

CHAPTER 14 - CONVERGENT BOUNDARIES: MOUNTAIN BUILDING AND THE EVOLUTION OF CONTINENTS

- The process of producing a mountain belt is called **orogenesis**.
- Earth's less dense continental crust "floats" in the more dense asthenosphere. This is not unlike an iceberg floating in water. The concept of the crust floating in gravitational balance (that is, at a level determined by its density relative to the underlying asthenosphere – the less dense the crust, the higher it floats) is known as **isostasy**.
- When mountain belts are crumpled up, they also crumple *down* to produce deep crustal "**roots**" that help support the thicker crust floating in the asthenosphere.
- As mountain belts are removed by erosion, the continent bobs up higher in response to the removal of overlying weight, in order to maintain **isostatic equilibrium**. Similarly, if a large mass is "rapidly" put onto the crust (like a huge new stratovolcano or glacial ice sheets), the crust will slowly sink farther into the asthenosphere to maintain equilibrium. The continents are still **rebouncing** (bobbing back up) after the removal of glaciers from the last ice age by about 10,000 years ago.
- Most mountains consist of roughly parallel ridges of crumpled up metamorphosed crust produced by compressional forces at convergent boundaries.
- At ocean-continent convergent boundaries, wrinkled up mountain belts with arcs of volcanoes produced by melting of the subducting oceanic plate form.
- At continent-continent convergent boundaries, only crumpling up, often to very large heights and crustal thicknesses, can occur. This produces huge mountain belts like the Alps and Himalayas.
- Over large amounts of geologic time, small crustal fragments can get slapped onto the edges of continents at ocean-continent convergent boundaries. These fragments are added to the continent by a process called **accretion**, producing a mountain belt and adding to the size of the continent. In this way, continents can grow over time.
- It is still not clear whether most continental material formed early in Earth's history with only minor later accretion, or if accretion has gradually built up the continents to the size we see today.