Plate Tectonics

The Earth’s crust is broken up into pieces called plates.

There are eight main plates:

* African plate
* Antarctic plate
* Eurasian plate
* Indo-Australian plate
* Pacific plate
* Nazca plate
* North American plate
* South American plate

Heat rising and falling inside the mantle creates convection currents generated by radioactive decay in the core. The convection currents move the plates. Where convection currents diverge near the Earth’s crust, plates move apart. Where convection currents converge, plates move towards each other. The movement of the plates and the activity inside the Earth is called plate tectonics.

Plate tectonics cause earthquakes and volcanoes. The point where two plates meet is called a plate boundary. Earthquakes and volcanoes are most likely to occur either on or near plate boundaries.

Because of the temperature difference between the Earth’s surface and outer core and the ability of the crystalline rocks at high pressure and temperature to undergo slow, creeping, viscous-like deformation over millions of years, there is a convective material circulation in the mantle. Hot material upwells, while cooler (and heavier) material sinks downward. Downward motion of material occurs at convergent plate boundaries called subduction zones. Locations on the surface that lie over plumes are predicted to have high elevation (because of the buoyancy of the hotter, less-dense plume beneath) and to exhibit hot spot volcanism. The volcanism often attributed to deep mantle plumes is alternatively explained by passive extension of the crust, permitting magma to leak to the surface (the “Plate” hypothesis).

The convection of the Earth’s mantle is a chaotic process (in the sense of fluid dynamics), which is thought to be an integral part of the motion of plates. Continental drift is the movement of the crustal components of the continents. The movements of the lithosphere and the underlying mantle are coupled since descending lithosphere is an essential component of convection in the mantle. The observed continental drift is a complicated relationship between the forces causing oceanic lithosphere to sink and the movements within Earth’s mantle.