Our generation is unique in its perspective of our planet. From space, Earth looks small, finite and fragile.

What's the first thing that you notice about our planet when you see this image?

The Earth is composed of several integrated parts (spheres) that interact with one another:

- atmosphere
- hydrosphere
- solid earth (lithosphere)
- biosphere (cryosphere)

The Earth System

Hydrosphere: the global ocean is the most prominent feature of our (blue) planet. The oceans cover ~71% of our planet and represent 97% of all the water on our planet.

Atmosphere: the swirling clouds of the atmosphere represent the very thin blanket of air that covers our planet. It is not only the air we breathe, but protects us from harmful radiation from the sun.

The Earth System

Biosphere: includes all life on Earth - concentrated at the surface. Plants and animals don't only respond the their environment but also exercise a very strong control over the other parts of the planet.

Solid Earth: represents the majority of the Earth system. Most of the Earth lies at inaccessible depths. However, the solid Earth exerts a strong influence on all other parts (ex. magnetic field).

The Rock Cycle

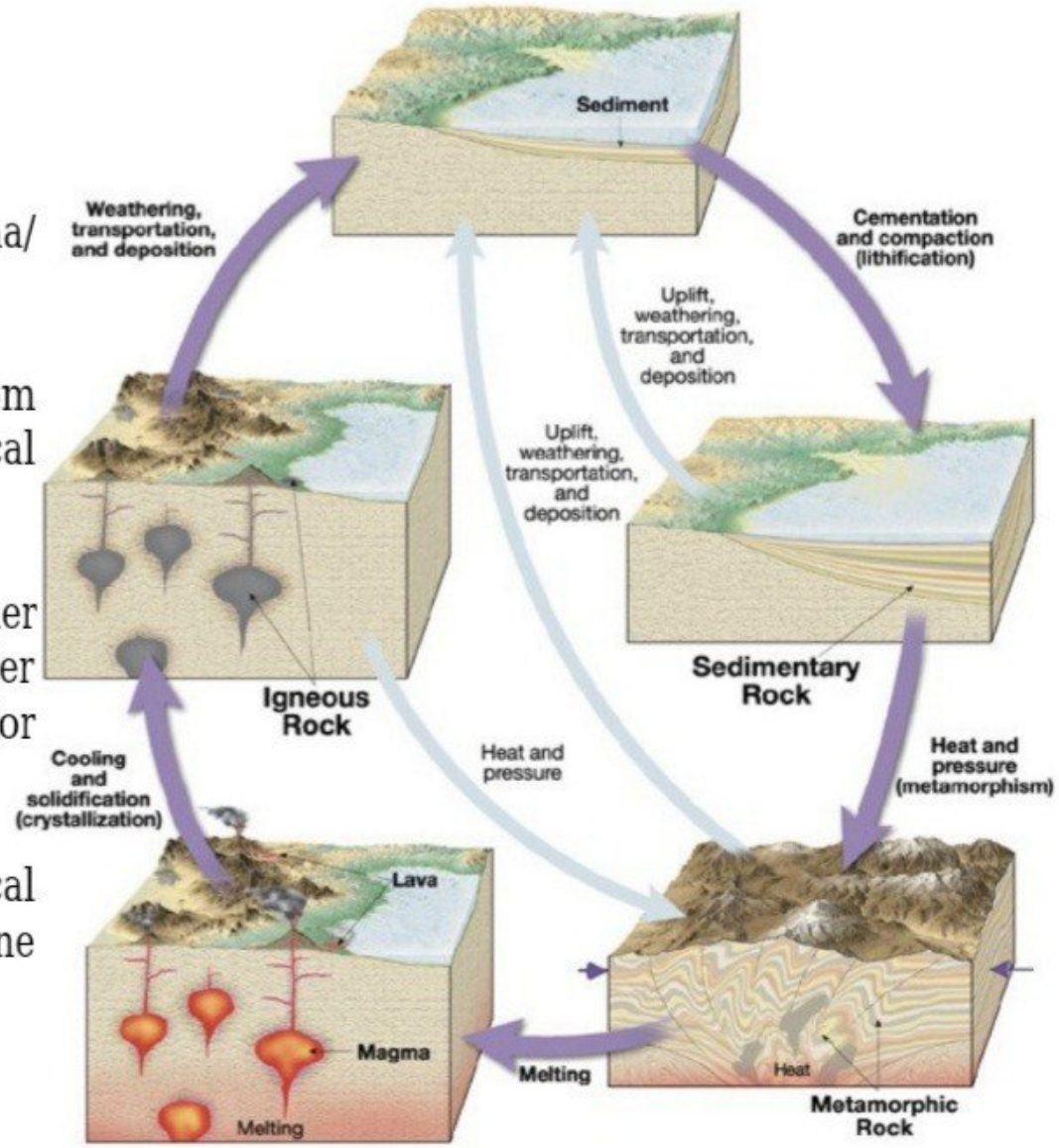
Three basic rock types:

igneous - form from magma/ lava.

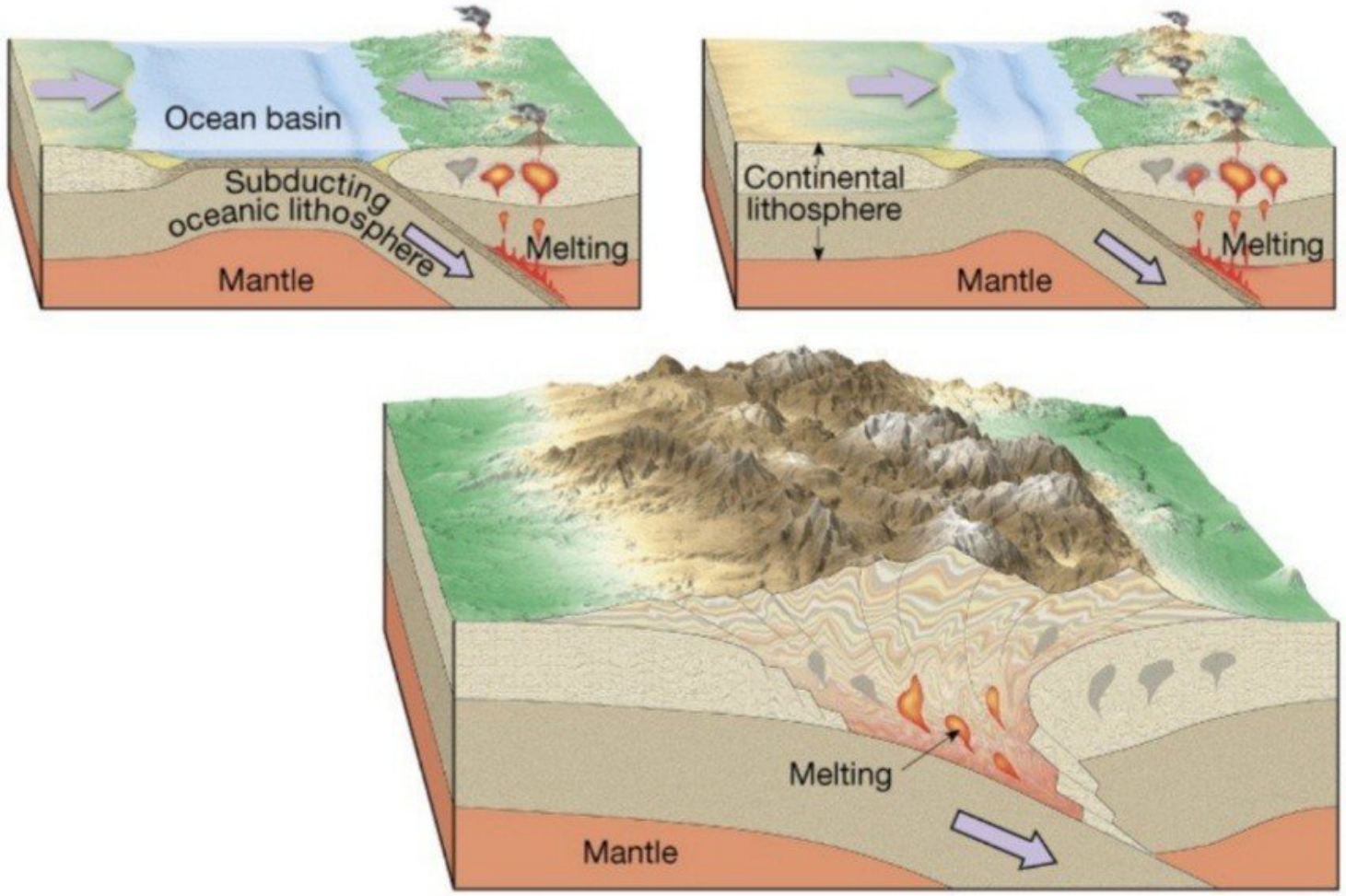
sedimentary - form from sediment and chemical precipitation from seawater

metamorphic - form from other rocks that recrystallize under higher pressures and/or temperatures.

A number of geological processes can transform one rock type into another.



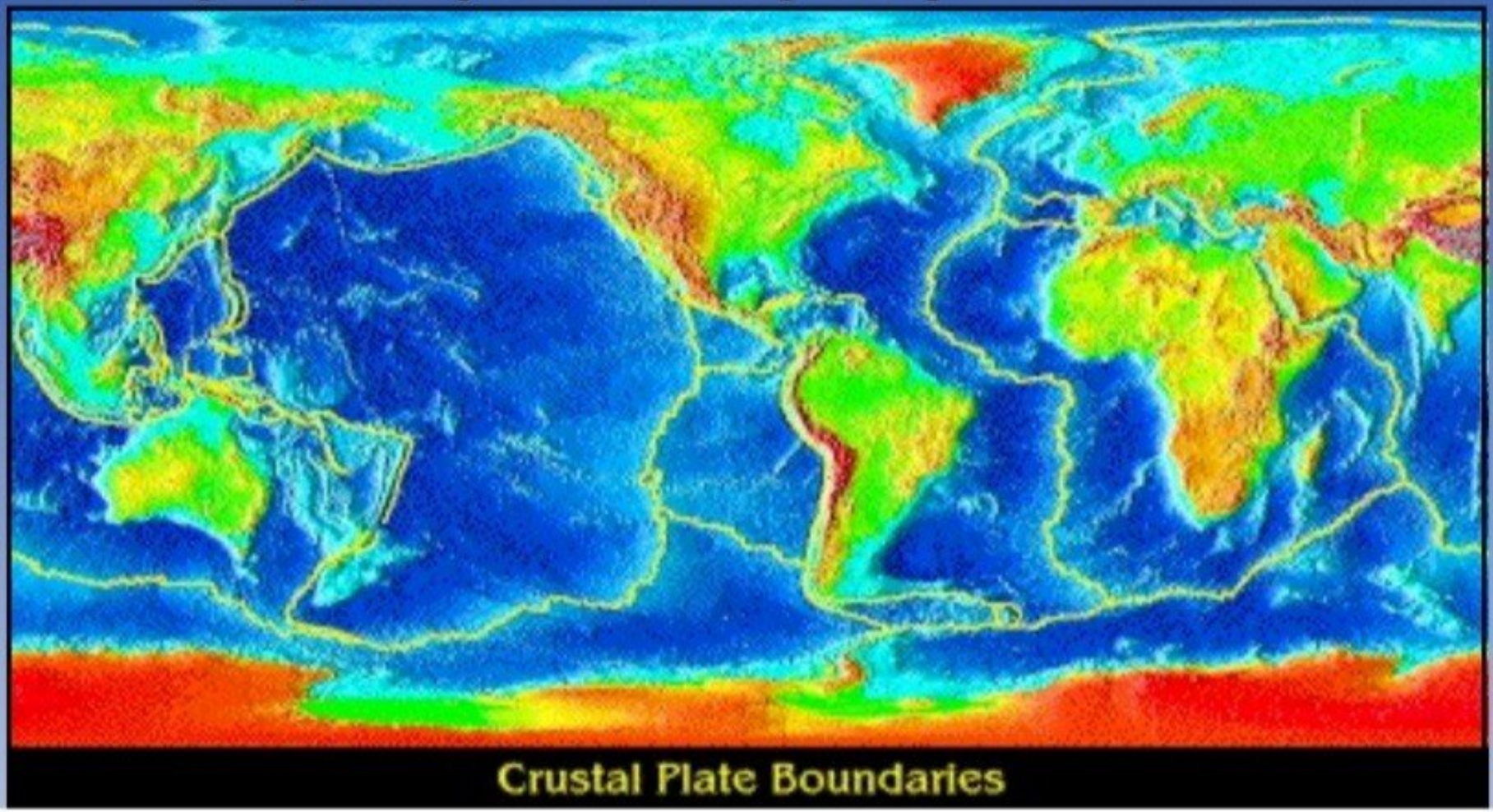
The Rock Cycle

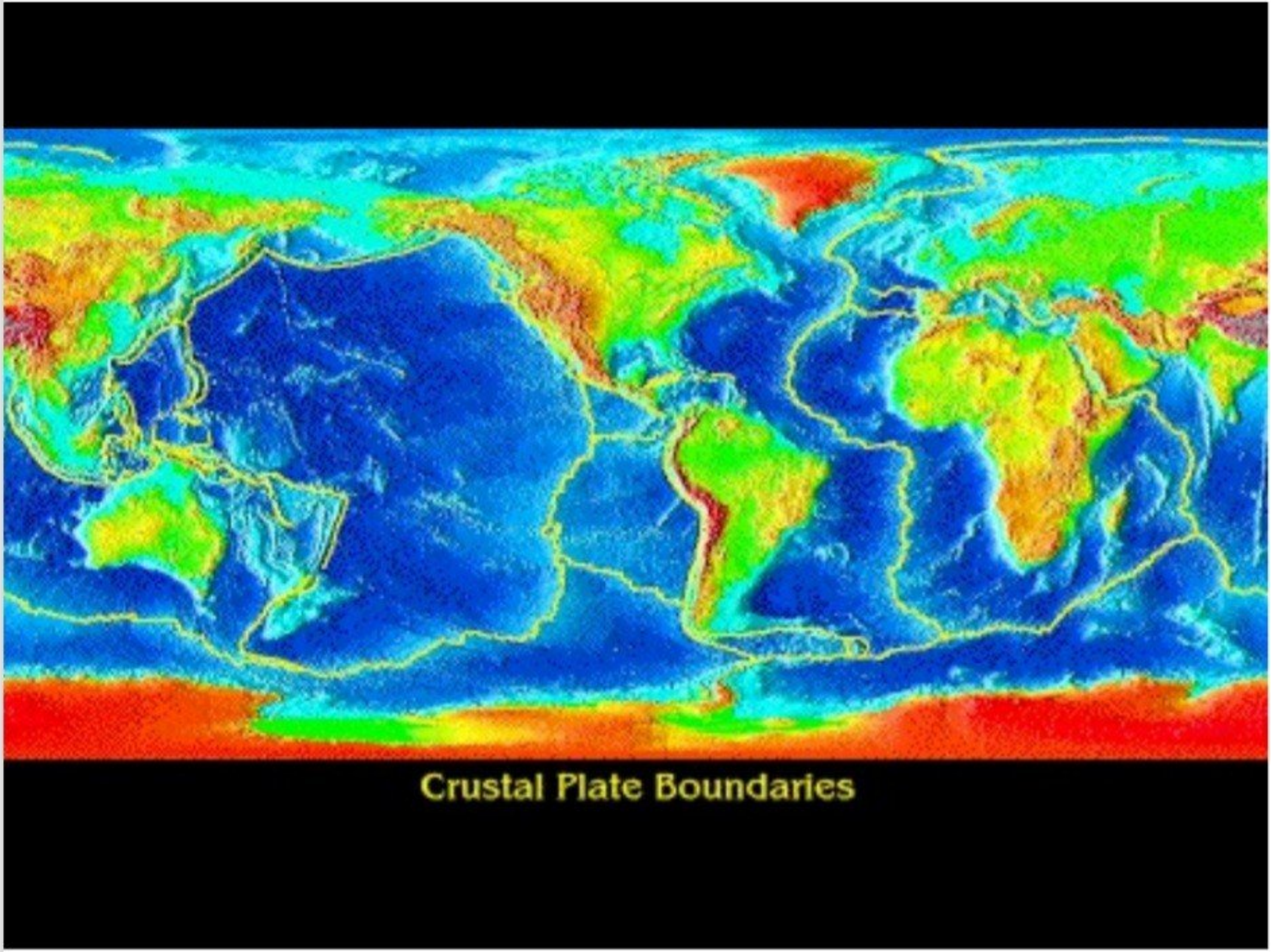


The Face of the Earth

• The continents sit just above sea level, except for the mountain belts, and include continental areas which are slightly covered by the oceans (<100m depth).

• The oceans are about 5km deep in the basins, but run to 10km in the trenches and as shallow as 2km on the mid-ocean ridges. Something systematic is going on to produce these global patterns.




Crustal Plate Boundaries

The Origin of the Earth

The Earth and the other 8 planets and the Sun accreted at about the same time from a vast cloud of dust and gas (nebula).

About 5 billion years ago, the nebula began to gravitationally contract, began to rotate and flattened. Eventually, the Sun ignited (fusion) and the newly formed planets began to differentiate - heavier elements and chemical components sank to the center and rocky material formed the crust. The newly formed planets and moons released gas forming early atmospheres.