Rayleigh-wave group velocities in Antarctica

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Seismicity in the Antarctic plate is very low, except the high seismicity along the plate boundaries. Body waves provide us with local structures beneath stations. Surface waves are very suitable to estimate structure beneath the whole Antarctic plate. In this study, 1-D structures beneath several areas of Antarctica and group velocity distribution beneath whole Antarctica are determined by using group velocities estimated from IRIS FARM data. The methods that Singh et al. (2001) applied to the northwest Pacific region are also applied in this study.

The IRIS FARM data recorded between 1990 and 1998 are used, and contain not only GSN data but other FDSN network data and PASSCAL data. Stations and epicenters located between 40S and 90S are used. The magnitudes are larger than 5.5.

Fundamental-mode Rayleigh-wave group velocities are measured by using the multiple filter technique (Dziewonski et al. 1969). The period range is between 10s and 150s. Anomalous dispersion curves are removed from the database. At periods shorter than 10s and longer than 100s, anomalous group velocities due to low S/N ratio are also removed. Thus, the numbers of earthquakes, stations, and paths that we analyze are 206, 37, and 1051, respectively.

Antarctica is divided into several areas according to tectonic features, and the 1-D S-wave velocity structures beneath these areas are estimated from the group velocity dispersion curves. We use the code developed by Herrmann (1987) and Herrmann and Ammon (2002). In the lower crust and upper mantle beneath East Antarctica, the S-wave velocities are lower than the EA-0 model estimated by Kobayashi (1999), and low velocity zone in the upper mantle appears.

Group velocity variations beneath Antarctica are estimated by using and the same group velocity data as that used above. A tomographic technique developed by Yanovskaya (1982) is used. The detail results will be reported in the presentation.