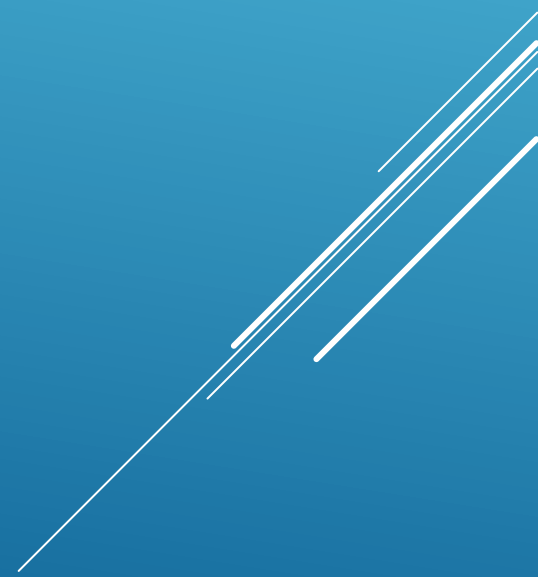


SEDIMENTOLOGY

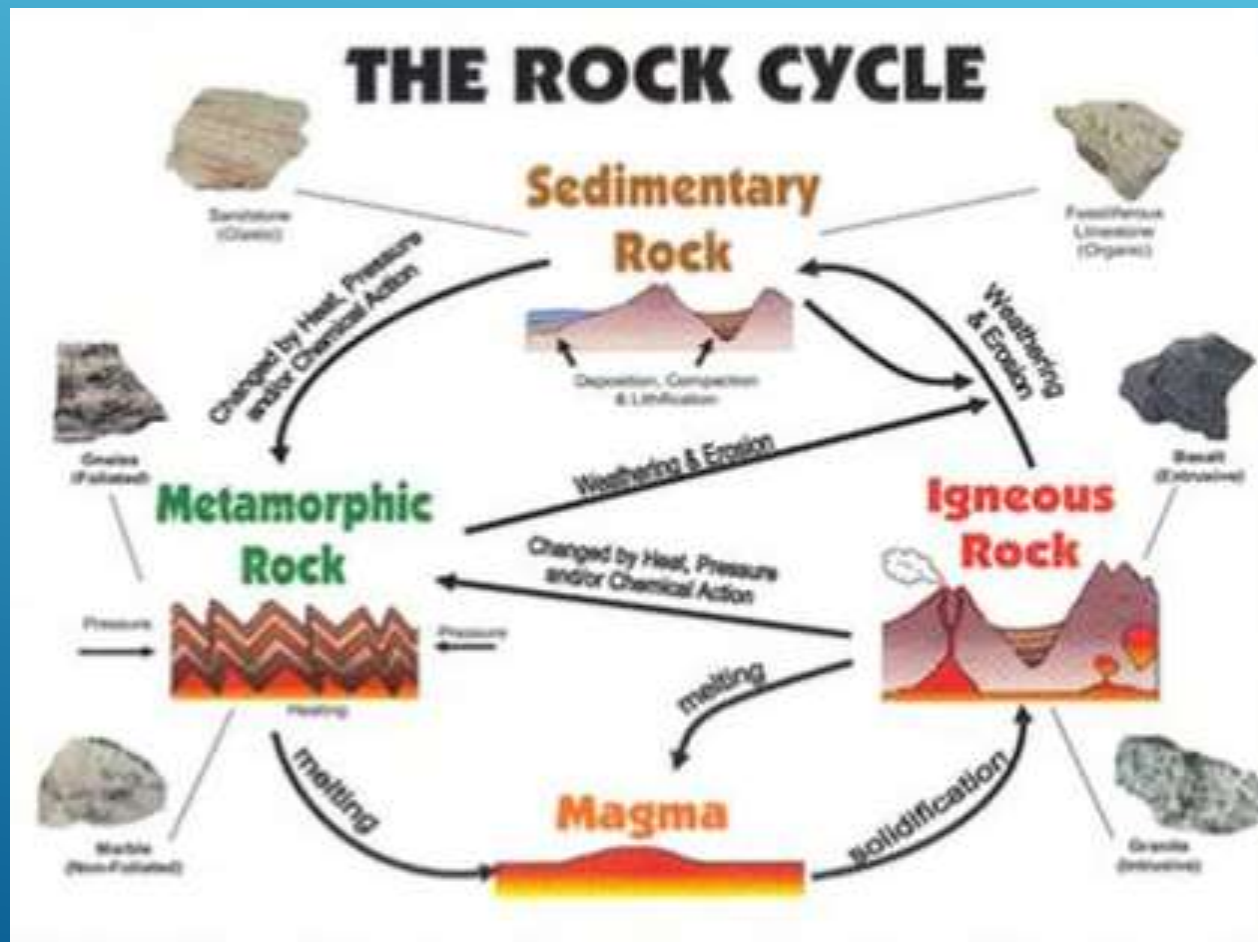
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LECTURE 1a



SEDIMENTOLOGY

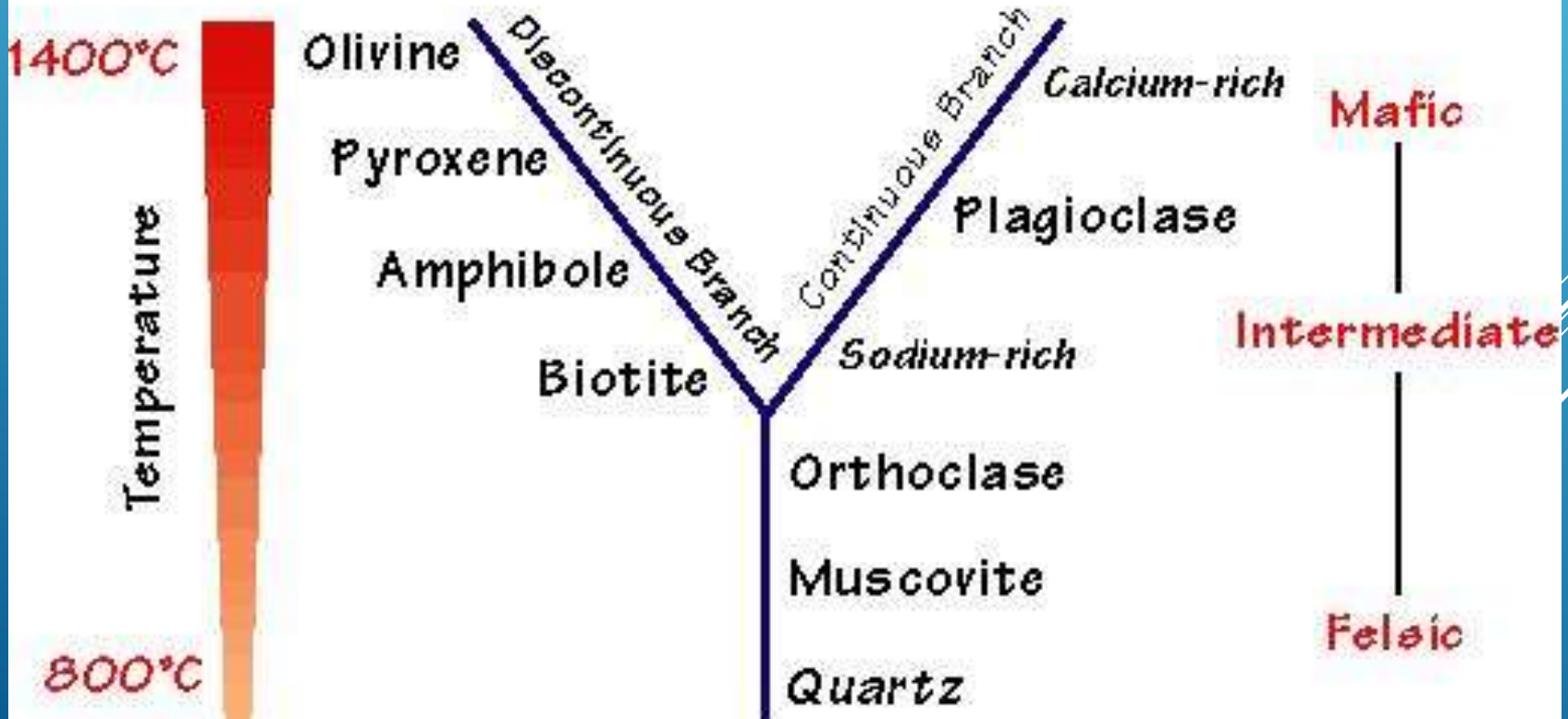
- Sedimentology: study of the processes of formation, transport and deposition of material which accumulates as sediment and eventually forms sedimentary rocks



SEDIMENTOLOGY

What kinds of sediments would you expect to dominate and form sedimentary rocks?

Bowen's Reaction Series



SEDIMENTOLOGY

WHY STUDY SEDIMENTARY ROCKS?

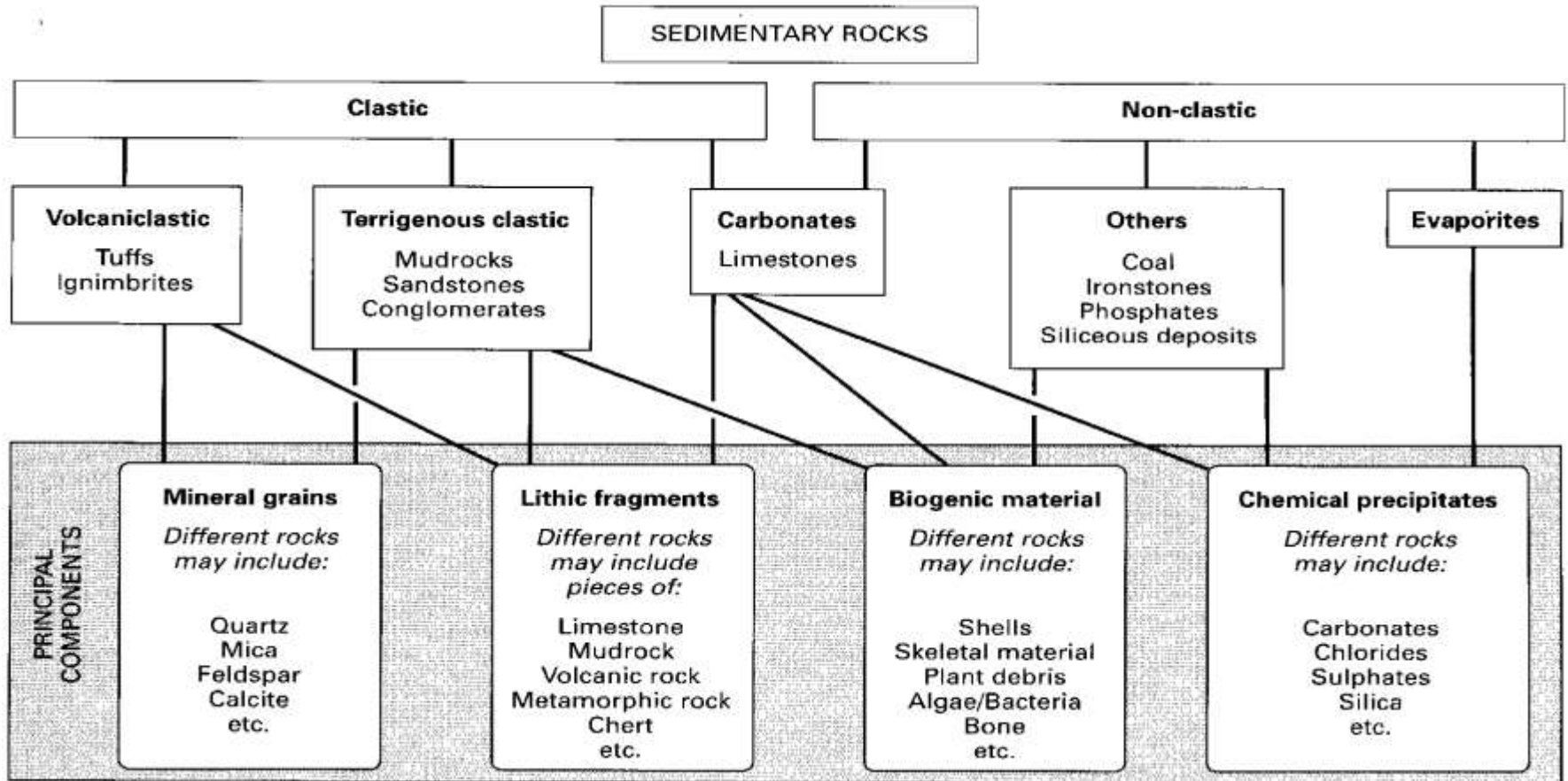
- ✓ Sheer abundance
- ✓ Study of *paleoclimatology* (study of climates throughout geologic time), *paleogeography* (study and description of the physical geography of Earth's past), *paleoecology* (study of the relationship between ancient organisms and their environment), *paleoceanography* (study of the characteristics of ancient oceans) and *paleontology* (study of history of life on Earth as based on fossils)
- ✓ Economic significance. Most of the world's oil and gas and all of its coal are contained in sedimentary rocks. Uranium minerals, phosphate minerals, and many other economically valuable minerals occur in these rocks.

SEDIMENTOLOGY

Kinds of sedimentary rocks

- ✓ Siliciclastic rocks are composed dominantly of silicate minerals, such as quartz and feldspar, and rock fragments (clasts). Conglomerates, sandstones, and shales belong to this group
- ✓ Volcaniclastic rocks are formed mainly from the products of explosive volcanism
- ✓ Chemical/biochemical rocks are composed of minerals precipitated mainly from ocean or lake water by 'inorganic (chemical) and/or organic (biogenic) processes. They include limestone, chert, evaporites such as gypsum, phosphorites, and iron-rich sedimentary rocks
- ✓ Evaporites: precipitated by inorganic processes resulting from evaporation of lake or seawater

SEDIMENTOLOGY



SEDIMENTOLOGY

Formation of Clastic sedimentary rocks

- ✓ Weathering and erosion- transformation of solid rock into smaller fragments or dissolved ions by physical and chemical weathering and moving the weathered products from their original position by running water, wind or moving ice
- ✓ Transportation- Sediment can be transported by sliding down slopes, being picked up by the wind, or by being carried by running water in streams, rivers, or ocean currents. The distance the sediment is transported and the energy of the transporting medium all leave clues in the final sediment that tell us something about the mode of transportation.

SEDIMENTOLOGY

- ✓ Deposition - Sediment deposition takes place when the energy of the transporting medium becomes too low to continue the transport process. In other words, if the velocity of the transporting medium becomes too low to transport sediment, the sediment will fall out and become deposited
- ✓ Lithification - the process that turns sediment into rock.
Stage of lithification
 - Compaction occurs as the weight of the overlying material increases.
 - Cementation start to bind the individual particles together.