[EJ] Evening Poster | S (Solid Earth Sciences) | S-CG Complex & General

[S-CG57]Dynamics in mobile belts

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The dynamic behaviours of mobile belts are expressed across a wide range of time scales, from the seismic and volcanic events that impact society during our lifetimes, to orogeny and the formation of large-scale fault systems which can take place over millions of years. Deformation occurs on length scales from microscopic fracture and flow to macroscopic deformation to plate-scale tectonics. To gain a physical understanding of the dynamics of mobile belts, we must determine the relationships between deformation and the driving stresses due to plate motion and other causes, which are connected through the rheological properties of the materials. To understand the full physical system, an integration of geophysics, geomorphology, and geology is necessary, as is the integration of observational, theoretical and experimental approaches. In addition, because rheological properties are greatly affected by fluids in the crust and fluid chemical reactions, petrological and geochemical approaches are also important. After the 2011 great Tohoku-oki earthquake, large-scale changes in seismic activity and regional scale crustal deformation were observed, making present-day Japan a unique natural laboratory for the study of the dynamics of mobile belts. This session welcomes presentations from different disciplines, such as seismology, geodesy, tectonic geomorphology, structural geology, petrology, and geofluids, as well as interdisciplinary studies, that relate to the dynamic behaviour of mobile belts.

[SCG57-P24]Three dimensional S-wave velocity structure near the fault zones of the 2000 western Tottori earthquake using surface wave tomography

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We applied high-resolution surface wave tomography using ambient noise records to reveal three dimensional S-wave velocity structure in San-in area near the 2000 western Tottori earthquake (Mw6.8). In this area, many earthquakes have been happened by unexplored faults. The recent study using GPS data revealed that strain is accumulated in the San-in area (Nishimura at al., 2017). Therefore, new faults may be generated in the future. To reveal the mechanism of earthquakes, many seismometers were deployed around the western Tottori area. This project is called Manten project (Iio et al., 2017). In this area, P- and S-wave velocity structure at deeper than 3km was estimated by seismic tomography using P- and S-wave first arrival times from local earthquakes (Zhao et al., 2004) but the spatial resolution in shallow structure is limited. In our study, we tried to explore relatively shallow velocity structure and clarify the fault and lithology distribution in this area by using ambient seismic noise obtained from the Manten project. We used continuous seismic data recorded by 129 seismometers during the period from 15th June to 20th September in 2015. We estimated surface wave dispersion curves between two pairs of seismometers by applying the zero-crossing method (Ekström et al., 2009) based on the Spatial Auto Correlation (SPAC) method (Aki, 1957). By using station pairs separated by 10 to 40km, we calculated more than 3000 dispersion curves. We then inferred high-resolution phase velocity maps in the frequency range from 0.3 to 0.7Hz. Three dimensional S-wave velocity distribution was approximately estimated from observed dispersion curves by using empirical relationship between surface wave dispersion curve and S-wave velocity profile (one-third wavelength transformation) (Hayashi, 2008). The velocity boundary observed in our results could be related to the geological boundary in north area. The S-wave velocity distribution we obtained in this study demonstrated that east-west faults are identified as low S-wave velocity. However, the seismogenic fault in the 2000 western Tottori earthquake is located at high S-wave velocity lineament. Our high resolution shallow seismic velocity model (less than 3km depth) estimated using dense seismic array will help for understanding fault characteristics and stress accumulation, and contribute to disaster prevention in San-in area.