Physical properties of partially molten rocks and search for melt in the crust and mantle

Junichiro Kawagishi[1]; Hiroki Sato[2]; Kazuhiko Ito[3]

[1] Earth and Space Sci,Osaka Univ; [2] Earth and Space Sci., Osaka Univ.; [3] Faculty of Business Administration, Taisei Gakuin Univ.

We determined P-wave attenuation (Q) in an amphibolite at hypersolidus temperature and 1GPa by ultrasonic pulse transmission technique. For high temperature acoustic measurements using ultrasonic transducers, a buffer rod must be used in between the sample and the transducer. We observe both the direct (first) and reflected (second) echoes using a high impedance buffer rod. We determined Q values by taking spectral ratios of direct to reflected echoes. P-wave velocities were also determined from travel times between the two echoes.

Q values and velocities in amphibolite dropped sharply at temperatures above the solidus (700 degree), indicating that partial melting acts to significantly lower the elasticity of amphibolite.

We estimated the temperature and the fraction of partial melt in the lower crust and the upper mantle from Q and velocity data of amphibolite and peridotite, respectively. We will report estimates of temperature and melt fraction beneath the Central Andes, where the Nazca plate subducts beneath the South America plate.