[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

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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-P05]sPL waves observed by the OJP array in the Ontong Java Plateau

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A seismic phase, sPL, is a PL wave converted from upgoing S waves at the earth’s surface or an ocean bottom. We found conspicuous sPL waves traveling over the Philippine Sea plate from intermediate-depth earthquakes in the Mariana region, and reported that their predominant periods are sensitive to the seismic velocity structure of the lithosphere (Ukawa et al., 2017 SSJ meeting). In this study, we try to find sPL waves in the Ontong Java Plateau (OJP), using broad-band seismograms observed by the OJP array deployed by Suetsugu et al., (2017).

We examined seismograms from 6 intermediate-depth and deep focus earthquakes in and around the Solomon Islands and New Hebrides regions in 2015 and 2016. Among them, we identified sPL waves at three stations (OJ15, OJ16 and OJ20) in the epicenter distance range 10 to 16 degrees from an intermediate-depth earthquake (focal depth 220 km, M6.8) in the New Hebrides region occurring on Jan. 23, 2015. The seismic waves from the epicenter to OJ15 and OJ16 propagated outside of the southern margin of the OJP, and those to OJ20 propagated outside of the eastern margin of the OJP. By applying the wavelet analysis, the predominant periods of OJ15 and OJ16 are estimated to be 30-32 s. In contrast, OJ20 shows shorter predominant period of 23 s. The former predominant periods are synthesized by the seismic velocity structure of PREM, and the shorter predominant period at OJ20

suggests thinner crust like oceanic lithospheres. Considering the results of the research for the Philippine Sea plate, we call the former case as the PREM type, and the latter as the oceanic type.
It is noticeable that observed seismograms from the event (June 21, 2016) near Latangai Island (focal depth 354 km, M6.3) exhibit no or weak sPL waves in the Ontong Java Plateau, although synthetic seismograms for this event show clear sPL waves.
Our results indicate the following regional characteristics of the sPL waves observed by the OJP array; sPL waves traveling along the western side of the OJP with the predominant periods of the PREM type, those traveling along the eastern side of the OJP with the predominant period of the oceanic type, and no or weak sPL waves traveling in the main part of the OJP. This regional difference presumably originates from the seismic velocity of the lithosphere, especially of the crust.