Attenuation structure beneath Atotsugawa fault - estimation of Qp/Qs -

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The Atotsugawa fault (AF) system is one of the most active fault zones in inland area of central Japan. Along this fault, non-homogeneous distributions of microearthquakes and creep like movements were reported [e.g. Ito et al.(2007) , Tada et al.(1998)]. To know what factors cause such heterogeneity of seismicity or creep like movements will be very important to clarify strain accumulation and stress concentration processes in this region.

Using the seismic and MT data derived by the joint seismic observations [Japanese University Group of the Joint Seismic Observations at NKTZ (2005)] and Network-MT survey, detailed seismic velocity, attenuation and resistivity structures were revealed [Nakajima et al.(200), Kato et al.(2007), Nozaki et al.(2008), Ueshima et al.(2008)]. Comparing the attenuation structure with the velocity structure determined by Kato et al.(2007), we found that high Qp region approximately corresponds to high Vp region in the western to central part of the AF. However the resistivity becomes rather low in the same region. Such discrepancies between velocity, attenuation and resistivity structures might be caused by the different responses of these parameters for physical conditions.

Since, in the shallower depths, Qp/Qs is considered to be a sensitive parameter to the existence of fluid, we try to determine it along the AF. Using a simultaneous inversion method developed by Tsumura et al. (2000), we can get Qp and Qs values independently. However, calculating Qp/Qs from those Qp and Qs values is not adequate, because both of Qp and Qs values always involve some trade off between source, site, and attenuation and it is very difficult to know accurate amount of such trade off. Then, in this study, we try to determine Qp/Qs from spectral ratio between P and S waves.

The results of preliminary analysis show that derived Qp/Qs have large variation in the fault zone. However this variation is probably caused by noisy P and S spectra at high frequencies. Noise reduction at the high frequency side of wave spectra will provide us better images of the Qp/Qs along the AF.