

Lithological and petrophysical variation of the lower crustal section from the ICDP Oman drilling project Holes GT1A and GT2A

*Yuki Kusano¹, Susumu Umino², Takashi Hoshide³, Eiichi TAKAZAWA⁴, Damon A H Teagle⁵, Peter B Kelemen⁶, Judith Coggon⁵, The Oman Drilling Project Phase I Science Party⁷

1. Geological Survey of Japan/AIST, 2. Kanazawa University, 3. Akita University, 4. Niigata University, 5. University of Southampton, 6. Lamont-Doherty Earth Observatory, 7. D/V CHIKYU

Oman Ophiolite is one of the best-preserved ophiolite in the world and the type locality of oceanic lithosphere. ICDP Oman Drilling Project (OmDP) drilled ~100% core recovery of continual lower crustal section in Hole GT1A (22° 53.535'N, 58° 30.904'E; 403.7 m depth) and GT2A (22° 51.793'N, 58° 31.198'E; 406.77 m depth). These cores were cut in half and conducted on-board description on D/V CHIKYU during July-August 2017. Igneous and alteration petrologists, structural geologists, geochemists, physical property specialists and paleomagnetists got a series of core description.

Both GT1A and GT2A cores consist of ~65% of olivine gabbro, ~25% of olivine-bearing gabbro and olivine melagabbro. Minor rock types are anorthositic gabbro, troctolitic gabbro, orthopyroxene-bearing gabbro, gabbro-norite, dunite, gabbro, gabbro-norite, varitextured gabbro, troctolite, and troctolitic gabbro. Intercalation of minor rock types into major rock types exhibits “layering” structure, but also major rock types show layering and foliation consist of mineral size, mode and structure.

Variable layering and foliation intensity is common feature of the lower crust, but it is difficult to describe it standardize due to the thickness changes from < mm to meter order. We tried to use magnetic susceptibility (MS), luminance value (L*, a*, b*) of the archive half cores measured by Multi-Sensor Core Logger with 2 cm step interval. Generally, MS and luminance are sensitive in olivine mode and alteration, respectively.

Keywords: Oman Ophiolite, layered gabbro, foliated gabbro, Magnetic susceptibility