

Unconformities, and their significance regarding geologic time

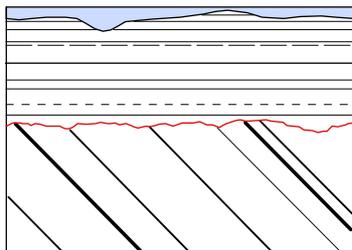
Unconformities are ancient surfaces of erosion. They are "unconformable" in the sense that they represent disruptions in otherwise simple and

un-interrupted sequences of layers of sedimentary rock. There are three commonly recognized kinds of unconformities, as shown here.

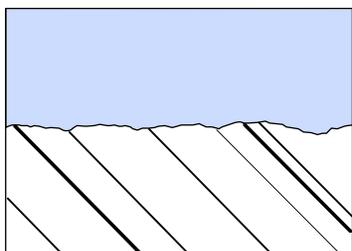
In each case, the surface defining the unconformity is highlighted in red in the uppermost panel.

Angular Unconformity

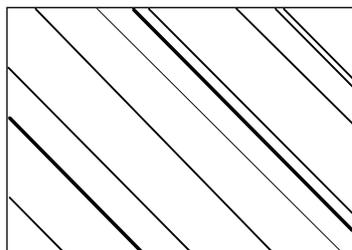
An angular unconformity, as its name suggests, is an unconformity between layers that are not parallel but instead are at an angle.



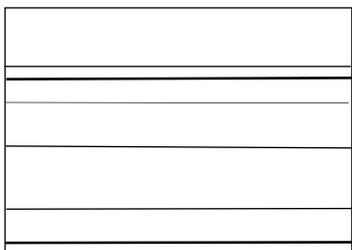
The upper, horizontal, layers were deposited atop the erosion surface, so we can step back in time by removing them.



Steno's principle of lateral continuity tells us that the tilted layers were originally continuous before being eroded.



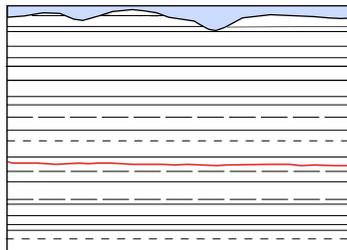
Steno's principle of original horizontality tells us that these tilted layers were deposited as horizontal layers and later tilted.



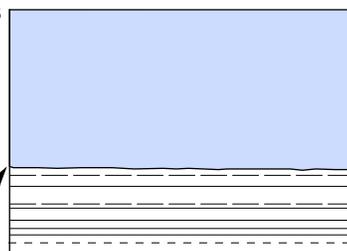
Modern land surface

Disconformity

A disconformity is an ancient surface of erosion between layers that are parallel.

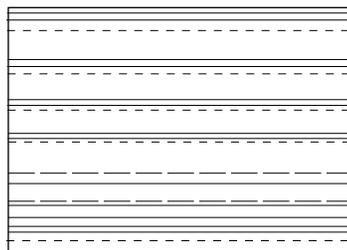


The upper layers were deposited atop the erosion surface, so we can step back in time by removing them.



Ancient land surface

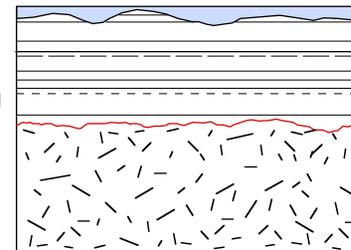
Prior to the erosion, there may have been layers of sediment that were eroded, and of which no trace remains.



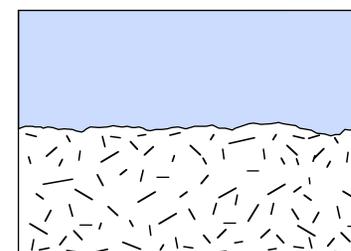
Just one unconformity demonstrates that our Earth must be, at the very least, millions of years old. Working upwards through the example at left, much time would be required to deposit the original layers; much time would be required for them to solidify; much time would be required to tilt them, much time would be required to erode them, much time would be required to deposit the overlying layers, much time would be required for *them* to solidify, and much time has been required to erode those layers to give the modern landscape. As he looked at one such unconformity at Siccar Point in Scotland in the 1700s, James Hutton concluded with only a bit of hyperbole that geologic time had "no vestige of a beginning, and no prospect of an end".

Nonconformity

A nonconformity is an ancient surface of erosion between overlying sedimentary rock layers and underlying unlayered igneous or metamorphic rocks.



The layers were deposited atop the erosion surface, so we can step back in time by removing them.



Prior to the erosion, there has to have been rock into which magma was intruded or beneath which rocks were metamorphosed. Erosion of all that rock would require much time.

