

Fundamental Principles of Historical Geology

- Superposition
- Original Horizontality
- Original Lateral Continuity
- Intrusive Relationships
- Cross-Cutting Relationships
- Fossil Succession

Principle of Superposition

- In any undeformed sequence of sedimentary rocks, each bed is younger than the one below it and older than the bed above it.
- This is the basis of relative ages of all strata and their contained fossils.

Principle of Original Horizontality

- Because of gravity sedimentary particles form horizontal (or nearly so) layers or strata.
- Thus, steeply inclined strata have been moved from their original position.

Principle of Original Lateral Continuity

- Strata originally extended in all directions until they thinned to zero at their edges of deposition.
- Thus, matching strata on opposite sides of a valley can be correlated.
- This principle is used to trace coal seams from one mountain to the next in West Virginia.

Principle of Intrusive Relationships

- Invading igneous rock is always younger than the rock it intrudes.
- This is an indicator of relative ages.

Principle of Cross-Cutting Relationships

- Faults are younger than the rocks they cut through.
- Older faults are offset by younger faults.

Principle of Fossil Succession

- Fossils are not randomly distributed in rocks. They occur in a unique vertical order observed from place to place.
- This allows age correlation of rocks that are widely separated.
- It allows relative ages of rocks to be determined from one area to another.

Unconformities

- Unconformities represent major gaps of time.
- They are the result of periods of erosion or non-deposition.
- They help us to understand the great age of the earth.

Angular Unconformity

- Recognized by tilted or deformed sedimentary rocks below flat-lying sedimentary rocks.

Disconformity

- The unconformity is an erosion surface within a sequence of flat-lying sedimentary rocks.

Nonconformity

- Recognized by sedimentary rocks resting on an eroded surface of igneous or metamorphic rocks.

Paraconformity

- Para means "near", as in nearly conformable.
- An unconformity with no obvious erosion surface.
- There is a distinct gap in the fossil record.

Terms to Learn

- Contact - a distinct surface between two unlike bodies of rock. Unconformities and bedding planes are both contacts.
- Stratum - a single bed
- Strata - a group of beds
- Stratigraphy - the study of strata

Terms to Learn

- Formation - a body of rock with distinctive lithology that is bounded by contacts. Must be thick enough to map (>20 feet thick).
- Outcrop or Exposure - where rocks are exposed at the earth's surface.