Superposition Encyclopedia Article

Superposition

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Contents

Superposition Encyclopedia Article.....1

Contents.....2

Superposition.....3

Superposition

Originally observed by Nicholas Steno in the seventeenth century, the law of superposition states that in an undisturbed series of **sedimentary rocks**, the oldest rocks will be at the bottom and the youngest will be at the top. Before the development of radiometric dating techniques, the law of superposition was used to assign relative ages to **rock** units based on their position in the sequence. For example, looking at a series of undeformed sedimentary rocks one could assume that the rocks, and therefore associated **fossils**, of the top layers were younger than those below. This idea builds on one of Steno's other observations, the law of original horizontality, which states that sedimentary layers are approximately horizontal when deposited. It follows that any body of rock that cuts across the sequence must be younger than all of the layers that it cuts.

If a sequence of sedimentary rocks has been deformed, the law of superposition may be difficult to apply. If a sequence of beds has been tilted, it should be clear that the law of superposition cannot be applied until the original up direction is verified. Overturned beds cause a similar problem, and relative ages may be calculated incorrectly if the deformation is not noticed. There are several younging indicators to aid in determination of the original up direction. These include mudcracks, cross beds, graded **bedding**, load and flute casts, and burrow marks. Once younging direction has been determined, the law of superposition may be applied even to a deformed sedimentary sequence.

See Also

Bedforms (Ripples and Dunes); Cross Cutting; Lithification; Stratigraphy