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# Fluid flux and melting reactions in subduction zones

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Understanding the metamorphic reactions that occurs within the slab is a must to constrain subduction zone processes. Slab dehydration reactions ultimately permit the mantle wedge to melt, by lowering its solidus, thus forming arcs above descending slabs. Alternatively the slab crust may cross its solidus in warm hydrated slabs. Moreover, slab dehydration allows chemical fractionation to occur between residual phases and transferred fluid phase, giving arc magmas part of their typical subduction zone chemical characteristics. To better comprehend such complex thermo-chemical open system, we are using a numerical model that reproduces the thermo-mechanical behaviour of a subducting slab and computes the thermodynamic equilibrium paragenesis at each P-T-X conditions of the system. Hence we generate a "paragenetic map" of a subduction system, allowing us to track the fate of water during dehydration and subsequent re-hydration or melting reactions.
Here we highlight the role of dehydration and re-hydration reactions occurring in the slab's igneous crust and mantle and the mantle wedge for different slab configuration hence presenting the evolution of a subduction paragenetic map for different regimes. We intend to show the key roles of a) antigorite and chlorite breakdown in the hydrated part of the slab mantle, b) amphibole and lawsonite in the slab crust, and c) the role of amphibole and chlorite in the mantle wedge. Our results show the crucial role of dehydration and re-hydration reactions on slab and mantle wedge melting potential.