
 [EE] Evening Poster | S (Solid Earth Sciences) | S-CG Complex & General

[S-CG54]Hard-Rock Drilling: Oman to Oceanic Lithosphere to Island Arc Formation and Beyond

convener: Eiichi TAKAZAWA (Department of Geology, Faculty of Science, Niigata University), Katsuyoshi Michibayashi (Department of Earth and Planetary Sciences, Nagoya University), Peter B Kelemen (共同), Damon A H Teagle (Ocean & Earth Science, National Oceanography Centre Southampton, University of Southampton, SO14-3ZH, Southampton, UK)

Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

The on-going Oman Drilling Project (OmDP) has drilled numerous hard-rock cores of ancient oceanic lithosphere and the underlying subduction zone of the Samail ophiolite in Oman, with support from ICDP, IODP, the Sloan Foundation's Deep Carbon Observatory, and Japanese, US, and European research agencies. Moreover, a number of IODP expeditions have focused on hard-rock drilling over the last 5 years including Expedition 352 in 2014, which drilled the volcanic sequence associated with subduction initiation in the Bonin fore-arc, Expedition 357, which drilled the Lost City hydrothermal field, Expedition 360, which drilled the lithosphere associated with ultraslow-spreading at the Southwest Indian Ridge in 2016, and Expedition 366, which drilled the serpentinite seamounts in the Mariana fore-arc. In this session, we invite presentations on the scientific results of hard-rock drilling at these and other sites. We also invite related presentations on oceanic lithosphere, island arc formation, and any other significant issue that could be addressed by future hard-rock drilling. This includes marine studies of oceanic lithosphere and on-land geological investigations of ophiolites, accreted arcs, and subduction complexes. The session is intended to be interdisciplinary, including the fields of geophysics, geochemistry, petrology, engineering, and biology.

[SCG54-P01] Lower crustal section of the Oman Ophiolite drilled in Hole GT1A, ICDP Oman Drilling Project

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Keywords: Oman Ophiolite, fast-spreading axis, oceanic crust accretion, layered gabbro, foliated gabbro

Hole GT1A (22°N, 53.535°E) was drilled by the Oman Drilling Project (OmDP) into GT1A of the Samail ophiolite, Oman. OmDP is an international collaboration supported by the International Continental Scientific Drilling Program, the Deep Carbon Observatory, NSF, IODP, JAMSTEC, and the European, Japanese, German and Swiss Science Foundations, with in-kind support in Oman from the Ministry of Regional Municipalities and Water Resources, Public Authority of Mining, Sultan Qaboos University, and the German University of Technology. Hole GT1A was diamond cored in 22 Jan to 08 Feb 2017 to a total depth of 403.05 m. The outer surfaces of the cores were imaged and described on site before being curated, boxed and shipped to the IODP drill ship Chikyu, where they underwent comprehensive visual and instrumental analysis.

Hole GT1A drilled the lower crustal section in the southern Oman Ophiolite and recovered 401.52 m of total cores (99.6% recovery). The main lithology is dominated by olivine gabbro (65.9%), followed in

abundance by olivine-bearing gabbro (21.5%) and olivine melagabbro (3.9%). Minor rock types are orthopyroxene-bearing olivine gabbro (2.4%), oxide-bearing olivine gabbro (1.5%), gabbro (1.1%), anorthositic gabbro (1%), troctolitic gabbro (0.8%); orthopyroxene-bearing gabbro (0.5%), gabbronorite (0.3%); and dunite (0.3%).

These rocks are divided into Lithologic Unit I to VII at 26.62 m, 88.16 m, 104.72 m, 154.04 m, 215.22 m, 306.94 m in Chikyu Curated Depth in descending order; Unit I and II consist of medium-grained olivine gabbro with lower olivine abundance in Unit II. Unit III is medium-grained olivine melagabbros, marked by an increase in olivine. Unit IV is relatively homogenous medium-grained olivine gabbros with granular textures. Unit V is identified by the appearance of fine-grained gabbros, but the major rocktypes are medium grained olivine gabbros. Unit VI is medium-grained olivine gabbro, marked by appearance of orthopyroxene. Unit VII is of fine- to medium-grained olivine gabbros with less olivine.