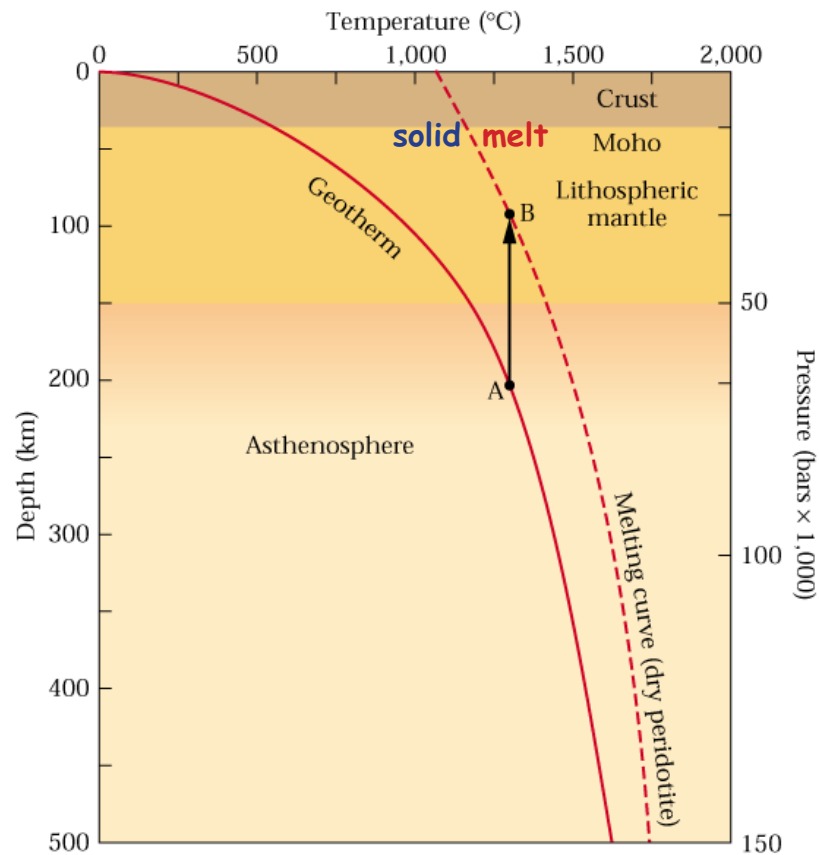


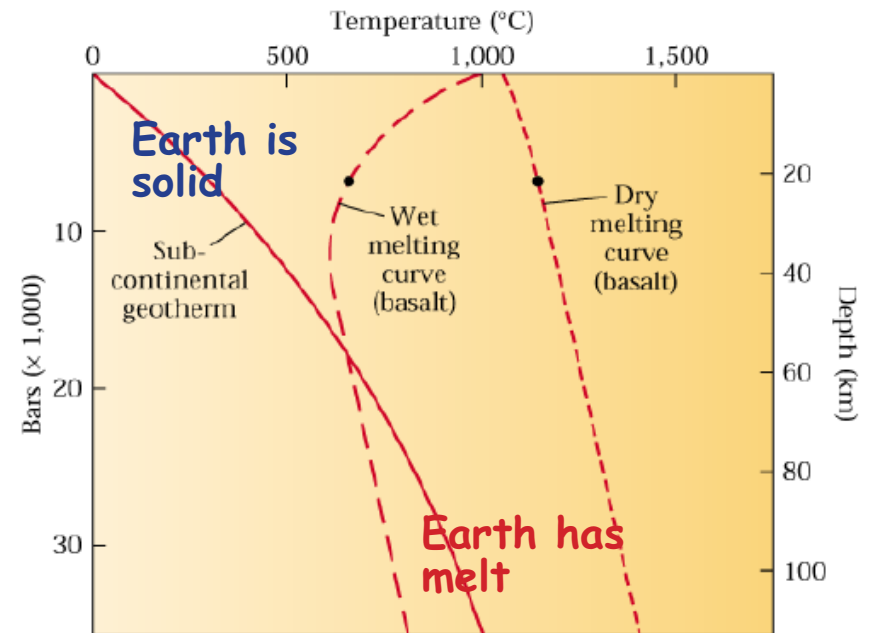
What Causes a Rock to melt?

Decompression Melting
(major melting agent at mid-ocean ridges)



This diagram shows the geotherm, the temperature inside the Earth, as function of depth (solid line). It also shows the melting curve of Peridotite, the rock in the upper mantle). The geotherm is left of the melting curve, so the rock is solid. When rock starts at depth A and ascends to depth B, it crosses the melting curve, so rock starts to melt.

Addition of Volatiles
(major melting agent at subduction zones)



Injection of water lowers the melting curve of Basalt/Gabbro. In a dry environment, the geotherm stays left of the melting curve of Basalt/Gabbro, so the rock is solid. In a wet environment, the geotherm crosses the melting curve, so the rock melts at depths below 20km.

NB: Peridotite is a Plutonic rock that has a little less SiO₂ than Gabbro/Basalt. Peridotite is in the mantle, while Gabbro is in the crust.

(the crust is between 12 and 70km thick)