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NSF Award Abstract
- #0208310

Collaborative Research: H₂O in the Mantle Wedge

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Abstract

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Large amounts of water are carried into the upper mantle by subduction. It is generally assumed that water is released in near continuous fashion to depths of at least 150-200 km. However, it is unknown how water is transported from the slab to the volcanic front. Water in the mantle wedge strongly influences rheological and seismological properties and has a major impact on subduction zone thermal structure. The investigators propose to study the influence of water on mantle wedge dynamics in a collaborative and multi-disciplinary project. Recent rheological work has made it possible, for the first time, to quantify the influence of water on creep properties of olivine. The investigators will systematically study the rheological influence of water, with particular interest in how the observationally inferred water distribution influences the balance of subduction forces and the generation of the cornerflow. The models provide predictions on subduction zone temperature and composition that allow for critical tests using observational and experimental constraints from seismology and mineral physics.

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