Creep of Intact Antigorite:
Low Temperature Plastic Rheology Measured On a Sheet Silicate

Eric Burdette
Department of Earth, Environmental and Planetary Sciences, Brown University, Providence, RI, USA

Minerals in subduction zones display a wide spectrum of brittle and ductile behavior in the hydrated down-going slab and nearby mantle that control seismic coupling, deep fluid transport, and local mantle convection. Antigorite serpentinite is a hydrous sheet silicate present on slab surfaces and in the mantle wedge whose rheology is difficult to characterize due to its complex sheet structure and low dehydration temperature. In this talk I will discuss new methods used to deform natural antigorite at constant stresses, low strain rates (10^{-4}-10^{-9}), and high pressure (1 GPa). I will follow with discussion of resulting mechanical data that is consistent with a low temperature plasticity flow law and recovered microstructure which suggests lattice resistance is the rate limiting deformation mechanism at high pressure.