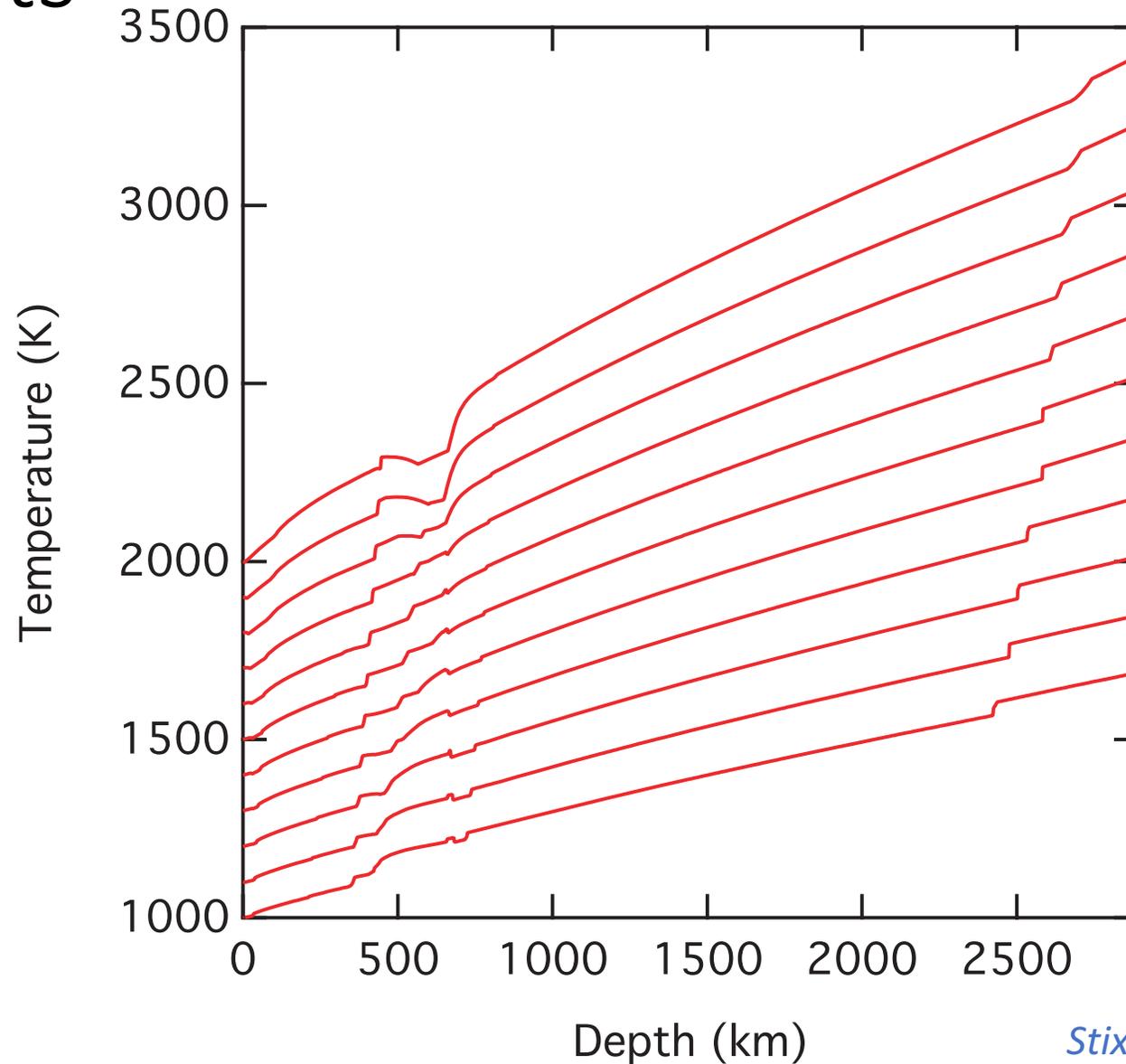


The Geotherm

Lars Stixrude

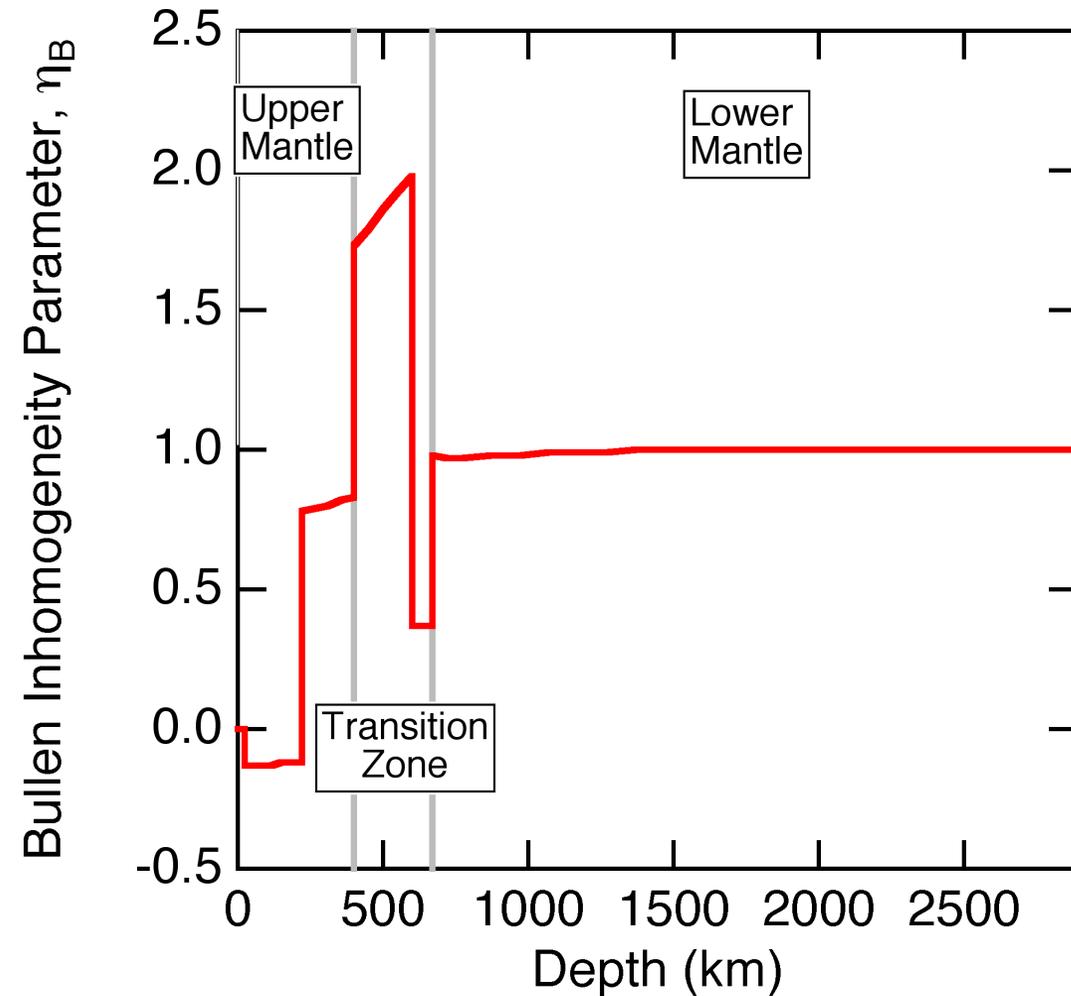
University College London

Adiabats



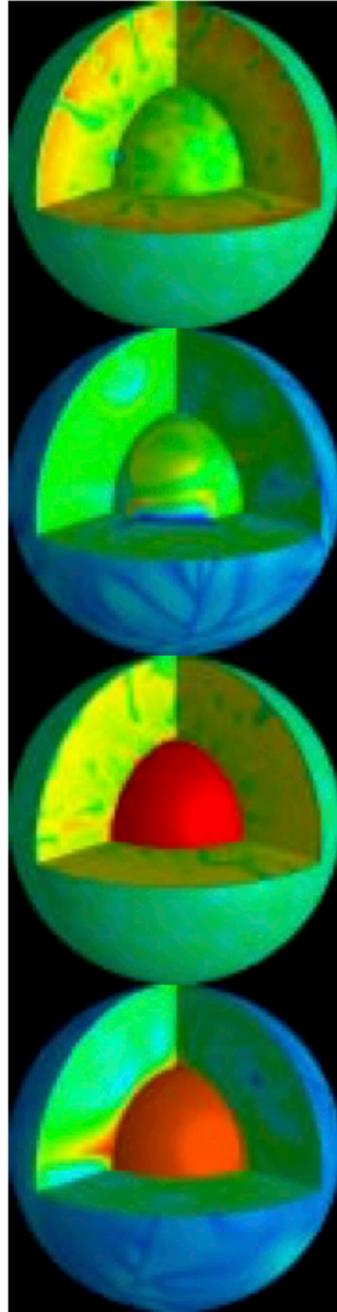
$$\left(\frac{\partial T}{\partial P}\right)_S = \frac{\gamma T}{K_S}$$

Adiabatic? Beware...

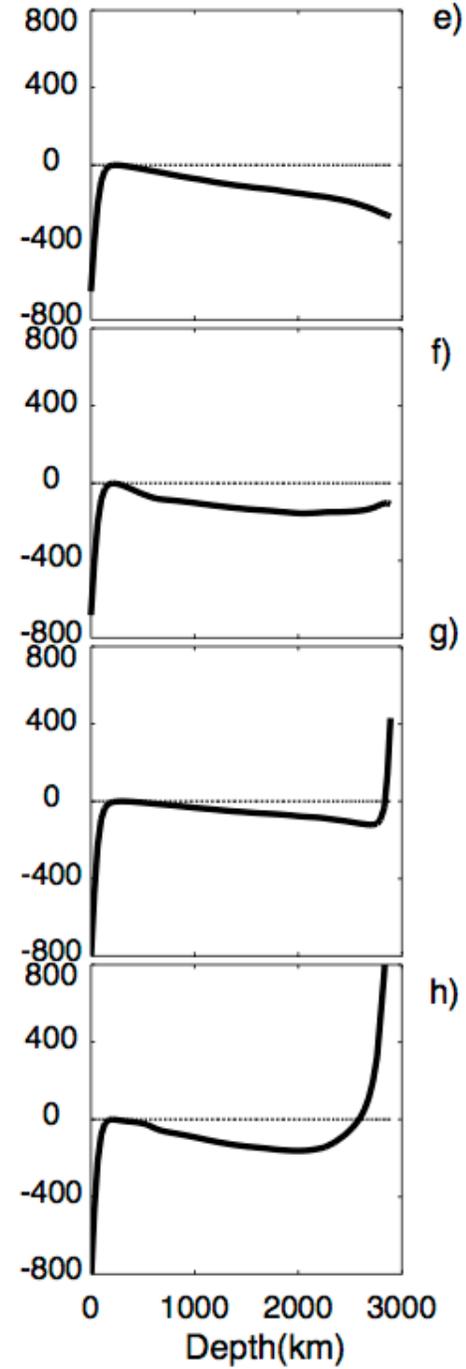


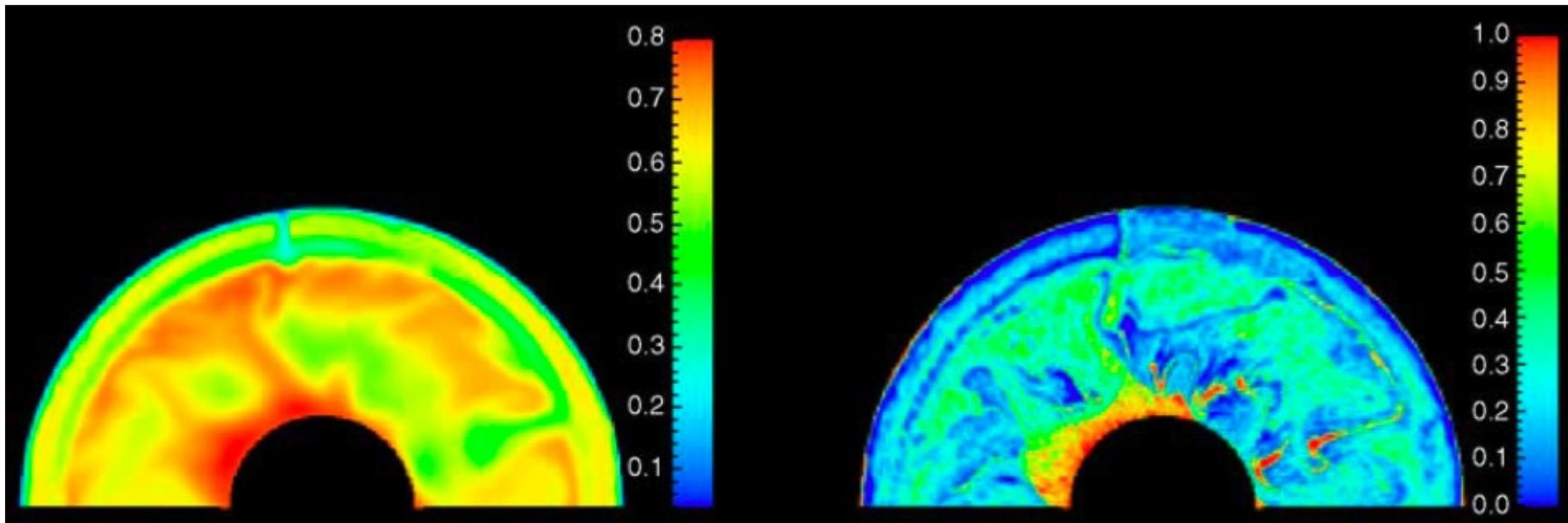
$$\eta_B = \frac{\phi}{\rho g} \frac{\partial \rho}{\partial r} = \frac{K_S}{K_E}$$

Temperatures

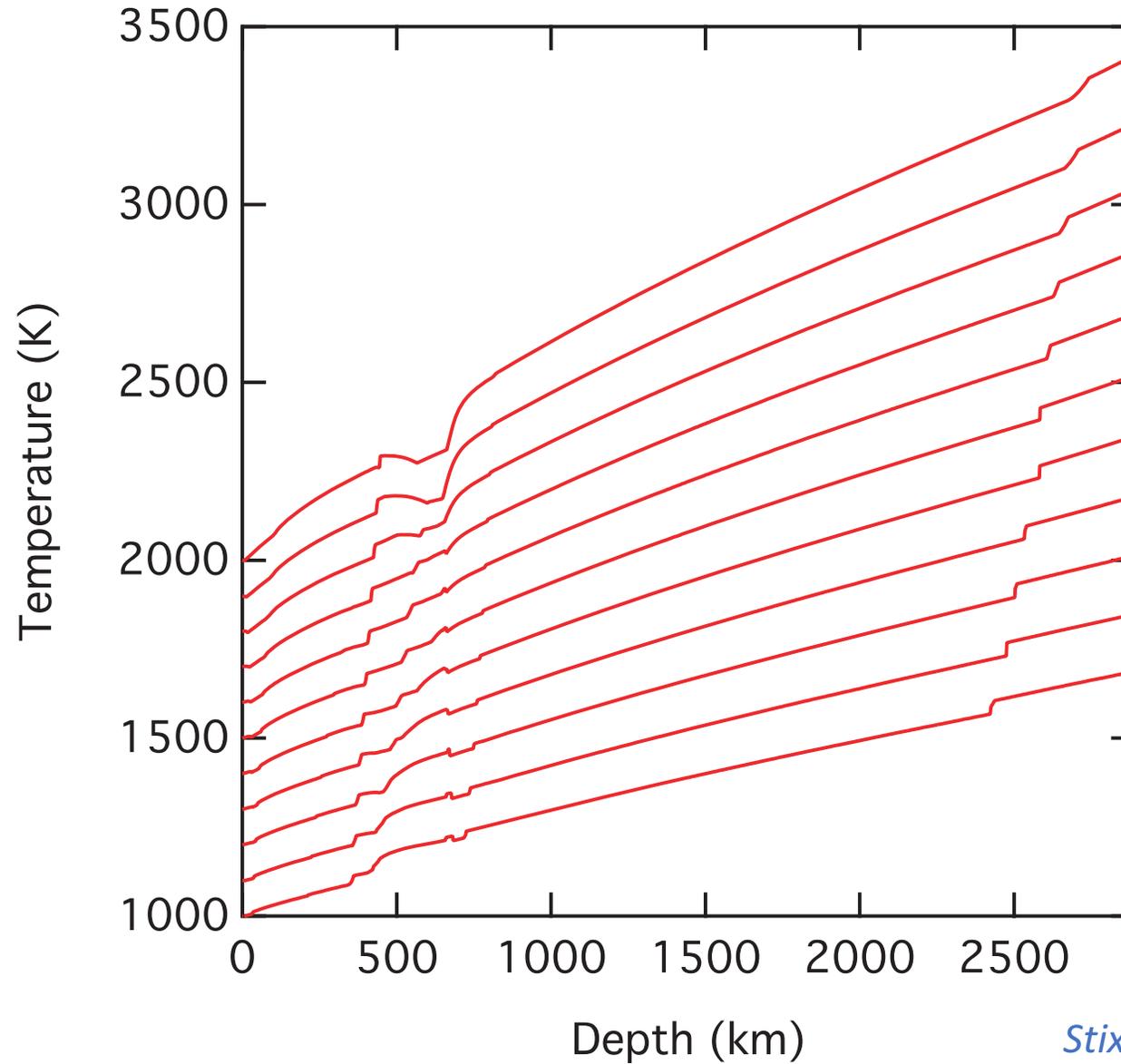


Geotherms

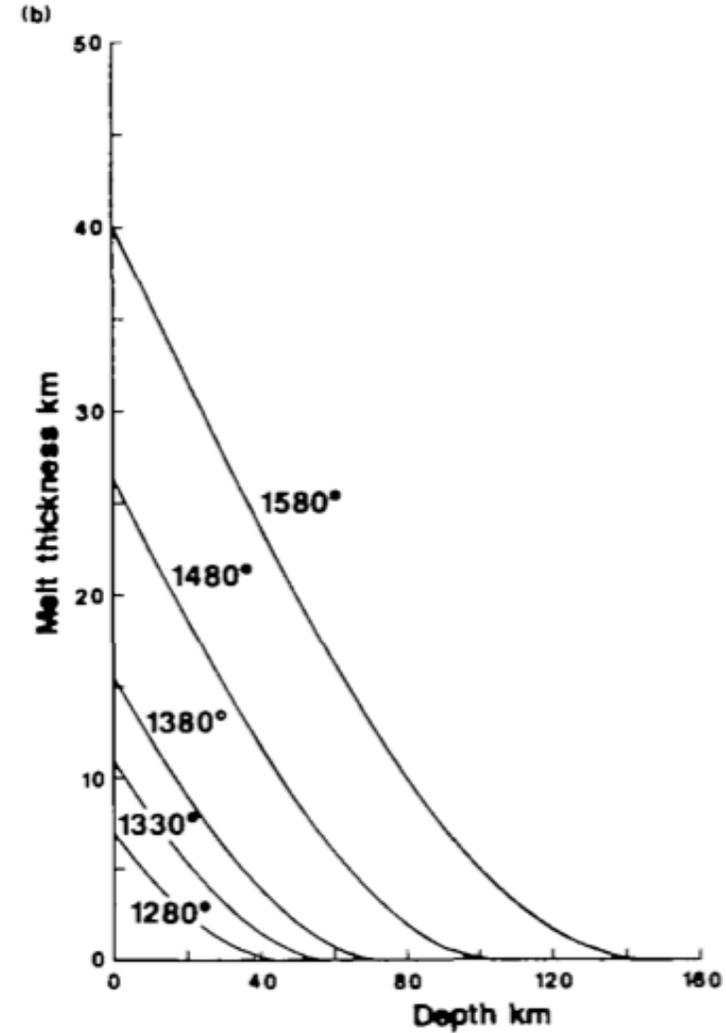
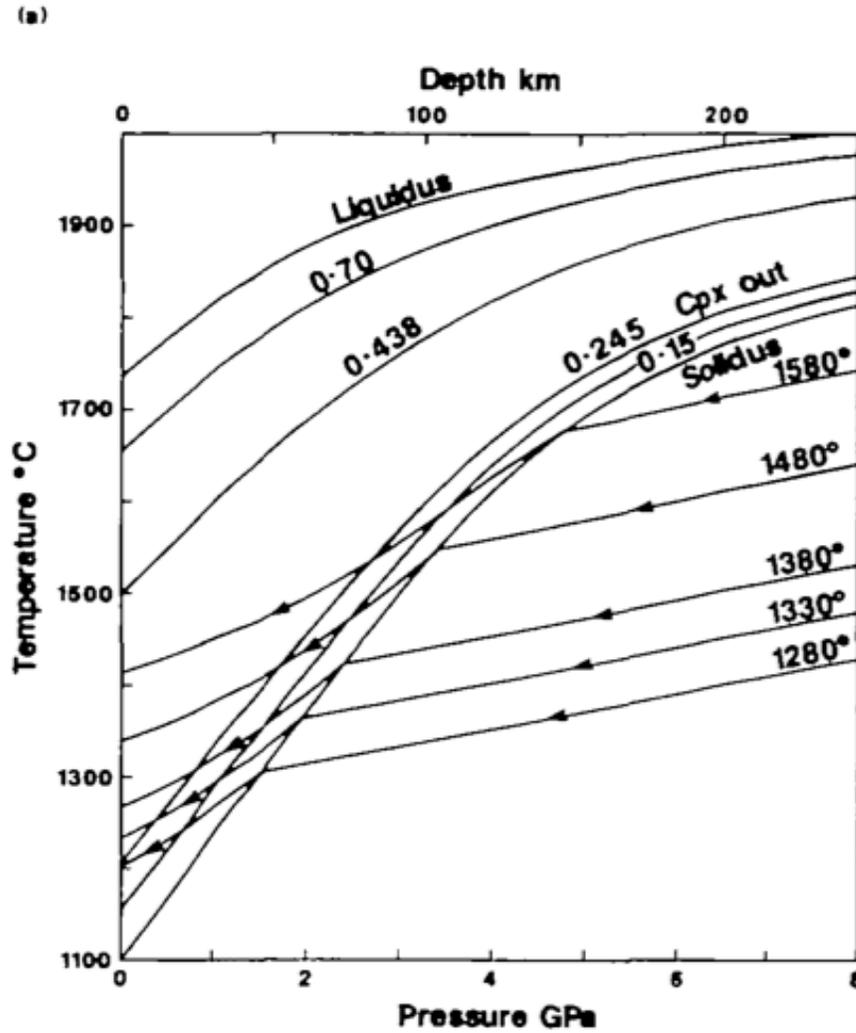


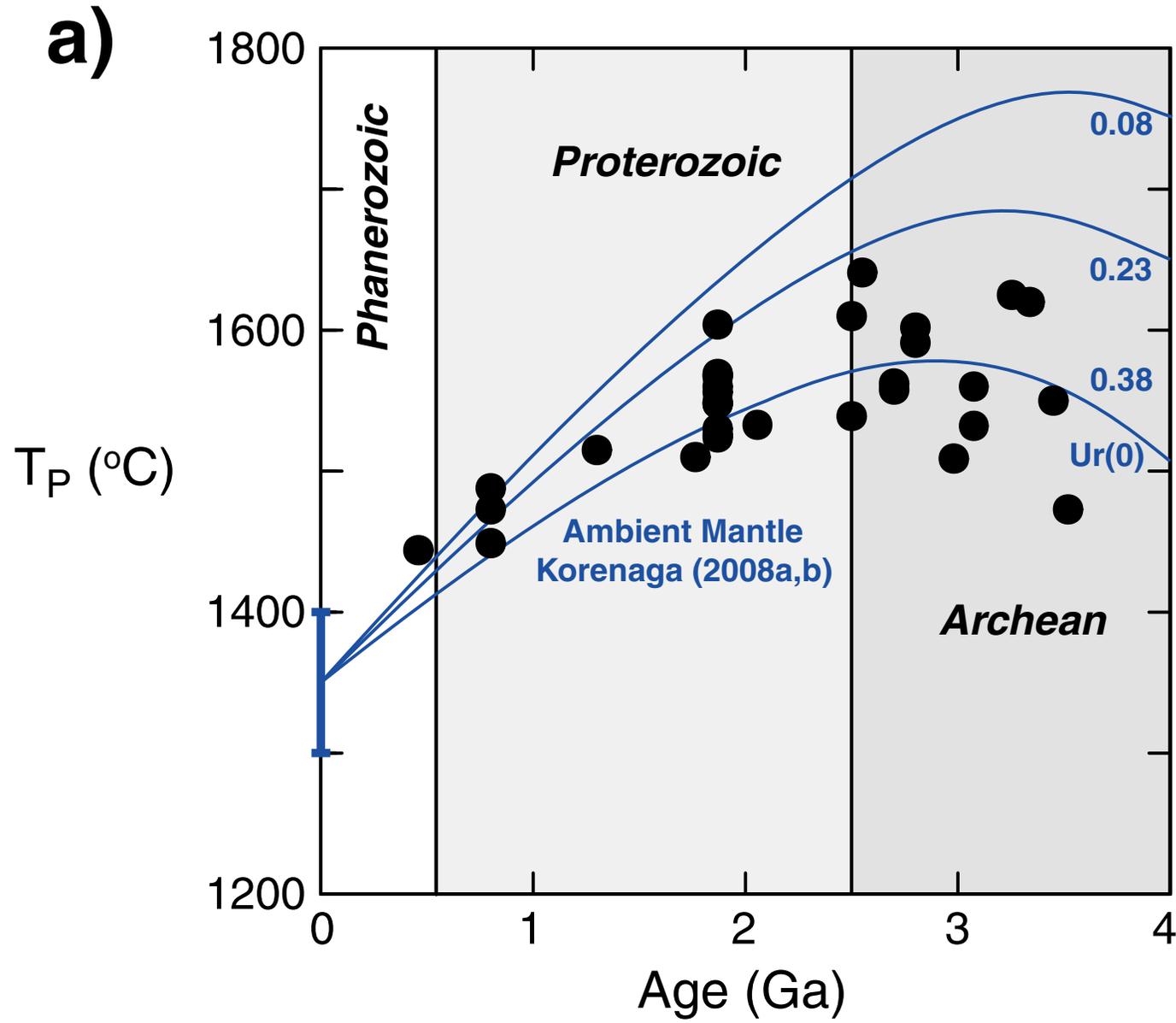


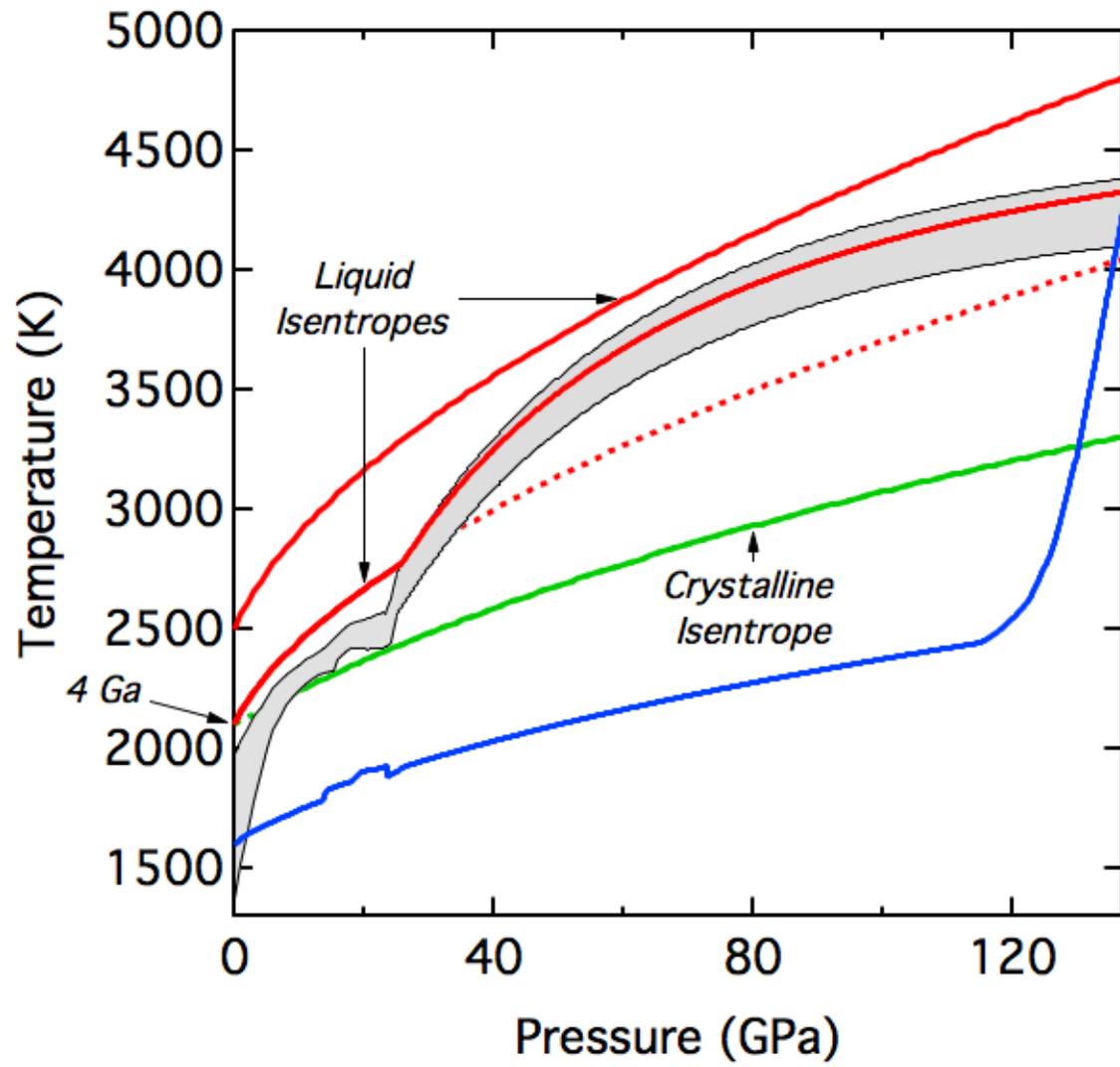
Which one?

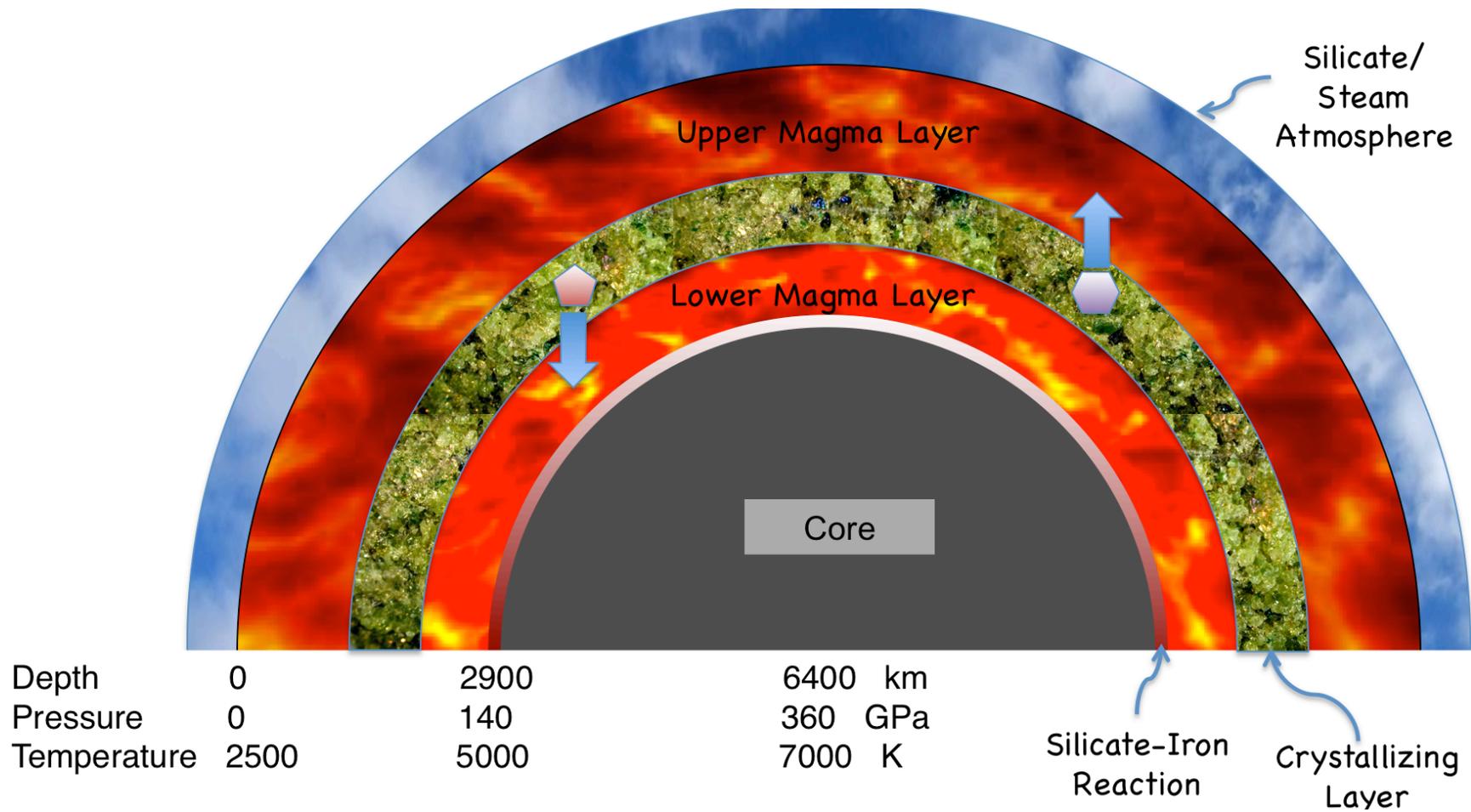


Melting

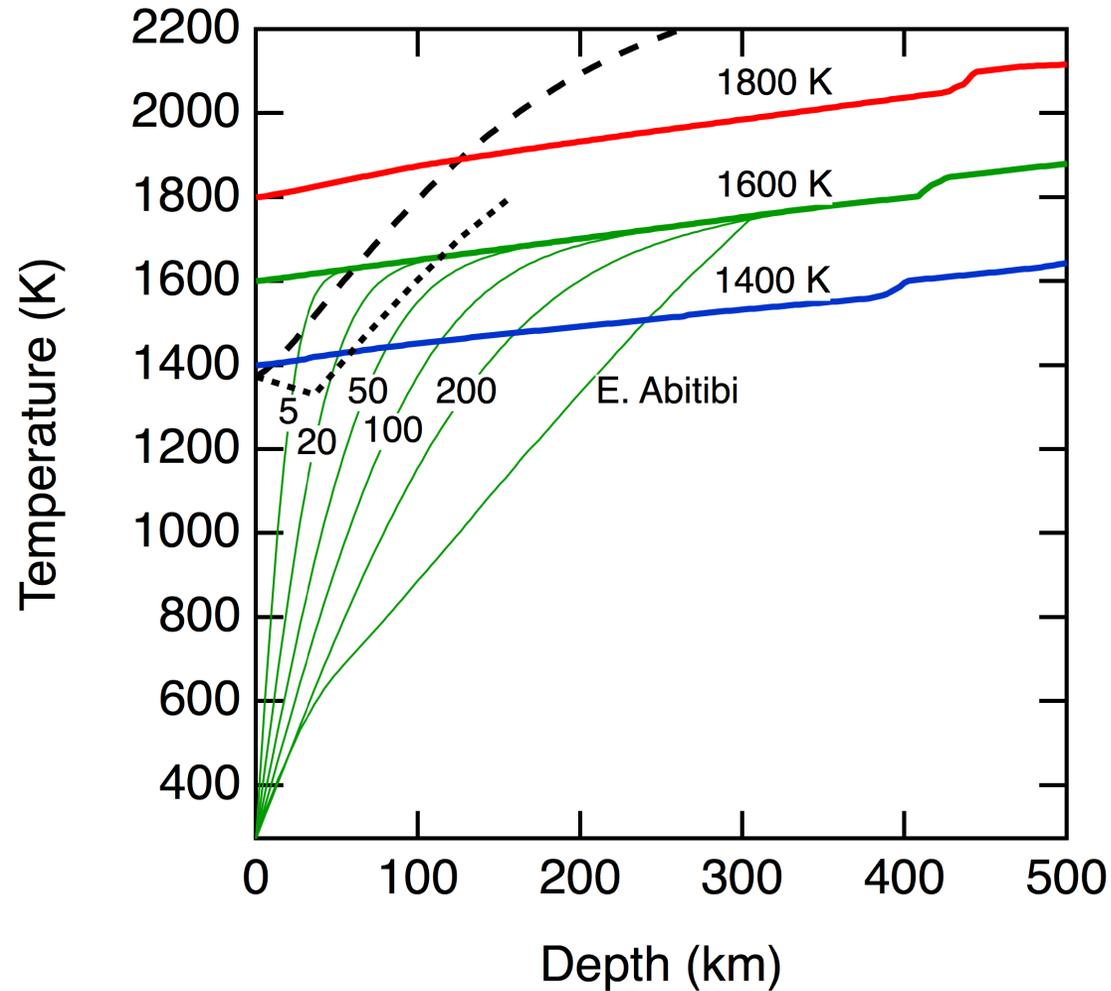


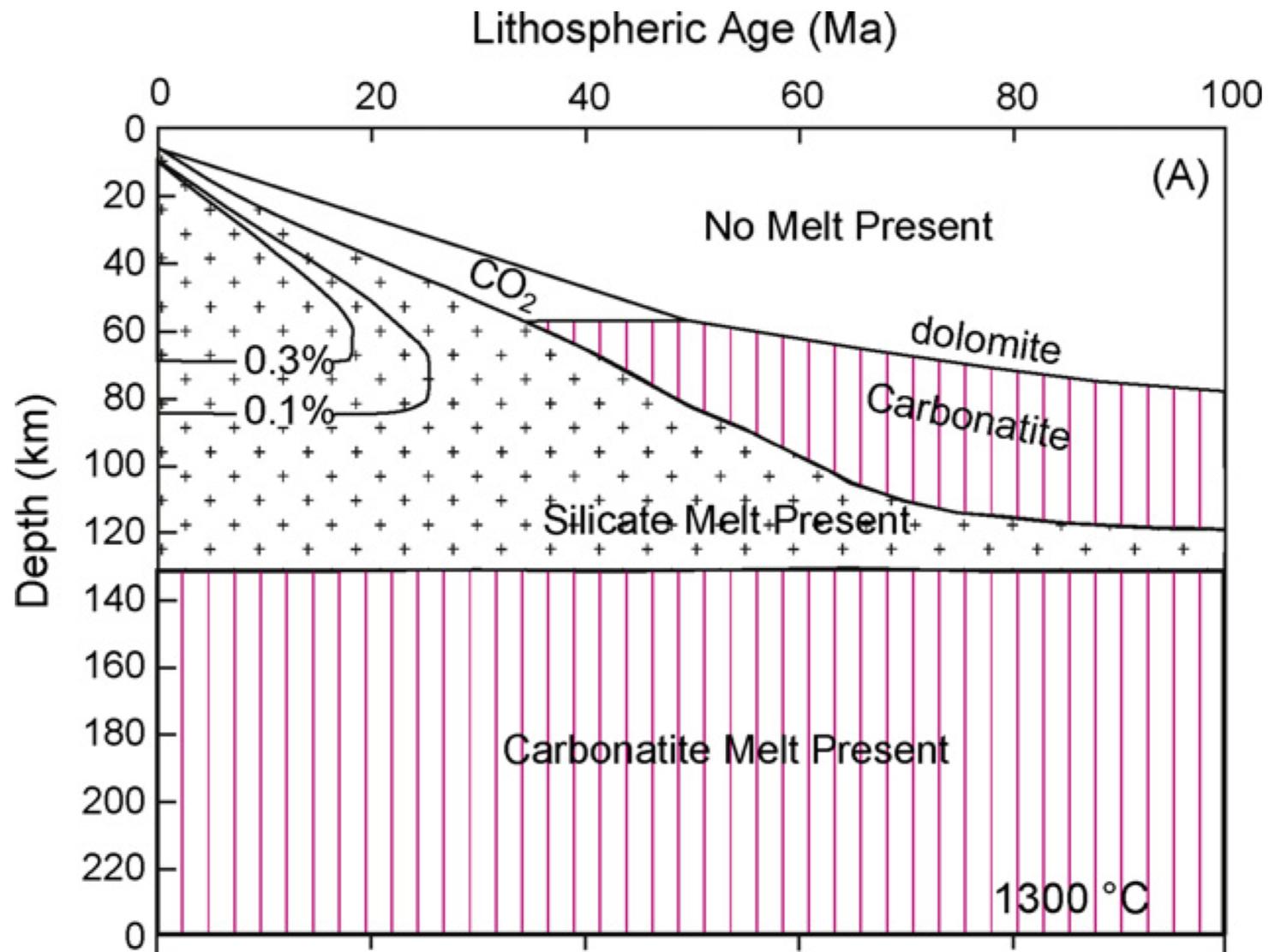




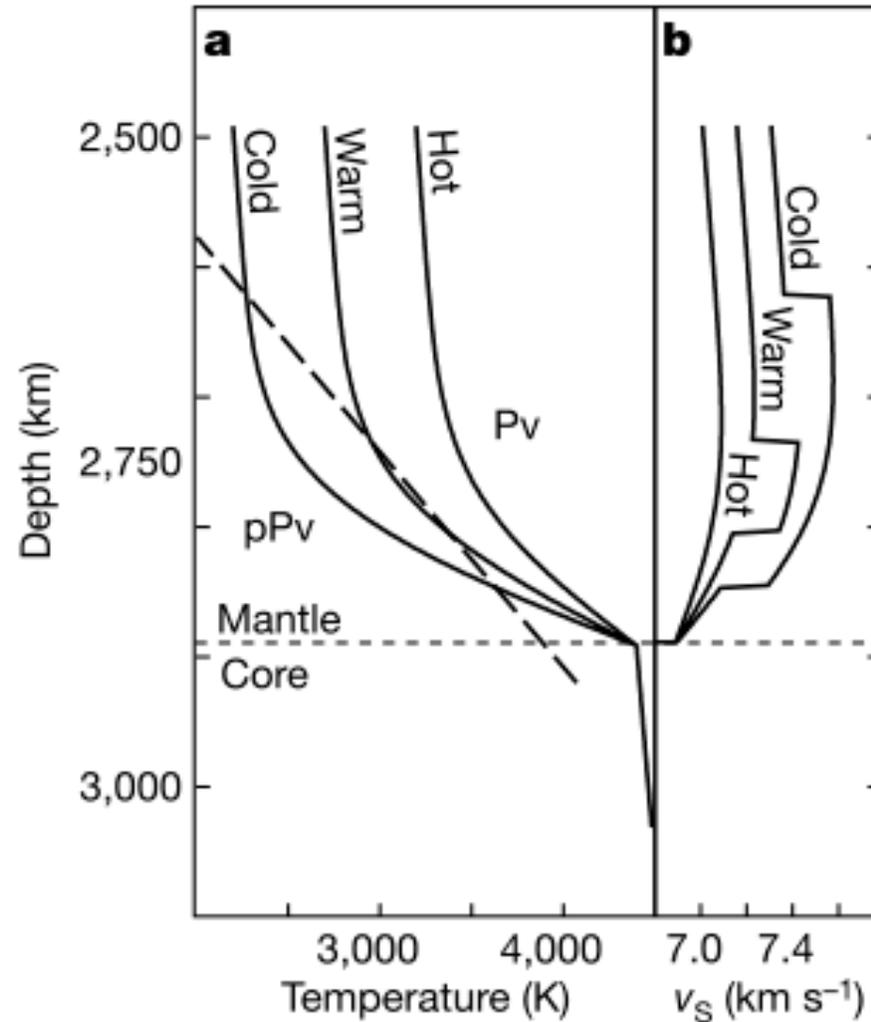


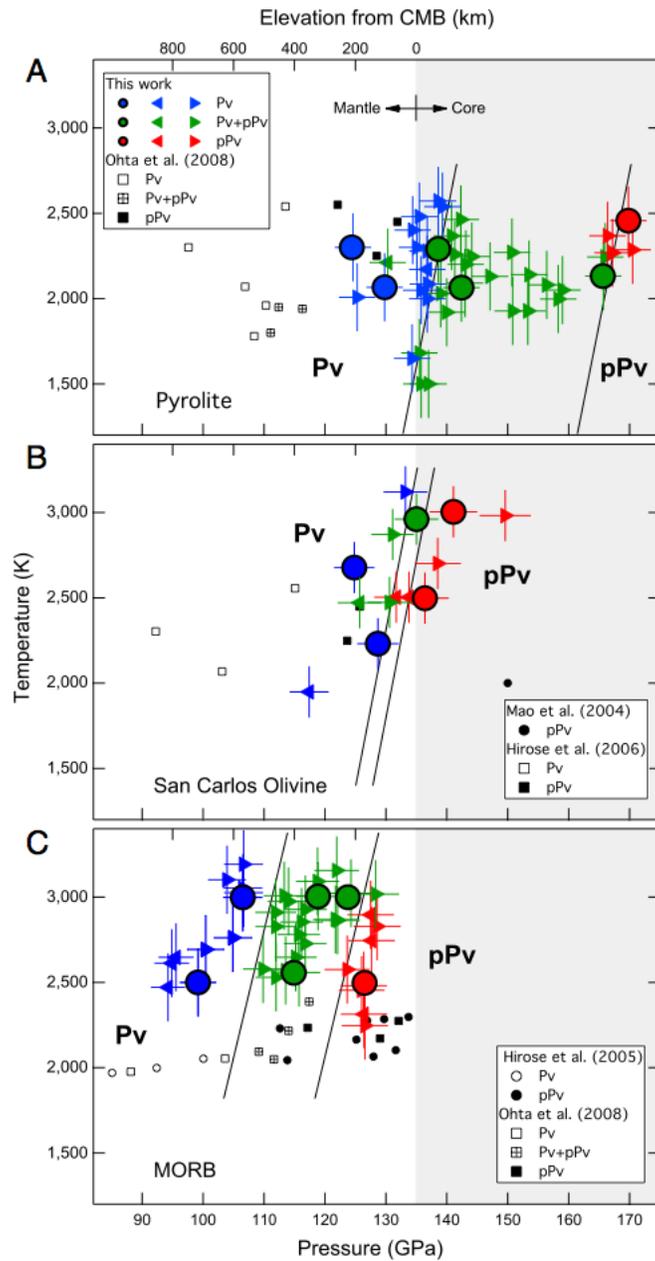
Upper thermal boundary layer

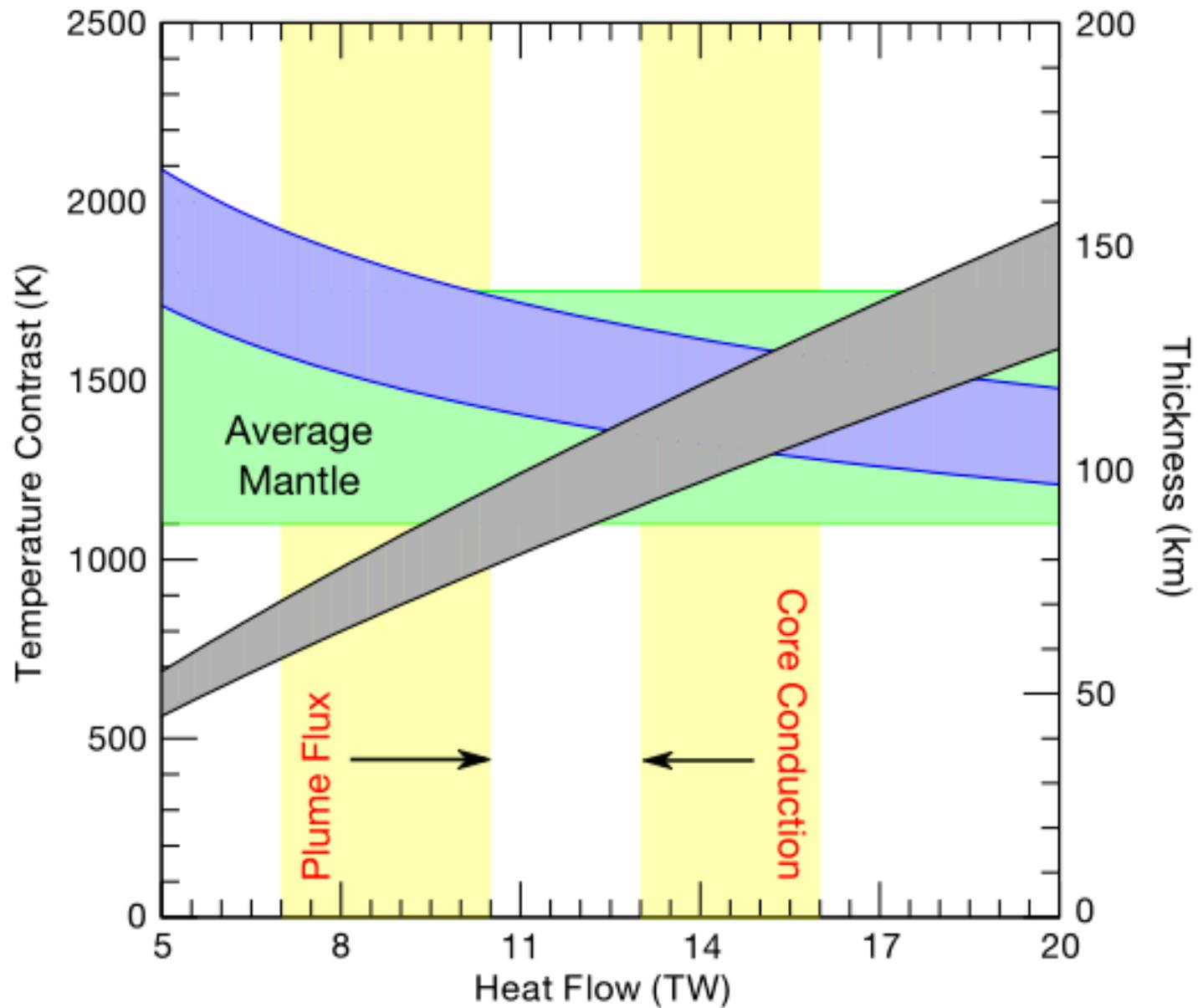




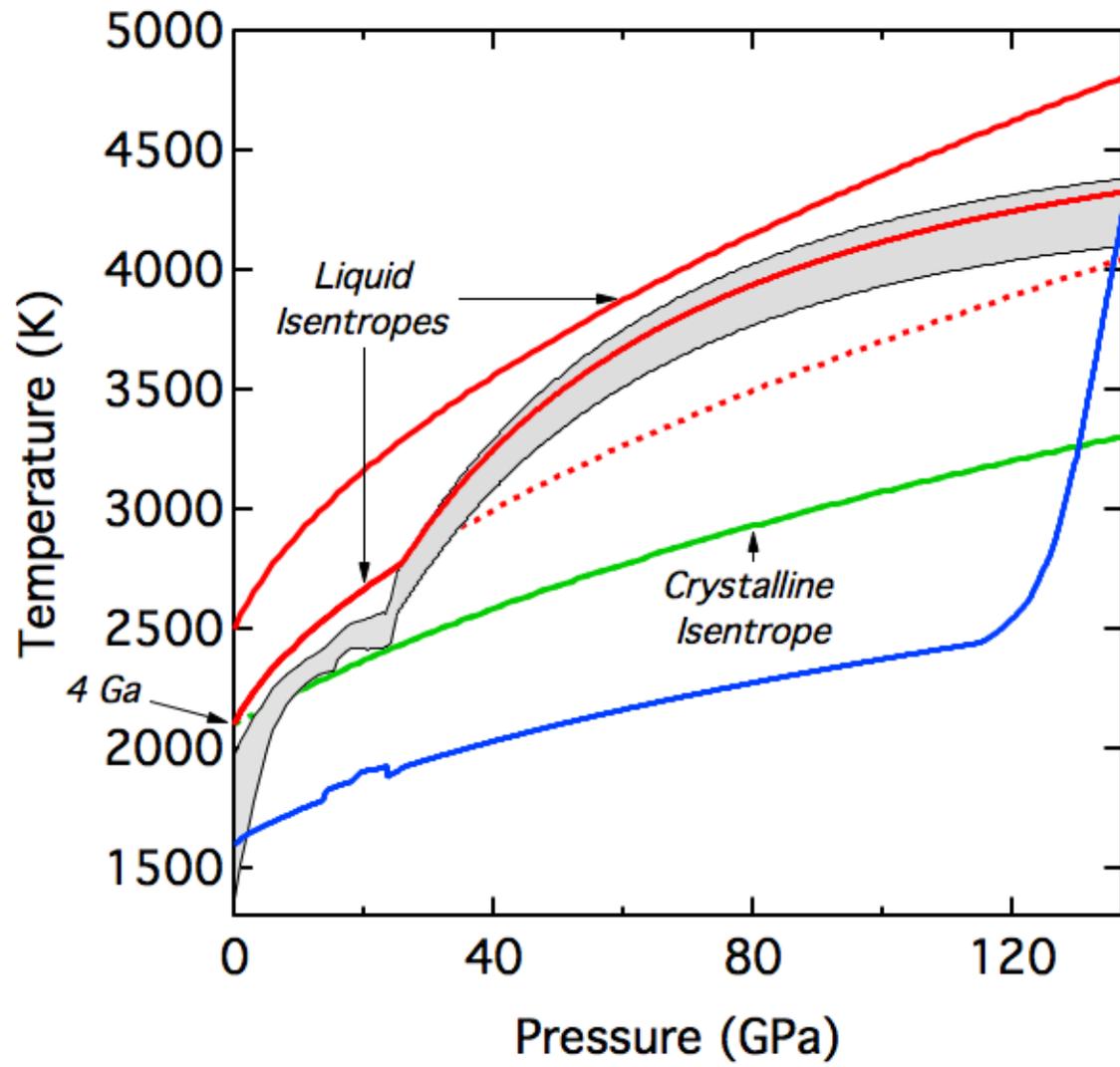
Lower thermal boundary layer



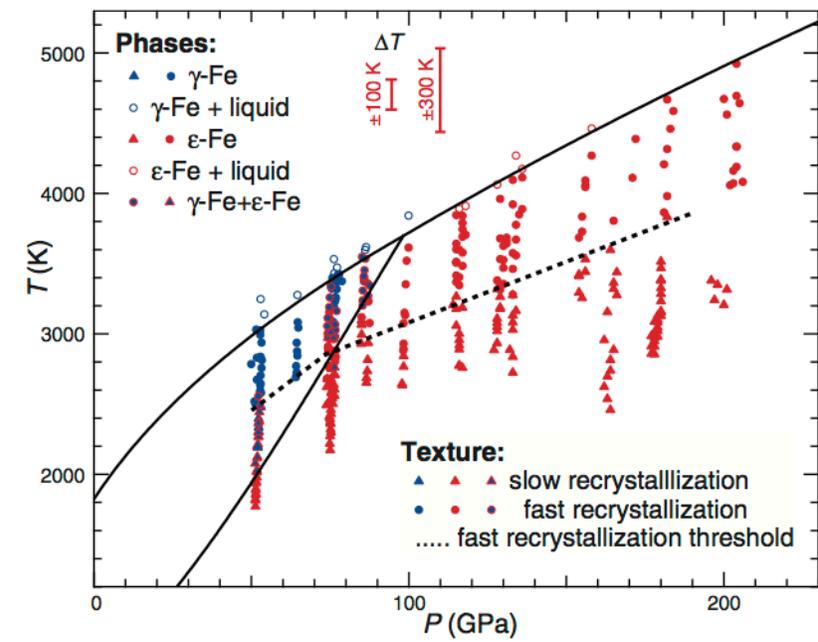
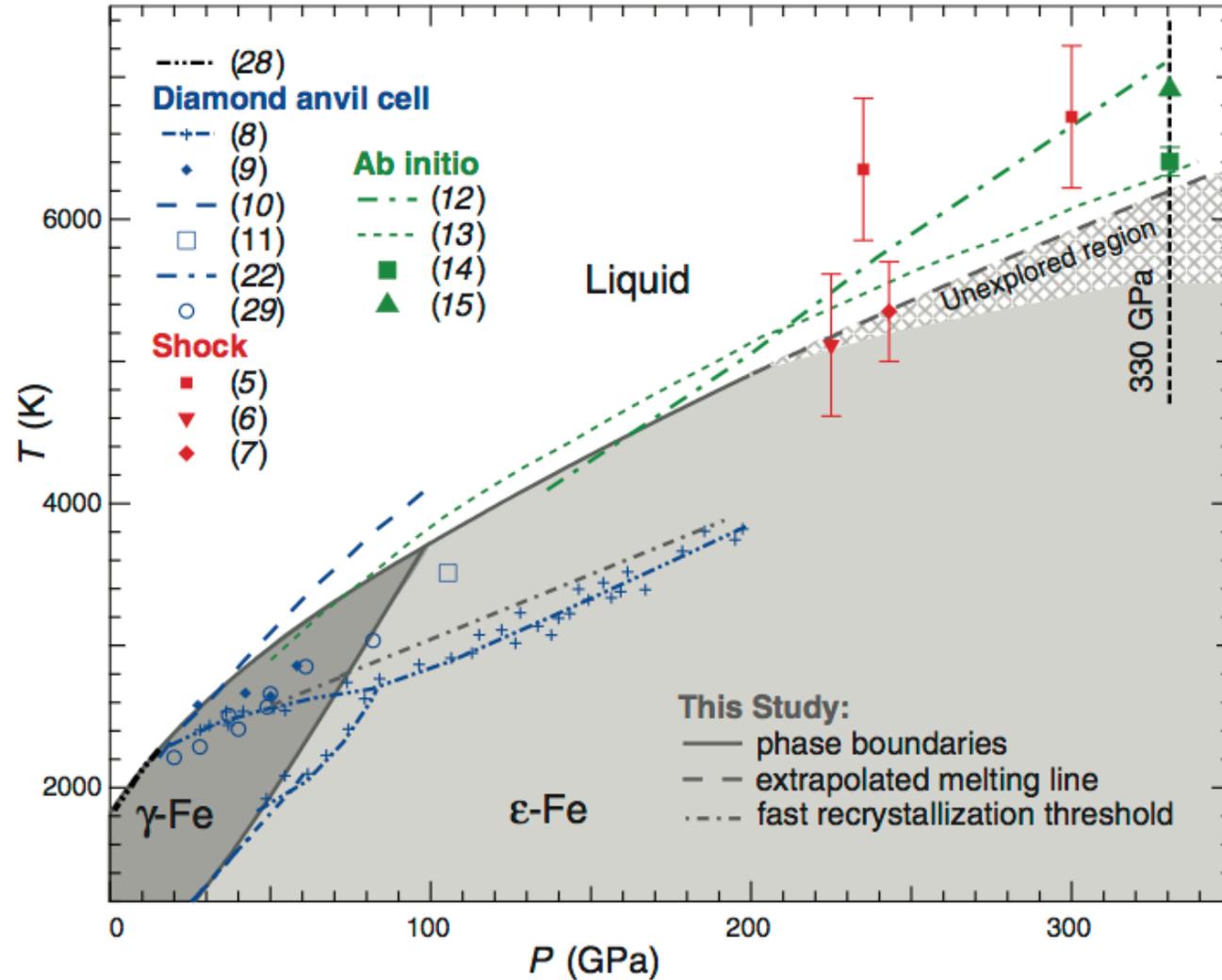


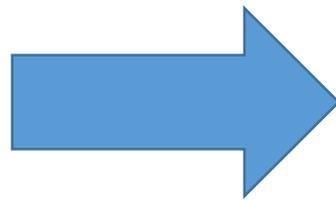
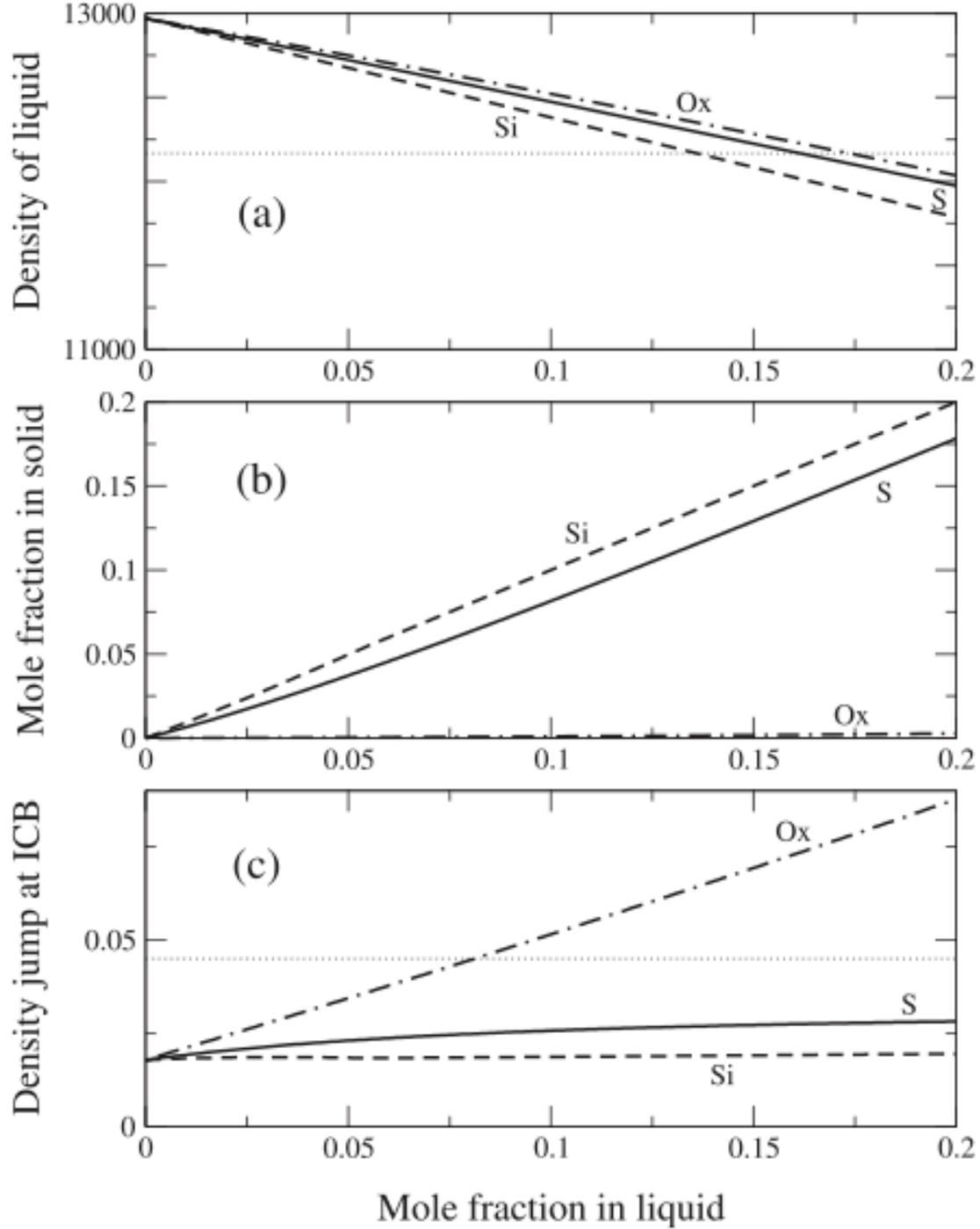


$$Q = bk \left(\frac{\alpha g}{\kappa \nu} \right)^{1/3} \Delta T^{4/3} = \frac{k \Delta T}{\delta}$$

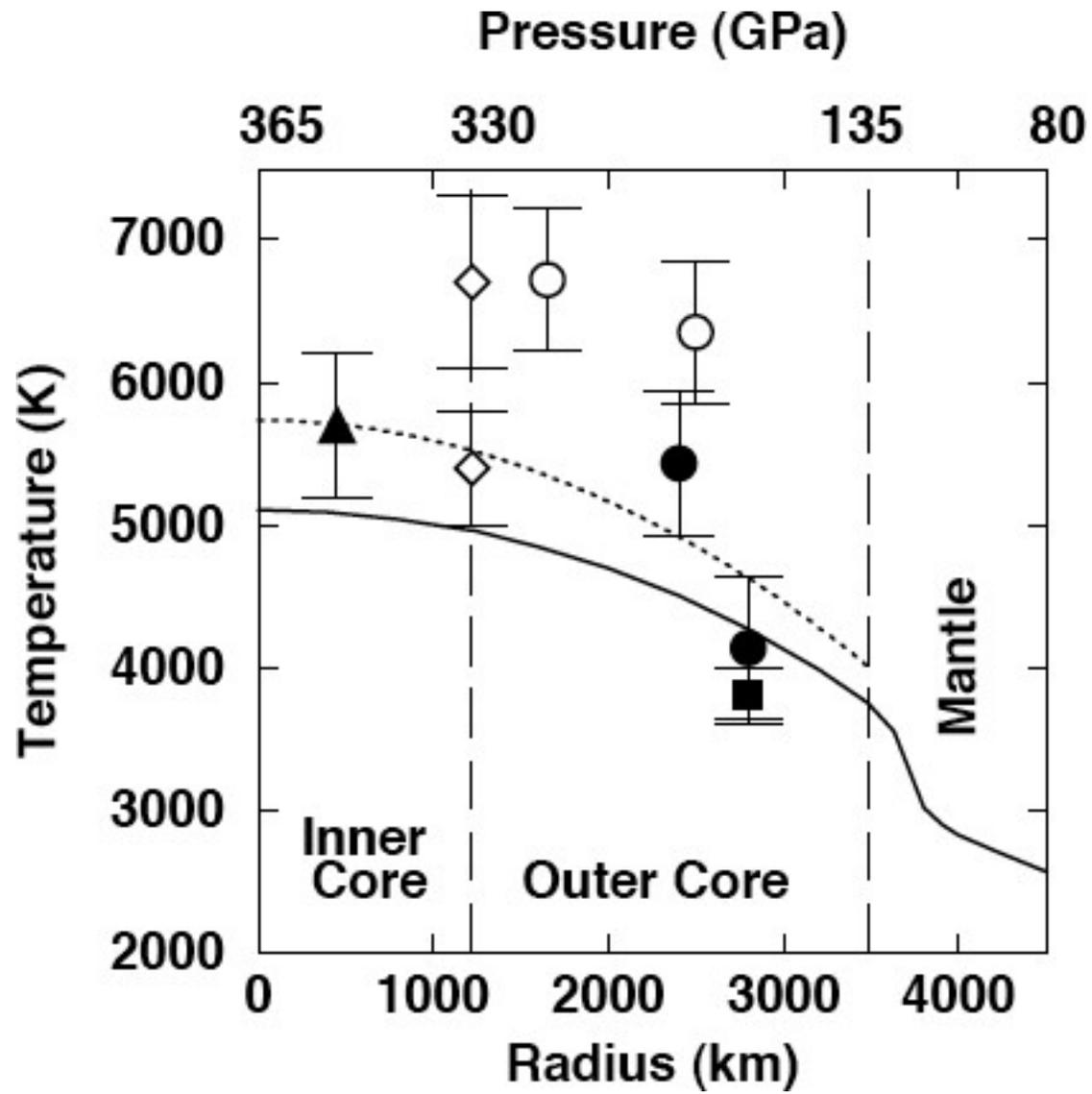


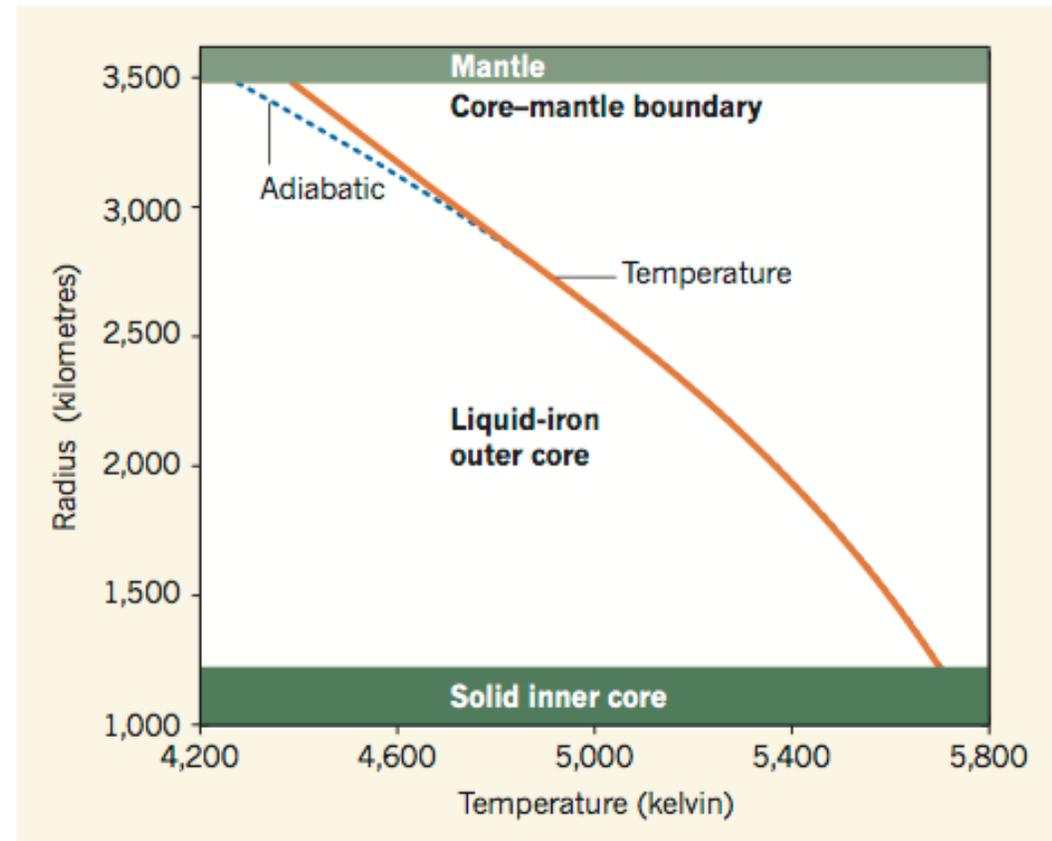
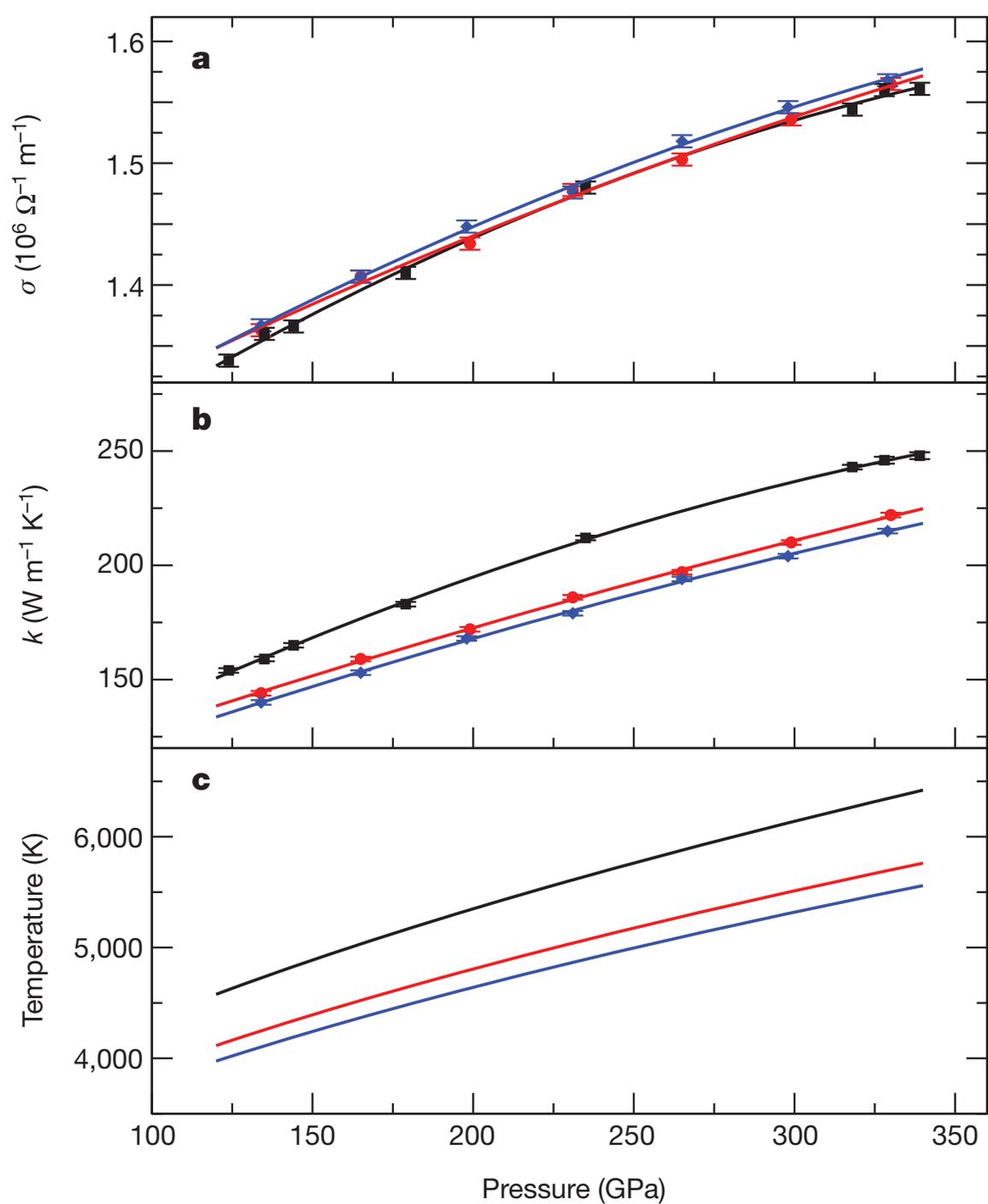
Core





$\Delta T \sim 700 \text{ K}$





Pozzo et al. (2012) Nature
Buffett (2012) Nature

Inner core

