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

[S-CG57]Dynamics in mobile belts

convener:Yukitoshi Fukahata(Disaster Prevention Research Institute, Kyoto University), Toru Takeshita(Department of Natural History Sciences, Graduate School of Science, Hokkaido University), Hikaru Iwamori(海洋研究開発機構・地球内部物質循環研究分野)
Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
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-P01]Three-dimensional deformation of tectonic mélange indicated by slickenlines on foliation: An example from the Cretaceous Miyama Formation in the Kii Peninsula, Southwest Japan

*Noriaki Abe[1], Katsushi Sato[2] (1.Kyoto University, 2.Division of Earth and Planetary Sciences, Graduate School of Science, Kyoto University)
Keywords:subduction, underplating, striation lineation, tectonic melange, Miyama Formation, plate boundary

Tectonic mélanges composing accretionary prism have systematic shear structures and are considered as indicators of subducting directions of plates. The shear direction of the Cretaceous Miyama Formation, that is an underplated accretionary body composed of duplex horses including chert, basalt and tectonic mélanges of sandstones and shales, has been revealed by composite planar fabrics. Hashimoto and Kimura (1999) concluded that sinistral senses of shear dominate the central area of the formation, whereas Tokiwa (2009) found dextral shear fabrics from westernmost and eastern areas. Although they assumed a uniform shear deformation of the Miyama Formation affected by plate subduction, we should confirm whether the deformation is spatially uniform or not. To investigate more detailed spatial change of shear directions, striation lineation on the cleavage developed in the matrices of tectonic mélange was used. Our study area is the westernmost part of that of Hashimoto and Kimura (1999) and its adjacent area. As a result, various slip directions from strike-slip to dip-slip were found and they were distributed three-dimensionally. Furthermore, in order to ascertain whether the deformation of the Miyama Formation is random or systematic in the context of movement of the plate

boundary fault, deformation inversion analysis based on the model proposed by Twiss et al. (1991) was performed. According to this model, a complicated slip direction distribution can occur due to block rotation even under a uniform deformation. As a result of the inversion analysis of all the obtained slip direction data, it is impossible to explain the entire study area by a uniform deformation. Then, the same inversion analyses were applied to the slip directions for each duplex unit. As a result, it was found that the distribution of each unit can be explained by individual uniform deformation. It is considered that the difference reflects the deformation at the time of underplating.