

ENVIRONMENTAL GEOLOGY



Geologic Principles and Geologic Time

Dr. Hazim Jumaa



Flood



Tornado



Landslides



Avalanche



Forest Fire



Hurricane



Tsunami



Drought



**Volcanic
Eruption**



Geologic Principles and Geologic Time

Understanding and solving many environmental geological problems involves interpreting past events, projecting current human actions into the future, or both.

Geologic Principles

The Principle of Uniformitarianism

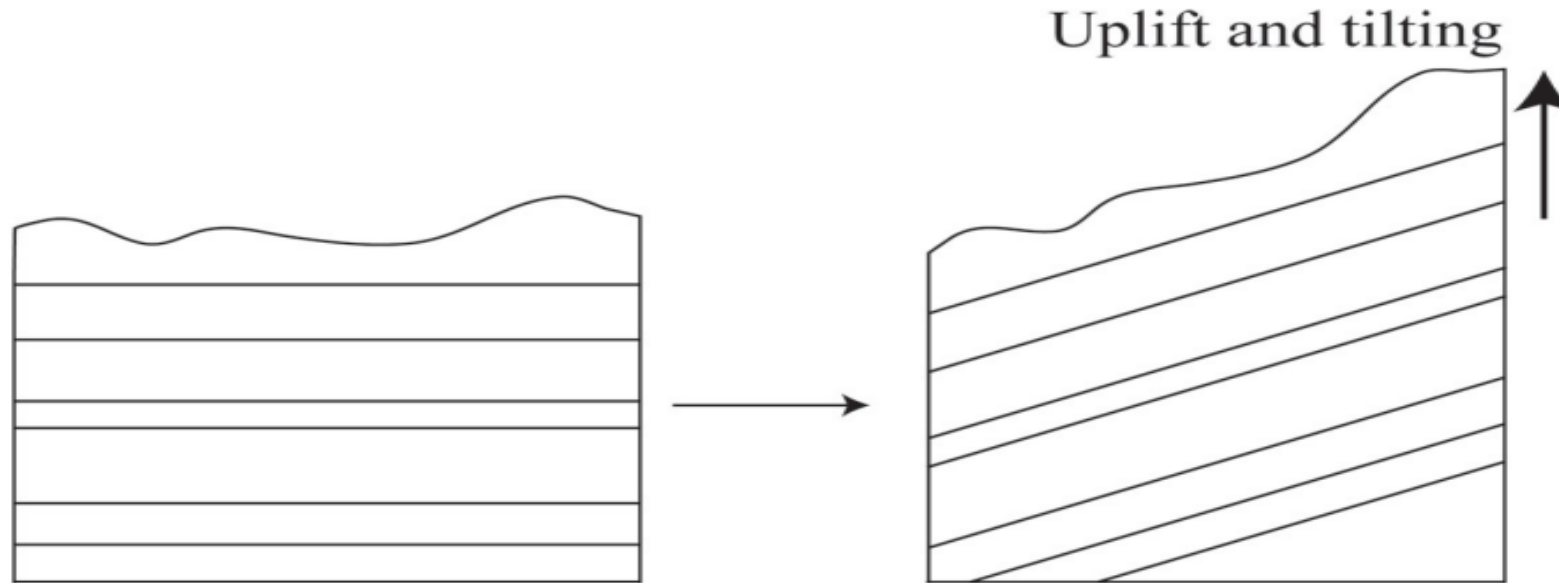
This principle states that "the present is the key to the past." By studying current geological processes such as erosion and volcanic activity, geologists can understand how ancient features formed and predict future occurrences.

- . Current geological processes help us interpret past events.
- . This principle suggests that similar processes have occurred throughout Earth's history, though some catastrophic events may not repeat.

The Principle of Original Horizontality

Sedimentary layers are originally deposited horizontally. If these layers are found tilted or disturbed, it indicates significant geological events such as tectonic movements or landslides.

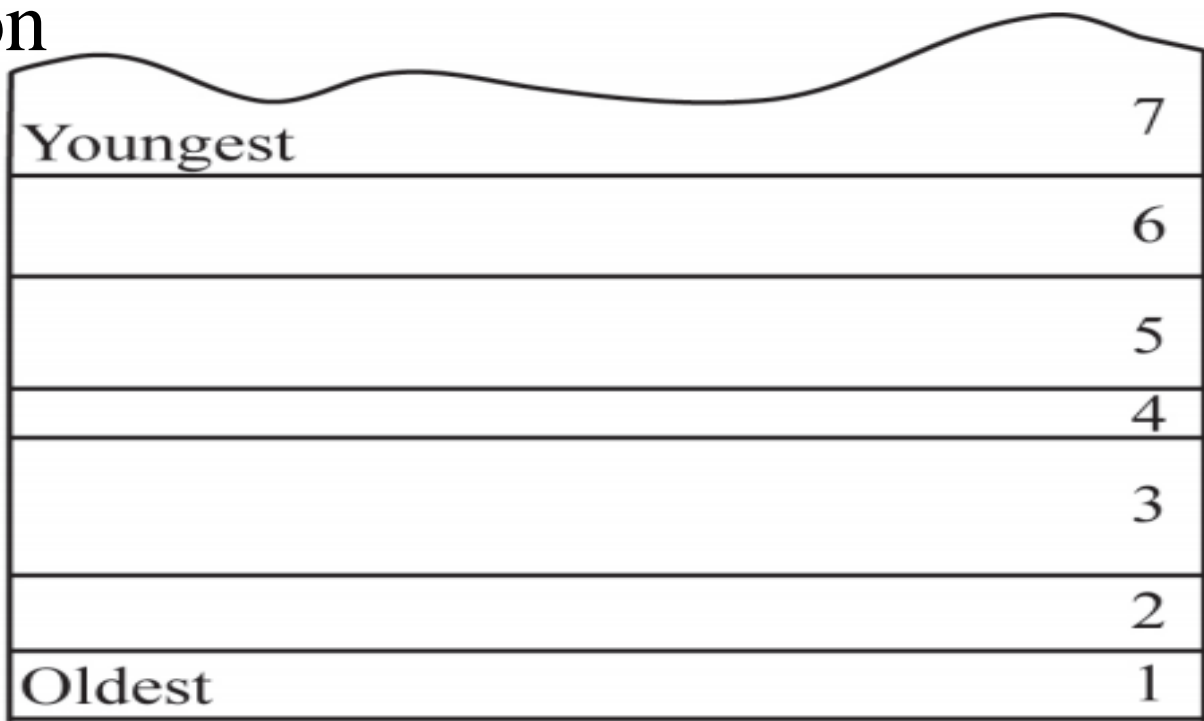
- Sedimentary layers are initially horizontal.
- Tilting or disturbance indicates tectonic activity or other significant events.



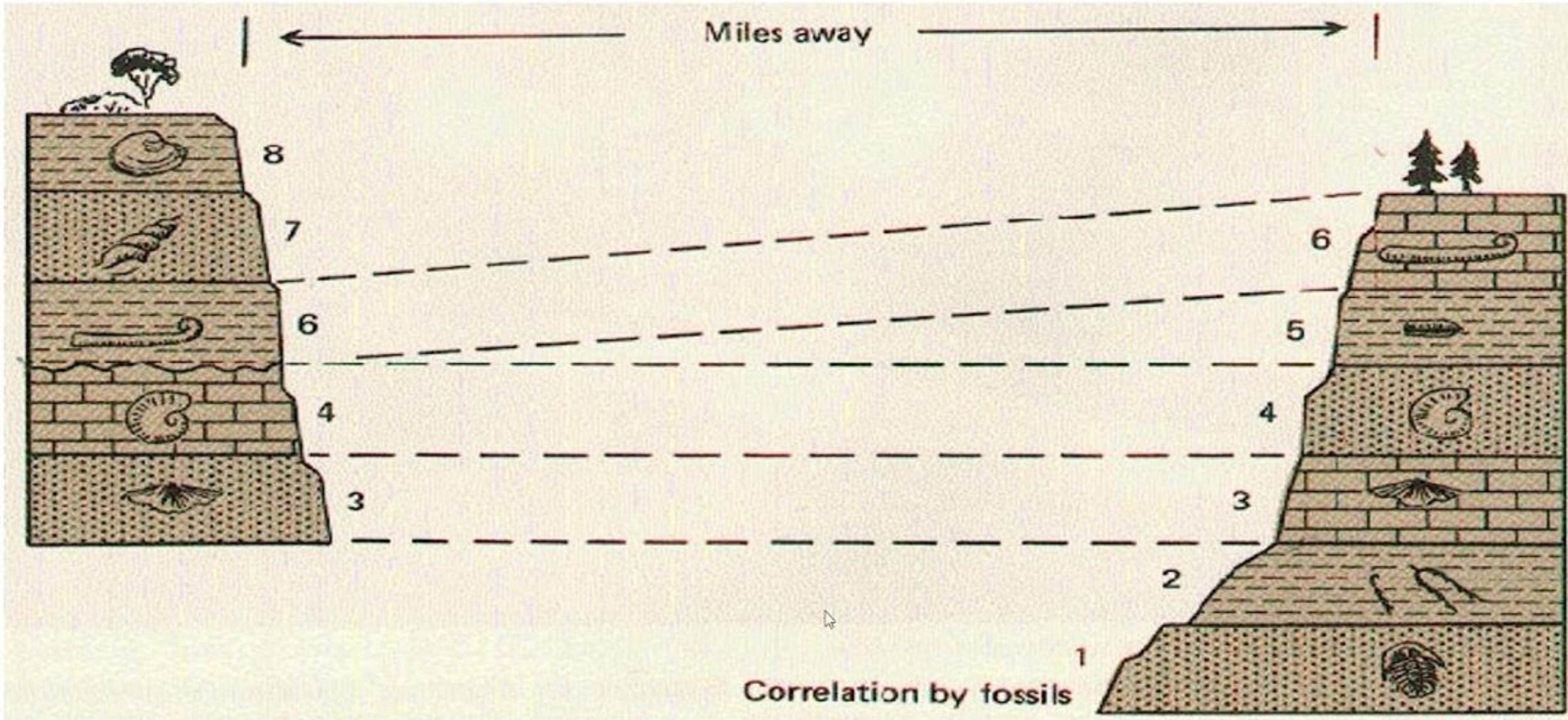
The Principle of Superposition

In a sequence of sedimentary layers, the youngest layers are on top and the oldest layers are at the bottom. This principle helps geologists determine the sequence of deposition.

- Younger layers are deposited above older ones.
- Used to understand rock formation history and past environments



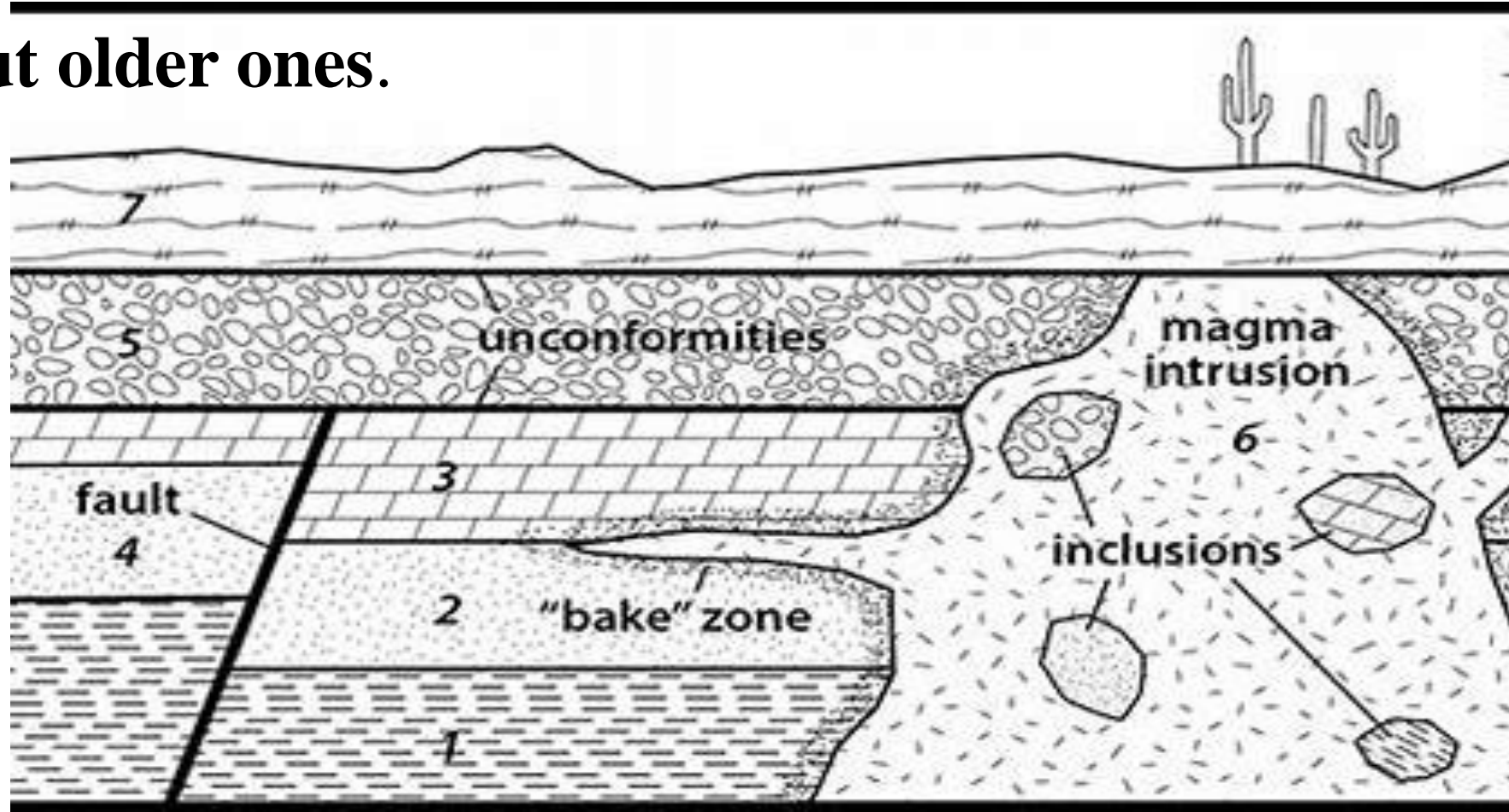
The Principle of Faunal Succession



The Principle of Crosscutting Relations

If one geological feature cuts through another, the feature doing the cutting must be younger than the one it cuts. This principle helps geologists understand the sequence of geological events.

Younger features cut older ones.



Cross-c

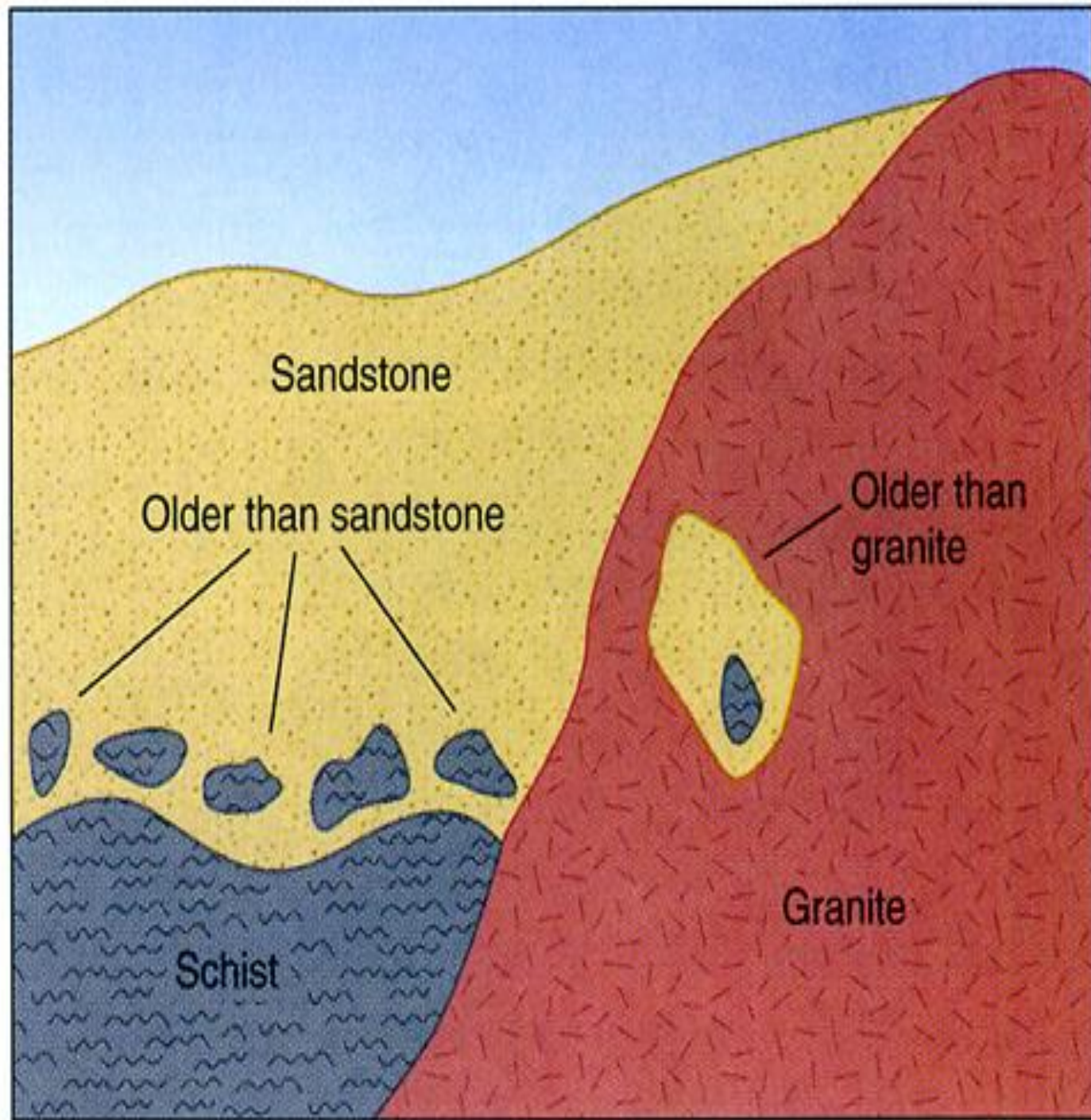


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The Principle of Inclusion

If a fragment of one rock is included within another, the included fragment is older than the surrounding rock. This principle helps establish the relative age of rocks.

. Fragments are older than the surrounding rock.

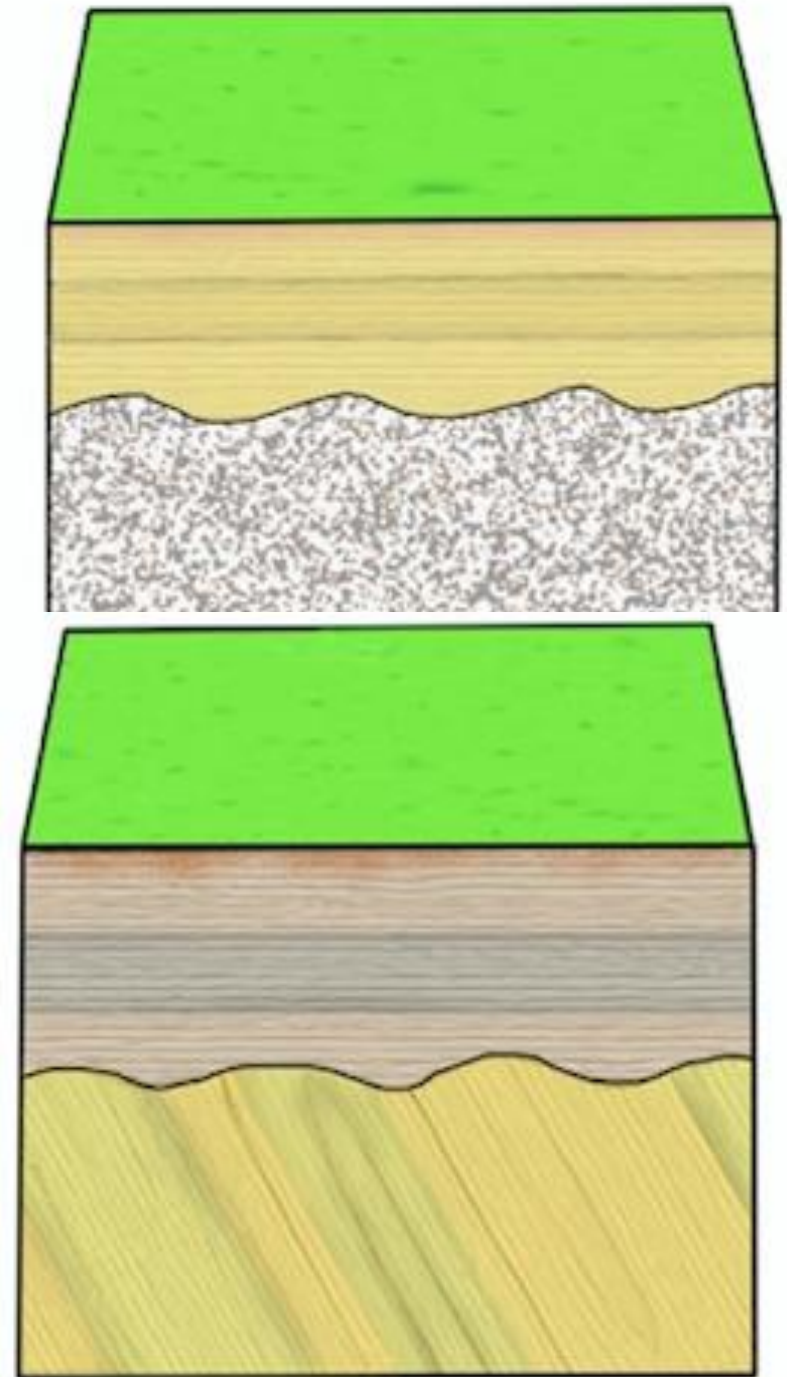


Unconformities

In this paragraph, we will explore the concept of unconformities, a critical feature in building relative time scales for geological sequences. Understanding unconformities helps geologists determine missing or erased time in the rock record. Let's break down this concept and its importance in relative dating.

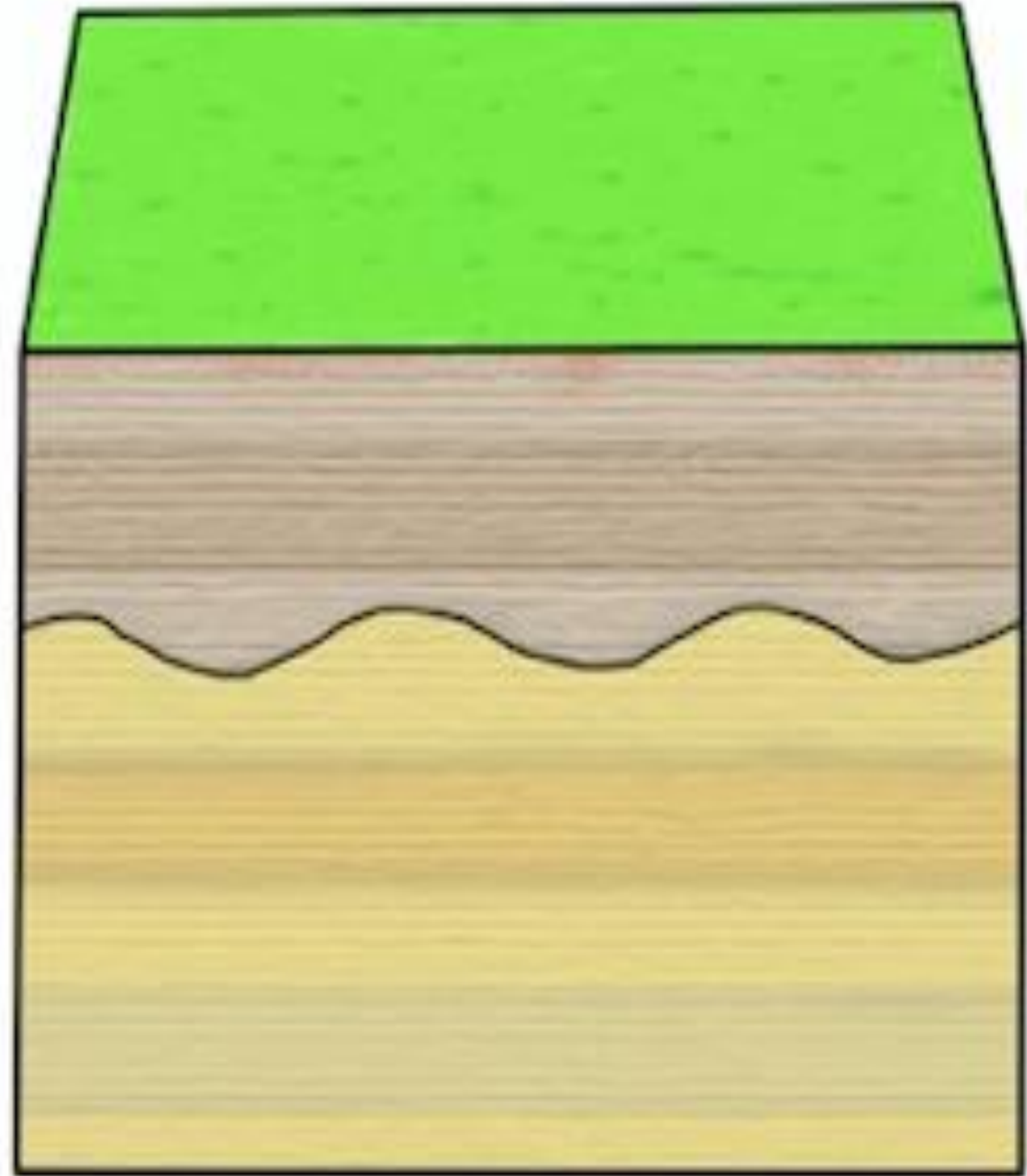
1. Types of Unconformities:

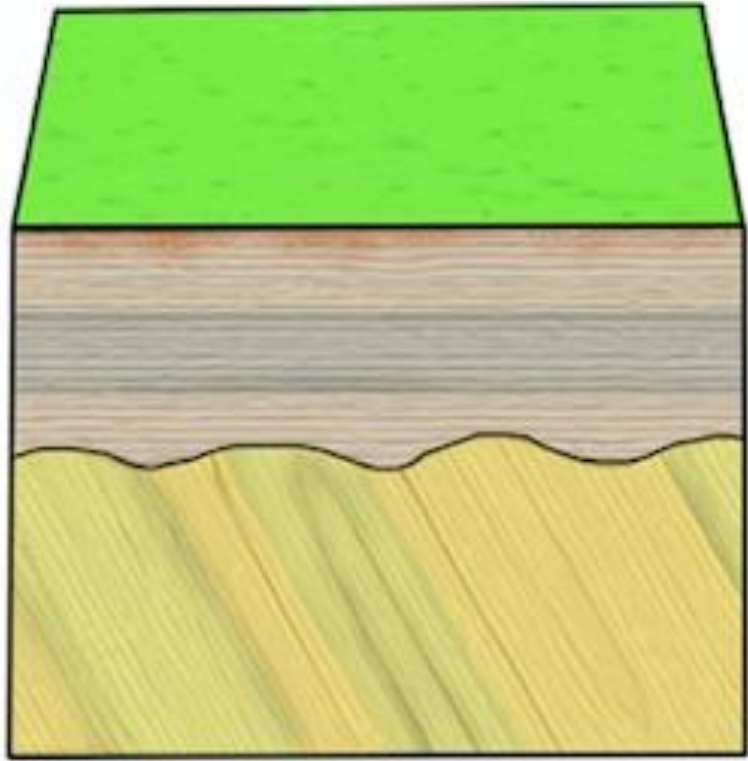
- **Nonconformity:** Occurs when the rock types above and below the unconformity are different. For example, an igneous rock (formed deep underground) is uplifted and exposed, then covered by sedimentary rock.
- **Angular Unconformity:** Happens when the layers below the unconformity are tilted or folded before younger layers are deposited on top. The layers below are not parallel to those above the unconformity.



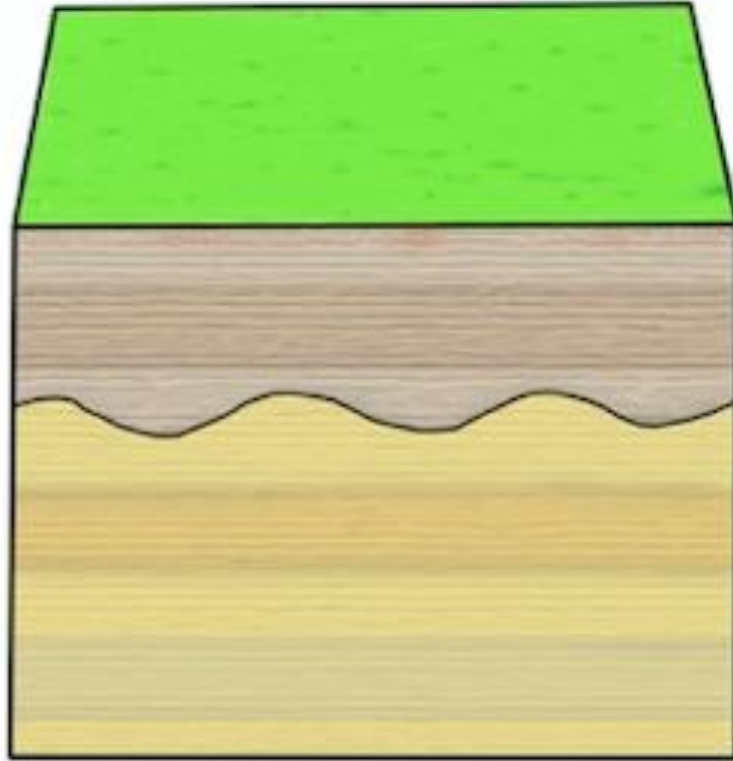
- **Disconformity:**

Occurs when the rocks above and below the unconformity are parallel to each other, but there is a gap in time represented by erosion or non-deposition. This type is harder to detect but can be recognized using fossils or other evidence.

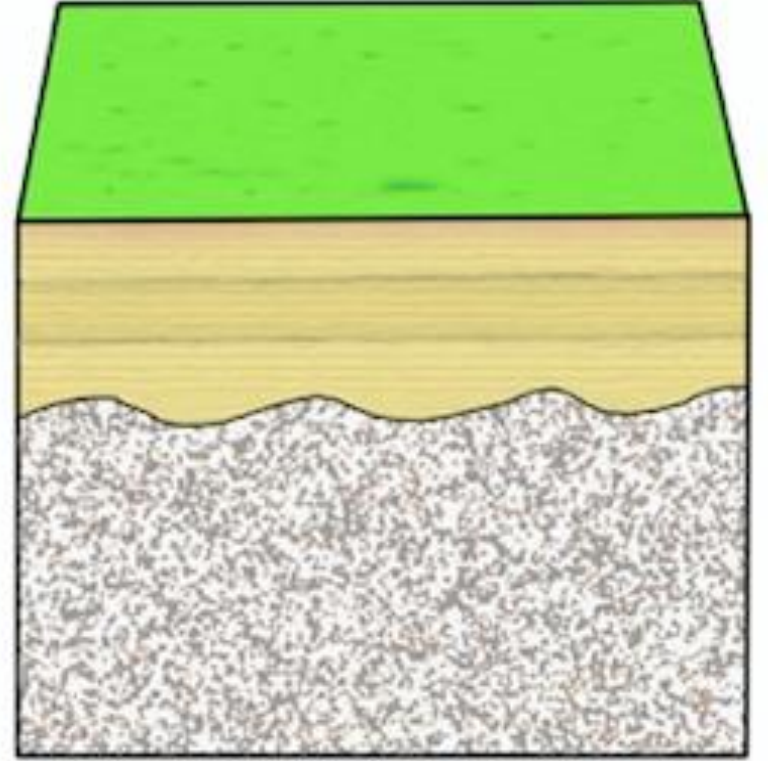




Angular
Unconformity



Disconformity



Nonconformity



Conclusion

In conclusion, by applying the principles of relative dating, we can study a series of rocks to determine their relative ages and reconstruct the sequence of geological events that occurred over time. These key events include:

- 1. Deposition of Sedimentary Layers:** The accumulation of sediments forming rocks.
- 2. Tilting or Folding of Rocks:** Tectonic forces causing rocks to tilt or fold.
- 3. Uplift and Erosion:** Uplifting rocks to the surface, where they are exposed to erosion.
- 4. Intrusion of Magma:** Magma intruding into existing rocks and solidifying to form new layers.
- 5. Fracturing of Rocks (Faulting):** Fractures in rocks caused by tectonic stress.

Thank You for Listening



Any Questions?