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

[S-CG57]Dynamics in mobile belts

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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-P07]Integrated deformation scheme around the northern Izu-Bonin arc, as a "strain concentrated zone" including N-S crustal-shortening

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Keywords:integrated deformation scheme, strain concentrated zone, crustal thickness, Izu peninsula, Izu-Bonin arc, northern border of the Philippine Sea plate

We present a simple model of "integrated deformation scheme", including massive N-S crustal shortening with both the elastic and inelastic components, at the Izu Peninsula and its vicinity of the northeastern border of the Philippine Sea plate (PH). In our model, the so-called "strain concentrated zone" covers the area around the Izu peninsula.
The main tectonic elements governing the integrated crustal deformation concerned, are as follows;

(1) Northward (or northwestward) compressive lithospheric convergence with some components of scraping off the upper crustal layer of PH, at the northern end zone of the Izu peninsula. As stated in previous studies, this process involves a differential horizontal motion between the shallower crustal layer and deeper part of PH lithosphere.

(2) 3D deflection effects of PH due to both of the northwestward and northeastward bending processes at the Suruga and western Sagami troughs, respectively.

(3) Dynamic behavior of PH slab within the wedge mantle beneath the area from the metropolitan area to

the Shizuoka prefecture.

(4) Confined zonal right-lateral shear deformation along the volcanic front (VF) of the Izu-Bonin arc system. Non-negligible contrast across VF in both the thermal state and the crustal strength of PH.

Our integrated model requests inevitably a long-term increase in the crustal thickness due to the massive strain accumulation of both the larger N-S (or NNW-SSE) shortening and the smaller E-W elongation, especially at the northern part of the Izu-Bonin arc.