Slow subduction initiation drives fast mantle upwelling and lithosphere formation

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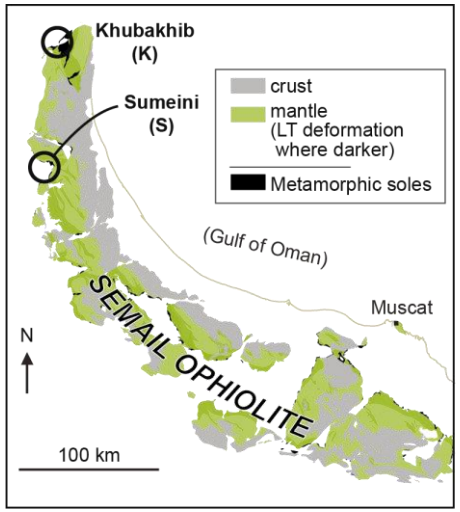
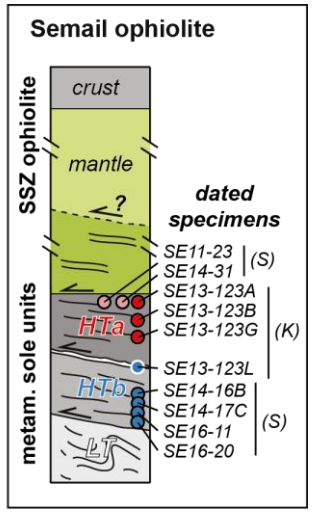


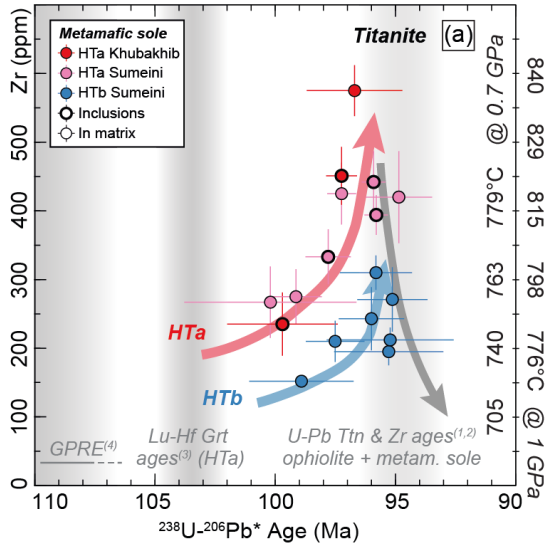


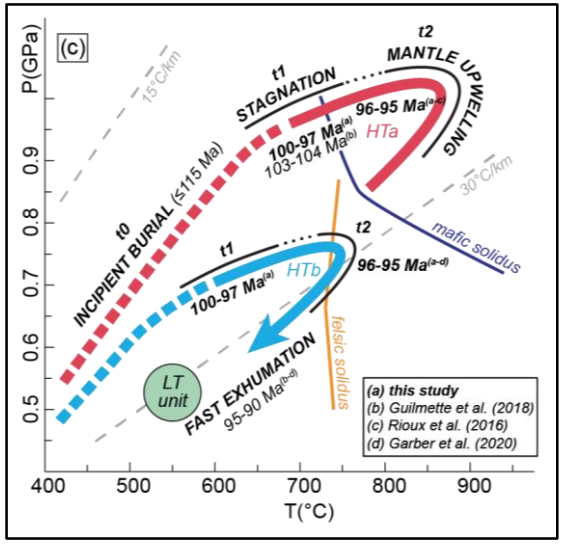
Timescale of oceanic subductions?

Our petrochronological study shows:

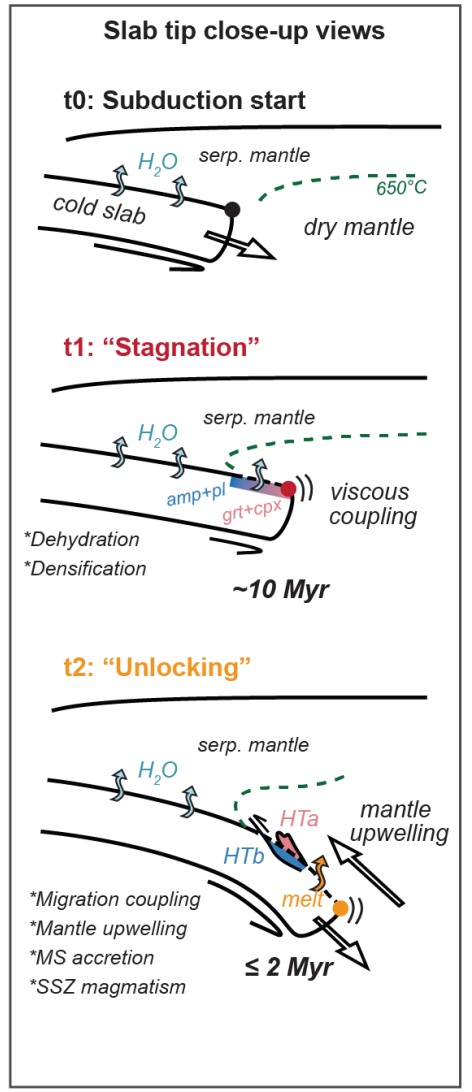
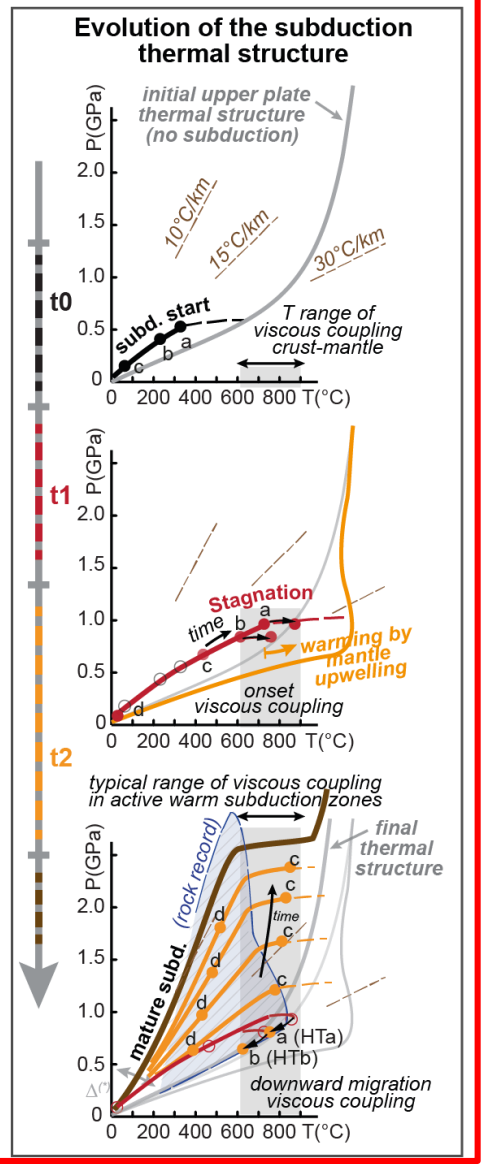
1) **Subduction initiated at a slow rate** (<1cm/yr). It stagnated at warm conditions (15-20°C/km) **from < 100 to 96 Ma** before evolving into a faster (≥ 2–5 cm/yr) and colder (~7°C/km) regime.
2) Subduction unlocking triggered the onset of slab retreat, large-scale corner flow and fast ocean spreading in the overriding plate (96-95 Ma).

Refined P-T-t evolution of the Oman metamorphic sole





U-Th/Pb dating:
- ➔ Monazite
- ➔ Titanite

Pseudosections:
- ➔ Both sole units
- ➔ Prograde P-T

Refined model of subduction initiation