

Crustal structure and evolution model of Antarctic continent inferred from broadband waveform analyses

Masaki Kanao[1]

[1] NIPR

<http://www.isc.nipr.ac.jp/~kanao>

Seismic velocity models of the crust were studied by teleseismic waveform inversion analyses beneath the permanent station of Federation of Digital Seismographic Networks in Antarctic margins. In order to eliminate the starting model dependency, non-linear Genetic Algorithm was introduced in the time domain inversion for the receiver functions. A plenty of velocity models with an acceptable fit to the broadband waveforms were generated during the inversion, and a stable model was produced by employing a weighted average of the best models encountered in the development of the GA. The shear velocity model beneath the East Antarctic stations (MAW, DRV, SYO) have sharp Moho boundaries around 30-44 km depth that might have involved in a reworking of the adjacent area. Fairly complicated velocity variations within the crust in these regions may have a relationship with lithology of metamorphic rocks in the shallow crustal level associated with chiefly Pan-African events. Broadening low velocity zones about 30 km depths with transitional crust-mantle boundary at the Ross Sea area (VNDA), might be caused by the rift system besides the Trans Antarctic Mountains. As for the Antarctic Peninsular, very broad Moho was found around 36 km depths around the PMSA station. The evidence of velocity variations within the crust reflects the tectonic histories of each terrain where these permanent stations are located. At last, the temporary broadband data were investigated to obtain the Moho depth variations in the southern part of the SYO, western Esderby Land. The deepened and complex crustal signature toward the southern part along the Soya coast would be presumably associated with the Pan-African events, when the amalgamation of East - West Gondana.