Non-lithostatic eclogitization in exhuming continental crust

Jamie A. Cutts, Matthijs A. Smit, Johannes Vrijmoed

Buried continental crust and the Western Gneiss Complex

- 420-400 Ma: NW-directed burial of Baltica beneath Laurentia to up to 3.5 GPa & 820 °C
- 400-390 Ma: Isothermal exhumation to crustal depths (<2.5 Gpa)
- Svartberget: Pressures of up to 5.5 GPa at 393-381 Ma reported at Svartberget
  - Geochronology not interpreted unambiguously
UHP eclogitization during exhumation to the mid-crust

- Lu-Hf garnet geochronology: enstatite eclogite formation at c. 393 Ma host gneiss garnet growth at c. 409 Ma
- U-Pb zircon geochronology: protracted, but HREE-depleted ages <400 Ma
- Thermobarometry: formation of equilibrium assemblage at 3-4.5 Gpa and 800-870 °C
Enstatite-eclogites record mechanical pressure heterogeneity

- Localized mechanical pressure heterogeneity (MPH) due to inhibited volume expansion during exhumation

- Variations in MPH can be obtained by different eclogite geometries (elongate vs. equant, size, orientation)