

The Earth's Lower Mantle and Core

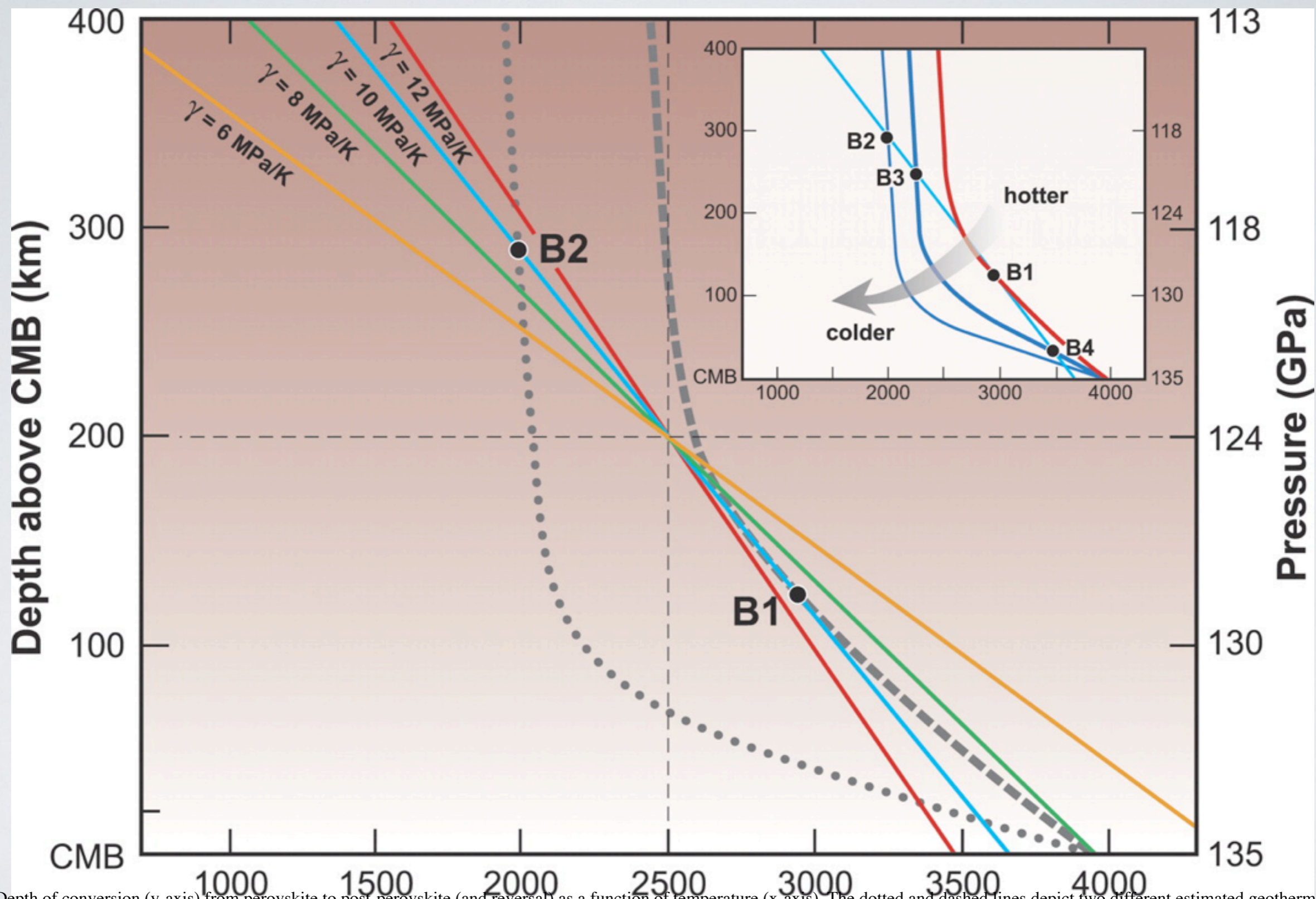


FIGURE 5 Depth of conversion (y-axis) from perovskite to post-perovskite (and reversal) as a function of temperature (x-axis). The dotted and dashed lines depict two different estimated geotherms through B1 and B2. The shallow part (shallower than 200 km above the core-mantle boundary) is adiabatic, whereas the deeper part may be described with a conductive temperature gradient toward the CMB. These temperature profiles intersect the perovskite to post-perovskite phase transition boundary (coloured lines) at different locations (B1 or B2), depending on the pressure-temperature conditions. A reference point is fixed at $P = 124$ GPa and $T = 2500$ K for the perovskite-post-perovskite transition, and different Clapeyron slopes ($= 6$ - 12 MPa/K) are represented. **Inset:** cold, intermediate and hot geotherms and Clapeyron slopes (the straight blue line stands for $= 10$ MPa/K). No transition occurs if the mantle is sufficiently hot (B1). As the mantle temperature decreases, the same perovskite to post-perovskite transition occurs at increasing distances above the CMB (B3 and B2). A reverse transition from post-perovskite to perovskite occurs along colder geotherms (double crossing) at decreasing height above the CMB (B4). See Van der Hilst (2007) and references therein for further details