4 - Sedimentary Rocks

Tip

Sedimentary rocks cover most of the Earth's surface

General Terms

Grain (clast)

Particle of rock, like a pebble or grain of sand

Deposition

The process by which gains settle and collect

Lithification

When sediments become stuck together

Formation

Weathering

Definition

A process where pre-existing rocks are broken down physically or chemically to produce sediments

Physically

- Ice wedging
  - Rocky debris is known as talus
    - Exfoliation
      - Cracks form due to release of surface pressure, parallel to the surface (perpendicular to plane of pressure release)
      - Pieces of the rock slide off, more cracks form

        - Known as a jointing pattern
        - Often happens in granite
    - Organic activity
        - When living things destroy rocks
    - Glacial Abrasion
        - Striations
        - Deep "U-Shaped" valleys
    - River Abrasion
    - Wave Abrasion
    - Wind abrasion
        - Aeolian
    - Thermal expansion and contraction

Chemically

- Hydrolysis
    - Turns feldspar into clay
    - Absorption of water into the crystal structures of silicates and removal of some components of the silicate structure in solution (carried away in water)
    - Weathering of feldspar is typical
- Oxidation
    - Common with metallic ions
- Dissolution
    - Dissolving of minerals and rocks
    - Common with calcite
    - Hard water, seashells, stagalmites

Deposition

> **Definition**
>
> Sediments are transported by wind, water, ice, gravity, etc, that come to rest and pile up somewhere

Lithification

> **Definition**
>
> Sediments are stuck together by the growth of new minerals between grains

Clastic

Definition

Fragments of other rocks
Biological if it contains fossils/fossil fragments

Chemical

Definition

Crystals grown from a solution

Characteristics

Grain Rounding

Definition

"roundness" of a grain or average "roundness" of multiple grains

- Angular, Subangular, Sub-rounded, Rounded
- Result of abrasion

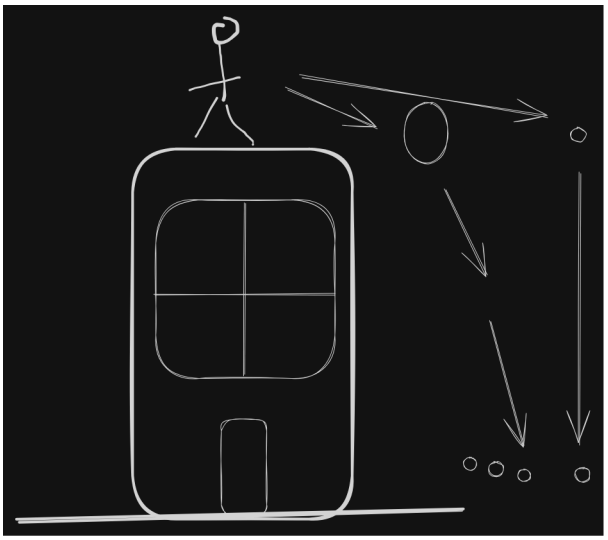
Sorting

Definition

Describes the range of grain sizes in a rock

Changes over time

- Become more sorted over time
- Become rounded over time
- Become finer over time



- Become more quartz rich
  - Quartz is quite stable, and survives the journey down a river more easily than other minerals
  - Quartz doesn't increase, but occurrence of other minerals decrease

Types

Clastic

- Conglomerate
  - Poorly sorted (mixture of silt, sand, pebbles, etc)
  - Rounded grains
  - Formation
    - Rivers
    - Beaches (swash zones)
    - Glaciers
- Breccia
  - Poorly sorted (mixture of silt, sand, pebbles, etc)
  - Angular grains
  - Formation
    - Faults
    - Landslides
    - Talus
- Sandstone
  - Well sorted
  - Rounded
  - Formation
    - Beaches
    - Dunes
    - Rivers

    - Has mostly uniform layering
- Shale
    - Well sorted
    - Rounded grains
    - Formation
        - Underwater
        - Rivers
        - Floodplains
    - Fossil preservation
        - Shale preserves great fossils
        - Fine details can be preserved quite well
            - Due to small grain size

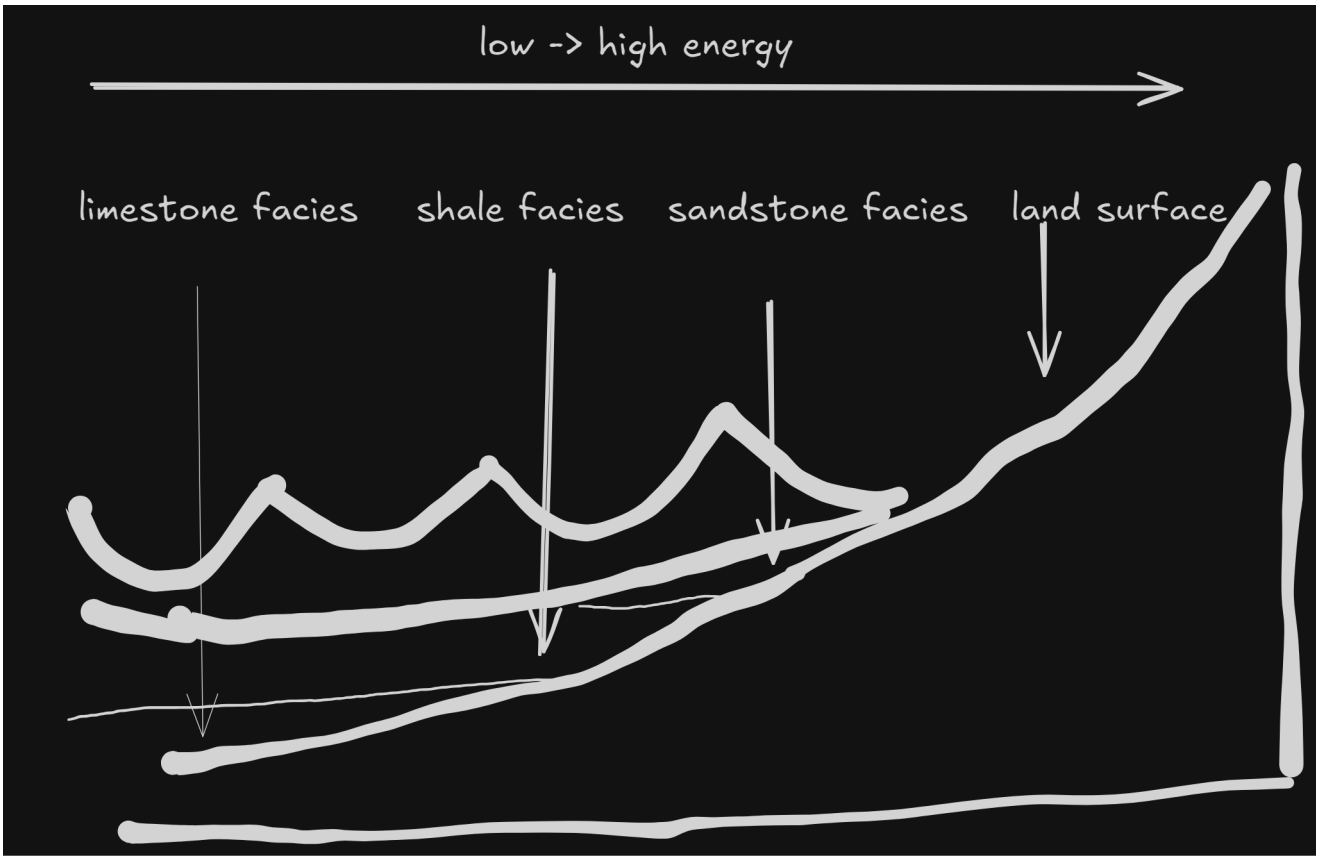
Chemical

- Old minerals dissolve into water, then reform back into crystals again
- Limestone
    - Composed of calcite crystals
    - Carbonate rock
    - Ancient fossil-rich limestone with fossil shells
    - Tiny crystalline calcite spheres formed in seawater in tropical regions
- Chert
    - Made of silica, mainly from plankton shells
- Coal
- Evaporites
    - Made of various mineral crystals
    - Has to do with what elements are present in the water

Layers

- Sediments usually pile up in horizontal sheets on the Earth's surface
- These sheets stack up on top of each other over time
- Therefore, the deeper down you dig, the old the layers are
- Also known as "strata" or "bedding"

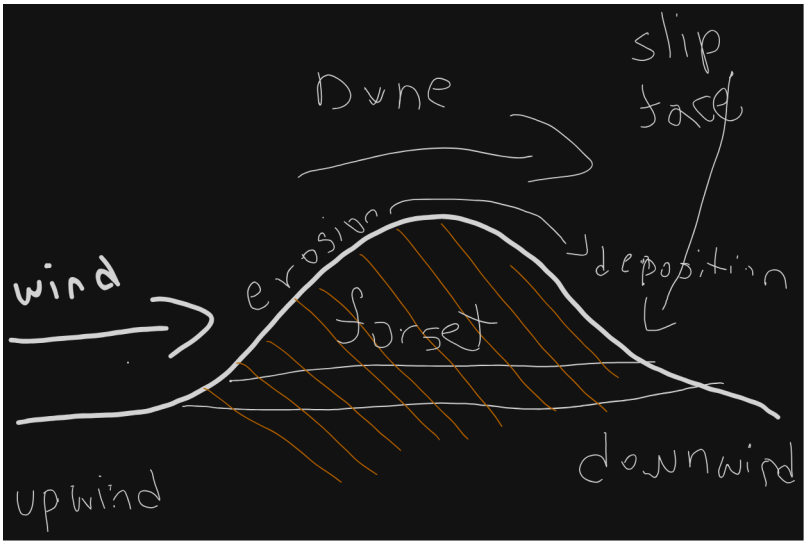
Facies

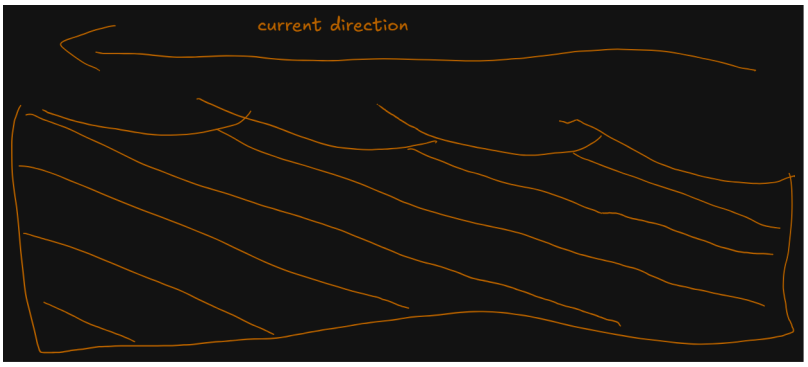


Rising sea level -> transgression
Falling sea level -> regression

Cross Bedding Forms from Moving Sediments

- These rocks were deposited from flowing water or wind and have a distinctive pattern
- Forms from dunes and ripples




current direction