

Relative Dating

How do we determine a rock's age by the surrounding rocks?



Geologic History

Relative Dating

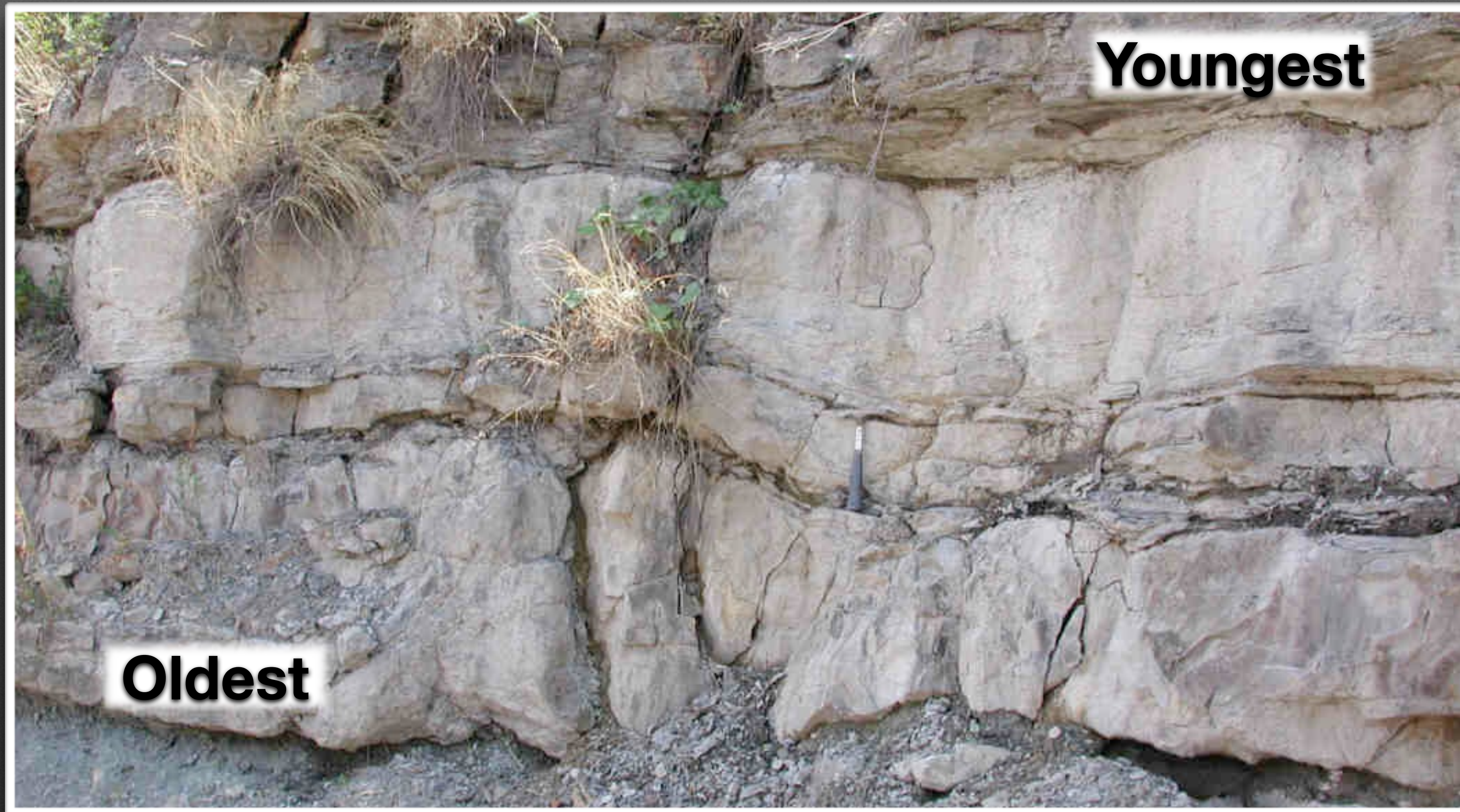
- Uniformitarianism - the idea that forces working on our planet today worked on our planet in the past in the same manner
- “The present is the key to the past”

Relative Dating

- Relative Dating - determination of the age of a rock or event in relation to other rocks or events

Relative Dating

- Principle of Superposition - idea that the bottom layer is the oldest and each overlying layer gets progressively younger



Principle of Superposition

Relative Dating

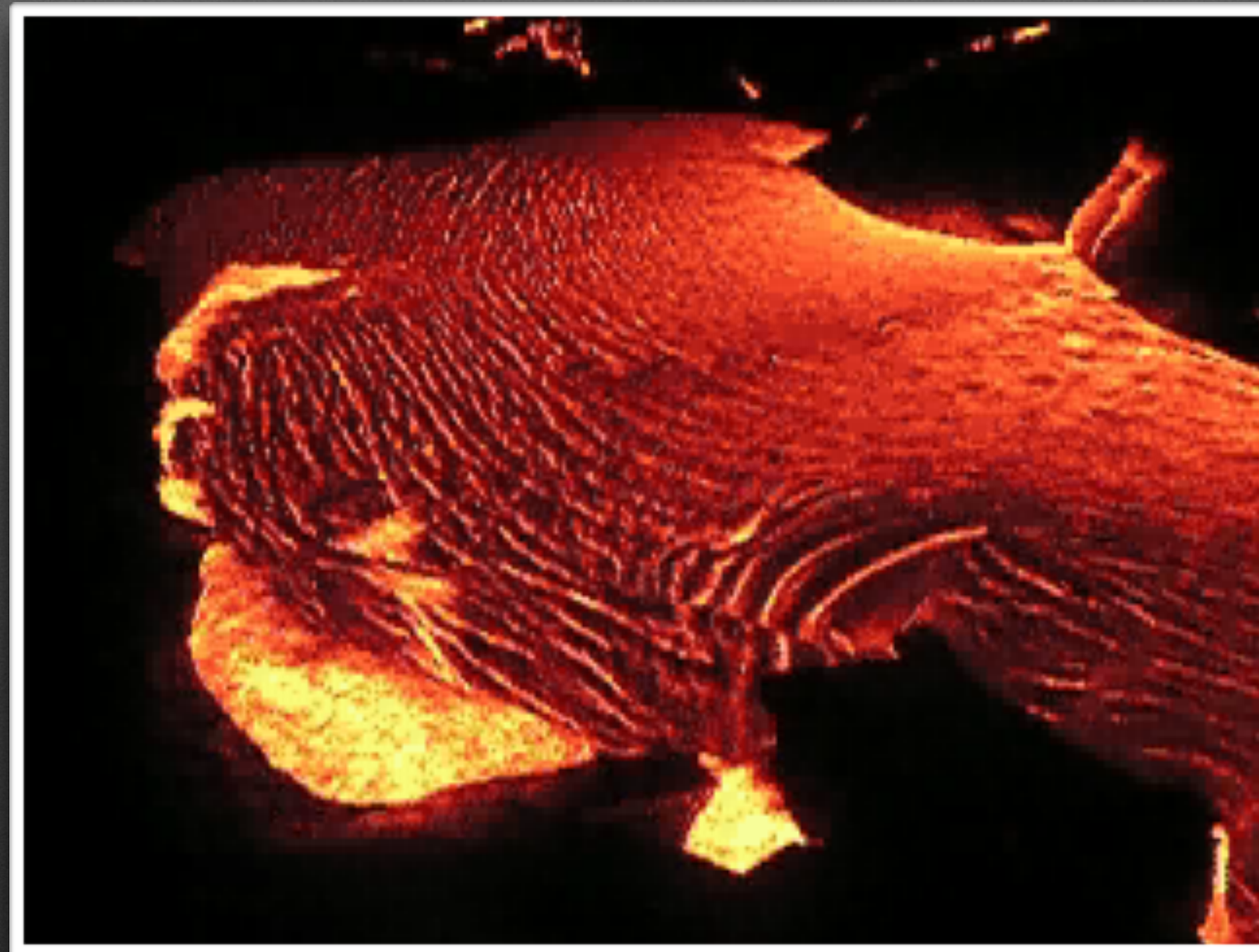
- Original Horizontality - idea that sedimentary and igneous rocks are deposited in parallel layers to Earth's surface



Original Horizontality

Relative Dating

- Extrusions - molten rock flows onto the surface



Relative Dating

- Intrusions - when molten rock squeezes into preexisting rock layers
 - Younger than the rocks that they crosscut
 - Exception to the principle of superposition



Igneous Intrusions



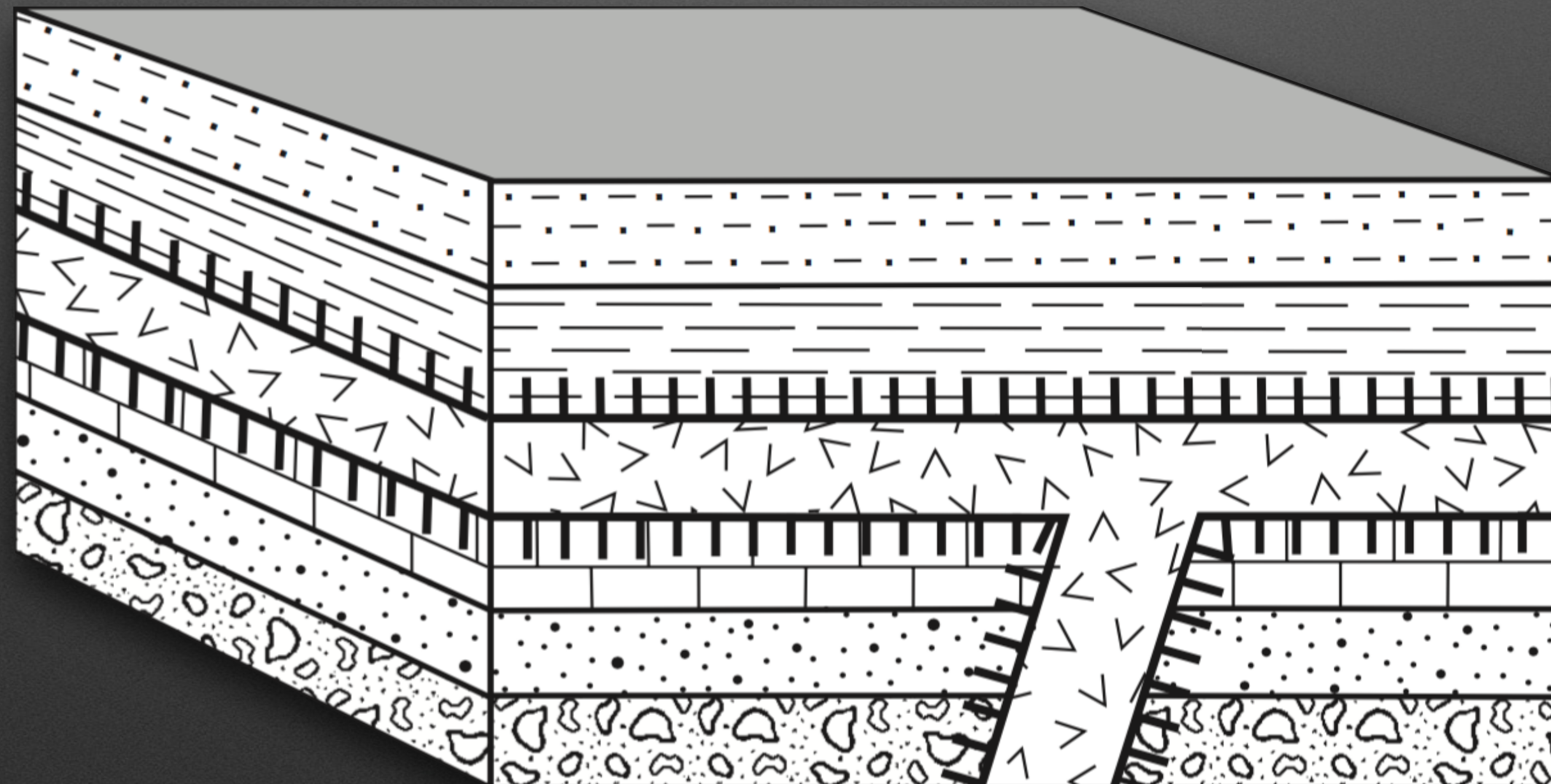
New Hampshire



Hawaii

Relative Dating

- Contact Metamorphism - temperature induces change of preexisting rocks along an intrusion

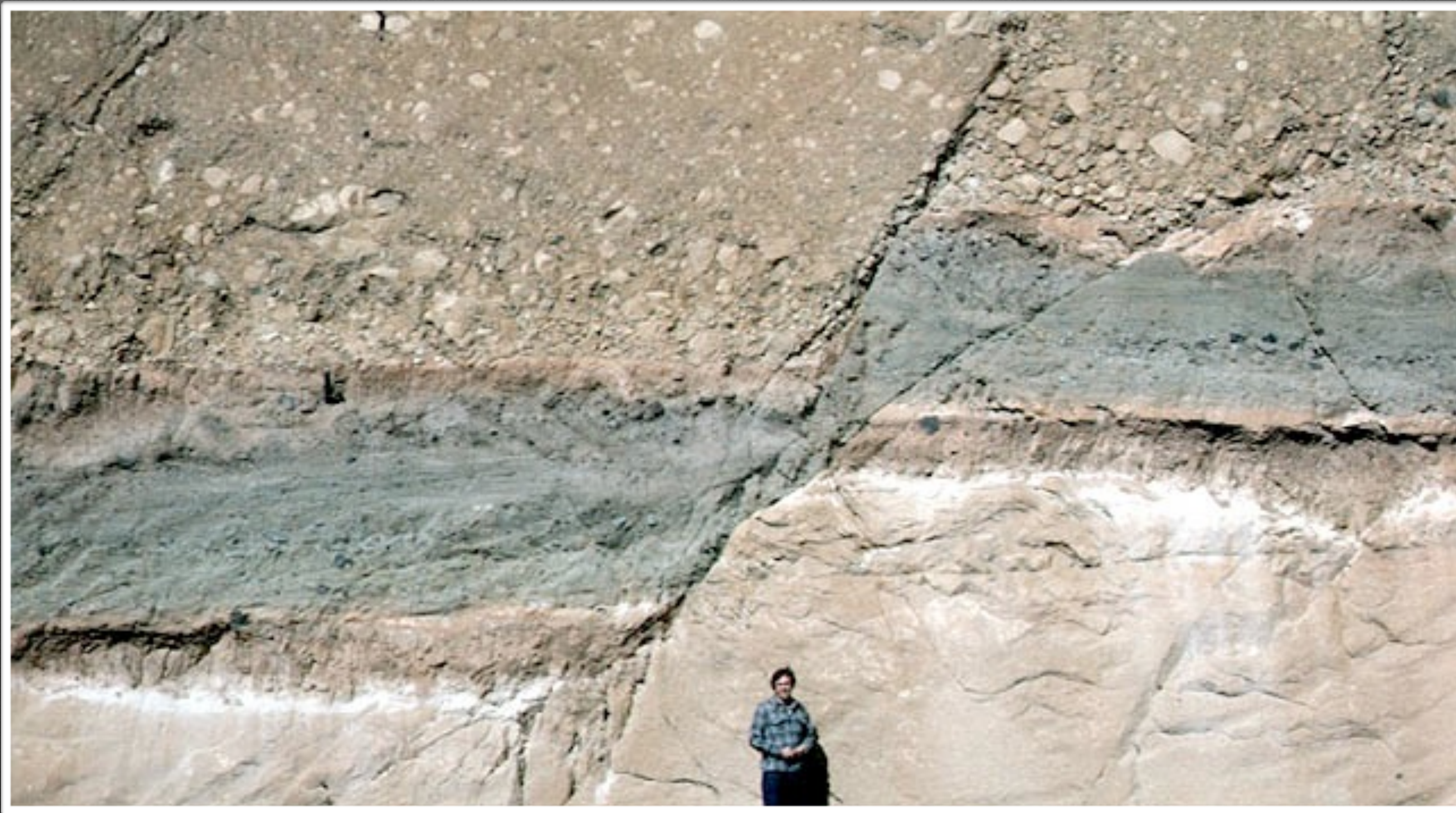




Contact Metamorphism

Relative Dating

- Faults - a crack in the bedrock where movement has occurred
 - Younger than the rocks that they crosscut



Faults



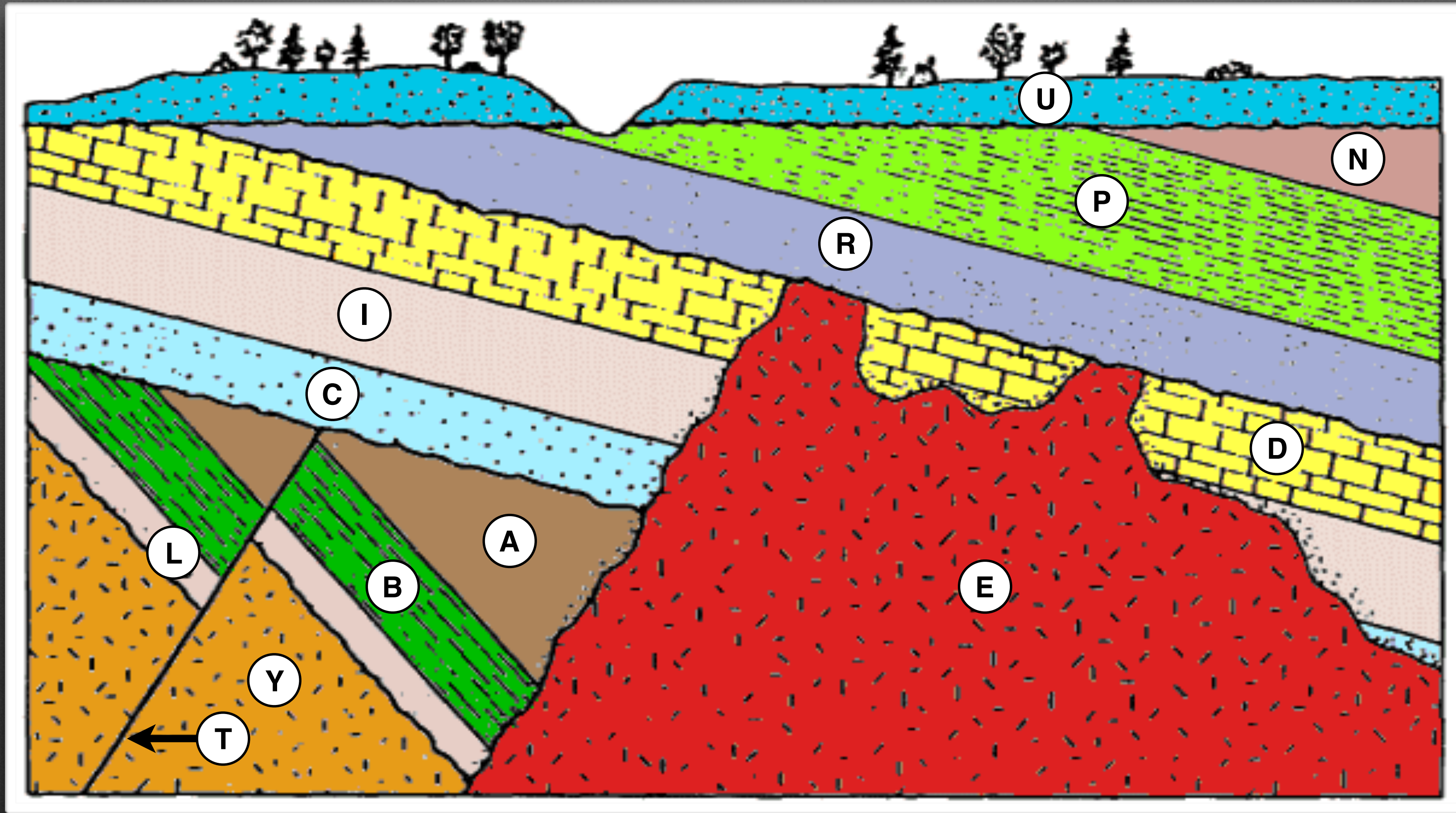
Faults

Relative Dating

- Folds - when thrusting rock layers cause preexisting rock layers to overturn
 - Exception to the principle of superposition



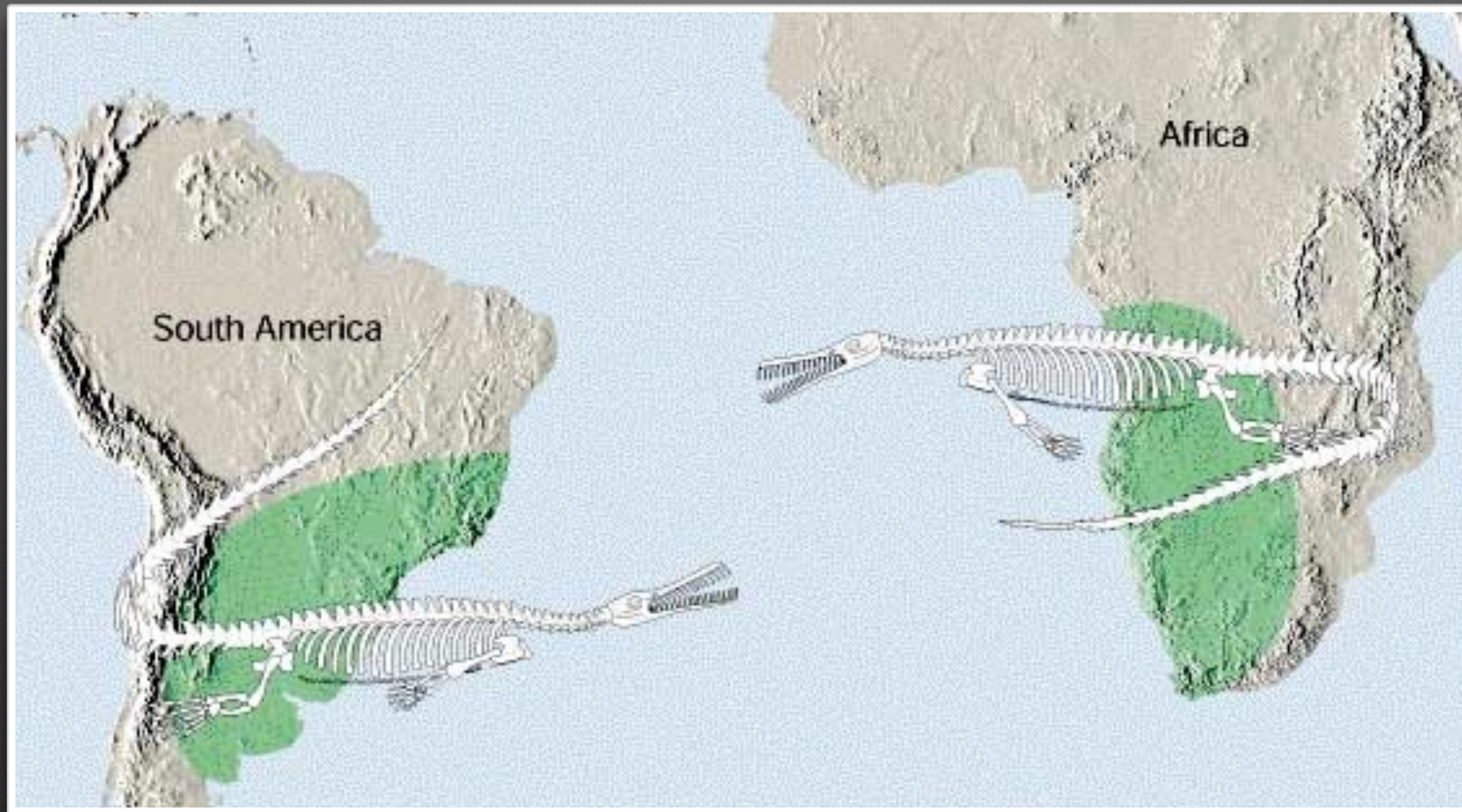
Folds



Relative Dating

Relative Dating

- Correlation - the process of showing that rocks or geologic events from different places are the same or similar age
 - Correlation is the most effective method when using relative dating



Correlation

Relative Dating

- What to look for when correlating rocks:
 - Similarities in Rocks
 - Rock Sequence
 - Mineral Composition
 - Color
 - Fossils

Relative Dating

- Fossils - remains or evidence of former living things
 - Examples: bones, shells, footprints, and organic compounds (DNA)



Relative Dating

- Index Fossil - fossil used to define and identify geologic periods
 - Best method for correlating rocks

Relative Dating



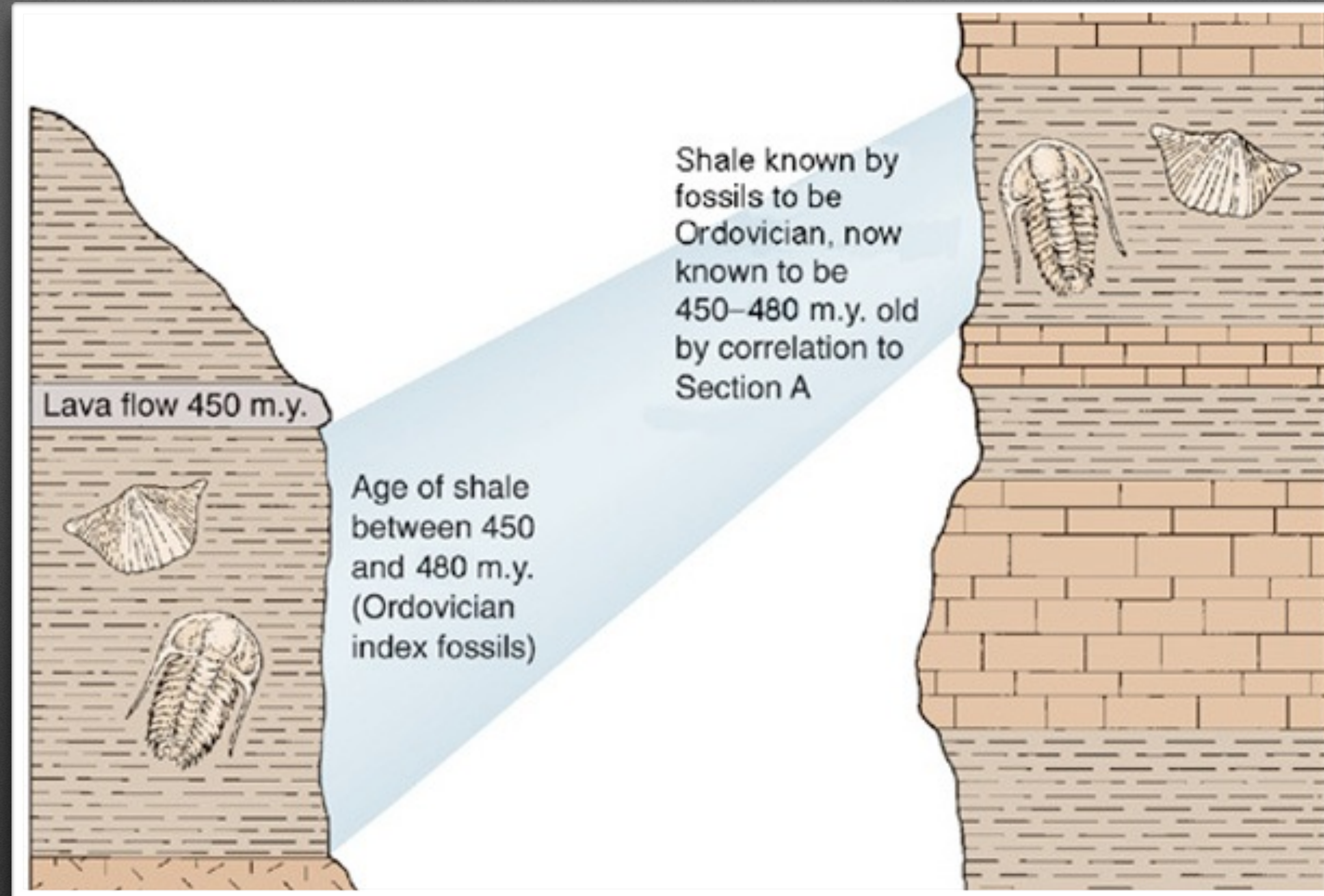
Dinosaur Fossils
251 - 65 mya



Trilobite Fossils
544 - 251 mya



Charlie with some Trilobites



Correlation

Relative Dating

- To be considered a good index fossil it needs to meet two criteria:
 1. The organism existed over a large geographic area
 2. The organism existed over a short time

Relative Dating

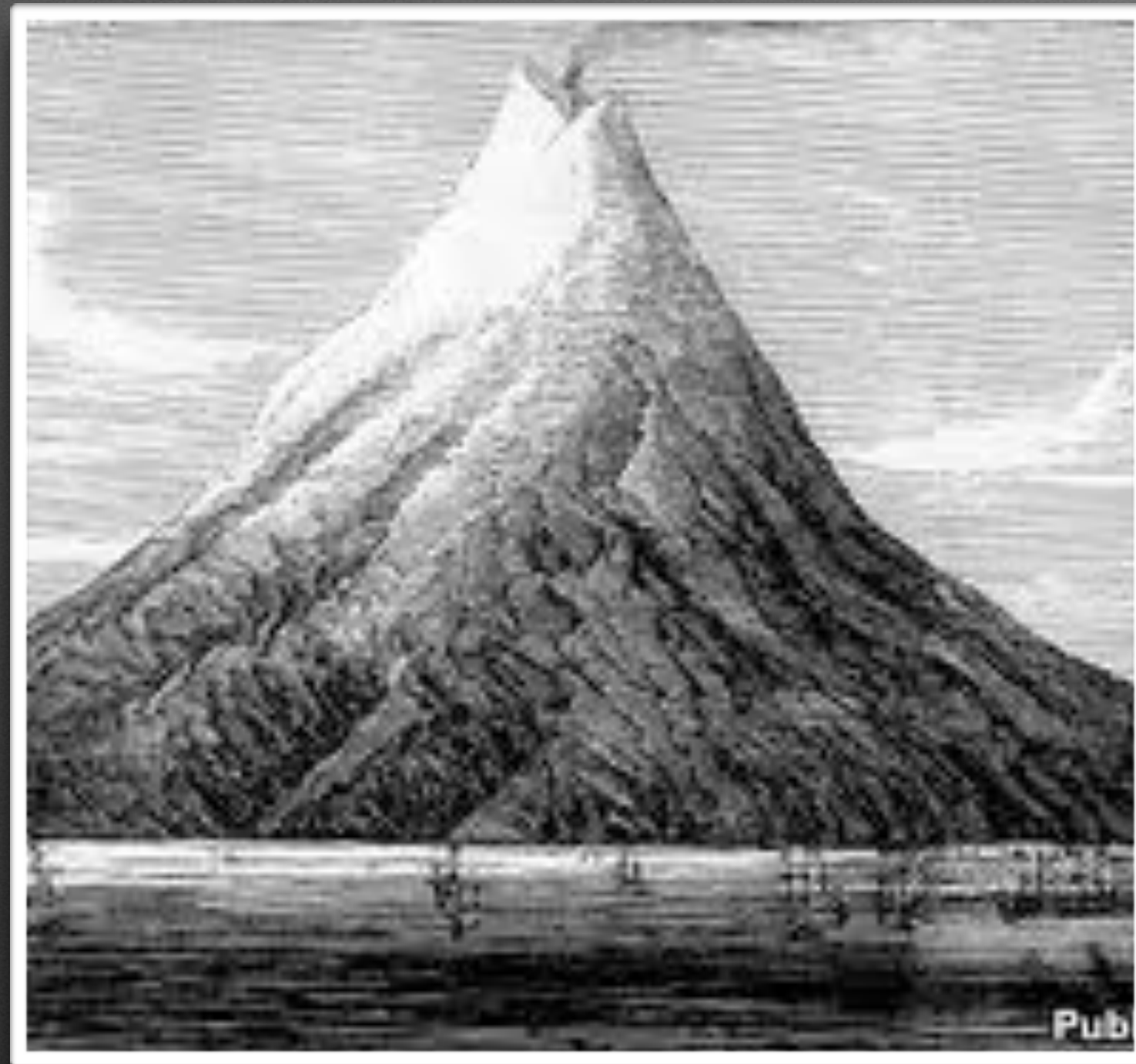
- Geologic Time Markers - deposits spread over large areas that represent a specific date
 - Examples: volcanic ash deposits and meteorite impacts

Relative Dating

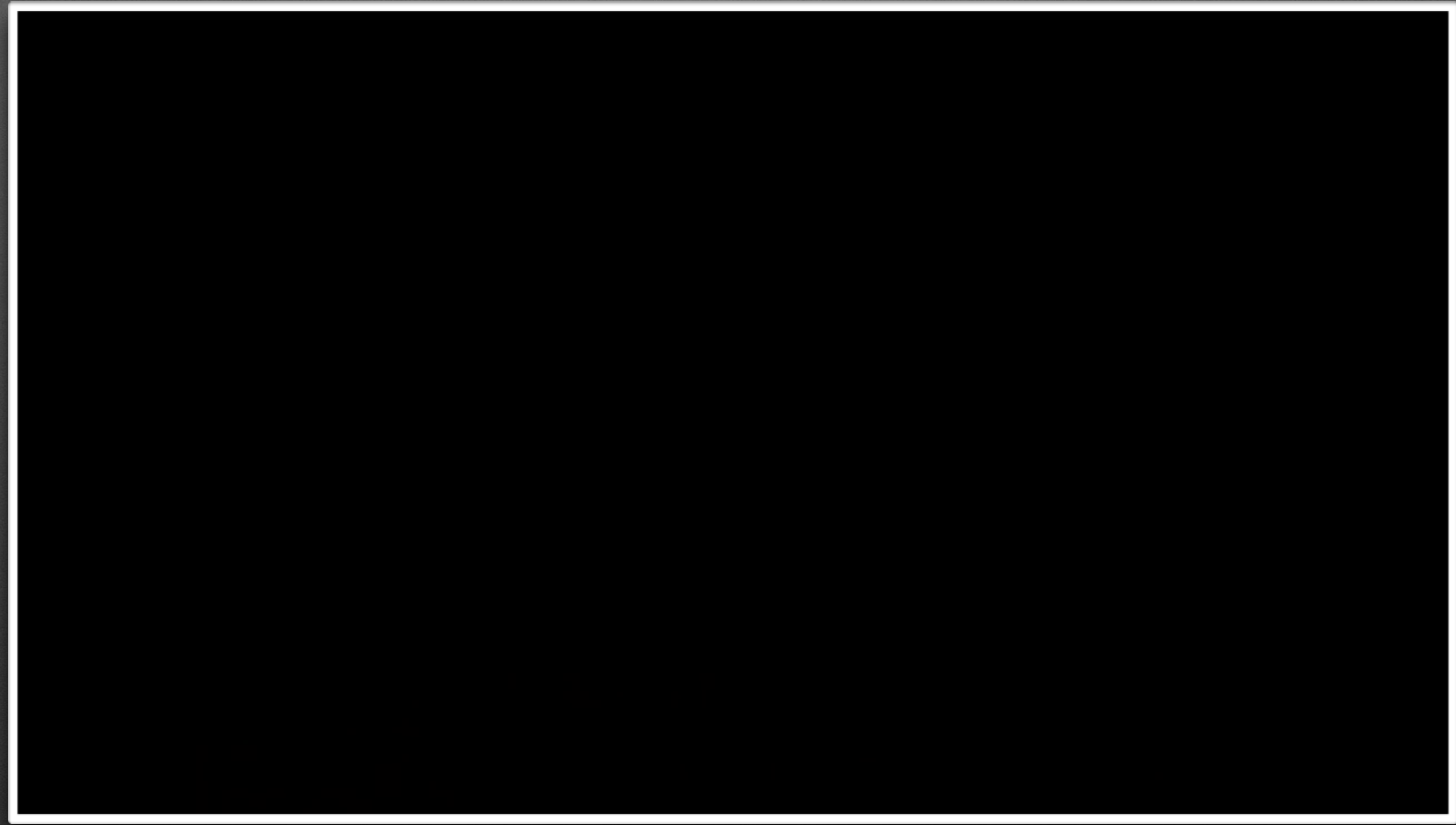


KT Asteroid - 65 mya
Meteorite Impact

Relative Dating



Krakatau - 1883
Volcanic Ash Deposit



KT Boundary