ISTerre
Institut des Sciences de la Terre

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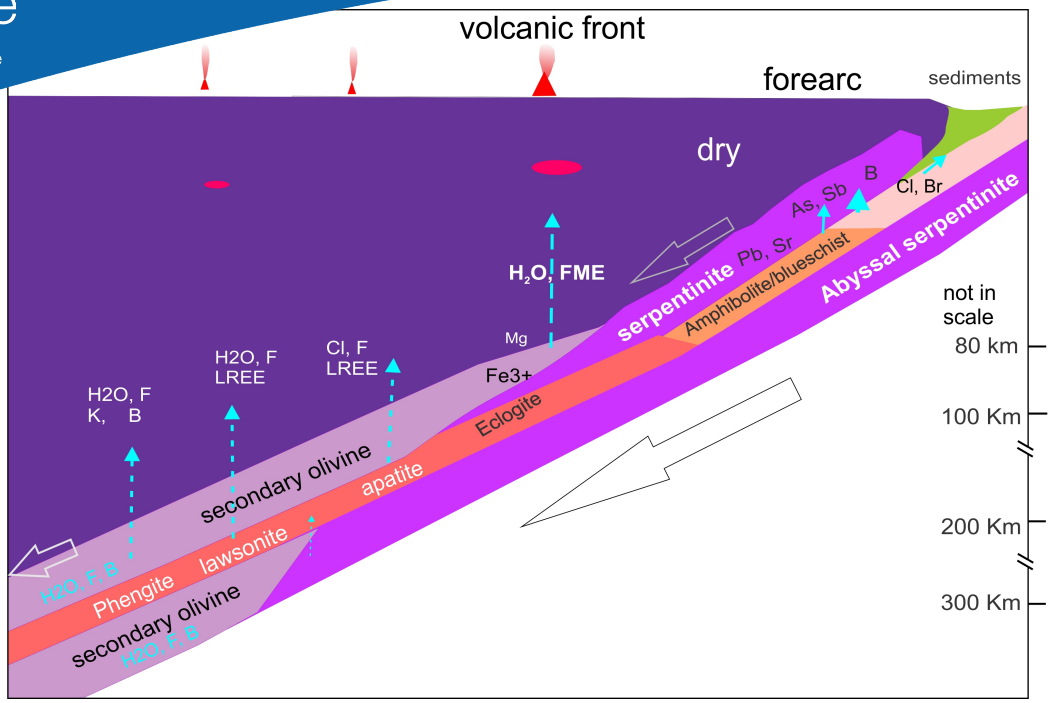

Subduction: How some elements enter deep into the mantle

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Over the past fifteen years, the importance of serpentinites in recycling of elements is becoming better understood. Serpentinites at the base of mantle wedges act as a sink for water and fluid-mobile elements that are released from underlying slabs; this reservoir of water keeps the fore-arc region dry, without magmatism. The destabilization of serpentinites at ~100 km depth then releases water which triggers melting in the mantle wedge and arc magmatism along volcanic fronts. A serpentinite layer <2 km thick at the base of the mantle wedge can provide sufficient water to produce a typical volume rate of magmatism along arc fronts. The dehydration of serpentinites is not isochemical; the reaction to secondary olivine is accompanied by the release of oxidizing flux to the overlying mantle wedge, and the olivine retains significant H_2O, Li, Ti, Zr, F and B, the latter with high ^{11}B. Furthermore, the subducted slabs commonly contain minerals stable far below the sub-arc mantle. They include lawsonite (11 wt.% H_2O and with high halogen content, stable to 280 km depth), phengite (stable to ~ 300 km) and apatite (~200 km). These minerals fractionate volatiles, and transport H_2O, alkalis, F, I and B into the deep mantle, thus contributing to the generation of alkaline magmas at much deeper levels than that of arc magmas.

Jeudi 3 mars 2016 à 11h
Salle de conférences d'ISTerre

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