Department of Earth Sciences

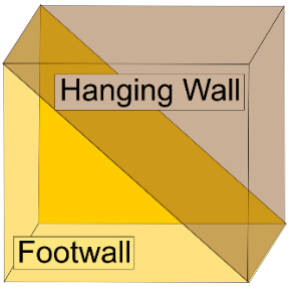
ROYAL HOLLOWAY UNIVERSITY OF LONDON

Earth Structures (GL1201 and GL1900)

We use geology to recreate the geological history of the Earth. An important part of this is learning what the structures we can observe actually represent. This summary sheet covers faulting, folding, and unconformities.

Faulting: 'A fracture in rock where there has been movement and displacement'

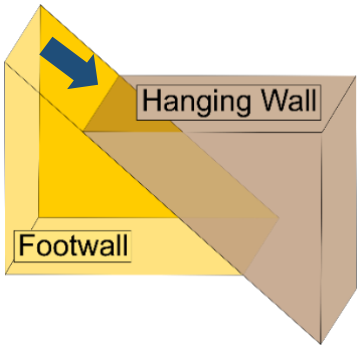
Terminology:



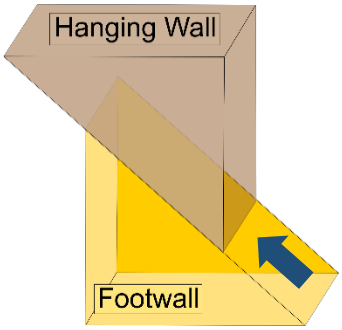
Hanging Wall: Named as it is where miners hung their lamps!

Footwall: Named for where miners walked (put their feet)!

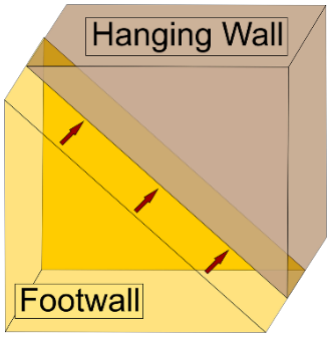
Normal Fault. Extensional. Hanging wall moves down in respect to the footwall



Reserve Fault. Compressional. Hanging wall moves up in respect to the footwall

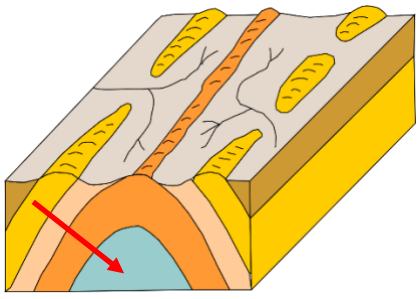


Strike-slip fault. Hanging wall slides over footwall

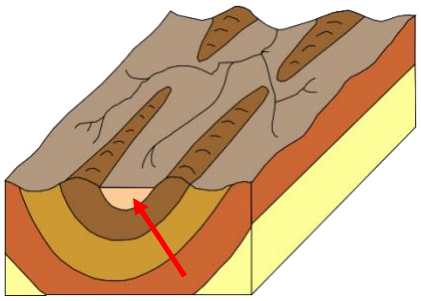


Folding: 'Rock strata that has undergone bending or curvature'

Antiform (Looks like an A)
If you know the age of the rocks and they young inwards (red arrow) it is called an **Anticline**

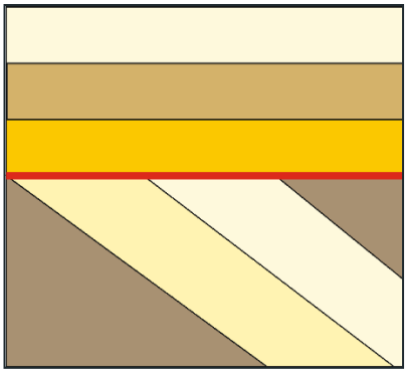


Synform (Looks like a sink)
If you know the age of the rocks and they young outward (red arrow) it is called a **Syncline**

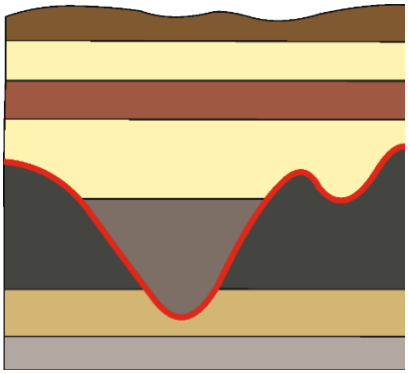


Unconformity: 'Gaps in stratigraphy that form when previous rocks are removed by erosion or when a period of time passes without any new deposition'

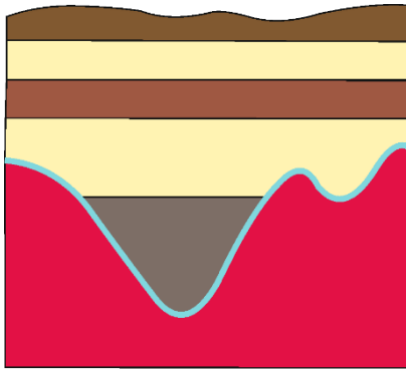
Angular Unconformity:
Forms when rock deposited in horizontal layers is folded or titled and then eroded. Afterwards, new horizontal layers are deposited



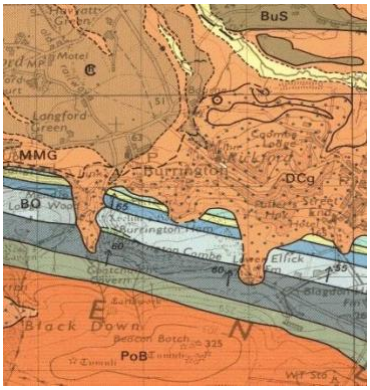
Disconformity:
Forms when strata are uplifted and eroded without folding or tilting. Eventually, the area subsides and deposition resumes

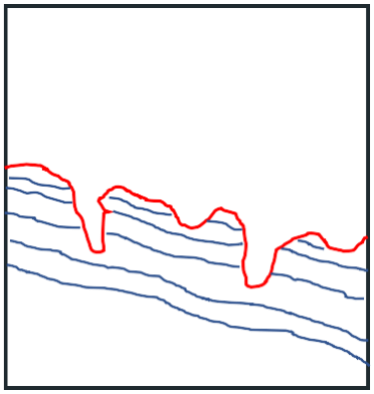


Nonconformity:
Similar to a disconformity but underlain by igneous or metamorphic rocks.
N.B. This is different to an igneous contact

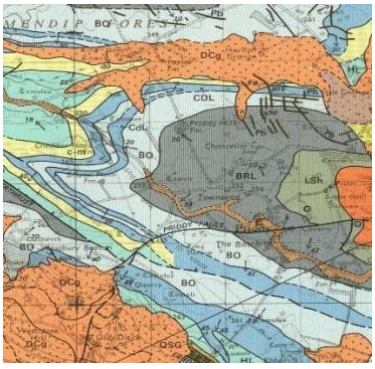


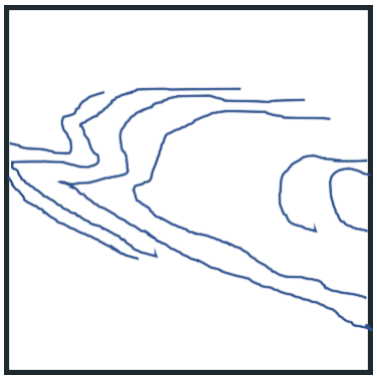
Geological Maps: We can use all of these structures to read geological maps. The two examples below use the features described above:





This section of geological map shows an unconformity! This shows an angular unconformity. The strata in the south were titled and eroded, and then covered with horizontal layers (seen in the north)





This section of geological map shows a fold. As it looks like the shape of a 'A' we know it is an antiform. The strata are younger in the center of the fold, so we can call it an anticline.

Want to learn more? We recommend reading 'Chapters 10 and 14; Earth: An Introduction to Physical Geology, Global Edition, Tarbuck et al.'

Try your hand at some topography! Map reading is an important first step for any Earth Science degree:

Topographic maps allow for a three-dimensional landscape to be expressed in map view. This means we need to be aware of what they are trying to show us. Below, there are simplified versions of topographic maps, showing the contours. Using the example as a guide, draw a cross section (from left to right) of the topography for each of these maps