Surface wave imaging of the lithosphere and asthenosphere system beneath north Okinawa Trough from NOT OBS array

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The NOT experiment is an ocean bottom seismic experiment conducted at the north part of the Okinawa Trough as a collaboration between Taiwan and Japan. The NOT experiment is designed to image the structure of the Ryukyu subduction system which consists of trench–arc–backarc extending from Japan to Taiwan. The Okinawa Trough (OT), the backarc basin in the Ryukyu subduction system, is unique due to its extensive active rifting. Here we present surface wave analysis data from the ~21 broadband ocean bottom seismograms and 3 land-stations from the F-net network of Japan. With the passive seismic imaging using this seismic array with the aperture ~260 km, we can have local constraints on the seismic model in the lithosphere and asthenosphere system. Noise levels in vertical components of the most OBS sit within the global reference new high- and low- noise models with significant tilt and compliance noises contaminations. Tilt and compliance noises arise from instrument tilting under bottom current flow due to coupling problems and seafloor deformation caused by the infragravity wave respectively. We first characterize the temporal variations of tilt and compliance noises for each station. We then remove tilt and compliances noises from vertical recordings sequentially to retrieve true ground motions due to the structural properties. We utilize an intra-array cross-correlation analysis to measure Rayleigh-wave phase velocities for the teleseismic events with noises corrected vertical data. Phase velocity maps from the shorter period (< 32s sec) show low velocities beneath the volcanic arc. In the mid-period (40- 70s), the low phase velocity anomaly is seen beneath Okinawa Trough. We plan to show regional dispersion patterns beneath the backarc basin and volcanic arc to understand the seismic structure within the lithosphere and asthenosphere system.

Keywords: Ryukyu subduction, broad-band ocean-bottom seismograph (BBOBS), seismic noise, compliance and tilt corrections, Rayleigh wave phase velocity