

OLLI Journey of the Continents

Fall 2023 with Nicole Myers

Handout

Digital presentations associated with the course + handouts will be available at:

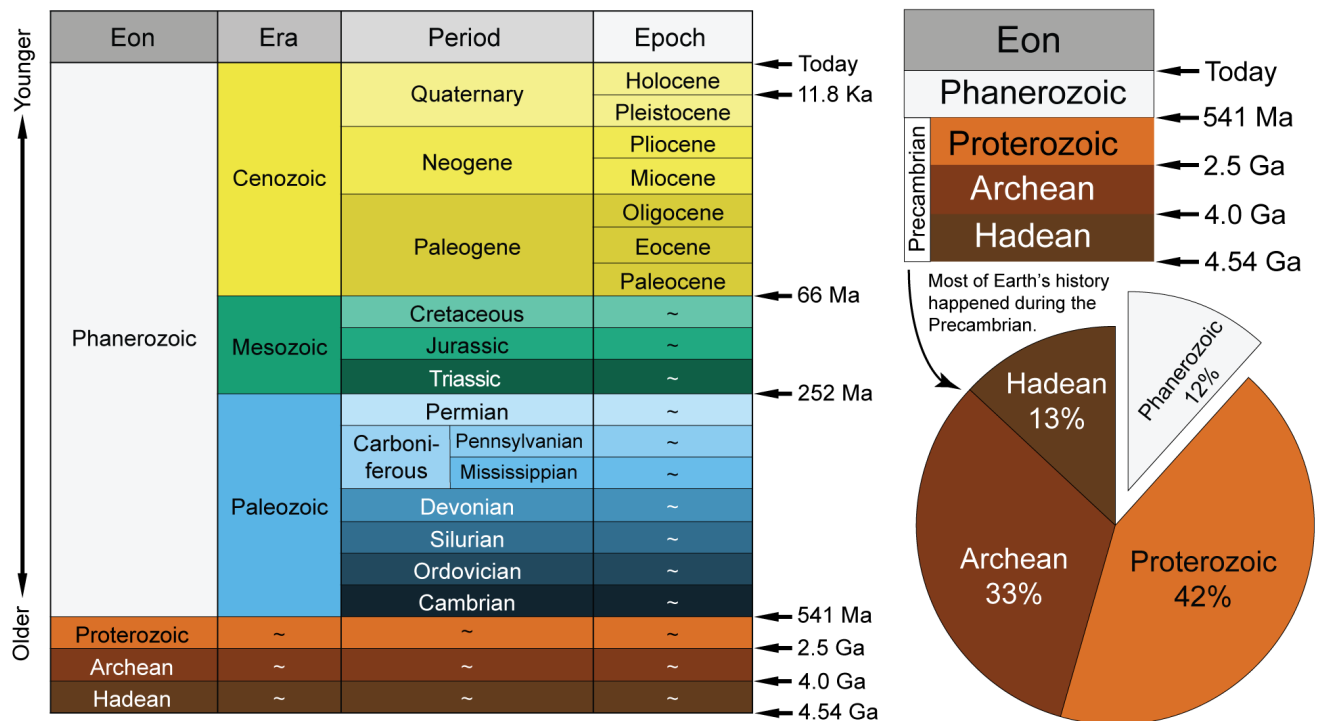
<https://www.appreciatingearth.com/olli>

A Few Helpful Definitions:

- **Tectonic Plate** – a tectonic fragment composed of continental and/or oceanic crust plus mantle materials that moves relative to adjacent plates
- **Tectonic boundaries** – relative plate movements that include convergent (compressional/ /subduction/orogeny), divergent (tensional/pull-apart), & transform (sliding/shear)
- **Crust** – continental & oceanic crust makes up the most surficial compositional Earth layer
- **Continent** – defined by accumulation of continental crust, often composed of granite
- **Platform** – a portion of continental crust that is below sea level & therefore drowned
- **Craton** – the oldest cores of a continents formed during the Precambrian Supereon
- **Orogeny** – mountain building process that occurs due to tectonic convergence and is associated with uplift along faults
- **Ocean** – defined by tectonic formation of oceanic crust & fluctuating sea level
- **Mineral** – naturally occurring solid inorganic substance made of atoms organized in a crystal structure with a well-defined chemical composition (including: zircon)
- **Rock** – solid material made of minerals forming part of the Earth or other space objects
- **Igneous** – rocks formed by the solidification of magma or lava (ranging from mafic to felsic and including: peridotite, komatite, basalt, gabbro, andesite, diorite, rhyolite, granite)
- **Sedimentary** – rocks formed by surface environmental processes that record climate & are made of sediment fragments of broken rocks or crystals formed by evaporation of water (including: shale, siltstone, sandstone, conglomerate, breccia, halite, gypsum)
- **Detrital** – sedimentary material made of broken rock fragments that are the remains of previously formed then eroded rocks
- **Metamorphic** – rocks that form when increased pressure and/or temperature reforms and deforms the minerals through solid-state recrystallization (including: gneiss, granulite, blueschist, schist, greenstone, shale)
- **Xenolith** – a rock or mineral fragment that is included within a younger rock, that formed at a different time and by a different process
- **Modern Continents** - Australia, India, Zealandia, Antarctica, Africa, Eurasia, South America, North America
- **Paleocontinents/Megacontinents** - Gondwana, Laurentia, Laurasia, Pannotia
- **Supercontinents** - Ur, Kenorland, Columbia/Nuna, Rodinia, Pangaea
- **Ancient Oceans** - Panthalassa, Tethys, Iapetus, Mirovia, Rheic

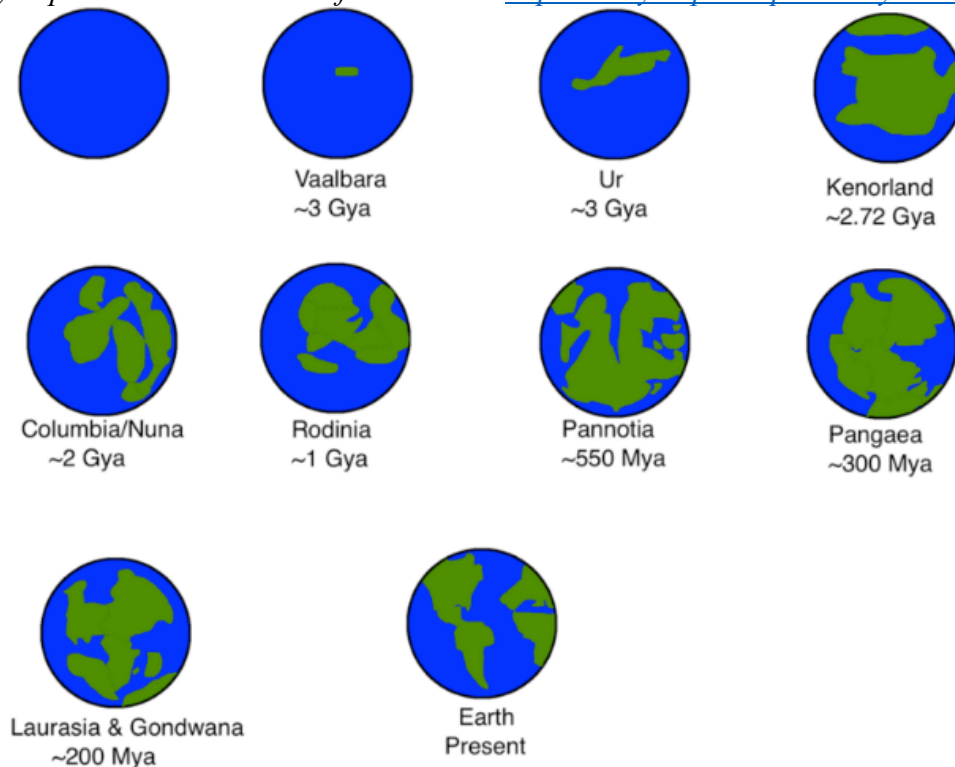
Deep Time: this semester we focus on the evolution of continents over the last 4+ billion years and use the geologic time scale to organize the events and communicate the time scale

Figure from: *EARTH@HOME Geologic Time Scale* <https://earthathome.org/geologic-time-scale/>



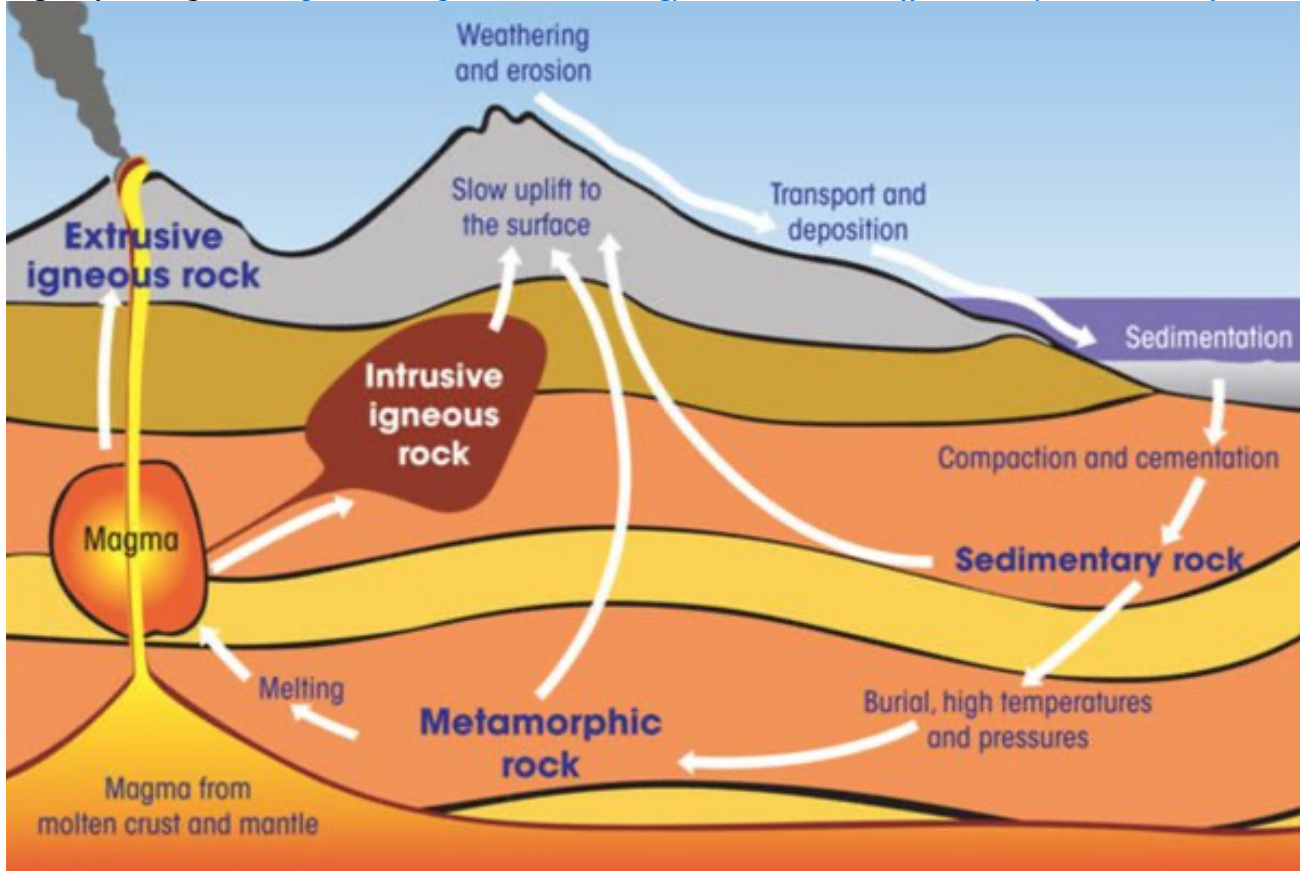
Supercontinent Cycle: the ~3 billion years evolution of continents is marked by times when the vast majority of continental masses converge to form large continents

Figure from: *Encyclopedia: From Scholars for Scholars* <https://encyclopedia.pub/entry/32673>



Interdependent Rock-Tectonic-Hydrologic Cycles: rocks form & change as they are exposed to the atmosphere & weather and as plate tectonics move them around and cause fluctuations in the pressures and temperatures they are exposed to

Figure from: Quora <https://www.quora.com/Geology-What-are-the-different-ways-that-rocks-form>



Rock Types: the tectonic cycle and rock cycle are interconnected, and rocks are divided into 3 rock types that include igneous, sedimentary, and metamorphic

Figure from: Forbes <https://www.forbes.com/sites/trevornace/2016/02/21/rock-cycle-kids-types-rocks-minerals/?sh=3aee095f640b>

