[EE] Evening Poster | S (Solid Earth Sciences) | S-IT Science of the Earth's Interior & Tectonophysics

[S-IT24]Probing the Earth's interior with geophysical observation on seafloor

convener:Daisuke Suetsugu(Department of Deep Earth Structure and Dynamics Research, Japan Agency for Marine-Earth Science and Technology), Guilhem BARRUOL(CNRS, Institut de Physique du Globe de Paris, France), Hitoshi Kawakatsu(東京大学地震研究所, 共同), Douglas Wiens(Washington University in St Louis)

Tue. May 22, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Most important sites for plate tectonics and mantle dynamics studies (e.g., subduction zones, spreading ridges, and hot spots) are located in oceanic regions. The coverage of seismic stations is concentrated in land areas, which cover only one-third of Earth's surface. Since 1990s, technology for seafloor geophysical instruments to explore deep earth structure have been advanced, such as broadband ocean bottom seismographs (BBOBSs), ocean bottom electro-magnetometers (OBEMs), and pressure gauge, because observation network in oceanic regions is essential for major breakthroughs in Earth sciences. Technical advance in the instruments including cabled realtime seafloor networks have made the seafloor observation more common and reliable, which promotes a number of seafloor observations, both temporary and permanent networks, in the last decade. We call for papers on recent scientific results from such observation projects, including those on crust and mantle structure beneath subduction zones, hot spots, Large Igneous Provinces, and spreading ridges. Technical advances for observation in oceanic regions, including seafloor instruments and drifting float, proposals and plans for innovative observations are also welcome.

[SIT24-P09]3D gravity modeling of crustal structures beneath the Southwest Indian Ridge

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Keywords:Gravity modeling, Southwest Indian Ridge, Ultraslow spreading segment, lithospheric structure

The oceanic crust is continuously produced by a combination of magmatic and tectonic processes at mid-ocean ridges, which extend about 80,000 km across the entire ocean basins. Such spreading mode at ridges in general varies as a function of spreading rates. The oceanic lithospheres are diverging with sufficient magmatic supply under faster spreading environments, whereas the plates experience brittle extension with little melt supply under slower spreading environments. In particular, the Southwest Indian Ridge (SWIR) spreading at a full rate of ~14 mm/yr is categorized as an ultraslow spreading ridge. However, the axial depth of the SWIR changes dramatically depending on available melt supply, showing ~1000 m depth difference across the Gallieni Fracture Zone (FZ). Recent seismic studies on this shallow segment at 50º28´E consistently revealed the presence of an extremely magmatic accretion of the oceanic crust. In this study, we utilize the two-dimensional seismic velocity model to predict the three-dimensional density structure associated with such enhanced melt supply at the SWIR. First, we constructed a 2-D reference density model in IGMAS+ based on the 2-D seismic observation and minimized errors by adjusting boundaries between distinct anomalous bodies. Then, we have continually added more 2-D sections having small offsets from the reference density model so that our gravity model can be extended to regions where no seismic data are available. Here we present preliminary results from the 3-D gravity modeling that characterize the enhanced magma supply system beneath the

Southwest Indian Ridge and discuss its tectonic implications to lithospheric extension at ultraslow spreading ridges.