

## Along-axis variations of a fast-spreading mid-ocean ridge: implication from the volcanic rocks in the Oman ophiolite

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Overlapping spreading centers and small offsets 'devals' mark the boundaries of the magma supply systems in fast spreading centers [Langmuir et al., 1986] and the topographic features appear as volcanic and compositional variations between each segment. For example, digitized profiles of the ridge axis show deeper depth, narrower axial summit and deeper melt lens beneath the ridge axis in the segment margin than shallower and inflated segment center [Scheirer and Macdonald, 1993]. It indicates that magmatisms are changed along a ridge segment. However, seafloor observations of the EPR suggest that effusion rates of lavas frequently change in each flows [Fundis et al., 2010] and investigating along-axis variations needs to detailed three-dimensional observation. Based on the segment structure proposed by Miyashita et al. [2003], we studied along-axis variations of upper crustal section in the Oman ophiolite and discovered systematic changes of extrusive sequence due to the segment structure.

Comparing eight geologic sections spanning 70 km, the along-axis volcanic system is reconstructed. Representative area of the segment center and margin is Bani Ghayth and Wadi Fizh, respectively. The total thickness of on-axis lava section decreases from the segment center (603 m thick) to the margin (410 m thick). Predominant appearance of pillow lavas around the segment margin indicates more ragged seafloor topography than the center where pahoehoe flows dominate. The intermediate areas are characterized by relatively thick (50-300 m thick) transition zone from sheeted dike complex to extrusive sequences than the segment center and margin areas (20-50 m thick). These differences might be derived from volcanic cycles between high and low lava supply periods on the area compared with an effusive segment center or less magmatic segment margin. Although thinner on-axis lava sequences occur at the segment margins, total thickness of lava section is relatively fixed because of off ridge volcanisms. Occurrences of the fissure vent or dikes intruding into the extrusives imply the volcanisms after on-ridge magmatism. Such vigorous off-axis volcanisms are recognized around the second- and third-order segment margins along the EPR. They might be rooted at less-evolved melts from depths avoiding the focus into the melt lens beneath the axis area.

Keywords: Fast-spreading ridge, MORB, Volcanostratigraphy, Oman ophiolite, Segment structure