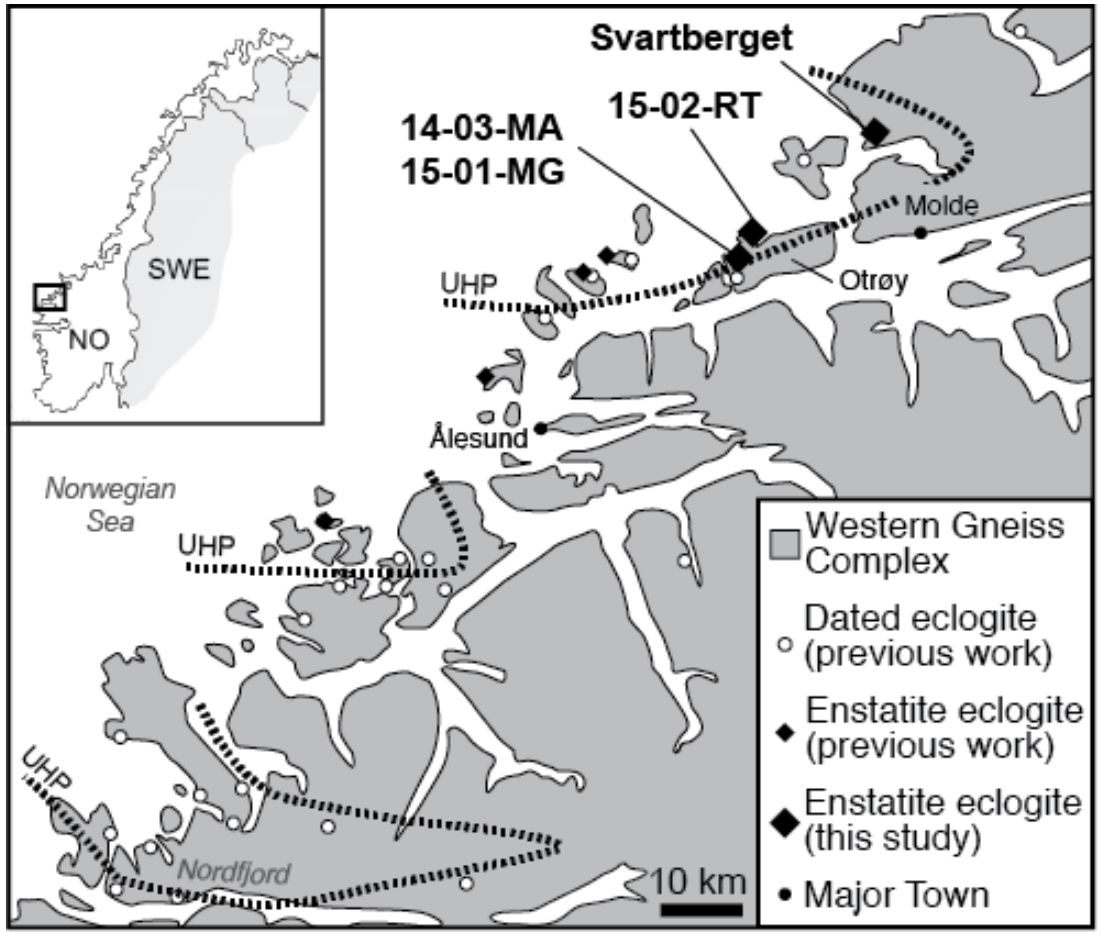
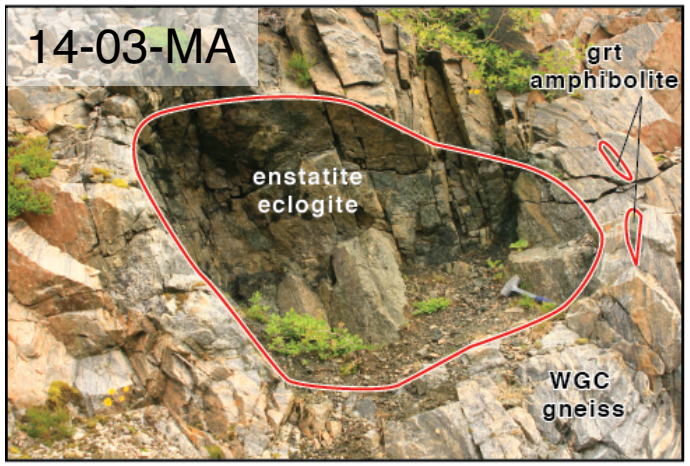
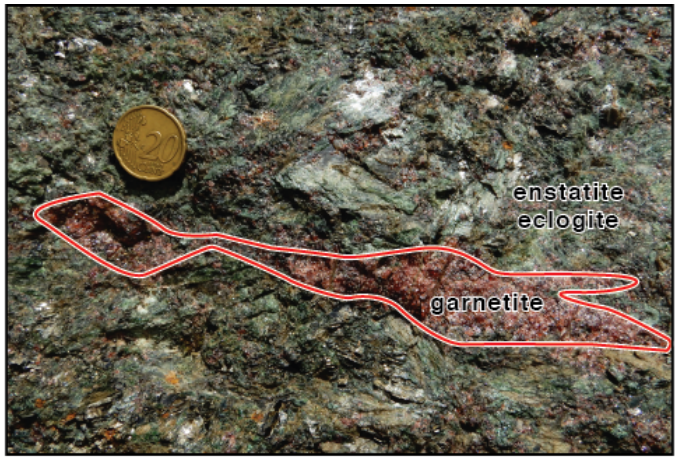
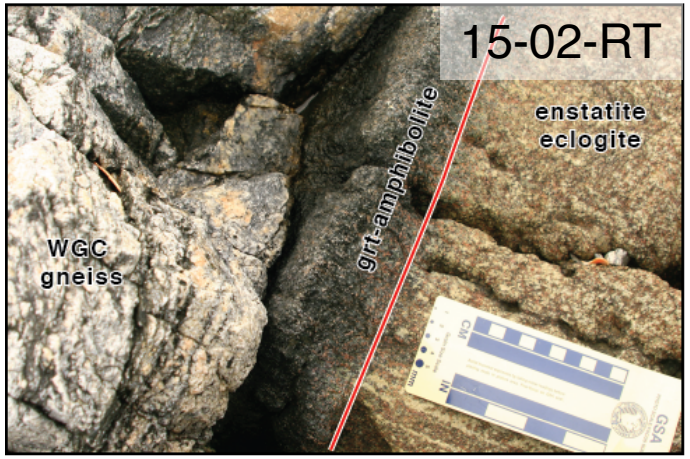
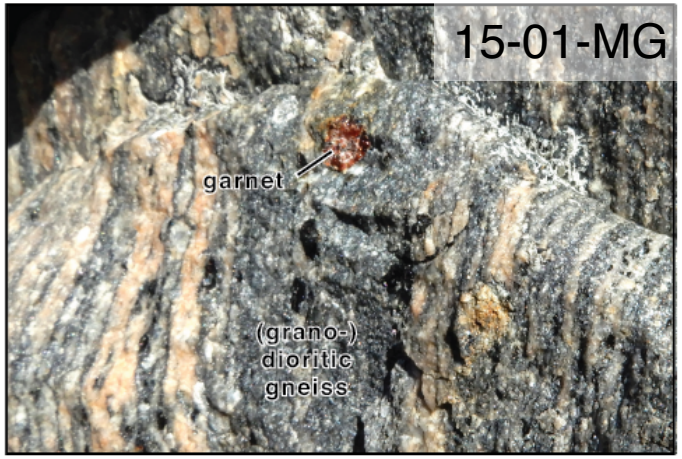
Non-lithostatic eclogitization in exhuming continental crust











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

See Cutts et al. 2020 – Contrib. Mineral. Petrol. vol. 175:3 For more details

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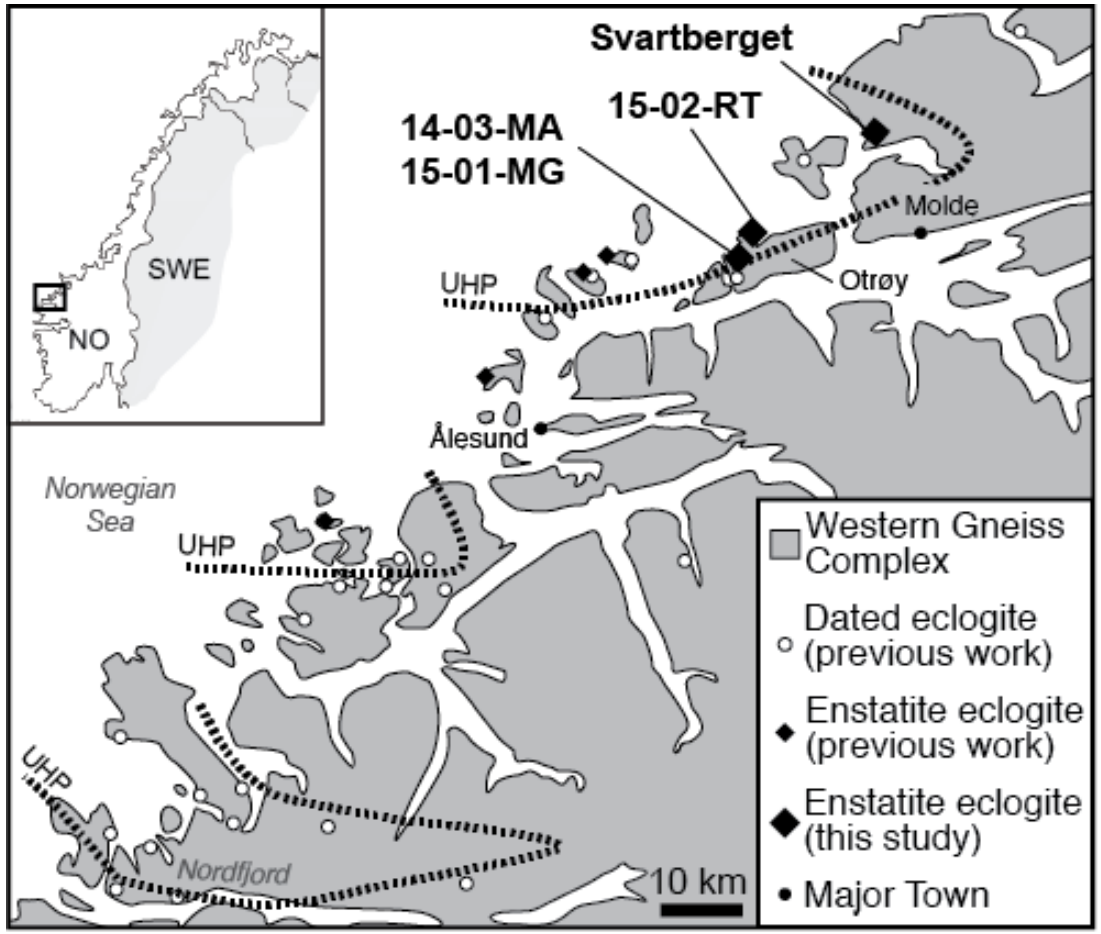
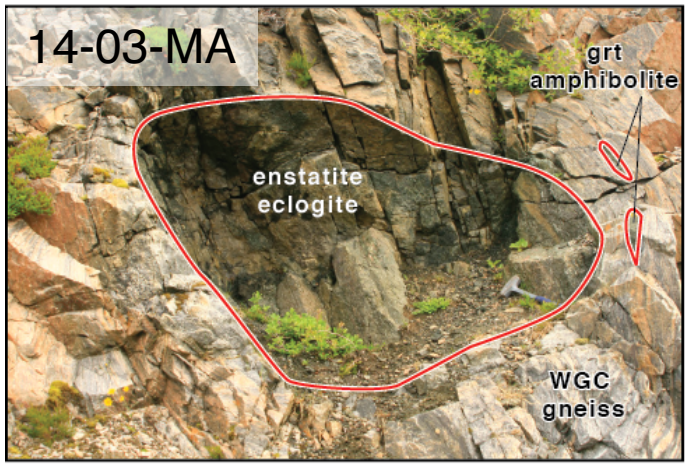
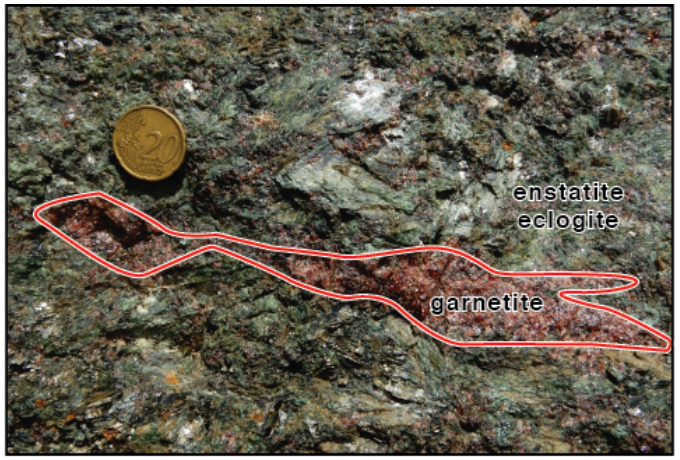
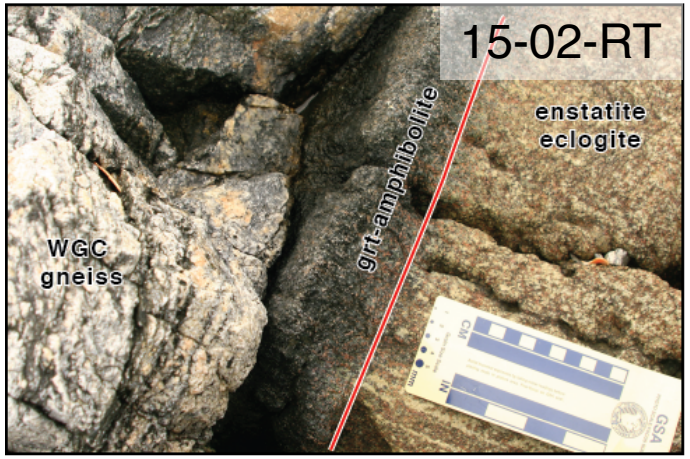
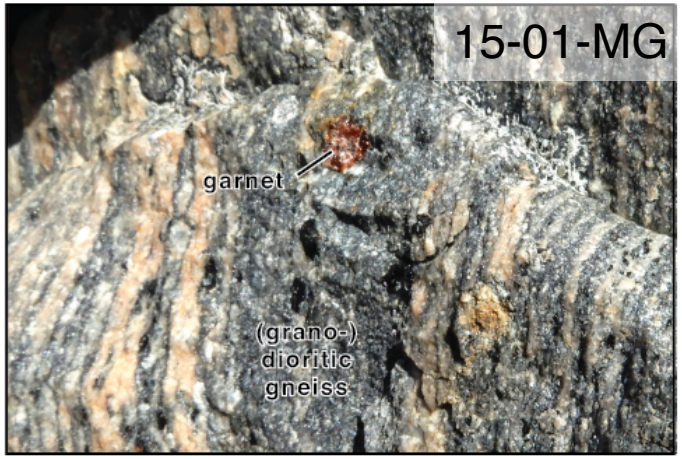
Buried continental crust and the Western Gneiss Complex





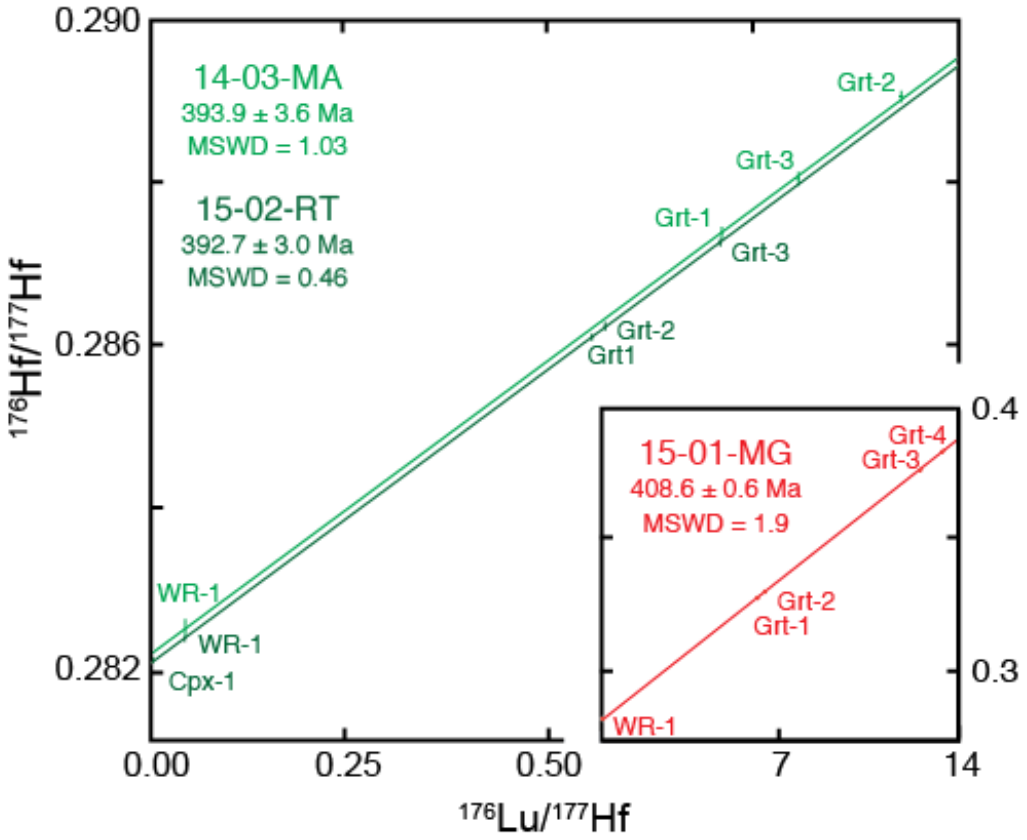


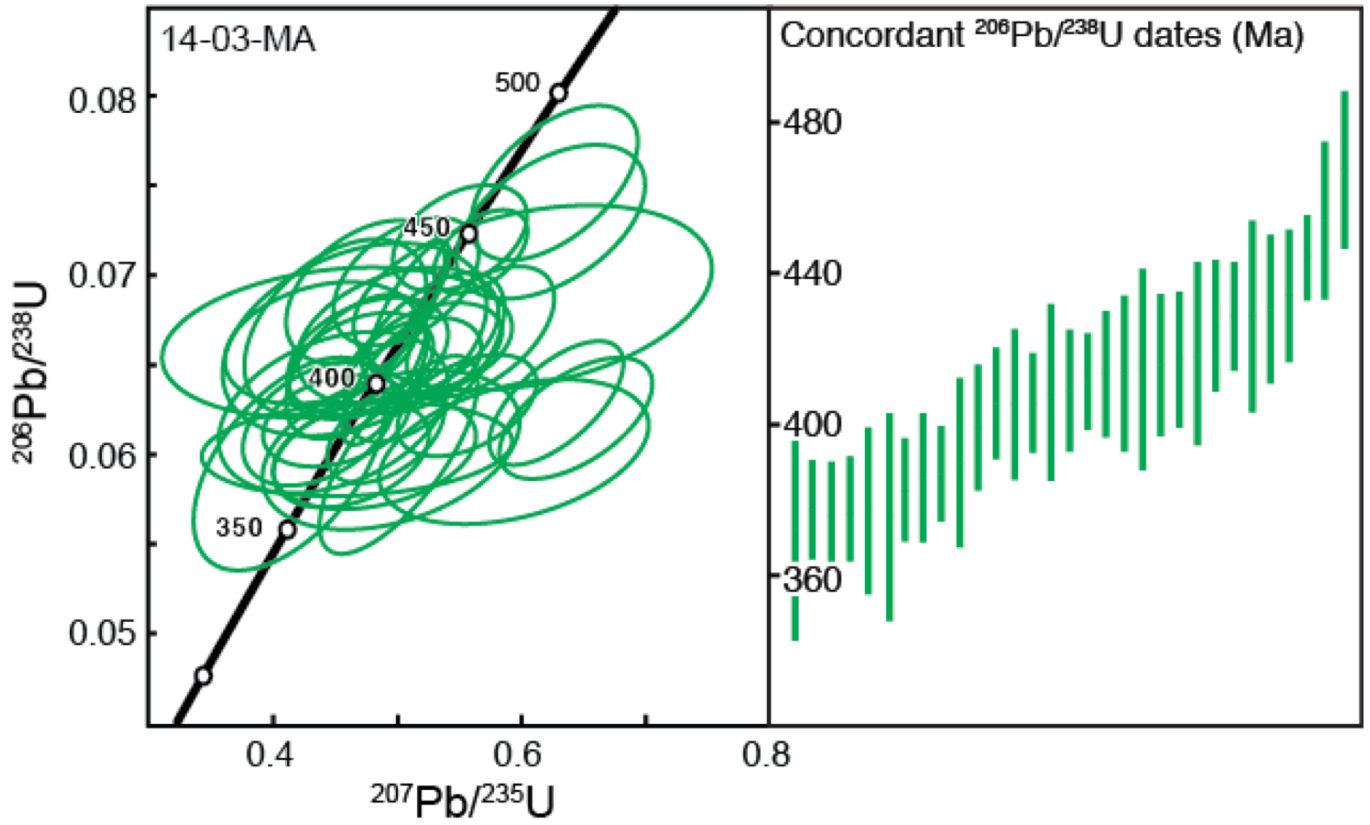




- 420-400 Ma: NW-directed burial of Baltica beneath Laurentia to up to 3.5 GPa & 820 °C
- 400-390 Ma: Isothermal exhumation to crustal depths (<2.5 Gpa)
- Svartberget: Pressures of up to 5.5 GPa at 393-381 Ma reported at Svartberget
  - Geochronology not interpreted unambiguously

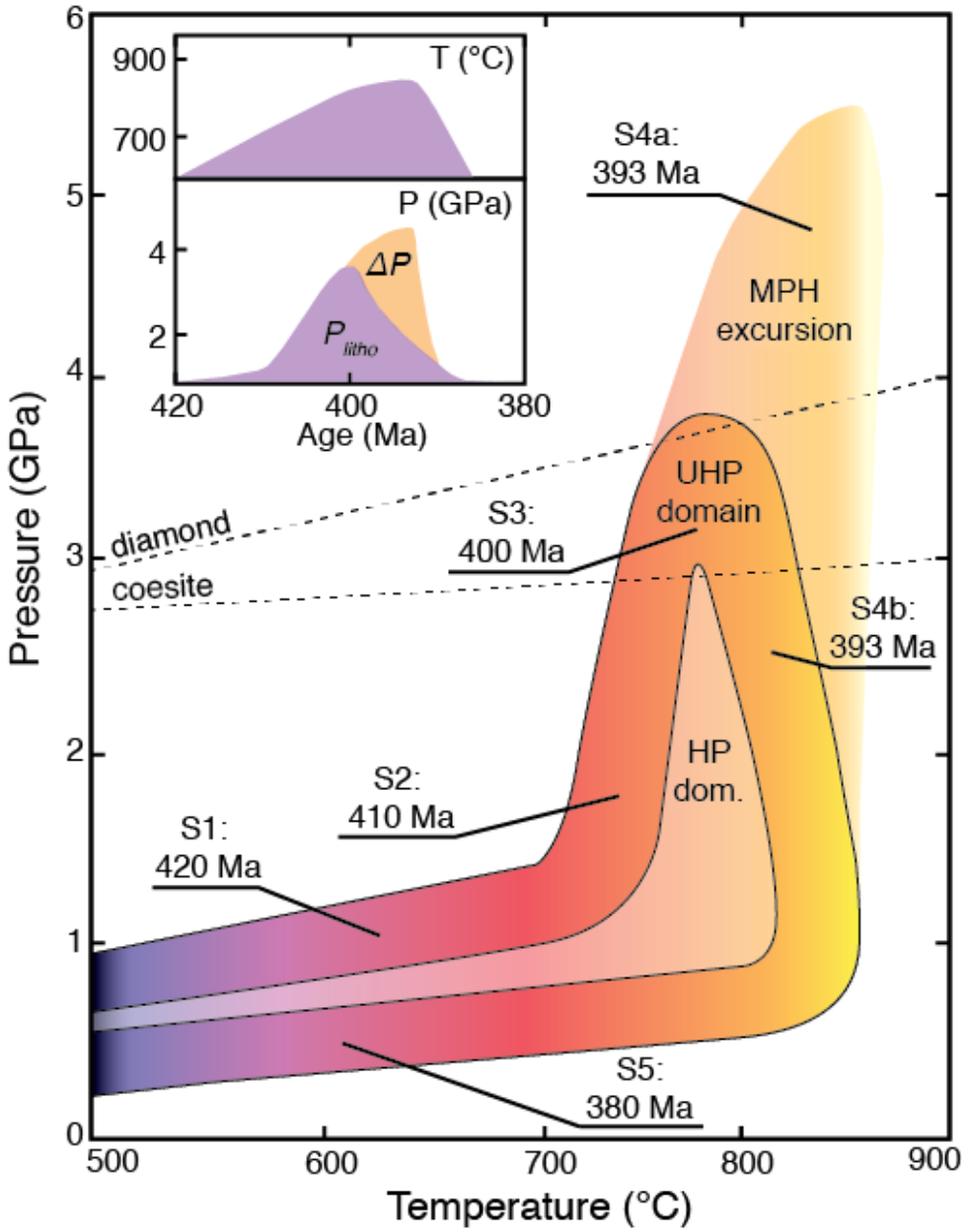
UHP eclogitization during exhumation to the mid-crust

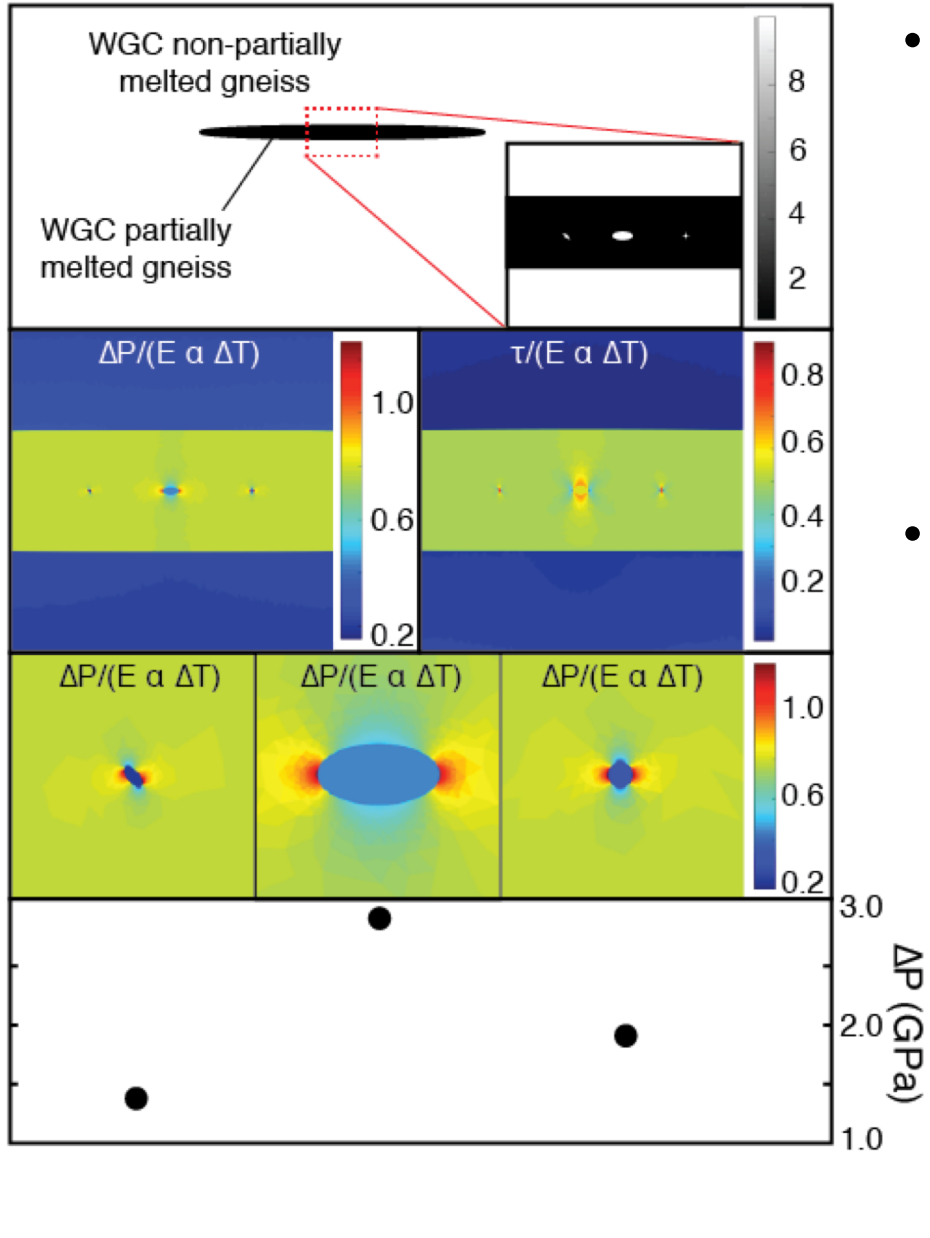




- Lu-Hf garnet geochronology: enstatite eclogite formation at c. 393 Ma
  host gneiss garnet growth at c. 409 Ma
- U-Pb zircon geochronology: protracted, but HREE-depleted ages <400 Ma
- Thermobarometry: formation of equilibrium assemblage at 3-4.5 Gpa and 800-870 °C

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)