AOB Seminar

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講演題目& 要旨：

A large mantle water source for the Northern California: Results from modeling and field and lab observations and implications for San Andreas Fault System hydrology and serpentinite crustal emplacement*

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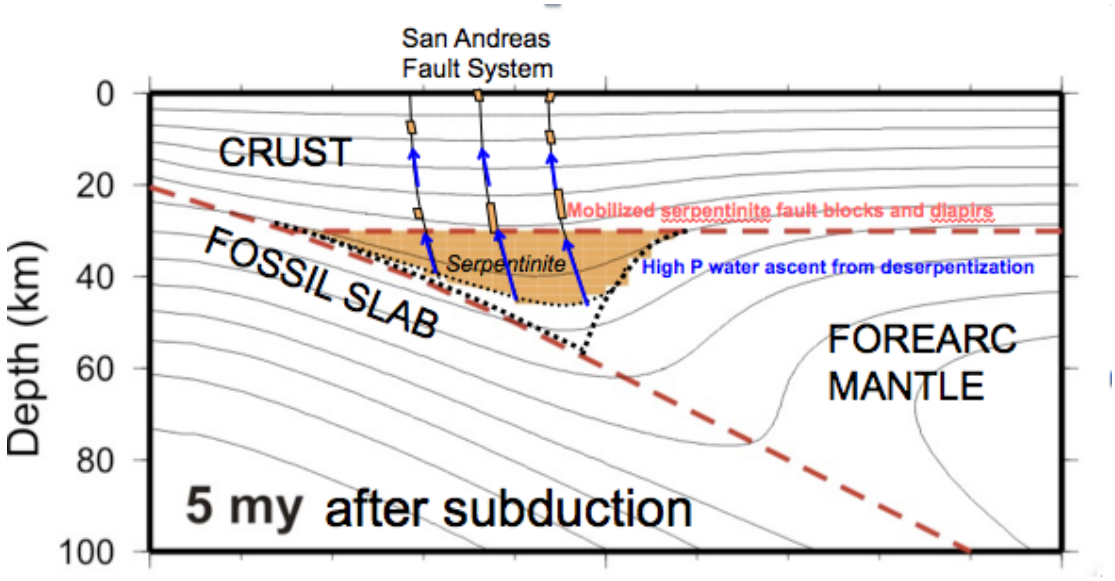
Abstract
Recent research indicates that the shallow mantle of the Cascadia subduction margin under near-coastal Pacific Northwest, USA is cold and partially serpentinized, storing large quantities of water in this wedge-shaped region. Such a wedge probably formed to the south in California during an earlier period of subduction. We show by numerical modeling that after subduction ceased with the creation of the San Andreas Fault System (SAFS), the mantle wedge warmed, slowly releasing its water over a period of more than 25 Ma by serpentine dehydration into the crust above. This deep, long-term water source could facilitate fault slip in San Andreas System at low shear stresses by raising pore pressures in a broad region above the wedge. Moreover, the location and breadth of the water release from this model gives insights into the position and breadth of the SAFS. Such a mantle source of water also likely plays a role in the occurrence of non-volcanic tremor (NVT) that has been reported along the SAFS in central California. This process of water release from mantle depths could also mobilize mantle serpentinite from the wedge above the dehydration front, permitting upward emplacement of serpentinite bodies by faulting or by diapiric ascent. Specimens of serpentinite collected from a tectonically emplaced serpentinite body along the SAFS show mineralogical and structural evidence of high fluid pressures during ascent from depth. Serpentinite dehydration may also lead to tectonic mobility along other plate boundaries that follow subduction, such as other continental transforms, collision zones, or along present-day subduction zones where spreading centers, active volcanic arcs, or plumes are subducting.

*Presentation based on Kirby *et al.*, Earth, Planets, and Space 2014, **66**:67 and Kirby, S.H and Uno, M. 2014, Geofluid 3 Presentation.



Caption: Diagram showing the warming of serpentinized forearc mantle that dehydrates from the bottom after subduction ceases (dashed to dotted line) and transform motion begins, releasing pressurized water into the mantle and crust above, facilitating slip at low stresses along the San Andreas Fault System, and mobilizing diapiric ascent of serpentinite bodies.