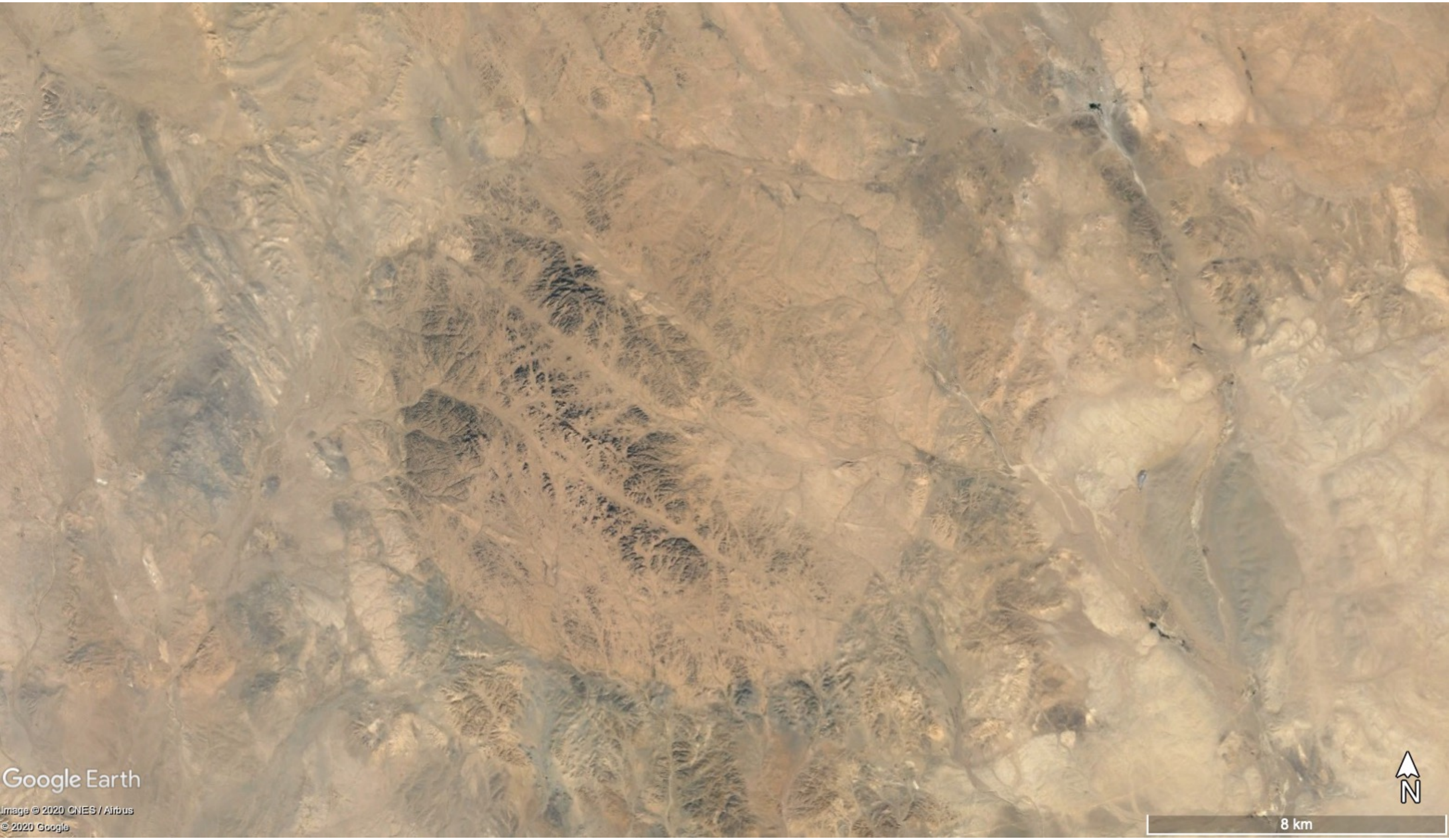
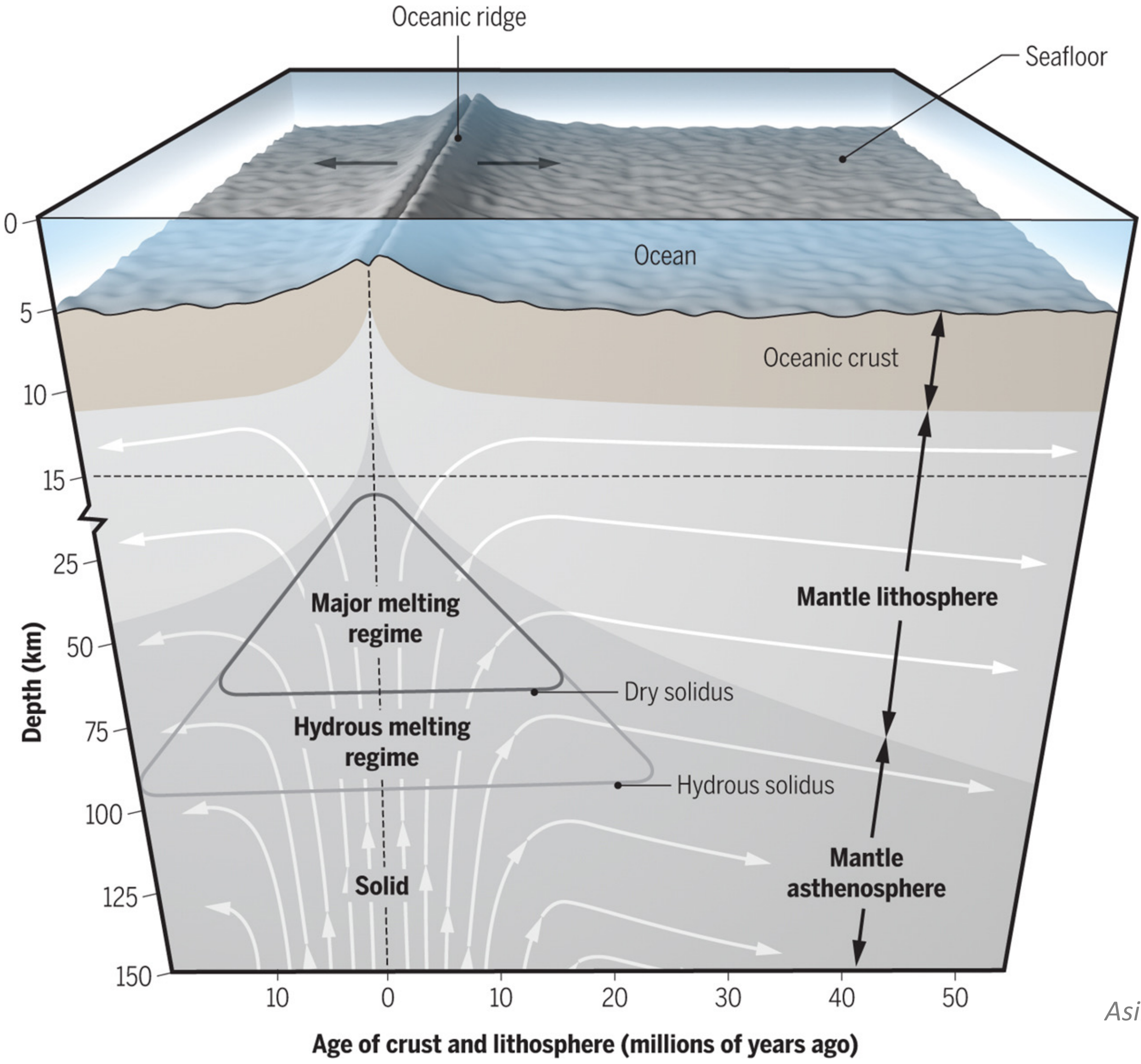
Corso di Geologia del Cristallino



La formazione e l'evoluzione dei sistemi magmatici

Generazioni di magmi

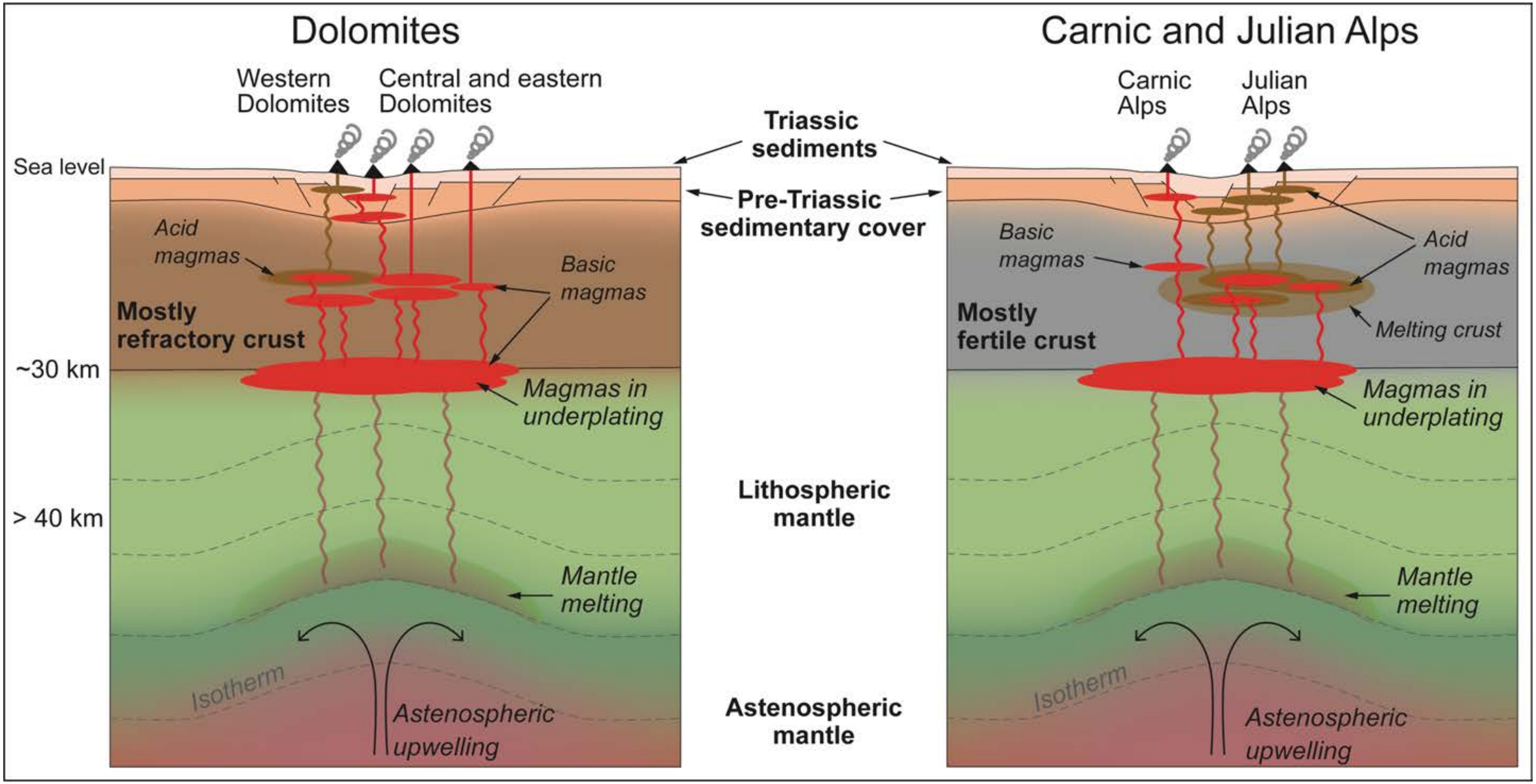
Fusione di mantello



Asimow (2017; Science)

Generazioni di magmi

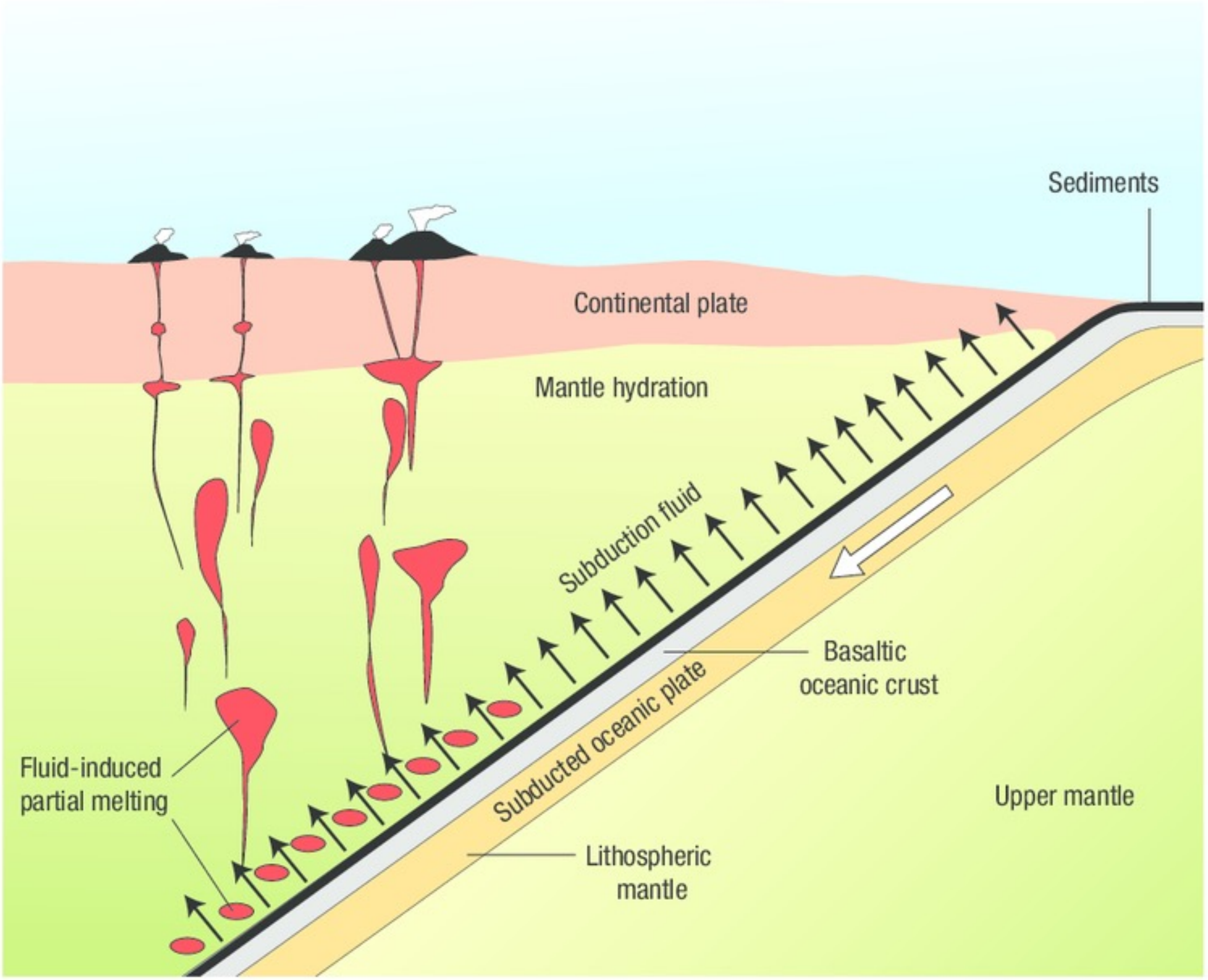
Fusione di mantello



De Min et al (2020; Geological Magazine)

Generazioni di magmi

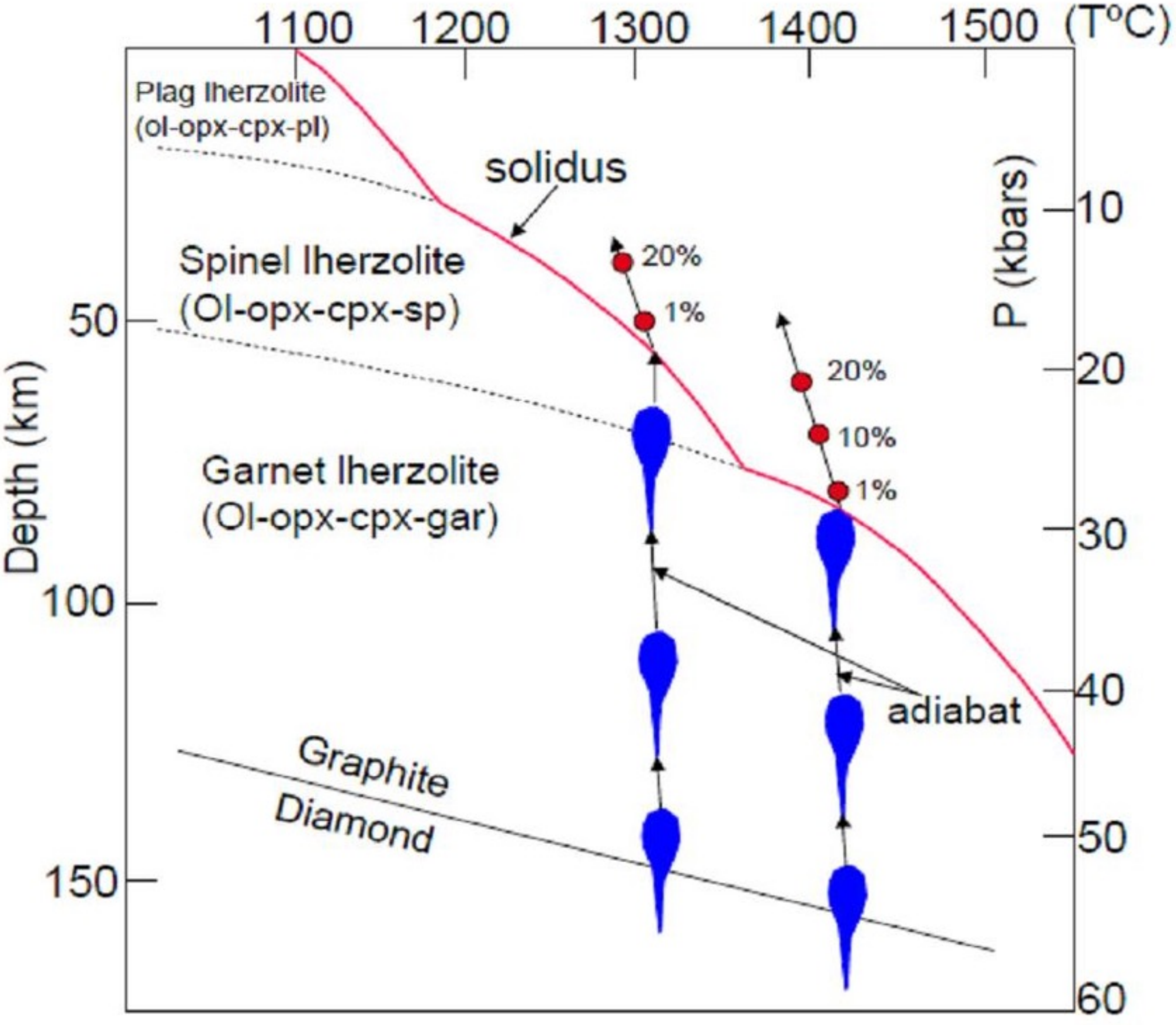
Fusione di mantello



Churikova (2008; Nature Geoscience)

Generazioni di magmi

Fusione di mantello



El-Desoky et al. (2015)

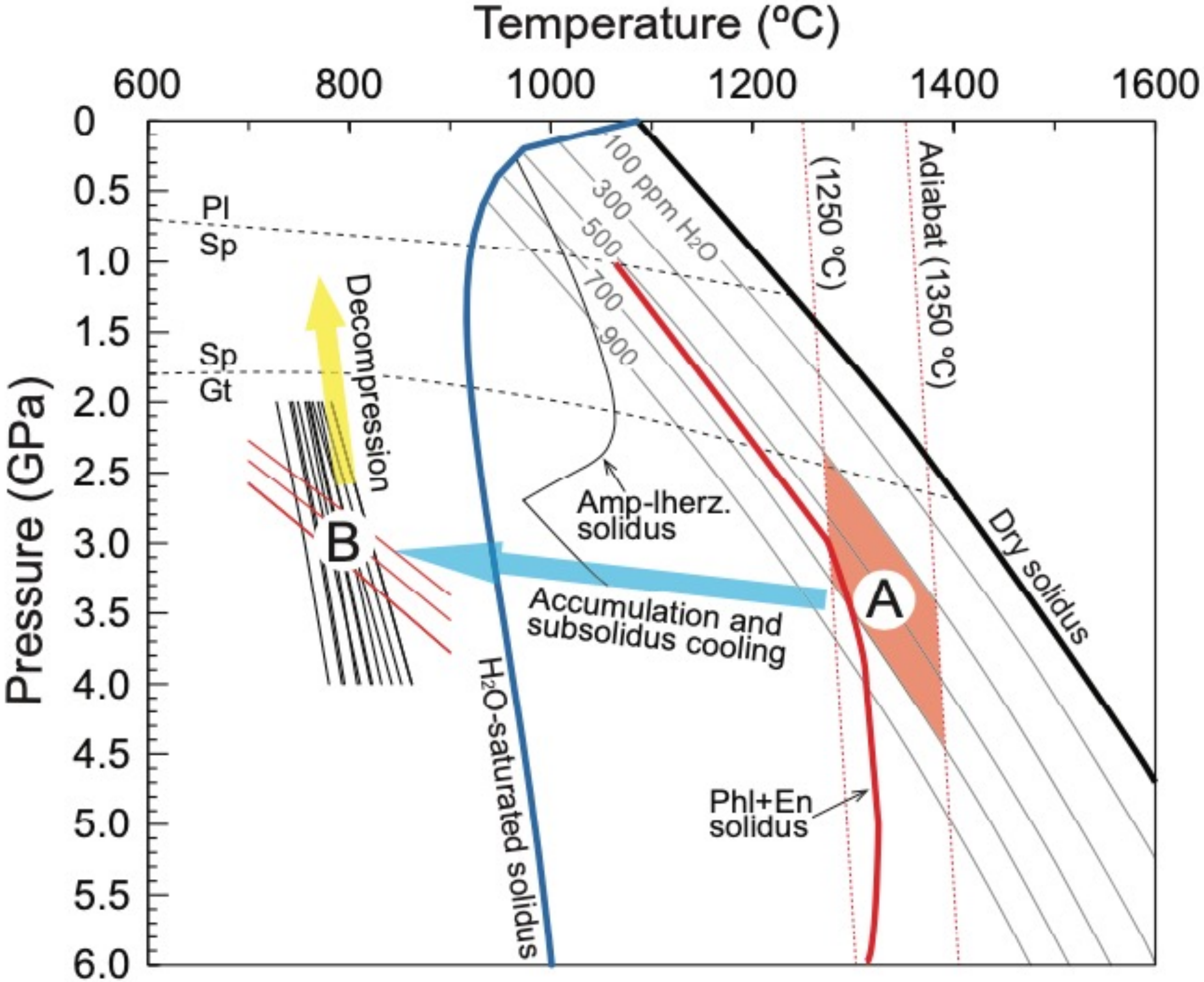


Fig. 14. *P*–*T* diagram showing the likely melting conditions in a convective mantle wedge (A) and the *P*–*T* estimates of peak-stage equilibration (B) in the Shenglikou pyroxenite dykes. The dry solidus

Xiong et al 2014 – J Pet

Rocce di mantello

https://www.backyardnature.net/n/x/peridott.htm

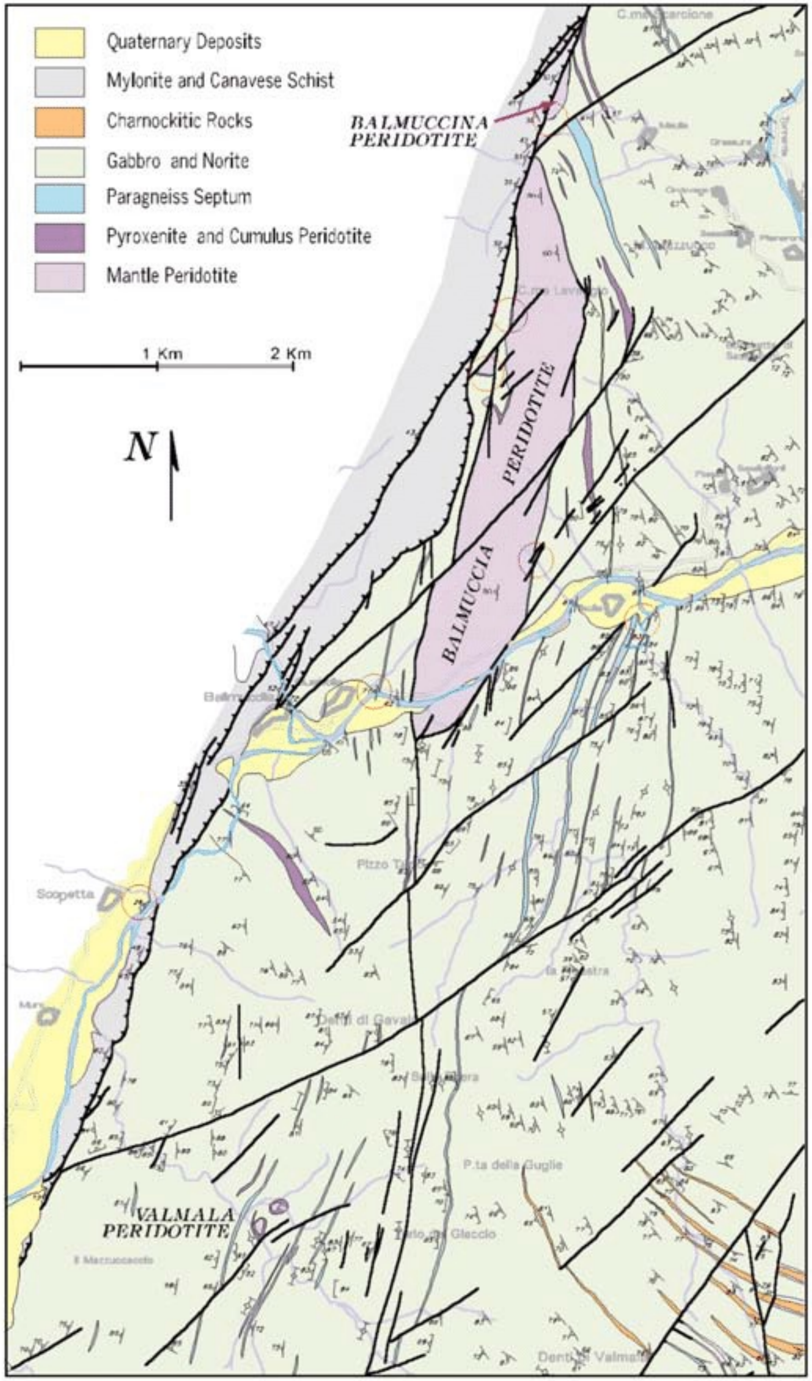
Gli affioramenti di rocce ultramafiche

Dygert et al (2016; J Pet)

Corpo peridotitico di

Balmuccia

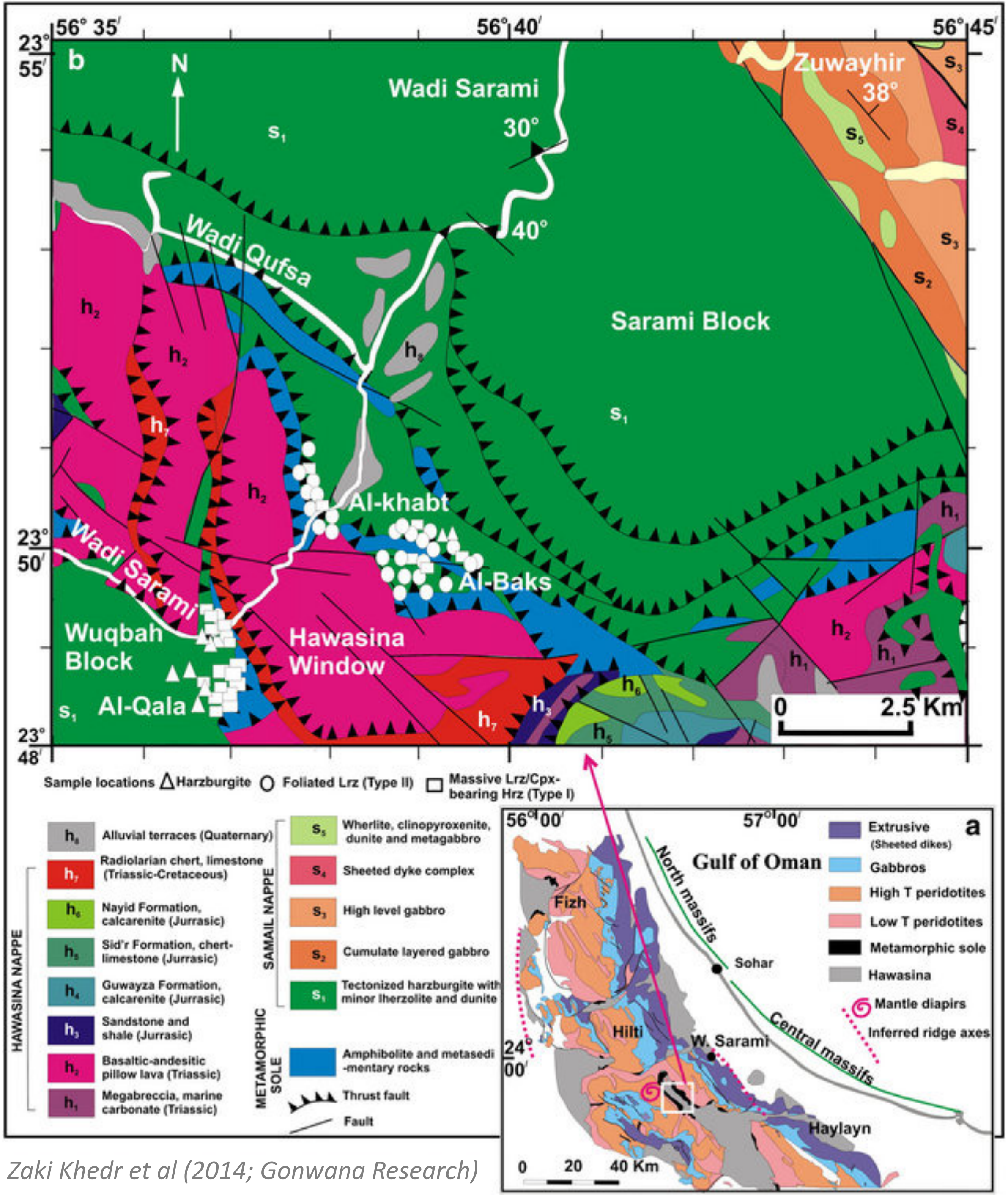
(Ivrea-Verbano)



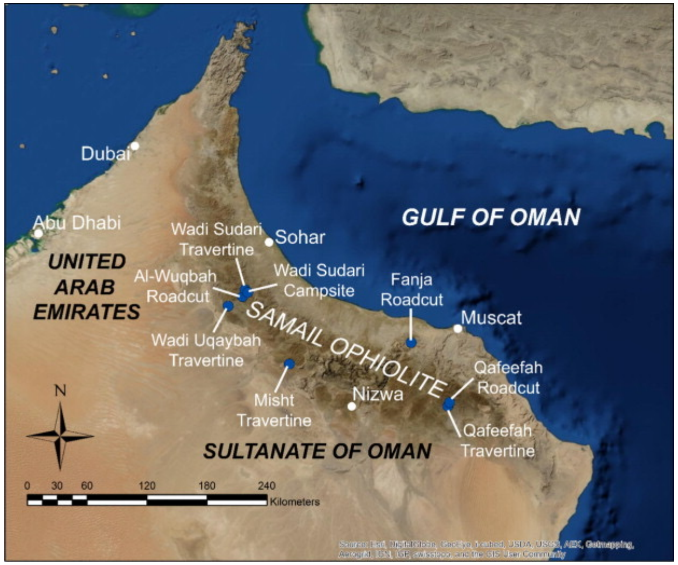
Sinigoi et al (2010)

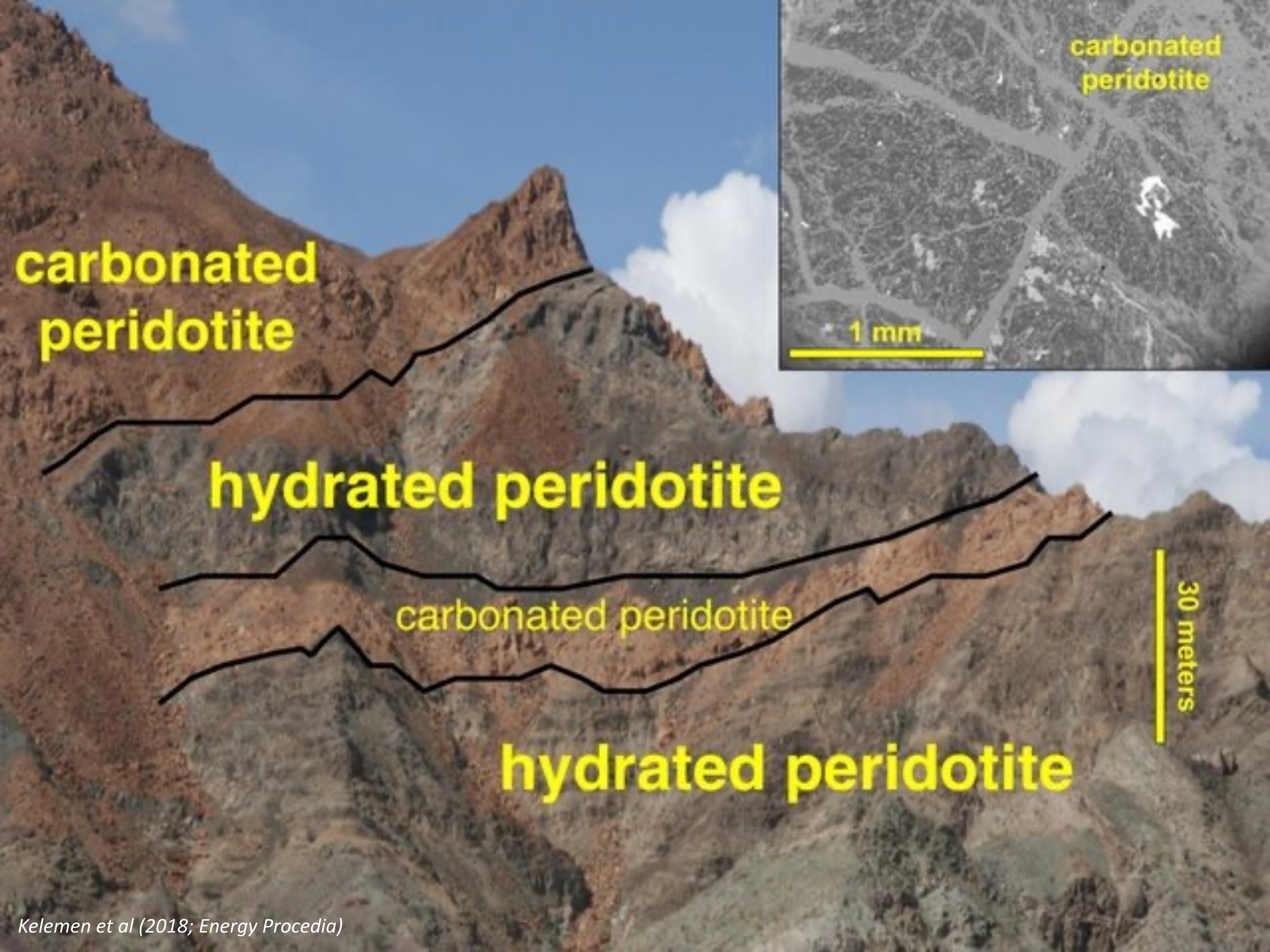

WARNING WEAR
SAFETY GOGGLES

Peridotiti nelle ofioliti dell'Oman



Zaki Khedr et al (2014; Gonwana Research)



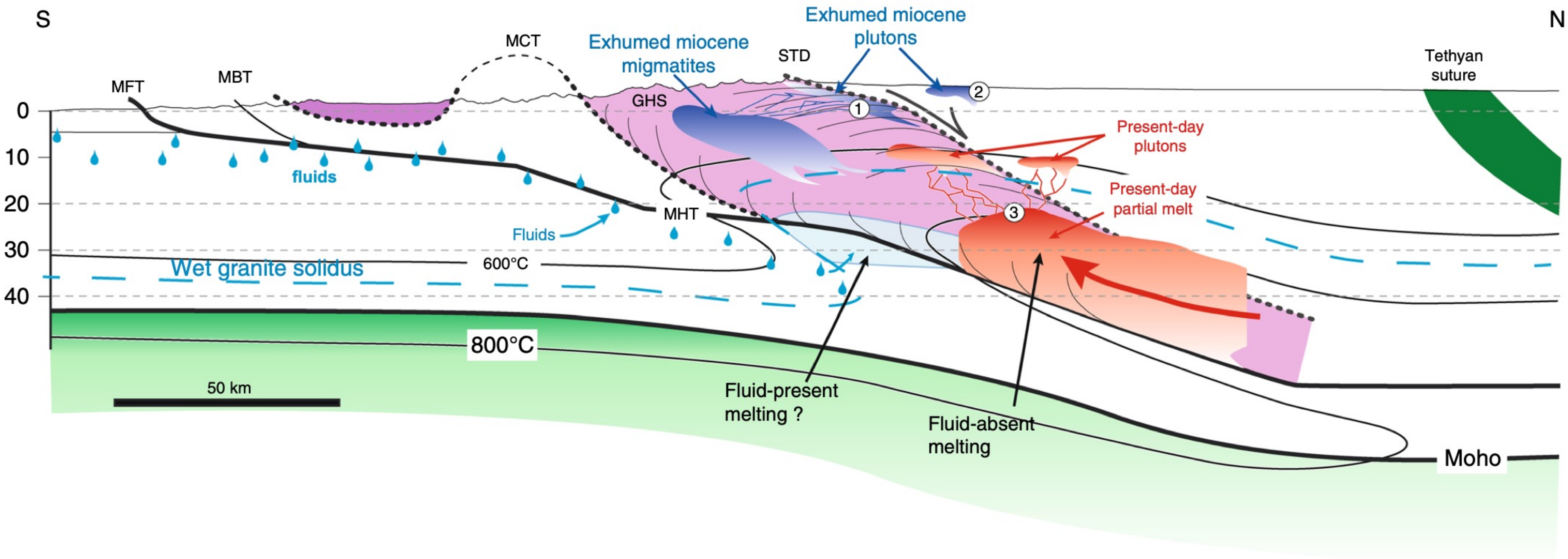


Kelemen et al (2018; Energy Procedia)

Kelemen et al (2018; Energy Procedia)

Generazioni di magmi

Fusione di crosta

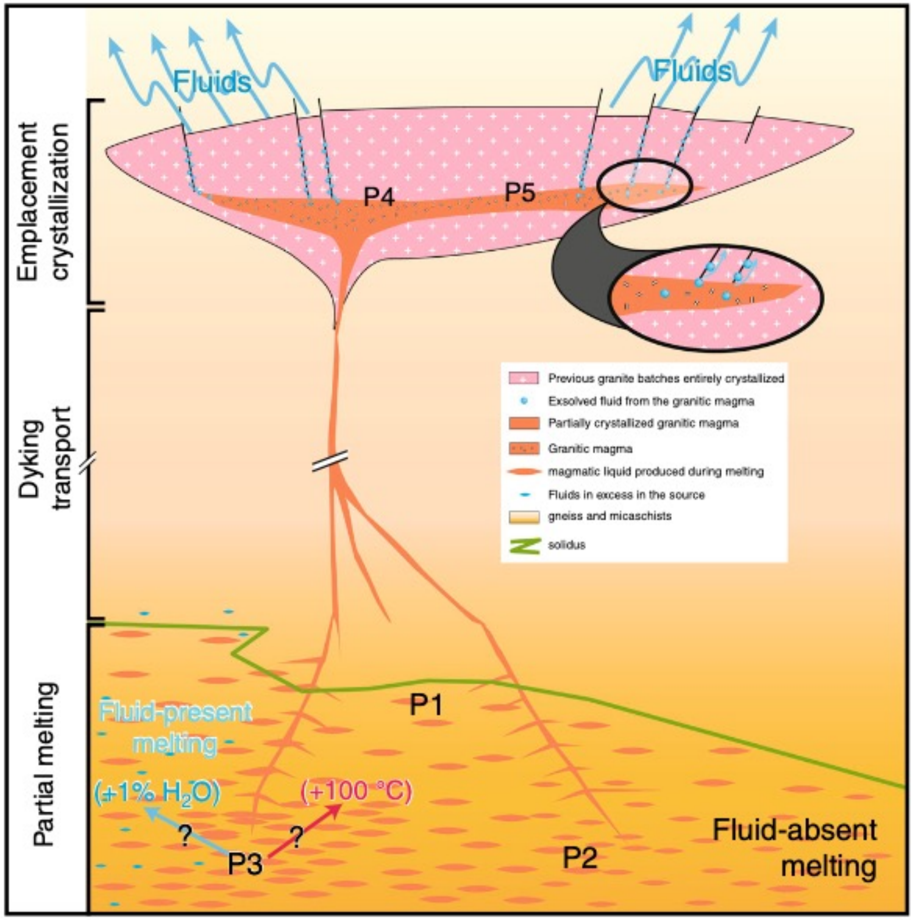


Chen et al (2018; Nature Communications)

Fig. 7 Schematic diagram of granitic magma production, migration, and emplacement in a schematic cross-section of the Himalaya. The inactive shear zones (i.e., STD and MCT) are shown with bold dotted lines, while the active shear zones (i.e., MBT, MFT, and MHT) are shown as bold straight lines. The red regions identify the present-day location of partial melting plus melt ponding (present-day leucogranite plutons) while the blue areas are exhumed and solidified granitic rocks (migmatites and plutons). The numbers illustrate the emplacement of granitic plutons (1) below the STD or (2) above the STD while (3) refers to the top of the partial melting region from where the present-day dykes feeding the growing plutons are nucleating. The fluid identified by Rawat et al.[40] is delineated by the blue droplets, south of the Main Frontal Thrust, and located within the Indian basement. Melting is obviously not occurring in the cold regions of the Indian basement, but this must represent a fluid-enriched zone that is buried beneath the chain. What happens to these fluids is not the kernel of this study but they may well contribute to the process of melting beneath Tibet

Generazioni di magmi

Fusione di crosta

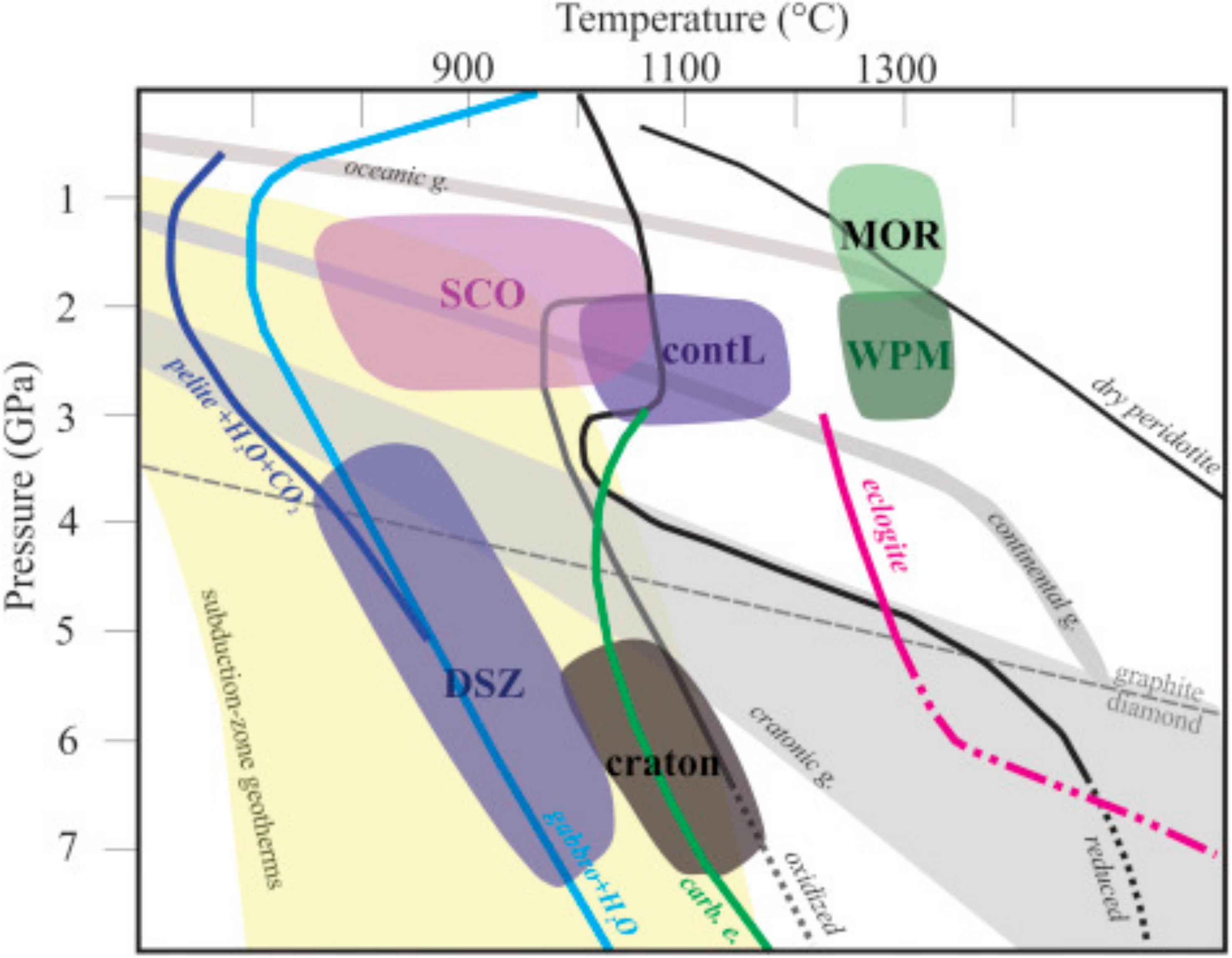


Chen et al (2018; Nature Communications)

Fig. 6 Illustration linking P1–P5 MT anomalies to magmatic processes and crustal-scale transfer of water. The magmatic conditions at the P1–P5 electrical anomalies are given in Table 3. By these magmatic processes, water is transferred from the lower crust (depth >20 km), where partial melting occurs, to the emplacement/crystallization zone of granites (depth = ca. 10–12 km). Aqueous fluids released from solidifying granites may well significantly contribute to the numerous hot springs suggested from their geochemical features[47]. Fluid-absent melting under conditions similar to the G1 *P*–*T* path can explain the Northwestern Tibet, while beneath the Southern Tibet, either fluid-present melting or a warmer crust is required

Generazioni di magmi

Comparazione tra curve di solidus di rocce di mantello e crosta)



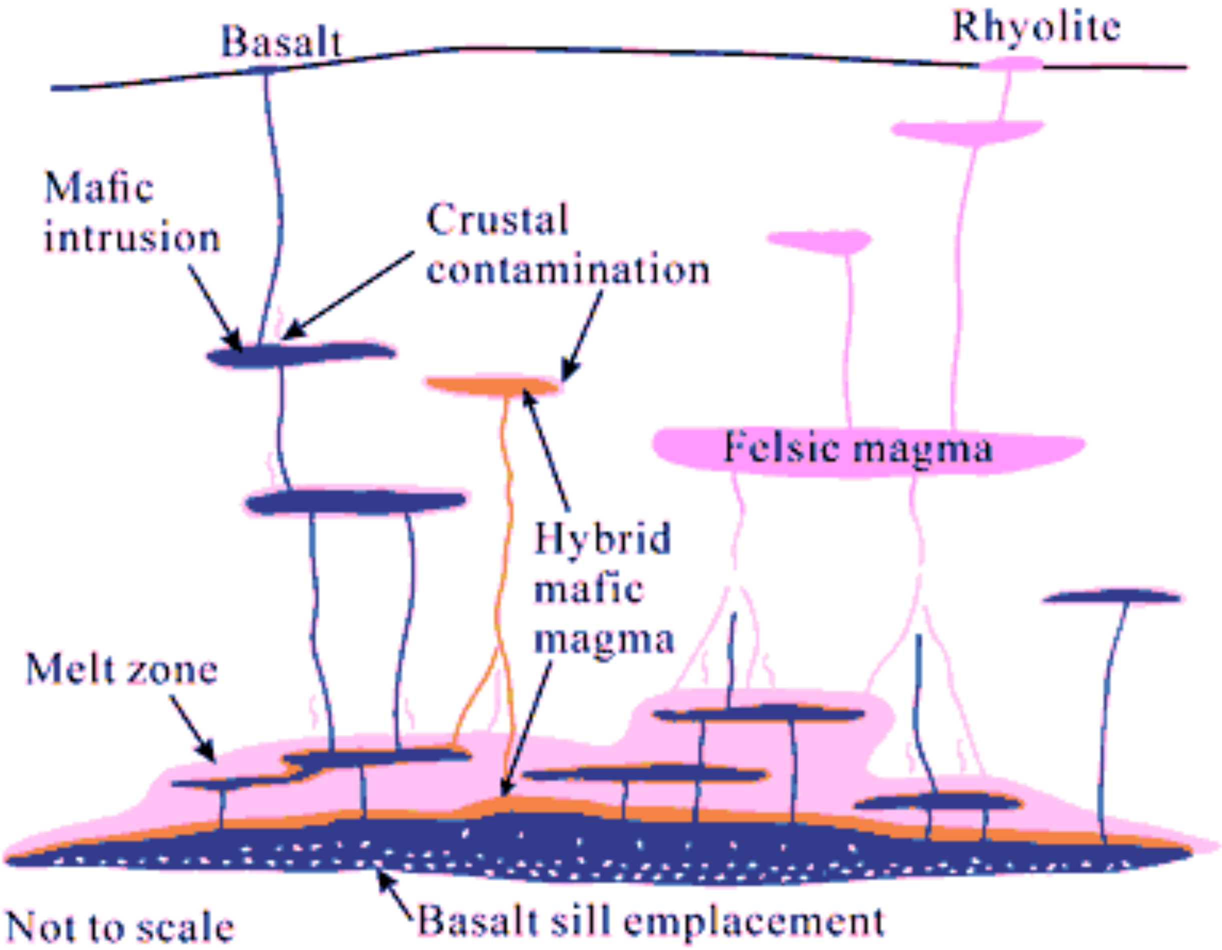
https://www.sciencedirect.com/topics/earth-and-planetary-sciences/solidus

Didascalia della figura precedente:

Figure 1.10. Pressure–temperature melting conditions for various geodynamic environments (*colored/shaded areas*) compared to melting curves for mantle rocks and components of subducting lithospheric slabs and to example geothermal gradients (*thick gray lines*). Midocean ridge (MOR) and within-plate magmatism (WPM) regions are determined by upwelling asthenospheric mantle and lie above the melting points of recycled eclogite blocks. Continental lithosphere (contL) lies close to the solidus shelf and is controlled by the stability of calcic amphibole and carbonatite melts, which therefore feature prominently in noncratonic continental mantle rocks. Melting beneath the cratons is limited to high pressures and favored in oxidizing conditions. Subduction environments are divided into (1) deep subduction zones (DSZ) in which peridotite cannot melt but both igneous and sedimentary components of the subducting slab may melt, and (2) shallow collisional orogens (SCO), in which slab components may melt followed by peridotite as mantle heat accesses the new lithosphere in the postcollisional environment. See Fig. 1.3 for sources of melting curves; pelite + H_2O + CO_2 from Mann and Schmidt (2015); gabbro + H_2O from Lambert and Wyllie (1978); eclogite from Spandler et al. (2008); and carbonated eclogite from Dasgupta et al. (2004).

http://users.monash.edu.au/~weinberg/Pages/Reru_valley/Reru_migmatite.htm

http://users.monash.edu.au/~weinberg/Pages/Reru_valley/Reru_migmatite.htm



http://www.mantleplumes.org/CrustalContamination.html