

Tectonics of the Lutzow-Holm Complex, East Antarctica, derived from deep seismic surveys

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Lithospheric evolution viewed from East Antarctic Precambrian Shield have sufficient significance in relating to the continental growth in Earth's evolution. In this presentation, we focus on the lithospheric structure of the early-Paleozoic crust of the Lutzow-Holm Complex (LHC), Eastern Dronning Maud Land, East Antarctica. LHC is considered to be one of the collision zones between the East- and the West- Gondwana during the formation of a paleo-supercontinent when the Pan-African orogeny. The SEAL project has been carried out since 1996-1997 austral summer in the framework of the Japanese Antarctic Expedition. In the austral summer in 2000, and 2002, deep seismic probing were conducted on continental ice sheet in northern part of the Mizuho Plateau. Wide-angle travel-time analyses revealed the Moho depths have values ranging from 38-42 km along the profiles, with the velocities of the upper crust, the middle crust, the lower crust and the uppermost mantle, about 6.2, 6.4, 6.5 and 8.0 km/s, respectively. The velocities in surface layer have a variation from 5.9-6.2 km/s, which appears to correspond with the metamorphic grade of the surface geology from the amphibolite to the granulite facies. Moreover, clear reflections from the Moho, together with inner crustal reflections have been observed on the record sections; which imply the existence of horizontal heterogeneity on the crust-mantle boundary beneath the Paleozoic orogenic belt of the LHC. Laminated layered structure around the Moho discontinuity can also be identified by the spectral ratio analyses for the PmP waves. Relatively complicated crustal structure characterized by the reflection section by SEAL-2002 indicate the influence of the compression stress in the NE-SW direction during the Pan-African age; when the last stage of continent-continent collision between the East- and West- Gondwana. On the other hand, fairly flatter structure derived from SEAL-2000 survey suggests the existence of extensional stress in the NW-SE direction presumably when the breakup of Gondwana around 150 Ma.