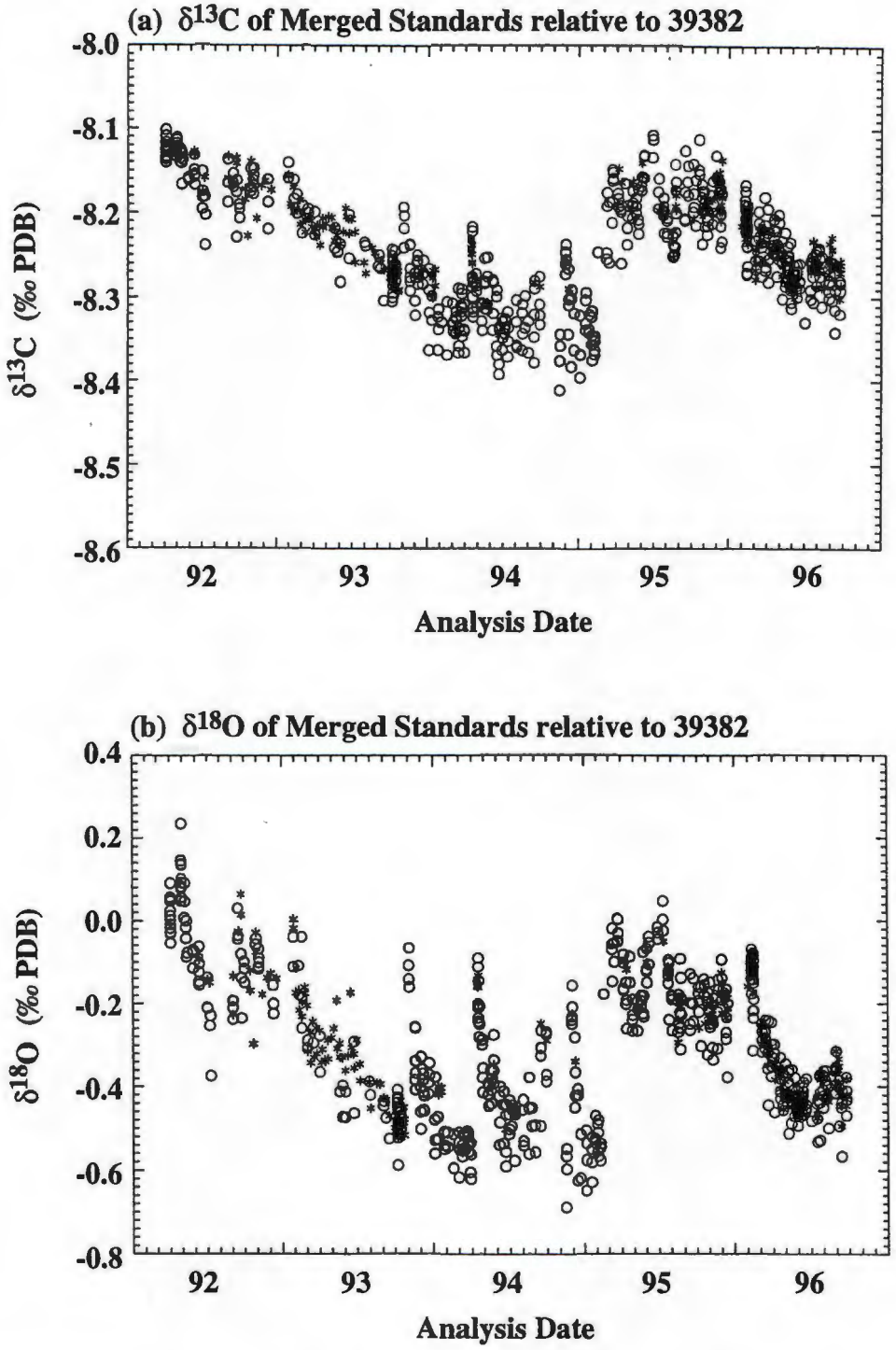

Figure 10. Merged secondary standard data relative to 39382. Data for atmospheric standards 75635 and 75859 have been adjusted to 39382 using the average offsets. Data for oceanic standards GS19, GS20, and GEA4 have been adjusted to 39382 using average offsets and the differential drift relationship between oceanic and atmospheric standards. (a) is a plot of $\delta^{13}C$ data and (b) is a plot of the $\delta^{18}O$ data for the same analyses, versus analysis date. Open circles denote atmospheric standards and asterisks, oceanic standards.

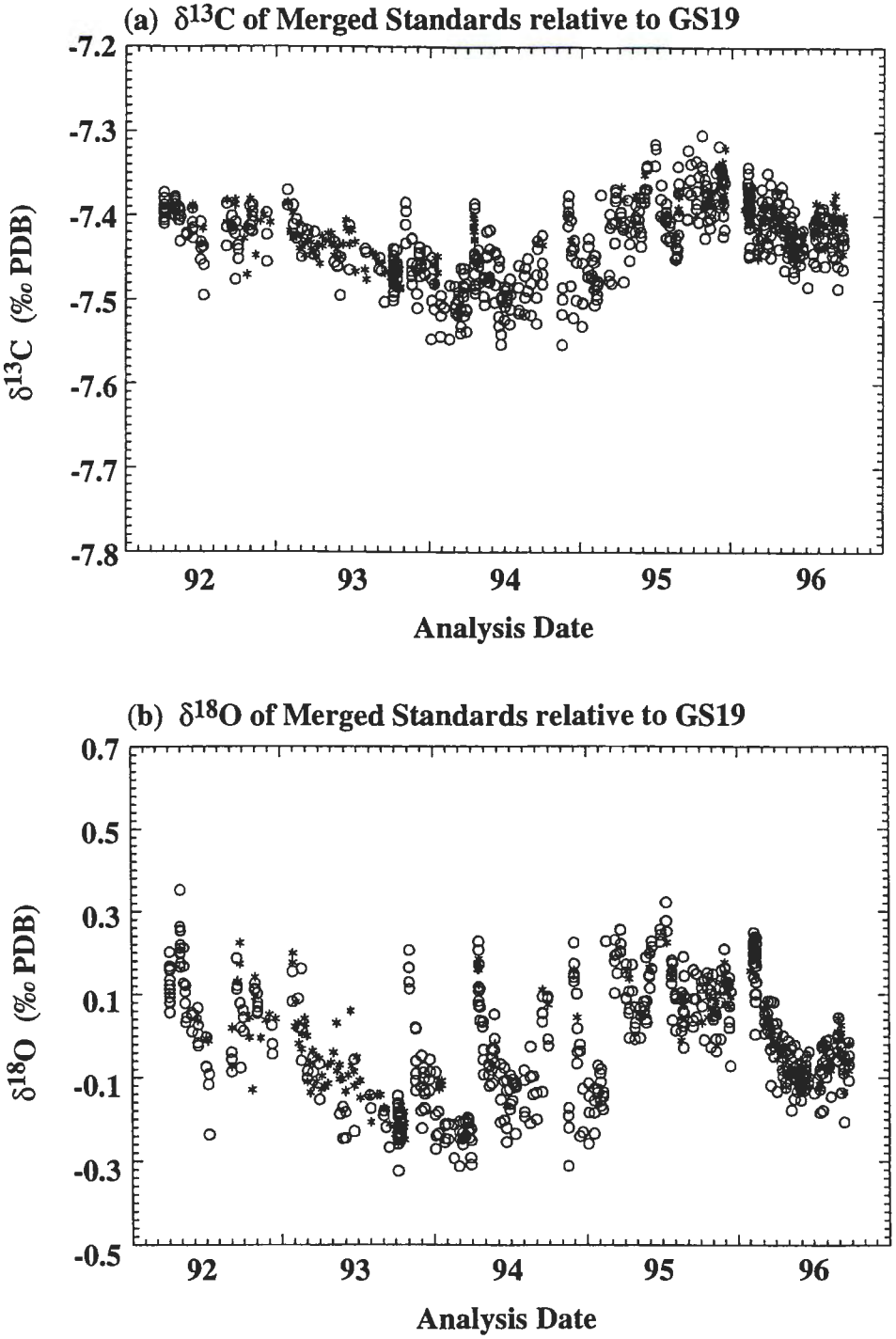

Figure 11. Merged secondary standard data relative to GS19. Data for oceanic standards GS20 and GEA4 have been adjusted to GS19 using the average offsets. Data for atmospheric standards 39382, 75635, and 75859 have been adjusted to GS19 using average offsets and the differential drift relationship between oceanic and atmospheric standards. (a) is a plot of $\delta^{13}C$ data and (b) is a plot of the $\delta^{18}O$ data for the same analyses, versus analysis date. Open circles denote atmospheric standards and asterisks, oceanic standards.

and 5. For the GEA4 assignment, GS19 and GS20 were combined to increase the number of data comparisons.

The assignment of NBS-derived values to the atmospheric secondary standards made use of the differential drift relationship between the atmospheric and oceanic secondary standards. The linear differential drift equation between all the atmospheric standard values adjusted to 39382, and the GS19 and GS20 data adjusted to GS19 (Figures 8 and 9), was evaluated on the dates of the 1994 NBS calibration to obtain the assigned value for 39382. This calculation is shown in Table I. The assigned values for standards 75635 and 75859 were then calculated from their average offsets from 39382 over the five year period, as shown in Table F. Table E summarizes the assigned values and average offsets for all of the standards. The close agreement of the "Experimental" values on the right side of Table E with the assigned values on the left side confirms that the offsets and differential drift used to assign the $\delta^{13}C$ and $\delta^{18}O$ of the secondary standards are consistent. The assignments are determined from far fewer data than in the entire "Experimental" data sets (see Table F).

The assigned values for NBS standards are as listed in Coplen et al. [1983].

Determination of Daily Corrections for Atmospheric and Oceanic Data. Daily correction terms were calculated based on the average difference of all secondary standards run on any given day from their assigned 1994 NBS calibration values. The six standards were adjusted to atmospheric standard 39382 in order to calculate atmospheric correction terms, and to GS19 in order to calculate oceanic correction terms. These merged data sets are plotted versus time in Figures 10 and 11. The circles represent air standards and the asterisks, oceanic standards. The terms in each data set are defined as the differences between the measured values (NBS-corrected and adjusted (merged)) and the respective assigned values, 39382 for atmospheric and GS19 for oceanic measurements. For each standard measurement, the adjustment and calculated correction term are listed in Table D.

Daily averages of all correction terms in these tables were calculated to create a look-up table including every analysis date along with the corresponding $\delta^{13}C$ and $\delta^{18}O$ term for that day (Table J, with both atmospheric and oceanic correction terms). These daily terms were then added to the NBS-corrected value of a sample measured on any given day to determine its final value. Atmospheric samples finally must be corrected for N_2O (see page 31). The N_2O correction for $\delta^{13}C$ is approximately +0.2‰, and the $\delta^{18}O$ correction is approximately +0.3‰ for natural air.

Samples were routinely analyzed on a weekly basis, as the reference cell was freshly filled with reference standard MW1 each week. Samples were usually analyzed on two consecutive days each week. Table D lists the merged standard data. A week number has been assigned to each standard in order to group the data according to reference gas fills. For example, Week No. 1 corresponds to 3 April 1992 and Week No. 161 corresponds to 24, 25 September 1996. During three weekly periods, Nos. 3, 7, and 14, no standards were run. For those weeks, the average weekly terms for the previous and following weeks were averaged to fill in the missing terms. During some weekly periods with standard runs, there were 20 analysis dates on which no standards were run. If standards were run on days adjacent to the missing dates (i.e. within the same week) then the average weekly term was used to fill in for the missing terms (Table J).

Finally, after an inspection of the entire secondary standard record, as well as station data, a total of fourteen standard measurements were declared to be outliers and were flagged. Details are given in Table K. These outliers were found in the $\delta^{13}C$ record. The $\delta^{18}O$ record was not inspected separately for outliers, although the $\delta^{18}O$ values for the flagged $\delta^{13}C$ measurements were also flagged. Neither $\delta^{13}C$ nor $\delta^{18}O$ from flagged data were used in the calculation of daily correction terms.

The above methodology gives a correction term for each analysis day. We considered calculating a weekly term instead, averaging all the daily terms within a week. Inspection of the correction term plots, both daily and weekly, showed that the daily term method did a better job of characterizing the behavior of the VG Prism II mass spectrometer.

Figures 12 and 13 are plots of the final daily and weekly correction terms for atmospheric data ("Air terms") and for oceanic data ("Sea terms"). Figures 14 and 15 show the daily-corrected data for each of the six standards. It is clear that the correction scheme has removed the drift feature from the data.

Long-Term Stability of Atmospheric Standards

The atmospheric secondary standards, consisting of natural-air gases stored in high pressure cylinders, have been in use since March, 1991. During this period of use, samples of CO_2 gas extracted from the standards have been archived in order to check for stability at later times. These archived samples are listed in the summary of standard gas fills in Table C. If a number of these archived samples from the same standard are analyzed on the same day on the mass spectrometer, the results afford an estimate of the "real" stability of the standard, since all applied corrections are the same for an individual day of analysis. Such stability check experiments have been performed several times. The most definitive experiment was the most recent one, performed in July, 1997. The $\delta^{13}C$ and $\delta^{18}O$ data are plotted in Figure 16. The dates of this experiment were well after the period of this report. We provide a summary here but the standard data will be tabulated in a second report, when more recent NBS calibrations and updated daily corrections will also be reported.

For each of the standards, ten extractions made between 1991 and 1997 were analyzed on a single day, along with a set of five extractions all made on a single day in 1997 on a new automated extraction line (39382 on 3 July 1997, 75635 on 24 June

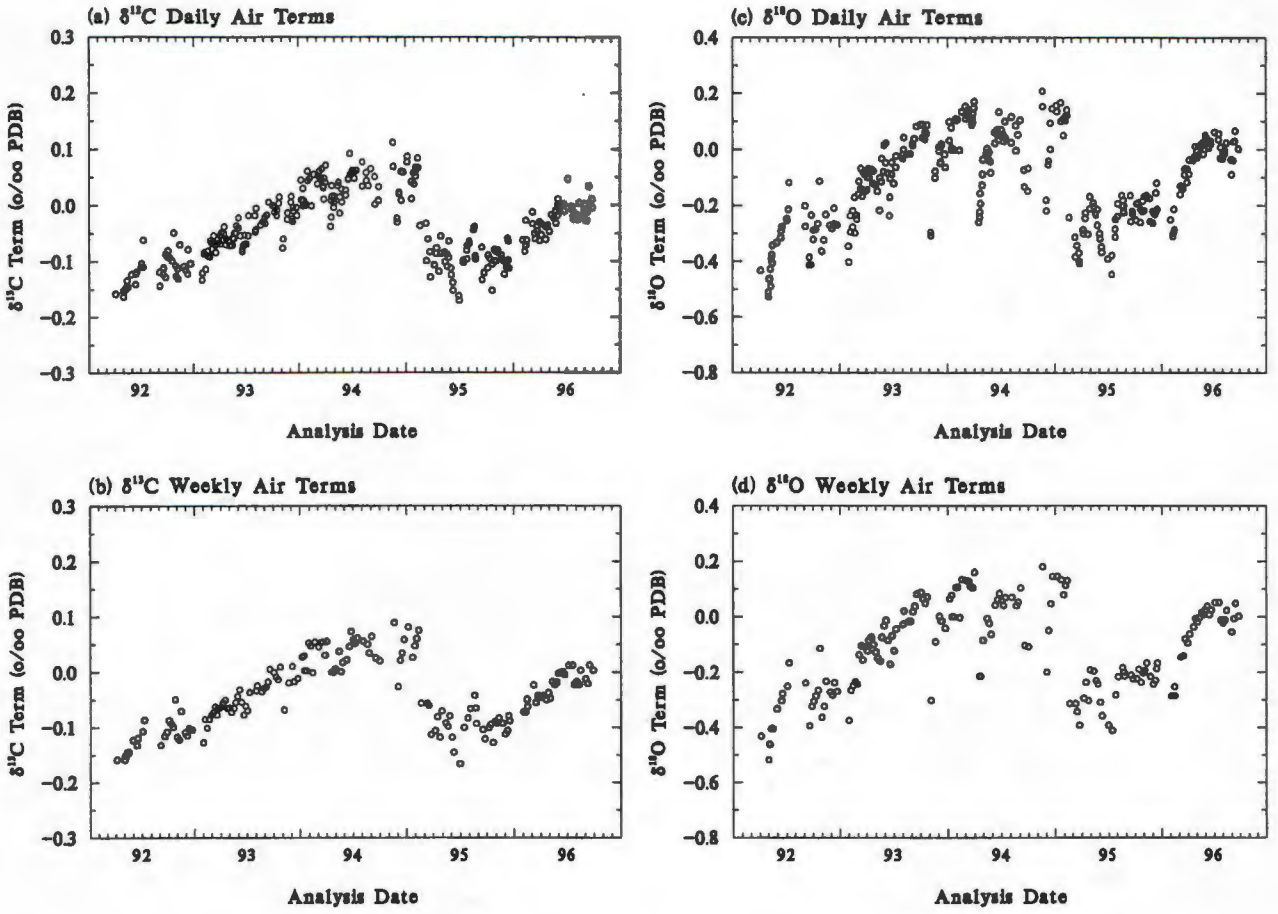

Figure 12. Air terms, daily and weekly, for $\delta^{13}C$ and $\delta^{18}O$. Air correction terms are the offsets of secondary standard measurements (merged relative to 39382) from the 1994 NBS assigned value for 39382. (a) is a plot of $\delta^{13}C$ offsets averaged daily, and (b) is a plot of $\delta^{13}C$ offsets averaged weekly. (c) is a plot of $\delta^{18}O$ offsets averaged daily, and (d) is a plot of $\delta^{18}O$ offsets averaged weekly. The daily terms are from Table J.

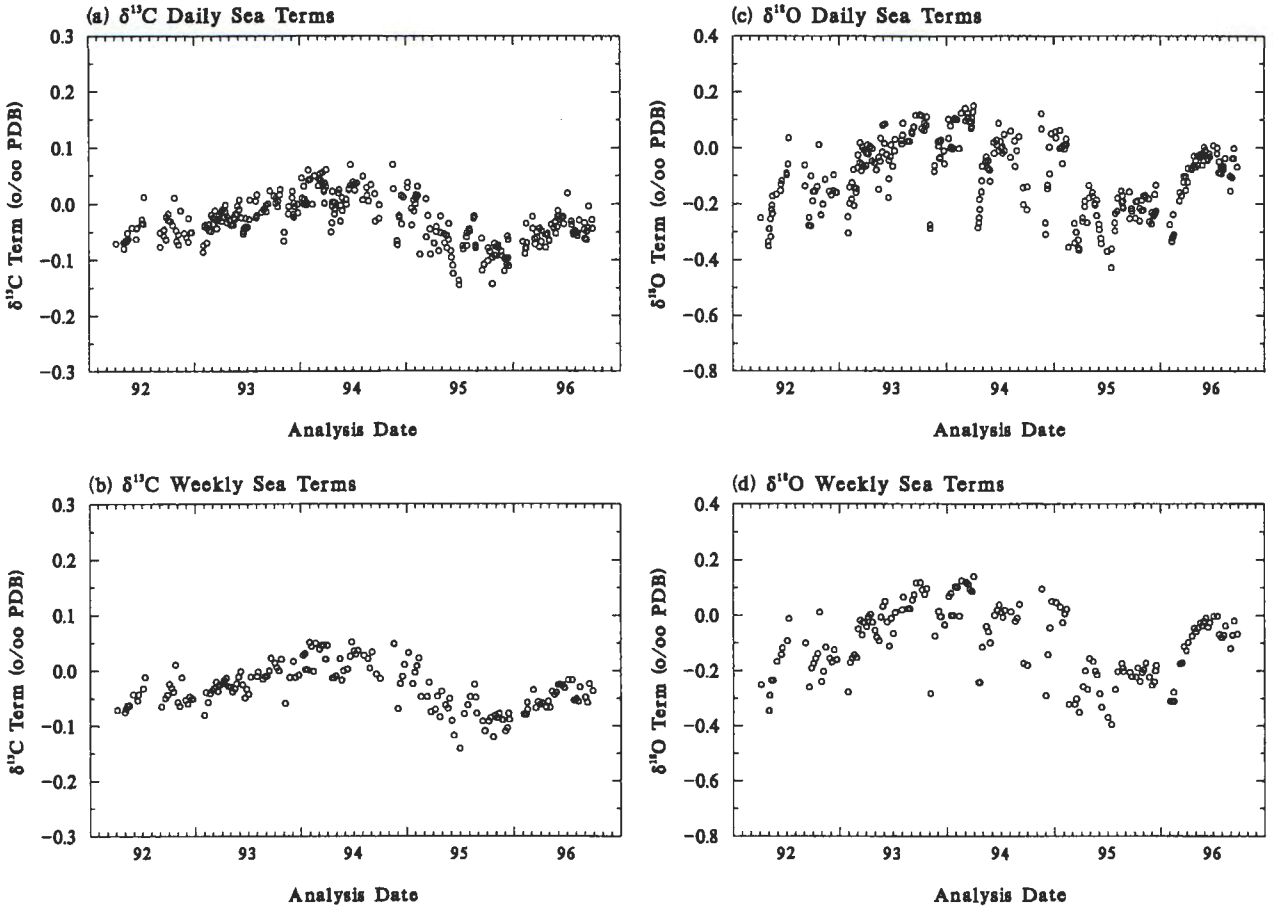

Figure 13. Sea terms, daily and weekly, for $\delta^{13}C$ and $\delta^{18}O$. Sea correction terms are the offsets of secondary standard measurements (merged relative to GS19) from the 1994 NBS assigned value for GS19. (a) is a plot of $\delta^{13}C$ offsets averaged daily, and (b) is a plot of $\delta^{13}C$ offsets averaged weekly. (c) is a plot of $\delta^{18}O$ offsets averaged daily, and (d) is a plot of $\delta^{18}O$ offsets averaged weekly. The daily terms are from Table J.

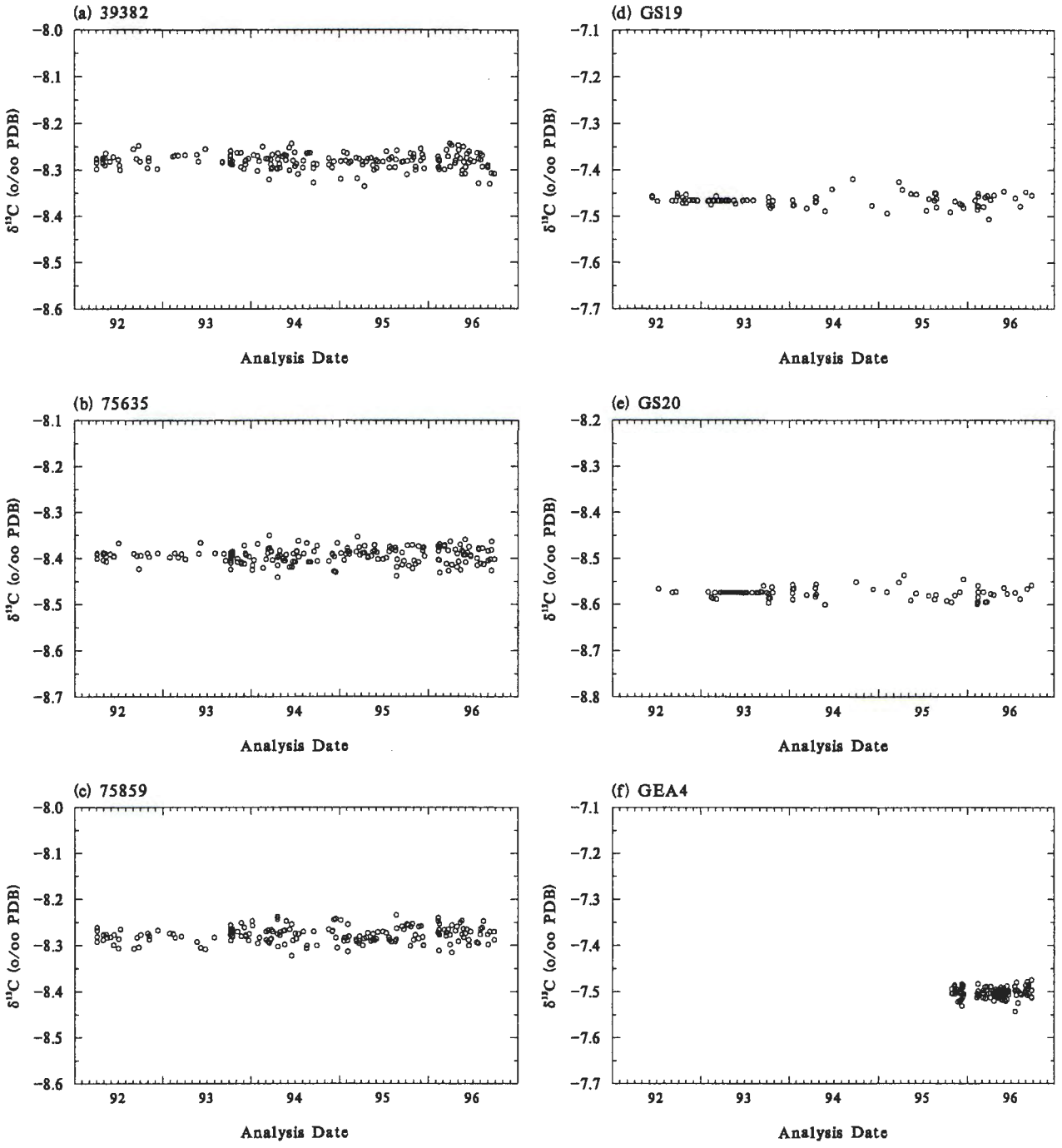

Figure 14. NBS and "Daily Corrected" $\delta^{13}C$ measurements of secondary standards. Compare with Figure 2. These plots show the same data as in Figure 2, corrected for daily machine variations with the appropriate term file. Daily air terms are applied to the data for the three atmospheric standards, and daily sea terms are applied to the data for the three oceanic standards.

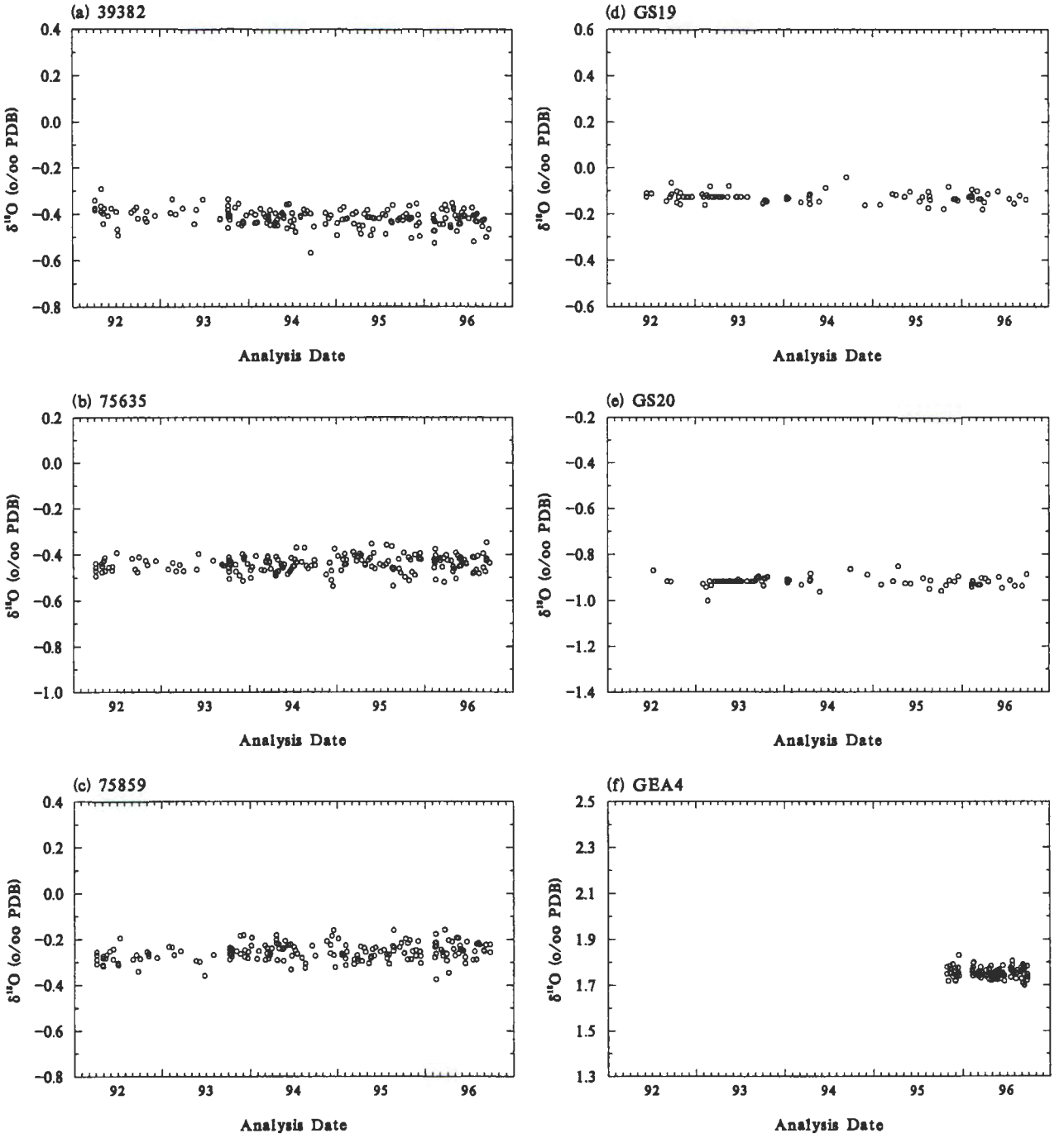

Figure 15. NBS and "Daily Corrected" $\delta^{18}O$ measurements of secondary standards. Compare with Figure 3. These plots show the same data as in Figure 3, corrected for daily machine variations with the appropriate term file. Daily air terms are applied to the data for the three atmospheric standards, and daily sea terms are applied to the data for the three oceanic standards.

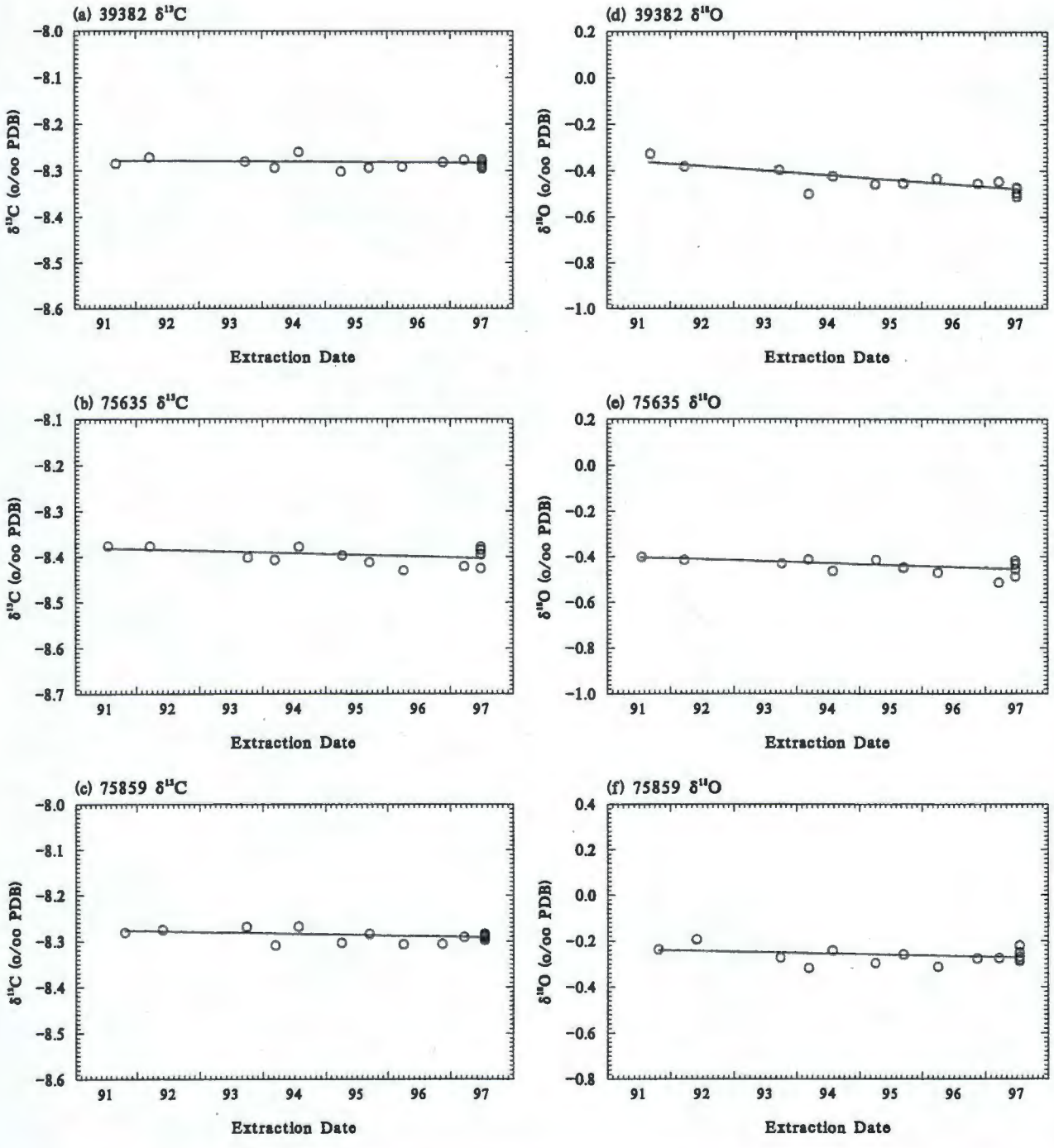

Figure 16. Stability check of the three atmospheric secondary standards. In order to check for real changes in $\delta^{13}C$ and $\delta^{18}O$, fifteen archived samples extracted from each of the steel cylinders over a period of six years were analyzed on the same day. Results are plotted here as NBS plus "daily corrected" values. (a), (b), and (c) plot $\delta^{13}C$ data versus date of extraction. (d), (e), and (f) plot $\delta^{18}O$ data versus date of extraction. The lines are linear fits to the data.

1997, and 75859 on 15 July 1997). The samples were analyzed as "unknowns." Their values were not used to determine the air terms for the analysis days and hence do not appear in the tabular summaries of this report. The extractions of standard 75635 were analyzed on 9 July 1997; of 39382, on 10 July, 1997; and of 75859, on 18 July 1997. One analysis of 75635 was rejected, that of the extraction made on 12 November 1996. The $\delta^{13}C$ of the rejected analysis was –8.466‰, and the $\delta^{18}O$, –0.532‰.

The plots in Figure 16 display excellent stability in $\delta^{13}C$ over a period of six years. The following table summarizes the averages and standard deviations of the data shown in Figure 16 and also tabulates the slopes for the straight lines fit to the data. The only apparent drift of any significance is for the $\delta^{18}O$ in 39382. Also, there does not appear to be a significant difference between samples that have been extracted on the automated extraction line and those extracted on the manual extraction line.

Stability of Atmospheric Secondary Standards (July, 1997 - Figure 16)

		Manual Extraction		Auto Extraction		Slope (‰/year) (N)
Cyl. No.		Av.	s(N)	Av.	s(N)	
39382	$\delta^{13}C$	–8.282	0.012 (10)	–8.283	0.008 (5)	–0.001 (15)
	$\delta^{18}O$	–0.423	0.049 (10)	–0.481	0.018 (5)	–0.020 (15)
75635	$\delta^{13}C$	–8.398	0.020 (9)	–8.393	0.018 (5)	–0.004 (14)
	$\delta^{18}O$	–0.436	0.037 (9)	–0.441	0.027 (5)	–0.009 (14)
75859	$\delta^{13}C$	–8.287	0.016 (10)	–8.287	0.006 (5)	–0.002 (15)
	$\delta^{18}O$	–0.264	0.038 (10)	–0.258	0.027 (5)	–0.006 (15)

CIO vs. SIO Isotopic Data

With the Wahlen isotopic data set for $\delta^{13}C$ and $\delta^{18}O$ corrected to agree with the 1994 NBS calibration, and also corrected for the daily variation of the VG Prism II mass spectrometer, the CIO and the Wahlen data sets were compared to determine the offset between the two. The determined offset was then applied to the Wahlen data set to correct it to the CIO data set.

Five sets of samples analyzed both at CIO and SIO were compared to determine the offset between the data sets. Table L is a summary of the results, and Tables M and N list the individual measurements made at CIO and SIO, respectively. Mass spectrometer results for atmospheric secondary standards and La Jolla atmospheric samples were compared to determine the offset between atmospheric $\delta^{13}C$ data sets (*before* application of N_2O corrections). Extractions of CO_2 from the atmospheric secondary standards and the La Jolla samples were performed at SIO, and flame-off tubes with the extracted CO_2 were sent to CIO. Extractions from bicarbonate titration standards, as well as a set of duplicate samples extracted from surface sea water samples collected off Southern California (the CALCOFI program), were analyzed on both mass spectrometers to investigate the offset between oceanic $\delta^{13}C$ data. CIO values for the oceanic secondary standards GS-19 and GS-20 were also compared to the values measured at SIO.

In Tables L(1) and L(2), the columns headed "s" under "Wahlen" and "CIO" list the sample standard deviation of an individual measurement in each set of data. The column headed "S" under "Wahlen-CIO" lists the (sample) standard deviation of the mean in the difference between the Wahlen and CIO data, as calculated by the following equation:

$$S^2 = (s_w / n_w^{½})^2 + (s_c / n_c^{½})^2$$

where the subscripts w and c refer to Wahlen and CIO, respectively.

The Grand Weighted Means in Tables L(1) and L(2) are weighted by the inverse variance of each set of data, $1/S^2$, according to the following equation [Bevington, 1969, pp. 72, 73]:

$$\text{Grand Weighted Mean} = \Sigma\,(\text{Diff}/S_i^2)/\Sigma\,(1/S_i^2)$$

where the i refers to each difference between the sets of data.

The standard deviations of the Grand Weighted Means are calculated by the following equation (*op cit*):

$$S^2_{GWM} = 1/\Sigma(1/S_i^2)$$

In Tables M and N, the averages carried over to Tables L(1) and L(2) are listed after each set of data. Note that averages for the secondary standards measured in the Wahlen laboratory are calculated through week number 143 (18 and 19 April 1996).

For atmospheric $\delta^{13}C$, comparison of secondary standard samples revealed that CIO data were more negative than Wahlen data by an average of 0.1175‰. The comparison of 18 sets of La Jolla atmospheric samples found CIO to be more negative than Wahlen by 0.1057‰. Wahlen atmospheric $\delta^{13}C$ data will be shifted by –0.112‰ and $\delta^{18}O$ data by –0.109‰ in order to combine CIO data with Wahlen data, as calculated by the following equations:

$$(40 * 0.1057 + 55 * 0.1175)/95 = 0.1125 \quad \text{for } \delta^{13}C$$

$$(40 * 0.1067 + 55 * 0.1101)/95 = 0.1087 \quad \text{for } \delta^{18}O$$

Forty (40) La Jolla samples and fifty-five (55) secondary standard samples analyzed at CIO were used for this comparison.

To investigate a possible offset in calibration between CIO and Wahlen for oceanic $\delta^{13}C$, we have compared samples that do not contain N_2O. Only one set of samples extracted from real sea water (comprising four duplicate extractions from CALCOFI samples) were compared. These samples have the $\delta^{13}C$ signature of surface ocean water, very close to that of NBS-19. Since both laboratories calibrated their mass spectrometers against NBS-19, we expect that any offset would be minimal at that level. Indeed, the difference found (see Table L(1)) is 0.01‰. However, SIO, as discussed earlier (see pages 2-4), applies a three-point calibration with NBS-17 and NBS-16, as well as NBS-19. This calibration (see Figure 1) adjusts measured $\delta^{13}C$'s in the range of −8‰ by approximately +0.05‰. The oceanic secondary standards GS19 and GS20 are in this range, and we do find an offset of approximately 0.05‰ (see Table L(1)). The bicarbonate titration standard batches are also in this range ($\delta^{13}C$ of −6 to −9‰), but comparison of the two data sets does not yield such clear results. An appropriate difference of approximately 0.05‰ is found for one batch (No. 15), but the other two batches (Nos. 16 and 18) show offsets of less than 0.01‰. In conclusion, while there may be a small offset in calibration between CIO and Wahlen oceanic $\delta^{13}C$, the available comparison data are not conclusive enough to support application of an offset correction between the two data sets.

N_2O Corrections for $\delta^{13}C$ and $\delta^{18}O$ of Atmospheric Samples

Approximately 0.1% of the cryogenic extraction of CO_2 from air samples is actually N_2O, which cannot be separated from the CO2 except by chemical reduction of the N_2O. The isotopic masses of the two gases are identical; consequently, portions of the 45/44 and 46/44 ratios in the mass spectrum are due to N_2O. The effect of N_2O on CO_2 isotopic measurements has been experimentally determined by measuring pure CO_2 samples of known isotopic composition doped with varying, known quantities of pure N_2O, and also by measuring CO_2 extractions from real air before and after

removal of the N_2O by passing the gas over hot copper.

Mook and Van der Hoek [1983] used doped mixtures to find the following empirical relationships for the CIO mass spectrometer:

$$\Delta(\delta^{13}C) = (343 \pm 6)*\rho*E$$

$$\Delta(\delta^{18}O) = (497 \pm 6)*\rho*E$$

where

E = mass 44 ion yield ratio from equal-inlet pressures of N_2O and CO_2, found to be 0.73

ρ = abundance ratio of N_2O to CO_2

Mook and Jongsma [1987] used the N_2O removal technique to confirm the N_2O effect on $\delta^{13}C$, but the $\delta^{18}O$ is seriously affected by the removal process. They conclude that the theoretical corrections of +0.23‰ for $\delta^{13}C$ and +0.33‰ for $\delta^{18}O$ were justified by the data, and the CIO group has generally used these values when reporting their data.

Wahlen (personal communication) has used the doping method to determine the N_2O effect and found the following relationships for his VG Prism II mass spectrometer:

$$\Delta(\delta^{13}C) = (2.24*I(44)+221)*\rho$$

$$\Delta(\delta^{18}O) = (3.46*I(44)+331)*\rho$$

where

I(44) = mass 44 beam current in nanoAmps, found to be 9.2 nA

ρ = abundance ratio of N_2O to CO_2

The abundance ratio ρ decreases with time, since the CO_2 concentration is rising faster than the N_2O concentration in the atmosphere. Illustrating this effect, the following table compares calculations using the Mook and Wahlen relationships for three different dates, with the average global N_2O concentrations from R. Weiss (personal communication) and the CO_2 from co-author T. Whorf.

Comparison of Mook and Wahlen N_2O Corrections

Date	N_2O (ppm)	CO_2	ρ (N_2O/CO_2)	$\Delta(\delta^{13}C)‰$ Mook	Wahlen	Diff	$\Delta(\delta^{18}O)‰$ Mook	Wahlen
1Jan1978	0.2998	334.7	0.0008957	0.2243	0.2164	0.0079	0.3250	0.3250
1Jan1992	0.3094	355.9	0.0008693	0.2177	0.2100	0.0076	0.3154	0.3154
1Jan1999	0.3136	367.9	0.0008524	0.2134	0.2059	0.0075	0.3093	0.3093

The table shows that on any given date, the Mook calculation of the correction for $\delta^{13}C$ is 0.008‰ larger than the Wahlen calculation. There is no difference between the corrections for $\delta^{18}O$.

We decided to use a time-dependent ρ (obtained from the above table) and the Wahlen equations to calculate the N_2O corrections for data obtained on the Wahlen VG Prism II mass spectrometer since 1992. A linear fit of the N_2O concentrations on 1 Jan 1992 and 1 Jan 1999 provides the following regression equation:

$$N_2O(ppm) = (-889.8725 + 0.60204083 * DecimalYear)/1000$$

where

Decimal Year = sampling date (in format YEAR.xxx, e.g. 1995.088 for 1 Feb 95)

This approximation was made because the N_2O is not measured routinely on most of our air samples. The N_2O concentration calculated from this relationship was combined with the measured CO_2 concentration of a sample to calculate the N_2O corrections for $\delta^{13}C$ and $\delta^{18}O$, using the Wahlen equations.

For the CIO data up to 1992, we decided to apply a constant N_2O correction. Since the results of Mook and Wahlen were so similar, we decided to use the Wahlen equations to calculate the corrections, in order to avoid introducing the 0.008‰ difference into the combined data set. Using the above relationship for N_2O and the measured CO_2, we calculated an average N_2O correction for each of the 10 atmospheric sampling sites in 1992, and then averaged the 10 N_2O corrections, finding +0.2107 ± 0.0011‰ for $\Delta(\delta^{13}C)$ and +0.3164 ± 0.0017‰ for $\Delta(\delta^{18}O)$, where the uncertainty represents one standard deviation of a site's averaged yearly correction. The range in the individual calculations of the N_2O correction in 1992 was 0.01‰, with both the smallest and largest values calculated for Point Barrow samples (caused by the large seasonal cycle in CO_2). The constant corrections for $\Delta(\delta^{13}C)$ and $\Delta(\delta^{18}O)$ were applied to the CIO data, and result in a smooth transition from the CIO data set to the Wahlen data set in 1992.

Summary of Corrections

The following steps comprise the sequence of corrections made to measurements of the stable carbon and oxygen isotopes of natural-air samples made on the VG Prism II mass spectrometer during the period of this report.

(1) Original data are δ45/44 and δ46/44 mass ratios with reference to the machine standard MW1. See page 5 of this report.

(2) The NBS calibration equations determined in January and February, 1994 are applied to the original data and then the values are converted to $\delta^{13}C$ and $\delta^{18}O$ using

the Craig corrections. See pages 2 to 5 of this report.

(3) The daily air terms for $\delta^{13}C$ and $\delta^{18}O$ determined as described in this report are added. See Table J for the daily air terms.

(4) The values are corrected to the CIO standard by adding –0.112 ‰ for $\delta^{13}C$ and –0.109‰ for $\delta^{18}O$. See pages 30 to 33 of this report.

(5) Finally, the N_2O correction is added. See pages 33 to 35 of this report.

For measurements of the stable carbon and oxygen isotopes in extractions of CO_2 gas from sea water samples, the sequence of corrections is as listed above, except that the appropriate daily sea terms are added in step (3), as listed in Table J of this report, and steps (4) and (5) are omitted.

Future Plans

On 5 November 1996, the source filament was replaced in the VG Prism II mass spectrometer. This may have changed the sensitivity and calibration of the instrument. In January, 1997, the three NBS standards were again analyzed, this time on a number of days along with all of the secondary standards. This new calibration will be the basis for measurements made after September, 1996, and will be presented in a subsequent report.

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TABLE A(1): Data for 1994 Calibration of VG Prism II Mass Spectrometer with NBS 16, NBS 17, and NBS 19.

Standard No.	National Institute of Science and Technology Stable Carbon Isotopic Standard No., NBS 19, NBS 17, or NBS 16.
Batch No.	For NBS 19, the chronological number of the preparation batch of CO2 gas from the standard carbonate, performed in the Wahlen laboratory.
NBS Assignments	Assigned values of the standards, for d13C and d18O (Craig-corrected reduced isotopic ratio) and d45/44 and d46/44 (non-Craig-corrected reduced isotopic ratio).
Date of Analysis	Date of measurement on the VG Prism II mass spectrometer.
SIO Measured Values	Measured values of the standards, for d13C and d18O (Craig-corrected reduced isotopic ratio) and d45/44 and d46/44 (non-Craig-corrected reduced isotopic ratio), with reference to the assigned value of the machine standard MW1.

TABLE A(1): Data for 1994 Calibration of VG Prism II Mass Spectrometer with NBS 16, NBS 17, and NBS 19

Standard No.	Batch No.	NBS Assignments d13C	NBS Assignments d18O	NBS Assignments d45/44	NBS Assignments d46/44	Date of Analysis	SIO Measured Values d13C	SIO Measured Values d18O	SIO Measured Values d45/44	SIO Measured Values d46/44
NBS 19	3	1.912	-2.239	1.720	-2.233	940112	+1.875	-2.422	1.680	-2.416
NBS 19	3					940112	+1.890	-2.413	1.694	-2.407
NBS 19	3					940112	+1.878	-2.396	1.683	-2.390
NBS 19	3					940112	+1.875	-2.383	1.681	-2.377
NBS 19	2					940112	+1.886	-2.418	1.690	-2.412
NBS 19	2					940112	+1.885	-2.431	1.689	-2.425
NBS 19	2					940112	+1.870	-2.426	1.675	-2.420
NBS 19	3					940119	+1.880	-2.448	1.683	-2.442
NBS 19	3					940119	+1.875	-2.465	1.678	-2.459
NBS 19	3					940119	+1.875	-2.464	1.678	-2.458
NBS 19	2					940119	+1.887	-2.466	1.689	-2.460
NBS 19	2					940119	+1.891	-2.433	1.694	-2.427
NBS 19	2					940119	+1.892	-2.471	1.694	-2.465
NBS 19	3					940120	+1.856	-2.493	1.660	-2.487
NBS 19	3					940120	+1.859	-2.480	1.663	-2.474
NBS 19	2					940120	+1.870	-2.492	1.673	-2.486
NBS 19	2					940120	+1.878	-2.480	1.681	-2.474
NBS 19	2					940120	+1.887	-2.457	1.690	-2.451
NBS 19	5					940209	+1.873	-2.488	1.676	-2.482
NBS 19	5					940209	+1.872	-2.489	1.675	-2.483
NBS 19	5					940209	+1.861	-2.499	1.664	-2.493
NBS 19	6					940209	+1.846	-2.496	1.650	-2.490
NBS 19	6					940209	+1.854	-2.488	1.658	-2.482
NBS 19	3					940210	+1.858	-2.493	1.661	-2.487
NBS 19	3					940210	+1.851	-2.488	1.655	-2.482
NBS 19	3					940210	+1.857	-2.480	1.661	-2.474
Average (of 26)				1.720	-2.233				1.676	-2.454
Standard deviation									0.013	0.034
NBS 17		-4.41	-18.71	-4.723	-18.701	940120	-4.499	-18.720	-4.807	-18.711
NBS 17						940120	-4.495	-18.707	-4.803	-18.698
NBS 17						940120	-4.516	-18.748	-4.824	-18.739
NBS 17						940120	-4.513	-18.726	-4.820	-18.717
NBS 17						940120	-4.503	-18.719	-4.811	-18.710
NBS 17						940120	-4.509	-18.735	-4.817	-18.726
NBS 17						940120	-4.509	-18.720	-4.816	-18.711
Average (of 7)				-4.723	-18.701				-4.814	-18.716
Standard deviation									0.007	0.013
NBS 18		-41.48	-36.09	-39.998	-36.141	940119	-41.745	-36.145	-40.248	-36.196
NBS 18						940119	-41.747	-36.173	-40.249	-36.224
NBS 18						940119	-41.754	-36.186	-40.255	-36.217
NBS 18						940120	-41.760	-35.988	-40.255	-36.040
NBS 18						940120	-41.758	-36.002	-40.254	-36.054
NBS 18						940120	-41.771	-35.998	-40.266	-36.050
NBS 18						940210	-41.763	-36.005	-40.258	-36.057
NBS 18						940210	-41.753	-35.949	-40.247	-36.001
Average (of 8)				-39.998	-36.141				-40.254	-36.105
Standard deviation									0.007	0.091

TABLE A(2): NBS 3 Point Calibration (1994): Confirmation

Standard No.	National Institute of Science and Technology Stable Carbon Isotopic Standard No., NBS 19, NBS 17, or NBS 16.
Batch No.	For NBS 19, the chronological number of the preparation batch of CO2 gas from the standard carbonate, performed in the Wahlen laboratory.
Date of Analysis	Date of measurement on the VG Prism II mass spectrometer.
(Craig) Measured	Reduced isotopic ratios d13C and d18O, as measured and Craig-corrected.
NBS Corrected d45/44 d46/44	Application of the average correction from the calibration to each measurement of d45/44 and d46/44.
NBS Corrected d13C d18O	Craig correction applied to each measurement.
d13C term	Daily d13C correction term. See text, page 22, and Table J.
daily d13C	NBS-corrected d13C plus daily d13C correction term.
d18O term	Daily d18O correction term. See text, page 22, and Table J.
daily d18O	NBS-corrected d18O plus daily d18O correction term.

TABLE A(2): NBS 3 Point Calibration (1994): Confirmation

Standard No.	Batch No.	Date of Analysis	(Craig) ---Measured--- d13C	d18O	NBS ----Corrected---- d45/44	d46/44	NBS ----Corrected---- d13C	d18O	d13C term	daily d13C	d18O term	daily d18O
NBS 19	3	940112	+1.875	-2.422	+1.730	-2.223	+1.923	-2.229	+0.000	+1.923	+0.001	-2.228
NBS 19	3	940112	+1.890	-2.413	+1.745	-2.213	+1.937	-2.220	+0.000	+1.937	+0.001	-2.219
NBS 19	3	940112	+1.878	-2.396	+1.734	-2.196	+1.926	-2.203	+0.000	+1.926	+0.001	-2.202
NBS 19	3	940112	+1.875	-2.383	+1.731	-2.183	+1.923	-2.190	+0.000	+1.923	+0.001	-2.189
NBS 19	2	940112	+1.886	-2.418	+1.741	-2.219	+1.934	-2.225	+0.000	+1.934	+0.001	-2.224
NBS 19	2	940112	+1.885	-2.431	+1.739	-2.232	+1.933	-2.238	+0.000	+1.933	+0.001	-2.237
NBS 19	2	940112	+1.870	-2.426	+1.725	-2.227	+1.918	-2.233	+0.000	+1.918	+0.001	-2.232
NBS 19	3	940119	+1.880	-2.448	+1.734	-2.249	+1.928	-2.255	-0.001	+1.927	-0.002	-2.257
NBS 19	3	940119	+1.875	-2.465	+1.729	-2.266	+1.923	-2.272	-0.001	+1.922	-0.002	-2.274
NBS 19	3	940119	+1.875	-2.464	+1.729	-2.265	+1.923	-2.271	-0.001	+1.922	-0.002	-2.273
NBS 19	2	940119	+1.887	-2.466	+1.740	-2.267	+1.935	-2.273	-0.001	+1.934	-0.002	-2.275
NBS 19	2	940119	+1.891	-2.433	+1.745	-2.234	+1.938	-2.240	-0.001	+1.937	-0.002	-2.242
NBS 19	2	940119	+1.892	-2.471	+1.745	-2.272	+1.940	-2.278	-0.001	+1.939	-0.002	-2.280
NBS 19	3	940120	+1.856	-2.493	+1.710	-2.294	+1.904	-2.300	+0.003	+1.907	+0.002	-2.298
NBS 19	3	940120	+1.859	-2.480	+1.714	-2.281	+1.907	-2.287	+0.003	+1.910	+0.002	-2.285
NBS 19	2	940120	+1.870	-2.492	+1.723	-2.293	+1.918	-2.299	+0.003	+1.921	+0.002	-2.297
NBS 19	2	940120	+1.878	-2.480	+1.731	-2.281	+1.926	-2.287	+0.003	+1.929	+0.002	-2.285
NBS 19	2	940120	+1.887	-2.457	+1.740	-2.258	+1.935	-2.264	+0.003	+1.938	+0.002	-2.262
NBS 19	5	940209	+1.873	-2.488	+1.726	-2.289	+1.921	-2.295	+0.000	+1.921	+0.000	-2.295
NBS 19	5	940209	+1.872	-2.489	+1.725	-2.290	+1.920	-2.296	+0.000	+1.920	+0.000	-2.296
NBS 19	5	940209	+1.861	-2.499	+1.715	-2.300	+1.909	-2.306	+0.000	+1.909	+0.000	-2.306
NBS 19	6	940209	+1.846	-2.496	+1.701	-2.297	+1.894	-2.303	+0.000	+1.894	+0.000	-2.303
NBS 19	6	940209	+1.854	-2.488	+1.709	-2.289	+1.902	-2.295	+0.000	+1.902	+0.000	-2.295
NBS 19	3	940210	+1.858	-2.493	+1.712	-2.294	+1.906	-2.300	+0.000	+1.906	+0.000	-2.300
NBS 19	3	940210	+1.851	-2.488	+1.706	-2.289	+1.899	-2.295	+0.000	+1.899	+0.000	-2.295
NBS 19	3	940210	+1.857	-2.480	+1.712	-2.281	+1.905	-2.287	+0.000	+1.905	+0.000	-2.287
										---		---
							Average (of 26)			+1.921		-2.267
NBS 17		940120	-4.499	-18.720	-4.724	-18.641	-4.413	-18.651	+0.003	-4.410	+0.002	-18.649
NBS 17		940120	-4.495	-18.707	-4.720	-18.628	-4.409	-18.637	+0.003	-4.406	+0.002	-18.635
NBS 17		940120	-4.516	-18.748	-4.741	-18.669	-4.430	-18.679	+0.003	-4.427	+0.002	-18.677
NBS 17		940120	-4.513	-18.726	-4.737	-18.647	-4.427	-18.657	+0.003	-4.424	+0.002	-18.655
NBS 17		940120	-4.503	-18.719	-4.728	-18.640	-4.417	-18.650	+0.003	-4.414	+0.002	-18.648
NBS 17		940120	-4.509	-18.735	-4.734	-18.656	-4.423	-18.666	+0.003	-4.420	+0.002	-18.664
NBS 17		940120	-4.509	-18.720	-4.733	-18.641	-4.423	-18.651	+0.003	-4.420	+0.002	-18.649
										---		---
							Average (of 7)			-4.417		-18.654
NBS 16		940119	-41.745	-36.145	-39.987	-36.259	-41.466	-36.209	-0.001	-41.467	-0.002	-36.211
NBS 16		940119	-41.747	-36.173	-39.990	-36.288	-41.468	-36.237	-0.001	-41.469	-0.002	-36.239
NBS 16		940119	-41.754	-36.166	-39.996	-36.281	-41.475	-36.230	-0.001	-41.476	-0.002	-36.232
NBS 16		940120	-41.760	-35.988	-39.996	-36.101	-41.481	-36.050	+0.003	-41.478	+0.002	-36.048
NBS 16		940120	-41.758	-36.002	-39.995	-36.116	-41.479	-36.065	+0.003	-41.476	+0.002	-36.063
NBS 16		940120	-41.771	-35.998	-40.007	-36.112	-41.492	-36.061	+0.003	-41.489	+0.002	-36.059
NBS 16		940210	-41.763	-36.005	-40.000	-36.119	-41.484	-36.068	+0.000	-41.484	+0.000	-36.068
NBS 16		940210	-41.753	-35.949	-39.988	-36.062	-41.475	-36.011	+0.000	-41.475	+0.000	-36.011
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							Average (of 8)			-41.477		-36.116

TABLE B(1) (B(2)): Summary of Atmospheric (Oceanic) Secondary Standards, 1996 NBS Calibration.

Standard No.	Designated number of atmospheric (oceanic) secondary standard.
Date of Analysis	Date of measurement on the VG Prism II mass spectrometer.
Measured d13C d18O	Measured (and Craig-corrected) reduced isotopic ratio, with reference to machine standard MW1.
NBS corrected d13 d18O	Application of 1994 NBS calibration to data.
d13C daily term d13C	Daily d13C correction term and its addition to NBS-corrected reduced isotopic ratio. See text, page 22, and Table J.
d18O daily term d18O	Daily d18O correction term and its addition to NBS-corrected reduced isotopic ratio. See text, page 22, and Table J.
N2O corrected d13C d18O	Application of N2O correction for atmospheric secondary standards (Table B(1)). See text, page 33.

TABLE B(1): Summary of Atmospheric Secondary Standards, 1996 NBS Calibration

Standard No.	Date of Analysis	--Measured--- d13C	d180	NBS --corrected-- d13C	d180	d13C term	daily d13C	d180 term	daily d180	N20 corrected d13C	d180
75635	960209	-8.401	-0.331	-8.303	-0.122	-0.072	-8.375	-0.296	-0.418	-8.169	-0.108
75635	960209	-8.409	-0.343	-8.311	-0.134	-0.072	-8.383	-0.296	-0.430	-8.177	-0.121
75635	960213	-8.401	-0.343	-8.303	-0.134	-0.070	-8.373	-0.289	-0.423	-8.167	-0.114
75635	960213	-8.404	-0.294	-8.306	-0.085	-0.070	-8.376	-0.289	-0.374	-8.170	-0.064
75635	960214	-8.405	-0.328	-8.307	-0.119	-0.061	-8.368	-0.283	-0.402	-8.162	-0.092
75635	960214	-8.467	-0.432	-8.369	-0.224	-0.061	-8.430	-0.283	-0.507	-8.224	-0.197
							---		---		
				Average (of 6)			-8.384		-0.426		
				Standard deviation			0.023		0.045		
				Assigned Value			-8.388		-0.425		
39382	960209	-8.318	-0.384	-8.221	-0.176	-0.072	-8.293	-0.296	-0.472	-8.085	-0.160
39382	960209	-8.303	-0.334	-8.206	-0.125	-0.072	-8.278	-0.296	-0.421	-8.071	-0.110
39382	960213	-8.320	-0.351	-8.223	-0.142	-0.070	-8.293	-0.289	-0.431	-8.085	-0.120
39382	960213	-8.303	-0.349	-8.206	-0.140	-0.070	-8.276	-0.289	-0.429	-8.069	-0.118
39382	960214	-8.315	-0.358	-8.218	-0.149	-0.061	-8.279	-0.283	-0.432	-8.071	-0.121
39382	960214	-8.316	-0.397	-8.219	-0.189	-0.061	-8.280	-0.283	-0.472	-8.072	-0.161
							---		---		
				Average (of 6)			-8.283		-0.443		
				Standard deviation			0.008		0.023		
				Assigned Value			-8.281		-0.418		
75859	960209	-8.271	-0.127	-8.174	+0.083	-0.072	-8.246	-0.296	-0.213	-8.039	+0.099
75859	960209	-8.264	-0.145	-8.167	+0.065	-0.072	-8.239	-0.296	-0.231	-8.032	+0.080
75859	960213	-8.337	-0.292	-8.240	-0.083	-0.070	-8.310	-0.289	-0.372	-8.102	-0.061
75859	960213	-8.300	-0.182	-8.203	+0.028	-0.070	-8.273	-0.289	-0.261	-8.066	+0.050
75859	960214	-8.288	-0.140	-8.191	+0.070	-0.061	-8.252	-0.283	-0.213	-8.045	+0.098
75859	960214	-8.312	-0.153	-8.215	+0.057	-0.061	-8.276	-0.283	-0.226	-8.069	+0.085
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				Average (of 6)			-8.266		-0.253		
				Standard deviation			0.026		0.061		
				Assigned Value			-8.282		-0.266		

TABLE B(2): Summary of Oceanic Secondary Standards, 1996 NBS Calibration

Standard No.	Date of Analysis	---Measured---- d13C	d180	NBS ---corrected---- d13C	d180	d13C term	daily d13C	d180 term	daily d180
GS19	960209	-7.490	-0.016	-7.397	+0.195	-0.079	-7.476	-0.345	-0.150
GS19	960209	-7.498	-0.009	-7.405	+0.202	-0.079	-7.484	-0.345	-0.143
GS19	960213	-7.493	-0.015	-7.400	+0.196	-0.078	-7.478	-0.340	-0.144
GS19	960213	-7.464	+0.012	-7.371	+0.223	-0.078	-7.449	-0.340	-0.117
GS19	960214	-7.479	-0.024	-7.386	+0.187	-0.069	-7.455	-0.334	-0.147
GS19	960214	-7.500	-0.042	-7.407	+0.169	-0.069	-7.476	-0.334	-0.165
							------		------
				Average (of 6)			-7.470		-0.119
				Standard deviation			0.014		0.015
				Assigned Value			-7.464		-0.125
GS20	960209	-8.614	-0.812	-8.515	-0.607	-0.079	-8.594	-0.345	-0.952
GS20	960209	-8.618	-0.824	-8.519	-0.619	-0.079	-8.598	-0.345	-0.964
GS20	960213	-8.604	-0.803	-8.505	-0.598	-0.078	-8.583	-0.340	-0.938
GS20	960213	-8.579	-0.803	-8.480	-0.598	-0.078	-8.558	-0.340	-0.938
GS20	960214	-8.602	-0.814	-8.503	-0.609	-0.069	-8.572	-0.334	-0.943
GS20	960214	-8.624	-0.812	-8.525	-0.607	-0.069	-8.594	-0.334	-0.941
							------		------
				Average (of 6)			-8.583		-0.921
				Standard deviation			0.018		0.010
				Assigned Value			-8.573		-0.915
GEA4	960209	-7.516	+1.857	-7.424	+2.082	-0.079	-7.503	-0.345	+1.737
GEA4	960209	-7.516	+1.839	-7.424	+2.064	-0.079	-7.503	-0.345	+1.719
GEA4	960213	-7.512	+1.887	-7.420	+2.113	-0.078	-7.498	-0.340	+1.773
GEA4	960213	-7.519	+1.833	-7.427	+2.058	-0.078	-7.505	-0.340	+1.718
GEA4	960214	-7.506	+1.884	-7.414	+2.110	-0.069	-7.483	-0.334	+1.776
GEA4	960214	-7.531	+1.838	-7.439	+2.063	-0.069	-7.508	-0.334	+1.729
							------		------
				Average (of 6)			-7.500		+1.787
				Standard deviation			0.009		0.026
				Assigned Value			-7.499		+1.756

TABLE B(3): Summary of NBS 19 Standard, 1996 NBS Calibration

Standard No.	National Institute of Science and Technology Stable Carbon Isotopic Standard No., NBS 19.
Batch No.	The chronological number of the preparation batch of CO2 gas from the standard carbonate, performed in the Wahlen laboratory.
Date of Analysis	Date of measurement on the VG Prism II mass spectrometer.
(Craig) Measured	Reduced isotopic ratios d13C and d18O, as measured and Craig-corrected.
NBS Corrected d45/44 d46/44	Application of the average correction from the 1994 NBS calibration to each measurement of d45/44 and d46/44.
NBS Corrected d13C d18O	Craig correction applied to each measurement.
d13C term	Daily d13C correction term. See text, page 22, and Table J.
daily d13C	NBS-corrected d13C plus daily d13C correction term.
d18O term	Daily d18O correction term. See text, page 22, and Table J.
daily d18O	NBS-corrected d18O plus daily d18O correction term.

TABLE B(3): Summary of NBS 19 Standard, 1996 NBS Calibration

Standard No.	Batch No.	Date of Analysis	----Measured---- d13C	d18O	NBS ---corrected---- d13C	d18O	d13C term	daily d13C	d18O term	daily d18O
NBS 19	9	960209	+1.988	-2.254	+2.035	-2.060	-0.079	+1.956	-0.320	-2.380
NBS 19	9	960209	+1.972	-2.224	+2.019	-2.029	-0.079	+1.940	-0.320	-2.349
NBS 19	9	960209	+1.962	-2.209	+2.009	-2.014	-0.079	+1.930	-0.320	-2.334
NBS 19	9	960209	+1.955	-2.243	+2.002	-2.048	-0.079	+1.923	-0.320	-2.368
NBS 19	9	960209	+1.955	-2.255	+2.002	-2.061	-0.079	+1.923	-0.320	-2.381
NBS 19	9	960209	+1.964	-2.180	+2.011	-1.985	-0.079	+1.932	-0.320	-2.305
NBS 19	9	960209	+1.928	-2.168	+1.975	-1.973	-0.079	+1.896	-0.320	-2.293
NBS 19	7	960213	+1.937	-2.129	+1.984	-1.934	-0.078	+1.906	-0.315	-2.249
NBS 19	7	960213	+1.941	-2.152	+1.988	-1.957	-0.078	+1.910	-0.315	-2.272
NBS 19	7	960213	+1.956	-2.136	+2.003	-1.941	-0.078	+1.925	-0.315	-2.256
NBS 19	9	960213	+1.969	-2.343	+2.016	-2.149	-0.078	+1.938	-0.315	-2.464
NBS 19	9	960213	+1.981	-2.221	+2.028	-2.026	-0.078	+1.950	-0.315	-2.341
NBS 19	9	960213	+1.960	-2.222	+2.007	-2.027	-0.078	+1.929	-0.315	-2.342
NBS 19	7	960213	+1.950	-2.150	+1.997	-1.955	-0.078	+1.919	-0.315	-2.270
NBS 19	7	960213	+1.948	-2.147	+1.995	-1.952	-0.078	+1.917	-0.315	-2.267
NBS 19	9	960214	+1.942	-2.193	+1.989	-1.998	-0.069	+1.920	-0.308	-2.306
NBS 19	9	960214	+1.971	-2.216	+2.018	-2.021	-0.069	+1.949	-0.308	-2.329
NBS 19	9	960214	+1.969	-2.206	+2.016	-2.011	-0.069	+1.947	-0.308	-2.319
NBS 19	7	960214	+1.933	-2.159	+1.980	-1.964	-0.069	+1.911	-0.308	-2.272
NBS 19	7	960214	+1.908	-2.155	+1.955	-1.960	-0.069	+1.886	-0.308	-2.268
NBS 19	7	960214	+1.919	-2.138	+1.966	-1.943	-0.069	+1.897	-0.308	-2.251
NBS 19	9	960214	+1.969	-2.293	+2.016	-2.099	-0.069	+1.947	-0.308	-2.407
NBS 19	9	960214	+1.951	-2.262	+1.998	-2.068	-0.069	+1.929	-0.308	-2.376
NBS 19	9	960214	+1.947	-2.240	+1.994	-2.045	-0.069	+1.925	-0.308	-2.353
					Average of 24			+1.925		-2.323
					Standard deviation			0.018		0.056
					Assigned Value			+1.912		-2.239

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Number assigned to extracted sample. There is a separate consecutively-numbered series for each year.
Shpt. No.	"Shipment No." A consecutive number assigned to sets of samples (standards and natural atmospheric and oceanic) analyzed on the mass spectrometer each week. ARC refers to samples archived for later stability tests.
Fill No.	Each fill consists of sets of six extractions from each atmospheric natural-air secondary standard (stored as whole air in high-pressure cylinders).
Tube No.	Extraction order for each standard of each fill (numbered 1 to 6).
Cylinder No.	Designated (cylinder) number of atmospheric secondary standard.
Extraction Date	Date of extraction of sample from standard.
Measured d13C d18O	Craig-corrected (but not NBS- or daily-corrected) reduced isotopic ratios of measurement. One extraction from each fill of each cylinder is archived.
Date of Analysis	Date of measurement of sample on mass spectrometer.

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K91-258	W01	1	1	75635	24MAY91	-8.328	-0.247	03APR92
K91-259	288	1	2	75635	24MAY91	-8.48	-0.78	20JUN91
K91-260	ARC	1	3	75635	24MAY91	.	.	
K91-261	292	1	4	75635	24MAY91	-8.52	-0.79	23AUG91
K91-262	291	1	5	75635	24MAY91	-8.51	-0.77	23AUG91
K91-263	287	1	6	75635	24MAY91	-8.54	-0.77	26JUN91
K91-270	W01	1	1	39382	17MAY91	-8.223	-0.159	03APR92
K91-271	286	1	2	39382	17MAY91	-8.38	-0.72	20JUN91
K91-272	ARC	1	3	39382	17MAY91	.	.	
K91-273	287	1	4	39382	17MAY91	-8.40	-0.73	26JUN91
K91-274	288	1	5	39382	17MAY91	-8.37	-0.71	26JUN91
K91-275	289	1	6	39382	17MAY91	-8.39	-0.69	26JUN91
K91-264	286	1	1	75859	20MAY91	-8.36	-0.58	20JUN91
K91-265	ARC	1	2	75859	20MAY91	.	.	
K91-266	289	1	3	75859	20MAY91	-8.35	-0.63	26JUN91
K91-267	288	1	4	75859	20MAY91	-8.45	-0.65	26JUN91
K91-268	W01	1	5	75859	20MAY91	-8.231	-0.087	03APR92
K91-269	287	1	6	75859	20MAY91	-8.36	-0.61	26JUN91
K91-296	289	2	1	75635	07JUN91	-8.54	-0.90	26JUN91
K91-297	W02	2	2	75635	07JUN91	-8.332	-0.138	29APR92
K91-298	288	2	3	75635	07JUN91	-8.46	-0.77	26JUN91
K91-299	W56	2	4	75635	07JUN91	-8.484	-0.661	06OCT93
K91-300	W01	2	5	75635	07JUN91	-8.340	-0.270	03APR92
K91-301	291	2	6	75635	07JUN91	-8.44	-0.72	23AUG91
K91-302	W01	2	1	39382	14JUN91	-8.214	-0.153	03APR92
K91-303	W56	2	2	39382	14JUN91	-8.370	-0.632	06OCT93
K91-304	291	2	3	39382	14JUN91	-8.38	-0.72	23AUG91
K91-305	292	2	4	39382	14JUN91	-8.38	-0.69	23AUG91
K91-306	294	2	5	39382	14JUN91	-2.77	10.39	12SEP91
K91-307	W02	2	6	39382	14JUN91	-8.222	-0.066	29APR92
K91-351	W01	2	1	75859	12JUL91	-8.220	-0.035	03APR92
K91-352	292	2	2	75859	12JUL91	-8.39	-0.52	23AUG91
K91-353	295	2	3	75859	12JUL91	-8.35	-0.46	30SEP91
K91-354	W56	2	4	75859	12JUL91	-8.357	-0.487	06OCT93
K91-355	294	2	5	75859	12JUL91	-8.38	-0.44	12SEP91
K91-356	W02	2	6	75859	12JUL91	-8.232	-0.011	29APR92

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K91-357	297	3	1	75635	15JUL91	-8.53	-0.76	02OCT91
K91-358	W02	3	2	75635	15JUL91	-8.325	-0.134	30APR92
K91-359	294	3	3	75635	15JUL91	-8.43	-0.56	12SEP91
K91-360	W01	3	4	75635	15JUL91	-8.332	-0.234	03APR92
K91-361	ARC	3	5	75635	15JUL91	.	.	
K91-362	295	3	6	75635	15JUL91	-8.49	-0.83	30SEP91
K91-418	W02	3	1	39382	05SEP91	-8.218	+0.023	30APR92
K91-419	295	3	2	39382	05SEP91	-8.38	-0.72	30SEP91
K91-420	299	3	3	39382	05SEP91	-8.38	-0.68	31OCT91
K91-421	W01	3	4	39382	05SEP91	-8.237	-0.119	03APR92
K91-422	ARC	3	5	39382	05SEP91	.	.	
K91-423	297	3	6	39382	05SEP91	-8.39	-0.70	02OCT91
K91-424	W01	3	1	75859	06SEP91	-8.207	-0.047	03APR92
K91-425	297	3	2	75859	06SEP91	-8.41	-0.65	02OCT91
K91-426	ARC	3	3	75859	06SEP91	.	.	
K91-427	W02	3	4	75859	06SEP91	-8.210	+0.041	30APR92
K91-428	299	3	5	75859	06SEP91	-8.29	-0.48	31OCT91
K91-429	302	3	6	75859	06SEP91	-8.40	-0.57	08NOV91
ICS- 1	SEN	4	1	39382	18JUL91	-8.321	-0.365	10DEC91
ICS- 2	SEN	4	2	39382	18JUL91	-8.332	-0.372	10DEC91
ICS- 3	W56	4	3	39382	18JUL91	-8.363	-0.615	06OCT93
ICS- 4	W04	4	4	39382	18JUL91	-8.237	-0.119	08MAY92
ICS- 5	SEN	4	5	39382	18JUL91	lost	.	07SEP93
ICS- 6	SEN	4	6	39382	18JUL91	-8.334	-0.415	07SEP93
ICS- 7	SEN	4	1	75859	19JUL91	-8.335	-0.310	07SEP93
ICS- 8	SEN	4	2	75859	19JUL91	lost	.	07SEP93
ICS- 9	SEN	4	3	75859	19JUL91	-8.328	-0.250	10DEC91
ICS- 10	SEN	4	4	75859	19JUL91	-8.326	-0.237	10DEC91
ICS- 11	W04	4	5	75859	19JUL91	-8.235	-0.136	14MAY92
ICS- 12	W56	4	6	75859	19JUL91	-8.342	-0.513	06OCT93
ICS- 13	SEN	4	1	75635	22JUL91	-8.457	-0.503	07SEP93
ICS- 14	SEN	4	2	75635	22JUL91	-8.464	-0.503	07SEP93
ICS- 15	W56	4	3	75635	22JUL91	-8.510	-0.723	06OCT93
ICS- 16	W04	4	4	75635	22JUL91	-8.339	-0.210	07MAY92
ICS- 17	SEN	4	5	75635	22JUL91	-8.440	-0.441	10DEC91
ICS- 18	SEN	4	6	75635	22JUL91	-8.445	-0.449	10DEC91

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K91-471	W01	5	1	75635	03OCT91	-8.331	-0.216	03APR92
K91-472	299	5	2	75635	03OCT91	-8.47	-0.78	31OCT91
K91-473	303	5	3	75635	03OCT91	-8.52	-0.58	25MAR92
K91-474	ARC	5	4	75635	03OCT91	.	.	
K91-475	302	5	5	75635	03OCT91	-8.43	-0.74	08NOV91
K91-476	W02	5	6	75635	03OCT91	-8.322	-0.160	30APR92
K91-477	302	5	1	39382	18OCT91	-8.41	-0.74	08NOV91
K91-478	W02	5	2	39382	18OCT91	-8.208	-0.074	30APR92
K91-479	303	5	3	39382	18OCT91	-8.40	-0.47	25MAR92
K91-480	ARC	5	4	39382	18OCT91	.	.	
K91-481	W01	5	5	39382	18OCT91	-8.217	-0.162	03APR92
K91-482	304	5	6	39382	18OCT91	-8.42	-0.52	01APR92
K91-483	W02	5	1	75859	29OCT91	-8.212	+0.033	30APR92
K91-484	W01	5	2	75859	29OCT91	-8.200	-0.068	03APR92
K91-485	305	5	3	75859	29OCT91	-8.36	-0.33	15APR92
K91-486	304	5	4	75859	29OCT91	-8.37	-0.34	01APR92
K91-487	303	5	5	75859	29OCT91	-8.38	-0.40	25MAR92
K91-488	ARC	5	6	75859	20OCT91	.	.	
K92- 71	306	6	1	75635	21FEB92	-8.55	-0.58	29APR92
K92- 72	W02	6	2	75635	21FEB92	-8.338	-0.160	30APR92
K92- 73	W56	6	3	75635	21FEB92	-8.478	-0.708	06OCT93
K92- 74	304	6	4	75635	21FEB92	-8.50	-0.51	01APR92
K92- 75	305	6	5	75635	21FEB92	-8.47	-0.50	15APR92
K92- 76	W04	6	6	75635	21FEB92	-8.345	-0.232	11MAY92
K91-656	W56	6	1	39382	21NOV91	-8.354	-0.633	06OCT93
K91-657	306	6	2	39382	21NOV91	-8.42	-0.44	29APR92
K91-658	307	6	3	39382	21NOV91	-8.38	-0.46	21MAY92
K91-659	W02	6	4	39382	21NOV91	-8.220	-0.076	30APR92
K91-660	305	6	5	39382	21NOV91	-8.38	-0.51	15APR92
K91-661	W04	6	6	39382	21NOV91	-8.227	-0.210	12MAY92
K92- 65	W02	6	1	75859	14FEB92	-8.211	-0.003	30APR92
K92- 66	W04	6	2	75859	14FEB92	-8.225	-0.101	11MAY92
K92- 67	307	6	3	75859	14FEB92	-8.39	-0.39	21MAY92
K92- 68	306	6	4	75859	14FEB92	-8.33	-0.29	29APR92
K92- 69	309	6	5	75859	14FEB92	-8.31	-0.23	08JUL92
K92- 70	W56	6	6	75859	14FEB92	-8.350	-0.494	06OCT93

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K92-143	W04	7	1	75635	18MAR92	-8.371	-0.304	12MAY92
K92-144	ARC	7	2	75635	18MAR92	.	.	
K92-145	310	7	3	75635	18MAR92	-8.49	-0.54	26JAN93
K92-146	W05	7	4	75635	18MAR92	-8.368	-0.331	28MAY92
K92-147	307	7	5	75635	18MAR92	-8.44	-0.43	21MAY92
K92-148	309	7	6	75635	18MAR92	-2.57 +	11.52	08JUL92
K92-149	W04	7	1	39382	19MAR92	-8.221	-0.163	08MAY92
K92-150	ARC	7	2	39382	19MAR92	.	.	
K92-151	310	7	3	39382	19MAR92	-8.28	-0.31	26JAN93
K92-152	W05	7	4	39382	19MAR92	-8.256	-0.285	28MAY92
K92-153	W06	7	5	39382	19MAR92	-8.228	-0.271	11JUN92
K92-154	309	7	6	39382	19MAR92	-8.42	-0.57	08JUL92
K92-155	311	7	1	75859	27MAY92	-8.38	-0.21	27AUG92
K92-156	W06	7	2	75859	27MAY92	-8.255	-0.182	11JUN92
K92-157	W06	7	3	75859	27MAY92	-8.252	-0.182	12JUN92
K92-158	ARC	7	4	75859	27MAY92	.	.	
K92-159	W05	7	5	75859	27MAY92	-8.256	-0.129	28MAY92
K92-160	310	7	6	75859	27MAY92	-8.35	-0.32	26JAN93
K92-269	W07	8	1	75635	01JUN92	-8.510	-0.659	15JUN92
K92-270	W56	8	2	75635	01JUN92	-8.500	-0.736	07OCT93
K92-271	W06	8	3	75635	01JUN92	-8.353	-0.382	11JUN92
K92-272	W06	8	4	75635	01JUN92	-8.371	-0.369	12JUN92
K92-273	W08	8	5	75635	01JUN92	-8.354	-0.354	01JUL92
K92-274	***	8	6	75635	01JUN92	.	.	
K92-275	W08	8	1	39382	19JUN92	-8.271	-0.347	02JUL92
K92-276	311	8	2	39382	19JUN92	-8.32	-0.47	27AUG92
K92-277	W09	8	3	39382	19JUN92	-8.277	-0.461	07JUL92
K92-278	W10	8	4	39382	19JUN92	-8.233	-0.401	02SEP92
K92-279	W09	8	5	39382	19JUN92	-8.335	-0.581	09JUL92
K92-280	W56	8	6	39382	19JUN92	-8.365	-0.707	07OCT93
K92-281	W56	8	1	75859	22JUN92	-8.384	-0.555	07OCT93
K92-282	W09	8	2	75859	22JUN92	-8.300	-0.286	09JUL92
K92-283	W08	8	3	75859	22JUN92	-8.279	-0.268	02JUL92
K92-284	W10	8	4	75859	22JUN92	-8.285	-0.295	03SEP92
K92-285	311	8	5	75859	22JUN92	-8.31	-0.28	27AUG92
K92-286	W08	8	6	75859	22JUN92	-8.293	-0.266	01JUL92

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K92-351	W18	9	1	75635	14JUL92	-8.382	-0.332	04NOV92
K92-352	W17	9	2	75635	14JUL92	-8.379	-0.274	28OCT92
K92-353	W13	9	3	75635	14JUL92	-8.411	-0.332	01OCT92
K92-354	W12	9	4	75635	14JUL92	-8.434	-0.450	24SEP92
K92-355	W11	9	5	75635	14JUL92	-8.370	-0.280	15SEP92
K92-356	W10	9	6	75635	14JUL92	-8.369	-0.424	02SEP92
K92-357	W18	9	1	39382	29JUL92	-8.258	-0.277	04NOV92
K92-358	W13	9	2	39382	29JUL92	-8.287	-0.308	30SEP92
K92-359	W18	9	3	39382	29JUL92	-8.265	-0.320	04NOV92
K92-360	W17	9	4	39382	29JUL92	-8.267	-0.265	29OCT92
K92-361	W12	9	5	39382	29JUL92	-8.258	-0.347	24SEP92
K92-362	W11	9	6	39382	29JUL92	-8.250	-0.180	15SEP92
K92-363	W11	9	1	75859	13JUL92	-8.267	-0.094	16SEP92
K92-364	W12	9	2	75859	13JUL92	-8.273	-0.139	23SEP92
K92-365	W13	9	3	75859	13JUL92	-8.293	-0.207	01OCT92
K92-366	W17	9	4	75859	13JUL92	-8.245	-0.101	29OCT92
K92-367	W18	9	5	75859	13JUL92	-8.245	-0.159	05NOV92
K92-368	W18	9	6	75859	13JUL92	-8.253	-0.149	05NOV92
K92-578	W56	10	1	75635	17NOV92	-8.491	-0.721	07OCT93
K92-579	W24	10	2	75635	17NOV92	-8.383	-0.328	29JAN93
K92-580	W27	10	3	75635	17NOV92	-8.405	-0.474	17FEB93
K92-581	W29	10	4	75635	17NOV92	-8.429	-0.520	03MAR93
K92-582	***	10	5	75635	17NOV92	.	.	
K92-583	W22	10	6	75635	17NOV92	-8.365	-0.370	09DEC92
K92-584	W26	10	1	39382	20OCT92	-8.280	-0.386	11FEB93
K92-585	W27	10	2	39382	20OCT92	-8.275	-0.248	18FEB93
K92-586	W52	10	3	39382	20OCT92	-8.348	-0.641	03SEP93
K92-587	W29	10	4	39382	20OCT92	-8.288	-0.496	04MAR93
K92-588	W22	10	5	39382	20OCT92	-8.316	-0.408	10DEC92
K92-589	W56	10	6	39382	20OCT92	-8.354	-0.632	07OCT93
K92-590	W26	10	1	75859	03NOV92	-8.258	-0.167	10FEB93
K92-591	W56	10	2	75859	03NOV92	-8.361	-0.557	07OCT93
K92-592	W24	10	3	75859	03NOV92	-8.238	-0.098	28JAN93
K92-593	W22	10	4	75859	03NOV92	-8.285	-0.281	10DEC92
K92-594	W27	10	5	75859	03NOV92	-8.299	-0.243	19FEB93
K92-595	***	10	6	75859	03NOV92	.	.	

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K93-103	W42	11	1	75635	01MAR93	-8.442	-0.626	03JUN93
K93-104	W33	11	2	75635	01MAR93	-8.431	-0.579	02APR93
K93-105	W41	11	3	75635	01MAR93	-8.452	-0.686	27MAY93
K93-106	W31	11	4	75635	01MAR93	-8.405	-0.509	17MAR93
K93-107	ARC	11	5	75635	01MAR93	.	.	
K93-108	W49	11	6	75635	01MAR93	-8.444	-0.633	02AUG93
K93-109	W41	11	1	39382	02MAR93	-8.344	-0.605	27MAY93
K93-110	ARC	11	2	39382	02MAR93	.	.	
K93-111	W40	11	3	39382	02MAR93	-8.315	-0.619	20MAY93
K93-112	W45	11	4	39382	02MAR93	-8.299	-0.499	24JUN93
K93-113	W52	11	5	39382	02MAR93	-8.361	-0.652	02SEP93
K93-114	W33	11	6	39382	02MAR93	-8.296	-0.486	02APR93
K93-115	ARC	11	1	75859	16MAR93	.	.	
K93-116	W45	11	2	75859	16MAR93	-8.353	-0.519	24JUN93
K93-117	W31	11	3	75859	16MAR93	-8.293	-0.317	17MAR93
K93-118	W40	11	4	75859	16MAR93	-8.340	-0.469	20MAY93
K93-119	W42	11	5	75859	16MAR93	-8.381	-0.529	03JUN93
K93-120	W48	11	6	75859	16MAR93	-8.333	-0.444	31JUL93
K93-336	W53	12	1	75635	29JUN93	-8.471	-0.688	08SEP93
K93-337	W56	12	2	75635	29JUN93	-8.505	-0.800	07OCT93
K93-338	W56	12	3	75635	29JUN93	-8.482	-0.719	07OCT93
K93-339	W54	12	4	75635	29JUN93	-8.509	-0.738	15SEP93
K93-340	W60	12	5	75635	29JUN93	-8.497	-0.621	19NOV93
K93-341	W60	12	6	75635	29JUN93	-8.481	-0.598	18NOV93

(NOTE: only one cylinder was extracted during this fill)

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K93-584	W59	13	1	75635	06OCT93	-8.446	-0.375	04NOV93
K93-585	W59	13	2	75635	06OCT93	-8.423	-0.358	03NOV93
K93-586	W56	13	3	75635	06OCT93	-8.491	-0.725	07OCT93
K93-587	W57	13	4	75635	06OCT93	-8.469	-0.682	13OCT93
K93-588	W61	13	5	75635	06OCT93	-8.476	-0.615	01DEC93
K93-589	ARC	13	6	75635	06OCT93	.	.	
K93-342	***	13	1	39382	23SEP93	.	.	
K93-343	W60	13	2	39382	23SEP93	-8.335	-0.464	18NOV93
K93-344	ARC	13	3	39382	23SEP93	.	.	
K93-345	W56	13	4	39382	23SEP93	-8.372	-0.693	07OCT93
K93-346	W59	13	5	39382	23SEP93	-8.300	-0.275	04NOV93
K93-347	W56	13	6	39382	23SEP93	-8.373	-0.709	06OCT93
K93-348	W57	13	1	75859	27SEP93	-8.344	-0.507	13OCT93
K93-349	W60	13	2	75859	27SEP93	-8.335	-0.316	19NOV93
K93-350	W56	13	3	75859	27SEP93	-8.365	-0.562	07OCT93
K93-351	W56	13	4	75859	27SEP93	-8.363	-0.537	06OCT93
K93-352	W59	13	5	75859	27SEP93	-8.291	-0.166	03NOV93
K93-353	ARC	13	6	75859	27SEP93	.	.	
K93-590	W57	14	1	75635	08OCT93	-8.475	-0.716	14OCT93
K93-591	130	14	2	75635	08OCT93	-8.383	-0.435	20NOV95
K93-592	ARC	14	3	75635	08OCT93	.	.	
K93-593	163	14	4	75635	08OCT93	-8.434	-0.423	26NOV96
K93-594	W57	14	5	75635	08OCT93	-8.478	-0.699	14OCT93
K93-595	W57	14	6	75635	08OCT93	-8.484	-0.712	14OCT93
K93-596	W57	14	1	39382	09OCT93	-8.368	-0.668	13OCT93
K93-597	163	14	2	39382	09OCT93	-8.332	-0.430	26NOV96
K93-598	ARC	14	3	39382	09OCT93	.	.	
K93-599	131	14	4	39382	09OCT93	-8.228	-0.303	30NOV95
K93-600	W57	14	5	39382	09OCT93	-8.371	-0.675	14OCT93
K93-601	W57	14	6	39382	09OCT93	-8.379	-0.681	14OCT93
K93-602	130	14	1	75859	11OCT93	-8.259	-0.201	22NOV95
K93-603	W57	14	2	75859	11OCT93	-8.369	-0.545	14OCT93
K93-604	W57	14	3	75859	11OCT93	-8.371	-0.528	14OCT93
K93-605	142	14	4	75859	11OCT93	-8.320	-0.375	05APR96
K93-606	W57	14	5	75859	11OCT93	-8.360	-0.511	14OCT93
K93-607	163	14	6	75859	11OCT93	-8.312	-0.227	26NOV96

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K93-871	W81	15	1	75835	02NOV93	-8.527	-0.715	02DEC93
K93-872	W82	15	2	75835	02NOV93	-8.481	-0.635	10DEC93
K93-873	ARC	15	3	75835	02NOV93	.	.	
K93-874	W83	15	4	75835	02NOV93	-8.476	-0.585	22DEC93
K93-875	W82	15	5	75835	02NOV93	-8.463	-0.572	06DEC93
K93-876	W82	15	6	75835	02NOV93	-8.461	-0.583	07DEC93
K93-877	W82	15	1	39382	04NOV93	-8.367	-0.664	10DEC93
K93-878	W82	15	2	39382	04NOV93	-8.355	-0.592	06DEC93
K93-879	ARC	15	3	39382	04NOV93	.	.	
K93-880	W80	15	4	39382	04NOV93	-8.379	-0.574	19NOV93
K93-881	W82	15	5	39382	04NOV93	-8.382	-0.661	08DEC93
K93-882	W81	15	6	39382	04NOV93	-8.402	-0.666	01DEC93
K93-883	W82	15	1	75859	01NOV93	-8.349	-0.440	07DEC93
K93-884	W83	15	2	75859	01NOV93	-8.383	-0.473	20DEC93
K93-885	W81	15	3	75859	01NOV93	-8.375	-0.384	02DEC93
K93-886	W82	15	4	75859	01NOV93	-8.371	-0.469	08DEC93
K93-887	W80	15	5	75859	01NOV93	-8.365	-0.394	19NOV93
K93-888	ARC	15	6	75859	01NOV93	.	.	
K93-850	W87	16	1	75835	08DEC93	-8.529	-0.723	26JAN94
K93-851	W85	16	2	75835	08DEC93	-8.533	-0.739	11JAN94
K93-852	312	16	3	75835	08DEC93	-8.62	-0.85	08JUN94
K93-853	W84	16	4	75835	08DEC93	-8.569	-0.773	04JAN94
K93-854	ARC	16	5	75835	08DEC93	.	.	
K93-855	312	16	6	75835	08DEC93	broken	.	08JUN94
K93-856	***	16	1	39382	07DEC93	.	.	
K93-857	312	16	2	39382	07DEC93	broken	.	08JUN94
K93-858	ARC	16	3	39382	07DEC93	.	.	
K93-859	W83	16	4	39382	07DEC93	-8.370	-0.597	20DEC93
K93-860	W85	16	5	39382	07DEC93	-8.396	-0.679	11JAN94
K93-861	312	16	6	39382	07DEC93	-8.53	-0.94	08JUN94
K93-862	312	16	1	75859	12DEC93	-8.51	-0.80	08JUN94
K93-863	W84	16	2	75859	12DEC93	-8.390	-0.534	04JAN94
K93-864	W83	16	3	75859	12DEC93	-8.355	-0.399	22DEC93
K93-865	ARC	16	4	75859	12DEC93	.	.	
K93-866	W87	16	5	75859	12DEC93	-8.437	-0.596	27JAN94
K93-867	312	16	6	75859	12DEC93	broken		08JUN94

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K94- 1	ARC	17	1	75635	04JAN94	.	.	
K94- 2	W70	17	2	75635	04JAN94	-8.575	-0.807	17FEB94
K94- 3	W68	17	3	75635	04JAN94	-8.622	-0.924	02FEB94
K94- 4	W76	17	4	75635	04JAN94	-8.518	-0.458	18APR94
K94- 5	W64	17	5	75635	04JAN94	-8.523	-0.741	05JAN94
K94- 6	W76	17	6	75635	04JAN94	-8.504	-0.463	19APR94
K94- 7	W76	17	1	39382	06JAN94	-8.375	-0.409	18APR94
K94- 8	W67	17	2	39382	06JAN94	-8.412	-0.714	27JAN94
K94- 9	W71	17	3	39382	06JAN94	-8.427	-0.716	03MAR94
K94- 10	W67	17	4	39382	06JAN94	-8.461	-0.756	26JAN94
K94- 11	ARC	17	5	39382	06JAN94	.	.	
K94- 12	W68	17	6	39382	06JAN94	-8.427	-0.751	03FEB94
K94- 13	W71	17	1	75859	03JAN94	-8.439	-0.606	03MAR94
K94- 14	ARC	17	2	75859	03JAN94	.	.	
K94- 15	W68	17	3	75859	03JAN94	-8.429	-0.565	03FEB94
K94- 16	W68	17	4	75859	03JAN94	-8.490	-0.686	02FEB94
K94- 17	W64	17	5	75859	03JAN94	-8.365	-0.433	05JAN94
K94- 18	W76	17	6	75859	03JAN94	-8.314	-0.149	18APR94
K94-201	W76	18	1	75635	04FEB94	-8.528	-0.462	20APR94
K94-202	W75	18	2	75635	04FEB94	-8.544	-0.817	29MAR94
K94-203	W71	18	3	75635	04FEB94	-8.539	-0.829	02MAR94
K94-204	W96	18	4	75635	04FEB94	-8.589	-0.837	14DEC94
K94-205	ARC	18	5	75635	04FEB94	.	.	
K94-206	W72	18	6	75635	04FEB94	-8.549	-0.754	09MAR94
K94-207	ARC	18	1	39382	03FEB94	.	.	
K94-208	W76	18	2	39382	03FEB94	-8.410	-0.489	20APR94
K94-209	W75	18	3	39382	03FEB94	-8.464	-0.826	30MAR94
K94-210	W72	18	4	39382	03FEB94	-8.468	-0.835	09MAR94
K94-211	W70	18	5	39382	03FEB94	-8.403	-0.720	17FEB94
K94-212	W72	18	6	39382	03FEB94	-8.424	-0.745	11MAR94
K94-213	W96	18	1	75859	02FEB94	-8.400	-0.462	14DEC94
K94-214	W86	18	2	75859	02FEB94	-8.435	-0.510	14JUL94
K94-215	W71	18	3	75859	02FEB94	-8.406	-0.588	02MAR94
K94-216	W75	18	4	75859	02FEB94	-8.439	-0.618	30MAR94
K94-217	ARC	18	5	75859	02FEB94	.	.	
K94-218	W72	18	6	75859	02FEB94	-8.440	-0.609	10MAR94

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K94-311	W74	19	1	75635	09MAR94	-8.495	-0.733	24MAR94
K94-312	ARC	19	2	75635	09MAR94	.	.	
K94-313	W74	19	3	75635	09MAR94	-8.516	-0.753	23MAR94
K94-314	W72	19	4	75635	09MAR94	-8.529	-0.780	10MAR94
K94-315	W73	19	5	75635	09MAR94	-8.542	-0.727	17MAR94
K94-316	W73	19	6	75635	09MAR94	-8.494	-0.725	16MAR94
K94-317	W75	19	1	39382	11MAR94	-8.406	-0.741	29MAR94
K94-318	W74	19	2	39382	11MAR94	-8.407	-0.713	22MAR94
K94-319	W74	19	3	39382	11MAR94	-8.444	-0.761	25MAR94
K94-320	ARC	19	4	39382	11MAR94	.	.	
K94-321	W73	19	5	39382	11MAR94	-8.464	-0.757	16MAR94
K94-322	W74	19	6	39382	11MAR94	-8.420	-0.727	23MAR94
K94-323	W74	19	1	75859	10MAR94	-8.394	-0.567	24MAR94
K94-324	W74	19	2	75859	10MAR94	-8.412	-0.594	25MAR94
K94-325	W74	19	3	75859	10MAR94	-8.416	-0.566	22MAR94
K94-326	W72	19	4	75859	10MAR94	-8.415	-0.570	11MAR94
K94-327	W73	19	5	75859	10MAR94	-8.457	-0.601	17MAR94
K94-328	ARC	19	6	75859	10MAR94	.	.	

K94-369	W77	20	1	75635	12APR94	-8.497	-0.592	28APR94
K94-370	W85	20	2	75635	13APR94	-8.544	-0.709	06JUL94
K94-371	W85	20	3	75635	12APR94	-8.531	-0.658	07JUL94
K94-372	ARC	20	4	75635	12APR94	.	.	
K94-373	W77	20	5	75635	12APR94	-8.477	-0.502	27APR94
K94-374	W86	20	6	75635	12APR94	-8.522	-0.675	13JUL94
K94-375	W77	20	1	39382	05APR94	-8.409	-0.621	29APR94
K94-376	W85	20	2	39382	05APR94	-8.433	-0.662	07JUL94
K94-377	***	20	3	39382	05APR94	.	.	
K94-378	ARC	20	4	39382	05APR94	.	.	
K94-379	W76	20	5	39382	05APR94	-8.378	-0.414	21APR94
K94-380	W77	20	6	39382	05APR94	-8.381	-0.506	27APR94
K94-381	W85	20	1	75859	08APR94	-8.442	-0.508	06JUL94
K94-382	ARC	20	2	75859	08APR94	.	.	
K94-383	W77	20	3	75859	08APR94	-8.381	-0.343	28APR94
K94-384	W77	20	4	75859	08APR94	-8.385	-0.411	29APR94
K94-385	W76	20	5	75859	08APR94	-8.416	-0.307	21APR94
K94-386	W76	20	6	75859	08APR94	-8.381	-0.204	19APR94

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K94-408	W81	21	1	75635	19APR94	-8.545	-0.753	07JUN94
K94-409	W83	21	2	75635	20APR94	-8.544	-0.656	23JUN94
K94-410	W84	21	3	75635	20APR94	-8.569	-0.727	30JUN94
K94-411	W86	21	4	75635	22APR94	-8.558	-0.680	14JUL94
K94-412	ARC	21	5	75635	22APR94	.	.	
K94-413	W79	21	6	75635	22APR94	-8.518	-0.654	19MAY94
K94-414	W84	21	1	39382	28APR94	-8.446	-0.709	01JUL94
K94-415	W81	21	2	39382	28APR94	-8.417	-0.692	08JUN94
K94-416	W81	21	3	39382	28APR94	-8.377	-0.629	07JUN94
K94-417	ARC	21	4	39382	28APR94	.	.	
K94-418	W84	21	5	39382	28APR94	-8.422	-0.673	30JUN94
K94-419	W83	21	6	39382	28APR94	-8.433	-0.674	23JUN94
K94-420	W79	21	1	75859	29APR94	-8.382	-0.464	18MAY94
K94-421	W79	21	2	75859	29APR94	-8.380	-0.437	19MAY94
K94-422	W83	21	3	75859	29APR94	-8.479	-0.612	22JUN94
K94-423	ARC	21	4	75859	29APR94	.	.	
K94-424	W84	21	5	75859	29APR94	-8.428	-0.490	01JUL94
K94-425	W81	21	6	75859	29APR94	-8.381	-0.456	08JUN94

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K94-593	W82	22	1	75635	04MAY94	-8.564	-0.750	16JUN94
K94-594	ARC	22	2	75635	04MAY94	.	.	
K94-595	W78	22	3	75635	04MAY94	-8.534	-0.632	11MAY94
K94-596	W78	22	4	75635	04MAY94	-8.545	-0.659	13MAY94
K94-597	W80	22	5	75635	04MAY94	-8.519	-0.607	24MAY94
K94-598	W83	22	6	75635	04MAY94	-8.598	-0.803	22JUN94
K94-587	W80	22	1	39382	03MAY94	-8.373	-0.543	25MAY94
K94-588	W80	22	2	39382	03MAY94	-8.406	-0.569	24MAY94
K94-589	W79	22	3	39382	03MAY94	-8.351	-0.566	18MAY94
K94-590	W82	22	4	39382	03MAY94	-8.389	-0.619	17JUN94
K94-591	W78	22	5	39382	03MAY94	-8.404	-0.599	11MAY94
K94-592	ARC	22	6	39382	03MAY94	.	.	
K94-581	W82	22	1	75859	02MAY94	-8.468	-0.592	17JUN94
K94-582	ARC	22	2	75859	02MAY94	.	.	
K94-583	W80	22	3	75859	02MAY94	-8.350	-0.333	25MAY94
K94-584	W82	22	4	75859	02MAY94	-8.398	-0.498	16JUN94
K94-585	***	22	5	75859	02MAY94	.	.	
K94-586	W78	22	6	75859	02MAY94	-8.407	-0.455	13MAY94

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K94-795	102	23	1	75635	14JUL94	-8.574	-0.789	08FEB95
K94-796	ARC	23	2	75635	14JUL94	.	.	
K94-797	W89	23	3	75635	14JUL94	-8.542	-0.708	24AUG94
K94-798	***	23	4	75635	14JUL94	.	.	
K94-799	W91	23	5	75635	14JUL94	-8.485	-0.522	16SEP94
K94-800	W88	23	6	75635	14JUL94	-8.523	-0.663	17AUG94
K94-801	W86	23	1	39382	13JUL94	-8.469	-0.783	13JUL94
K94-802	W87	23	2	39382	13JUL94	-8.455	-0.737	04AUG94
K94-803	***	23	3	39382	13JUL94	.	.	
K94-804	W89	23	4	39382	13JUL94	-8.398	-0.657	24AUG94
K94-805	W88	23	5	39382	13JUL94	-8.406	-0.585	18AUG94
K94-806	ARC	23	6	39382	13JUL94	.	.	
K94-807	W96	23	1	75859	15JUL94	-8.390	-0.477	15DEC94
K94-808	102	23	2	75859	15JUL94	-8.462	-0.602	08FEB95
K94-809	ARC	23	3	75859	15JUL94	.	.	
K94-810	W88	23	4	75859	15JUL94	-8.442	-0.508	18AUG94
K94-811	W88	23	5	75859	15JUL94	-8.462	-0.617	17AUG94
K94-812	W95	23	6	75859	15JUL94	-8.365	-0.339	07DEC94
K94-831	W97	24	1	75635	27JUL94	-8.524	-0.727	21DEC94
K94-832	W92	24	2	75635	27JUL94	-8.538	-0.586	29SEP94
K94-833	W92	24	3	75635	27JUL94	-8.480	-0.484	28SEP94
K94-834	W90	24	4	75635	27JUL94	-8.572	-0.770	01SEP94
K94-835	W87	24	5	75635	27JUL94	-8.566	-0.755	04AUG94
K94-836	ARC	24	6	75635	27JUL94	.	.	
K94-837	ARC	24	1	39382	28JUL94	.	.	
K94-838	W90	24	2	39382	28JUL94	-8.426	-0.699	01SEP94
K94-839	W91	24	3	39382	28JUL94	-8.476	-0.701	16SEP94
K94-840	W91	24	4	39382	28JUL94	-8.387	-0.474	16SEP94
K94-841	W87	24	5	39382	28JUL94	-8.427	-0.638	03AUG94
K94-842	W91	24	6	39382	28JUL94	-8.445	-0.533	15SEP94
K94-843	101	24	1	75859	23JUL94	-8.474	-0.622	03FEB95
K94-844	ARC	24	2	75859	23JUL94	.	.	
K94-845	W91	24	3	75859	23JUL94	-8.419	-0.362	15SEP94
K94-846	W92	24	4	75859	23JUL94	-8.407	-0.332	28SEP94
K94-847	W87	24	5	75859	23JUL94	-8.402	-0.511	03AUG94
K94-848	W90	24	6	75859	23JUL94	-8.649	-0.979	01SEP94

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TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K94-933	W94	25	1	75635	29SEP94	-8.465	-0.465	30NOV94
K94-934	103	25	2	75635	29SEP94	-8.460	-0.486	26NOV96
K94-935	W95	25	3	75635	29SEP94	-8.514	-0.635	08DEC94
K94-936	W95	25	4	75635	29SEP94	-8.550	-0.663	07DEC94
K94-937	W94	25	5	75635	29SEP94	-8.460	-0.424	01DEC94
K94-938	W93	25	6	75635	29SEP94	-8.617	-0.900	16NOV94
K94-939	W93	25	1	39382	28SEP94	-8.442	-0.756	17NOV94
K94-940	103	25	2	39382	28SEP94	-8.331	-0.404	26NOV96
K94-941	W95	25	3	39382	28SEP94	-8.400	-0.573	08DEC94
K94-942	W93	25	4	39382	28SEP94	-8.456	-0.803	17NOV94
K94-943	W94	25	5	39382	28SEP94	-8.370	-0.448	30NOV94
K94-944	W92	25	6	39382	28SEP94	-8.419	-0.595	29SEP94
K94-945	W93	25	1	75859	27SEP94	-8.475	-0.623	16NOV94
K94-946	101	25	2	75859	27SEP94	-8.415	-0.535	03FEB95
K94-947	W97	25	3	75859	27SEP94	-8.462	-0.673	21DEC94
K94-948	W94	25	4	75859	27SEP94	-8.335	-0.215	01DEC94
K94-949	W94	25	5	75859	27SEP94	-8.344	-0.290	30NOV94
K94-950	103	25	6	75859	27SEP94	-8.310	-0.222	26NOV96
K94-A63	100	26	1	75635	20DEC94	-8.548	-0.737	26JAN95
K94-A64	W99	26	2	75635	20DEC94	-8.545	-0.841	18JAN95
K94-A65	101	26	3	75635	20DEC94	-8.551	-0.723	02FEB95
K94-A66	ARC	26	4	75635	20DEC94	.	.	
K94-A67	101	26	5	75635	20DEC94	-8.529	-0.767	01FEB95
K94-A68	W98	26	6	75635	20DEC94	-8.575	-0.749	05JAN95
K94-A69	W98	26	1	39382	19DEC94	-8.466	-0.781	05JAN95
K94-A70	100	26	2	39382	19DEC94	-8.436	-0.740	26JAN95
K94-A71	W98	26	3	39382	19DEC94	-8.494	-0.854	04JAN95
K94-A72	W99	26	4	39382	19DEC94	-8.401	-0.756	18JAN95
K94-A73	101	26	5	39382	19DEC94	-8.414	-0.695	01FEB95
K94-A74	ARC	26	6	39382	19DEC94	.	.	
K94-A75	W98	26	1	75859	16DEC94	-8.420	-0.560	04JAN95
K94-A76	100	26	2	75859	16DEC94	-8.419	-0.525	27JAN95
K94-A77	W99	26	3	75859	16DEC94	-8.393	-0.578	19JAN95
K94-A78	ARC	26	4	75859	16DEC94	.	.	
K94-A79	101	26	5	75859	16DEC94	-8.455	-0.610	02FEB95
K94-A80	W99	26	6	75859	16DEC94	-8.430	-0.635	18JAN95

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K95- 90	105	27	1	75635	07FEB95	-8.362	-0.214	24MAR95
K95- 91	105	27	2	75635	07FEB95	-8.391	-0.268	22MAR95
K95- 92	104	27	3	75635	07FEB95	-8.391	-0.270	15MAR95
K95- 93	103	27	4	75635	07FEB95	-8.452	-0.286	09MAR95
K95- 94	102	27	5	75635	07FEB95	-8.552	-0.750	09FEB95
K95- 95	ARC	27	6	75635	07FEB95	.	.	
K95- 96	102	27	1	39382	09FEB95	-8.450	-0.750	09FEB95
K95- 97	104	27	2	39382	09FEB95	-8.355	-0.309	15MAR95
K95- 98	105	27	3	39382	09FEB95	-8.245	-0.205	23MAR95
K95- 99	ARC	27	4	39382	09FEB95	.	.	
K95-100	103	27	5	39382	09FEB95	-8.272	-0.229	10MAR95
K95-101	103	27	6	39382	09FEB95	-8.343	-0.385	16FEB95
K95-102	105	27	1	75859	17FEB95	-8.309	-0.109	22MAR95
K95-103	105	27	2	75859	17FEB95	-8.259	-0.106	23MAR95
K95-104	105	27	3	75859	17FEB95	-8.249	-0.089	24MAR95
K95-105	ARC	27	4	75859	17FEB95	.	.	
K95-106	103	27	5	75859	17FEB95	-8.352	-0.205	09MAR95
K95-107	103	27	6	75859	17FEB95	-8.289	-0.114	10MAR95
K95-239	112	28	1	75635	05APR95	-8.417	-0.447	25MAY95
K95-240	111	28	2	75635	05APR95	-8.398	-0.398	18MAY95
K95-241	112	28	3	75635	05APR95	-8.376	-0.292	24MAY95
K95-242	110	28	4	75635	05APR95	-8.392	-0.429	11MAY95
K95-243	ARC	28	5	75635	05APR95	.	.	
K95-244	106	28	6	75635	05APR95	-8.381	-0.318	05APR95
K95-233	119	28	1	39382	30MAR95	-8.348	-0.477	17AUG95
K95-234	110	28	2	39382	30MAR95	-8.270	-0.420	11MAY95
K95-235	110	28	3	39382	30MAR95	-8.287	-0.402	10MAY95
K95-236	ARC	28	4	39382	30MAR95	.	.	
K95-237	106	28	5	39382	30MAR95	-8.279	-0.375	06APR95
K95-238	106	28	6	39382	30MAR95	-8.273	-0.372	05APR95
K95-227	112	28	1	75859	29MAR95	-8.322	-0.238	25MAY95
K95-228	111	28	2	75859	29MAR95	-8.263	-0.250	19MAY95
K95-229	111	28	3	75859	29MAR95	-8.297	-0.263	18MAY95
K95-230	106	28	4	75859	29MAR95	-8.290	-0.141	06APR95
K95-231	ARC	28	5	75859	29MAR95	.	.	
K95-232	110	28	6	75859	29MAR95	-8.303	-0.323	10MAY95

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TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K95-245	119	29	1	75635	06APR95	-8.431	-0.409	17AUG95
K95-246	107	29	2	75635	06APR95	-8.395	-0.407	13APR95
K95-247	107	29	3	75635	06APR95	-8.400	-0.365	12APR95
K95-248	109	29	4	75635	06APR95	-8.408	-0.443	28APR95
K95-249	ARC	29	5	75635	06APR95	.	.	
K95-250	109	29	6	75635	06APR95	-8.442	-0.481	27APR95
K95-251	ARC	29	1	39382	07APR95	.	.	
K95-252	111	29	2	39382	07APR95	-8.278	-0.390	19MAY95
K95-253	109	29	3	39382	07APR95	-8.287	-0.398	28APR95
K95-254	108	29	4	39382	07APR95	-8.261	-0.359	21APR95
K95-255	107	29	5	39382	07APR95	-8.357	-0.469	13APR95
K95-256	112	29	6	39382	07APR95	-8.304	-0.432	24MAY95
K95-257	ARC	29	1	75859	11APR95	.	.	
K95-258	107	29	2	75859	11APR95	-8.296	-0.258	12APR95
K95-259	109	29	3	75859	11APR95	-8.315	-0.296	27APR95
K95-260	120	29	4	75859	13APR95	-8.346	-0.279	21AUG95
K95-261	120	29	5	75859	13APR95	-8.239	-0.150	22AUG95
K95-262	108	29	6	75859	13APR95	-8.262	-0.145	21APR95
K95-779	121	30	1	75635	25MAY95	-8.427	-0.473	23AUG95
K95-780	120	30	2	75635	25MAY95	-8.444	-0.524	22AUG95
K95-781	ARC	30	3	75635	25MAY95	.	.	
K95-782	113	30	4	75635	25MAY95	-8.361	-0.284	02JUN95
K95-783	118	30	5	75635	25MAY95	-8.413	-0.398	02AUG95
K95-784	114	30	6	75635	25MAY95	-8.362	-0.322	07JUN95
K95-785	ARC	30	1	39382	26MAY95	.	.	
K95-786	114	30	2	39382	26MAY95	-8.227	-0.262	08JUN95
K95-787	117	30	3	39382	26MAY95	-8.320	-0.447	26JUL95
K95-788	117	30	4	39382	26MAY95	-8.278	-0.304	25JUL95
K95-789	113	30	5	39382	26MAY95	-8.264	-0.327	01JUN95
K95-790	113	30	6	39382	26MAY95	-8.269	-0.359	02JUN95
K95-791	119	30	1	75859	24MAY95	-8.349	-0.235	18AUG95
K95-792	118	30	2	75859	24MAY95	-8.325	-0.236	02AUG95
K95-793	118	30	3	75859	24MAY95	-8.321	-0.322	03AUG95
K95-794	113	30	4	75859	24MAY95	-8.271	-0.181	01JUN95
K95-795	114	30	5	75859	24MAY95	-8.230	-0.098	07JUN95
K95-796	ARC	30	6	75859	24MAY95	.	.	

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TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K95-816	115	31	1	75635	15JUN95	-8.337	-0.261	28JUN95
K95-817	121	31	2	75635	15JUN95	-8.404	-0.442	24AUG95
K95-818	116	31	3	75635	15JUN95	-8.399	-0.214	12JUL95
K95-819	117	31	4	75635	15JUN95	-8.403	-0.366	24JUL95
K95-820	117	31	5	75635	15JUN95	-8.401	-0.319	26JUL95
K95-821	119	31	6	75635	15JUN95	-8.442	-0.464	18AUG95
K95-822	120	31	1	39382	13JUN95	-8.337	-0.467	21AUG95
K95-823	120	31	2	39382	13JUN95	-8.413	-0.600	22AUG95
K95-824	121	31	3	39382	13JUN95	-8.259	-0.347	24AUG95
K95-825	116	31	4	39382	13JUN95	-8.255	-0.233	13JUL95
K95-826	118	31	5	39382	13JUN95	-8.302	-0.398	03AUG95
K95-827	115	31	6	39382	13JUN95	-8.209	-0.238	29JUN95
K95-828	121	31	1	75859	14JUN95	-8.270	-0.244	23AUG95
K95-829	ARC	31	2	75859	14JUN95	.	.	
K95-830	117	31	3	75859	14JUN95	-8.300	-0.191	24JUL95
K95-831	117	31	4	75859	14JUN95	-8.289	-0.180	25JUL95
K95-832	116	31	5	75859	14JUN95	-8.272	-0.011	12JUL95
K95-833	115	31	6	75859	14JUN95	-8.205	-0.074	28JUN95
K95-A97	124	32	1	75635	13SEP95	-8.381	-0.407	06OCT95
K95-A98	123	32	2	75635	13SEP95	-8.383	-0.458	22SEP95
K95-A99	125	32	3	75635	13SEP95	-8.419	-0.516	11OCT95
K95-B01	ARC	32	4	75635	13SEP95	.	.	
K95-B02	122	32	5	75635	13SEP95	-8.379	-0.413	15SEP95
K95-B03	122	32	6	75635	13SEP95	-8.411	-0.464	14SEP95
K95-B04	124	32	1	39382	12SEP95	-8.295	-0.384	05OCT95
K95-B05	123	32	2	39382	12SEP95	-8.259	-0.408	21SEP95
K95-B06	126	32	3	39382	12SEP95	-8.209	-0.351	19OCT95
K95-B07	ARC	32	4	39382	12SEP95	.	.	
K95-B08	124	32	5	39382	12SEP95	-8.289	-0.428	06OCT95
K95-B09	122	32	6	39382	12SEP95	-8.305	-0.472	14SEP95
K95-B10	125	32	1	75859	11SEP95	-8.258	-0.218	11OCT95
K95-B11	126	32	2	75859	11SEP95	-8.246	-0.236	19OCT95
K95-B12	124	32	3	75859	11SEP95	-8.239	-0.218	05OCT95
K95-B13	ARC	32	4	75859	11SEP95	.	.	
K95-B14	123	32	5	75859	11SEP95	-8.241	-0.197	22SEP95
K95-B15	122	32	6	75859	11SEP95	-8.223	-0.187	15SEP95

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TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K95-B80	127	33	1	75635	20OCT95	-8.441	-0.537	27OCT95
K95-B81	159	33	2	75635	20OCT95	-8.488	-0.707	07SEP96
K95-B82	129	33	3	75635	20OCT95	-8.430	-0.520	08NOV95
K95-B83	128	33	4	75635	20OCT95	-8.420	-0.464	02NOV95
K95-B84	127	33	5	75635	20OCT95	-8.370	-0.400	26OCT95
K95-B85	130	33	6	75635	20OCT95	-8.417	-0.522	20NOV95
K95-B86	159	33	1	39382	09OCT95	-8.401	-0.591	06SEP96
K95-B87	129	33	2	39382	09OCT95	-8.312	-0.542	09NOV95
K95-B88	129	33	3	39382	09OCT95	-8.305	-0.456	09NOV95
K95-B89	128	33	4	39382	09OCT95	-8.280	-0.465	02NOV95
K95-B90	128	33	5	39382	09OCT95	-8.270	-0.357	01NOV95
K95-B91	127	33	6	39382	09OCT95	-8.277	-0.404	26OCT95
K95-B92	130	33	1	75859	16OCT95	-8.285	-0.225	22NOV95
K95-B93	129	33	2	75859	16OCT95	-8.294	-0.297	08NOV95
K95-B94	128	33	3	75859	16OCT95	-8.285	-0.277	01NOV95
K95-B95	159	33	4	75859	16OCT95	-8.356	-0.459	07SEP96
K95-B96	127	33	5	75859	16OCT95	-8.271	-0.230	27OCT95
K95-B97	126	33	6	75859	16OCT95	-8.251	-0.213	20OCT95
K95-D39	135	34	1	75635	03DEC95	-8.389	-0.319	08FEB96
K95-D40	134	34	2	75635	03DEC95	-8.381	-0.415	15DEC95
K95-D41	133	34	3	75635	03DEC95	-8.376	-0.381	12DEC95
K95-D42	ARC	34	4	75635	03DEC95	.	.	
K95-D43	132	34	5	75635	03DEC95	-8.380	-0.396	07DEC95
K95-D44	132	34	6	75635	03DEC95	-8.366	-0.399	08DEC95
K95-D45	131	34	1	39382	30NOV95	-8.254	-0.398	30NOV95
K95-D46	135	34	2	39382	30NOV95	-8.286	-0.305	08FEB96
K95-D47	134	34	3	39382	30NOV95	-8.330	-0.584	14DEC95
K95-D48	133	34	4	39382	30NOV95	-8.312	-0.493	11DEC95
K95-D49	ARC	34	5	39382	30NOV95	.	.	
K95-D50	132	34	6	39382	30NOV95	-8.263	-0.382	07DEC95
K95-D51	135	34	1	75859	29NOV95	-8.287	-0.178	08FEB96
K95-D52	133	34	2	75859	29NOV95	-8.338	-0.327	11DEC95
K95-D53	ARC	34	3	75859	29NOV95	.	.	
K95-D54	132	34	4	75859	29NOV95	-8.269	-0.236	08DEC95
K95-D55	131	34	5	75859	29NOV95	-8.254	-0.197	01DEC95
K95-D56	133	34	6	75859	29NOV95	-8.298	-0.291	12DEC95

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K96- 36	137	35	1	75635	17JAN96	-8.467	-0.432	14FEB96
K96- 37	140	35	2	75635	17JAN96	-8.479	-0.657	21MAR96
K96- 38	140	35	3	75635	17JAN96	-8.444	-0.532	20MAR96
K96- 39	ARC	35	4	75635	17JAN96	.	.	
K96- 40	137	35	5	75635	17JAN96	-8.405	-0.328	14FEB96
K96- 41	136	35	6	75635	17JAN96	-8.404	-0.294	13FEB96
K96- 42	143	35	1	39382	18JAN96	-8.316	-0.634	19APR96
K96- 43	144	35	2	39382	18JAN96	-8.332	-0.572	26APR96
K96- 44	141	35	3	39382	18JAN96	-8.277	-0.453	28MAR96
K96- 45	141	35	4	39382	18JAN96	-8.361	-0.557	29MAR96
K96- 46	ARC	35	5	39382	18JAN96	.	.	
K96- 47	140	35	6	39382	18JAN96	-8.331	-0.563	20MAR96
K96- 48	141	35	1	75859	19JAN96	-8.366	-0.431	29MAR96
K96- 49	141	35	2	75859	19JAN96	-8.311	-0.355	28MAR96
K96- 50	140	35	3	75859	19JAN96	-8.316	-0.298	21MAR96
K96- 51	139	35	4	75859	19JAN96	-8.309	-0.341	14MAR96
K96- 52	139	35	5	75859	19JAN96	-8.326	-0.325	13MAR96
K96- 53	ARC	35	6	75859	19JAN96	.	.	
K96- 54	143	36	1	75635	23JAN96	-8.441	-0.595	18APR96
K96- 55	141	36	2	75635	23JAN96	-8.431	-0.541	29MAR96
K96- 56	139	36	3	75635	23JAN96	-8.460	-0.522	13MAR96
K96- 57	138	36	4	75635	23JAN96	-8.460	-0.464	05MAR96
K96- 58	ARC	36	5	75635	23JAN96	.	.	
K96- 59	138	36	6	75635	23JAN96	-8.436	-0.503	06MAR96
K96- 60	139	36	1	39382	24JAN96	-8.294	-0.448	14MAR96
K96- 61	138	36	2	39382	24JAN96	-8.364	-0.523	06MAR96
K96- 62	137	36	3	39382	24JAN96	-8.316	-0.397	14FEB96
K96- 63	143	36	4	39382	24JAN96	-8.345	-0.618	18APR96
K96- 64	ARC	36	5	39382	24JAN96	.	.	
K96- 65	137	36	6	39382	24JAN96	-8.315	-0.358	14FEB96
K96- 66	ARC	36	1	75859	22JAN96	.	.	
K96- 67	138	36	2	75859	22JAN96	-8.330	-0.324	06MAR96
K96- 68	137	36	3	75859	22JAN96	-8.502	-0.575	14FEB96
K96- 69	136	36	4	75859	22JAN96	-8.300	-0.182	13FEB96
K96- 70	137	36	5	75859	22JAN96	-8.312	-0.153	14FEB96
K96- 71	137	36	6	75859	22JAN96	-8.288	-0.140	14FEB96

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K96- 75	136	37	1	75635	30JAN96	-8.475	-0.432	12FEB96
K96- 76	ARC	37	2	75635	30JAN96	.	.	
K96- 77	136	37	3	75635	30JAN96	-8.401	-0.343	13FEB96
K96- 78	135	37	4	75635	30JAN96	-8.409	-0.343	09FEB96
K96- 79	135	37	5	75635	30JAN96	-8.401	-0.331	09FEB96
K96- 80	135	37	6	75635	30JAN96	-8.419	-0.356	08FEB96
K96- 81	136	37	1	39382	25JAN96	-8.303	-0.349	13FEB96
K96- 82	136	37	2	39382	25JAN96	-8.370	-0.520	12FEB96
K96- 83	135	37	3	39382	25JAN96	-8.303	-0.334	09FEB96
K96- 84	135	37	4	39382	25JAN96	-8.318	-0.384	09FEB96
K96- 85	ARC	37	5	39382	25JAN96	.	.	
K96- 86	136	37	6	39382	25JAN96	-8.320	-0.351	13FEB96
K96- 87	136	37	1	75859	26JAN96	-8.337	-0.292	13FEB96
K96- 88	135	37	2	75859	26JAN96	-8.264	-0.145	09FEB96
K96- 89	135	37	3	75859	26JAN96	-8.271	-0.127	09FEB96
K96- 90	136	37	4	75859	26JAN96	-8.336	-0.173	12FEB96
K96- 91	135	37	5	75859	26JAN96	.lost	.	09FEB96
K96- 92	ARC	37	6	75859	26JAN96	.	.	
K96-189	146	38	1	75635	01APR96	-8.451	-0.580	08MAY96
K96-190	145	38	2	75635	01APR96	-8.459	-0.639	01MAY96
K96-191	ARC	38	3	75635	01APR96	.	.	
K96-192	144	38	4	75635	01APR96	-8.453	-0.669	26APR96
K96-193	142	38	5	75635	01APR96	-8.459	-0.545	04APR96
K96-194	144	38	6	75635	01APR96	-8.479	-0.658	25APR96
K96-195	149	38	1	39382	26MAR96	-8.403	-0.699	31MAY96
K96-196	146	38	2	39382	26MAR96	-8.356	-0.595	08MAY96
K96-197	145	38	3	39382	26MAR96	-8.307	-0.582	02MAY96
K96-198	ARC	38	4	39382	26MAR96	.	.	
K96-199	142	38	5	39382	26MAR96	-8.291	-0.505	04APR96
K96-200	145	38	6	39382	26MAR96	-8.298	-0.551	01MAY96
K96-201	145	38	1	75859	30MAR96	-8.403	-0.548	01MAY96
K96-202	ARC	38	2	75859	30MAR96	.	.	
K96-203	144	38	3	75859	30MAR96	-8.318	-0.428	25APR96
K96-204	143	38	4	75859	30MAR96	-8.304	-0.388	19APR96
K96-205	142	38	5	75859	30MAR96	-8.506	-0.754	05APR96
K96-206	142	38	6	75859	30MAR96	-8.380	-0.516	05APR96

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K98-328	ARC	39	1	75835	06MAY98	.	.	
K98-329	146	39	2	75835	06MAY98	-8.506	-0.725	09MAY98
K98-330	152	39	3	75835	06MAY98	-8.493	-0.672	19JUN98
K98-331	151	39	4	75835	06MAY98	-8.474	-0.635	13JUN98
K98-332	150	39	5	75835	06MAY98	-8.489	-0.685	06JUN98
K98-333	149	39	6	75835	06MAY98	-8.517	-0.682	31MAY98
K98-334	151	39	1	39382	03MAY98	-8.358	-0.596	14JUN98
K98-335	152	39	2	39382	03MAY98	-8.379	-0.647	19JUN98
K98-336	150	39	3	39382	30MAY98	-8.366	-0.641	06JUN98
K98-337	151	39	4	39382	03MAY98	-8.383	-0.618	13JUN98
K98-338	ARC	39	5	39382	03MAY98	.	.	
K98-339	150	39	6	39382	03MAY98	-8.368	-0.654	05JUN98
K98-340	151	39	1	75859	30APR98	-8.398	-0.522	14JUN98
K98-341	151	39	2	75859	30APR98	-8.387	-0.490	13JUN98
K98-342	ARC	39	3	75859	30APR98	.	.	
K98-343	150	39	4	75859	30APR98	-8.359	-0.492	05JUN98
K98-344	146	39	5	75859	30APR98	-8.330	-0.415	09MAY98
K98-345	145	39	6	75859	30APR98	-8.341	-0.472	02MAY98
K98-346	ARC	40	1	75835	07MAY98	.	.	
K98-347	149	40	2	75835	07MAY98	-8.491	-0.679	30MAY98
K98-348	149	40	3	75835	07MAY98	-8.439	-0.621	29MAY98
K98-349	148	40	4	75835	07MAY98	-8.482	-0.683	23MAY98
K98-350	147	40	5	75835	07MAY98	-8.458	-0.623	16MAY98
K98-351	148	40	6	75835	07MAY98	-8.472	-0.636	22MAY98
K98-352	149	40	1	39382	08MAY98	-8.388	-0.646	29MAY98
K98-353	148	40	2	39382	08MAY98	-8.349	-0.634	24MAY98
K98-354	ARC	40	3	39382	08MAY98	.	.	
K98-355	148	40	4	39382	08MAY98	-8.336	-0.631	22MAY98
K98-356	147	40	5	39382	08MAY98	-8.378	-0.647	17MAY98
K98-357	147	40	6	39382	08MAY98	-8.384	-0.693	16MAY98
K98-358	149	40	1	75859	10MAY98	-8.373	-0.476	30MAY98
K98-359	147	40	2	75859	10MAY98	-8.353	-0.490	17MAY98
K98-360	148	40	3	75859	10MAY98	-8.348	-0.434	24MAY98
K98-361	148	40	4	75859	10MAY98	-8.353	-0.461	23MAY98
K98-362	147	40	5	75859	10MAY98	-8.320	-0.414	16MAY98
K98-363	ARC	40	6	75859	10MAY98	.	.	

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K98-396	154	41	1	75635	14JUN98	-8.455	-0.627	23JUL98
K98-397	154	41	2	75635	14JUN98	-8.456	-0.651	22JUL98
K98-398	155	41	3	75635	14JUN98	-8.490	-0.663	31JUL98
K98-399	152	41	4	75635	14JUN98	-8.484	-0.666	20JUN98
K98-400	153	41	5	75635	14JUN98	-8.506	-0.745	17JUL98
K98-401	153	41	6	75635	14JUN98	-8.496	-0.653	16JUL98
K98-402	155	41	1	39382	28JUN98	-8.346	-0.579	30JUL98
K98-403	154	41	2	39382	28JUN98	-8.403	-0.734	23JUL98
K98-404	155	41	3	39382	28JUN98	-8.357	-0.628	31JUL98
K98-405	154	41	4	39382	28JUN98	-8.354	-0.582	22JUL98
K98-406	153	41	5	39382	28JUN98	-8.354	-0.636	17JUL98
K98-407	153	41	6	39382	28JUN98	-8.427	-0.688	03JUL98
K98-408	152	41	1	75859	11JUN98	-8.358	-0.437	20JUN98
K98-409	155	41	2	75859	11JUN98	-8.342	-0.418	31JUL98
K98-410	155	41	3	75859	11JUN98	-8.358	-0.462	30JUL98
K98-411	158	41	4	75859	11JUN98	-8.370	-0.370	31AUG98
K98-412	154	41	5	75859	11JUN98	-8.373	-0.428	22JUL98
K98-413	153	41	6	75859	11JUN98	-8.389	-0.531	16JUL98
K98-643	158	42	1	75635	07AUG98	-8.457	-0.607	07AUG98
K98-644	158	42	2	75635	07AUG98	lost	.	30AUG98
K98-645	158	42	3	75635	07AUG98	-8.505	-0.627	30AUG98
K98-646	158	42	4	75635	07AUG98	-8.484	-0.567	30AUG98
K98-647	ARC	42	5	75635	07AUG98	.	.	
K98-648	157	42	6	75635	07AUG98	-8.515	-0.712	12AUG98
K98-649	158	42	1	39382	08AUG98	-8.390	-0.601	30AUG98
K98-650	158	42	2	39382	08AUG98	-8.381	-0.624	29AUG98
K98-651	156	42	3	39382	08AUG98	-8.372	-0.634	07AUG98
K98-652	ARC	42	4	39382	08AUG98	.	.	
K98-653	156	42	5	39382	08AUG98	-8.341	-0.591	06AUG98
K98-654	158	42	6	39382	08AUG98	air	.	30AUG98
K98-655	156	42	1	75859	02AUG98	-8.339	-0.417	07AUG98
K98-656	158	42	2	75859	02AUG98	-8.363	-0.418	29AUG98
K98-657	158	42	3	75859	02AUG98	-8.415	-0.472	29AUG98
K98-658	ARC	42	4	75859	02AUG98	.	.	
K98-659	156	42	5	75859	02AUG98	-8.415	-0.551	07AUG98
K98-660	157	42	6	75859	02AUG98	-8.349	-0.454	12AUG98

ARC: Archived sample

TABLE C: Summary of Atmospheric Secondary Standards by FILL No.

Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis
K98-734	165	43	1	75635	10SEP98	-8.432	-0.461	04DEC98
K98-735	160	43	2	75635	10SEP98	-8.475	-0.662	12SEP98
K98-736	ARC	43	3	75635	10SEP98	.	.	
K98-737	161	43	4	75635	10SEP98	-8.496	-0.644	25SEP98
K98-738	160	43	5	75635	10SEP98	-8.495	-0.621	13SEP98
K98-739	160	43	6	75635	10SEP98	-8.519	-0.653	12SEP98
K98-740	164	43	1	39382	13SEP98	-8.330	-0.484	03DEC98
K98-741	165	43	2	39382	13SEP98	-8.329	-0.472	05DEC98
K98-742	164	43	3	39382	13SEP98	-8.325	-0.457	02DEC98
K98-743	160	43	4	39382	13SEP98	-8.439	-0.772	13SEP98
K98-744	161	43	5	39382	13SEP98	-8.417	-0.675	24SEP98
K98-745	ARC	43	6	39382	13SEP98	.	.	
K98-746	165	43	1	75859	20SEP98	-8.340	-0.256	04DEC98
K98-747	164	43	2	75859	20SEP98	-8.339	-0.330	03DEC98
K98-748	165	43	3	75859	20SEP98	-8.338	-0.314	05DEC98
K98-749	161	43	4	75859	20SEP98	-8.382	-0.466	25SEP98
K98-750	ARC	43	5	75859	20SEP98	.	.	
K98-751	161	43	6	75859	20SEP98	-8.379	-0.433	24SEP98

ARC: Archived sample

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

Date	Date of measurement on mass spectrometer.
Standard No.	Designated atmospheric or oceanic secondary standard number.
Measured d13C d18O	Craig-corrected (but not NBS - or daily-corrected) reduced isotopic ratios.
NBS Corrected d13C d18O	NBS-corrected reduced isotopic ratio. See calibration equation, text, page 3.
Adjusted to 39382 d13C d18O	Adjustment of NBS-corrected values using average offsets from 39382 and differential drift equation. See Tables E, F, G, and text, pages 12, 17.
AIR Terms	Differences of individual adjusted values from assigned value of 39382.
Adjusted to GS19 d13C d18O	Adjustment of NBS-corrected values using average offsets from GS19 and differential drift equation. See Tables E, F, G, and text, pages 12, 17.
SEA Terms	Differences of individual adjusted values from assigned values of GS19.
Week No.	Designated week number for measurements (corresponds to shipment number (Table C)).

Flagged data are indicated with a #. See Table K.

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
03-Apr-92	39382	-8.217	-0.162	-8.120	0.048	-8.120	0.048	-0.161	-0.466	-7.391	0.159	-0.073	-0.284	1
03-Apr-92	39382	-8.214	-0.153	-8.117	0.057	-8.117	0.057	-0.164	-0.475	-7.388	0.168	-0.076	-0.293	1
03-Apr-92	39382	-8.223	-0.159	-8.126	0.051	-8.126	0.051	-0.155	-0.469	-7.398	0.162	-0.068	-0.287	1
03-Apr-92	39382	-8.237	-0.119	-8.140	0.091	-8.140	0.091	-0.141	-0.509	-7.410	0.202	-0.054	-0.327	1
03-Apr-92	75635	-8.332	-0.234	-8.235	-0.025	-8.128	-0.018	-0.153	-0.400	-7.398	0.093	-0.066	-0.218	1
03-Apr-92	75635	-8.340	-0.270	-8.243	-0.061	-8.136	-0.054	-0.145	-0.364	-7.406	0.057	-0.058	-0.182	1
03-Apr-92	75635	-8.331	-0.216	-8.234	-0.006	-8.127	0.001	-0.154	-0.419	-7.397	0.112	-0.067	-0.237	1
03-Apr-92	75635	-8.328	-0.247	-8.231	-0.038	-8.124	-0.031	-0.157	-0.387	-7.394	0.080	-0.070	-0.205	1
03-Apr-92	75859	-8.231	-0.087	-8.134	0.124	-8.133	-0.028	-0.148	-0.390	-7.403	0.083	-0.061	-0.208	1
03-Apr-92	75859	-8.207	-0.047	-8.110	0.164	-8.109	0.012	-0.172	-0.430	-7.380	0.123	-0.084	-0.248	1
03-Apr-92	75859	-8.220	-0.035	-8.123	0.176	-8.122	0.024	-0.159	-0.442	-7.393	0.135	-0.071	-0.260	1
03-Apr-92	75859	-8.200	-0.068	-8.103	0.143	-8.102	-0.009	-0.179	-0.409	-7.373	0.102	-0.091	-0.227	1
29-Apr-92	39382	-8.222	-0.066	-8.125	0.145	-8.125	0.145	-0.156	-0.563	-7.392	0.263	-0.072	-0.388	2
29-Apr-92	75635	-8.332	-0.138	-8.235	0.072	-8.128	0.079	-0.153	-0.497	-7.394	0.197	-0.070	-0.322	2
29-Apr-92	75859	-8.232	-0.011	-8.135	0.200	-8.134	0.048	-0.147	-0.466	-7.401	0.166	-0.063	-0.291	2
30-Apr-92	39382	-8.208	-0.074	-8.111	0.137	-8.111	0.137	-0.170	-0.555	-7.378	0.255	-0.086	-0.380	2
30-Apr-92	39382	-8.218	0.023	-8.121	0.234	-8.121	0.234	-0.160	-0.652	-7.388	0.353	-0.076	-0.478	2
30-Apr-92	39382	-8.220	-0.076	-8.123	0.135	-8.123	0.135	-0.158	-0.553	-7.390	0.253	-0.074	-0.378	2
30-Apr-92	75635	-8.338	-0.160	-8.241	0.050	-8.134	0.057	-0.147	-0.475	-7.400	0.176	-0.064	-0.301	2
30-Apr-92	75635	-8.325	-0.134	-8.228	0.076	-8.121	0.083	-0.160	-0.501	-7.387	0.202	-0.077	-0.327	2
30-Apr-92	75635	-8.322	-0.160	-8.225	0.050	-8.118	0.057	-0.163	-0.475	-7.384	0.176	-0.080	-0.301	2
30-Apr-92	75859	-8.212	0.033	-8.115	0.244	-8.114	0.092	-0.167	-0.510	-7.381	0.211	-0.083	-0.336	2
30-Apr-92	75859	-8.211	-0.003	-8.114	0.208	-8.113	0.056	-0.168	-0.474	-7.380	0.175	-0.084	-0.300	2
30-Apr-92	75859	-8.210	0.041	-8.113	0.253	-8.112	0.101	-0.169	-0.519	-7.379	0.219	-0.085	-0.344	2
07-May-92	75635	-8.339	-0.210	-8.242	0.000	-8.135	0.007	-0.146	-0.425	-7.400	0.127	-0.064	-0.252	4
08-May-92	39382	-8.221	-0.163	-8.124	0.047	-8.124	0.047	-0.157	-0.465	-7.390	0.168	-0.074	-0.293	4
08-May-92	39382	-8.237	-0.119	-8.140	0.091	-8.140	0.091	-0.141	-0.509	-7.406	0.212	-0.058	-0.337	4
11-May-92	75635	-8.345	-0.232	-8.248	-0.023	-8.141	-0.016	-0.140	-0.402	-7.406	0.106	-0.058	-0.231	4
11-May-92	75859	-8.225	-0.101	-8.128	0.109	-8.127	-0.043	-0.154	-0.375	-7.392	0.079	-0.072	-0.204	4
12-May-92	39382	-8.227	-0.210	-8.130	0.000	-8.130	0.000	-0.151	-0.418	-7.395	0.122	-0.069	-0.247	4
12-May-92	75635	-8.371	-0.304	-8.273	-0.095	-8.166	-0.088	-0.115	-0.330	-7.431	0.034	-0.033	-0.159	4
14-May-92	75859	-8.235	-0.138	-8.138	0.074	-8.137	-0.078	-0.144	-0.340	-7.402	0.045	-0.062	-0.170	4
28-May-92	39382	-8.256	-0.285	-8.159	-0.076	-8.159	-0.076	-0.122	-0.342	-7.422	0.050	-0.042	-0.175	5
28-May-92	75635	-8.366	-0.331	-8.268	-0.122	-8.161	-0.115	-0.120	-0.303	-7.424	0.011	-0.040	-0.136	5
28-May-92	75859	-8.256	-0.129	-8.159	0.081	-8.158	-0.071	-0.123	-0.347	-7.421	0.056	-0.043	-0.181	5
11-Jun-92	39382	-8.228	-0.271	-8.131	-0.062	-8.131	-0.062	-0.150	-0.356	-7.392	0.068	-0.072	-0.193	6
11-Jun-92	75635	-8.353	-0.362	-8.256	-0.154	-8.149	-0.147	-0.132	-0.271	-7.409	-0.016	-0.055	-0.109	6
11-Jun-92	75859	-8.255	-0.182	-8.158	0.028	-8.157	-0.124	-0.124	-0.294	-7.418	0.006	-0.046	-0.131	6
11-Jun-92	GS19	-7.489	-0.184	-7.396	0.026	-8.135	-0.104	-0.146	-0.314	-7.396	0.026	-0.068	-0.151	6
11-Jun-92	GS19	-7.486	-0.169	-7.393	0.041	-8.132	-0.089	-0.149	-0.329	-7.393	0.041	-0.071	-0.166	6
12-Jun-92	75635	-8.371	-0.369	-8.273	-0.161	-8.166	-0.154	-0.115	-0.264	-7.427	-0.023	-0.037	-0.102	6
12-Jun-92	75859	-8.252	-0.162	-8.155	0.048	-8.154	-0.104	-0.127	-0.314	-7.415	0.027	-0.049	-0.152	6

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
15-Jun-92	75635	-8.510	-0.659	-8.412	-0.453	-8.305	-0.446	0.024#	0.028#	-7.565	-0.314	0.101#	0.189#	7
01-Jul-92	75635	-8.354	-0.354	-8.257	-0.145	-8.150	-0.138	-0.131	-0.280	-7.408	-0.003	-0.056	-0.122	8
01-Jul-92	75859	-8.293	-0.266	-8.196	-0.057	-8.195	-0.209	-0.086	-0.209	-7.453	-0.073	-0.011	-0.052	8
02-Jul-92	39382	-8.271	-0.347	-8.174	-0.138	-8.174	-0.138	-0.107	-0.280	-7.432	-0.002	-0.032	-0.123	8
02-Jul-92	75859	-8.279	-0.268	-8.182	-0.059	-8.181	-0.211	-0.100	-0.207	-7.439	-0.075	-0.025	-0.050	8
02-Jul-92	GS19	-7.532	-0.226	-7.439	-0.016	-8.180	-0.153	-0.101	-0.265	-7.439	-0.016	-0.025	-0.109	8
07-Jul-92	39382	-8.277	-0.461	-8.180	-0.253	-8.180	-0.253	-0.101	-0.165	-7.437	-0.116	-0.027	-0.009	9
07-Jul-92	GS20	-8.629	-1.016	-8.530	-0.812	-8.163	-0.160	-0.118	-0.258	-7.421	-0.022	-0.043	-0.103	9
09-Jul-92	39382	-8.335	-0.581	-8.238	-0.374	-8.238	-0.374	-0.043	-0.044	-7.495	-0.236	0.031	0.111	9
09-Jul-92	75859	-8.300	-0.286	-8.203	-0.077	-8.202	-0.229	-0.079	-0.189	-7.459	-0.091	-0.005	-0.034	9
02-Sep-92	39382	-8.233	-0.401	-8.136	-0.193	-8.136	-0.193	-0.145	-0.225	-7.386	-0.039	-0.078	-0.086	10
02-Sep-92	75635	-8.369	-0.424	-8.271	-0.216	-8.164	-0.209	-0.117	-0.209	-7.414	-0.055	-0.050	-0.070	10
02-Sep-92	75859	-8.285	-0.295	-8.188	-0.086	-8.187	-0.238	-0.094	-0.180	-7.437	-0.085	-0.027	-0.040	10
02-Sep-92	GS19	-7.507	-0.293	-7.414	-0.084	-8.164	-0.237	-0.117	-0.181	-7.414	-0.084	-0.050	-0.041	10
03-Sep-92	GS20	-8.596	-0.985	-8.497	-0.781	-8.138	-0.145	-0.143	-0.273	-7.388	0.009	-0.076	-0.134	10
15-Sep-92	39382	-8.250	-0.180	-8.153	0.030	-8.153	0.030	-0.128	-0.448	-7.401	0.187	-0.063	-0.312	11
15-Sep-92	75635	-8.370	-0.260	-8.272	-0.051	-8.165	-0.044	-0.116	-0.374	-7.414	0.113	-0.050	-0.238	11
16-Sep-92	75859	-8.267	-0.094	-8.170	0.117	-8.169	-0.035	-0.112	-0.383	-7.417	0.122	-0.047	-0.247	11
17-Sep-92	GS19	-7.513	-0.089	-7.420	0.122	-8.172	-0.036	-0.109	-0.382	-7.420	0.122	-0.044	-0.247	11
17-Sep-92	GS20	-8.626	-0.874	-8.527	-0.669	-8.170	-0.037	-0.111	-0.381	-7.418	0.121	-0.046	-0.246	11
23-Sep-92	75859	-8.273	-0.139	-8.176	0.071	-8.175	-0.081	-0.106	-0.337	-7.422	0.079	-0.042	-0.204	12
23-Sep-92	GS19	-7.486	-0.048	-7.393	0.163	-8.146	0.004	-0.135	-0.422	-7.393	0.163	-0.071	-0.288	12
23-Sep-92	GS19	-7.480	0.002	-7.387	0.213	-8.140	0.054	-0.141	-0.472	-7.387	0.213	-0.077	-0.338	12
24-Sep-92	39382	-8.258	-0.347	-8.161	-0.138	-8.161	-0.138	-0.120	-0.280	-7.408	0.021	-0.056	-0.146	12
24-Sep-92	75635	-8.434	-0.450	-8.336	-0.242	-8.229	-0.235	-0.052	-0.183	-7.476	-0.076	0.012	-0.049	12
30-Sep-92	39382	-8.287	-0.308	-8.190	-0.099	-8.190	-0.099	-0.091	-0.319	-7.436	0.062	-0.028	-0.187	13
01-Oct-92	75635	-8.411	-0.332	-8.313	-0.123	-8.206	-0.116	-0.075	-0.302	-7.452	0.045	-0.012	-0.170	13
01-Oct-92	75859	-8.293	-0.207	-8.196	0.003	-8.195	-0.149	-0.086	-0.269	-7.441	0.012	-0.023	-0.137	13
15-Oct-92	GS19	-7.526	-0.175	-7.433	0.035	-8.189	-0.131	-0.092	-0.287	-7.433	0.035	-0.031	-0.160	15
15-Oct-92	GS19	-7.514	-0.223	-7.421	-0.013	-8.177	-0.179	-0.104	-0.239	-7.421	-0.013	-0.043	-0.112	15
22-Oct-92	GS19	-7.570	-0.348	-7.476	-0.139	-8.233	-0.307	-0.048	-0.111	-7.476	-0.139	0.012	0.014	16
28-Oct-92	75635	-8.379	-0.274	-8.281	-0.065	-8.174	-0.058	-0.107	-0.360	-7.417	0.111	-0.047	-0.236	17
29-Oct-92	39382	-8.267	-0.265	-8.170	-0.056	-8.170	-0.056	-0.111	-0.362	-7.412	0.114	-0.052	-0.239	17
29-Oct-92	75859	-8.245	-0.101	-8.148	0.109	-8.147	-0.043	-0.134	-0.375	-7.389	0.127	-0.075	-0.252	17
29-Oct-92	GS19	-7.479	-0.080	-7.386	0.131	-8.144	-0.039	-0.137	-0.379	-7.386	0.131	-0.078	-0.256	17
29-Oct-92	GS19	-7.497	-0.128	-7.404	0.082	-8.162	-0.087	-0.119	-0.331	-7.404	0.082	-0.060	-0.207	17

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d180	NBS Corrected d13C	NBS Corrected d180	Adjusted to 39382 d13C	Adjusted to 39382 d180	AIR Terms d13C	AIR Terms d180	Adjusted to GS19 d13C	Adjusted to GS19 d180	SEA Terms d13C	SEA Terms d180	Week No.
04-Nov-92	39382	-8.258	-0.277	-8.161	-0.068	-8.161	-0.068	-0.120	-0.350	-7.402	0.103	-0.062	-0.228	18
04-Nov-92	39382	-8.265	-0.320	-8.168	-0.111	-8.168	-0.111	-0.113	-0.307	-7.409	0.060	-0.055	-0.185	18
04-Nov-92	75635	-8.382	-0.332	-8.284	-0.123	-8.177	-0.116	-0.104	-0.302	-7.419	0.055	-0.045	-0.180	18
05-Nov-92	75859	-8.245	-0.159	-8.148	0.051	-8.147	-0.101	-0.134	-0.317	-7.388	0.070	-0.076	-0.195	18
05-Nov-92	75859	-8.253	-0.149	-8.156	0.061	-8.155	-0.091	-0.128	-0.327	-7.396	0.080	-0.068	-0.205	18
12-Nov-92	GS19	-7.546	-0.224	-7.453	-0.014	-8.212	-0.188	-0.069	-0.230	-7.453	-0.014	-0.011	-0.111	19
25-Nov-92	GS19	-7.505	-0.182	-7.412	0.028	-8.173	-0.149	-0.108	-0.269	-7.412	0.028	-0.052	-0.153	20
03-Dec-92	GS19	-7.498	-0.169	-7.405	0.041	-8.167	-0.138	-0.114	-0.280	-7.405	0.041	-0.059	-0.166	21
09-Dec-92	75635	-8.365	-0.370	-8.267	-0.162	-8.160	-0.155	-0.121	-0.263	-7.397	0.028	-0.067	-0.151	22
10-Dec-92	39382	-8.316	-0.408	-8.219	-0.200	-8.219	-0.200	-0.062	-0.218	-7.455	-0.019	-0.009	-0.106	22
10-Dec-92	75859	-8.285	-0.281	-8.188	-0.072	-8.187	-0.224	-0.094	-0.194	-7.423	-0.043	-0.041	-0.082	22
17-Dec-92	GS19	-7.507	-0.178	-7.414	0.032	-8.178	-0.151	-0.103	-0.267	-7.414	0.032	-0.050	-0.157	23
28-Jan-93	75635	-8.363	-0.328	-8.265	-0.119	-8.158	-0.112	-0.123	-0.306	-7.388	0.083	-0.076	-0.208	24
28-Jan-93	75859	-8.238	-0.098	-8.141	0.113	-8.140	-0.039	-0.141	-0.379	-7.370	0.155	-0.094	-0.280	24
29-Jan-93	GS19	-7.485	-0.023	-7.392	0.188	-8.162	-0.007	-0.119	-0.411	-7.392	0.188	-0.072	-0.313	24
29-Jan-93	GS20	-8.598	-0.829	-8.499	-0.624	-8.160	-0.029	-0.121	-0.389	-7.390	0.166	-0.074	-0.291	24
03-Feb-93	GS19	-7.517	-0.197	-7.424	0.013	-8.195	-0.184	-0.088	-0.234	-7.424	0.013	-0.040	-0.138	25
04-Feb-93	GS19	-7.520	-0.139	-7.427	0.071	-8.198	-0.126	-0.083	-0.292	-7.427	0.071	-0.037	-0.196	25
10-Feb-93	75859	-8.258	-0.167	-8.161	0.043	-8.160	-0.109	-0.121	-0.309	-7.388	0.090	-0.076	-0.215	26
10-Feb-93	GS19	-7.496	-0.189	-7.403	0.021	-8.175	-0.178	-0.106	-0.240	-7.403	0.021	-0.061	-0.146	26
11-Feb-93	39382	-8.280	-0.386	-8.183	-0.178	-8.183	-0.178	-0.098	-0.240	-7.411	0.021	-0.053	-0.146	26
11-Feb-93	GS20	-8.641	-1.021	-8.542	-0.818	-8.205	-0.226	-0.078	-0.192	-7.433	-0.028	-0.031	-0.097	26
17-Feb-93	75635	-8.405	-0.474	-8.307	-0.266	-8.200	-0.259	-0.081	-0.159	-7.427	-0.059	-0.037	-0.066	27
17-Feb-93	GS19	-7.521	-0.251	-7.428	-0.042	-8.200	-0.242	-0.081	-0.176	-7.428	-0.042	-0.036	-0.083	27
18-Feb-93	39382	-8.275	-0.248	-8.178	-0.039	-8.178	-0.039	-0.103	-0.379	-7.405	0.162	-0.059	-0.287	27
18-Feb-93	GS20	-8.638	-0.999	-8.539	-0.795	-8.203	-0.206	-0.078	-0.212	-7.430	-0.005	-0.034	-0.120	27
19-Feb-93	75859	-8.299	-0.243	-8.202	-0.034	-8.201	-0.186	-0.080	-0.232	-7.428	0.015	-0.036	-0.140	27
25-Feb-93	GS19	-7.509	-0.178	-7.416	0.032	-8.190	-0.171	-0.091	-0.247	-7.416	0.032	-0.048	-0.157	28
26-Feb-93	GS20	-8.653	-0.976	-8.554	-0.772	-8.219	-0.185	-0.062	-0.233	-7.445	0.018	-0.019	-0.143	28
03-Mar-93	75635	-8.429	-0.520	-8.331	-0.313	-8.224	-0.306	-0.057	-0.112	-7.449	-0.101	-0.015	-0.024	29
03-Mar-93	GS19	-7.524	-0.220	-7.431	-0.010	-8.205	-0.215	-0.078	-0.203	-7.431	-0.010	-0.033	-0.115	29
04-Mar-93	39382	-8.288	-0.496	-8.191	-0.289	-8.191	-0.289	-0.090	-0.129	-7.416	-0.084	-0.048	-0.041	29
04-Mar-93	GS20	-8.651	-1.113	-8.552	-0.910	-8.217	-0.325	-0.064	-0.093	-7.443	-0.120	-0.021	-0.005	29

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
10-Mar-93	GS19	-7.546	-0.284	-7.453	-0.075	-8.228	-0.281	-0.053	-0.137	-7.453	-0.075	-0.011	-0.050	30
11-Mar-93	GS19	-7.531	-0.355	-7.438	-0.146	-8.213	-0.353	-0.068	-0.065	-7.438	-0.146	-0.026	0.021	30
16-Mar-93	GS19	-7.528	-0.255	-7.435	-0.046	-8.211	-0.254	-0.070	-0.164	-7.435	-0.046	-0.029	-0.079	31
17-Mar-93	75635	-8.405	-0.509	-8.307	-0.302	-8.200	-0.295	-0.081	-0.123	-7.424	-0.086	-0.040	-0.039	31
17-Mar-93	75859	-8.293	-0.317	-8.196	-0.108	-8.195	-0.260	-0.086	-0.158	-7.418	-0.052	-0.046	-0.073	31
19-Mar-93	GS20	-8.644	-1.124	-8.545	-0.921	-8.213	-0.340	-0.068	-0.078	-7.436	-0.131	-0.028	0.006	32
24-Mar-93	GS20	-8.646	-1.052	-8.547	-0.849	-8.215	-0.269	-0.066	-0.149	-7.438	-0.059	-0.026	-0.066	32
25-Mar-93	GS19	-7.538	-0.329	-7.445	-0.120	-8.222	-0.331	-0.059	-0.087	-7.445	-0.120	-0.019	-0.005	32
01-Apr-93	GS20	-8.658	-1.057	-8.559	-0.854	-8.228	-0.276	-0.053	-0.142	-7.450	-0.064	-0.014	-0.061	33
02-Apr-93	39382	-8.298	-0.486	-8.199	-0.278	-8.199	-0.278	-0.082	-0.140	-7.420	-0.066	-0.044	-0.059	33
02-Apr-93	75635	-8.431	-0.579	-8.333	-0.372	-8.226	-0.365	-0.055	-0.053	-7.447	-0.152	-0.017	0.027	33
06-Apr-93	GS20	-8.663	-1.131	-8.564	-0.928	-8.234	-0.352	-0.047	-0.066	-7.455	-0.138	-0.009	0.013	34
08-Apr-93	GS19	-7.534	-0.315	-7.441	-0.106	-8.220	-0.321	-0.061	-0.097	-7.441	-0.106	-0.023	-0.019	34
13-Apr-93	GS20	-8.649	-1.122	-8.550	-0.919	-8.221	-0.345	-0.060	-0.073	-7.441	-0.129	-0.023	0.004	35
15-Apr-93	GS19	-7.557	-0.342	-7.463	-0.133	-8.244	-0.350	-0.037	-0.068	-7.463	-0.133	-0.001	0.008	35
21-Apr-93	GS20	-8.639	-1.074	-8.540	-0.871	-8.212	-0.299	-0.069	-0.119	-7.431	-0.081	-0.033	-0.044	36
22-Apr-93	GS19	-7.535	-0.334	-7.442	-0.125	-8.223	-0.344	-0.058	-0.074	-7.442	-0.125	-0.022	0.000	36
29-Apr-93	GS20	-8.644	-1.067	-8.545	-0.864	-8.218	-0.294	-0.063	-0.124	-7.436	-0.074	-0.028	-0.051	37
05-May-93	GS20	-8.635	-1.042	-8.536	-0.839	-8.210	-0.271	-0.071	-0.147	-7.427	-0.049	-0.037	-0.076	38
13-May-93	GS20	-8.635	-0.973	-8.536	-0.769	-8.211	-0.203	-0.070	-0.215	-7.427	0.021	-0.037	-0.146	39
14-May-93	GS19	-7.533	-0.303	-7.440	-0.094	-8.224	-0.319	-0.057	-0.099	-7.440	-0.094	-0.024	-0.031	39
19-May-93	GS20	-8.646	-1.073	-8.547	-0.870	-8.223	-0.306	-0.058	-0.112	-7.438	-0.080	-0.026	-0.045	40
20-May-93	39382	-8.315	-0.619	-8.218	-0.412	-8.218	-0.412	-0.063	-0.006	-7.432	-0.186	-0.032	0.061	40
20-May-93	75859	-8.340	-0.469	-8.243	-0.261	-8.242	-0.413	-0.039	-0.005	-7.456	-0.187	-0.008	0.062	40
20-May-93	GS19	-7.546	-0.323	-7.453	-0.114	-8.238	-0.340	-0.043	-0.078	-7.453	-0.114	-0.011	-0.011	40
26-May-93	GS20	-8.654	-1.108	-8.555	-0.903	-8.232	-0.341	-0.049	-0.077	-7.446	-0.113	-0.018	-0.012	41
27-May-93	39382	-8.344	-0.605	-8.246	-0.398	-8.246	-0.398	-0.035	-0.020	-7.460	-0.170	-0.004	0.045	41
27-May-93	75635	-8.452	-0.686	-8.354	-0.480	-8.247	-0.473	-0.034	0.055	-7.461	-0.245	-0.003	0.120	41
02-Jun-93	GS20	-8.663	-1.136	-8.564	-0.933	-8.242	-0.373	-0.039	-0.045	-7.455	-0.143	-0.009	0.018	42
03-Jun-93	75635	-8.442	-0.626	-8.344	-0.420	-8.237	-0.413	-0.044	-0.005	-7.450	-0.182	-0.014	0.057	42
03-Jun-93	75859	-8.381	-0.529	-8.283	-0.322	-8.282	-0.474	0.001	0.056	-7.495	-0.244	0.031	0.119	42

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured		NBS Corrected		Adjusted to 39382		AIR Terms		Adjusted to GS19		SEA Terms		Week No.
		d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	
09-Jun-93	GS20	-8.648	-1.097	-8.549	-0.894	-8.228	-0.338	-0.053	-0.082	-7.440	-0.104	-0.024	-0.021	43
16-Jun-93	GS20	-8.619	-0.944	-8.520	-0.740	-8.200	-0.184	-0.081	-0.234	-7.411	0.050	-0.053	-0.175	44
18-Jun-93	GS19	-7.514	-0.292	-7.421	-0.083	-8.210	-0.317	-0.071	-0.101	-7.421	-0.083	-0.043	-0.042	44
23-Jun-93	GS19	-7.517	-0.305	-7.424	-0.096	-8.213	-0.332	-0.068	-0.086	-7.424	-0.096	-0.040	-0.029	45
24-Jun-93	39382	-8.299	-0.499	-8.202	-0.292	-8.202	-0.292	-0.079	-0.126	-7.412	-0.056	-0.052	-0.069	45
24-Jun-93	75859	-8.353	-0.519	-8.255	-0.312	-8.254	-0.464	-0.027	0.046	-7.465	-0.228	0.001	0.103	45
24-Jun-93	GS20	-8.648	-1.123	-8.549	-0.920	-8.230	-0.368	-0.051	-0.052	-7.440	-0.130	-0.024	0.005	45
30-Jun-93	GS20	-8.631	-1.055	-8.532	-0.852	-8.213	-0.299	-0.068	-0.119	-7.423	-0.062	-0.041	-0.063	46
07-Jul-93	GS20	-8.645	-1.110	-8.546	-0.907	-8.228	-0.357	-0.053	-0.061	-7.437	-0.117	-0.027	-0.008	47
08-Jul-93	GS19	-7.566	-0.366	-7.472	-0.158	-8.264	-0.397	-0.017	-0.021	-7.472	-0.158	0.008	0.033	47
30-Jul-93	GS20	-8.678	-1.147	-8.579	-0.944	-8.264	-0.401	-0.017	-0.017	-7.470	-0.154	0.006	0.029	48
31-Jul-93	75859	-8.333	-0.444	-8.236	-0.236	-8.235	-0.388	-0.046	-0.030	-7.440	-0.142	-0.024	0.017	48
02-Aug-93	75635	-8.444	-0.633	-8.346	-0.427	-8.239	-0.420	-0.042	0.002	-7.444	-0.173	-0.020	0.048	49
03-Aug-93	GS19	-7.575	-0.424	-7.481	-0.216	-8.277	-0.463	-0.004	0.045	-7.481	-0.216	0.017	0.091	49
18-Aug-93	GS20	-8.658	-1.144	-8.559	-0.941	-8.247	-0.403	-0.034	-0.015	-7.450	-0.151	-0.014	0.026	50
25-Aug-93	GS20	-8.663	-1.144	-8.564	-0.941	-8.253	-0.405	-0.028	-0.013	-7.455	-0.151	-0.009	0.026	51
02-Sep-93	39382	-8.361	-0.652	-8.263	-0.446	-8.263	-0.446	-0.018	0.028	-7.464	-0.190	0.000	0.065	52
02-Sep-93	GS20	-8.668	-1.175	-8.569	-0.973	-8.259	-0.438	-0.022	0.020	-7.460	-0.183	-0.004	0.058	52
03-Sep-93	39382	-8.348	-0.641	-8.250	-0.435	-8.250	-0.435	-0.031	0.017	-7.451	-0.179	-0.013	0.054	52
08-Sep-93	75635	-8.471	-0.688	-8.373	-0.482	-8.266	-0.475	-0.015	0.057	-7.466	-0.218	0.002	0.093	53
08-Sep-93	GS20	-8.672	-1.178	-8.573	-0.976	-8.264	-0.443	-0.017	0.025	-7.464	-0.186	0.000	0.061	53
15-Sep-93	75635	-8.509	-0.738	-8.411	-0.532	-8.304	-0.525	0.023	0.107	-7.503	-0.266	0.039	0.141	54
15-Sep-93	GS20	-8.681	-1.214	-8.582	-1.012	-8.273	-0.481	-0.008	0.063	-7.473	-0.222	0.009	0.097	54
29-Sep-93	GS20	-8.688	-1.238	-8.588	-1.036	-8.282	-0.509	0.001	0.091	-7.479	-0.246	0.015	0.121	55
06-Oct-93	39382	-8.363	-0.615	-8.265	-0.408	-8.265	-0.408	-0.018	-0.010	-7.462	-0.143	-0.002	0.018	56
06-Oct-93	39382	-8.370	-0.632	-8.272	-0.426	-8.272	-0.426	-0.009	0.008	-7.469	-0.160	0.005	0.035	56
06-Oct-93	39382	-8.373	-0.709	-8.275	-0.503	-8.275	-0.503	-0.008	0.085	-7.471	-0.238	0.007	0.113	56
06-Oct-93	39382	-8.354	-0.633	-8.256	-0.427	-8.256	-0.427	-0.025	0.009	-7.453	-0.161	-0.011	0.036	56
06-Oct-93	75635	-8.510	-0.723	-8.412	-0.517	-8.305	-0.510	0.024	0.092	-7.501	-0.245	0.037	0.120	56

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
06-Oct-93	75635	-8.484	-0.661	-8.386	-0.455	-8.279	-0.448	-0.002	0.030	-7.475	-0.183	0.011	0.058	56
06-Oct-93	75635	-8.478	-0.708	-8.380	-0.502	-8.273	-0.495	-0.008	0.077	-7.469	-0.230	0.005	0.105	56
06-Oct-93	75859	-8.342	-0.513	-8.244	-0.306	-8.243	-0.458	-0.038	0.040	-7.440	-0.193	-0.024	0.068	56
06-Oct-93	75859	-8.357	-0.487	-8.259	-0.279	-8.258	-0.431	-0.023	0.013	-7.455	-0.166	-0.009	0.041	56
06-Oct-93	75859	-8.363	-0.537	-8.265	-0.330	-8.264	-0.482	-0.017	0.064	-7.461	-0.217	-0.003	0.092	56
06-Oct-93	75859	-8.350	-0.494	-8.252	-0.287	-8.251	-0.439	-0.030	0.021	-7.448	-0.173	-0.016	0.048	56
06-Oct-93	GS19	-7.553	-0.433	-7.459	-0.225	-8.263	-0.490	-0.018	0.072	-7.459	-0.225	-0.005	0.100	56
06-Oct-93	GS20	-8.687	-1.208	-8.587	-1.006	-8.282	-0.481	0.001	0.063	-7.478	-0.216	0.014	0.091	56
06-Oct-93	GS20	-8.697	-1.206	-8.597	-1.004	-8.292	-0.479	0.011	0.061	-7.488	-0.214	0.024	0.089	56
07-Oct-93	39382	-8.372	-0.693	-8.274	-0.487	-8.274	-0.487	-0.007	0.069	-7.470	-0.222	0.008	0.097	56
07-Oct-93	39382	-8.365	-0.707	-8.267	-0.501	-8.267	-0.501	-0.014	0.083	-7.463	-0.236	-0.001	0.111	56
07-Oct-93	39382	-8.354	-0.632	-8.256	-0.426	-8.256	-0.426	-0.025	0.008	-7.452	-0.160	-0.012	0.035	56
07-Oct-93	75635	-8.500	-0.736	-8.402	-0.530	-8.295	-0.523	0.014	0.105	-7.491	-0.258	0.027	0.133	56
07-Oct-93	75635	-8.482	-0.719	-8.384	-0.513	-8.277	-0.506	-0.004	0.088	-7.473	-0.241	0.009	0.116	56
07-Oct-93	75635	-8.491	-0.725	-8.393	-0.519	-8.286	-0.512	0.005	0.094	-7.482	-0.247	0.018	0.122	56
07-Oct-93	75635	-8.505	-0.800	-8.407	-0.595	-8.300	-0.588	0.019	0.170	-7.496	-0.322	0.032	0.197	56
07-Oct-93	75635	-8.491	-0.721	-8.393	-0.515	-8.286	-0.508	0.005	0.090	-7.482	-0.243	0.018	0.118	56
07-Oct-93	75859	-8.384	-0.555	-8.286	-0.348	-8.285	-0.500	0.004	0.082	-7.481	-0.235	0.017	0.110	56
07-Oct-93	75859	-8.365	-0.562	-8.267	-0.355	-8.266	-0.507	-0.015	0.089	-7.462	-0.242	-0.002	0.117	56
07-Oct-93	75859	-8.361	-0.557	-8.263	-0.350	-8.262	-0.502	-0.019	0.084	-7.458	-0.237	-0.006	0.112	56
07-Oct-93	GS19	-7.579	-0.476	-7.485	-0.268	-8.289	-0.534	0.008	0.116	-7.485	-0.268	0.021	0.143	56
07-Oct-93	GS19	-7.572	-0.475	-7.478	-0.267	-8.282	-0.533	0.001	0.115	-7.478	-0.267	0.014	0.142	56
07-Oct-93	GS20	-8.687	-1.221	-8.587	-1.019	-8.282	-0.494	0.001	0.078	-7.478	-0.229	0.014	0.104	56
13-Oct-93	39382	-8.368	-0.668	-8.270	-0.462	-8.270	-0.462	-0.011	0.044	-7.466	-0.195	0.002	0.070	57
13-Oct-93	75635	-8.469	-0.682	-8.371	-0.476	-8.264	-0.469	-0.017	0.051	-7.459	-0.202	-0.005	0.077	57
13-Oct-93	75859	-8.344	-0.507	-8.246	-0.300	-8.245	-0.452	-0.036	0.034	-7.441	-0.185	-0.023	0.060	57
13-Oct-93	GS20	-8.680	-1.170	-8.581	-0.968	-8.276	-0.445	-0.005	0.027	-7.472	-0.178	0.008	0.053	57
14-Oct-93	39382	-8.379	-0.681	-8.281	-0.475	-8.281	-0.475	0.000	0.057	-7.476	-0.208	0.012	0.083	57
14-Oct-93	39382	-8.371	-0.675	-8.273	-0.469	-8.273	-0.469	-0.008	0.051	-7.468	-0.202	0.004	0.077	57
14-Oct-93	75635	-8.478	-0.699	-8.380	-0.493	-8.273	-0.486	-0.008	0.068	-7.468	-0.219	0.004	0.094	57
14-Oct-93	75635	-8.475	-0.716	-8.377	-0.510	-8.270	-0.503	-0.011	0.085	-7.465	-0.236	0.001	0.111	57
14-Oct-93	75635	-8.484	-0.712	-8.386	-0.506	-8.279	-0.499	-0.002	0.081	-7.474	-0.232	0.010	0.107	57
14-Oct-93	75859	-8.371	-0.528	-8.273	-0.321	-8.272	-0.473	-0.009	0.055	-7.467	-0.205	0.003	0.080	57
14-Oct-93	75859	-8.369	-0.545	-8.271	-0.338	-8.270	-0.490	-0.011	0.072	-7.465	-0.223	0.001	0.098	57
14-Oct-93	75859	-8.360	-0.511	-8.262	-0.304	-8.261	-0.456	-0.020	0.038	-7.457	-0.188	-0.007	0.063	57
14-Oct-93	GS19	-7.580	-0.438	-7.486	-0.230	-8.291	-0.497	0.010	0.079	-7.486	-0.230	0.022	0.105	57
20-Oct-93	GS19	-7.587	-0.436	-7.493	-0.228	-8.299	-0.497	0.018	0.079	-7.493	-0.228	0.029	0.103	58
20-Oct-93	GS20	-8.677	-1.183	-8.578	-0.981	-8.274	-0.460	-0.007	0.042	-7.469	-0.191	0.005	0.066	58
22-Oct-93	GS19	-7.585	-0.466	-7.491	-0.258	-8.297	-0.528	0.016	0.110	-7.491	-0.258	0.027	0.133	58
22-Oct-93	GS20	-8.699	-1.212	-8.599	-1.010	-8.296	-0.489	0.015	0.071	-7.490	-0.220	0.026	0.095	58

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured		NBS Corrected		Adjusted to 39382		AIR Terms		Adjusted to GS19		SEA Terms		Week No.
		d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	
03-Nov-93	75635	-8.423	-0.358	-8.325	-0.149	-8.218	-0.142	-0.063	-0.276	-7.411	0.130	-0.053	-0.255	59
03-Nov-93	75859	-8.291	-0.166	-8.194	0.044	-8.193	-0.108	-0.088	-0.310	-7.385	0.165	-0.079	-0.290	59
04-Nov-93	39382	-8.300	-0.275	-8.203	-0.066	-8.203	-0.066	-0.078	-0.352	-7.395	0.207	-0.069	-0.332	59
04-Nov-93	75635	-8.446	-0.375	-8.348	-0.167	-8.241	-0.160	-0.040	-0.258	-7.433	0.114	-0.031	-0.239	59
18-Nov-93	39382	-8.335	-0.464	-8.238	-0.256	-8.238	-0.256	-0.043	-0.162	-7.428	0.021	-0.036	-0.146	60
18-Nov-93	75635	-8.481	-0.598	-8.383	-0.391	-8.276	-0.384	-0.005	-0.034	-7.466	-0.107	0.002	-0.018	60
19-Nov-93	39382	-8.379	-0.574	-8.281	-0.367	-8.281	-0.367	0.000	-0.051	-7.472	-0.090	0.008	-0.035	60
19-Nov-93	75635	-8.497	-0.621	-8.399	-0.414	-8.292	-0.407	0.011	-0.011	-7.482	-0.130	0.018	0.005	60
19-Nov-93	75859	-8.335	-0.316	-8.238	-0.107	-8.237	-0.259	-0.044	-0.159	-7.427	0.018	-0.037	-0.143	60
19-Nov-93	75859	-8.365	-0.394	-8.267	-0.186	-8.266	-0.338	-0.015	-0.080	-7.457	-0.060	-0.007	-0.065	60
01-Dec-93	39382	-8.402	-0.666	-8.304	-0.460	-8.304	-0.460	0.023	0.042	-7.493	-0.179	0.029	0.054	61
01-Dec-93	75635	-8.476	-0.615	-8.378	-0.408	-8.271	-0.401	-0.010	-0.017	-7.459	-0.121	-0.005	-0.004	61
02-Dec-93	75635	-8.527	-0.715	-8.428	-0.509	-8.321	-0.502	0.040	0.084	-7.510	-0.221	0.046	0.098	61
02-Dec-93	75859	-8.375	-0.384	-8.277	-0.176	-8.276	-0.328	-0.005	-0.090	-7.465	-0.047	0.001	-0.078	61
06-Dec-93	39382	-8.355	-0.592	-8.257	-0.385	-8.257	-0.385	-0.024	-0.033	-7.445	-0.103	-0.019	-0.022	62
06-Dec-93	75635	-8.463	-0.572	-8.365	-0.365	-8.258	-0.358	-0.023	-0.060	-7.446	-0.076	-0.018	-0.049	62
07-Dec-93	75635	-8.461	-0.583	-8.363	-0.376	-8.256	-0.369	-0.025	-0.049	-7.444	-0.087	-0.020	-0.038	62
07-Dec-93	75859	-8.349	-0.440	-8.251	-0.232	-8.250	-0.384	-0.031	-0.034	-7.438	-0.102	-0.026	-0.023	62
08-Dec-93	39382	-8.382	-0.661	-8.284	-0.455	-8.284	-0.455	0.003	0.037	-7.472	-0.172	0.008	0.047	62
08-Dec-93	75859	-8.371	-0.469	-8.273	-0.261	-8.272	-0.413	-0.009	-0.005	-7.460	-0.131	-0.004	0.006	62
10-Dec-93	39382	-8.367	-0.664	-8.269	-0.458	-8.269	-0.458	-0.012	0.040	-7.457	-0.175	-0.007	0.050	62
10-Dec-93	75635	-8.481	-0.635	-8.383	-0.429	-8.276	-0.422	-0.005	0.004	-7.463	-0.138	-0.001	0.013	62
20-Dec-93	39382	-8.370	-0.597	-8.272	-0.390	-8.272	-0.390	-0.009	-0.028	-7.458	-0.104	-0.006	-0.021	63
20-Dec-93	75859	-8.383	-0.473	-8.285	-0.265	-8.284	-0.417	0.003	-0.001	-7.470	-0.131	0.006	0.008	63
22-Dec-93	75635	-8.476	-0.585	-8.378	-0.378	-8.271	-0.371	-0.010	-0.047	-7.457	-0.085	-0.007	-0.040	63
22-Dec-93	75859	-8.355	-0.399	-8.257	-0.191	-8.256	-0.343	-0.025	-0.075	-7.442	-0.056	-0.022	-0.069	63
04-Jan-94	75635	-8.569	-0.773	-8.470	-0.568	-8.363	-0.561	0.082	0.143	-7.547	-0.270	0.083	0.145	64
04-Jan-94	75859	-8.390	-0.534	-8.292	-0.327	-8.291	-0.479	0.010	0.061	-7.475	-0.189	0.011	0.064	64
05-Jan-94	75635	-8.523	-0.741	-8.425	-0.535	-8.318	-0.528	0.038	0.110	-7.501	-0.238	0.037	0.113	64
05-Jan-94	75859	-8.365	-0.433	-8.267	-0.225	-8.266	-0.377	-0.015	-0.041	-7.450	-0.088	-0.014	-0.039	64
11-Jan-94	39382	-8.396	-0.679	-8.298	-0.473	-8.298	-0.473	0.017	0.055	-7.481	-0.181	0.017	0.056	65
11-Jan-94	75635	-8.533	-0.739	-8.434	-0.533	-8.327	-0.526	0.046	0.108	-7.511	-0.234	0.047	0.109	65
12-Jan-94	GS19	-7.557	-0.344	-7.463	-0.135	-8.280	-0.428	-0.001	0.010	-7.463	-0.135	-0.001	0.010	66
12-Jan-94	GS20	-8.673	-1.110	-8.574	-0.907	-8.282	-0.410	0.001	-0.008	-7.465	-0.117	0.001	-0.008	66
13-Jan-94	GS19	-7.578	-0.341	-7.484	-0.132	-8.302	-0.425	0.021	0.007	-7.484	-0.132	0.020	0.007	66
13-Jan-94	GS20	-8.664	-1.122	-8.565	-0.919	-8.273	-0.422	-0.008	0.004	-7.456	-0.129	-0.008	0.004	66
13-Jan-94	GS20	-8.697	-1.123	-8.597	-0.920	-8.306	-0.423	0.025	0.005	-7.488	-0.130	0.024	0.005	66
13-Jan-94	GS20	-8.673	-1.130	-8.574	-0.927	-8.282	-0.430	0.001	0.012	-7.465	-0.137	0.001	0.012	66

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 393B2 d13C	Adjusted to 393B2 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
19-Jan-94	GS19	-7.567	-0.338	-7.473	-0.129	-8.291	-0.424	0.010	0.006	-7.473	-0.129	0.009	0.004	66
19-Jan-94	GS20	-8.662	-1.111	-8.563	-0.908	-8.272	-0.413	-0.009	-0.005	-7.454	-0.118	-0.010	-0.007	66
26-Jan-94	39382	-8.461	-0.756	-8.363	-0.550	-8.363	-0.550	0.082	0.132	-7.544	-0.254	0.080	0.129	67
26-Jan-94	75635	-8.529	-0.723	-8.430	-0.517	-8.323	-0.510	0.042	0.092	-7.505	-0.214	0.041	0.089	67
27-Jan-94	39382	-8.412	-0.714	-8.314	-0.508	-8.314	-0.508	0.033	0.090	-7.495	-0.211	0.031	0.086	67
27-Jan-94	75859	-8.437	-0.596	-8.339	-0.389	-8.338	-0.541	0.057	0.123	-7.519	-0.245	0.055	0.120	67
02-Feb-94	75635	-8.622	-0.924	-8.523	-0.720	-8.416	-0.713	0.135#	0.295#	-7.596	-0.414	0.132#	0.289#	68
02-Feb-94	75859	-8.490	-0.686	-8.392	-0.480	-8.391	-0.632	0.110#	0.214#	-7.571	-0.334	0.107#	0.209#	68
03-Feb-94	39382	-8.427	-0.751	-8.329	-0.545	-8.329	-0.545	0.048	0.127	-7.509	-0.247	0.045	0.122	68
03-Feb-94	75859	-8.429	-0.565	-8.331	-0.358	-8.330	-0.510	0.049	0.092	-7.510	-0.211	0.046	0.086	68
17-Feb-94	39382	-8.403	-0.720	-8.305	-0.514	-8.305	-0.514	0.024	0.096	-7.483	-0.212	0.019	0.087	70
17-Feb-94	75635	-8.575	-0.807	-8.476	-0.602	-8.369	-0.595	0.088	0.177	-7.547	-0.292	0.083	0.167	70
02-Mar-94	75635	-8.539	-0.829	-8.440	-0.624	-8.333	-0.617	0.052	0.199	-7.510	-0.311	0.046	0.186	71
02-Mar-94	75859	-8.406	-0.588	-8.308	-0.381	-8.307	-0.533	0.026	0.115	-7.484	-0.227	0.020	0.102	71
03-Mar-94	39382	-8.427	-0.716	-8.329	-0.510	-8.329	-0.510	0.048	0.092	-7.505	-0.204	0.041	0.079	71
03-Mar-94	75859	-8.439	-0.606	-8.341	-0.399	-8.340	-0.551	0.059	0.133	-7.516	-0.245	0.052	0.120	71
09-Mar-94	39382	-8.468	-0.835	-8.370	-0.630	-8.370	-0.630	0.089#	0.212#	-7.545	-0.322	0.081#	0.197#	72
09-Mar-94	75635	-8.549	-0.754	-8.450	-0.548	-8.343	-0.541	0.062	0.123	-7.519	-0.233	0.055	0.108	72
10-Mar-94	75635	-8.529	-0.780	-8.430	-0.575	-8.323	-0.568	0.042	0.150	-7.499	-0.259	0.035	0.134	72
10-Mar-94	75859	-8.440	-0.609	-8.342	-0.402	-8.341	-0.554	0.060	0.136	-7.516	-0.246	0.052	0.121	72
11-Mar-94	39382	-8.424	-0.745	-8.326	-0.539	-8.326	-0.539	0.045	0.121	-7.501	-0.231	0.037	0.106	72
11-Mar-94	75859	-8.415	-0.570	-8.317	-0.363	-8.316	-0.515	0.035	0.097	-7.491	-0.206	0.027	0.081	72
11-Mar-94	GS19	-7.618	-0.468	-7.524	-0.260	-8.349	-0.569	0.068	0.151	-7.524	-0.260	0.060	0.135	72
11-Mar-94	GS20	-8.721	-1.244	-8.621	-1.042	-8.337	-0.561	0.058	0.143	-7.512	-0.252	0.048	0.127	72
16-Mar-94	39382	-8.464	-0.757	-8.366	-0.551	-8.366	-0.551	0.085	0.133	-7.540	-0.241	0.076	0.116	73
16-Mar-94	75635	-8.494	-0.725	-8.396	-0.519	-8.289	-0.512	0.008	0.094	-7.463	-0.202	-0.001	0.077	73
17-Mar-94	75635	-8.542	-0.727	-8.443	-0.521	-8.336	-0.514	0.055	0.096	-7.511	-0.204	0.047	0.079	73
17-Mar-94	75859	-8.457	-0.601	-8.359	-0.394	-8.358	-0.546	0.077	0.128	-7.532	-0.236	0.068	0.111	73
22-Mar-94	39382	-8.407	-0.713	-8.309	-0.507	-8.309	-0.507	0.028	0.089	-7.483	-0.195	0.019	0.070	74
22-Mar-94	75859	-8.416	-0.566	-8.318	-0.359	-8.317	-0.511	0.036	0.093	-7.491	-0.199	0.027	0.074	74
23-Mar-94	39382	-8.420	-0.727	-8.322	-0.521	-8.322	-0.521	0.041	0.103	-7.496	-0.209	0.032	0.084	74
23-Mar-94	75635	-8.516	-0.753	-8.418	-0.547	-8.311	-0.540	0.030	0.122	-7.484	-0.228	0.020	0.103	74
24-Mar-94	75635	-8.495	-0.733	-8.397	-0.527	-8.290	-0.520	0.009	0.102	-7.463	-0.208	-0.001	0.083	74
24-Mar-94	75859	-8.394	-0.567	-8.296	-0.360	-8.295	-0.512	0.014	0.094	-7.469	-0.200	0.005	0.075	74
25-Mar-94	39382	-8.444	-0.761	-8.346	-0.556	-8.346	-0.556	0.065	0.138	-7.519	-0.243	0.055	0.118	74
25-Mar-94	75859	-8.412	-0.594	-8.314	-0.387	-8.313	-0.539	0.032	0.121	-7.486	-0.227	0.022	0.102	74

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	----Measured--- d13C	d180	NBS ---Corrected--- d13C	d180	Adjusted to 39382 d13C	d180	AIR ------Terms----- d13C	d180	Adjusted to GS19 d13C	d180	SEA ------Terms----- d13C	d180	Week No.
29-Mar-94	39382	-8.406	-0.741	-8.308	-0.535	-8.308	-0.535	0.027	0.117	-7.481	-0.222	0.017	0.097	75
29-Mar-94	75635	-8.544	-0.817	-8.445	-0.612	-8.338	-0.605	0.057	0.187	-7.511	-0.291	0.047	0.166	75
30-Mar-94	39382	-8.464	-0.826	-8.366	-0.621	-8.366	-0.621	0.085	0.203	-7.538	-0.307	0.074	0.182	75
30-Mar-94	75859	-8.439	-0.618	-8.341	-0.411	-8.340	-0.563	0.059	0.145	-7.513	-0.249	0.049	0.124	75
15-Apr-94	GS19	-7.501	-0.047	-7.408	0.164	-8.237	-0.155	-0.044	-0.263	-7.408	0.164	-0.058	-0.289	76
15-Apr-94	GS19	-7.510	-0.060	-7.417	0.151	-8.246	-0.168	-0.035	-0.250	-7.417	0.151	-0.047	-0.276	76
15-Apr-94	GS19	-7.512	-0.062	-7.419	0.149	-8.248	-0.170	-0.033	-0.248	-7.419	0.149	-0.045	-0.274	76
15-Apr-94	GS20	-8.632	-0.829	-8.533	-0.624	-8.253	-0.153	-0.028	-0.265	-7.424	0.166	-0.040	-0.291	76
15-Apr-94	GS20	-8.613	-0.835	-8.514	-0.630	-8.235	-0.159	-0.046	-0.259	-7.405	0.160	-0.059	-0.285	76
18-Apr-94	39382	-8.373	-0.418	-8.275	-0.210	-8.275	-0.210	-0.006	-0.208	-7.445	0.109	-0.019	-0.234	76
18-Apr-94	39382	-8.375	-0.409	-8.277	-0.201	-8.277	-0.201	-0.004	-0.217	-7.447	0.119	-0.017	-0.244	76
18-Apr-94	75635	-8.492	-0.450	-8.394	-0.242	-8.287	-0.235	0.006	-0.183	-7.457	0.084	-0.007	-0.209	76
18-Apr-94	75635	-8.518	-0.458	-8.420	-0.250	-8.313	-0.243	0.032	-0.175	-7.483	0.076	0.019	-0.201	76
18-Apr-94	75859	-8.319	-0.170	-8.222	0.040	-8.221	-0.112	-0.060	-0.306	-7.391	0.207	-0.073	-0.332	76
18-Apr-94	75859	-8.314	-0.149	-8.217	0.061	-8.216	-0.091	-0.065	-0.327	-7.386	0.228	-0.078	-0.353	76
18-Apr-94	GS19	-7.517	-0.100	-7.424	0.111	-8.254	-0.209	-0.027	-0.209	-7.424	0.111	-0.040	-0.236	76
18-Apr-94	GS19	-7.526	-0.057	-7.433	0.154	-8.263	-0.166	-0.018	-0.252	-7.433	0.154	-0.031	-0.279	76
18-Apr-94	GS20	-8.643	-0.820	-8.544	-0.615	-8.265	-0.144	-0.016	-0.274	-7.435	0.175	-0.029	-0.300	76
18-Apr-94	GS20	-8.621	-0.846	-8.522	-0.641	-8.243	-0.171	-0.038	-0.247	-7.413	0.149	-0.051	-0.274	76
19-Apr-94	75635	-8.504	-0.463	-8.406	-0.255	-8.299	-0.248	0.018	-0.170	-7.469	0.071	0.005	-0.196	76
19-Apr-94	75859	-8.381	-0.204	-8.283	0.006	-8.282	-0.146	0.001	-0.272	-7.452	0.173	-0.012	-0.298	76
20-Apr-94	39382	-8.410	-0.489	-8.312	-0.281	-8.312	-0.281	0.031	-0.137	-7.482	0.038	0.018	-0.163	76
20-Apr-94	75635	-8.528	-0.462	-8.430	-0.254	-8.323	-0.247	0.042	-0.171	-7.492	0.073	0.028	-0.198	76
21-Apr-94	39382	-8.378	-0.414	-8.280	-0.206	-8.280	-0.206	-0.001	-0.212	-7.450	0.114	-0.014	-0.239	76
21-Apr-94	75859	-8.416	-0.307	-8.318	-0.098	-8.317	-0.250	0.036	-0.168	-7.487	0.070	0.023	-0.195	76
27-Apr-94	39382	-8.381	-0.506	-8.283	-0.299	-8.283	-0.299	0.002	-0.119	-7.452	0.023	-0.012	-0.148	77
27-Apr-94	75635	-8.477	-0.502	-8.379	-0.295	-8.272	-0.288	-0.009	-0.130	-7.441	0.034	-0.023	-0.159	77
28-Apr-94	75635	-8.497	-0.592	-8.399	-0.385	-8.292	-0.378	0.011	-0.040	-7.460	-0.056	-0.004	-0.069	77
28-Apr-94	75859	-8.381	-0.343	-8.283	-0.134	-8.282	-0.286	0.001	-0.132	-7.451	0.036	-0.013	-0.161	77
29-Apr-94	39382	-8.409	-0.621	-8.311	-0.414	-8.311	-0.414	0.030	-0.004	-7.480	-0.092	0.016	-0.033	77
29-Apr-94	75859	-8.385	-0.411	-8.287	-0.203	-8.286	-0.355	0.005	-0.063	-7.455	-0.032	-0.009	-0.093	77
11-May-94	39382	-8.404	-0.599	-8.306	-0.392	-8.306	-0.392	0.025	-0.026	-7.473	-0.067	0.009	-0.058	78
11-May-94	75635	-8.534	-0.632	-8.435	-0.426	-8.328	-0.419	0.047	0.001	-7.496	-0.093	0.032	-0.032	78
13-May-94	75635	-8.545	-0.659	-8.446	-0.453	-8.339	-0.446	0.058	0.028	-7.506	-0.119	0.042	-0.006	78
13-May-94	75859	-8.407	-0.455	-8.309	-0.247	-8.308	-0.399	0.027	-0.019	-7.475	-0.073	0.011	-0.052	78
18-May-94	39382	-8.351	-0.566	-8.253	-0.359	-8.253	-0.359	-0.028	-0.059	-7.419	-0.031	-0.045	-0.094	79
18-May-94	75859	-8.382	-0.464	-8.284	-0.256	-8.283	-0.408	0.002	-0.010	-7.449	-0.081	-0.015	-0.044	79
19-May-94	75635	-8.518	-0.654	-8.420	-0.448	-8.313	-0.441	0.032	0.023	-7.478	-0.113	0.014	-0.012	79
19-May-94	75859	-8.380	-0.437	-8.282	-0.229	-8.281	-0.381	0.000	-0.037	-7.447	-0.053	-0.017	-0.072	79

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
24-May-94	39382	-8.408	-0.569	-8.308	-0.362	-8.308	-0.362	0.027	-0.056	-7.473	-0.033	0.009	-0.092	80
24-May-94	75635	-8.519	-0.607	-8.421	-0.400	-8.314	-0.393	0.033	-0.025	-7.479	-0.064	0.015	-0.061	80
25-May-94	39382	-8.373	-0.543	-8.275	-0.336	-8.275	-0.336	-0.006	-0.082	-7.440	-0.006	-0.024	-0.119	80
25-May-94	75859	-8.350	-0.333	-8.253	-0.124	-8.252	-0.276	-0.029	-0.142	-7.417	0.053	-0.047	-0.178	80
25-May-94	GS19	-7.570	-0.238	-7.476	-0.029	-8.311	-0.358	0.030	-0.060	-7.476	-0.029	0.012	-0.096	80
25-May-94	GS20	-8.687	-1.047	-8.588	-0.844	-8.313	-0.383	0.032	-0.035	-7.479	-0.054	0.015	-0.071	80
07-Jun-94	39382	-8.377	-0.629	-8.279	-0.423	-8.279	-0.423	-0.002	0.005	-7.443	-0.089	-0.021	-0.036	81
07-Jun-94	75635	-8.545	-0.753	-8.446	-0.547	-8.339	-0.540	0.058	0.122	-7.503	-0.207	0.039	0.082	81
08-Jun-94	39382	-8.417	-0.692	-8.319	-0.486	-8.319	-0.486	0.038	0.068	-7.482	-0.152	0.018	0.027	81
08-Jun-94	75859	-8.381	-0.456	-8.283	-0.248	-8.282	-0.400	0.001	-0.018	-7.446	-0.067	-0.018	-0.058	81
16-Jun-94	75635	-8.564	-0.750	-8.465	-0.544	-8.358	-0.537	0.077	0.119	-7.520	-0.202	0.056	0.077	82
16-Jun-94	75859	-8.398	-0.498	-8.300	-0.291	-8.299	-0.443	0.018	0.025	-7.461	-0.107	-0.003	-0.018	82
17-Jun-94	39382	-8.389	-0.619	-8.291	-0.412	-8.291	-0.412	0.010	-0.006	-7.453	-0.076	-0.011	-0.049	82
17-Jun-94	75859	-8.468	-0.592	-8.370	-0.385	-8.369	-0.537	0.088	0.119	-7.531	-0.201	0.067	0.076	82
22-Jun-94	75635	-8.598	-0.803	-8.499	-0.598	-8.392	-0.591	0.111	0.173	-7.553	-0.253	0.089	0.128	83
22-Jun-94	75859	-8.479	-0.612	-8.381	-0.405	-8.380	-0.557	0.099	0.139	-7.541	-0.220	0.077	0.095	83
22-Jun-94	GS19	-7.605	-0.384	-7.511	-0.176	-8.350	-0.513	0.069	0.095	-7.511	-0.176	0.047	0.051	83
23-Jun-94	39382	-8.433	-0.674	-8.335	-0.468	-8.335	-0.468	0.054	0.050	-7.496	-0.130	0.032	0.005	83
23-Jun-94	75635	-8.544	-0.656	-8.445	-0.450	-8.338	-0.443	0.057	0.025	-7.500	-0.105	0.036	-0.020	83
30-Jun-94	39382	-8.422	-0.673	-8.324	-0.467	-8.324	-0.467	0.043	0.049	-7.484	-0.127	0.020	0.002	84
30-Jun-94	75635	-8.569	-0.727	-8.470	-0.521	-8.363	-0.514	0.082	0.096	-7.524	-0.175	0.060	0.050	84
01-Jul-94	39382	-8.446	-0.709	-8.348	-0.503	-8.348	-0.503	0.067	0.085	-7.508	-0.163	0.044	0.038	84
01-Jul-94	75859	-8.428	-0.490	-8.330	-0.282	-8.329	-0.434	0.048	0.016	-7.489	-0.094	0.025	-0.031	84
06-Jul-94	75635	-8.544	-0.709	-8.445	-0.503	-8.338	-0.496	0.057	0.078	-7.498	-0.155	0.034	0.030	85
06-Jul-94	75859	-8.442	-0.508	-8.344	-0.301	-8.343	-0.453	0.062	0.035	-7.502	-0.111	0.038	-0.014	85
07-Jul-94	39382	-8.433	-0.662	-8.335	-0.456	-8.335	-0.456	0.054	0.038	-7.494	-0.114	0.030	-0.011	85
07-Jul-94	75635	-8.531	-0.658	-8.432	-0.452	-8.325	-0.445	0.044	0.027	-7.485	-0.103	0.021	-0.022	85
13-Jul-94	39382	-8.469	-0.783	-8.371	-0.578	-8.371	-0.578	0.090	0.160	-7.529	-0.234	0.065	0.109	86
13-Jul-94	75635	-8.522	-0.675	-8.424	-0.469	-8.317	-0.462	0.036	0.044	-7.475	-0.118	0.011	-0.007	86
14-Jul-94	75635	-8.558	-0.680	-8.459	-0.474	-8.352	-0.467	0.071	0.049	-7.511	-0.123	0.047	-0.002	86
14-Jul-94	75859	-8.435	-0.510	-8.337	-0.303	-8.336	-0.455	0.055	0.037	-7.494	-0.111	0.030	-0.014	86
03-Aug-94	39382	-8.427	-0.638	-8.329	-0.432	-8.329	-0.432	0.048	0.014	-7.485	-0.082	0.021	-0.043	87
03-Aug-94	75859	-8.402	-0.511	-8.304	-0.304	-8.303	-0.456	0.022	0.038	-7.459	-0.106	-0.005	-0.019	87
04-Aug-94	39382	-8.455	-0.737	-8.357	-0.531	-8.357	-0.531	0.076	0.113	-7.512	-0.182	0.048	0.057	87
04-Aug-94	75635	-8.566	-0.755	-8.467	-0.549	-8.360	-0.542	0.079	0.124	-7.516	-0.193	0.052	0.068	87

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
17-Aug-94	75635	-8.523	-0.663	-8.425	-0.457	-8.318	-0.450	0.037	0.032	-7.471	-0.097	0.007	-0.028	88
17-Aug-94	75859	-8.462	-0.617	-8.364	-0.410	-8.363	-0.562	0.082	0.144	-7.517	-0.209	0.053	0.084	88
18-Aug-94	39382	-8.408	-0.585	-8.308	-0.378	-8.308	-0.378	0.027	-0.040	-7.462	-0.025	-0.002	-0.100	88
18-Aug-94	75859	-8.442	-0.508	-8.344	-0.301	-8.343	-0.453	0.082	0.035	-7.497	-0.099	0.033	-0.026	88
24-Aug-94	39382	-8.398	-0.657	-8.298	-0.451	-8.298	-0.451	0.017	0.033	-7.451	-0.098	-0.013	-0.029	89
24-Aug-94	75635	-8.542	-0.708	-8.443	-0.502	-8.336	-0.495	0.055	0.077	-7.489	-0.140	0.025	0.015	89
01-Sep-94	39382	-8.426	-0.699	-8.328	-0.493	-8.328	-0.493	0.047	0.075	-7.480	-0.138	0.016	0.011	90
01-Sep-94	75635	-8.572	-0.770	-8.473	-0.565	-8.366	-0.558	0.085	0.140	-7.518	-0.200	0.054	0.075	90
01-Sep-94	75859	-8.649	-0.979	-8.550	-0.775	-8.549	-0.927	0.268#	0.509#	-7.701	-0.570	0.237#	0.445#	90
15-Sep-94	39382	-8.476	-0.701	-8.378	-0.495	-8.378	-0.495	0.097	0.077	-7.528	-0.134	0.064	0.009	91
15-Sep-94	39382	-8.445	-0.533	-8.347	-0.326	-8.347	-0.326	0.066	-0.092	-7.497	0.035	0.033	-0.160	91
15-Sep-94	75859	-8.419	-0.362	-8.321	-0.154	-8.320	-0.306	0.039	-0.112	-7.470	0.056	0.006	-0.181	91
15-Sep-94	GS19	-7.530	-0.109	-7.437	0.101	-8.287	-0.260	0.006	-0.158	-7.437	0.101	-0.027	-0.226	91
16-Sep-94	39382	-8.387	-0.474	-8.289	-0.266	-8.289	-0.266	0.008	-0.152	-7.439	0.095	-0.025	-0.220	91
16-Sep-94	75635	-8.485	-0.522	-8.387	-0.315	-8.280	-0.308	-0.001	-0.110	-7.430	0.054	-0.034	-0.179	91
28-Sep-94	75635	-8.480	-0.484	-8.382	-0.276	-8.275	-0.269	-0.006	-0.149	-7.423	0.095	-0.041	-0.220	92
28-Sep-94	75859	-8.407	-0.332	-8.309	-0.123	-8.308	-0.275	0.027	-0.143	-7.456	0.090	-0.008	-0.215	92
29-Sep-94	39382	-8.419	-0.595	-8.321	-0.388	-8.321	-0.388	0.040	-0.030	-7.469	-0.023	0.005	-0.102	92
29-Sep-94	75635	-8.538	-0.586	-8.439	-0.379	-8.332	-0.372	0.051	-0.046	-7.481	-0.007	0.017	-0.118	92
29-Sep-94	GS20	-8.648	-0.929	-8.549	-0.725	-8.292	-0.300	0.011	-0.118	-7.440	0.065	-0.024	-0.190	92
16-Nov-94	75635	-8.617	-0.900	-8.518	-0.696	-8.411	-0.689	0.130	0.271	-7.553	-0.310	0.089	0.185	93
16-Nov-94	75859	-8.475	-0.623	-8.377	-0.416	-8.376	-0.568	0.095	0.150	-7.517	-0.190	0.053	0.065	93
17-Nov-94	39382	-8.456	-0.803	-8.358	-0.598	-8.358	-0.598	0.077	0.180	-7.499	-0.219	0.035	0.094	93
17-Nov-94	39382	-8.442	-0.756	-8.344	-0.550	-8.344	-0.550	0.063	0.132	-7.485	-0.172	0.021	0.047	93
30-Nov-94	39382	-8.370	-0.448	-8.272	-0.240	-8.272	-0.240	-0.009	-0.178	-7.412	0.142	-0.052	-0.267	94
30-Nov-94	75635	-8.465	-0.465	-8.367	-0.257	-8.260	-0.250	-0.021	-0.168	-7.400	0.132	-0.064	-0.257	94
30-Nov-94	75859	-8.344	-0.290	-8.247	-0.081	-8.246	-0.233	-0.035	-0.185	-7.385	0.150	-0.079	-0.275	94
01-Dec-94	75635	-8.460	-0.424	-8.362	-0.216	-8.255	-0.209	-0.026	-0.209	-7.395	0.174	-0.069	-0.299	94
01-Dec-94	75859	-8.335	-0.215	-8.238	-0.005	-8.237	-0.157	-0.044	-0.261	-7.376	0.225	-0.088	-0.350	94
01-Dec-94	GS19	-7.497	-0.064	-7.404	0.147	-8.264	-0.236	-0.017	-0.182	-7.404	0.147	-0.060	-0.272	94
07-Dec-94	75635	-8.550	-0.663	-8.451	-0.457	-8.344	-0.450	0.063	0.032	-7.483	-0.065	0.019	-0.060	95
07-Dec-94	75859	-8.365	-0.339	-8.267	-0.130	-8.266	-0.282	-0.015	-0.136	-7.405	0.102	-0.059	-0.227	95
08-Dec-94	39382	-8.400	-0.573	-8.302	-0.366	-8.302	-0.366	0.021	-0.052	-7.441	0.019	-0.023	-0.144	95
08-Dec-94	75635	-8.514	-0.635	-8.416	-0.429	-8.309	-0.422	0.028	0.004	-7.447	-0.037	-0.017	-0.088	95
08-Dec-94	GS20	-8.642	-0.959	-8.543	-0.755	-8.295	-0.350	0.014	-0.068	-7.434	0.035	-0.030	-0.160	95
14-Dec-94	75635	-8.589	-0.837	-8.490	-0.632	-8.383	-0.625	0.102	0.207	-7.521	-0.239	0.057	0.114	96
14-Dec-94	75859	-8.400	-0.462	-8.302	-0.254	-8.301	-0.406	0.020	-0.012	-7.439	-0.020	-0.025	-0.105	96
15-Dec-94	75859	-8.390	-0.477	-8.292	-0.269	-8.291	-0.421	0.010	0.003	-7.429	-0.035	-0.035	-0.090	96

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
21-Dec-94	75635	-8.524	-0.727	-8.426	-0.521	-8.319	-0.514	0.038	0.098	-7.455	-0.126	-0.009	0.001	97
21-Dec-94	75859	-8.462	-0.673	-8.364	-0.467	-8.363	-0.619	0.082	0.201	-7.500	-0.230	0.036	0.105	97
04-Jan-95	39382	-8.494	-0.854	-8.396	-0.649	-8.396	-0.649	0.115	0.231	-7.531	-0.257	0.067	0.132	98
04-Jan-95	75859	-8.420	-0.560	-8.322	-0.353	-8.321	-0.505	0.040	0.087	-7.456	-0.113	-0.008	-0.012	98
05-Jan-95	39382	-8.468	-0.781	-8.368	-0.576	-8.368	-0.576	0.087	0.158	-7.503	-0.183	0.039	0.058	98
05-Jan-95	75635	-8.575	-0.749	-8.476	-0.543	-8.369	-0.536	0.088	0.118	-7.504	-0.144	0.040	0.019	98
18-Jan-95	39382	-8.401	-0.756	-8.303	-0.550	-8.303	-0.550	0.022	0.132	-7.436	-0.154	-0.028	0.029	99
18-Jan-95	75635	-8.545	-0.841	-8.446	-0.636	-8.339	-0.629	0.058	0.211	-7.472	-0.233	0.008	0.108	99
18-Jan-95	75859	-8.430	-0.635	-8.332	-0.429	-8.331	-0.581	0.050	0.163	-7.464	-0.184	0.000	0.059	99
19-Jan-95	75859	-8.393	-0.578	-8.295	-0.369	-8.294	-0.521	0.013	0.103	-7.427	-0.125	-0.037	0.000	99
26-Jan-95	39382	-8.436	-0.740	-8.338	-0.534	-8.338	-0.534	0.057	0.116	-7.470	-0.136	0.006	0.011	100
26-Jan-95	75635	-8.548	-0.737	-8.449	-0.531	-8.342	-0.524	0.061	0.106	-7.474	-0.126	0.010	0.001	100
27-Jan-95	75859	-8.419	-0.525	-8.321	-0.318	-8.320	-0.470	0.039	0.052	-7.452	-0.071	-0.012	-0.054	100
01-Feb-95	39382	-8.414	-0.695	-8.316	-0.489	-8.316	-0.489	0.035	0.071	-7.447	-0.089	-0.017	-0.038	101
01-Feb-95	75635	-8.529	-0.767	-8.430	-0.562	-8.323	-0.555	0.042	0.137	-7.455	-0.154	-0.009	0.029	101
01-Feb-95	GS19	-7.587	-0.379	-7.493	-0.171	-8.362	-0.571	0.081	0.153	-7.493	-0.171	0.029	0.046	101
02-Feb-95	75635	-8.551	-0.723	-8.452	-0.517	-8.345	-0.510	0.064	0.092	-7.476	-0.110	0.012	-0.015	101
02-Feb-95	75859	-8.455	-0.610	-8.357	-0.403	-8.356	-0.555	0.075	0.137	-7.487	-0.155	0.023	0.030	101
02-Feb-95	GS20	-8.688	-1.146	-8.589	-0.943	-8.348	-0.554	0.067	0.136	-7.480	-0.153	0.016	0.028	101
03-Feb-95	75859	-8.415	-0.535	-8.317	-0.328	-8.316	-0.480	0.035	0.062	-7.447	-0.079	-0.017	-0.046	101
03-Feb-95	75859	-8.474	-0.622	-8.376	-0.415	-8.375	-0.567	0.094	0.149	-7.506	-0.167	0.042	0.042	101
08-Feb-95	75635	-8.574	-0.789	-8.475	-0.584	-8.368	-0.577	0.087	0.159	-7.499	-0.175	0.035	0.050	102
08-Feb-95	75859	-8.462	-0.602	-8.364	-0.395	-8.363	-0.547	0.082	0.129	-7.493	-0.145	0.029	0.020	102
09-Feb-95	39382	-8.450	-0.750	-8.352	-0.544	-8.352	-0.544	0.071	0.126	-7.482	-0.142	0.018	0.017	102
09-Feb-95	75635	-8.552	-0.750	-8.453	-0.544	-8.346	-0.537	0.065	0.119	-7.477	-0.135	0.013	0.010	102
16-Feb-95	39382	-8.343	-0.385	-8.246	-0.177	-8.246	-0.177	-0.035	-0.241	-7.375	0.228	-0.089	-0.353	103
09-Mar-95	75635	-8.452	-0.286	-8.354	-0.077	-8.247	-0.070	-0.034	-0.348	-7.470	0.180	0.006	-0.305	103
09-Mar-95	75859	-8.352	-0.205	-8.255	0.005	-8.254	-0.147	-0.027	-0.271	-7.477	0.103	0.013	-0.228	103
10-Mar-95	39382	-8.272	-0.229	-8.175	-0.019	-8.175	-0.019	-0.106	-0.399	-7.398	0.231	-0.066	-0.356	103
10-Mar-95	75859	-8.289	-0.114	-8.192	0.096	-8.191	-0.056	-0.090	-0.362	-7.414	0.194	-0.050	-0.319	103
15-Mar-95	39382	-8.355	-0.309	-8.258	-0.100	-8.258	-0.100	-0.023	-0.318	-7.480	0.151	0.016	-0.276	104
15-Mar-95	75635	-8.391	-0.270	-8.293	-0.061	-8.186	-0.054	-0.095	-0.364	-7.409	0.197	-0.055	-0.322	104
22-Mar-95	75635	-8.391	-0.268	-8.293	-0.059	-8.186	-0.052	-0.095	-0.366	-7.408	0.201	-0.056	-0.326	105
22-Mar-95	75859	-8.309	-0.109	-8.212	0.101	-8.211	-0.051	-0.070	-0.367	-7.432	0.202	-0.032	-0.327	105
23-Mar-95	39382	-8.245	-0.205	-8.148	0.005	-8.148	0.005	-0.133	-0.423	-7.369	0.257	-0.095	-0.382	105
23-Mar-95	75859	-8.259	-0.106	-8.162	0.104	-8.161	-0.048	-0.120	-0.370	-7.382	0.205	-0.082	-0.330	105

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured		NBS Corrected		Adjusted to 39382		AIR Terms		Adjusted to GS19		SEA Terms		Week No.
		d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	
23-Mar-95	GS19	-7.428	0.032	-7.335	0.244	-8.114	-0.009	-0.167#	-0.409#	-7.335	0.244	-0.129#	-0.369#	105
23-Mar-95	GS20	-8.561	-0.764	-8.462	-0.559	-8.132	-0.021	-0.149#	-0.397#	-7.353	0.231	-0.111#	-0.356#	105
24-Mar-95	75635	-8.362	-0.214	-8.265	-0.004	-8.158	0.003	-0.123	-0.421	-7.378	0.255	-0.086	-0.380	105
24-Mar-95	75859	-8.249	-0.089	-8.152	0.122	-8.151	-0.030	-0.130	-0.388	-7.372	0.222	-0.092	-0.347	105
05-Apr-95	39382	-8.273	-0.372	-8.176	-0.164	-8.176	-0.164	-0.105	-0.254	-7.395	0.092	-0.069	-0.217	106
05-Apr-95	75635	-8.381	-0.318	-8.283	-0.109	-8.176	-0.102	-0.105	-0.316	-7.396	0.153	-0.068	-0.278	106
06-Apr-95	39382	-8.279	-0.375	-8.182	-0.167	-8.182	-0.167	-0.099	-0.251	-7.401	0.089	-0.063	-0.214	106
06-Apr-95	75859	-8.290	-0.141	-8.193	0.069	-8.192	-0.083	-0.089	-0.335	-7.411	0.173	-0.053	-0.298	106
06-Apr-95	GS19	-7.464	-0.066	-7.371	0.145	-8.152	-0.111	-0.129	-0.307	-7.371	0.145	-0.093	-0.270	106
12-Apr-95	75635	-8.400	-0.365	-8.302	-0.157	-8.195	-0.150	-0.086	-0.268	-7.413	0.107	-0.051	-0.232	107
12-Apr-95	75859	-8.296	-0.258	-8.199	-0.049	-8.198	-0.201	-0.083	-0.217	-7.416	0.056	-0.048	-0.181	107
13-Apr-95	39382	-8.357	-0.469	-8.259	-0.261	-8.259	-0.261	-0.022	-0.157	-7.478	-0.004	0.014	-0.121	107
13-Apr-95	75635	-8.395	-0.407	-8.297	-0.199	-8.190	-0.192	-0.091	-0.226	-7.408	0.065	-0.056	-0.190	107
13-Apr-95	GS20	-8.594	-0.867	-8.495	-0.662	-8.168	-0.129	-0.113	-0.289	-7.386	0.128	-0.078	-0.253	107
21-Apr-95	39382	-8.261	-0.359	-8.164	-0.150	-8.164	-0.150	-0.117	-0.268	-7.381	0.108	-0.083	-0.233	108
21-Apr-95	75859	-8.262	-0.145	-8.165	0.065	-8.164	-0.087	-0.117	-0.331	-7.381	0.172	-0.083	-0.297	108
27-Apr-95	75635	-8.442	-0.481	-8.344	-0.273	-8.237	-0.266	-0.044	-0.152	-7.453	-0.007	-0.011	-0.118	109
27-Apr-95	75859	-8.315	-0.298	-8.218	-0.087	-8.217	-0.239	-0.064	-0.179	-7.433	0.021	-0.031	-0.146	109
28-Apr-95	39382	-8.287	-0.398	-8.190	-0.190	-8.190	-0.190	-0.091	-0.228	-7.406	0.070	-0.058	-0.195	109
28-Apr-95	75635	-8.408	-0.443	-8.310	-0.235	-8.203	-0.228	-0.078	-0.190	-7.419	0.032	-0.045	-0.157	109
10-May-95	39382	-8.287	-0.402	-8.190	-0.194	-8.190	-0.194	-0.091	-0.224	-7.404	0.068	-0.060	-0.193	110
10-May-95	75859	-8.303	-0.323	-8.206	-0.114	-8.205	-0.266	-0.076	-0.152	-7.419	-0.004	-0.045	-0.121	110
11-May-95	39382	-8.270	-0.420	-8.173	-0.212	-8.173	-0.212	-0.108	-0.206	-7.387	0.051	-0.077	-0.176	110
11-May-95	75635	-8.392	-0.429	-8.294	-0.221	-8.187	-0.214	-0.094	-0.204	-7.401	0.048	-0.063	-0.173	110
11-May-95	GS19	-7.474	-0.164	-7.381	0.046	-8.167	-0.216	-0.114	-0.202	-7.381	0.046	-0.083	-0.171	110
11-May-95	GS20	-8.620	-0.958	-8.521	-0.754	-8.198	-0.227	-0.083	-0.191	-7.412	0.036	-0.052	-0.161	110
18-May-95	75635	-8.396	-0.396	-8.298	-0.188	-8.191	-0.181	-0.090	-0.237	-7.404	0.083	-0.060	-0.208	111
18-May-95	75859	-8.297	-0.263	-8.200	-0.054	-8.199	-0.206	-0.082	-0.212	-7.412	0.058	-0.052	-0.183	111
19-May-95	39382	-8.278	-0.390	-8.181	-0.182	-8.181	-0.182	-0.100	-0.236	-7.394	0.082	-0.070	-0.207	111
19-May-95	75859	-8.263	-0.250	-8.166	-0.041	-8.165	-0.193	-0.116	-0.225	-7.378	0.071	-0.086	-0.196	111
24-May-95	39382	-8.304	-0.432	-8.207	-0.224	-8.207	-0.224	-0.074	-0.194	-7.419	0.041	-0.045	-0.166	112
24-May-95	75635	-8.376	-0.292	-8.278	-0.083	-8.171	-0.076	-0.110	-0.342	-7.384	0.189	-0.080	-0.314	112
25-May-95	75635	-8.417	-0.447	-8.319	-0.239	-8.212	-0.232	-0.089	-0.186	-7.424	0.033	-0.040	-0.158	112
25-May-95	75859	-8.322	-0.238	-8.225	-0.029	-8.224	-0.181	-0.057	-0.237	-7.436	0.085	-0.028	-0.210	112

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	NBS ----Measured--- d13C	d180	NBS ---Corrected--- d13C	d180	Adjusted to 39382 d13C	d180	AIR ------Terms----- d13C	d180	Adjusted to GS19 d13C	d180	SEA ------Terms----- d13C	d180	Week No.
01-Jun-95	39382	-8.264	-0.327	-8.167	-0.118	-8.167	-0.118	-0.114	-0.300	-7.378	0.148	-0.086	-0.273	113
01-Jun-95	75859	-8.271	-0.181	-8.174	0.029	-8.173	-0.123	-0.108	-0.295	-7.384	0.144	-0.080	-0.269	113
02-Jun-95	39382	-8.269	-0.359	-8.172	-0.150	-8.172	-0.150	-0.109	-0.268	-7.383	0.116	-0.081	-0.241	113
02-Jun-95	75635	-8.361	-0.284	-8.263	-0.075	-8.156	-0.068	-0.125	-0.350	-7.368	0.199	-0.096	-0.324	113
02-Jun-95	GS19	-7.449	-0.023	-7.356	0.188	-8.145	-0.079	-0.136	-0.339	-7.356	0.188	-0.108	-0.313	113
02-Jun-95	GS20	-8.579	-0.840	-8.480	-0.635	-8.160	-0.112	-0.121	-0.306	-7.371	0.155	-0.093	-0.280	113
07-Jun-95	75635	-8.362	-0.322	-8.264	-0.113	-8.157	-0.106	-0.124	-0.312	-7.368	0.162	-0.096	-0.287	114
07-Jun-95	75859	-8.230	-0.098	-8.133	0.113	-8.132	-0.039	-0.149	-0.379	-7.343	0.228	-0.121	-0.353	114
08-Jun-95	39382	-8.227	-0.262	-8.130	-0.053	-8.130	-0.053	-0.151	-0.365	-7.340	0.215	-0.124	-0.340	114
28-Jun-95	75635	-8.337	-0.261	-8.240	-0.052	-8.133	-0.045	-0.148	-0.373	-7.340	0.227	-0.124	-0.352	115
28-Jun-95	75859	-8.205	-0.074	-8.108	0.137	-8.107	-0.015	-0.174	-0.403	-7.315	0.257	-0.149	-0.382	115
29-Jun-95	39382	-8.209	-0.238	-8.112	-0.029	-8.112	-0.029	-0.169	-0.389	-7.320	0.244	-0.144	-0.369	115
12-Jul-95	75635	-8.399	-0.214	-8.301	-0.004	-8.194	0.003	-0.087	-0.421	-7.400	0.278	-0.064	-0.403	116
12-Jul-95	75859	-8.272	-0.011	-8.175	0.200	-8.174	0.048	-0.107	-0.466	-7.380	0.323	-0.084	-0.448	116
13-Jul-95	39382	-8.255	-0.233	-8.158	-0.024	-8.158	-0.024	-0.123	-0.394	-7.363	0.252	-0.101	-0.377	116
13-Jul-95	GS19	-7.499	0.004	-7.406	0.215	-8.201	-0.060	-0.080	-0.358	-7.406	0.215	-0.058	-0.340	116
24-Jul-95	75635	-8.403	-0.366	-8.305	-0.158	-8.198	-0.151	-0.083	-0.267	-7.402	0.127	-0.062	-0.252	117
24-Jul-95	75859	-8.300	-0.191	-8.203	0.019	-8.202	-0.133	-0.079	-0.285	-7.406	0.144	-0.058	-0.269	117
24-Jul-95	GS19	-7.496	-0.070	-7.403	0.141	-8.199	-0.137	-0.082	-0.281	-7.403	0.141	-0.061	-0.266	117
24-Jul-95	GS20	-8.621	-0.841	-8.522	-0.636	-8.209	-0.123	-0.072	-0.295	-7.413	0.154	-0.051	-0.279	117
25-Jul-95	39382	-8.278	-0.304	-8.181	-0.095	-8.181	-0.095	-0.100	-0.323	-7.385	0.182	-0.079	-0.307	117
25-Jul-95	75859	-8.289	-0.180	-8.192	0.030	-8.191	-0.122	-0.090	-0.296	-7.395	0.155	-0.069	-0.280	117
26-Jul-95	39382	-8.320	-0.447	-8.223	-0.239	-8.223	-0.239	-0.058	-0.179	-7.426	0.039	-0.038	-0.164	117
26-Jul-95	75635	-8.401	-0.319	-8.303	-0.110	-8.196	-0.103	-0.085	-0.315	-7.400	0.175	-0.064	-0.300	117
02-Aug-95	75635	-8.413	-0.398	-8.315	-0.190	-8.208	-0.183	-0.073	-0.235	-7.411	0.096	-0.053	-0.221	118
02-Aug-95	75859	-8.325	-0.236	-8.228	-0.027	-8.227	-0.179	-0.054	-0.239	-7.429	0.101	-0.035	-0.226	118
03-Aug-95	39382	-8.302	-0.398	-8.205	-0.190	-8.205	-0.190	-0.076	-0.228	-7.407	0.090	-0.057	-0.215	118
03-Aug-95	75859	-8.321	-0.322	-8.224	-0.113	-8.223	-0.265	-0.058	-0.153	-7.425	0.014	-0.039	-0.139	118
17-Aug-95	39382	-8.348	-0.477	-8.250	-0.269	-8.250	-0.269	-0.031	-0.149	-7.451	0.013	-0.013	-0.138	119
17-Aug-95	75635	-8.431	-0.409	-8.333	-0.201	-8.226	-0.194	-0.055	-0.224	-7.427	0.088	-0.037	-0.213	119
17-Aug-95	GS19	-7.532	-0.231	-7.439	-0.021	-8.238	-0.304	-0.043	-0.114	-7.439	-0.021	-0.025	-0.104	119
18-Aug-95	75635	-8.442	-0.464	-8.344	-0.256	-8.237	-0.249	-0.044	-0.169	-7.437	0.033	-0.027	-0.158	119
18-Aug-95	75859	-8.349	-0.235	-8.252	-0.026	-8.251	-0.178	-0.030	-0.240	-7.451	0.105	-0.013	-0.230	119
18-Aug-95	GS19	-7.520	-0.122	-7.427	0.088	-8.226	-0.194	-0.055	-0.224	-7.427	0.088	-0.037	-0.213	119
18-Aug-95	GS20	-8.666	-0.962	-8.567	-0.758	-8.257	-0.250	-0.024	-0.168	-7.458	0.032	-0.006	-0.157	119
21-Aug-95	39382	-8.337	-0.467	-8.240	-0.259	-8.240	-0.259	-0.041	-0.159	-7.439	0.024	-0.025	-0.149	120
21-Aug-95	75859	-8.346	-0.279	-8.249	-0.070	-8.248	-0.222	-0.033	-0.196	-7.447	0.061	-0.017	-0.186	120

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
22-Aug-95	39382	-8.413	-0.600	-8.315	-0.393	-8.315	-0.393	0.034#	-0.025#	-7.515	-0.110	0.051#	-0.015#	120
22-Aug-95	75635	-8.444	-0.524	-8.346	-0.317	-8.239	-0.310	-0.042	-0.108	-7.439	-0.027	-0.025	-0.098	120
22-Aug-95	75859	-8.239	-0.150	-8.142	0.060	-8.141	-0.092	-0.140	-0.326	-7.341	0.191	-0.123	-0.316	120
23-Aug-95	75635	-8.427	-0.473	-8.329	-0.265	-8.222	-0.258	-0.059	-0.160	-7.422	0.025	-0.042	-0.150	121
23-Aug-95	75859	-8.270	-0.244	-8.173	-0.035	-8.172	-0.187	-0.109	-0.231	-7.372	0.097	-0.092	-0.222	121
23-Aug-95	GS19	-7.469	-0.145	-7.376	0.065	-8.176	-0.218	-0.105	-0.200	-7.376	0.065	-0.088	-0.190	121
23-Aug-95	GS20	-8.604	-0.928	-8.505	-0.724	-8.196	-0.217	-0.085	-0.201	-7.396	0.066	-0.068	-0.191	121
24-Aug-95	39382	-8.259	-0.347	-8.162	-0.138	-8.162	-0.138	-0.119	-0.280	-7.381	0.145	-0.103	-0.270	121
24-Aug-95	75635	-8.404	-0.442	-8.306	-0.234	-8.199	-0.227	-0.082	-0.191	-7.399	0.056	-0.065	-0.181	121
24-Aug-95	GS19	-7.475	-0.134	-7.382	0.076	-8.183	-0.207	-0.098	-0.211	-7.382	0.076	-0.082	-0.201	121
24-Aug-95	GS19	-7.494	-0.134	-7.401	0.076	-8.201	-0.207	-0.080	-0.211	-7.401	0.076	-0.063	-0.201	121
14-Sep-95	39382	-8.305	-0.472	-8.208	-0.264	-8.208	-0.264	-0.073	-0.154	-7.404	0.023	-0.060	-0.148	122
14-Sep-95	75635	-8.411	-0.464	-8.313	-0.256	-8.206	-0.249	-0.075	-0.169	-7.403	0.038	-0.061	-0.163	122
15-Sep-95	75635	-8.379	-0.413	-8.281	-0.205	-8.174	-0.198	-0.107	-0.220	-7.371	0.090	-0.093	-0.215	122
15-Sep-95	75859	-8.223	-0.187	-8.126	0.023	-8.125	-0.129	-0.156	-0.289	-7.322	0.159	-0.142	-0.284	122
21-Sep-95	39382	-8.259	-0.408	-8.162	-0.200	-8.162	-0.200	-0.119	-0.218	-7.357	0.089	-0.107	-0.214	123
22-Sep-95	75635	-8.383	-0.458	-8.285	-0.250	-8.178	-0.243	-0.103	-0.175	-7.374	0.046	-0.090	-0.171	123
22-Sep-95	75859	-8.241	-0.197	-8.144	0.013	-8.143	-0.139	-0.138	-0.279	-7.338	0.150	-0.126	-0.275	123
05-Oct-95	39382	-8.295	-0.384	-8.198	-0.176	-8.198	-0.176	-0.083	-0.242	-7.391	0.116	-0.073	-0.241	124
05-Oct-95	75859	-8.239	-0.218	-8.142	-0.008	-8.141	-0.160	-0.140	-0.258	-7.335	0.132	-0.129	-0.257	124
06-Oct-95	39382	-8.289	-0.428	-8.192	-0.220	-8.192	-0.220	-0.089	-0.198	-7.385	0.072	-0.079	-0.197	124
06-Oct-95	75635	-8.381	-0.407	-8.283	-0.199	-8.176	-0.192	-0.105	-0.226	-7.370	0.100	-0.094	-0.225	124
06-Oct-95	GS20	-8.612	-0.971	-8.513	-0.767	-8.211	-0.269	-0.070	-0.149	-7.404	0.023	-0.060	-0.148	124
11-Oct-95	75635	-8.419	-0.516	-8.321	-0.309	-8.214	-0.302	-0.067	-0.116	-7.407	-0.009	-0.057	-0.116	125
11-Oct-95	75859	-8.258	-0.218	-8.161	-0.008	-8.160	-0.160	-0.121	-0.258	-7.353	0.133	-0.111	-0.258	125
19-Oct-95	39382	-8.209	-0.351	-8.112	-0.142	-8.112	-0.142	-0.169	-0.276	-7.304	0.152	-0.160	-0.277	126
19-Oct-95	75859	-8.246	-0.236	-8.149	-0.027	-8.148	-0.179	-0.133	-0.239	-7.340	0.116	-0.124	-0.241	126
20-Oct-95	75859	-8.251	-0.213	-8.154	-0.003	-8.153	-0.155	-0.128	-0.263	-7.345	0.140	-0.119	-0.265	126
20-Oct-95	GS19	-7.487	-0.174	-7.394	0.038	-8.202	-0.259	-0.079	-0.159	-7.394	0.038	-0.070	-0.161	126
26-Oct-95	39382	-8.277	-0.404	-8.180	-0.196	-8.180	-0.196	-0.101	-0.222	-7.370	0.100	-0.094	-0.225	127
26-Oct-95	75635	-8.370	-0.400	-8.272	-0.192	-8.165	-0.185	-0.116	-0.233	-7.358	0.111	-0.108	-0.236	127
26-Oct-95	GS20	-8.602	-0.915	-8.503	-0.711	-8.203	-0.217	-0.078	-0.201	-7.394	0.079	-0.070	-0.204	127
27-Oct-95	75635	-8.441	-0.537	-8.343	-0.330	-8.236	-0.323	-0.045	-0.095	-7.426	-0.026	-0.038	-0.099	127
27-Oct-95	75859	-8.271	-0.230	-8.174	-0.020	-8.173	-0.172	-0.108	-0.246	-7.363	0.124	-0.101	-0.249	127
27-Oct-95	GEA4	-7.526	1.712	-7.433	1.936	-8.208	-0.241	-0.073	-0.177	-7.398	0.055	-0.066	-0.180	127
27-Oct-95	GEA4	-7.515	1.742	-7.423	1.966	-8.197	-0.211	-0.084	-0.207	-7.388	0.085	-0.076	-0.210	127

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured		NBS Corrected		Adjusted to 39382		AIR Terms		Adjusted to GS19		SEA Terms		Week No.
		d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	d13C	d18O	
01-Nov-95	39382	-8.270	-0.357	-8.173	-0.148	-8.173	-0.148	-0.108	-0.270	-7.363	0.149	-0.101	-0.274	128
01-Nov-95	75859	-8.285	-0.277	-8.188	-0.068	-8.187	-0.220	-0.094	-0.198	-7.377	0.078	-0.087	-0.203	128
01-Nov-95	GEA4	-7.503	1.716	-7.411	1.940	-8.186	-0.238	-0.095	-0.180	-7.376	0.059	-0.088	-0.184	128
02-Nov-95	39382	-8.280	-0.465	-8.183	-0.257	-8.183	-0.257	-0.098	-0.161	-7.372	0.040	-0.092	-0.165	128
02-Nov-95	75835	-8.420	-0.464	-8.322	-0.256	-8.215	-0.249	-0.066	-0.169	-7.405	0.048	-0.059	-0.173	128
08-Nov-95	75835	-8.430	-0.520	-8.332	-0.313	-8.225	-0.306	-0.056	-0.112	-7.414	-0.007	-0.050	-0.118	129
08-Nov-95	75859	-8.294	-0.297	-8.197	-0.088	-8.196	-0.240	-0.085	-0.178	-7.385	0.059	-0.079	-0.184	129
08-Nov-95	GEA4	-7.515	1.728	-7.423	1.952	-8.199	-0.227	-0.082	-0.191	-7.388	0.071	-0.076	-0.196	129
08-Nov-95	GEA4	-7.504	1.702	-7.412	1.926	-8.188	-0.254	-0.093	-0.164	-7.377	0.045	-0.087	-0.170	129
09-Nov-95	39382	-8.305	-0.456	-8.208	-0.248	-8.208	-0.248	-0.073	-0.170	-7.396	0.051	-0.068	-0.176	129
09-Nov-95	39382	-8.312	-0.542	-8.215	-0.335	-8.215	-0.335	-0.066	-0.083	-7.403	-0.036	-0.061	-0.089	129
09-Nov-95	GEA4	-7.502	1.736	-7.410	1.960	-8.186	-0.220	-0.095	-0.198	-7.375	0.079	-0.089	-0.204	129
09-Nov-95	GEA4	-7.506	1.701	-7.414	1.925	-8.190	-0.255	-0.091	-0.163	-7.379	0.044	-0.085	-0.169	129
09-Nov-95	GEA4	-7.514	1.707	-7.422	1.931	-8.198	-0.249	-0.083	-0.169	-7.387	0.050	-0.077	-0.175	129
09-Nov-95	GEA4	-7.518	1.701	-7.426	1.925	-8.202	-0.255	-0.079	-0.163	-7.391	0.044	-0.073	-0.169	129
09-Nov-95	GEA4	-7.507	1.702	-7.415	1.926	-8.191	-0.254	-0.090	-0.164	-7.380	0.045	-0.084	-0.170	129
09-Nov-95	GEA4	-7.506	1.706	-7.414	1.930	-8.190	-0.250	-0.091	-0.168	-7.379	0.049	-0.085	-0.174	129
09-Nov-95	GEA4	-7.502	1.721	-7.410	1.945	-8.186	-0.235	-0.095	-0.183	-7.375	0.064	-0.089	-0.189	129
09-Nov-95	GS19	-7.481	-0.116	-7.388	0.094	-8.199	-0.205	-0.082	-0.213	-7.388	0.094	-0.076	-0.219	129
09-Nov-95	GS20	-8.600	-0.942	-8.501	-0.738	-8.203	-0.247	-0.078	-0.171	-7.392	0.052	-0.072	-0.177	129
20-Nov-95	75835	-8.383	-0.435	-8.285	-0.227	-8.178	-0.220	-0.103	-0.198	-7.365	0.081	-0.099	-0.206	130
20-Nov-95	75835	-8.417	-0.522	-8.319	-0.315	-8.212	-0.308	-0.069	-0.110	-7.399	-0.007	-0.065	-0.118	130
20-Nov-95	GEA4	-7.503	1.748	-7.411	1.973	-8.189	-0.210	-0.092	-0.208	-7.376	0.092	-0.088	-0.217	130
22-Nov-95	75859	-8.285	-0.225	-8.188	-0.015	-8.187	-0.167	-0.094	-0.251	-7.374	0.134	-0.090	-0.259	130
22-Nov-95	75859	-8.259	-0.201	-8.162	0.009	-8.161	-0.143	-0.120	-0.275	-7.348	0.158	-0.116	-0.283	130
22-Nov-95	GEA4	-7.521	1.776	-7.429	2.001	-8.207	-0.182	-0.074	-0.236	-7.394	0.120	-0.070	-0.245	130
30-Nov-95	39382	-8.254	-0.398	-8.157	-0.190	-8.157	-0.190	-0.124	-0.228	-7.343	0.113	-0.121	-0.238	131
30-Nov-95	39382	-8.228	-0.303	-8.131	-0.094	-8.131	-0.094	-0.150	-0.324	-7.317	0.209	-0.147	-0.334	131
30-Nov-95	GEA4	-7.471	1.793	-7.379	2.018	-8.158	-0.166	-0.123	-0.252	-7.344	0.137	-0.120	-0.262	131
30-Nov-95	GEA4	-7.475	1.822	-7.383	2.047	-8.162	-0.137	-0.119	-0.281	-7.348	0.166	-0.116	-0.291	131
30-Nov-95	GEA4	-7.494	1.769	-7.402	1.994	-8.181	-0.190	-0.100	-0.228	-7.367	0.113	-0.097	-0.238	131
30-Nov-95	GS19	-7.445	-0.075	-7.352	0.136	-8.166	-0.167	-0.115	-0.251	-7.352	0.136	-0.112	-0.261	131
30-Nov-95	GS20	-8.552	-0.851	-8.453	-0.646	-8.159	-0.159	-0.122	-0.259	-7.344	0.144	-0.120	-0.269	131
01-Dec-95	75859	-8.254	-0.197	-8.157	0.013	-8.156	-0.139	-0.125	-0.279	-7.342	0.164	-0.122	-0.289	131
01-Dec-95	GEA4	-7.498	1.770	-7.406	1.995	-8.185	-0.190	-0.096	-0.228	-7.371	0.114	-0.093	-0.239	131
01-Dec-95	GEA4	-7.513	1.727	-7.421	1.951	-8.200	-0.233	-0.081	-0.185	-7.386	0.070	-0.078	-0.195	131
01-Dec-95	GEA4	-7.498	1.725	-7.404	1.949	-8.183	-0.235	-0.098	-0.183	-7.369	0.068	-0.095	-0.193	131
07-Dec-95	39382	-8.263	-0.382	-8.166	-0.174	-8.166	-0.174	-0.115	-0.244	-7.351	0.131	-0.113	-0.256	132
07-Dec-95	75835	-8.380	-0.396	-8.282	-0.188	-8.175	-0.181	-0.106	-0.237	-7.360	0.124	-0.104	-0.249	132
07-Dec-95	GEA4	-7.509	1.765	-7.417	1.990	-8.197	-0.196	-0.084	-0.222	-7.382	0.109	-0.082	-0.234	132
07-Dec-95	GEA4	-7.498	1.754	-7.404	1.979	-8.184	-0.207	-0.097	-0.211	-7.369	0.098	-0.095	-0.223	132

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
08-Dec-95	75635	-8.366	-0.399	-8.268	-0.191	-8.161	-0.184	-0.120	-0.234	-7.346	0.121	-0.118	-0.246	132
08-Dec-95	75859	-8.269	-0.236	-8.172	-0.027	-8.171	-0.179	-0.110	-0.239	-7.356	0.126	-0.108	-0.251	132
08-Dec-95	GEA4	-7.468	1.764	-7.376	1.989	-8.156	-0.197	-0.125	-0.221	-7.341	0.108	-0.123	-0.233	132
08-Dec-95	GEA4	-7.515	1.761	-7.423	1.986	-8.203	-0.200	-0.078	-0.218	-7.388	0.105	-0.076	-0.230	132
08-Dec-95	GEA4	-7.474	1.760	-7.382	1.985	-8.162	-0.201	-0.119	-0.217	-7.347	0.104	-0.117	-0.229	132
08-Dec-95	GS19	-7.460	-0.107	-7.367	0.103	-8.182	-0.201	-0.099	-0.217	-7.367	0.103	-0.097	-0.228	132
11-Dec-95	39382	-8.312	-0.493	-8.215	-0.285	-8.215	-0.285	-0.066	-0.133	-7.399	0.020	-0.065	-0.145	133
11-Dec-95	75859	-8.338	-0.327	-8.241	-0.118	-8.240	-0.270	-0.041	-0.148	-7.424	0.035	-0.040	-0.160	133
11-Dec-95	GEA4	-7.526	1.718	-7.433	1.942	-8.214	-0.244	-0.067	-0.174	-7.398	0.061	-0.066	-0.186	133
12-Dec-95	75635	-8.376	-0.381	-8.278	-0.173	-8.171	-0.166	-0.110	-0.252	-7.355	0.140	-0.109	-0.265	133
12-Dec-95	75859	-8.298	-0.291	-8.201	-0.082	-8.200	-0.234	-0.081	-0.184	-7.384	0.072	-0.080	-0.197	133
12-Dec-95	GEA4	-7.506	1.762	-7.414	1.987	-8.195	-0.200	-0.086	-0.218	-7.379	0.106	-0.085	-0.231	133
12-Dec-95	GEA4	-7.482	1.766	-7.390	1.991	-8.171	-0.196	-0.110	-0.222	-7.355	0.110	-0.109	-0.235	133
14-Dec-95	39382	-8.330	-0.584	-8.233	-0.377	-8.233	-0.377	-0.048	-0.041	-7.416	-0.071	-0.048	-0.054	134
14-Dec-95	GEA4	-7.514	1.740	-7.422	1.964	-8.203	-0.223	-0.078	-0.195	-7.387	0.083	-0.077	-0.208	134
15-Dec-95	75635	-8.381	-0.415	-8.283	-0.207	-8.176	-0.200	-0.105	-0.218	-7.360	0.106	-0.104	-0.231	134
15-Dec-95	GEA4	-7.486	1.742	-7.394	1.966	-8.175	-0.221	-0.106	-0.197	-7.359	0.085	-0.105	-0.210	134
15-Dec-95	GS19	-7.463	-0.126	-7.370	0.084	-8.186	-0.222	-0.095	-0.196	-7.370	0.084	-0.094	-0.209	134
15-Dec-95	GS20	-8.533	-0.875	-8.434	-0.670	-8.142	-0.187	-0.139	-0.231	-7.325	0.120	-0.139	-0.245	134
31-Jan-96	GS19	-7.490	-0.064	-7.397	0.147	-8.220	-0.169	-0.061	-0.249	-7.397	0.147	-0.067	-0.272	135
08-Feb-96	39382	-8.286	-0.305	-8.189	-0.096	-8.189	-0.096	-0.092	-0.322	-7.365	0.221	-0.099	-0.348	135
08-Feb-96	75635	-8.389	-0.319	-8.291	-0.110	-8.184	-0.103	-0.097	-0.315	-7.360	0.214	-0.104	-0.339	135
08-Feb-96	75635	-8.419	-0.356	-8.321	-0.147	-8.214	-0.140	-0.067	-0.278	-7.390	0.177	-0.074	-0.302	135
08-Feb-96	75859	-8.287	-0.178	-8.190	0.032	-8.189	-0.120	-0.092	-0.298	-7.365	0.197	-0.099	-0.322	135
08-Feb-96	GEA4	-7.516	1.870	-7.424	2.095	-8.213	-0.103	-0.068	-0.315	-7.389	0.214	-0.075	-0.339	135
08-Feb-96	GEA4	-7.515	1.878	-7.423	2.104	-8.212	-0.095	-0.069	-0.323	-7.388	0.223	-0.076	-0.348	135
09-Feb-96	39382	-8.318	-0.384	-8.221	-0.176	-8.221	-0.176	-0.060	-0.242	-7.396	0.142	-0.068	-0.267	135
09-Feb-96	39382	-8.303	-0.334	-8.206	-0.125	-8.206	-0.125	-0.075	-0.293	-7.381	0.192	-0.083	-0.317	135
09-Feb-96	75635	-8.401	-0.331	-8.303	-0.122	-8.196	-0.115	-0.085	-0.303	-7.372	0.202	-0.092	-0.327	135
09-Feb-96	75635	-8.409	-0.343	-8.311	-0.134	-8.204	-0.127	-0.077	-0.291	-7.380	0.190	-0.084	-0.315	135
09-Feb-96	75859	-8.264	-0.145	-8.167	0.065	-8.166	-0.087	-0.115	-0.331	-7.342	0.231	-0.122	-0.356	135
09-Feb-96	75859	-8.271	-0.127	-8.174	0.083	-8.173	-0.069	-0.108	-0.349	-7.349	0.249	-0.115	-0.374	135
09-Feb-96	GEA4	-7.516	1.857	-7.424	2.082	-8.213	-0.116	-0.068	-0.302	-7.389	0.201	-0.075	-0.326	135
09-Feb-96	GEA4	-7.516	1.839	-7.424	2.064	-8.213	-0.134	-0.068	-0.284	-7.389	0.183	-0.075	-0.308	135
09-Feb-96	GS19	-7.490	-0.016	-7.397	0.195	-8.221	-0.122	-0.060	-0.296	-7.397	0.195	-0.067	-0.320	135
09-Feb-96	GS19	-7.498	-0.009	-7.405	0.202	-8.229	-0.115	-0.052	-0.303	-7.405	0.202	-0.059	-0.327	135
09-Feb-96	GS20	-8.614	-0.812	-8.515	-0.607	-8.230	-0.134	-0.051	-0.284	-7.406	0.183	-0.058	-0.308	135
09-Feb-96	GS20	-8.618	-0.824	-8.519	-0.619	-8.234	-0.146	-0.047	-0.272	-7.410	0.171	-0.054	-0.296	135
12-Feb-96	39382	-8.370	-0.520	-8.272	-0.313	-8.272	-0.313	-0.009	-0.105	-7.448	0.005	-0.018	-0.130	136
12-Feb-96	75635	-8.475	-0.432	-8.377	-0.224	-8.270	-0.217	-0.011	-0.201	-7.445	0.101	-0.019	-0.226	136
12-Feb-96	75859	-8.336	-0.173	-8.239	0.037	-8.238	-0.115	-0.043	-0.303	-7.413	0.203	-0.051	-0.328	136
12-Feb-96	GEA4	-7.541	1.791	-7.448	2.016	-8.238	-0.183	-0.043	-0.235	-7.413	0.135	-0.051	-0.260	136

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d180	NBS Corrected d13C	NBS Corrected d180	Adjusted to 39382 d13C	Adjusted to 39382 d180	AIR Terms d13C	AIR Terms d180	Adjusted to GS19 d13C	Adjusted to GS19 d180	SEA Terms d13C	SEA Terms d180	Week No.
13-Feb-96	39382	-8.320	-0.351	-8.223	-0.142	-8.223	-0.142	-0.058	-0.276	-7.398	0.176	-0.066	-0.301	136
13-Feb-96	39382	-8.303	-0.349	-8.206	-0.140	-8.206	-0.140	-0.075	-0.278	-7.381	0.178	-0.083	-0.303	136
13-Feb-96	75635	-8.404	-0.294	-8.306	-0.085	-8.199	-0.078	-0.082	-0.340	-7.374	0.240	-0.090	-0.365	136
13-Feb-96	75635	-8.401	-0.343	-8.303	-0.134	-8.196	-0.127	-0.085	-0.291	-7.371	0.191	-0.093	-0.316	136
13-Feb-96	75859	-8.337	-0.292	-8.240	-0.083	-8.239	-0.235	-0.042	-0.183	-7.414	0.083	-0.050	-0.208	136
13-Feb-96	75859	-8.300	-0.182	-8.203	0.028	-8.202	-0.124	-0.079	-0.294	-7.377	0.194	-0.087	-0.319	136
13-Feb-96	GEA4	-7.512	1.887	-7.420	2.113	-8.210	-0.087	-0.071	-0.331	-7.385	0.232	-0.079	-0.357	136
13-Feb-96	GEA4	-7.519	1.833	-7.427	2.058	-8.216	-0.141	-0.065	-0.277	-7.392	0.177	-0.072	-0.302	136
13-Feb-96	GS19	-7.493	-0.015	-7.400	0.196	-8.225	-0.122	-0.056	-0.296	-7.400	0.196	-0.064	-0.321	136
13-Feb-96	GS19	-7.464	0.012	-7.371	0.223	-8.196	-0.095	-0.085	-0.323	-7.371	0.223	-0.093	-0.348	136
13-Feb-96	GS20	-8.604	-0.803	-8.505	-0.598	-8.221	-0.126	-0.060	-0.292	-7.396	0.192	-0.068	-0.317	136
13-Feb-96	GS20	-8.579	-0.803	-8.480	-0.598	-8.196	-0.126	-0.085	-0.292	-7.371	0.192	-0.093	-0.317	136
14-Feb-96	39382	-8.315	-0.358	-8.218	-0.149	-8.218	-0.149	-0.063	-0.269	-7.393	0.169	-0.071	-0.294	137
14-Feb-96	39382	-8.316	-0.397	-8.219	-0.189	-8.219	-0.189	-0.062	-0.229	-7.394	0.130	-0.070	-0.255	137
14-Feb-96	75635	-8.467	-0.432	-8.369	-0.224	-8.262	-0.217	-0.019	-0.201	-7.437	0.101	-0.027	-0.226	137
14-Feb-96	75635	-8.405	-0.328	-8.307	-0.119	-8.200	-0.112	-0.081	-0.306	-7.375	0.206	-0.089	-0.331	137
14-Feb-96	75859	-8.502	-0.575	-8.404	-0.368	-8.403	-0.520	0.122#	0.102#	-7.578	-0.202	0.114#	0.077#	137
14-Feb-96	75859	-8.288	-0.140	-8.191	0.070	-8.190	-0.082	-0.091	-0.336	-7.365	0.237	-0.099	-0.362	137
14-Feb-96	75859	-8.312	-0.153	-8.215	0.057	-8.214	-0.095	-0.067	-0.323	-7.389	0.224	-0.075	-0.349	137
14-Feb-96	GEA4	-7.506	1.884	-7.414	2.110	-8.204	-0.090	-0.077	-0.328	-7.379	0.229	-0.085	-0.354	137
14-Feb-96	GEA4	-7.531	1.838	-7.439	2.063	-8.229	-0.136	-0.052	-0.282	-7.404	0.182	-0.060	-0.307	137
14-Feb-96	GS19	-7.479	-0.024	-7.386	0.187	-8.211	-0.131	-0.070	-0.287	-7.386	0.187	-0.078	-0.312	137
14-Feb-96	GS19	-7.500	-0.042	-7.407	0.169	-8.232	-0.150	-0.049	-0.268	-7.407	0.169	-0.057	-0.294	137
14-Feb-96	GS20	-8.602	-0.814	-8.503	-0.609	-8.219	-0.137	-0.062	-0.281	-7.394	0.181	-0.070	-0.306	137
14-Feb-96	GS20	-8.624	-0.812	-8.525	-0.607	-8.241	-0.135	-0.040	-0.283	-7.416	0.183	-0.048	-0.308	137
05-Mar-96	75635	-8.460	-0.464	-8.362	-0.256	-8.255	-0.249	-0.026	-0.169	-7.427	0.073	-0.037	-0.198	138
05-Mar-96	GEA4	-7.583	1.711	-7.490	1.935	-8.283	-0.268	0.002	-0.150	-7.455	0.054	-0.009	-0.179	138
05-Mar-96	GEA4	-7.572	1.717	-7.479	1.941	-8.272	-0.262	-0.009	-0.156	-7.444	0.060	-0.020	-0.185	138
06-Mar-96	39382	-8.364	-0.523	-8.266	-0.316	-8.266	-0.316	-0.015	-0.102	-7.439	0.007	-0.025	-0.132	138
06-Mar-96	75635	-8.436	-0.503	-8.338	-0.296	-8.231	-0.289	-0.050	-0.129	-7.403	0.034	-0.061	-0.159	138
06-Mar-96	75859	-8.330	-0.324	-8.233	-0.115	-8.232	-0.267	-0.049	-0.151	-7.404	0.055	-0.060	-0.180	138
06-Mar-96	GEA4	-7.547	1.696	-7.454	1.920	-8.247	-0.283	-0.034	-0.135	-7.419	0.039	-0.045	-0.164	138
06-Mar-96	GEA4	-7.554	1.674	-7.461	1.898	-8.254	-0.306	-0.027	-0.112	-7.426	0.017	-0.038	-0.142	138
06-Mar-96	GS19	-7.528	-0.153	-7.435	0.057	-8.263	-0.265	-0.018	-0.153	-7.435	0.057	-0.029	-0.182	138
06-Mar-96	GS20	-8.628	-0.978	-8.529	-0.774	-8.248	-0.307	-0.033	-0.111	-7.420	0.016	-0.044	-0.141	138
13-Mar-96	75635	-8.460	-0.522	-8.362	-0.315	-8.255	-0.308	-0.026	-0.110	-7.426	0.016	-0.038	-0.141	139
13-Mar-96	75859	-8.326	-0.325	-8.229	-0.116	-8.228	-0.268	-0.053	-0.150	-7.399	0.056	-0.065	-0.181	139
13-Mar-96	GEA4	-7.520	1.726	-7.428	1.950	-8.221	-0.255	-0.060	-0.163	-7.393	0.069	-0.071	-0.194	139
13-Mar-96	GS19	-7.489	-0.174	-7.396	0.036	-8.225	-0.288	-0.056	-0.130	-7.396	0.036	-0.068	-0.161	139
14-Mar-96	39382	-8.294	-0.448	-8.197	-0.240	-8.197	-0.240	-0.084	-0.178	-7.368	0.084	-0.096	-0.209	139
14-Mar-96	75859	-8.309	-0.341	-8.212	-0.132	-8.211	-0.284	-0.070	-0.134	-7.382	0.040	-0.082	-0.165	139
14-Mar-96	GEA4	-7.536	1.678	-7.443	1.902	-8.237	-0.303	-0.044	-0.115	-7.408	0.021	-0.056	-0.146	139
14-Mar-96	GS20	-8.622	-0.966	-8.523	-0.762	-8.243	-0.296	-0.038	-0.122	-7.414	0.028	-0.050	-0.153	139

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
20-Mar-96	39382	-8.331	-0.563	-8.234	-0.356	-8.234	-0.356	-0.047	-0.062	-7.404	-0.031	-0.060	-0.094	140
20-Mar-96	75635	-8.444	-0.532	-8.346	-0.325	-8.239	-0.318	-0.042	-0.100	-7.409	0.007	-0.055	-0.132	140
20-Mar-96	GEA4	-7.539	1.652	-7.446	1.876	-8.241	-0.330	-0.040	-0.088	-7.411	-0.005	-0.053	-0.120	140
20-Mar-96	GS20	-8.642	-0.985	-8.543	-0.781	-8.264	-0.316	-0.017	-0.102	-7.434	0.009	-0.030	-0.134	140
21-Mar-96	75635	-8.479	-0.657	-8.381	-0.451	-8.274	-0.444	-0.007	0.026	-7.444	-0.118	-0.020	-0.007	140
21-Mar-96	75859	-8.316	-0.298	-8.219	-0.089	-8.218	-0.241	-0.063	-0.177	-7.388	0.084	-0.076	-0.209	140
21-Mar-96	GEA4	-7.523	1.624	-7.430	1.848	-8.225	-0.359	-0.056	-0.059	-7.395	-0.033	-0.069	-0.092	140
21-Mar-96	GS19	-7.488	-0.243	-7.395	-0.034	-8.225	-0.359	-0.056	-0.059	-7.395	-0.034	-0.069	-0.091	140
28-Mar-96	39382	-8.277	-0.453	-8.180	-0.245	-8.180	-0.245	-0.101	-0.173	-7.349	0.082	-0.115	-0.207	141
28-Mar-96	75859	-8.311	-0.355	-8.214	-0.146	-8.213	-0.298	-0.068	-0.120	-7.382	0.028	-0.082	-0.153	141
28-Mar-96	GEA4	-7.519	1.671	-7.427	1.895	-8.222	-0.313	-0.059	-0.105	-7.392	0.014	-0.072	-0.139	141
28-Mar-96	GS19	-7.522	-0.238	-7.429	-0.029	-8.260	-0.355	-0.021	-0.063	-7.429	-0.029	-0.035	-0.096	141
29-Mar-96	39382	-8.361	-0.557	-8.263	-0.350	-8.263	-0.350	-0.018	-0.068	-7.432	-0.023	-0.032	-0.102	141
29-Mar-96	75635	-8.431	-0.541	-8.333	-0.334	-8.226	-0.327	-0.055	-0.091	-7.395	0.000	-0.069	-0.125	141
29-Mar-96	75859	-8.366	-0.431	-8.268	-0.223	-8.267	-0.375	-0.014	-0.043	-7.436	-0.048	-0.028	-0.077	141
04-Apr-96	39382	-8.291	-0.505	-8.194	-0.298	-8.194	-0.298	-0.087	-0.120	-7.362	0.031	-0.102	-0.156	142
04-Apr-96	75635	-8.459	-0.545	-8.361	-0.338	-8.254	-0.331	-0.027	-0.087	-7.422	-0.003	-0.042	-0.122	142
04-Apr-96	GEA4	-7.538	1.637	-7.445	1.861	-8.242	-0.349	-0.039	-0.069	-7.410	-0.020	-0.054	-0.105	142
04-Apr-96	GS19	-7.489	-0.237	-7.396	-0.028	-8.228	-0.356	-0.053	-0.062	-7.398	-0.028	-0.068	-0.097	142
05-Apr-96	75859	-8.380	-0.516	-8.282	-0.309	-8.281	-0.461	0.000	0.043	-7.449	-0.132	-0.015	0.007	142
05-Apr-96	75859	-8.506	-0.754	-8.408	-0.548	-8.407	-0.700	0.126#	0.282#	-7.575	-0.372	0.111#	0.247#	142
05-Apr-96	75859	-8.320	-0.375	-8.223	-0.167	-8.222	-0.319	-0.059	-0.099	-7.390	0.010	-0.074	-0.135	142
05-Apr-96	GEA4	-7.534	1.593	-7.441	1.816	-8.238	-0.393	-0.043	-0.025	-7.406	-0.065	-0.058	-0.060	142
05-Apr-96	GEA4	-7.548	1.615	-7.455	1.839	-8.252	-0.371	-0.029	-0.047	-7.420	-0.042	-0.044	-0.083	142
05-Apr-96	GS20	-8.628	-1.036	-8.529	-0.833	-8.252	-0.371	-0.029	-0.047	-7.420	-0.043	-0.044	-0.082	142
18-Apr-96	39382	-8.345	-0.618	-8.247	-0.411	-8.247	-0.411	-0.034	-0.007	-7.414	-0.080	-0.050	-0.045	143
18-Apr-96	75635	-8.441	-0.595	-8.343	-0.388	-8.236	-0.381	-0.045	-0.037	-7.402	-0.050	-0.062	-0.075	143
18-Apr-96	GEA4	-7.541	1.626	-7.448	1.850	-8.247	-0.362	-0.034	-0.056	-7.413	-0.031	-0.051	-0.094	143
18-Apr-96	GEA4	-7.536	1.619	-7.443	1.843	-8.242	-0.370	-0.039	-0.048	-7.408	-0.038	-0.056	-0.087	143
18-Apr-96	GS20	-8.623	-1.044	-8.524	-0.841	-8.249	-0.382	-0.032	-0.036	-7.415	-0.051	-0.049	-0.074	143
19-Apr-96	39382	-8.316	-0.634	-8.219	-0.428	-8.219	-0.428	-0.062	0.010	-7.385	-0.096	-0.079	-0.029	143
19-Apr-96	75859	-8.304	-0.386	-8.207	-0.178	-8.206	-0.330	-0.075	-0.088	-7.372	0.002	-0.092	-0.127	143
19-Apr-96	GEA4	-7.522	1.573	-7.429	1.796	-8.228	-0.416	-0.053	-0.002	-7.394	-0.085	-0.070	-0.040	143
19-Apr-96	GEA4	-7.535	1.599	-7.442	1.822	-8.241	-0.390	-0.040	-0.028	-7.407	-0.059	-0.057	-0.066	143
19-Apr-96	GS19	-7.469	-0.253	-7.376	-0.044	-8.210	-0.375	-0.071	-0.043	-7.376	-0.044	-0.088	-0.081	143
25-Apr-96	75635	-8.479	-0.656	-8.381	-0.450	-8.274	-0.443	-0.007	0.025	-7.439	-0.110	-0.025	-0.015	144
25-Apr-96	75859	-8.318	-0.426	-8.221	-0.218	-8.220	-0.370	-0.061	-0.048	-7.385	-0.038	-0.079	-0.087	144
25-Apr-96	GEA4	-7.536	1.623	-7.443	1.847	-8.243	-0.367	-0.038	-0.051	-7.408	-0.034	-0.056	-0.091	144
25-Apr-96	GEA4	-7.532	1.586	-7.439	1.809	-8.239	-0.404	-0.042	-0.014	-7.404	-0.072	-0.060	-0.053	144
26-Apr-96	39382	-8.332	-0.572	-8.235	-0.365	-8.235	-0.365	-0.046	-0.053	-7.400	-0.032	-0.064	-0.093	144
26-Apr-96	75635	-8.453	-0.669	-8.355	-0.463	-8.248	-0.456	-0.033	0.038	-7.413	-0.123	-0.051	-0.002	144

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d180	NBS Corrected d13C	NBS Corrected d180	Adjusted to 39382 d13C	Adjusted to 39382 d180	AIR Terms d13C	AIR Terms d180	Adjusted to GS19 d13C	Adjusted to GS19 d180	SEA Terms d13C	SEA Terms d180	Week No.
26-Apr-96	GEA4	-7.541	1.553	-7.448	1.776	-8.248	-0.438	-0.033	0.020	-7.413	-0.105	-0.051	-0.020	144
26-Apr-96	GEA4	-7.551	1.527	-7.458	1.750	-8.258	-0.464	-0.023	0.046	-7.423	-0.131	-0.041	0.006	144
01-May-96	39382	-8.298	-0.551	-8.201	-0.344	-8.201	-0.344	-0.080	-0.074	-7.365	-0.010	-0.099	-0.115	145
01-May-96	75635	-8.459	-0.639	-8.361	-0.433	-8.254	-0.426	-0.027	0.008	-7.418	-0.092	-0.046	-0.033	145
01-May-96	75859	-8.403	-0.546	-8.305	-0.339	-8.304	-0.491	0.023#	0.073#	-7.469	-0.157	0.005#	0.032#	145
01-May-96	GEA4	-7.538	1.593	-7.445	1.816	-8.246	-0.398	-0.035	-0.020	-7.410	-0.065	-0.054	-0.060	145
01-May-96	GEA4	-7.533	1.594	-7.440	1.817	-8.241	-0.397	-0.040	-0.021	-7.405	-0.064	-0.059	-0.061	145
02-May-96	39382	-8.307	-0.582	-8.210	-0.375	-8.210	-0.375	-0.071	-0.043	-7.374	-0.041	-0.090	-0.084	145
02-May-96	75859	-8.341	-0.472	-8.244	-0.264	-8.243	-0.416	-0.038	-0.002	-7.407	-0.082	-0.057	-0.043	145
02-May-96	GEA4	-7.533	1.565	-7.440	1.788	-8.241	-0.427	-0.040	0.009	-7.405	-0.093	-0.059	-0.032	145
02-May-96	GEA4	-7.538	1.553	-7.445	1.776	-8.246	-0.439	-0.035	0.021	-7.410	-0.105	-0.054	-0.020	145
08-May-96	39382	-8.356	-0.595	-8.258	-0.388	-8.258	-0.388	-0.023	-0.030	-7.422	-0.053	-0.042	-0.072	146
08-May-96	75635	-8.451	-0.580	-8.353	-0.373	-8.246	-0.366	-0.035	-0.052	-7.409	-0.031	-0.055	-0.094	146
08-May-96	GEA4	-7.567	1.564	-7.474	1.787	-8.276	-0.429	-0.005	0.011	-7.439	-0.094	-0.025	-0.031	146
08-May-96	GEA4	-7.570	1.572	-7.477	1.795	-8.279	-0.421	-0.002	0.003	-7.442	-0.086	-0.022	-0.039	146
09-May-96	75635	-8.506	-0.725	-8.408	-0.519	-8.301	-0.512	0.020	0.094	-7.464	-0.177	0.000	0.052	146
09-May-96	75859	-8.330	-0.415	-8.233	-0.207	-8.232	-0.359	-0.049	-0.059	-7.395	-0.024	-0.069	-0.101	146
09-May-96	GEA4	-7.551	1.581	-7.458	1.784	-8.260	-0.432	-0.021	0.014	-7.423	-0.097	-0.041	-0.028	146
09-May-96	GEA4	-7.559	1.582	-7.466	1.785	-8.268	-0.431	-0.013	0.013	-7.431	-0.096	-0.033	-0.029	146
16-May-96	39382	-8.384	-0.693	-8.286	-0.487	-8.286	-0.487	0.005	0.069	-7.448	-0.150	-0.016	0.025	147
16-May-96	75635	-8.458	-0.623	-8.360	-0.416	-8.253	-0.409	-0.028	-0.009	-7.415	-0.073	-0.049	-0.052	147
16-May-96	75859	-8.320	-0.414	-8.223	-0.206	-8.222	-0.358	-0.059	-0.060	-7.384	-0.021	-0.080	-0.104	147
16-May-96	GEA4	-7.554	1.549	-7.461	1.772	-8.264	-0.446	-0.017	0.028	-7.426	-0.109	-0.038	-0.016	147
16-May-96	GEA4	-7.562	1.535	-7.469	1.758	-8.272	-0.460	-0.009	0.042	-7.434	-0.123	-0.030	-0.002	147
17-May-96	39382	-8.378	-0.647	-8.280	-0.441	-8.280	-0.441	-0.001	0.023	-7.442	-0.104	-0.022	-0.021	147
17-May-96	75859	-8.353	-0.490	-8.255	-0.282	-8.254	-0.434	-0.027	0.016	-7.417	-0.098	-0.047	-0.027	147
17-May-96	GEA4	-7.542	1.563	-7.449	1.786	-8.252	-0.432	-0.029	0.014	-7.414	-0.095	-0.050	-0.030	147
17-May-96	GEA4	-7.548	1.539	-7.455	1.762	-8.258	-0.456	-0.023	0.038	-7.420	-0.119	-0.044	-0.006	147
22-May-96	39382	-8.338	-0.631	-8.238	-0.425	-8.238	-0.425	-0.043	0.007	-7.400	-0.087	-0.064	-0.038	148
22-May-96	75635	-8.472	-0.636	-8.374	-0.430	-8.267	-0.423	-0.014	0.005	-7.428	-0.085	-0.036	-0.040	148
22-May-96	GEA4	-7.577	1.532	-7.484	1.755	-8.288	-0.464	0.007	0.046	-7.449	-0.128	-0.015	0.001	148
22-May-96	GEA4	-7.575	1.572	-7.482	1.795	-8.286	-0.424	0.005	0.006	-7.447	-0.086	-0.017	-0.039	148
23-May-96	75635	-8.482	-0.683	-8.384	-0.477	-8.277	-0.470	-0.004	0.052	-7.438	-0.132	-0.026	0.007	148
23-May-96	75859	-8.353	-0.461	-8.255	-0.253	-8.254	-0.405	-0.027	-0.013	-7.416	-0.067	-0.048	-0.058	148
23-May-96	GEA4	-7.567	1.554	-7.474	1.777	-8.278	-0.442	-0.003	0.024	-7.439	-0.104	-0.025	-0.021	148
23-May-96	GEA4	-7.572	1.528	-7.479	1.751	-8.283	-0.468	0.002	0.050	-7.444	-0.130	-0.020	0.005	148
24-May-96	39382	-8.349	-0.634	-8.251	-0.428	-8.251	-0.428	-0.030	0.010	-7.413	-0.089	-0.051	-0.036	148
24-May-96	75859	-8.348	-0.434	-8.250	-0.228	-8.249	-0.378	-0.032	-0.040	-7.411	-0.040	-0.053	-0.085	148

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
29-May-96	39382	-8.388	-0.646	-8.290	-0.440	-8.290	-0.440	0.009	0.022	-7.451	-0.100	-0.013	-0.025	149
29-May-96	75635	-8.439	-0.621	-8.341	-0.414	-8.234	-0.407	-0.047	-0.011	-7.394	-0.068	-0.070	-0.057	149
29-May-96	GEA4	-7.550	1.591	-7.457	1.814	-8.262	-0.406	-0.019	-0.012	-7.422	-0.067	-0.042	-0.058	149
29-May-96	GEA4	-7.556	1.565	-7.463	1.788	-8.268	-0.432	-0.013	0.014	-7.428	-0.093	-0.036	-0.032	149
30-May-96	75635	-8.491	-0.679	-8.393	-0.473	-8.286	-0.466	0.005	0.048	-7.446	-0.126	-0.018	0.001	149
30-May-96	75859	-8.373	-0.476	-8.275	-0.268	-8.274	-0.420	-0.007	0.002	-7.435	-0.081	-0.029	-0.044	149
30-May-96	GEA4	-7.566	1.545	-7.473	1.768	-8.278	-0.453	-0.003	0.035	-7.438	-0.113	-0.026	-0.012	149
30-May-96	GEA4	-7.583	1.559	-7.490	1.782	-8.295	-0.438	0.014	0.020	-7.455	-0.099	-0.009	-0.026	149
31-May-96	39382	-8.403	-0.699	-8.305	-0.493	-8.305	-0.493	0.024	0.075	-7.465	-0.153	0.001	0.028	149
31-May-96	75635	-8.517	-0.682	-8.419	-0.476	-8.312	-0.469	0.031	0.051	-7.472	-0.129	0.008	0.004	149
31-May-96	GEA4	-7.573	1.515	-7.480	1.738	-8.285	-0.483	0.004	0.065	-7.445	-0.143	-0.019	0.018	149
31-May-96	GEA4	-7.585	1.521	-7.492	1.744	-8.297	-0.477	0.016	0.059	-7.457	-0.137	-0.007	0.012	149
31-May-96	GS19	-7.527	-0.315	-7.434	-0.106	-8.274	-0.446	-0.007	0.028	-7.434	-0.106	-0.030	-0.019	149
31-May-96	GS20	-8.651	-1.105	-8.552	-0.902	-8.283	-0.452	0.002	0.034	-7.443	-0.112	-0.021	-0.013	149
05-Jun-96	39382	-8.368	-0.654	-8.270	-0.448	-8.270	-0.448	-0.011	0.030	-7.430	-0.107	-0.034	-0.018	150
05-Jun-96	75859	-8.359	-0.492	-8.261	-0.284	-8.260	-0.436	-0.021	0.018	-7.420	-0.096	-0.044	-0.029	150
05-Jun-96	GEA4	-7.572	1.543	-7.479	1.766	-8.285	-0.456	0.004	0.038	-7.444	-0.115	-0.020	-0.010	150
05-Jun-96	GEA4	-7.584	1.517	-7.491	1.740	-8.297	-0.482	0.016	0.064	-7.456	-0.141	-0.008	0.016	150
06-Jun-96	39382	-8.366	-0.641	-8.268	-0.435	-8.268	-0.435	-0.013	0.017	-7.428	-0.094	-0.036	-0.031	150
06-Jun-96	75635	-8.489	-0.685	-8.391	-0.479	-8.284	-0.472	0.003	0.054	-7.443	-0.131	-0.021	0.006	150
06-Jun-96	GEA4	-7.570	1.527	-7.477	1.750	-8.283	-0.472	0.002	0.054	-7.442	-0.131	-0.022	0.006	150
06-Jun-96	GEA4	-7.593	1.536	-7.500	1.759	-8.306	-0.463	0.025	0.045	-7.465	-0.122	0.001	-0.003	150
13-Jun-96	39382	-8.383	-0.618	-8.285	-0.411	-8.285	-0.411	0.004	-0.007	-7.444	-0.069	-0.020	-0.056	151
13-Jun-96	75635	-8.474	-0.635	-8.376	-0.429	-8.269	-0.422	-0.012	0.004	-7.427	-0.079	-0.037	-0.046	151
13-Jun-96	75859	-8.387	-0.490	-8.289	-0.282	-8.288	-0.434	0.007	0.016	-7.447	-0.092	-0.017	-0.033	151
13-Jun-96	GEA4	-7.557	1.566	-7.464	1.789	-8.271	-0.434	-0.010	0.016	-7.429	-0.092	-0.035	-0.033	151
13-Jun-96	GEA4	-7.586	1.576	-7.493	1.799	-8.300	-0.424	0.019	0.006	-7.458	-0.082	-0.006	-0.043	151
14-Jun-96	39382	-8.358	-0.596	-8.260	-0.389	-8.260	-0.389	-0.021	-0.029	-7.419	-0.047	-0.045	-0.078	151
14-Jun-96	75859	-8.398	-0.522	-8.300	-0.315	-8.299	-0.467	0.018	0.049	-7.457	-0.124	-0.007	-0.001	151
14-Jun-96	GEA4	-7.570	1.602	-7.477	1.825	-8.284	-0.398	0.003	-0.020	-7.442	-0.056	-0.022	-0.069	151
14-Jun-96	GEA4	-7.566	1.561	-7.473	1.784	-8.280	-0.439	-0.001	0.021	-7.438	-0.097	-0.026	-0.028	151
14-Jun-96	GS20	-8.651	-1.110	-8.552	-0.907	-8.285	-0.460	0.004	0.042	-7.443	-0.117	-0.021	-0.008	151
19-Jun-96	39382	-8.379	-0.647	-8.281	-0.441	-8.281	-0.441	0.000	0.023	-7.439	-0.097	-0.025	-0.028	152
19-Jun-96	75635	-8.493	-0.672	-8.395	-0.466	-8.288	-0.459	0.007	0.041	-7.445	-0.115	-0.019	-0.010	152
20-Jun-96	75635	-8.484	-0.666	-8.386	-0.460	-8.279	-0.453	-0.002	0.035	-7.436	-0.109	-0.028	-0.016	152
20-Jun-96	75859	-8.358	-0.437	-8.260	-0.229	-8.259	-0.381	-0.022	-0.037	-7.417	-0.037	-0.047	-0.088	152
20-Jun-96	GEA4	-7.563	1.528	-7.470	1.751	-8.278	-0.474	-0.003	0.058	-7.435	-0.130	-0.029	0.005	152
20-Jun-96	GEA4	-7.555	1.553	-7.462	1.776	-8.270	-0.449	-0.011	0.031	-7.427	-0.105	-0.037	-0.020	152

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
03-Jul-96	39382	-8.427	-0.688	-8.329	-0.482	-8.329	-0.482	0.048	0.064	-7.484	-0.136	0.020	0.011	153
16-Jul-96	75635	-8.496	-0.653	-8.398	-0.447	-8.291	-0.440	0.010	0.022	-7.444	-0.091	-0.020	-0.034	153
16-Jul-96	75859	-8.389	-0.531	-8.291	-0.324	-8.290	-0.476	0.009	0.058	-7.444	-0.127	-0.020	0.002	153
16-Jul-96	GEA4	-7.552	1.573	-7.459	1.796	-8.271	-0.434	-0.010	0.016	-7.424	-0.085	-0.040	-0.040	153
16-Jul-96	GEA4	-7.550	1.532	-7.457	1.755	-8.269	-0.475	-0.012	0.057	-7.422	-0.126	-0.042	0.001	153
17-Jul-96	39382	-8.354	-0.636	-8.256	-0.430	-8.256	-0.430	-0.025	0.012	-7.410	-0.080	-0.054	-0.045	153
17-Jul-96	75635	-8.506	-0.745	-8.408	-0.539	-8.301	-0.532	0.020	0.114	-7.454	-0.183	-0.010	0.058	153
17-Jul-96	GEA4	-7.554	1.542	-7.461	1.765	-8.273	-0.465	-0.008	0.047	-7.426	-0.116	-0.038	-0.009	153
17-Jul-96	GEA4	-7.599	1.510	-7.506	1.733	-8.318	-0.497	0.037#	0.079#	-7.471	-0.148	0.007#	0.023#	153
17-Jul-96	GS19	-7.516	-0.345	-7.423	-0.138	-8.269	-0.485	-0.012	0.067	-7.423	-0.136	-0.041	0.011	153
17-Jul-96	GS20	-8.637	-1.117	-8.538	-0.914	-8.275	-0.473	-0.006	0.055	-7.429	-0.124	-0.035	-0.001	153
22-Jul-96	39382	-8.354	-0.582	-8.256	-0.375	-8.256	-0.375	-0.025	-0.043	-7.409	-0.025	-0.055	-0.100	154
22-Jul-96	75635	-8.456	-0.651	-8.358	-0.445	-8.251	-0.438	-0.030	0.020	-7.404	-0.088	-0.060	-0.037	154
22-Jul-96	75859	-8.373	-0.428	-8.275	-0.220	-8.274	-0.372	-0.007	-0.046	-7.427	-0.022	-0.037	-0.103	154
22-Jul-96	GEA4	-7.538	1.624	-7.445	1.848	-8.258	-0.384	-0.023	-0.034	-7.410	-0.033	-0.054	-0.092	154
22-Jul-96	GEA4	-7.550	1.630	-7.457	1.854	-8.270	-0.377	-0.011	-0.041	-7.422	-0.027	-0.042	-0.098	154
23-Jul-96	39382	-8.403	-0.734	-8.305	-0.528	-8.305	-0.528	0.024	0.110	-7.458	-0.178	-0.006	0.053	154
23-Jul-96	75635	-8.455	-0.627	-8.357	-0.421	-8.250	-0.414	-0.031	-0.004	-7.403	-0.063	-0.061	-0.062	154
23-Jul-96	GEA4	-7.518	1.613	-7.425	1.836	-8.238	-0.395	-0.043	-0.023	-7.390	-0.045	-0.074	-0.080	154
23-Jul-96	GEA4	-7.517	1.631	-7.425	1.855	-8.237	-0.377	-0.044	-0.041	-7.390	-0.026	-0.074	-0.099	154
30-Jul-96	39382	-8.346	-0.579	-8.248	-0.372	-8.248	-0.372	-0.033	-0.046	-7.400	-0.020	-0.064	-0.105	155
30-Jul-96	75859	-8.358	-0.482	-8.260	-0.254	-8.259	-0.406	-0.022	-0.012	-7.411	-0.055	-0.053	-0.070	155
30-Jul-96	GEA4	-7.544	1.630	-7.451	1.854	-8.265	-0.379	-0.016	-0.039	-7.416	-0.027	-0.048	-0.098	155
30-Jul-96	GEA4	-7.570	1.619	-7.477	1.843	-8.291	-0.390	0.010	-0.028	-7.442	-0.038	-0.022	-0.087	155
31-Jul-96	39382	-8.357	-0.628	-8.259	-0.422	-8.259	-0.422	-0.022	0.004	-7.411	-0.070	-0.053	-0.055	155
31-Jul-96	75635	-8.490	-0.663	-8.392	-0.457	-8.285	-0.450	0.004	0.032	-7.436	-0.098	-0.028	-0.027	155
31-Jul-96	75859	-8.342	-0.418	-8.245	-0.210	-8.244	-0.362	-0.037	-0.056	-7.395	-0.010	-0.069	-0.115	155
06-Aug-96	39382	-8.341	-0.591	-8.243	-0.384	-8.243	-0.384	-0.038	-0.034	-7.394	-0.031	-0.070	-0.094	156
06-Aug-96	GS20	-8.630	-1.064	-8.531	-0.861	-8.271	-0.424	-0.010	0.006	-7.422	-0.071	-0.042	-0.054	156
07-Aug-96	39382	-8.372	-0.634	-8.274	-0.428	-8.274	-0.428	-0.007	0.010	-7.425	-0.074	-0.039	-0.051	156
07-Aug-96	75635	-8.457	-0.607	-8.359	-0.400	-8.252	-0.393	-0.029	-0.025	-7.402	-0.040	-0.062	-0.085	156
07-Aug-96	75859	-8.415	-0.551	-8.317	-0.344	-8.316	-0.496	0.035#	0.078#	-7.467	-0.143	0.003#	0.018#	156
07-Aug-96	75859	-8.339	-0.417	-8.242	-0.209	-8.241	-0.361	-0.040	-0.057	-7.391	-0.008	-0.073	-0.117	156
07-Aug-96	GEA4	-7.544	1.571	-7.451	1.794	-8.266	-0.440	-0.015	0.022	-7.416	-0.087	-0.048	-0.038	156
07-Aug-96	GEA4	-7.545	1.590	-7.452	1.813	-8.267	-0.421	-0.014	0.003	-7.417	-0.068	-0.047	-0.057	156
07-Aug-96	GS19	-7.519	-0.298	-7.426	-0.089	-8.275	-0.442	-0.006	0.024	-7.426	-0.089	-0.038	-0.036	156
12-Aug-96	75635	-8.515	-0.712	-8.417	-0.506	-8.310	-0.499	0.029	0.081	-7.459	-0.145	-0.005	0.020	157
12-Aug-96	75859	-8.349	-0.454	-8.251	-0.246	-8.250	-0.398	-0.031	-0.020	-7.400	-0.044	-0.064	-0.081	157
12-Aug-96	GEA4	-7.571	1.579	-7.478	1.802	-8.293	-0.433	0.012	0.015	-7.443	-0.079	-0.021	-0.046	157
12-Aug-96	GEA4	-7.569	1.567	-7.476	1.790	-8.291	-0.445	0.010	0.027	-7.441	-0.091	-0.023	-0.034	157

TABLE D: Complete Secondary Standards Data Summary (with adjustment to 39382 and to GS19)

MASS SPECTROMETER SECONDARY STANDARDS

# denotes flagged data

Date	Standard No.	Measured d13C	Measured d18O	NBS Corrected d13C	NBS Corrected d18O	Adjusted to 39382 d13C	Adjusted to 39382 d18O	AIR Terms d13C	AIR Terms d18O	Adjusted to GS19 d13C	Adjusted to GS19 d18O	SEA Terms d13C	SEA Terms d18O	Week No.
29-Aug-96	39382	-8.381	-0.624	-8.283	-0.417	-8.283	-0.417	0.002	-0.001	-7.431	-0.060	-0.033	-0.085	158
29-Aug-96	75859	-8.363	-0.418	-8.265	-0.210	-8.264	-0.362	-0.017	-0.056	-7.412	-0.004	-0.052	-0.121	158
29-Aug-96	75859	-8.415	-0.472	-8.317	-0.264	-8.316	-0.416	0.035#	-0.002#	-7.464	-0.059	0.000#	-0.066#	158
29-Aug-96	GEA4	-7.545	1.641	-7.452	1.865	-8.270	-0.374	-0.011	-0.044	-7.417	-0.016	-0.047	-0.109	158
29-Aug-96	GEA4	-7.551	1.655	-7.458	1.879	-8.276	-0.360	-0.005	-0.058	-7.423	-0.002	-0.041	-0.123	158
29-Aug-96	GEA4	-7.551	1.607	-7.458	1.830	-8.276	-0.408	-0.005	-0.010	-7.423	-0.051	-0.041	-0.074	158
29-Aug-96	GEA4	-7.534	1.635	-7.441	1.859	-8.259	-0.380	-0.022	-0.038	-7.406	-0.022	-0.058	-0.103	158
30-Aug-96	39382	-8.390	-0.601	-8.292	-0.394	-8.292	-0.394	0.011	-0.024	-7.440	-0.036	-0.024	-0.089	158
30-Aug-96	75635	-8.484	-0.567	-8.386	-0.360	-8.279	-0.353	-0.002	-0.065	-7.428	0.005	-0.038	-0.130	158
30-Aug-96	75635	-8.505	-0.627	-8.407	-0.421	-8.300	-0.414	0.019	-0.004	-7.447	-0.056	-0.017	-0.069	158
30-Aug-96	GS19	-7.506	-0.231	-7.413	-0.021	-8.265	-0.379	-0.016	-0.039	-7.413	-0.021	-0.051	-0.104	158
31-Aug-96	75859	-8.370	-0.370	-8.272	-0.162	-8.271	-0.314	-0.010	-0.104	-7.419	0.045	-0.045	-0.170	158
31-Aug-96	GEA4	-7.515	1.691	-7.423	1.915	-8.240	-0.324	-0.041	-0.094	-7.388	0.034	-0.076	-0.159	158
31-Aug-96	GEA4	-7.531	1.659	-7.438	1.883	-8.256	-0.356	-0.025	-0.062	-7.403	0.002	-0.061	-0.127	158
06-Sep-96	39382	-8.401	-0.591	-8.303	-0.384	-8.303	-0.384	0.022	-0.034	-7.450	-0.025	-0.014	-0.100	159
06-Sep-96	GEA4	-7.507	1.655	-7.415	1.879	-8.233	-0.362	-0.048	-0.056	-7.380	-0.002	-0.084	-0.123	159
06-Sep-96	GEA4	-7.522	1.647	-7.429	1.871	-8.248	-0.370	-0.033	-0.048	-7.394	-0.010	-0.070	-0.115	159
06-Sep-96	GEA4	-7.537	1.591	-7.444	1.814	-8.263	-0.426	-0.018	0.008	-7.409	-0.067	-0.055	-0.058	159
06-Sep-96	GEA4	-7.507	1.673	-7.415	1.897	-8.233	-0.343	-0.048	-0.075	-7.380	0.016	-0.084	-0.141	159
06-Sep-96	GS20	-8.601	-1.034	-8.502	-0.831	-8.247	-0.400	-0.034	-0.018	-7.393	-0.041	-0.071	-0.084	159
07-Sep-96	75635	-8.488	-0.707	-8.390	-0.501	-8.283	-0.494	0.002	0.078	-7.429	-0.135	-0.035	0.010	159
07-Sep-96	75859	-8.358	-0.459	-8.258	-0.251	-8.257	-0.403	-0.024	-0.015	-7.404	-0.044	-0.060	-0.081	159
12-Sep-96	75635	-8.519	-0.653	-8.421	-0.447	-8.314	-0.440	0.033	0.022	-7.459	-0.079	-0.005	-0.046	160
12-Sep-96	75635	-8.475	-0.662	-8.377	-0.456	-8.270	-0.449	-0.011	0.031	-7.415	-0.088	-0.049	-0.037	160
12-Sep-96	GEA4	-7.538	1.562	-7.445	1.785	-8.265	-0.456	-0.016	0.038	-7.410	-0.096	-0.054	-0.029	160
12-Sep-96	GEA4	-7.542	1.514	-7.449	1.737	-8.269	-0.505	-0.012	0.087	-7.414	-0.144	-0.050	0.019	160
12-Sep-96	GEA4	-7.535	1.588	-7.442	1.811	-8.262	-0.430	-0.019	0.012	-7.407	-0.070	-0.057	-0.055	160
12-Sep-96	GEA4	-7.554	1.597	-7.461	1.820	-8.281	-0.421	0.000	0.003	-7.426	-0.061	-0.038	-0.064	160
13-Sep-96	39382	-8.439	-0.772	-8.341	-0.567	-8.341	-0.567	0.060	0.149	-7.486	-0.206	0.022	0.081	160
13-Sep-96	75635	-8.495	-0.621	-8.397	-0.414	-8.290	-0.407	0.009	-0.011	-7.435	-0.047	-0.029	-0.078	160
24-Sep-96	39382	-8.417	-0.675	-8.319	-0.469	-8.319	-0.469	0.038	0.051	-7.463	-0.106	-0.001	-0.019	161
24-Sep-96	75859	-8.379	-0.433	-8.281	-0.225	-8.280	-0.377	-0.001	-0.041	-7.424	-0.014	-0.040	-0.111	161
24-Sep-96	GEA4	-7.578	1.566	-7.485	1.789	-8.306	-0.455	0.025	0.037	-7.450	-0.092	-0.014	-0.033	161
24-Sep-96	GEA4	-7.540	1.627	-7.447	1.851	-8.269	-0.393	-0.012	-0.025	-7.412	-0.030	-0.052	-0.095	161
25-Sep-96	75635	-8.496	-0.644	-8.398	-0.438	-8.291	-0.431	0.010	0.013	-7.434	-0.068	-0.030	-0.057	161
25-Sep-96	75859	-8.382	-0.466	-8.284	-0.258	-8.283	-0.410	0.002	-0.008	-7.427	-0.047	-0.037	-0.078	161
25-Sep-96	GEA4	-7.546	1.581	-7.453	1.804	-8.275	-0.440	-0.006	0.022	-7.418	-0.077	-0.046	-0.048	161
25-Sep-96	GEA4	-7.561	1.593	-7.468	1.816	-8.290	-0.428	0.009	0.010	-7.433	-0.065	-0.031	-0.060	161
25-Sep-96	GS19	-7.503	-0.279	-7.410	-0.070	-8.266	-0.433	-0.015	0.015	-7.410	-0.070	-0.054	-0.055	161
25-Sep-96	GS20	-8.613	-1.021	-8.514	-0.818	-8.261	-0.391	-0.020	-0.027	-7.405	-0.028	-0.059	-0.097	161

TABLE E: Summary of Standards, Including NBS Standards, Secondary Standards, and Working Reference Standard

The left side of the table ("Assigned") lists the assigned NBS-corrected reduced isotopic ratios for the secondary standards, atmospheric and oceanic. Also listed are the average offsets (from 39382) determined for each atmospheric standard and (from GS19), for each oceanic standard. See text, page 12, and Figures 4 and 5. The right side of the table ("Experimental") lists averages and standard deviations for measurements of the standards over the entire period of measurement (1992-1996). Data are also included for the NBS calibration standards, the working reference standard, and five additional CIO standards.

TABLE E: Summary of Standards, Including NBS Standards, Secondary Standards, and Working Reference Standard
(Values are in NBS-corrected d13C and d18O) (N2O corrections have not been applied for air standards)

	d13C (offset)	Assigned d13C	Assigned d18O	d18O (offset)	Experimental d13C	s	Experimental d18O	s	N
Atmospheric:									
39382		-8.281	-0.418		-8.280	0.017	-0.415	0.039	183
75635	(0.107)	-8.388	-0.425	(0.007)	-8.393	0.017	-0.438	0.034	192
75859	(0.001)	-8.282	-0.266	(-0.152)	-8.276	0.017	-0.254	0.037	180
Oceanic:									
GS19		-7.464	-0.125		-7.464	0.013	-0.126	0.023	90
GS20	(1.109)	-8.573	-0.915	(0.790)	-8.574	0.012	-0.915	0.020	81
GEA4	(0.035)	-7.499	1.756	(-1.881)	-7.501	0.012	1.755	0.021	123
CIO Carbonate secondary standards:									
HGJC		-4.27	-14.00	(Meijer)	-4.251	0.014	-13.940	0.015	6
		-4.215	-14.015	(Wahlen)					
GS17		1.96	-2.02	(Meijer)	1.891	0.019	-2.056	0.022	6
		1.909	-2.113	(Wahlen)					
CIO pure CO2 secondary standards:									
GS12		-6.95	-6.00		-6.673		-5.187		1
GS13		-7.93	-7.62		-7.694		-6.908		1
GS14		-8.79	-7.73		-8.554		-7.076		1
NBS Standards:									
NBS 19		1.92	-2.19						
		(1.912	-2.239)	acid corrected, values used for 3 point calibration correction					
NBS 17		-4.41	-18.71						
NBS 16		-41.48	-36.09						
Working Reference Standard:									
MW1		-42.405	-27.767						
		-40.599	-27.828	(without Craig correction)					

TABLE F: Relative Stability and Offset Comparison of Secondary Standards

Secondary Stds Compared	Lists the two secondary standards compared in the direction as listed, e.g. the d13C of 39382 minus the d13C of 75635 for the first line.
No. of Differences (Days)	The number of days of comparisons. For days on which there are multiple non-flagged comparisons, a daily average is taken.
d13C (NBS corr.) and d18O (NBS corr.)	Lists the average difference and the standard deviation of the set of differences and the slope of a linear fit to the differences. See Figures 4 and 5.

TABLE F: Relative Stability and Offset Comparison of Secondary Standards

Secondary Stds Compared	No. of Differences (Days)	d13C (NBS corr.) Average Diff. (per mil)	d13C (NBS corr.) St. Dev. of Diff. (per mil)	d13C (NBS corr.) Slope of Linear Fit (per mil/yr)	d18O (NBS corr.) Average Diff. (per mil)	d18O (NBS corr.) St. Dev. of Diff. (per mil)	d18O (NBS corr.) Slope of Linear Fit (per mil/yr)
Atmospheric Secondary Standards:							
39382-75635	82	0.107	0.030	-0.00496	0.007	0.061	-0.01650
39382-75859	78	0.001	0.031	0.00103	-0.152	0.068	-0.00780
75635-75859	94	-0.119	0.031	-0.00154	-0.195	0.067	-0.00555
Oceanic Secondary Standards:							
GS19- GS20	29	1.109	0.017	0.00274	0.790	0.028	0.00486
GS19- GEA4	17	0.035	0.016	0.00287	-1.881	0.023	-0.00945

TABLE G(1) (G(2)): Differential Drift Between Oceanic and Atmospheric Secondary Standards for d13C (d18O)

Secondary Stds Compared	Lists the secondary standards compared in the direction as listed, i.e. the merged oceanic daily average minus the merged atmospheric daily average.
No. of Differences (Days)	The number of days of comparisons. For days on which there are multiple non-flagged comparisons, a daily average is taken.
d13C (NBS corr.) (d18O (NBS corr.))	Lists the average difference and the standard deviation of the set of differences, and the intercept and slope of a linear fit to the differences. See Figures 8 and 9.

TABLE G(1): Differential Drift Between Oceanic and Atmospheric Secondary Standards for d13C

Secondary Standards Compared	No. of Differences (Days)	d13C (NBS corr.) Avg. Diff. (per mil)	St. Dev. of Diff. (per mil)	Intercept of Linear Fit (per mil)	Slope of Linear Fit (per mil/yr)
Set A, before 28FEB95 valve change:					
Merged Oceanic (as GS19) - Merged Atmospheric (as 39382)	31	0.800	0.047	-3.797	0.049068
Set B, after 28FEB95 valve change:					
Merged Oceanic (as GS19) - Merged Atmospheric (as 39382)	39	0.819	0.036	-4.099	0.051226

TABLE G(2): Differential Drift Between Oceanic and Atmospheric Secondary Standards for d18O

Secondary Standards Compared	No. of Differences (Days)	d18O (NBS corr.) Avg. Diff. (per mil)	St. Dev. of Diff. (per mil)	Intercept of Linear Fit (per mil)	Slope of Linear Fit (per mil/yr)
Set A, before 28FEB95 valve change:					
Merged Oceanic (as GS19) - Merged Atmospheric (as 39382)	31	0.258	0.102	-9.307	0.102087
Set B, after 28FEB95 valve change:					
Merged Oceanic (as GS19) - Merged Atmospheric (as 39382)	39	0.310	0.054	-6.717	0.073192

TABLE H : Calculation of Assigned Value for Oceanic Secondary Standard GS19

The assigned d13C and d18O values for secondary standard GS19 were determined from the NBS-corrected measurements made on January 12 and 19, 1994 (Table D).

		----NBS-Corrected---- d13C	d18O
Jan 12, 1994	GS19	-7.463	-0.135
Jan 19, 1994	GS19	-7.473	-0.129
Jan 12, 1994	GS20	-8.574	-0.907
Jan 19, 1994	GS20	-8.563	-0.908

The average offsets determined from the comparison of GS20 to GS19 for all data from Jun 11, 1992 to Sep 25, 1998 were used to adjust the GS20 values to GS19 (Table F):

d13C (GS20adj) = d13C (GS20) + 1.109
d18O (GS20adj) = d18O (GS20) + 0.790

		d13C(adj)	d18O(adj)
Jan 12, 1994	GS20	-7.465	-0.117
Jan 19, 1994	GS20	-7.454	-0.118

The assigned d13C value of GS19 is the average of the 2 GS19 values and the 2 adjusted GS20 values, i.e.

((-7.463) + (-7.473) + (-7.465) + (-7.454)) / 4.0

which is equal to -7.464

The assigned d18O value of GS19 is the average of the 2 GS19 values and the 2 adjusted GS20 values, i.e.

((-0.135) + (-0.129) + (-0.117) + (-0.118)) / 4.0

which is equal to -0.125

TABLE I: Calculation of Assigned Value for Atmospheric Secondary Standard 39382

The assigned d13C and d18O values for secondary standard 39382 were determined from the assigned values for secondary standard GS19, using the differential drift relationships between Oceanic (GS) and Atmospheric (GS(adjABC)) secondary standards (Table G).

GS(adjABC) = GS - (-3.797 + 0.049068 * date) for d13C

and

GS(adjABC) = GS - (-9.307 + 0.102087 * date) for d18O

These equations were evaluated for the dates Jan 12, 1994 (94.0329).
and Jan 19, 1994 (94.0520).

For Jan 12, 1994, evaluation of the differential drift equals -0.8170 for d13C.
and -0.2925 for d18O.

For Jan 19, 1994, evaluation of the differential drift equals -0.8179 for d13C.
and -0.2945 for d18O.

The assigned d13C value of GS19 is -7.464 (Table H).
Using the above evaluations, the d13C of 39382 equals -8.281 on Jan 12, 1994.
and -8.282 on Jan 19, 1994.

The average assigned d13C of 39382 is -8.281.

The assigned d18O value of GS19 is -0.125 (Table H).
Using the above evaluations, the d18O of 39382 equals -0.418 on Jan 12, 1994.
and -0.419 on Jan 19, 1994.

The average assigned d18O of 39382 is -0.418.

TABLE J: Daily Isotopic Correction Terms

For each measurement date on the VG Prism II mass spectrometer, the table lists the daily correction terms (d13C and d18O) to be added to the NBS-corrected reduced isotopic ratio of samples (atmospheric or oceanic) measured on that date. These are daily averages of all non-flagged individual terms, as listed in Table D.

TABLE J: Daily Isotopic Correction Terms

DAILY TERMS
(Correction terms from combined GEA4, GS19, GS20, 39382, 75635 and 75859)

Date of Analysis	week	Atmospheric Terms d13C	Atmospheric Terms d18O	Oceanic Terms d13C	Oceanic Terms d18O	Remarks
03-Apr-92	1	-0.157	-0.430	-0.070	-0.248	
29-Apr-92	2	-0.152	-0.509	-0.068	-0.334	
30-Apr-92	2	-0.162	-0.524	-0.079	-0.349	
01-May-92	3	-0.150	-0.460	-0.068	-0.287	# avg. of weekly avg of 920430 & 920507
04-May-92	3	-0.150	-0.460	-0.068	-0.287	# avg. of weekly avg of 920430 & 920507
05-May-92	3	-0.150	-0.460	-0.068	-0.287	# avg. of weekly avg of 920430 & 920507
07-May-92	4	-0.146	-0.425	-0.064	-0.252	
08-May-92	4	-0.149	-0.487	-0.066	-0.315	
11-May-92	4	-0.147	-0.389	-0.065	-0.218	
12-May-92	4	-0.133	-0.374	-0.051	-0.203	
13-May-92	4	-0.144	-0.403	-0.062	-0.232	# Used weekly average for this week
14-May-92	4	-0.144	-0.340	-0.062	-0.170	
15-May-92	4	-0.144	-0.403	-0.062	-0.232	# Used weekly average for this week
28-May-92	5	-0.122	-0.331	-0.042	-0.164	
11-Jun-92	6	-0.140	-0.313	-0.062	-0.150	
12-Jun-92	6	-0.121	-0.289	-0.043	-0.127	
15-Jun-92	7	-0.118	-0.275	-0.042	-0.115	# avg. of weekly avg of 920612 & 920701
01-Jul-92	8	-0.109	-0.245	-0.034	-0.087	
02-Jul-92	8	-0.103	-0.251	-0.027	-0.094	
07-Jul-92	9	-0.109	-0.212	-0.035	-0.056	
09-Jul-92	9	-0.081	-0.116	0.013	0.038	
02-Sep-92	10	-0.118	-0.199	-0.051	-0.059	
03-Sep-92	10	-0.143	-0.273	-0.078	-0.134	
15-Sep-92	11	-0.122	-0.411	-0.056	-0.275	
16-Sep-92	11	-0.112	-0.383	-0.047	-0.247	
17-Sep-92	11	-0.110	-0.382	-0.045	-0.247	
23-Sep-92	12	-0.127	-0.410	-0.063	-0.277	
24-Sep-92	12	-0.086	-0.232	-0.022	-0.098	
30-Sep-92	13	-0.091	-0.319	-0.028	-0.187	
01-Oct-92	13	-0.080	-0.286	-0.017	-0.154	
07-Oct-92	14	-0.092	-0.283	-0.030	-0.153	# avg. of weekly avg of 921001 & 921015
08-Oct-92	14	-0.092	-0.283	-0.030	-0.153	# avg. of weekly avg of 921001 & 921015
15-Oct-92	15	-0.098	-0.263	-0.037	-0.136	
21-Oct-92	16	-0.048	-0.111	0.012	0.014	# Used weekly average for this week
22-Oct-92	16	-0.048	-0.111	0.012	0.014	
28-Oct-92	17	-0.107	-0.360	-0.047	-0.236	
29-Oct-92	17	-0.125	-0.362	-0.066	-0.239	
04-Nov-92	18	-0.112	-0.320	-0.054	-0.198	
05-Nov-92	18	-0.130	-0.322	-0.072	-0.200	
11-Nov-92	19	-0.069	-0.230	-0.011	-0.111	# Used weekly average for this week
12-Nov-92	19	-0.069	-0.230	-0.011	-0.111	
25-Nov-92	20	-0.108	-0.269	-0.052	-0.153	
02-Dec-92	21	-0.114	-0.280	-0.059	-0.166	# Used weekly average for this week
03-Dec-92	21	-0.114	-0.280	-0.059	-0.166	
09-Dec-92	22	-0.121	-0.283	-0.067	-0.151	

TABLE J: Daily Isotopic Correction Terms

DAILY TERMS
(Correction terms from combined GEA4, GS19, GS20, 39382, 75835 and 75859)

Date of Analysis	week	Atmospheric Terms d13C	Atmospheric Terms d18O	Oceanic Terms d13C	Oceanic Terms d18O	Remarks
10-Dec-92	22	-0.078	-0.206	-0.025	-0.094	
17-Dec-92	23	-0.103	-0.267	-0.050	-0.157	
21-Dec-92	23	-0.103	-0.267	-0.050	-0.157	# Used weekly average for this week
28-Jan-93	24	-0.132	-0.343	-0.085	-0.244	
29-Jan-93	24	-0.120	-0.400	-0.073	-0.302	
03-Feb-93	25	-0.086	-0.234	-0.040	-0.138	
04-Feb-93	25	-0.083	-0.292	-0.037	-0.196	
10-Feb-93	26	-0.113	-0.275	-0.069	-0.181	
11-Feb-93	26	-0.087	-0.216	-0.042	-0.122	
17-Feb-93	27	-0.081	-0.168	-0.036	-0.075	
18-Feb-93	27	-0.090	-0.296	-0.047	-0.204	
19-Feb-93	27	-0.080	-0.232	-0.036	-0.140	
25-Feb-93	28	-0.091	-0.247	-0.048	-0.157	
26-Feb-93	28	-0.062	-0.233	-0.019	-0.143	
03-Mar-93	29	-0.066	-0.157	-0.024	-0.069	
04-Mar-93	29	-0.077	-0.111	-0.035	-0.023	
10-Mar-93	30	-0.053	-0.137	-0.011	-0.050	
11-Mar-93	30	-0.068	-0.065	-0.026	0.021	
16-Mar-93	31	-0.070	-0.164	-0.029	-0.079	
17-Mar-93	31	-0.083	-0.141	-0.043	-0.056	
19-Mar-93	32	-0.068	-0.078	-0.028	0.006	
24-Mar-93	32	-0.066	-0.149	-0.026	-0.066	
25-Mar-93	32	-0.059	-0.087	-0.019	-0.005	
01-Apr-93	33	-0.053	-0.142	-0.014	-0.061	
02-Apr-93	33	-0.068	-0.097	-0.030	-0.016	
06-Apr-93	34	-0.047	-0.066	-0.009	0.013	
08-Apr-93	34	-0.061	-0.097	-0.023	-0.019	
13-Apr-93	35	-0.060	-0.073	-0.023	0.004	
14-Apr-93	35	-0.049	-0.071	-0.012	0.006	# Used weekly average for this week
15-Apr-93	35	-0.037	-0.068	-0.001	0.008	
21-Apr-93	36	-0.069	-0.119	-0.033	-0.044	
22-Apr-93	36	-0.058	-0.074	-0.022	0.000	
29-Apr-93	37	-0.063	-0.124	-0.028	-0.051	
30-Apr-93	37	-0.063	-0.124	-0.028	-0.051	# Used weekly average for this week
05-May-93	38	-0.071	-0.147	-0.037	-0.076	
06-May-93	38	-0.071	-0.147	-0.037	-0.076	# Used weekly average for this week
13-May-93	39	-0.070	-0.215	-0.037	-0.146	
14-May-93	39	-0.057	-0.099	-0.024	-0.031	
19-May-93	40	-0.058	-0.112	-0.026	-0.045	
20-May-93	40	-0.048	-0.030	-0.017	0.037	
26-May-93	41	-0.049	-0.077	-0.018	-0.012	
27-May-93	41	-0.035	0.017	-0.003	0.083	
02-Jun-93	42	-0.039	-0.045	-0.009	0.018	
03-Jun-93	42	-0.021	0.025	0.008	0.088	
09-Jun-93	43	-0.053	-0.082	-0.024	-0.021	

TABLE J: Daily Isotopic Correction Terms

DAILY TERMS
(Correction terms from combined GEA4, GS19, GS20, 39382, 75635 and 75859)

Date of Analysis	week	Atmospheric Terms d13C	Atmospheric Terms d18O	Oceanic Terms d13C	Oceanic Terms d18O	Remarks
10-Jun-93	43	-0.053	-0.082	-0.024	-0.021	# Used weekly average for this week
16-Jun-93	44	-0.081	-0.234	-0.053	-0.175	
17-Jun-93	44	-0.076	-0.168	-0.048	-0.108	# Used weekly average for this week
18-Jun-93	44	-0.071	-0.101	-0.043	-0.042	
23-Jun-93	45	-0.068	-0.086	-0.040	-0.029	
24-Jun-93	45	-0.052	-0.044	-0.025	0.013	
30-Jun-93	46	-0.068	-0.119	-0.041	-0.063	
01-Jul-93	46	-0.068	-0.119	-0.041	-0.063	# Used weekly average for this week
07-Jul-93	47	-0.053	-0.061	-0.027	-0.008	
08-Jul-93	47	-0.017	-0.021	0.008	0.033	
30-Jul-93	48	-0.017	-0.017	0.006	0.029	
31-Jul-93	48	-0.046	-0.030	-0.024	0.017	
02-Aug-93	49	-0.042	0.002	-0.020	0.048	
03-Aug-93	49	-0.004	0.045	0.017	0.091	
18-Aug-93	50	-0.034	-0.015	-0.014	0.026	
19-Aug-93	50	-0.034	-0.015	-0.014	0.026	# Used weekly average for this week
25-Aug-93	51	-0.028	-0.013	-0.009	0.026	
26-Aug-93	51	-0.028	-0.013	-0.009	0.026	# Used weekly average for this week
02-Sep-93	52	-0.020	0.024	-0.002	0.061	
03-Sep-93	52	-0.031	0.017	-0.013	0.054	
08-Sep-93	53	-0.016	0.041	0.001	0.077	
09-Sep-93	53	-0.016	0.041	0.001	0.077	# Used weekly average for this week
10-Sep-93	53	-0.016	0.041	0.001	0.077	# Used weekly average for this week
15-Sep-93	54	0.007	0.085	0.024	0.119	
16-Sep-93	54	0.007	0.085	0.024	0.119	# Used weekly average for this week
29-Sep-93	55	0.001	0.091	0.015	0.121	
30-Sep-93	55	0.001	0.091	0.015	0.121	# Used weekly average for this week
06-Oct-93	56	-0.011	0.045	0.002	0.072	
07-Oct-93	56	-0.002	0.091	0.011	0.118	
13-Oct-93	57	-0.017	0.039	-0.004	0.065	
14-Oct-93	57	-0.007	0.065	0.006	0.091	
20-Oct-93	58	0.005	0.060	0.017	0.084	
22-Oct-93	58	0.016	0.090	0.026	0.114	
03-Nov-93	59	-0.075	-0.293	-0.066	-0.273	
04-Nov-93	59	-0.059	-0.305	-0.050	-0.286	
18-Nov-93	60	-0.024	-0.098	-0.017	-0.082	
19-Nov-93	60	-0.012	-0.075	-0.004	-0.060	
01-Dec-93	61	0.007	0.012	0.012	0.025	
02-Dec-93	61	0.017	-0.003	0.023	0.009	
06-Dec-93	62	-0.023	-0.046	-0.018	-0.035	
07-Dec-93	62	-0.028	-0.042	-0.023	-0.031	
08-Dec-93	62	-0.003	0.016	0.002	0.027	
10-Dec-93	62	-0.009	0.022	-0.004	0.031	
20-Dec-93	63	-0.003	-0.015	0.000	-0.008	
22-Dec-93	63	-0.017	-0.061	-0.015	-0.054	

TABLE J: Daily Isotopic Correction Terms

DAILY TERMS
(Correction terms from combined GEA4, GS19, GS20, 39382, 75635 and 75859)

Date of Analysis	week	Atmospheric Terms d13C	Atmospheric Terms d18O	Oceanic Terms d13C	Oceanic Terms d18O	Remarks
04-Jan-94	64	0.046	0.102	0.047	0.105	
05-Jan-94	64	0.011	0.035	0.011	0.037	
11-Jan-94	65	0.031	0.081	0.032	0.082	
12-Jan-94	66	0.000	0.001	0.000	0.001	
13-Jan-94	66	0.010	0.007	0.009	0.007	
19-Jan-94	66	0.001	0.000	-0.001	-0.002	
20-Jan-94	66	0.004	0.003	0.003	0.002	# Used weekly average for this week
26-Jan-94	67	0.062	0.112	0.061	0.109	
27-Jan-94	67	0.045	0.106	0.043	0.103	
02-Feb-94	68	0.049	0.110	0.045	0.104	# Used value for 940203
03-Feb-94	68	0.049	0.110	0.045	0.104	
09-Feb-94	69	0.000	0.000	0.000	0.000	# NBS standard calibration
10-Feb-94	69	0.000	0.000	0.000	0.000	# NBS standard calibration
17-Feb-94	70	0.056	0.137	0.051	0.127	
02-Mar-94	71	0.039	0.157	0.033	0.144	
03-Mar-94	71	0.054	0.112	0.046	0.100	
09-Mar-94	72	0.062	0.123	0.055	0.108	
10-Mar-94	72	0.051	0.143	0.043	0.127	
11-Mar-94	72	0.051	0.128	0.043	0.112	
16-Mar-94	73	0.047	0.114	0.037	0.097	
17-Mar-94	73	0.066	0.112	0.057	0.095	
22-Mar-94	74	0.032	0.091	0.023	0.072	
23-Mar-94	74	0.035	0.113	0.026	0.094	
24-Mar-94	74	0.012	0.098	0.002	0.079	
25-Mar-94	74	0.049	0.130	0.038	0.110	
29-Mar-94	75	0.042	0.152	0.032	0.132	
30-Mar-94	75	0.072	0.174	0.062	0.153	
15-Apr-94	76	-0.037	-0.257	-0.049	-0.283	
18-Apr-94	76	-0.020	-0.240	-0.033	-0.266	
19-Apr-94	76	0.009	-0.221	-0.003	-0.247	
20-Apr-94	76	0.036	-0.154	0.023	-0.181	
21-Apr-94	76	0.017	-0.190	0.004	-0.217	
27-Apr-94	77	-0.003	-0.125	-0.017	-0.154	
28-Apr-94	77	0.006	-0.086	-0.009	-0.115	
29-Apr-94	77	0.017	-0.034	0.003	-0.063	
11-May-94	78	0.036	-0.013	0.020	-0.045	
13-May-94	78	0.042	0.005	0.026	-0.029	
18-May-94	79	-0.013	-0.035	-0.030	-0.069	
19-May-94	79	0.016	-0.007	-0.002	-0.042	
24-May-94	80	0.030	-0.041	0.012	-0.076	
25-May-94	80	0.007	-0.080	-0.011	-0.116	
07-Jun-94	81	0.028	0.064	0.009	0.023	
08-Jun-94	81	0.019	0.025	0.000	-0.016	
16-Jun-94	82	0.047	0.072	0.026	0.030	
17-Jun-94	82	0.049	0.056	0.028	0.014	

DAILY TERMS
(Correction terms from combined GEA4, GS19, GS20, 39382, 75635 and 75859)

Date of Analysis	week	Atmospheric Terms d13C	Atmospheric Terms d18O	Oceanic Terms d13C	Oceanic Terms d18O	Remarks
22-Jun-94	83	0.093	0.136	0.071	0.091	
23-Jun-94	83	0.056	0.037	0.034	-0.008	
30-Jun-94	84	0.063	0.072	0.040	0.026	
01-Jul-94	84	0.057	0.051	0.034	0.003	
06-Jul-94	85	0.060	0.056	0.036	0.008	
07-Jul-94	85	0.049	0.032	0.025	-0.016	
13-Jul-94	86	0.063	0.102	0.038	0.051	
14-Jul-94	86	0.063	0.043	0.038	-0.008	
03-Aug-94	87	0.035	0.026	0.008	-0.031	
04-Aug-94	87	0.078	0.119	0.050	0.063	
17-Aug-94	88	0.059	0.088	0.030	0.028	
18-Aug-94	88	0.045	-0.002	0.018	-0.063	
24-Aug-94	89	0.036	0.055	0.006	-0.007	
01-Sep-94	90	0.066	0.107	0.035	0.043	
15-Sep-94	91	0.052	-0.071	0.019	-0.140	
16-Sep-94	91	0.003	-0.131	-0.030	-0.200	
28-Sep-94	92	0.010	-0.146	-0.025	-0.218	
29-Sep-94	92	0.034	-0.065	-0.001	-0.137	
16-Nov-94	93	0.113	0.211	0.071	0.125	
17-Nov-94	93	0.070	0.156	0.028	0.071	
30-Nov-94	94	-0.022	-0.177	-0.065	-0.266	
01-Dec-94	94	-0.029	-0.217	-0.072	-0.307	
07-Dec-94	95	0.024	-0.052	-0.020	-0.144	
08-Dec-94	95	0.021	-0.039	-0.023	-0.131	
14-Dec-94	96	0.061	0.097	0.018	0.005	
15-Dec-94	96	0.010	0.003	-0.035	-0.090	
21-Dec-94	97	0.060	0.148	0.013	0.053	
04-Jan-95	98	0.078	0.159	0.030	0.060	
05-Jan-95	98	0.088	0.138	0.039	0.038	
18-Jan-95	99	0.043	0.169	-0.007	0.065	
19-Jan-95	99	0.013	0.103	-0.037	0.000	
26-Jan-95	100	0.059	0.111	0.008	0.006	
27-Jan-95	100	0.039	0.052	-0.012	-0.054	
01-Feb-95	101	0.053	0.120	0.001	0.013	
02-Feb-95	101	0.069	0.122	0.017	0.014	
03-Feb-95	101	0.064	0.105	0.012	-0.002	
08-Feb-95	102	0.085	0.144	0.032	0.035	
09-Feb-95	102	0.068	0.123	0.016	0.014	
16-Feb-95	103	-0.035	-0.241	-0.089	-0.353	
09-Mar-95	103	-0.031	-0.310	0.010	-0.267	
10-Mar-95	103	-0.098	-0.381	-0.058	-0.338	
15-Mar-95	104	-0.059	-0.341	-0.020	-0.299	
22-Mar-95	105	-0.082	-0.367	-0.044	-0.327	
23-Mar-95	105	-0.127	-0.397	-0.089	-0.356	
24-Mar-95	105	-0.127	-0.406	-0.089	-0.363	

TABLE J: Daily Isotopic Correction Terms

DAILY TERMS
(Correction terms from combined GEA4, GS19, GS20, 39382, 75635 and 75859)

Date of Analysis	week	Atmospheric Terms d13C	Atmospheric Terms d18O	Oceanic Terms d13C	Oceanic Terms d18O	Remarks
05-Apr-95	106	-0.105	-0.285	-0.069	-0.248	
06-Apr-95	106	-0.106	-0.298	-0.070	-0.261	
12-Apr-95	107	-0.085	-0.243	-0.049	-0.207	
13-Apr-95	107	-0.075	-0.224	-0.040	-0.188	
21-Apr-95	108	-0.117	-0.300	-0.083	-0.265	
27-Apr-95	109	-0.054	-0.166	-0.021	-0.132	
28-Apr-95	109	-0.085	-0.209	-0.051	-0.176	
10-May-95	110	-0.083	-0.188	-0.053	-0.157	
11-May-95	110	-0.100	-0.201	-0.069	-0.170	
18-May-95	111	-0.086	-0.225	-0.056	-0.196	
19-May-95	111	-0.108	-0.231	-0.078	-0.202	
24-May-95	112	-0.092	-0.268	-0.063	-0.240	
25-May-95	112	-0.063	-0.212	-0.034	-0.184	
01-Jun-95	113	-0.111	-0.298	-0.083	-0.271	
02-Jun-95	113	-0.123	-0.316	-0.095	-0.290	
07-Jun-95	114	-0.137	-0.346	-0.109	-0.320	
08-Jun-95	114	-0.151	-0.365	-0.124	-0.340	
28-Jun-95	115	-0.161	-0.388	-0.136	-0.367	
29-Jun-95	115	-0.169	-0.389	-0.144	-0.369	
12-Jul-95	116	-0.097	-0.444	-0.074	-0.426	
13-Jul-95	116	-0.101	-0.376	-0.080	-0.359	
24-Jul-95	117	-0.079	-0.282	-0.058	-0.266	
25-Jul-95	117	-0.095	-0.310	-0.074	-0.294	
26-Jul-95	117	-0.071	-0.247	-0.051	-0.232	
02-Aug-95	118	-0.063	-0.237	-0.044	-0.224	
03-Aug-95	118	-0.067	-0.191	-0.048	-0.177	
17-Aug-95	119	-0.043	-0.162	-0.025	-0.152	
18-Aug-95	119	-0.038	-0.200	-0.021	-0.190	
21-Aug-95	120	-0.037	-0.178	-0.021	-0.168	
22-Aug-95	120	-0.091	-0.217	-0.074	-0.207	
23-Aug-95	121	-0.089	-0.198	-0.073	-0.188	
24-Aug-95	121	-0.095	-0.223	-0.078	-0.213	
14-Sep-95	122	-0.074	-0.162	-0.061	-0.155	
15-Sep-95	122	-0.132	-0.255	-0.118	-0.250	
21-Sep-95	123	-0.119	-0.218	-0.107	-0.214	
22-Sep-95	123	-0.120	-0.227	-0.108	-0.223	
05-Oct-95	124	-0.111	-0.250	-0.101	-0.249	
06-Oct-95	124	-0.088	-0.191	-0.078	-0.190	
11-Oct-95	125	-0.094	-0.187	-0.084	-0.187	
19-Oct-95	126	-0.151	-0.258	-0.142	-0.259	
20-Oct-95	126	-0.104	-0.211	-0.095	-0.213	
26-Oct-95	127	-0.098	-0.219	-0.091	-0.222	
27-Oct-95	127	-0.078	-0.181	-0.070	-0.185	
01-Nov-95	128	-0.099	-0.216	-0.092	-0.220	
02-Nov-95	128	-0.082	-0.165	-0.076	-0.169	

TABLE J: Daily Isotopic Correction Terms

DAILY TERMS
(Correction terms from combined GEA4, GS19, GS20, 39382, 75635 and 75859)

Date of Analysis	week	Atmospheric Terms d13C	Atmospheric Terms d18O	Oceanic Terms d13C	Oceanic Terms d18O	Remarks
08-Nov-95	129	-0.079	-0.161	-0.073	-0.167	
09-Nov-95	129	-0.084	-0.168	-0.078	-0.174	
20-Nov-95	130	-0.088	-0.172	-0.084	-0.180	
22-Nov-95	130	-0.096	-0.254	-0.092	-0.262	
30-Nov-95	131	-0.122	-0.260	-0.119	-0.270	
01-Dec-95	131	-0.100	-0.219	-0.097	-0.229	
07-Dec-95	132	-0.100	-0.229	-0.099	-0.241	
08-Dec-95	132	-0.109	-0.224	-0.107	-0.236	
11-Dec-95	133	-0.058	-0.152	-0.057	-0.164	
12-Dec-95	133	-0.097	-0.219	-0.096	-0.232	
14-Dec-95	134	-0.063	-0.118	-0.063	-0.131	
15-Dec-95	134	-0.111	-0.211	-0.110	-0.224	
31-Jan-96	135	-0.061	-0.249	-0.067	-0.272	
08-Feb-96	135	-0.081	-0.308	-0.088	-0.333	
09-Feb-96	135	-0.072	-0.296	-0.079	-0.320	
12-Feb-96	136	-0.026	-0.211	-0.034	-0.236	
13-Feb-96	136	-0.070	-0.289	-0.078	-0.315	
14-Feb-96	137	-0.061	-0.283	-0.069	-0.308	
05-Mar-96	138	-0.011	-0.158	-0.022	-0.187	
06-Mar-96	138	-0.032	-0.128	-0.043	-0.157	
13-Mar-96	139	-0.049	-0.138	-0.061	-0.169	
14-Mar-96	139	-0.059	-0.137	-0.071	-0.168	
20-Mar-96	140	-0.036	-0.088	-0.050	-0.120	
21-Mar-96	140	-0.045	-0.087	-0.059	-0.100	
28-Mar-96	141	-0.062	-0.115	-0.076	-0.149	
29-Mar-96	141	-0.029	-0.067	-0.043	-0.101	
04-Apr-96	142	-0.052	-0.085	-0.067	-0.120	
05-Apr-96	142	-0.032	-0.035	-0.047	-0.071	
18-Apr-96	143	-0.037	-0.037	-0.054	-0.075	
19-Apr-96	143	-0.060	-0.030	-0.077	-0.069	
25-Apr-96	144	-0.037	-0.022	-0.055	-0.061	
26-Apr-96	144	-0.034	0.013	-0.052	-0.027	
01-May-96	145	-0.045	-0.027	-0.064	-0.067	
02-May-96	145	-0.046	-0.004	-0.065	-0.045	
08-May-96	146	-0.016	-0.017	-0.036	-0.059	
09-May-96	146	-0.016	0.016	-0.036	-0.026	
16-May-96	147	-0.022	0.014	-0.043	-0.030	
17-May-96	147	-0.020	0.023	-0.041	-0.021	
22-May-96	148	-0.011	0.016	-0.033	-0.029	
23-May-96	148	-0.008	0.028	-0.030	-0.017	
24-May-96	148	-0.031	-0.015	-0.052	-0.060	
29-May-96	149	-0.017	0.003	-0.040	-0.043	
30-May-96	149	0.002	0.026	-0.021	-0.020	
31-May-96	149	0.012	0.052	-0.011	0.005	
05-Jun-96	150	-0.003	0.037	-0.027	-0.010	

DAILY TERMS
(Correction terms from combined GEA4, GS19, GS20, 39382, 75635 and 75859)

Date of Analysis	week	Atmospheric Terms d13C	Atmospheric Terms d180	Oceanic Terms d13C	Oceanic Terms d180	Remarks
06-Jun-96	150	0.004	0.043	-0.020	-0.005	
13-Jun-96	151	0.002	0.007	-0.023	-0.042	
14-Jun-96	151	0.001	0.013	-0.024	-0.037	
19-Jun-96	152	0.003	0.032	-0.022	-0.019	
20-Jun-96	152	-0.009	0.021	-0.035	-0.030	
03-Jul-96	153	0.048	0.064	0.020	0.011	
16-Jul-96	153	-0.001	0.038	-0.030	-0.018	
17-Jul-96	153	-0.006	0.059	-0.036	0.003	
22-Jul-96	154	-0.019	-0.029	-0.050	-0.086	
23-Jul-96	154	-0.023	0.010	-0.054	-0.047	
30-Jul-96	155	-0.015	-0.031	-0.047	-0.090	
31-Jul-96	155	-0.018	-0.007	-0.050	-0.068	
06-Aug-96	156	-0.024	-0.014	-0.056	-0.074	
07-Aug-96	156	-0.018	-0.004	-0.051	-0.064	
12-Aug-96	157	0.005	0.028	-0.028	-0.035	
29-Aug-96	158	-0.010	-0.035	-0.045	-0.099	
30-Aug-96	158	0.003	-0.033	-0.033	-0.098	
31-Aug-96	158	-0.025	-0.087	-0.061	-0.152	
06-Sep-96	159	-0.026	-0.037	-0.063	-0.104	
07-Sep-96	159	-0.011	0.030	-0.048	-0.035	
12-Sep-96	160	-0.004	0.032	-0.042	-0.035	
13-Sep-96	160	0.035	0.069	-0.003	0.001	
24-Sep-96	161	0.012	0.005	-0.027	-0.065	
25-Sep-96	161	-0.003	0.004	-0.043	-0.068	

TABLE K: Summary of Flagged Secondary Standard Data

Sample No.	Number assigned to atmospheric secondary standards. See Table C.
Week No.	Week ("shipment") number of analysis on mass spectrometer.
Fill No. Tube No.	Fill and Tube numbers of atmospheric secondary standard extractions. See Table C.
Cylinder No.	Designated number of secondary standard.
Extraction Date	Date of extraction (fill) of atmospheric secondary standard.
Measured d13C d18O	Craig- but not NBS- or daily-corrected reduced isotopic ratio. See Table D.
Date of Analysis	Measurement date on mass spectrometer.
Criteria	Reason for flagged data.

TABLE K: Summary of Flagged Secondary Standard Data

Sample No.	Week No.	Fill No.	Tube No.	Standard No.	Extraction Date	---Measured--- d13C	d18O	Date of Analysis	Criteria
K94-210	72	18	4	39382	03FEB94	-8.468	-0.835	09MAR94	Inspection of SPO data set
K95-823	120	31	2	39382	13JUN95	-8.413	-0.600	22AUG95	*
K92-269	07	8	1	75635	01JUN92	-8.510	-0.659	15JUN92	Inspection of LJO data set
K94- 3	68	17	3	75635	04JAN94	-8.622	-0.924	02FEB94	Inspection of MLO data set
K94- 16	68	17	4	75859	03JAN94	-8.490	-0.686	02FEB94	Inspection of MLO data set
K94-848	90	24	6	75859	23JUL94	-8.649	-0.979	01SEP94	*
K96- 68	137	36	3	75859	22JAN96	-8.502	-0.575	14FEB96	*
K96-201	145	38	1	75859	30MAR96	-8.403	-0.646	01MAY96	*
K96-205	142	38	5	75859	30MAR96	-8.506	-0.754	05APR96	*
K96-657	158	42	3	75859	02AUG96	-8.415	-0.472	29AUG96	*
K96-659	156	42	5	75859	02AUG96	-8.415	-0.551	07AUG96	*
	105			GS19		-7.428	0.032	23MAR95	Inspection of KER data set
	105			GS20		-8.561	-0.764	23MAR95	Inspection of KER data set
	153			GEA4		-7.599	1.510	17JUL96	*

* When a standard is run, and its value looks suspect based on recent runs....another standard is run immediately. In each of these cases the resulting comparison warranted flagging of the suspect standard run.

TABLE L(1) (L(2)): CIO vs. Wahlen Isotopic Data - Determination of d13C (d18O) Offset based on NBS Corrected Data.

Sample Identification — The top section is for atmospheric samples (containing N2O), the three atmospheric secondary standards and a set of la Jolla natural air samples. The bottom section is for oceanic samples (pure CO2), including three bicarbonate batch extractions, a set of four duplicate natural sea water extractions, and the secondary standards GS19 and GS20.

Wahlen
n d13C s
(d18O)
Mean — For each sub-grouping, lists the number of analyses made at SIO on the VG Prism II, along with the mean d13C (d18O) and the standard deviation.

CIO
n d13C s
(d18O)
Mean — For each sub-grouping, lists the number of analyses made at CIO, along with the mean d13C (d18O) and the standard deviation.

Wahlen-CIO — Lists the difference in d13C (d18O) between Wahlen and CIO for each sub-grouping along with the weighted standard deviations, and the grand weighted means and standard deviations for each grouping. See text, p. 30.

TABLE L(1): CIO vs Wahlen Isotopic Data - Determination of d13C Offset Based on NBS Corrected Data

Sample Identification		WAHLEN			CIO			WAHLEN - CIO	
		n	d13C Mean	s	n	d13C Mean	s	d13C Diff	S
Atmospheric Samples									
Secondary Std.	39382	156	-8.279	0.015	18	-8.402	0.025	0.123	0.00601
Cylinder	75635	164	-8.393	0.016	18	-8.507	0.033	0.114	0.00788
No.	75859	158	-8.276	0.017	19	-8.387	0.035	0.111	0.00814
					GRAND WEIGHTED MEAN		=	0.1175	0.00412
La Jolla	28MAY91	6	-8.246	0.014	4	-8.355	0.016	0.109	0.00983
Sample Date	14NOV91	2	-8.094	0.011	2	-8.194	0.021	0.100	0.01676
	06JAN92	4	-8.196	0.008	4	-8.237	0.073	0.041	0.03672
	07FEB92	4	-8.148	0.028	2	-8.257	0.021	0.109	0.02041
	10FEB92	4	-8.124	0.012	2	-8.202	0.028	0.078	0.02069
	13FEB92	4	-8.120	0.017	2	-8.227	0.007	0.107	0.00984
	03MAR92	4	-8.201	0.020	2	-8.303	0.035	0.102	0.02669
	04MAR92	4	-8.141	0.019	2	-8.208	0.028	0.067	0.02196
	17MAR92	4	-8.189	0.011	2	-8.298	0.028	0.109	0.02055
	18MAR92	4	-8.165	0.016	2	-8.333	0.021	0.168	0.01687
	30MAR92	4	-8.163	0.011	2	-8.258	0.014	0.095	0.01132
	31MAR92	3	-8.175	0.016	2	-8.248	0.000	0.073	0.00924
	14APR92	2	-8.214	0.006	2	-8.304	0.037	0.090	0.02178
	30APR92	4	-8.216	0.018	2	-8.200	0.099	-0.016#	(0.07058)
	01MAY92	4	-8.276	0.011	2	-8.400	0.014	0.124	0.01132
	06MAY92	4	-8.275	0.017	2	-8.430	0.071	0.155	0.05092
	19MAY92	4	-8.221	0.003	2	-8.215	0.177	-0.006#	(0.1252)
	27MAY92	4	-8.201	0.005	2	-8.315	0.007	0.114	0.00554
					GRAND WEIGHTED MEAN		=	0.1057	0.00314
Oceanic Samples									
Bicarbonate	NCO3-15	2	-6.001	0.001	10	-6.047	0.035	0.046	0.01109
Batch No.	NCO3-16	5	-6.535	0.003	4	-6.541	0.055	0.006	0.02753
	NCO3-18	5	-8.981	0.012	4	-8.988	0.030	0.007	0.01593
Secondary	GS-19	85	-7.465	0.013	28	-7.513	0.030	0.048	0.00605
Standard	GS-20	75	-8.575	0.012	25	-8.636	0.037	0.061	0.00753
No.									
Calcofi	20APR92	1	1.887		1	1.89		-0.003	
Sample Date	20APR92	1	1.873		1	1.85		0.023	
	5JUL92	1	1.916		1	1.87		0.046	
	7JUL92	1	1.935		1	1.95		-0.015	
					Mean and(s) (Calcofi)		=	0.013	(0.027)

Rejected

TABLE L(2): CIO vs Wahlen Isotopic Data - Determination of d18O Offset Based on NBS Corrected Data

Sample Identification		WAHLEN			CIO			WAHLEN - CIO	
		n	d18O Mean	s	n	d18O Mean	s	d18O Diff	S
Atmospheric Samples									
Secondary Std.	39382	158	-0.414	0.039	18	-0.506	0.046	0.092	0.0113
Cylinder	75635	164	-0.439	0.034	18	-0.571	0.050	0.132	0.0121
No.	75859	158	-0.255	0.038	19	-0.364	0.051	0.109	0.0121
					GRAND WEIGHTED MEAN		=	0.1101	0.00681
La Jolla	28MAY91	6	0.174	0.024	4	0.045	0.070	0.129	0.0363
Sample Date	14NOV91	2	-0.470	0.019	2	-0.628	0.113	0.158	0.0810
	06JAN92	4	-0.476	0.022	4	-0.471	0.136	-0.005	0.0689
	07FEB92	4	-0.185	0.041	2	-0.280	0.035	0.095	0.0321
	10FEB92	4	-0.062	0.045	2	-0.180	0.134	0.118	0.0974
	13FEB92	4	-0.036	0.045	2	-0.185	0.042	0.149	0.0373
	03MAR92	4	-0.072	0.055	2	-0.117	0.028	0.045	0.0339
	04MAR92	4	0.087	0.044	2	-0.057	0.042	0.144	0.0370
	17MAR92	4	0.024	0.042	2	-0.107	0.014	0.131	0.0232
	18MAR92	4	0.042	0.031	2	-0.147	0.042	0.189	0.0335
	30MAR92	4	0.200	0.028	2	0.073	0.000	0.127	0.0140
	31MAR92	3	0.152	0.025	2	0.098	0.035	0.054	0.0285
	14APR92	2	0.079	0.001	2	0.017	0.034	0.062	0.0196
	30APR92	4	0.245	0.053	2	0.421	0.141	-0.176#	(0.1032)
	01MAY92	4	0.171	0.019	2	0.086	0.035	0.085	0.0265
	06MAY92	4	0.560	0.023	2	0.446	0.064	0.114	0.0467
	19MAY92	4	0.282	0.028	2	0.411	0.354	-0.129#	(0.2507)
	27MAY92	4	0.393	0.010	2	0.301	0.057	0.092	0.0406
					GRAND WEIGHTED MEAN		=	0.1067	0.00732
Oceanic Samples									
Bicarbonate	NCO3-15	2	-9.123	0.058	10	-9.899	0.230	0.776	0.0835
Batch No.	NCO3-16	5	-9.205	0.358	4	-9.403	0.156	0.198	0.1781
	NCO3-18	5	-8.191	0.153	4	-8.459	0.336	0.268	0.1814
Secondary	GS-19	85	-0.126	0.023	25	-0.206	0.06	0.080	0.0123
Standard	GS-20	75	-0.915	0.020	25	-1.015	0.05	0.100	0.0103
No.									
Calcofi	20APR92	1	0.019		1	-0.31		0.329	
Sample Date	20APR92	1	-0.934		1	-0.98		0.046	
	5JUL92	1	-1.224		1	-0.94		-0.284	
	7JUL92	1	-0.934		1	-0.99		0.056	
					Mean and (s) (Calcofi)		=	0.037	(0.250)

Rejected

TABLE M(1): CIO Oceanic Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Number assigned to extracted sample. Each year has a separate consecutively-numbered series.
Batch/Sample Date	For the bicarbonate titration standards, the date of bottling the batch of standards. For the sea water samples, the sampling date.
Batch/Bottle No.	For the bicarbonate titration standards, the number of the batch followed by a letter designating the individual bottle of the batch. The "A" after 18E and 18F indicates the samples were one of double extractions from the bottles. For the sea water samples, the bottle/sample number followed by B, indicating one of a double extraction from the bottle.
D.I.C. umol/kg	The dissolved inorganic carbon concentration (or "Total CO2") of the standard or sea water sample.
Extraction Date	Date of extraction of CO2 sample from standard or sea water sample.
Corrected d13C d18O	Corrected reduced isotopic ratio data from CIO.
Shipment No.	Consecutive number assigned to shipments of samples to CIO.
Analysis Date	Date of analysis on mass spectrometer at CIO.

TABLE M(1): CIO Oceanic Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Batch/Sample Date	Batch/Bottle No.	D.I.C. umol/kg	Extraction Date	Corrected d13C	Corrected d18O	Shipment No.	Analysis Date
Bicarbonate Titration Standards:								
K89-276	28NOV88	15A	2243.74	28NOV88	-6.042	-9.843	254	01DEC89
K89-210	28NOV88	15C	2245.50	08MAR89	-6.042	-10.273	252	02DEC89
K89-411	28NOV88	15F	2242.90	26JUN89	-6.112	-10.013	259	01DEC89
K89-434	28NOV88	15I	2242.41	12JUL89	-6.082	-10.013	259	01DEC89
K89-497	28NOV88	15J	2245.38	08AUG89	-6.023	-9.757	262	19DEC89
K89-498	28NOV88	15L	2246.36	18SEP89	-6.023	-10.127	262	19DEC89
K90- 29	28NOV88	15M	2246.22	29NOV89	-6.072	-9.774	265	27APR90
K90-428	28NOV88	15N	2244.28	14NOV88	-6.060	-9.430	296	02OCT91
K90-630	28NOV88	15P	2251.65	29NOV89	-6.010	-9.860	290	23AUG91
K90-427	28NOV88	15Q	2244.75	31JAN90	-6.000	-9.900	293	24AUG91
			Average (of 10) =		-6.047	-9.899		
K89-535	22SEP89	16A	2218.11	19OCT89	-6.493	-9.337	262	19DEC89
K90- 66	22SEP89	16C	2216.11	08JAN90	-6.530	-9.635	265	27SEP90
K90-405	22SEP89	16D	2225.97	04JAN90	-6.620	-9.300	290	24AUG91
K90-406	22SEP89	16F	2221.00	09MAR90	-6.520	-9.340	293	24AUG91
			Average (of 4) =		-6.541	-9.403		
K91-559	07DEC90	18C	2250.39	07DEC90	-9.030	-8.750	300	30OCT91
K91-584	07DEC90	18D	2238.84	15FEB91	-8.990	-8.720	301	08NOV91
K91-606	07DEC90	18EA	2241.16	08APR91	-8.961	-8.313	308	03JUN92
K91-635	07DEC90	18FA	2241.37	03APR91	-8.971	-8.053	308	03JUN92
			Average (of 4) =		-8.988	-8.459		
Calcofi Surface Seawater Samples:								
K94-168	20APR92	P-5214 B	1991.60	18JAN94	+1.89	-0.31	312	08JUN94
K94-170	20APR92	P-5215 B	1991.52	19JAN94	+1.85	-0.98	312	08JUN94
K94-172	05JUL92	P-5272 B	1988.71	24JAN94	+1.87	-0.94	312	08JUN94
K94-174	07JUL92	P-5274 B	1984.84	26JAN94	+1.95	-0.99	312	08JUN94

TABLE M(2): CIO La Jolla Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Number assigned to extracted sample. Each year has a separate consecutively-numbered series.
Loc.	Sampling location (La Jolla pier (LJO)).
Exposure Date	Date of sampling of air.
Flask No.	Number of 5-liter air sampling flask.
I.R. Anal. Date	Date of analysis of concentration of CO2 on infrared analyzer at SIO.
'99 Mole Fraction in ppm	The mole fraction of CO2 in the air sample, by infrared analysis, in the "X99" calibration scale.
Extraction Date	Date of extraction of CO2 sample from air sample.
Corrected d13C d18O	Corrected reduced isotopic ratio data from CIO.
Shipment No.	Consecutive number assigned to shipments of samples to CIO.
Analysis Date	Date of analysis on mass spectrometer at CIO.

TABLE M(2): CIO La Jolla Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Loc.	Exposure Date	Flask No.	I.R. Anal. Date	'99 Mole Fraction in ppm	Extraction Date	Corrected d13C	Corrected d18O	Shipment No.	Analysis Date
K91-236	LJO	28MAY91	I- 19	29MAY91	360.20	31MAY91	-8.332	+0.015	304	01APR92
K91-237	LJO	28MAY91	I- 20	29MAY91	360.12	04JUN91	-8.359	+0.125	305	15APR92
K91-238	LJO	28MAY91	I- 21	29MAY91	360.04	31MAY91	-8.369	-0.035	306	29APR92
K91-239	LJO	28MAY91	I- 22	29MAY91	360.04	04JUN91	-8.359	+0.075	307	21MAY92
							---	---		
					Average (of 4) =		-8.355	+0.045		
K92- 46	LJO	14NOV91	I-255	27NOV91	358.02	07FEB92	-8.179	-0.548	303	25MAR92
K92- 47	LJO	14NOV91	I-256	27NOV91	358.02	07FEB92	-8.209	-0.708	303	25MAR92
							---	---		
					Average (of 2) =		-8.194	-0.628		
K92- 59	LJO	06JAN92	I-263	07JAN92	359.55	11FEB92	-8.229	-0.478	303	25MAR92
K92- 60	LJO	06JAN92	I-264	07JAN92	359.55	11FEB92	-8.269	-0.498	303	25MAR92
K92- 63	LJO	06JAN92	I-167	10JAN92	359.65	24FEB92	-8.139	-0.288	303	25MAR92
K92- 64	LJO	06JAN92	I-168	10JAN92	359.65	24FEB92	-8.309	-0.618	303	25MAR92
							---	---		
					Average (of 4) =		-8.237	-0.471		
K92- 81	LJO	07FEB92	I-217	12FEB92	359.17	25FEB92	-8.242	-0.305	304	01APR92
K92- 82	LJO	07FEB92	I-218	12FEB92	359.07	25FEB92	-8.272	-0.255	304	01APR92
							---	---		
					Average (of 2) =		-8.257	-0.280		
K92- 87	LJO	10FEB92	I-223	12FEB92	358.67	26FEB92	-8.222	-0.275	304	01APR92
K92- 88	LJO	10FEB92	I-224	12FEB92	358.67	26FEB92	-8.182	-0.085	304	01APR92
							---	---		
					Average (of 2) =		-8.202	-0.180		
K92- 93	LJO	13FEB92	I-231	20FEB92	358.74	27FEB92	-8.232	-0.155	304	01APR92
K92- 94	LJO	13FEB92	I-232	20FEB92	358.74	27FEB92	-8.222	-0.215	304	01APR92
							---	---		
					Average (of 2) =		-8.227	-0.185		
K92-161	LJO	03MAR92	I-235	04MAR92	360.20	08APR92	-8.328	-0.097	309	08JUL92
K92-162	LJO	03MAR92	I-236	04MAR92	360.20	08APR92	-8.278	-0.137	309	08JUL92
							---	---		
					Average (of 2) =		-8.303	-0.117		
K92-171	LJO	04MAR92	I-245	18MAR92	359.34	14APR92	-8.188	-0.087	309	08JUL92
K92-172	LJO	04MAR92	I-246	18MAR92	359.14	14APR92	-8.228	-0.027	309	08JUL92
							---	---		
					Average (of 2) =		-8.208	-0.057		
K92-173	LJO	17MAR92	I-253	18MAR92	359.93	16APR92	-8.318	-0.117	309	08JUL92
K92-174	LJO	17MAR92	I-254	18MAR92	359.93	16APR92	-8.278	-0.097	309	08JUL92
							---	---		
					Average (of 2) =		-8.298	-0.107		

TABLE M(2): CIO La Jolla Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Loc.	Exposure Date	Flask No.	I.R. Anal. Date	'99 Mole Fraction in ppm	Extraction Date	Corrected d13C	Corrected d18O	Shipment No.	Analysis Date
K92-199	LJO	18MAR92	I-263	01APR92	359.48	29APR92	-8.318	-0.117	309	08JUL92
K92-200	LJO	18MAR92	I-264	01APR92	359.48	29APR92	-8.348	-0.177	309	08JUL92
						Average (of 2) =	-8.333	-0.147		
K92-213	LJO	30MAR92	I-247	01APR92	359.89	05MAY92	-8.248	+0.073	309	08JUL92
K92-214	LJO	30MAR92	I-248	01APR92	359.89	05MAY92	-8.268	+0.073	309	08JUL92
						Average (of 2) =	-8.258	+0.073		
K92-223	LJO	31MAR92	I-215	01APR92	360.08	07MAY92	-8.248	+0.073	309	08JUL92
K92-224	LJO	31MAR92	I-216	01APR92	360.18	07MAY92	-8.248	+0.123	309	08JUL92
						Average (of 2) =	-8.248	+0.098		
K92-232	LJO	14APR92	I-218	15APR92	360.62	20MAY92	-8.278	-0.007	309	08JUL92
K92-236	LJO	14APR92	I-222	22APR92	360.66	20MAY92	-8.330	+0.041	311	27AUG92
						Average (of 2) =	-8.304	+0.017		
K92-247	LJO	30APR92	I-223	06MAY92	360.74	09JUN92	-8.130	+0.521	311	27AUG92
K92-248	LJO	30APR92	I-224	06MAY92	360.94	09JUN92	-8.270	+0.321	311	27AUG92
						Average (of 2) =	-8.200	+0.421		
K92-293	LJO	01MAY92	I-229	06MAY92	361.33	23JUN92	-8.410	+0.111	311	27AUG92
K92-294	LJO	01MAY92	I-230	06MAY92	361.33	23JUN92	-8.390	+0.061	311	27AUG92
						Average (of 2) =	-8.400	+0.086		
K92-303	LJO	06MAY92	I-245	27MAY92	361.34	29JUN92	-8.380	+0.491	311	27AUG92
K92-304	LJO	06MAY92	I-246	27MAY92	361.34	30JUN92	-8.480	+0.401	311	27AUG92
						Average (of 2) =	-8.430	+0.446		
K92-317	LJO	19MAY92	I-253	27MAY92	360.61	10JUL92	-8.340	+0.161	311	27AUG92
K92-318	LJO	19MAY92	I-254	27MAY92	360.61	10JUL92	-8.090	+0.661	311	27AUG92
						Average (of 2) =	-8.215	+0.411		
K92-327	LJO	27MAY92	I-263	03JUN92	360.18	16JUL92	-8.310	+0.341	311	27AUG92
K92-328	LJO	27MAY92	I-264	03JUN92	360.18	16JUL92	-8.320	+0.261	311	27AUG92
						Average (of 2) =	-8.315	+0.301		

TABLE M(3): CIO Atmospheric Secondary Standard Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Number assigned to extracted sample. Each year has a separate consecutively-numbered series.
Shpt. No.	Consecutive number assigned to shipments of samples to CIO.
Fill No.	Each fill consists of sets of six extractions from each atmospheric natural-air secondary standard.
Tube No.	Extraction order for each standard of each fill (numbered 1 to 6).
Cylinder No.	Designated number of atmospheric secondary standard.
Corrected d13C d18O	Corrected reduced isotopic ratio data from CIO.
Date of Analysis	Date of analysis on mass spectrometer at CIO.

TABLE M(3): CIO Atmospheric Secondary Standard Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K91-271	286	1	2	39382	17MAY91	-8.404	-0.506	20JUN91
K91-275	289	1	6	39382	17MAY91	-8.403	-0.494	26JUN91
K91-274	288	1	5	39382	17MAY91	-8.373	-0.474	26JUN91
K91-273	287	1	4	39382	17MAY91	-8.393	-0.454	26JUN91
K91-304	291	2	3	39382	14JUN91	-8.393	-0.533	23AUG91
K91-305	292	2	4	39382	14JUN91	-8.393	-0.503	23AUG91
K91-419	295	3	2	39382	05SEP91	-8.406	-0.532	30SEP91
K91-423	297	3	6	39382	05SEP91	-8.432	-0.515	02OCT91
K91-420	299	3	3	39382	05SEP91	-8.379	-0.478	31OCT91
K91-477	302	5	1	39382	18OCT91	-8.429	-0.538	08NOV91
K91-479	303	5	3	39382	18OCT91	-8.399	-0.468	25MAR92
K91-482	304	5	6	39382	18OCT91	-8.422	-0.545	01APR92
K91-660	305	6	5	39382	21NOV91	-8.419	-0.485	15APR92
K91-657	306	6	2	39382	21NOV91	-8.409	-0.515	29APR92
K91-658	307	6	3	39382	21NOV91	-8.409	-0.545	21MAY92
K92-154	309	7	6	39382	19MAR92	-8.339	-0.402	08JUL92
K92-276	311	8	2	39382	19JUN92	-8.448	-0.607	27AUG92
K92-151	310	7	3	39382	19MAR92	-8.380	-0.549	26JAN93
						------	------	
				Average (of 18) =		-8.402	-0.506	
K91-259	286	1	2	75635	24MAY91	-8.507	-0.571	20JUN91
K91-298	288	2	3	75635	07JUN91	-8.533	-0.603	26JUN91
K91-263	287	1	6	75635	24MAY91	-8.523	-0.583	26JUN91
K91-296	289	2	1	75635	07JUN91	-8.543	-0.534	26JUN91
K91-261	292	1	4	75635	24MAY91	-8.543	-0.664	23AUG91
K91-262	291	1	5	75635	24MAY91	-8.463	-0.534	23AUG91
K91-301	291	2	6	75635	07JUN91	-8.453	-0.533	23AUG91
K91-359	294	3	3	75635	15JUL91	-8.519	-0.538	12SEP91
K91-362	295	3	6	75635	15JUL91	-8.473	-0.526	30SEP91
K91-357	297	3	1	75635	15JUL91	-8.516	-0.642	02OCT91
K91-472	299	5	2	75635	03OCT91	-8.522	-0.615	31OCT91
K91-475	302	5	5	75635	03OCT91	-8.519	-0.578	08NOV91
K91-473	303	5	3	75635	03OCT91	-8.449	-0.538	25MAR92
K92- 74	304	6	4	75635	21FEB92	-8.549	-0.625	01APR92
K92- 75	305	6	5	75635	21FEB92	-8.502	-0.535	15APR92
K92- 71	306	6	1	75635	21FEB92	-8.499	-0.535	29APR92
K92-147	307	7	5	75635	18MAR92	-8.549	-0.632	21MAY92
K92-145	310	7	3	75635	18MAR92	-8.469	-0.485	26JAN93
						------	------	
				Average (of 18) =		-8.507	-0.571	

TABLE M(3): CIO Atmospheric Secondary Standard Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K91-264	286	1	1	75859	20MAY91	-8.385	-0.369	20JUN91
K91-266	289	1	3	75859	20MAY91	-8.353	-0.394	26JUN91
K91-269	287	1	6	75859	20MAY91	-8.453	-0.414	26JUN91
K91-267	288	1	4	75859	20MAY91	-8.363	-0.374	26JUN91
K91-352	292	2	2	75859	12JUL91	-8.403	-0.333	23AUG91
K91-355	294	2	5	75859	12JUL91	-8.376	-0.272	12SEP91
K91-353	295	2	3	75859	12JUL91	-8.423	-0.406	30SEP91
K91-425	297	3	2	75859	06SEP91	-8.399	-0.428	02OCT91
K91-428	299	3	5	75859	06SEP91	-8.342	-0.315	31OCT91
K91-429	302	3	6	75859	06SEP91	-8.419	-0.368	08NOV91
K91-487	303	5	5	75859	29OCT91	-8.389	-0.365	25MAR92
K91-486	304	5	4	75859	29OCT91	-8.372	-0.365	01APR92
K91-485	305	5	3	75859	29OCT91	-8.379	-0.398	15APR92
K92- 68	306	6	4	75859	14FEB92	-8.419	-0.445	29APR92
K92- 67	307	6	3	75859	14FEB92	-8.329	-0.335	21MAY92
K92- 69	309	6	5	75859	14FEB92	-8.338	-0.267	08JUL92
K92-285	311	8	5	75859	22JUN92	-8.440	-0.289	27AUG92
K92-155	311	7	1	75859	27MAY92	-8.409	-0.412	27AUG92
K92-160	310	7	6	75859	27MAY92	-8.370	-0.359	26JAN93
					Average (of 19) =	-8.387	-0.364	

TABLE N(1): Wahlen Oceanic Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Number assigned to extracted sample. Each year has a separate consecutively-numbered series.
Batch/Sample Date	For the bicarbonate titration standards, the date of bottling the batch of standards. For the sea water samples, the sampling date.
Batch/Bottle No.	For the bicarbonate titration standards, the number of the batch followed by a letter designating the individual bottle of the batch. The "A" or "B" at the end of the number indicates the sample was one of a double extraction from the bottle. For the sea water samples, the bottle/sample number followed by A, indicating one of a double extraction from the bottle.
D.I.C. umol/kg	The dissolved inorganic carbon concentration (or "Total CO2") of the standard or sea water sample.
Extraction Date	Date of extraction of CO2 sample from standard or sea water sample.
Corrected d13C d18O	Fully corrected reduced isotopic ratio data (1994 NBS, Craig, and daily corrections applied).
Shipment No.	Consecutive number assigned to sets of samples analyzed on the Wahlen VG Prism II mass spectrometer each week.
Analysis Date	Date of analysis on VG Prism II mass spectrometer at SIO.

TABLE N(1): Wahlen Oceanic Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Batch/Sample Date	Batch/Bottle No.	D.I.C. umol/kg	Extraction Date	Corrected d13C	Corrected d18O	Shipment No.	Analysis Date
Bicarbonate Titration Standards:								
K93-629	28NOV88	15SA	2244.46	13OCT93	-6.000	-9.082	W58	20OCT93
K93-630	28NOV88	15SB	2244.80	13OCT93	-6.002	-9.164	W58	20OCT93
					------	-------		
			Average (of 2)	=	-6.001	-9.123		
K93-631	22SEP89	16QA	2223.33	18OCT93	-6.537	-8.832	W58	20OCT93
K93-632	22SEP89	16QB	2223.84	18OCT93	-6.534	-8.796	W58	20OCT93
K93-638	22SEP89	16B1	2221.33	25OCT89	-6.530	-9.496	W58	20OCT93
K93-639	22SEP89	16B2	2220.59	25OCT89	-6.537	-9.470	W58	20OCT93
K93-645	22SEP89	16A2	2218.74	29OCT89	-6.535	-9.430	W58	22OCT93
					------	------		
			Average (of 5)	=	-6.535	-9.205		
K93-633	07DEC90	18OA	2240.84	18OCT93	-8.975	-8.402	W58	20OCT93
K93-634	07DEC90	18OB	2237.86	18OCT93	-8.977	-8.255	W58	20OCT93
K93-635	07DEC90	18EB	2240.04	08APR91	-9.001	-8.144	W58	20OCT93
K93-636	07DEC90	18FB	2240.64	03APR91	-8.979	-7.986	W58	20OCT93
K93-637	07DEC90	18HB	2240.77	01MAY91	-8.971	-8.170	W58	20OCT93
					------	------		
			Average (of 5)	=	-8.981	-8.191		
Calcofi Surface Seawater Samples:								
K94-167	20APR92	P-5214 A	1991.70	18JAN94	+1.887	+0.019	W70	17FEB94
K94-169	20APR92	P-5215 A	1991.08	19JAN94	+1.873	-0.934	W70	17FEB94
K94-171	05JUL92	P-5272 A	1988.14	24JAN94	+1.916	-1.224	W70	17FEB94
K94-173	07JUL92	P-5274 A	1985.25	26JAN94	+1.935	-0.934	W70	17FEB94

TABLE N(2): Wahlen La Jolla Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Number assigned to extracted sample. Each year has a separate consecutively-numbered series.
Loc.	Sampling location (La Jolla pier (LJO)).
Exposure Date	Date of sampling of air.
Flask No.	Number of 5-liter air sampling flask.
I.R. Anal. Date	Date of analysis of concentration of CO2 on infrared analyzer at SIO.
'99 Mole Fraction in ppm	The mole fraction of CO2 in the air sample, by infrared analysis, in the "X99" calibration scale.
Extraction Date	Date of extraction of CO2 sample from air sample.
Corrected d13C d18O	Fully corrected reduced isotopic ratio data (1994 NBS, Craig, and daily corrections applied).
Shipment No.	Consecutive number assigned to sets of samples analyzed on the Wahlen VG Prism II mass spectrometer each week.
Analysis Date	Date of analysis on VG Prism II mass spectrometer at SIO.

TABLE N(2): Wahlen La Jolla Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Loc.	Exposure Date	Flask No.	I.R. Anal. Date	'99 Mole Fraction in ppm	Extraction Date	Corrected d13C	Corrected d18O	Shipment No.	Analysis Date
K91-240	LJO	28MAY91	I- 23	29MAY91	360.04	31MAY91	-8.238	+0.176	W03	05MAY92
K91-243	LJO	28MAY91	I- 26	29MAY91	360.04	04JUN91	-8.272	+0.138	W03	05MAY92
K91-241	LJO	28MAY91	I- 24	29MAY91	360.12	04JUN91	-8.235	+0.156	W05	28MAY92
K91-245	LJO	28MAY91	I- 28	29MAY91	360.12	05JUN91	-8.243	+0.180	W06	12JUN92
K91-246	LJO	28MAY91	I- 29	29MAY91	360.04	03JUN91	-8.249	+0.204	W57	13OCT93
K91-247	LJO	28MAY91	I- 30	29MAY91	360.04	05JUN91	-8.238	+0.191	W57	13OCT93
						Average (of 6) =	-8.246	+0.174		
K92- 44	LJO	14NOV91	I-253	20NOV91	357.80	06FEB92	-8.102	-0.483	W01	03APR92
K92- 45	LJO	14NOV91	I-254	20NOV91	357.70	07FEB92	-8.087	-0.456	W23	21DEC92
						Average (of 2) =	-8.094	-0.470		
K92- 61	LJO	06JAN92	I-165	10JAN92	359.65	24FEB92	-8.197	-0.500	W01	03APR92
K92- 62	LJO	06JAN92	I-166	10JAN92	359.65	24FEB92	-8.201	-0.463	W01	03APR92
K92- 58	LJO	06JAN92	I-262	07JAN92	359.55	11FEB92	-8.184	-0.487	W04	13MAY92
K92- 57	LJO	06JAN92	I-261	07JAN92	359.65	11FEB92	-8.203	-0.452	W23	21DEC92
						Average (of 4) =	-8.196	-0.476		
K92- 79	LJO	07FEB92	I-215	11FEB92	359.21	25FEB92	-8.169	-0.208	W01	03APR92
K92- 80	LJO	07FEB92	I-216	11FEB92	359.21	25FEB92	-8.175	-0.226	W01	03APR92
K92- 84	LJO	07FEB92	I-220	19FEB92	358.92	26FEB92	-8.117	-0.132	W04	12MAY92
K92- 83	LJO	07FEB92	I-219	19FEB92	358.92	26FEB92	-8.132	-0.175	W23	21DEC92
						Average (of 4) =	-8.148	-0.185		
K92- 88	LJO	10FEB92	I-222	11FEB92	358.82	26FEB92	-8.123	-0.098	W01	03APR92
K92- 90	LJO	10FEB92	I-226	19FEB92	358.92	27FEB92	-8.141	-0.093	W01	03APR92
K92- 89	LJO	10FEB92	I-225	19FEB92	358.92	27FEB92	-8.118	-0.055	W04	12MAY92
K92- 85	LJO	10FEB92	I-221	11FEB92	358.91	26FEB92	-8.114	0.000	W24	28JAN93
						Average (of 4) =	-8.124	-0.062		
K92- 91	LJO	13FEB92	I-229	19FEB92	358.73	27FEB92	-8.127	-0.068	W02	29APR92
K92- 96	LJO	13FEB92	I-234	26FEB92	358.80	28FEB92	-8.112	-0.062	W02	29APR92
K92- 92	LJO	13FEB92	I-230	19FEB92	358.62	27FEB92	-8.139	-0.025	W04	14MAY92
K92- 95	LJO	13FEB92	I-233	26FEB92	358.69	28FEB92	-8.101	+0.021	W24	28JAN93
						Average (of 4) =	-8.120	-0.036		

TABLE N(2): Wahlen La Jolla Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Loc.	Exposure Date	Flask No.	I.R. Anal. Date	'99 Mole Fraction in ppm	Extraction Date	Corrected d13C	Corrected d18O	Shipment No.	Analysis Date
K92-163	LJO	03MAR92	I-237	11MAR92	359.95	08APR92	-8.205	-0.131	W02	30APR92
K92-164	LJO	03MAR92	I-238	11MAR92	359.95	08APR92	-8.212	-0.107	W02	30APR92
K92-166	LJO	03MAR92	I-240	11MAR92	359.89	08APR92	-8.172	-0.053	W07	15JUN92
K92-165	LJO	03MAR92	I-239	11MAR92	360.00	08APR92	-8.217	-0.022	W24	28JAN93
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					Average (of 4) =		-8.201	-0.072		
K92-167	LJO	04MAR92	I-241	11MAR92	359.15	13APR92	-8.163	+0.066	W02	30APR92
K92-168	LJO	04MAR92	I-242	11MAR92	359.15	13APR92	-8.150	+0.038	W02	30APR92
K92-170	LJO	04MAR92	I-244	11MAR92	359.30	13APR92	-8.126	+0.105	W07	15JUN92
K92-169	LJO	04MAR92	I-243	11MAR92	359.39	13APR92	-8.125	+0.139	W24	28JAN93
							---	---		
					Average (of 4) =		-8.141	+0.087		
K92-175	LJO	17MAR92	I-255	25MAR92	359.88	16APR92	-8.197	-0.022	W02	30APR92
K92-176	LJO	17MAR92	I-256	25MAR92	359.88	16APR92	-8.200	+0.012	W02	30APR92
K92-177	LJO	17MAR92	I-257	25MAR92	359.59	16APR92	-8.176	+0.022	W04	15MAY92
K92-178	LJO	17MAR92	I-258	25MAR92	359.70	16APR92	-8.184	+0.080	W24	28JAN93
							---	---		
					Average (of 4) =		-8.189	+0.024		
K92-197	LJO	18MAR92	I-261	26MAR92	359.64	29APR92	-8.147	+0.048	W03	05MAY92
K92-198	LJO	18MAR92	I-262	26MAR92	359.64	29APR92	-8.157	+0.043	W03	05MAY92
K92-196	LJO	18MAR92	I-260	25MAR92	359.68	29APR92	-8.181	+0.001	W07	15JUN92
K92-195	LJO	18MAR92	I-259	25MAR92	359.68	29APR92	-8.174	+0.077	W24	28JAN93
							---	---		
					Average (of 4) =		-8.165	+0.042		
K92-215	LJO	30MAR92	I-249	01APR92	359.78	05MAY92	-8.162	+0.179	W07	15JUN92
K92-216	LJO	30MAR92	I-250	01APR92	359.78	05MAY92	-8.150	+0.213	W07	15JUN92
K92-217	LJO	30MAR92	I-251	01APR92	359.69	06MAY92	-8.163	+0.232	W13	30SEP92
K92-218	LJO	30MAR92	I-252	01APR92	359.59	06MAY92	-8.178	+0.174	W24	28JAN93
							---	---		
					Average (of 4) =		-8.163	+0.200		
K92-220	LJO	31MAR92	I-212	01APR92	360.08	06MAY92	-8.178	+0.125	W07	15JUN92
K92-221	LJO	31MAR92	I-213	01APR92	360.08	06MAY92	-8.190	+0.156	W07	15JUN92
K92-219	LJO	31MAR92	I-211	01APR92	359.98	06MAY92	-8.158	+0.174	W08	01JUL92
K92-222	LJO	31MAR92	I-214	01APR92	359.89	07MAY92	-8.263	+0.132	W24	28JAN93
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					Average (of 4) =		-8.175	+0.152		

TABLE N(2): Wahlen La Jolla Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Loc.	Exposure Date	Flask No.	I.R. Anal. Date	'99 Mole Fraction in ppm	Extraction Date	Corrected d13C	Corrected d18O	Shipment No.	Analysis Date
K92-234	LJO	14APR92	I-220	22APR92	360.37	20MAY92	-8.210	+0.080	W07	15JUN92
K92-235	LJO	14APR92	I-221	22APR92	360.66	20MAY92	-8.218	+0.078	W07	15JUN92
					Average (of 2) =		-8.214	+0.079		
K92-249	LJO	30APR92	I-225	13MAY92	360.84	09JUN92	-8.190	+0.324	W17	28OCT92
K92-250	LJO	30APR92	I-226	13MAY92	360.65	09JUN92	-8.228	+0.226	W17	28OCT92
K92-251	LJO	30APR92	I-227	13MAY92	360.94	09JUN92	-8.224	+0.210	W26	18FEB93
K92-252	LJO	30APR92	I-228	13MAY92	360.94	09JUN92	-8.223	+0.219	W57	13OCT93
					Average (of 4) =		-8.218	+0.245		
K92-295	LJO	01MAY92	I-231	13MAY92	361.39	23JUN92	-8.278	+0.194	W17	29OCT92
K92-296	LJO	01MAY92	I-232	13MAY92	361.50	23JUN92	-8.289	+0.152	W17	29OCT92
K92-297	LJO	01MAY92	I-233	13MAY92	361.39	23JUN92	-8.261	+0.179	W26	10FEB93
K92-298	LJO	01MAY92	I-234	13MAY92	361.20	23JUN92	-8.276	+0.159	W57	13OCT93
					Average (of 4) =		-8.276	+0.171		
K92-301	LJO	06MAY92	I-243	27MAY92	361.34	29JUN92	-8.287	+0.525	W18	05NOV92
K92-302	LJO	06MAY92	I-244	27MAY92	361.34	29JUN92	-8.289	+0.572	W18	05NOV92
K92-300	LJO	06MAY92	I-242	13MAY92	361.00	29JUN92	-8.253	+0.569	W26	10FEB93
K92-299	LJO	06MAY92	I-241	13MAY92	361.00	29JUN92	-8.271	+0.574	W57	13OCT93
					Average (of 4) =		-8.275	+0.560		
K92-321	LJO	19MAY92	I-257	28MAY92	360.60	10JUL92	-8.224	+0.254	W18	05NOV92
K92-322	LJO	19MAY92	I-258	28MAY92	360.60	16JUL92	-8.222	+0.315	W18	05NOV92
K92-319	LJO	19MAY92	I-255	27MAY92	360.61	10JUL92	-8.217	+0.294	W26	10FEB93
K92-320	LJO	19MAY92	I-256	27MAY92	360.52	10JUL92	-8.220	+0.266	W57	13OCT93
					Average (of 4) =		-8.221	+0.282		
K92-325	LJO	27MAY92	I-261	03JUN92	360.17	16JUL92	-8.194	+0.394	W18	05NOV92
K92-326	LJO	27MAY92	I-262	03JUN92	360.17	16JUL92	-8.202	+0.380	W18	05NOV92
K92-323	LJO	27MAY92	I-259	27MAY92	360.22	16JUL92	-8.205	+0.405	W26	10FEB93
K92-324	LJO	27MAY92	I-260	27MAY92	360.32	16JUL92	-8.202	+0.394	W57	13OCT93
					Average (of 4) =		-8.201	+0.393		

TABLE N(3a) (N(3b)) (N(3c)): Wahlen Atmospheric Secondary Standard <39382> (<75635>) (<75859>) Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Number assigned to extracted sample. Each year has a separate consecutively-numbered series.
Shpt. No.	Consecutive number assigned to sets of samples analyzed on the Wahlen VG Prism II mass spectrometer each week.
Fill No.	Each fill consists of sets of six extractions from each atmospheric natural-air secondary standard.
Tube No.	Extraction order for each standard of each fill (numbered 1 to 6).
Cylinder No.	Designated number of atmospheric secondary standard.
Corrected d13C d18O	Fully corrected reduced isotopic ratio data (1994 NBS, Craig, and daily corrections applied).
Date of Analysis	Date of analysis on VG Prism II mass spectrometer at SIO.

TABLE N(3a): Wahlen Atmospheric Secondary Standard <39382> Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K91-481	W01	5	5	39382	18OCT91	-8.277	-0.382	03APR92
K91-302	W01	2	1	39382	14JUN91	-8.274	-0.373	03APR92
K91-270	W01	1	1	39382	17MAY91	-8.283	-0.379	03APR92
K91-421	W01	3	4	39382	05SEP91	-8.297	-0.339	03APR92
K91-307	W02	2	6	39382	14JUN91	-8.277	-0.364	29APR92
K91-478	W02	5	2	39382	18OCT91	-8.273	-0.387	30APR92
K91-418	W02	3	1	39382	05SEP91	-8.283	-0.290	30APR92
K91-659	W02	6	4	39382	21NOV91	-8.285	-0.389	30APR92
K92-149	W04	7	1	39382	19MAR92	-8.273	-0.440	08MAY92
ICS- 4	W04	4	4	39382	18JUL91	-8.289	-0.396	08MAY92
K91-661	W04	6	6	39382	21NOV91	-8.263	-0.374	12MAY92
K92-152	W05	7	4	39382	19MAR92	-8.281	-0.407	28MAY92
K92-153	W06	7	5	39382	19MAR92	-8.271	-0.375	11JUN92
K92-275	W08	8	1	39382	19JUN92	-8.277	-0.389	02JUL92
K92-277	W09	8	3	39382	19JUN92	-8.289	-0.465	07JUL92
K92-279	W09	8	5	39382	19JUN92	-8.299	-0.490	09JUL92
K92-278	W10	8	4	39382	19JUN92	-8.254	-0.392	02SEP92
K92-362	W11	9	6	39382	29JUL92	-8.275	-0.381	15SEP92
K92-361	W12	9	5	39382	29JUL92	-8.247	-0.370	24SEP92
K92-358	W13	9	2	39382	29JUL92	-8.281	-0.418	30SEP92
K92-360	W17	9	4	39382	29JUL92	-8.295	-0.418	29OCT92
K92-357	W18	9	1	39382	29JUL92	-8.273	-0.388	04NOV92
K92-359	W18	9	3	39382	29JUL92	-8.280	-0.431	04NOV92
K92-588	W22	10	5	39382	20OCT92	-8.297	-0.406	10DEC92
K92-584	W26	10	1	39382	20OCT92	-8.270	-0.394	11FEB93
K92-585	W27	10	2	39382	20OCT92	-8.268	-0.335	18FEB93
K92-587	W29	10	4	39382	20OCT92	-8.268	-0.400	04MAR93
K93-114	W33	11	6	39382	02MAR93	-8.267	-0.375	02APR93
K93-111	W40	11	3	39382	02MAR93	-8.266	-0.442	20MAY93
K93-109	W41	11	1	39382	02MAR93	-8.281	-0.381	27MAY93
K93-112	W45	11	4	39382	02MAR93	-8.254	-0.336	24JUN93
K93-113	W52	11	5	39382	02MAR93	-8.283	-0.422	02SEP93
K92-586	W52	10	3	39382	20OCT92	-8.281	-0.418	03SEP93
ICS- 3	W56	4	3	39382	18JUL91	-8.276	-0.363	06OCT93
K91-303	W56	2	2	39382	14JUN91	-8.283	-0.381	06OCT93
K93-347	W56	13	6	39382	23SEP93	-8.286	-0.458	06OCT93
K91-656	W56	6	1	39382	21NOV91	-8.267	-0.382	06OCT93
K93-345	W56	13	4	39382	23SEP93	-8.276	-0.396	07OCT93
K92-280	W56	8	6	39382	19JUN92	-8.269	-0.410	07OCT93
K92-589	W56	10	6	39382	20OCT92	-8.258	-0.335	07OCT93
K93-596	W57	14	1	39382	09OCT93	-8.287	-0.423	13OCT93
K93-601	W57	14	6	39382	09OCT93	-8.288	-0.410	14OCT93
K93-600	W57	14	5	39382	09OCT93	-8.280	-0.404	14OCT93
K93-346	W59	13	5	39382	23SEP93	-8.262	-0.371	04NOV93
K93-343	W60	13	2	39382	23SEP93	-8.262	-0.354	18NOV93
K93-680	W60	15	4	39382	04NOV93	-8.293	-0.442	19NOV93
K93-682	W61	15	6	39382	04NOV93	-8.297	-0.448	01DEC93
K93-678	W62	15	2	39382	04NOV93	-8.280	-0.431	06DEC93
K93-681	W62	15	5	39382	04NOV93	-8.287	-0.439	08DEC93
K93-677	W62	15	1	39382	04NOV93	-8.278	-0.436	10DEC93

TABLE N(3a): Wahlen Atmospheric Secondary Standard <39382> Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K93-859	W63	16	4	39382	07DEC93	-8.275	-0.405	20DEC93
K93-860	W65	16	5	39382	07DEC93	-8.267	-0.392	11JAN94
K94- 10	W67	17	4	39382	06JAN94	-8.301	-0.438	26JAN94
K94- 8	W67	17	2	39382	06JAN94	-8.269	-0.402	27JAN94
K94- 12	W68	17	6	39382	06JAN94	-8.280	-0.435	03FEB94
K94-211	W70	18	5	39382	03FEB94	-8.249	-0.377	17FEB94
K94- 9	W71	17	3	39382	06JAN94	-8.275	-0.398	03MAR94
K94-212	W72	18	6	39382	03FEB94	-8.275	-0.411	11MAR94
K94-321	W73	19	5	39382	11MAR94	-8.319	-0.437	16MAR94
K94-318	W74	19	2	39382	11MAR94	-8.277	-0.416	22MAR94
K94-322	W74	19	6	39382	11MAR94	-8.287	-0.408	23MAR94
K94-319	W74	19	3	39382	11MAR94	-8.297	-0.426	25MAR94
K94-317	W75	19	1	39382	11MAR94	-8.266	-0.383	29MAR94
K94-209	W75	18	3	39382	03FEB94	-8.294	-0.447	30MAR94
K94- 7	W76	17	1	39382	06JAN94	-8.295	-0.450	18APR94
K94- 7	W76	17	1	39382	06JAN94	-8.297	-0.441	18APR94
K94-208	W76	18	2	39382	03FEB94	-8.276	-0.435	20APR94
K94-379	W76	20	5	39382	05APR94	-8.263	-0.396	21APR94
K94-380	W77	20	6	39382	05APR94	-8.286	-0.424	27APR94
K94-375	W77	20	1	39382	05APR94	-8.294	-0.448	29APR94
K94-591	W78	22	5	39382	03MAY94	-8.270	-0.405	11MAY94
K94-589	W79	22	3	39382	03MAY94	-8.266	-0.394	18MAY94
K94-588	W80	22	2	39382	03MAY94	-8.278	-0.403	24MAY94
K94-587	W80	22	1	39382	03MAY94	-8.268	-0.416	25MAY94
K94-416	W81	21	3	39382	28APR94	-8.251	-0.359	07JUN94
K94-415	W81	21	2	39382	28APR94	-8.300	-0.461	08JUN94
K94-590	W82	22	4	39382	03MAY94	-8.242	-0.356	17JUN94
K94-419	W83	21	6	39382	28APR94	-8.279	-0.431	23JUN94
K94-418	W84	21	5	39382	28APR94	-8.261	-0.395	30JUN94
K94-414	W84	21	1	39382	28APR94	-8.291	-0.452	01JUL94
K94-376	W85	20	2	39382	05APR94	-8.288	-0.424	07JUL94
K94-801	W86	23	1	39382	13JUL94	-8.308	-0.476	13JUL94
K94-841	W87	24	5	39382	28JUL94	-8.294	-0.406	03AUG94
K94-802	W87	23	2	39382	13JUL94	-8.279	-0.412	04AUG94
K94-805	W88	23	5	39382	13JUL94	-8.263	-0.380	18AUG94
K94-804	W89	23	4	39382	13JUL94	-8.262	-0.398	24AUG94
K94-838	W90	24	2	39382	28JUL94	-8.262	-0.386	01SEP94
K94-839	W91	24	3	39382	28JUL94	-8.326	-0.566	15SEP94
K94-842	W91	24	6	39382	28JUL94	-8.295	-0.397	15SEP94
K94-840	W91	24	4	39382	28JUL94	-8.286	-0.397	16SEP94
K94-944	W92	25	6	39382	28SEP94	-8.287	-0.453	29SEP94
K94-942	W93	25	4	39382	28SEP94	-8.288	-0.442	17NOV94
K94-939	W93	25	1	39382	28SEP94	-8.274	-0.394	17NOV94
K94-943	W94	25	5	39382	28SEP94	-8.294	-0.417	30NOV94
K94-941	W95	25	3	39382	28SEP94	-8.281	-0.405	08DEC94
K94-A71	W98	26	3	39382	19DEC94	-8.318	-0.490	04JAN95
K94-A69	W98	26	1	39382	19DEC94	-8.280	-0.438	05JAN95
K94-A72	W99	26	4	39382	19DEC94	-8.280	-0.381	18JAN95
K94-A70	100	26	2	39382	19DEC94	-8.279	-0.423	26JAN95
K94-A73	101	26	5	39382	19DEC94	-8.263	-0.369	01FEB95

TABLE N(3a): Wahlen Atmospheric Secondary Standard <39382> Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K95- 96	102	27	1	39382	09FEB95	-8.284	-0.421	09FEB95
K95-101	103	27	6	39382	09FEB95	-8.281	-0.418	16FEB95
K95-100	103	27	5	39382	09FEB95	-8.273	-0.400	10MAR95
K95- 97	104	27	2	39382	09FEB95	-8.317	-0.441	15MAR95
K95- 98	105	27	3	39382	09FEB95	-8.275	-0.392	23MAR95
K95-238	106	28	6	39382	30MAR95	-8.281	-0.449	05APR95
K95-237	106	28	5	39382	30MAR95	-8.288	-0.465	06APR95
K95-255	107	29	5	39382	07APR95	-8.334	-0.485	13APR95
K95-254	108	29	4	39382	07APR95	-8.281	-0.450	21APR95
K95-253	109	29	3	39382	07APR95	-8.275	-0.399	28APR95
K95-235	110	28	3	39382	30MAR95	-8.273	-0.382	10MAY95
K95-234	110	28	2	39382	30MAR95	-8.273	-0.413	11MAY95
K95-252	111	29	2	39382	07APR95	-8.289	-0.413	19MAY95
K95-256	112	29	6	39382	07APR95	-8.299	-0.492	24MAY95
K95-789	113	30	5	39382	26MAY95	-8.278	-0.416	01JUN95
K95-790	113	30	6	39382	26MAY95	-8.295	-0.466	02JUN95
K95-786	114	30	2	39382	26MAY95	-8.281	-0.418	08JUN95
K95-827	115	31	6	39382	13JUN95	-8.281	-0.418	29JUN95
K95-825	116	31	4	39382	13JUN95	-8.259	-0.400	13JUL95
K95-788	117	30	4	39382	26MAY95	-8.276	-0.405	25JUL95
K95-787	117	30	3	39382	26MAY95	-8.294	-0.486	26JUL95
K95-826	118	31	5	39382	13JUN95	-8.272	-0.381	03AUG95
K95-233	119	28	1	39382	30MAR95	-8.293	-0.431	17AUG95
K95-822	120	31	1	39382	13JUN95	-8.277	-0.437	21AUG95
K95-824	121	31	3	39382	13JUN95	-8.257	-0.361	24AUG95
K95-B09	122	32	6	39382	12SEP95	-8.282	-0.426	14SEP95
K95-B05	123	32	2	39382	12SEP95	-8.281	-0.418	21SEP95
K95-B04	124	32	1	39382	12SEP95	-8.309	-0.426	05OCT95
K95-B08	124	32	5	39382	12SEP95	-8.280	-0.411	06OCT95
K95-B06	126	32	3	39382	12SEP95	-8.263	-0.400	19OCT95
K95-B91	127	33	6	39382	09OCT95	-8.278	-0.415	26OCT95
K95-B90	128	33	5	39382	09OCT95	-8.272	-0.364	01NOV95
K95-B89	128	33	4	39382	09OCT95	-8.265	-0.422	02NOV95
K95-B88	129	33	3	39382	09OCT95	-8.292	-0.416	09NOV95
K95-B87	129	33	2	39382	09OCT95	-8.299	-0.503	09NOV95
K95-D45	131	34	1	39382	30NOV95	-8.279	-0.450	30NOV95
K93-599	131	14	4	39382	09OCT93	-8.253	-0.354	30NOV95
K95-D50	132	34	6	39382	30NOV95	-8.266	-0.403	07DEC95
K95-D48	133	34	4	39382	30NOV95	-8.273	-0.437	11DEC95
K95-D47	134	34	3	39382	30NOV95	-8.296	-0.495	14DEC95
K95-D46	135	34	2	39382	30NOV95	-8.270	-0.404	08FEB96
K96- 84	135	37	4	39382	25JAN96	-8.293	-0.472	09FEB96
K96- 83	135	37	3	39382	25JAN96	-8.278	-0.421	09FEB96
K96- 82	136	37	2	39382	25JAN96	-8.298	-0.524	12FEB96
K96- 86	136	37	6	39382	25JAN96	-8.293	-0.431	13FEB96
K96- 81	136	37	1	39382	25JAN96	-8.276	-0.429	13FEB96
K96- 65	137	36	6	39382	24JAN96	-8.279	-0.432	14FEB96
K96- 62	137	36	3	39382	24JAN96	-8.280	-0.472	14FEB96
K96- 61	138	36	2	39382	24JAN96	-8.298	-0.444	06MAR96
K96- 60	139	36	1	39382	24JAN96	-8.256	-0.377	14MAR96

TABLE N(3a): Wahlen Atmospheric Secondary Standard <39382> Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K96- 47	140	35	6	39382	18JAN96	-8.270	-0.444	20MAR96
K96- 44	141	35	3	39382	18JAN96	-8.242	-0.360	28MAR96
K96- 45	141	35	4	39382	18JAN96	-8.292	-0.417	29MAR96
K96-199	142	38	5	39382	26MAR96	-8.246	-0.383	04APR96
K96- 63	143	36	4	39382	24JAN96	-8.284	-0.448	18APR96
K96- 42	143	35	1	39382	18JAN96	-8.279	-0.458	19APR96
				Average (of 156) =		-8.279	-0.414	
				Standard Deviation		0.015	0.039	

TABLE N(3b): Wahlen Atmospheric Secondary Standard <75635> Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K91-360	W01	3	4	75635	15JUL91	-8.392	-0.455	03APR92
K91-300	W01	2	5	75635	07JUN91	-8.400	-0.491	03APR92
K91-471	W01	5	1	75635	030CT91	-8.391	-0.436	03APR92
K91-258	W01	1	1	75635	24MAY91	-8.388	-0.468	03APR92
K91-297	W02	2	2	75635	07JUN91	-8.387	-0.437	29APR92
K92- 72	W02	6	2	75635	21FEB92	-8.403	-0.474	30APR92
K91-358	W02	3	2	75635	15JUL91	-8.390	-0.448	30APR92
K91-478	W02	5	6	75635	030CT91	-8.387	-0.474	30APR92
ICS- 16	W04	4	4	75635	22JUL91	-8.388	-0.425	07MAY92
K92- 76	W04	6	6	75635	21FEB92	-8.395	-0.412	11MAY92
K92-143	W04	7	1	75635	18MAR92	-8.406	-0.469	12MAY92
K92-146	W05	7	4	75635	18MAR92	-8.390	-0.453	28MAY92
K92-271	W06	8	3	75635	01JUN92	-8.396	-0.467	11JUN92
K92-272	W06	8	4	75635	01JUN92	-8.394	-0.450	12JUN92
K92-273	W08	8	5	75635	01JUN92	-8.366	-0.390	01JUL92
K92-356	W10	9	6	75635	14JUL92	-8.389	-0.415	02SEP92
K92-355	W11	9	5	75635	14JUL92	-8.394	-0.462	15SEP92
K92-354	W12	9	4	75635	14JUL92	-8.422	-0.474	24SEP92
K92-353	W13	9	3	75635	14JUL92	-8.393	-0.409	01OCT92
K92-352	W17	9	2	75635	14JUL92	-8.388	-0.425	28OCT92
K92-351	W18	9	1	75635	14JUL92	-8.396	-0.443	04NOV92
K92-583	W22	10	6	75635	17NOV92	-8.388	-0.425	09DEC92
K92-579	W24	10	2	75635	17NOV92	-8.397	-0.462	28JAN93
K92-580	W27	10	3	75635	17NOV92	-8.388	-0.434	17FEB93
K92-581	W29	10	4	75635	17NOV92	-8.397	-0.470	03MAR93
K93-106	W31	11	4	75635	01MAR93	-8.390	-0.443	17MAR93
K93-104	W33	11	2	75635	01MAR93	-8.401	-0.469	02APR93
K93-105	W41	11	3	75635	01MAR93	-8.389	-0.463	27MAY93
K93-103	W42	11	1	75635	01MAR93	-8.365	-0.395	03JUN93
K93-108	W49	11	6	75635	01MAR93	-8.388	-0.425	02AUG93
K93-336	W53	12	1	75635	29JUN93	-8.389	-0.441	08SEP93
K93-339	W54	12	4	75635	29JUN93	-8.404	-0.447	15SEP93
ICS- 15	W56	4	3	75635	22JUL91	-8.423	-0.472	06OCT93
K91-299	W56	2	4	75635	07JUN91	-8.397	-0.410	06OCT93
K92- 73	W56	6	3	75635	21FEB92	-8.391	-0.457	06OCT93
K92-270	W56	8	2	75635	01JUN92	-8.404	-0.439	07OCT93
K93-338	W56	12	3	75635	29JUN93	-8.386	-0.422	07OCT93
K93-586	W56	13	3	75635	06OCT93	-8.395	-0.428	07OCT93
K93-337	W56	12	2	75635	29JUN93	-8.409	-0.504	07OCT93
K92-578	W56	10	1	75635	17NOV92	-8.395	-0.424	07OCT93
K93-587	W57	13	4	75635	06OCT93	-8.388	-0.437	13OCT93
K93-594	W57	14	5	75635	08OCT93	-8.387	-0.428	14OCT93
K93-590	W57	14	1	75635	08OCT93	-8.384	-0.445	14OCT93
K93-595	W57	14	6	75635	08OCT93	-8.393	-0.441	14OCT93
K93-585	W59	13	2	75635	06OCT93	-8.400	-0.442	03NOV93
K93-584	W59	13	1	75635	06OCT93	-8.407	-0.472	04NOV93
K93-341	W60	12	6	75635	29JUN93	-8.407	-0.489	18NOV93
K93-340	W60	12	5	75635	29JUN93	-8.411	-0.489	19NOV93
K93-588	W61	13	5	75635	06OCT93	-8.371	-0.396	01DEC93
K93-671	W61	15	1	75635	02NOV93	-8.411	-0.512	02DEC93

TABLE N(3b): Wahlen Atmospheric Secondary Standard <75635> Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K93-875	W82	15	5	75635	02NOV93	-8.388	-0.411	06DEC93
K93-876	W82	15	6	75635	02NOV93	-8.391	-0.418	07DEC93
K93-872	W82	15	2	75635	02NOV93	-8.392	-0.407	10DEC93
K93-874	W83	15	4	75635	02NOV93	-8.395	-0.439	22DEC93
K93-853	W84	16	4	75635	08DEC93	-8.424	-0.466	04JAN94
K94- 5	W84	17	5	75635	04JAN94	-8.414	-0.500	05JAN94
K93-851	W85	16	2	75635	08DEC93	-8.403	-0.452	11JAN94
K93-850	W87	16	1	75635	08DEC93	-8.368	-0.405	26JAN94
K94- 2	W70	17	2	75635	04JAN94	-8.420	-0.465	17FEB94
K94-203	W71	18	3	75635	04FEB94	-8.401	-0.467	02MAR94
K94-206	W72	18	6	75635	04FEB94	-8.388	-0.425	09MAR94
K94-314	W72	19	4	75635	09MAR94	-8.379	-0.432	10MAR94
K94-316	W73	19	6	75635	09MAR94	-8.349	-0.405	16MAR94
K94-315	W73	19	5	75635	09MAR94	-8.377	-0.409	17MAR94
K94-313	W74	19	3	75635	09MAR94	-8.383	-0.434	23MAR94
K94-311	W74	19	1	75635	09MAR94	-8.385	-0.429	24MAR94
K94-202	W75	18	2	75635	04FEB94	-8.403	-0.460	29MAR94
K94- 4	W76	17	4	75635	04JAN94	-8.414	-0.482	18APR94
K94- 4	W76	17	4	75635	04JAN94	-8.440	-0.490	18APR94
K94- 6	W76	17	6	75635	04JAN94	-8.397	-0.476	19APR94
K94-201	W76	18	1	75635	04FEB94	-8.394	-0.408	20APR94
K94-373	W77	20	5	75635	12APR94	-8.382	-0.420	27APR94
K94-369	W77	20	1	75635	12APR94	-8.393	-0.471	28APR94
K94-595	W78	22	3	75635	04MAY94	-8.399	-0.439	11MAY94
K94-596	W78	22	4	75635	04MAY94	-8.404	-0.448	13MAY94
K94-413	W79	21	6	75635	22APR94	-8.404	-0.455	19MAY94
K94-597	W80	22	5	75635	04MAY94	-8.391	-0.441	24MAY94
K94-408	W81	21	1	75635	19APR94	-8.418	-0.483	07JUN94
K94-593	W82	22	1	75635	04MAY94	-8.418	-0.472	16JUN94
K94-598	W83	22	6	75635	04MAY94	-8.406	-0.462	22JUN94
K94-409	W83	21	2	75635	20APR94	-8.389	-0.413	23JUN94
K94-410	W84	21	3	75635	20APR94	-8.407	-0.449	30JUN94
K94-370	W85	20	2	75635	13APR94	-8.385	-0.447	06JUL94
K94-371	W85	20	3	75635	12APR94	-8.383	-0.420	07JUL94
K94-374	W86	20	6	75635	12APR94	-8.361	-0.367	13JUL94
K94-411	W86	21	4	75635	22APR94	-8.396	-0.431	14JUL94
K94-835	W87	24	5	75635	27JUL94	-8.389	-0.430	04AUG94
K94-800	W88	23	6	75635	14JUL94	-8.366	-0.369	17AUG94
K94-797	W89	23	3	75635	14JUL94	-8.407	-0.447	24AUG94
K94-834	W90	24	4	75635	27JUL94	-8.407	-0.458	01SEP94
K94-799	W91	23	5	75635	14JUL94	-8.384	-0.446	16SEP94
K94-833	W92	24	3	75635	27JUL94	-8.372	-0.422	28SEP94
K94-832	W92	24	2	75635	27JUL94	-8.405	-0.444	29SEP94
K94-938	W93	25	6	75635	29SEP94	-8.405	-0.485	16NOV94
K94-933	W94	25	1	75635	29SEP94	-8.389	-0.434	30NOV94
K94-937	W94	25	5	75635	29SEP94	-8.391	-0.433	01DEC94
K94-936	W95	25	4	75635	29SEP94	-8.427	-0.509	07DEC94
K94-935	W95	25	3	75635	29SEP94	-8.395	-0.468	08DEC94
K94-204	W96	18	4	75635	04FEB94	-8.429	-0.535	14DEC94
K94-831	W97	24	1	75635	27JUL94	-8.366	-0.373	21DEC94

TABLE N(3b): Wahlen Atmospheric Secondary Standard <75635> Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K94-A68	W98	26	6	75635	20DEC94	-8.388	-0.405	05JAN95
K94-A64	W99	26	2	75635	20DEC94	-8.403	-0.467	18JAN95
K94-A63	100	26	1	75635	20DEC94	-8.390	-0.420	26JAN95
K94-A67	101	26	5	75635	20DEC94	-8.377	-0.442	01FEB95
K94-A65	101	26	3	75635	20DEC94	-8.383	-0.395	02FEB95
K94-795	102	23	1	75635	14JUL94	-8.390	-0.440	08FEB95
K95- 94	102	27	5	75635	07FEB95	-8.385	-0.421	09FEB95
K95- 93	103	27	4	75635	07FEB95	-8.385	-0.387	09MAR95
K95- 92	104	27	3	75635	07FEB95	-8.352	-0.402	15MAR95
K95- 91	105	27	2	75635	07FEB95	-8.375	-0.426	22MAR95
K95- 90	105	27	1	75635	07FEB95	-8.392	-0.409	24MAR95
K95-244	106	28	6	75635	05APR95	-8.388	-0.394	05APR95
K95-247	107	29	3	75635	08APR95	-8.387	-0.400	12APR95
K95-246	107	29	2	75635	08APR95	-8.372	-0.423	13APR95
K95-250	109	29	6	75635	08APR95	-8.398	-0.439	27APR95
K95-248	109	29	4	75635	08APR95	-8.395	-0.444	28APR95
K95-242	110	28	4	75635	05APR95	-8.394	-0.422	11MAY95
K95-240	111	28	2	75635	05APR95	-8.384	-0.413	18MAY95
K95-241	112	28	3	75635	05APR95	-8.370	-0.351	24MAY95
K95-239	112	28	1	75635	05APR95	-8.382	-0.451	25MAY95
K95-782	113	30	4	75635	25MAY95	-8.386	-0.391	02JUN95
K95-784	114	30	6	75635	25MAY95	-8.401	-0.459	07JUN95
K95-816	115	31	1	75635	15JUN95	-8.401	-0.440	28JUN95
K95-818	116	31	3	75635	15JUN95	-8.398	-0.448	12JUL95
K95-819	117	31	4	75635	15JUN95	-8.384	-0.440	24JUL95
K95-820	117	31	5	75635	15JUN95	-8.374	-0.357	26JUL95
K95-783	118	30	5	75635	25MAY95	-8.378	-0.427	02AUG95
K95-245	119	29	1	75635	08APR95	-8.376	-0.383	17AUG95
K95-821	119	31	6	75635	15JUN95	-8.382	-0.456	18AUG95
K95-780	120	30	2	75635	25MAY95	-8.437	-0.534	22AUG95
K95-779	121	30	1	75635	25MAY95	-8.418	-0.483	23AUG95
K95-817	121	31	2	75635	15JUN95	-8.401	-0.457	24AUG95
K95-B03	122	32	6	75635	13SEP95	-8.387	-0.418	14SEP95
K95-B02	122	32	5	75635	13SEP95	-8.413	-0.460	15SEP95
K95-A98	123	32	2	75635	13SEP95	-8.405	-0.477	22SEP95
K95-A97	124	32	1	75635	13SEP95	-8.371	-0.390	06OCT95
K95-A99	125	32	3	75635	13SEP95	-8.415	-0.496	11OCT95
K95-B84	127	33	5	75635	20OCT95	-8.370	-0.411	26OCT95
K95-B80	127	33	1	75635	20OCT95	-8.421	-0.511	27OCT95
K95-B83	128	33	4	75635	20OCT95	-8.404	-0.421	02NOV95
K95-B82	129	33	3	75635	20OCT95	-8.411	-0.474	08NOV95
K93-591	130	14	2	75635	08OCT93	-8.373	-0.399	20NOV95
K95-B85	130	33	6	75635	20OCT95	-8.407	-0.487	20NOV95
K95-D43	132	34	5	75635	03DEC95	-8.382	-0.417	07DEC95
K95-D44	132	34	6	75635	03DEC95	-8.377	-0.415	08DEC95
K95-D41	133	34	3	75635	03DEC95	-8.375	-0.392	12DEC95
K95-D40	134	34	2	75635	03DEC95	-8.394	-0.418	15DEC95
K95-D39	135	34	1	75635	03DEC95	-8.372	-0.418	08FEB96
K96- 80	135	37	6	75635	30JAN96	-8.402	-0.455	08FEB96
K96- 79	135	37	5	75635	30JAN96	-8.375	-0.418	09FEB96

TABLE N(3b): Wahlen Atmospheric Secondary Standard <75635> Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K96- 78	135	37	4	75635	30JAN96	-8.383	-0.430	09FEB96
K96- 75	136	37	1	75635	30JAN96	-8.403	-0.435	12FEB96
K96- 41	136	35	6	75635	17JAN96	-8.376	-0.374	13FEB96
K96- 77	136	37	3	75635	30JAN96	-8.373	-0.423	13FEB96
K96- 36	137	35	1	75635	17JAN96	-8.430	-0.507	14FEB96
K96- 40	137	35	5	75635	17JAN96	-8.388	-0.402	14FEB96
K96- 57	138	36	4	75635	23JAN96	-8.373	-0.414	05MAR96
K96- 59	138	36	6	75635	23JAN96	-8.370	-0.424	06MAR96
K96- 56	139	36	3	75635	23JAN96	-8.411	-0.453	13MAR96
K96- 38	140	35	3	75635	17JAN96	-8.382	-0.413	20MAR96
K96- 37	140	35	2	75635	17JAN96	-8.426	-0.518	21MAR96
K96- 55	141	36	2	75635	23JAN96	-8.362	-0.401	29MAR96
K96-193	142	38	5	75635	01APR96	-8.413	-0.423	04APR96
K96- 54	143	36	1	75635	23JAN96	-8.380	-0.425	18APR96
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				Average (of 164)	=	-8.393	-0.439	
				Standard Deviation		0.018	0.034	

TABLE N(3c): Wahlen Atmospheric Secondary Standard <75859> Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K91-268	W01	1	5	75859	20MAY91	-8.291	-0.306	03APR92
K91-424	W01	3	1	75859	06SEP91	-8.267	-0.266	03APR92
K91-351	W01	2	1	75859	12JUL91	-8.280	-0.254	03APR92
K91-484	W01	5	2	75859	29OCT91	-8.260	-0.287	03APR92
K91-356	W02	2	6	75859	12JUL91	-8.287	-0.309	29APR92
K91-483	W02	5	1	75859	29OCT91	-8.277	-0.280	30APR92
K92- 65	W02	6	1	75859	14FEB92	-8.276	-0.316	30APR92
K91-427	W02	3	4	75859	06SEP91	-8.275	-0.271	30APR92
K92- 66	W04	6	2	75859	14FEB92	-8.275	-0.280	11MAY92
ICS- 11	W04	4	5	75859	19JUL91	-8.282	-0.266	14MAY92
K92-159	W05	7	5	75859	27MAY92	-8.281	-0.250	28MAY92
K92-156	W06	7	2	75859	27MAY92	-8.298	-0.285	11JUN92
K92-157	W06	7	3	75859	27MAY92	-8.276	-0.241	12JUN92
K92-286	W08	8	6	75859	22JUN92	-8.305	-0.302	01JUL92
K92-283	W08	8	3	75859	22JUN92	-8.285	-0.310	02JUL92
K92-282	W09	8	2	75859	22JUN92	-8.264	-0.193	09JUL92
K92-284	W10	8	4	75859	22JUN92	-8.306	-0.285	02SEP92
K92-363	W11	9	1	75859	13JUL92	-8.282	-0.266	16SEP92
K92-364	W12	9	2	75859	13JUL92	-8.303	-0.339	23SEP92
K92-365	W13	9	3	75859	13JUL92	-8.276	-0.283	01OCT92
K92-366	W17	9	4	75859	13JUL92	-8.273	-0.253	29OCT92
K92-367	W18	9	5	75859	13JUL92	-8.278	-0.271	05NOV92
K92-368	W18	9	6	75859	13JUL92	-8.286	-0.261	05NOV92
K92-593	W22	10	4	75859	03NOV92	-8.266	-0.278	10DEC92
K92-592	W24	10	3	75859	03NOV92	-8.273	-0.230	28JAN93
K92-590	W26	10	1	75859	03NOV92	-8.274	-0.232	10FEB93
K92-594	W27	10	5	75859	03NOV92	-8.282	-0.266	19FEB93
K93-117	W31	11	3	75859	16MAR93	-8.279	-0.249	17MAR93
K93-118	W40	11	4	75859	16MAR93	-8.291	-0.291	20MAY93
K93-119	W42	11	5	75859	16MAR93	-8.304	-0.297	03JUN93
K93-116	W45	11	2	75859	16MAR93	-8.307	-0.356	24JUN93
K93-120	W48	11	6	75859	16MAR93	-8.282	-0.266	31JUL93
ICS- 12	W56	4	6	75859	19JUL91	-8.255	-0.261	06OCT93
K91-354	W56	2	4	75859	12JUL91	-8.270	-0.234	06OCT93
K93-351	W56	13	4	75859	27SEP93	-8.276	-0.285	06OCT93
K92- 70	W56	6	6	75859	14FEB92	-8.263	-0.242	06OCT93
K92-281	W56	8	1	75859	22JUN92	-8.288	-0.257	07OCT93
K93-350	W56	13	3	75859	27SEP93	-8.269	-0.264	07OCT93
K92-591	W56	10	2	75859	03NOV92	-8.265	-0.259	07OCT93
K93-348	W57	13	1	75859	27SEP93	-8.263	-0.261	13OCT93
K93-604	W57	14	3	75859	11OCT93	-8.280	-0.256	14OCT93
K93-603	W57	14	2	75859	11OCT93	-8.278	-0.273	14OCT93
K93-606	W57	14	5	75859	11OCT93	-8.269	-0.239	14OCT93
K93-352	W59	13	5	75859	27SEP93	-8.269	-0.249	03NOV93
K93-349	W60	13	2	75859	27SEP93	-8.250	-0.182	19NOV93
K93-687	W60	15	5	75859	01NOV93	-8.279	-0.261	19NOV93
K93-685	W61	15	3	75859	01NOV93	-8.260	-0.179	02DEC93
K93-683	W62	15	1	75859	01NOV93	-8.279	-0.274	07DEC93
K93-686	W62	15	4	75859	01NOV93	-8.276	-0.245	08DEC93
K93-684	W63	15	2	75859	01NOV93	-8.288	-0.280	20DEC93

TABLE N(3c): Wahlen Atmospheric Secondary Standard <75859> Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K93-864	W63	16	3	75859	12DEC93	-8.274	-0.252	22DEC93
K93-863	W64	16	2	75859	12DEC93	-8.246	-0.225	04JAN94
K94- 17	W64	17	5	75859	03JAN94	-8.256	-0.190	05JAN94
K93-866	W67	16	5	75859	12DEC93	-8.294	-0.283	27JAN94
K94- 15	W68	17	3	75859	03JAN94	-8.282	-0.248	03FEB94
K94-215	W71	18	3	75859	02FEB94	-8.269	-0.224	02MAR94
K94- 13	W71	17	1	75859	03JAN94	-8.287	-0.287	03MAR94
K94-218	W72	18	6	75859	02FEB94	-8.291	-0.259	10MAR94
K94-326	W72	19	4	75859	10MAR94	-8.266	-0.235	11MAR94
K94-327	W73	19	5	75859	10MAR94	-8.293	-0.282	17MAR94
K94-325	W74	19	3	75859	10MAR94	-8.286	-0.268	22MAR94
K94-323	W74	19	1	75859	10MAR94	-8.284	-0.262	24MAR94
K94-324	W74	19	2	75859	10MAR94	-8.265	-0.257	25MAR94
K94-216	W75	18	4	75859	02FEB94	-8.269	-0.237	30MAR94
K94- 18	W76	17	6	75859	03JAN94	-8.242	-0.200	18APR94
K94- 18	W76	17	6	75859	03JAN94	-8.237	-0.179	18APR94
K94-386	W76	20	6	75859	08APR94	-8.274	-0.215	19APR94
K94-385	W76	20	5	75859	08APR94	-8.301	-0.288	21APR94
K94-383	W77	20	3	75859	08APR94	-8.277	-0.220	28APR94
K94-384	W77	20	4	75859	08APR94	-8.270	-0.237	29APR94
K94-586	W78	22	6	75859	02MAY94	-8.267	-0.242	13MAY94
K94-420	W79	21	1	75859	29APR94	-8.297	-0.291	18MAY94
K94-421	W79	21	2	75859	29APR94	-8.266	-0.236	19MAY94
K94-583	W80	22	3	75859	02MAY94	-8.246	-0.204	25MAY94
K94-425	W81	21	6	75859	29APR94	-8.264	-0.223	08JUN94
K94-584	W82	22	4	75859	02MAY94	-8.253	-0.219	16JUN94
K94-581	W82	22	1	75859	02MAY94	-8.321	-0.329	17JUN94
K94-422	W83	21	3	75859	29APR94	-8.288	-0.269	22JUN94
K94-424	W84	21	5	75859	29APR94	-8.273	-0.231	01JUL94
K94-381	W85	20	1	75859	08APR94	-8.284	-0.245	06JUL94
K94-214	W86	18	2	75859	02FEB94	-8.274	-0.260	14JUL94
K94-847	W87	24	5	75859	23JUL94	-8.269	-0.278	03AUG94
K94-811	W88	23	5	75859	15JUL94	-8.305	-0.322	17AUG94
K94-810	W88	23	4	75859	15JUL94	-8.299	-0.303	18AUG94
K94-845	W91	24	3	75859	23JUL94	-8.269	-0.225	15SEP94
K94-846	W92	24	4	75859	23JUL94	-8.299	-0.269	28SEP94
K94-945	W93	25	1	75859	27SEP94	-8.264	-0.205	16NOV94
K94-949	W94	25	5	75859	27SEP94	-8.269	-0.258	30NOV94
K94-948	W94	25	4	75859	27SEP94	-8.267	-0.222	01DEC94
K94-812	W95	23	6	75859	15JUL94	-8.243	-0.182	07DEC94
K94-213	W96	18	1	75859	02FEB94	-8.241	-0.157	14DEC94
K94-807	W96	23	1	75859	15JUL94	-8.282	-0.266	15DEC94
K94-947	W97	25	3	75859	27SEP94	-8.304	-0.319	21DEC94
K94-A75	W98	26	1	75859	16DEC94	-8.244	-0.194	04JAN95
K94-A80	W99	26	6	75859	16DEC94	-8.289	-0.260	18JAN95
K94-A77	W99	26	3	75859	16DEC94	-8.282	-0.266	19JAN95
K94-A76	100	26	2	75859	16DEC94	-8.282	-0.266	27JAN95
K94-A79	101	26	5	75859	16DEC94	-8.288	-0.281	02FEB95
K94-946	101	25	2	75859	27SEP94	-8.253	-0.223	03FEB95
K94-843	101	24	1	75859	23JUL94	-8.312	-0.310	03FEB95

TABLE N(3c): Wahlen Atmospheric Secondary Standard <75859> Data Used for CIO/Wahlen Inter-Comparison

Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K94-808	102	23	2	75859	15JUL94	-8.279	-0.251	08FEB95
K95-106	103	27	5	75859	17FEB95	-8.286	-0.305	09MAR95
K95-107	103	27	6	75859	17FEB95	-8.290	-0.285	10MAR95
K95-102	105	27	1	75859	17FEB95	-8.294	-0.266	22MAR95
K95-103	105	27	2	75859	17FEB95	-8.289	-0.293	23MAR95
K95-104	105	27	3	75859	17FEB95	-8.279	-0.283	24MAR95
K95-230	106	28	4	75859	29MAR95	-8.299	-0.229	06APR95
K95-258	107	29	2	75859	11APR95	-8.284	-0.292	12APR95
K95-262	108	29	6	75859	13APR95	-8.282	-0.235	21APR95
K95-259	109	29	3	75859	11APR95	-8.272	-0.253	27APR95
K95-232	110	28	6	75859	29MAR95	-8.289	-0.302	10MAY95
K95-229	111	28	3	75859	29MAR95	-8.286	-0.279	18MAY95
K95-228	111	28	2	75859	29MAR95	-8.274	-0.272	19MAY95
K95-227	112	28	1	75859	29MAR95	-8.288	-0.241	25MAY95
K95-794	113	30	4	75859	24MAY95	-8.285	-0.269	01JUN95
K95-795	114	30	5	75859	24MAY95	-8.270	-0.233	07JUN95
K95-833	115	31	6	75859	14JUN95	-8.269	-0.251	28JUN95
K95-832	116	31	5	75859	14JUN95	-8.272	-0.244	12JUL95
K95-830	117	31	3	75859	14JUN95	-8.282	-0.263	24JUL95
K95-831	117	31	4	75859	14JUN95	-8.287	-0.280	25JUL95
K95-792	118	30	2	75859	24MAY95	-8.291	-0.264	02AUG95
K95-793	118	30	3	75859	24MAY95	-8.291	-0.304	03AUG95
K95-791	119	30	1	75859	24MAY95	-8.290	-0.226	18AUG95
K95-260	120	29	4	75859	13APR95	-8.286	-0.248	21AUG95
K95-261	120	29	5	75859	13APR95	-8.233	-0.157	22AUG95
K95-828	121	31	1	75859	14JUN95	-8.262	-0.233	23AUG95
K95-B15	122	32	6	75859	11SEP95	-8.258	-0.232	15SEP95
K95-B14	123	32	5	75859	11SEP95	-8.264	-0.214	22SEP95
K95-B12	124	32	3	75859	11SEP95	-8.253	-0.258	05OCT95
K95-B10	125	32	1	75859	11SEP95	-8.255	-0.195	11OCT95
K95-B11	126	32	2	75859	11SEP95	-8.300	-0.285	19OCT95
K95-B97	126	33	6	75859	16OCT95	-8.258	-0.214	20OCT95
K95-B96	127	33	5	75859	16OCT95	-8.252	-0.201	27OCT95
K95-B94	128	33	3	75859	16OCT95	-8.287	-0.284	01NOV95
K95-B93	129	33	2	75859	16OCT95	-8.276	-0.249	08NOV95
K95-B92	130	33	1	75859	16OCT95	-8.284	-0.269	22NOV95
K93-802	130	14	1	75859	11OCT93	-8.258	-0.245	22NOV95
K95-D55	131	34	5	75859	29NOV95	-8.257	-0.206	01DEC95
K95-D54	132	34	4	75859	29NOV95	-8.281	-0.251	08DEC95
K95-D52	133	34	2	75859	29NOV95	-8.299	-0.270	11DEC95
K95-D56	133	34	6	75859	29NOV95	-8.298	-0.301	12DEC95
K95-D51	135	34	1	75859	29NOV95	-8.271	-0.276	08FEB96
K96- 88	135	37	2	75859	26JAN96	-8.239	-0.231	09FEB96
K96- 89	135	37	3	75859	26JAN96	-8.246	-0.213	09FEB96
K96- 90	136	37	4	75859	26JAN96	-8.265	-0.174	12FEB96
K96- 87	136	37	1	75859	26JAN96	-8.310	-0.372	13FEB96
K96- 69	136	36	4	75859	22JAN96	-8.273	-0.261	13FEB96
K96- 71	137	36	6	75859	22JAN96	-8.252	-0.213	14FEB96
K96- 70	137	36	5	75859	22JAN96	-8.276	-0.226	14FEB96
K96- 67	138	36	2	75859	22JAN96	-8.265	-0.243	06MAR96

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Isotope Sample No.	Shpt. No.	Fill No.	Tube No.	Cylinder No.	Extraction Date	Corrected d13C	Corrected d18O	Date of Analysis
K96- 52	139	35	5	75859	19JAN96	-8.278	-0.254	13MAR96
K96- 51	139	35	4	75859	19JAN96	-8.271	-0.269	14MAR96
K96- 50	140	35	3	75859	19JAN96	-8.264	-0.158	21MAR96
K96- 49	141	35	2	75859	19JAN96	-8.276	-0.261	28MAR96
K96- 48	141	35	1	75859	19JAN96	-8.297	-0.290	29MAR96
K96-206	142	38	6	75859	30MAR96	-8.314	-0.344	05APR96
K93-605	142	14	4	75859	11OCT93	-8.255	-0.202	05APR96
K96-204	143	38	4	75859	30MAR96	-8.267	-0.208	19APR96
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				Average (of 158)	=	-8.276	-0.255	
				Standard Deviation		0.017	0.038	