[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-P26]P-wave anisotropic tomography of the Alps

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Keywords:Alps, P-wave anisotropy, tomography, velocity structure, plate subduction

The first tomographic images of P-wave azimuthal and radial anisotropies in the crust and upper mantle beneath the Alps are determined by joint inversions of arrival-time data of local earthquakes and teleseismic events. Our results show the south-dipping European plate with a high-velocity (high-V) anomaly beneath the Western-Central Alps and the north-dipping Adriatic plate with a high-V anomaly beneath the Eastern Alps, indicating that the subduction polarity changes along the strike of the Alps. The P-wave azimuthal anisotropy is characterized by mountain chain-parallel fast velocity directions (FVDs) in the Western-Central Alps and NE-SW FVDs in the Eastern Alps, which may be caused by mantle flow induced by the slab subductions. Our results reveal a negative radial anisotropy (i.e.,) existing within the subducting slabs and a positive radial anisotropy (i.e.,) in the low-velocity mantle wedge, which may reflect the subvertical plate subduction and its induced mantle flow. The results of anisotropic tomography provide important new information on the complex mantle structure and dynamics of the Alps and adjacent regions.

References

Hua, Y., D. Zhao, Y. Xu (2017) P wave anisotropic tomography of the Alps. *J. Geophys. Res.* 122, 4509-4528.