

## Global Tectonics (GL1201)

The key principles of plate tectonics are:

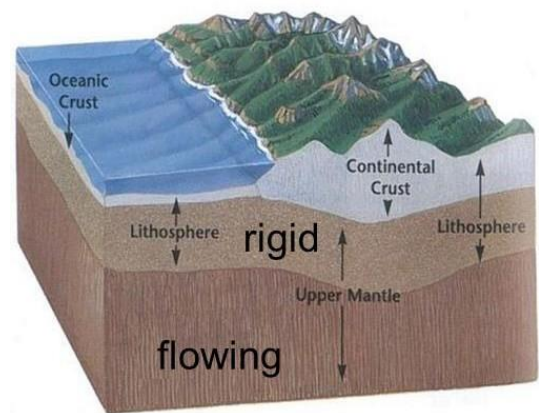
- The Earth's surface is divided into a small number of lithospheric plates (part-spherical caps)
- The plates are internally rigid
- The plates deform only at their boundaries with their neighbours
- The plates move slowly (centimetres / year)
- Relative plate motions are described using rotations

To understand any subject, it is first important to know the definition of commonly used terms:

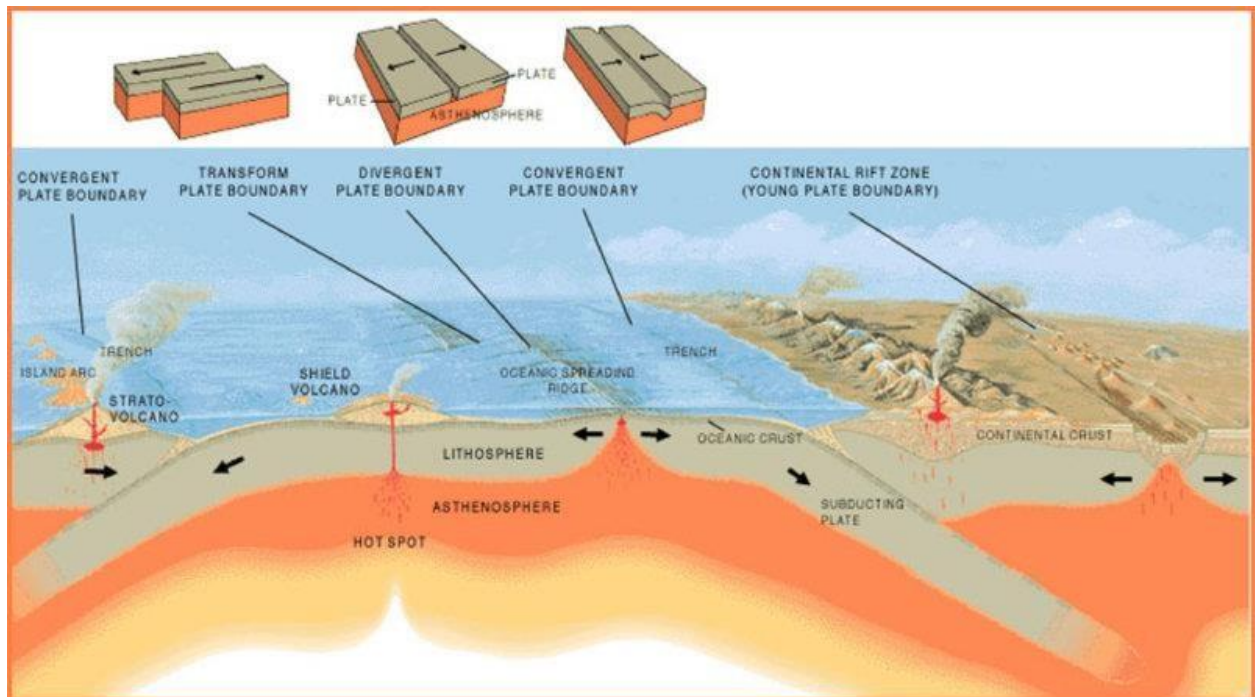
**Lithosphere** – mechanically strong surface layer of the planet: Conducts heat (does not convect) Includes the crust and part of the upper mantle.

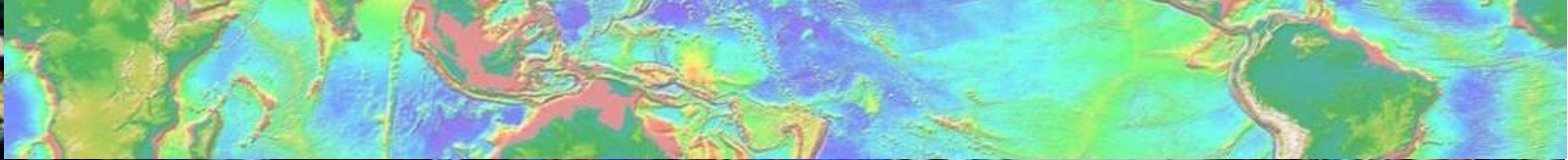
**Asthenosphere** – weaker interior mantle; solid but creeps like a glacier and convects!

**Plates** – internally coherent spherical caps of lithosphere. Deformation at edges where they interact, but not in the plate interior.



Main types of Tectonic Plate boundaries:

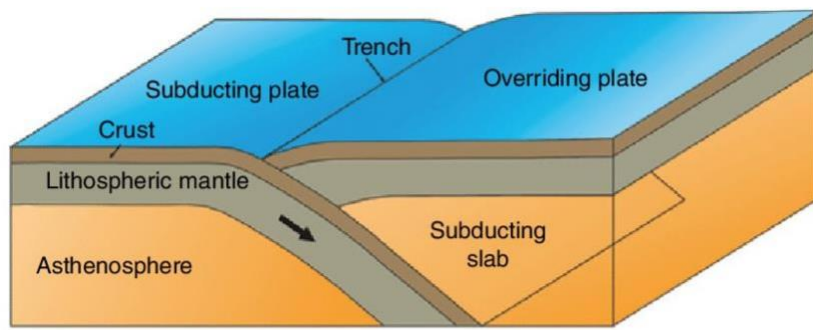




### Convergent:

A Convergent Plate Boundary occurs when two plates come together. Earthquakes and volcanoes are common here as the subduction of oceanic crust creates a volcanic arc.

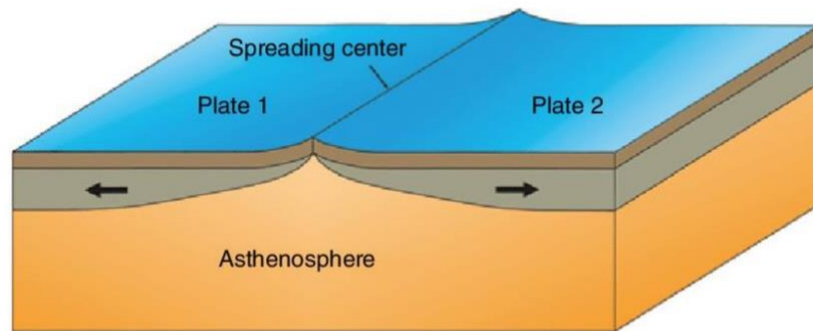
Convergent plate boundary: subduction zone



### Divergent:

A Divergent Plate Boundary occurs when two plates move away from each other. Mid-Ocean Ridges (MORs) are created here and new oceanic crust is formed by rising magma.

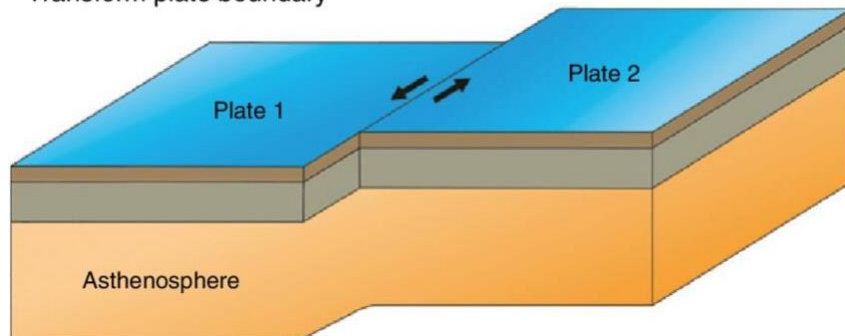
Divergent plate boundary



### Transform:

A Transform Plate Boundary occurs when two plates slide past each other. Earthquakes are common here with the San Andreas Fault being a famous example. These are often formed along MORs.

Transform plate boundary



### Types of crust:

Tectonic plates can be described as either continental plates (formed of continental crust) or oceanic plates (formed of oceanic crust) depending on how and where they are formed.

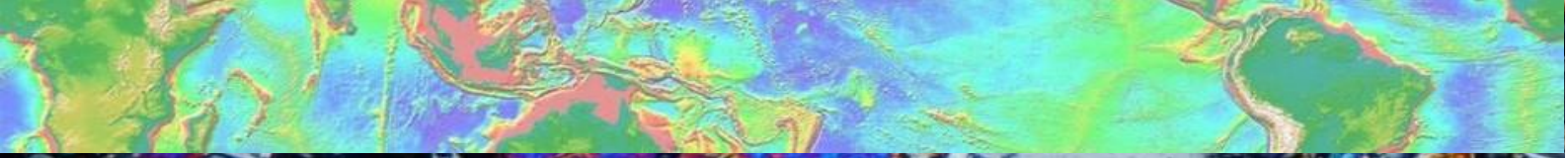
#### Continental crust:

- ~20 to 60km thick
- Mostly composed of granite
- Thicker, less dense, and typically older than oceanic crust

#### Oceanic crust:

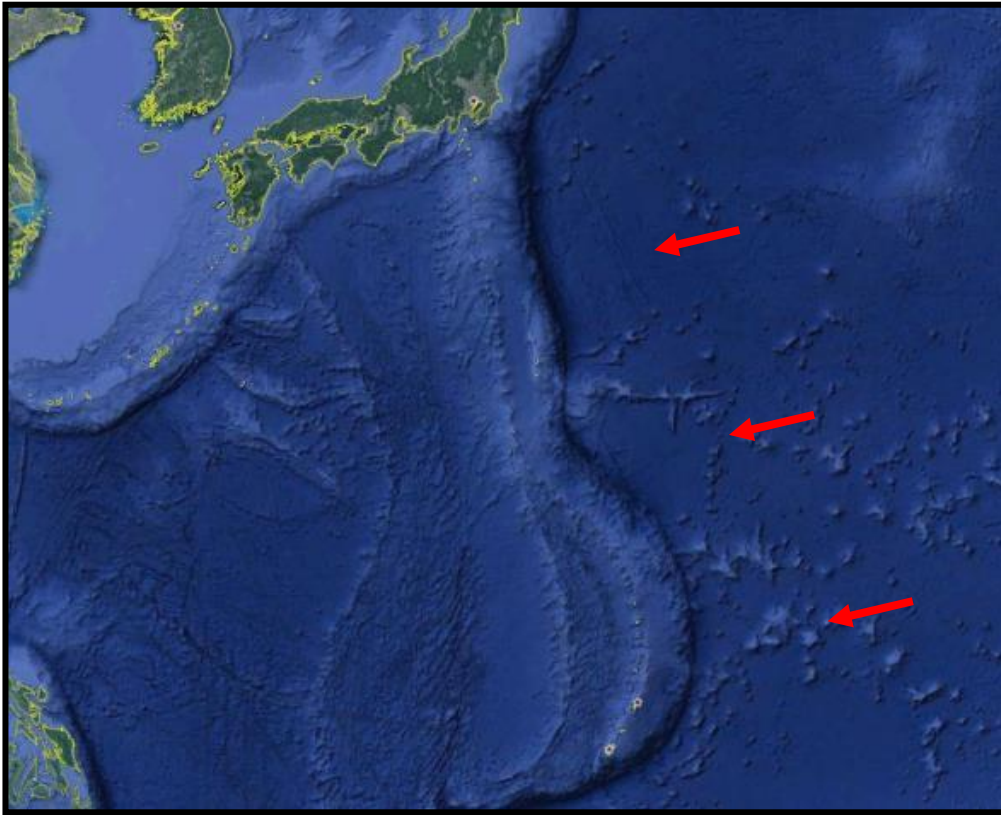
- ~10km thick
- Mostly composed of basalt
- Thinner, denser, and typically younger than continental crust

Want to know more? We recommend 'Chapters 2 and 12; Earth: An Introduction to Physical Geology, Global Edition, Tarbuck et al.'



**Can you identify the types of plate boundary?**

- a) What is the main type of plate boundary shown here? Would there be extensive volcanic and earthquake activity here?



- b) There are two types of plate boundary here that are often associated with each other, can you identify both?

