# The search for water in the mantle transition zone

*Christine Houser[1]

1. Earth-Life Science Institute, Tokyo Institute of Technology

Combining global maps of 410 and 660 km discontinuity topography and transition zone thickness with shear and compressional velocity variations is a powerful tool for constraining mantle transition zone chemistry, dynamics and mineralogy. Numerous seismic and mineral physics studies suggest that the 410 km discontinuity results from the phase change of olivine to wadsleyite and the 660 km discontinuity results from the phase change of ringwoodite to perovskite and magnesiowustite. We use underside reflections off the 410 and 660 km discontinuities, or SS precursors, to globally map discontinuity depth variations. We can then compare the observed discontinuity depth to global shear velocity models. Mineral physics studies have shown that water should decrease shear velocity, elevate the 410 km discontinuity, and depress the 660 km discontinuity. Combining the seismic data with results from mineral physics studies, there are few regions in the mantle transition zone that are compatible with measurable water content. Thus, the current seismic data do not find many oceans of water stored in the mantle transition zone.

Keywords: mantle transition zone, water in the mantle, mantle seismology

 