S231-004 **Room: 302** **Time: May 24 9:45-10:00**

Asperity of the 2004 Niigata-Chuetsu Earthquake from seismic velocity structure, stress tensor inversion and S wave splitting

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Imaging of the hypocentral faults of the 2004 Niigata-Chuetsu earthquake sequence was performed by double-difference tomography using data obtained by a temporary dense observation network deployed in the hypocentral region. Two parallel unfavorly oriented fault planes steeply inclined to the WNW are revealed, that of the main shock and that of the largest aftershock. They are imaged as well as a zone of velocity change between the high-velocity and low Vp/Vs footwall and the low-velocity and high Vp/Vs hanging wall for both P- and S- waves. This suggests that the mainshock and the largest aftershock are caused by the reactivation of normal faults in the Miocene under the current compressional stress regime. Parts of the fault planes are also found to be located within the low-velocity zone. This low-velocity zone would correspond with highly fractured zone around the fault plane with high fluid pressure, which reactivated the unfavorly oriented fault and triggered the present earthquake. Large coseismic slip area appears to extend to the northeastern portion with relatively high velocity and low Vp/vs. This suggest that the asperity (large coseismic slip area) of the main shock possibly correspond with a higher velocity region along the fault plane.

Stress field in the source area is studied by stress tensor inversion method [Gephart and Forsyth, 1987]. Reverse-fault type stress regime and strike-slip type stress regime with WNW-ENE oriented maximum compressional axis are obtained in the the southwestern and the central parts, and the northeastern part of the focal area, respectively. Maximum compressional axis near the large slip area is almost perpendiculer to the the mainshock fault plane. Aftershocks having large stress ratio value are located around the large slip area. These stress perturbations might be due to large coseismic slip of the mainshock asperities.

We also analyze shear wave splitting using the waveform data. Fast directions are E-W or ESE-WNW in the southwestern part of the focal area, where the distinct low-velocity hanging wall is distributed. This direction is consistent with the predominant direction of maximum compressional axis, which possibly suggests that aseismic deformation occurs there and it forms the anisotropic structure. However, NE-SW fast directions are dominant in the central part of the study area, where the high-velocity areas are distributed in and around the fault plane and large coseismic slip occurred. The strikes of main shock and other aftershocks are NE-SW there. Thus, NE-SW fast directions observed in the central part of the study area may be related to local crack alignment due to large coseismic slip of the mainshock asperities.

We also select similar earthquake pairs inferred from waveform similarity and precise hypocenter relocation. The similar earthquake pairs are located outside the large coseismic slip areas. It suggests that the similar earthquake pairs might occurred by the repeated rupture of small asperities outside the mainshock asperitis due to the postseismic deformation.