[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-P13]Major and trace element compositions of peridotites from the Maqsad diapir area: implication for the melting and melt-mantle reaction at mid-ocean ridge

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Keywords:ophiolite, mantle, diapir, mid-ocean ridge, partial melting, mantle-melt reaction

We investigated the relationship between the mantle diapir structure and the spatial distribution of partial melting and the mantle-melt reaction using the harzburgites from the mantle section from the Maqsad area of Samail massif in the southern Oman ophiolite.

From the planar and linear structures of harzburgites with relation to the analysis of flow direction and shear sense the upward flow in the central part of the diapir and the horizontal flow in the peripheral part were reproduced almost as same as those reported by Jousselin et al. (1998). As a result, the center of mantle diapir locates the vicinity of Maqsad and Mahram and in the periphery a flow along the paleo ridge axis extending in the NW-SE direction and a horizontal flow normal to the paleo ridge axis.

On the central part of the mantle diapir and on the paleo ridge axis, the spinel Cr# is as high as 0.55-0.58, and the relatively depleted peridotites are distributed compared to the peripheral part. On the

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other hand, in the peripheral part the spinel Cr# is as low as 0.41-0.55 indicating the distribution of less-depleted peridotites. Also, the REE abundance of clinopyroxene in the central part of the diapir is low whereas high in the peripheral part. Since the degree of melting and temperature are higher in the central part of the diapir relative to the peripheral part, the amount of melt impregnation was presumed to be small, and as a result, the residual peridotites were depleted in highly incompatible elements. On the other hand, it is thought that the peripheral part consisted of residual peridotites which moves in the horizontal direction after passing through the corner flow and gradually decreases in temperature resulted in the impregnation of melt due to percolation along grain boundaries. It caused crystallization of a small amount of clinopyroxene and spinel in equilibrium with MORB melt along grain boundaries of harzburgites.

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