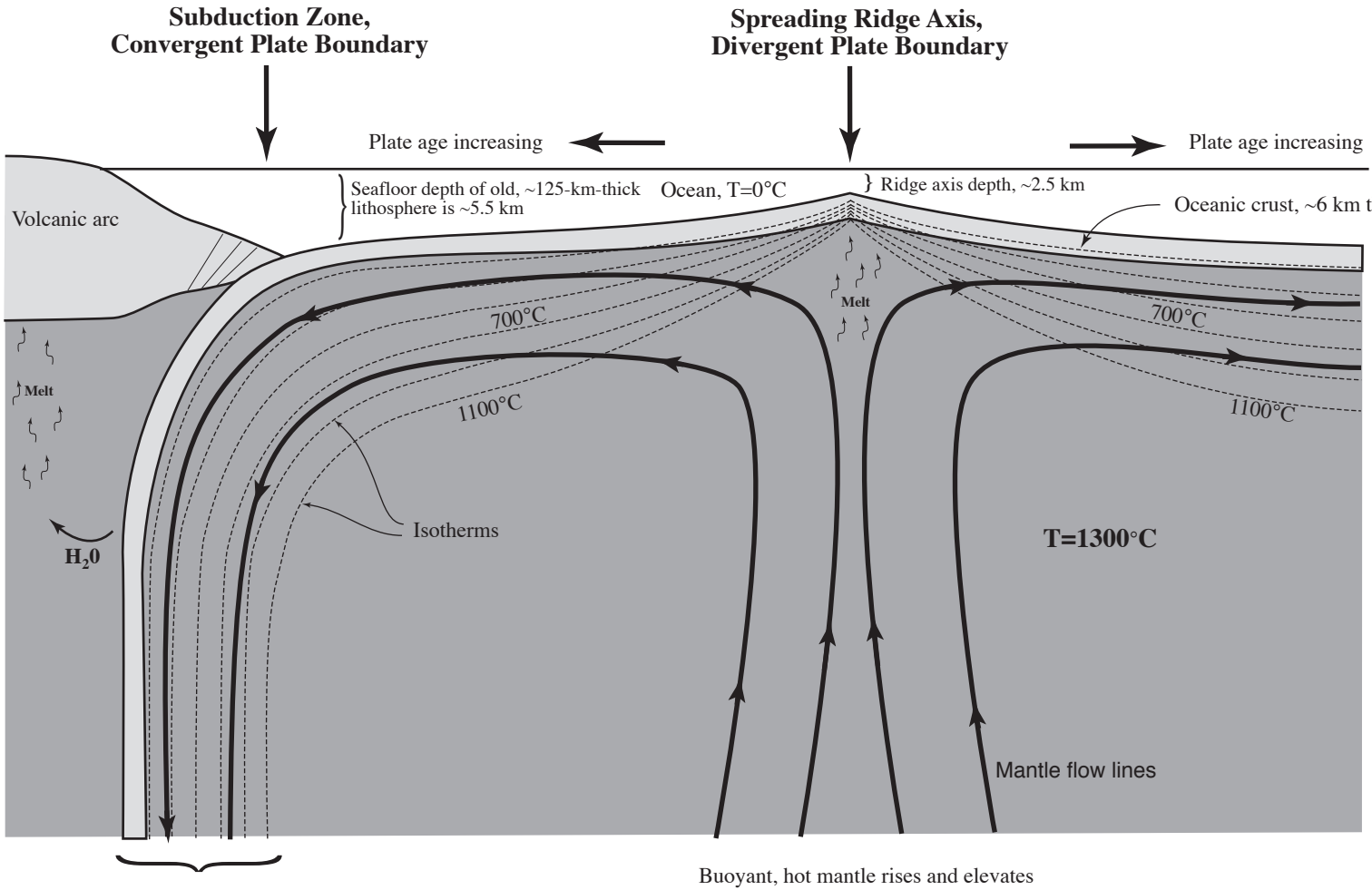

Lithosphere - Earth's upper thermal boundary layer. Thickens with age due to conductive cooling and includes the crust and upper mantle. The base of the lithosphere is generally taken to be the 1100°C isotherm. Oceanic lithosphere approaches an asymptotic thickness of ~125 km after 80 million years. Continental lithosphere can be much thicker, but we're not sure why.

Old, cold (and therefore dense) lithosphere sinks down into the mantle. The sinking lithosphere is referred to as a **slab**, and the sinking of the slab is referred to as **subduction**. Subducting slabs provide a pulling force referred to as **slab pull**. Slab pull helps drive the motion of the surface plates, which are contiguous sections of lithosphere

Buoyant, hot mantle rises and elevates the ridge axis relative to surrounding, cooler lithosphere. The gravitational potential of the elevated ridge provides a so-called **ridge-push** driving force for plate motion.

Note: The melting that occurs at convergent and divergent plate boundaries is a consequence of mantle convection, but this melting does not drive convection in any way. At subduction zones, water released from the subducting slab lowers the melting temperature of the mantle rocks inducing a small amount of melting. At spreading centers, rocks that were stable at high pressures are unstable at lower pressures near the surface and so melt a small amount. When mantle rocks melt, that melt rises quickly to the surface to produce crust.

The deepening of the seafloor as a function of lithospheric age is referred to as **thermal subsidence**. As the thermal boundary layer thickens and becomes more dense, it sinks down. If bathymetry is plotted as a function of seafloor age, the trend follows an age to the one-half power, or $t^{1/2}$, relationship.