[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-P06]Misconstrues related to grain size reduction and exsolution/phase separation in plagioclase under lower crustal conditions

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Understanding the development of shear zones in the uppermost region of the lower crust is a key factor to evaluate recurrence of major earthquakes. Plagioclase is a major constituent mineral of the lower crustal shear zones, and then mechanical and rheological properties of plagioclase aggregates is crucial. When plagioclase is very fine (less than tens of microns), it would deform by grain-size-sensitive (GSS) creep, leading strain softening. The processes of grain size reduction of plagioclase in the lower crust, involving dynamic recrystallization, fracturing, metamorphic recrystallization, and phase transition, have been reported. Recently, exsolution/phase separation has been proposed as a new process of grain size reduction of plagioclase. In this study, to clarify the dominant process of grain size reduction of plagioclase in the lower crustal conditions, we analyzed anorthositic mylonites from Eidsfjord shear zone in northern Norway. The observation of the microstructure and the crystal orientation obtained from SEM-EBSD revealed that dynamic recrystallization and fracturing are not important as the process of grain size reduction of plagioclase. In the recrystallized plagioclase grains, An-poor cores and An-rich rims are observed. The boundary between core and rim in each grain is sharp and the crystallographic orientation between them is not different to each other. There is a gap between the composition range of An-poor cores and the composition of An-rich rims. Compositions of plagioclase porphyroclasts are similar to those of rims of recrystallized grains, suggesting that compositional zonal structures

observed in recrystallized grains may not be resulted from fracturing of plagioclase porphyroclasts and subsequent metamorphic overgrowth of rims. These observations imply that the compositional zonal structures of fine-grained plagioclase may be the result of grain size reduction due to exsolution/phase separation.