

TYPES OF CRUSTAL MATERIAL

It is important to keep in mind when discussing plate tectonics that the crust of the Earth is composed of two basic types of crustal material. We refer to these as **continental crust** and **oceanic crust**.

These types of crust differ in several ways. While both are made mostly of igneous rocks (that is, rocks that solidify from molten material), they have different compositions. Ocean crust is composed of the rock **basalt**, a dark, dense igneous rock



image courtesy Northeastern University

This rock is not similar in any way to salt (NaCl), although many people are confused because of the similarity of their names. Basaltic rock is made at divergent zones when magma from the asthenosphere rises to the surface of the Earth. When the magma hits the cold ocean waters, the material cools relatively rapidly and forms new crust along the site of the divergent zone.



image courtesy USGeological Survey

The image above shows a piece of heated magma in the process of cooling into basalt.

Continental crust consists mostly of granite, a less dense, lighter in color, igneous rock.



image courtesy James Madison University

Differences in chemical composition between the two types of rocks accounts for the different appearance and density. The difference in density is critical in understanding plate tectonics.

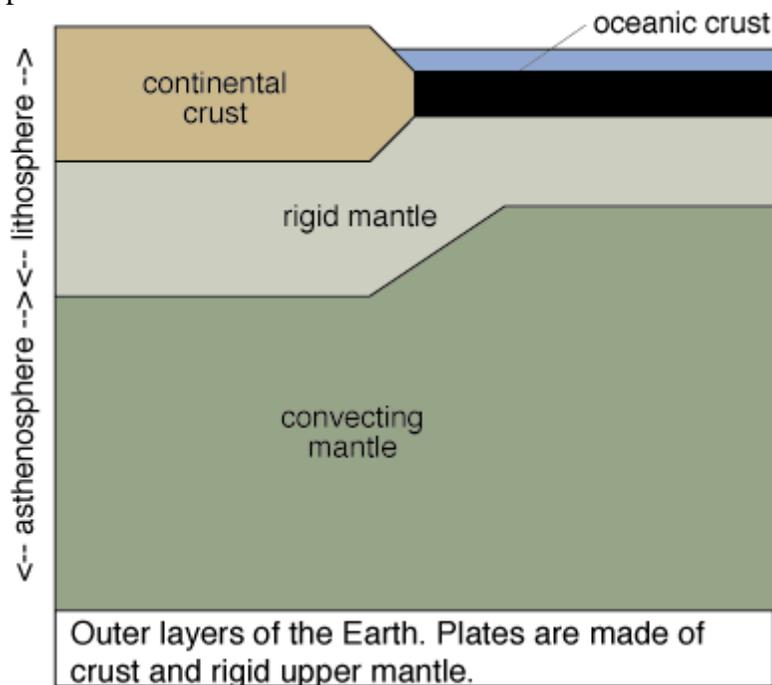


image courtesy Univ. North Dakota Volcano World

Because the lithosphere floats on the partially fluid asthenosphere, the denser basaltic ocean crust sinks lower into the asthenosphere than the less dense granitic continental crust. This is the reason why continents are higher than ocean basins; the basins would exist whether or not there was any water on the Earth. Their existence derives from the greater density of basalt. When we study the different types of [convergent zones](#), we will need to remember that ocean crust is denser than continent. This explains why it is ocean crust that sinks (subducts) back into the mantle in an ocean crust/continental crust collision, as well as explains why continent/continent collisions produce no subduction. Rather, such collisions result in tall continental mountain ranges, of which the Himalayas is the most striking example.