E016-010 Room: IC Time: May 29 11:30-11:45

Anisotropies of electrical conductivities and P wave velocities of cataclasites and mylonites at ambient condition

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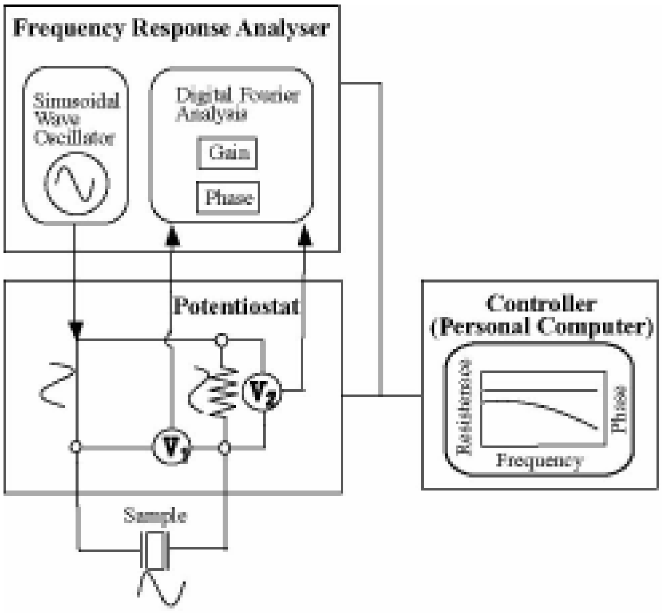
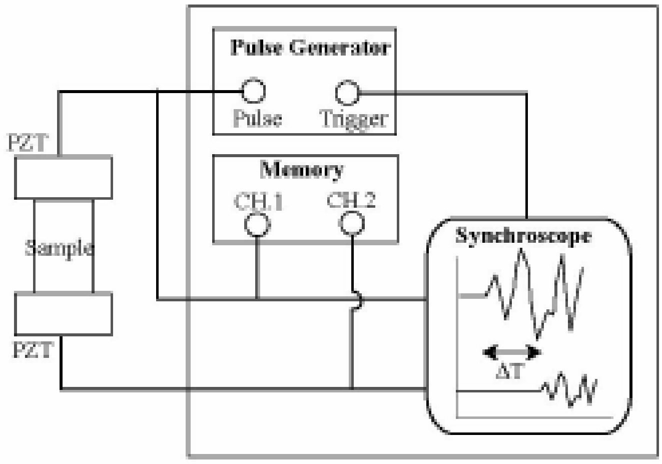
Resent studies of electromagnetic survey reveal the electrical conductivity structure at the deeper part of faults (Iio et al, 2000; Ogawa et al., 2001). There seems to be high conductivity region around the focal areas. The high conductivity may be related to the existence of water in rocks, which affect the strength and activity of faults, i.e., earthquake. At the same time, the electromagnetic responses indicate two-dimensional structure at the long period response (Ogawa et al., 2001). Rocks at the focal zone of a fault are expected to suffer from hard deformation and/or fracturing with alteration. Those fault-related rocks, such as mylonite and cataclasite have characteristic fabrics.

We conducted measurements at ambient condition of electrical conductivities and P wave velocities of mylonite and cataclasite samples collected at Hatagawa fault zone, which is a large exhumed fault in North-east Japan. We observed clearly foliations and lineations in mylonite samples, but not observed any planar or linear fabric on a cataclasite sample. The conductivities at 1 Hz of samples under dry condition had little difference among samples. Under wet condition, conductivities of all samples increased by more than one order of magnitude, and conductivities along three orientations of mylonite were significantly different; the conductivity perpendicular to the foliation was lower by about one order of magnitude. The P wave velocities of mylonite samples showed anisotropy both under dry and wet conditions; the velocity perpendicular to the foliation was slowest. The extent of the anisotropy appeared to be small under wet condition. These results indicate the distribution and connectivity of cracks in mylonite are anisotropic and more conductive and slower velocity water than rock matrix connected along the foliation. At rather shallow depth, cracks are insufficiently closed and the anisotropic distribution of the electrical conductivity and P wave velocity may be detected. At greater depth, cracks are closed but anisotropy due to the preferred orientation of minerals may be observed.



Block diagram of the electrical conductivity measurement



Block diagram of the P wave velocity measurement.