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Magma systems controlled by segment structure: example in Oman ophiolite

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The segmentation of ocean ridges has a significant role for the magmatism and crustal structures. Geophysical studies of ocean ridges show that the thickness of crust is considerably varied depending on the segment structure. However, it is noted that the variations in crustal thickness are different between slow-spread and fast-spread oceanic crusts. The thickest crust occurs at the center of ridge segment in slow-spread oceanic crust, whereas, such thicker part occurs at rather near the segment end at fast-spread crust. The crustal thickness at the segment center tends to thin in fast-spread crust. Therefore, the magmatic system and crustal accretion are significantly different between slow- and fast-spread oceanic crusts.

Previous studies on the variations of magmatic compositions along ocean ridges have been done for the samples obtained from the top of the extrusive layer. It should be noted that the samples from the top of the extrusive layers might not necessarily be representative compositions of underlying oceanic crust. On the other hand, we can observe both vertical and along-axis variations from whole crust to mantle sections in ophiolites.

Along axis variations up to 500 km can be analyzed in the Oman ophiolite, since the ophiolite distribution is roughly parallel with sheeted dike intrusion.

We summarize recent progress and unsolved problems on studies of the Oman ophiolite.

Keywords: oceanic crust, MORB, segmentation, Oman ophiolite, magma