[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-P27]Change of pore connectivity in granular materials under confining pressures

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The pore connectivity in Berea sandstone (porosity~20%) is remarkably reduced under confining pressures. Electrical conductivity in Berea sandstone decreased by 22% as the confining pressure was increased to 40 MPa, while the pore-fluid pressure was kept at atmospheric pressure (0.1 MPa). Measured volumetric strain showed that the change in porosity under the confining pressure was less than 1%. The observed relatively large decrease in conductivity requires a significant decrease in the connectivity of pores. The effective medium theory (Kirkpatrick, 1973) suggests that around 20% of conduction paths must be closed to decrease conductivity by 22%. The observation of pore structures with X-ray CT revealed that a lot of thin pores were involved in a network of pores. These thin pores are likely to close under confining pressures to reduce electrical conductivity. Compression tests on packed quartz sand also showed that a small decrease in porosity causes a relatively large decrease in conductivity.