



— University of Mosul —
College of Petroleum & Mining Engineering



General Geology 1

Lecture 3

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Continental Crust vs. Oceanic Crust

■ Continental Crust

- Crust beneath the Earth's continents
- Less dense and thicker than oceanic crust
- Composed of Granite (less dense because it is high in Silicon & Oxygen)

■ Oceanic Crust

- Crust beneath the Earth's oceans
- More dense and thinner than continental crust
- Composed of Basalt (dense because it is high in Iron & Magnesium)

القشرة Crust : تمتد من السطح إلى خط إنقطاع وهو الفاصل بين القشرة والجبة على عمق متفاوت بمعدلات 30 كم إلى 50 كم تحت المناطق القارية وحوالي 10 إلى 12 كم تحت المناطق المحيطية. ولذلك تقسم القشرة إلى نوعين قارية ومحيطية .

Principles (Laws) of Stratigraphy

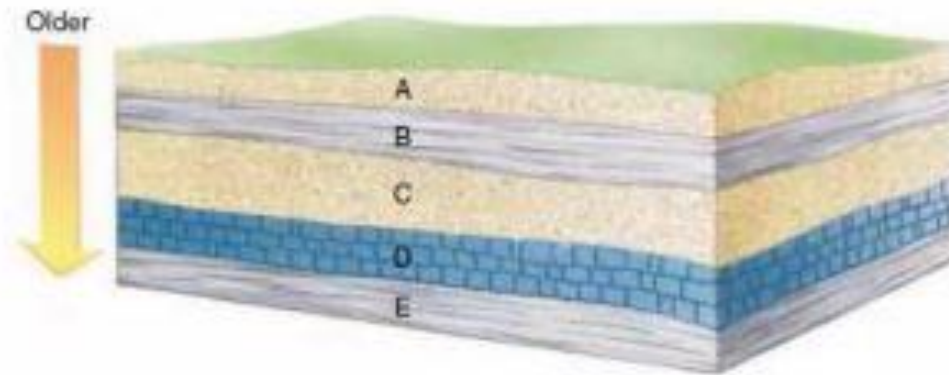
The principle of original horizontality

- It is based on the fact that sediment usually accumulates in horizontal layers. All sedimentary rocks are originally deposited horizontally
- If sedimentary rocks lie at an angle, we can infer that tectonic forces tilted them after they formed



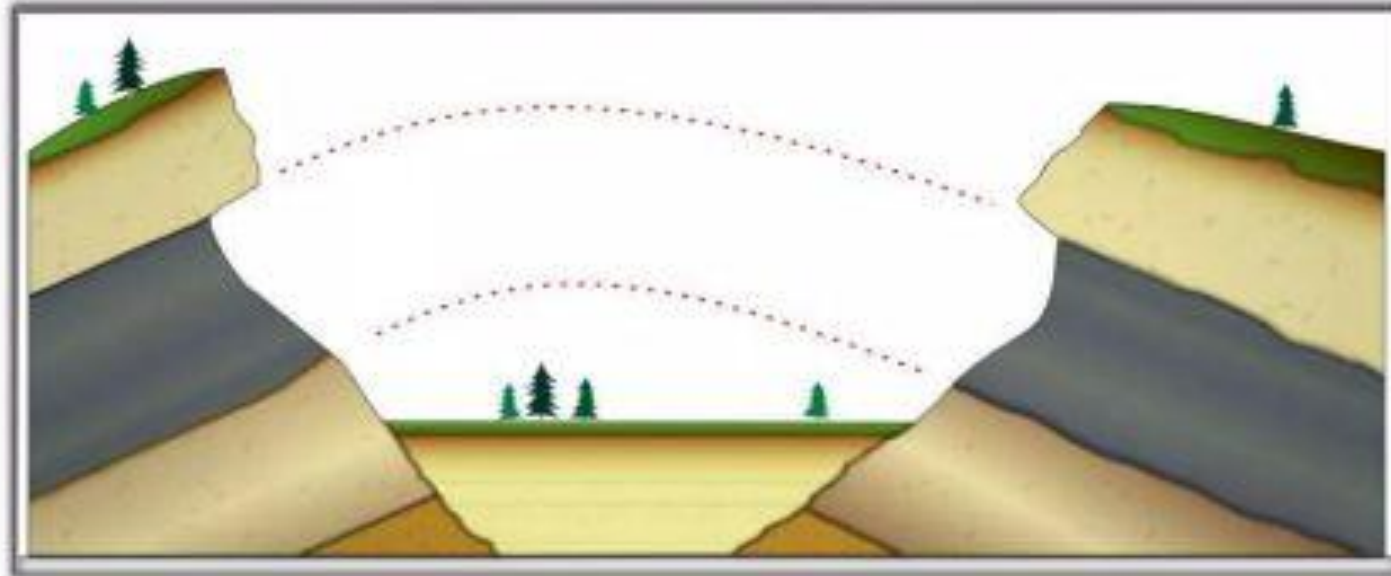
The principle of superposition

- It states that sedimentary rocks become younger from bottom to top (as long as tectonic forces have not turned them upside down).
- This is because younger layers of sediment always accumulate on top of older layers. In the figure below the sedimentary layers become progressively younger in the order E, D, C, B, and A.

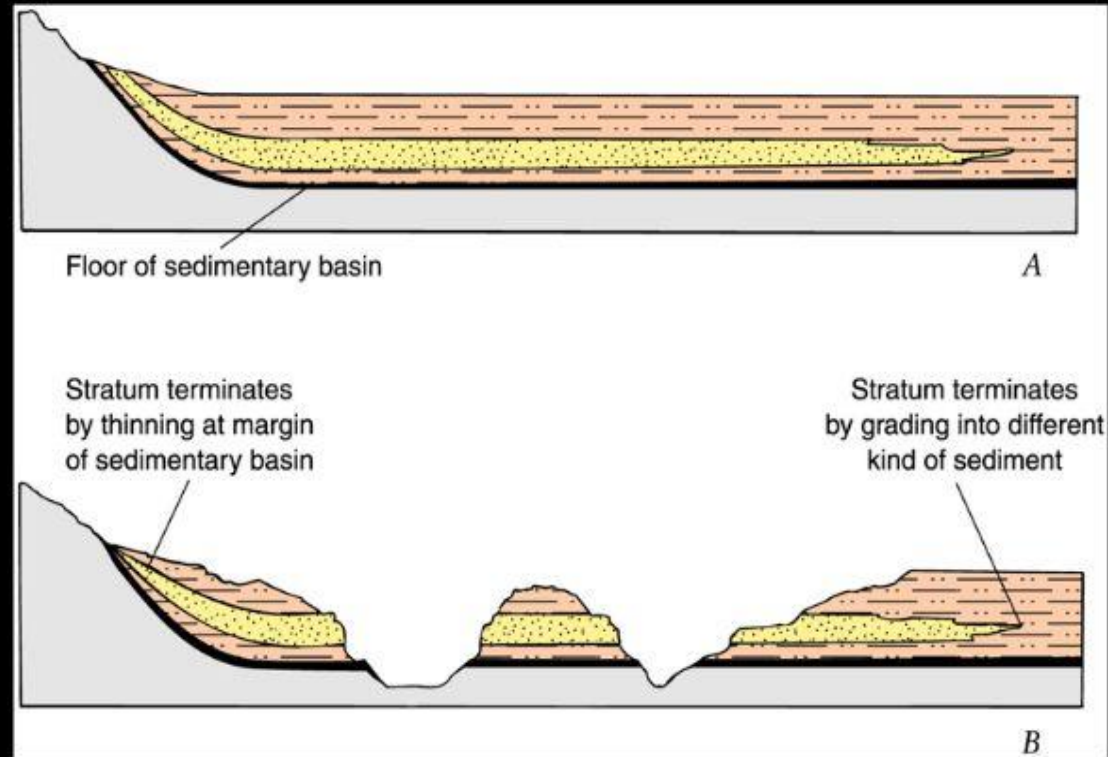


Principle of Lateral Continuity

- It states that if layers are deposited horizontally over the sea floor, then they would be expected to be laterally continuous over some distance.
- Sedimentary rocks are laterally continuous over large areas



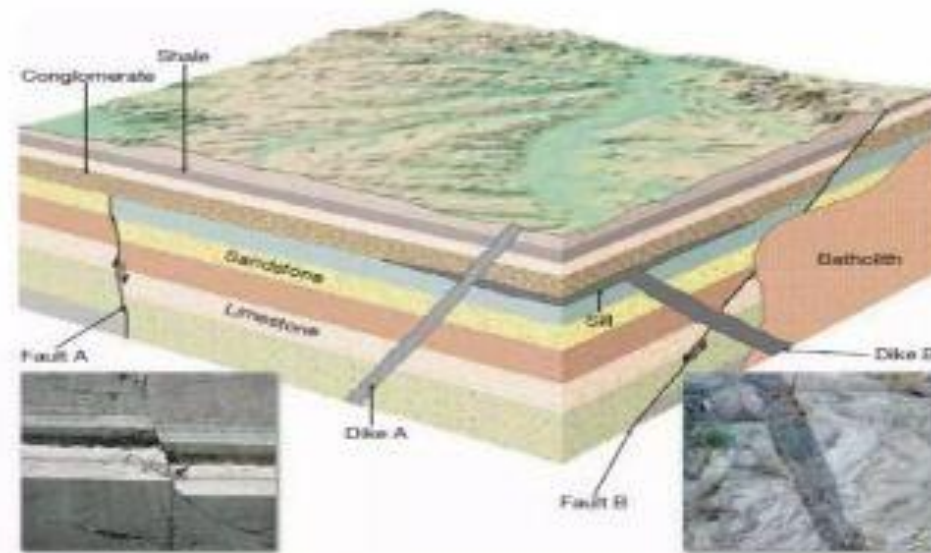
3. Principle of Lateral Continuity



Principle of Lateral Continuity: Layers of sediment initially extend laterally in all directions until they thin out or encounter a physical barrier. This principle suggests that similar layers found in different locations were once part of a continuous deposit.

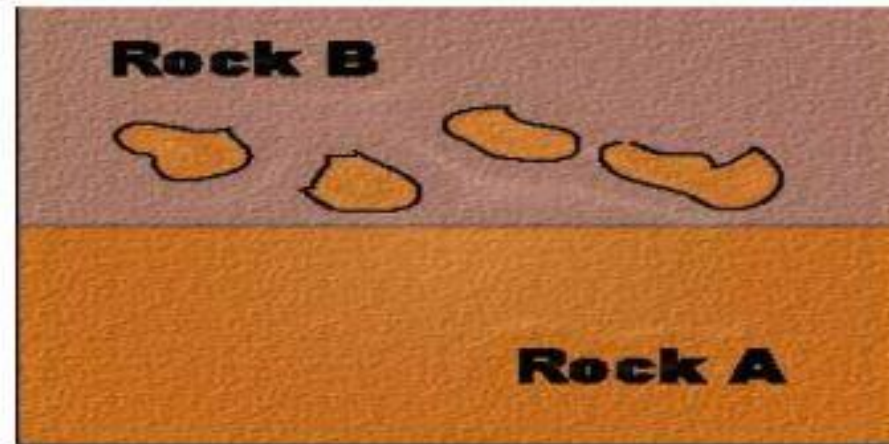
Principle of crosscutting relationships

- If one geologic feature cuts across another, the feature that has been cut is older. Younger features truncate (cut across) older features.
- It states that a rock must first exist before anything can happen to it.



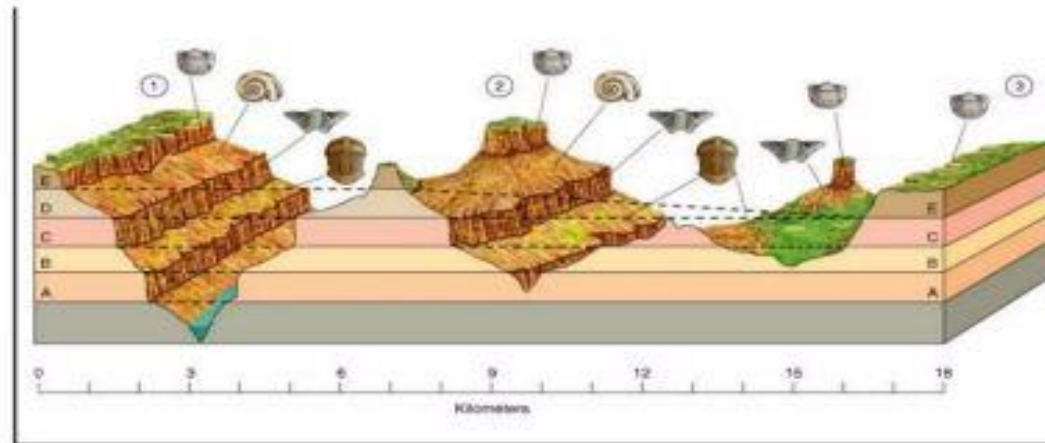
Principle of Inclusions

- The Law of Inclusions states that if a rock body (Rock B) contained fragments of another rock body (Rock A), it must be younger than the fragments of rock it contained.



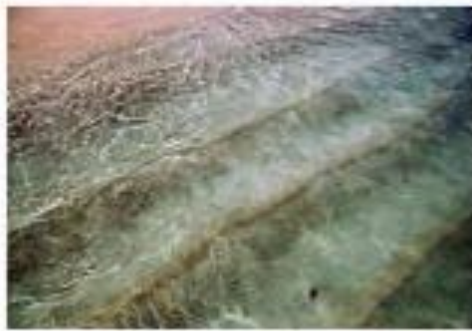
Principle of Faunal Succession

- Law of Faunal Succession states that fossils occur in a definite, invariable sequence in the geologic record.
- Fossils represent living creatures that have evolved through time, so when we found a fossil of the same type in two different areas (sections) that are not laterally continuous, we are pretty sure that the rocks are about the same age.



Principle of Uniformitarianism

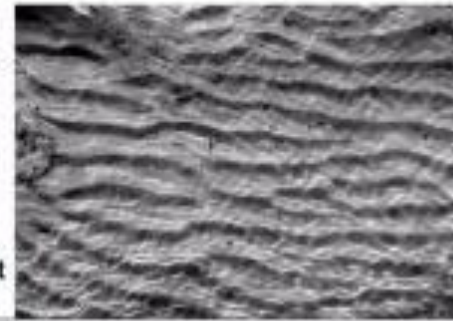
- Was postulated by James Hutton (1726-1797)
- The features like mud cracks, ripple marks, graded bedding and so on, where the same features that could be seen forming in modern environments, and that past geologic events can be explained by phenomena and forces observable today
- Hutton concluded that processes are currently operating on the Earth must be the same processes that operated in the past. Later on stated as "the present is the key to the past".



Present



Past



Geologic Time Chart

