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A Numerical Investigation of the Relative Importance of Different Meltng Mechanisms at Volcanic Arcs

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Abstract

Under this award, the PIs will use finite-element viscous flow models to study the different melting mechanisms likely to be occurring beneath volcanic arcs. The three main mechanisms to be studied are: flux melting from hydration of the mantle wedge from the subducting slab, decompression melting that occurs when a temperature-dependent mantle rheology is considered, and possible sediment melting at the subducting slab surface. Different arcs can have large differences in the amount of magmatic production and may also vary in the relative production of each melting mechanism. The PIs will investigate the various parameters affecting the production of each melting mechanism such as slab dip, subduction rate, subducting and overlying plate ages, etc. Some parameters will have a greater influence on one mechanism than another, leading to the possibility that the dominant melting mechanism could change from one arc to another, and affecting what is observed at real arcs.
