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Partial melting and assimilation at the basal part of sheeted dike complex in Hole 1256D, ultra-fast spread oceanic crus

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Hole 1256D is located on 15 Ma oceanic crust formed at the superfast spreading East Pacific Rise (220 mm/yr full spreading rate). This hole is the first successful drilling that penetrated the entire upper oceanic crust from 250 m thick sediments, 811 m thick extrusives (including the Transition Zone) and a thin (346 m) sheeted dike complex and drilled 105 m into the upper gabbro (Teagle et al., 2006) and important as the reference of oceanic crust from fast spreading ridges. The gabbro appears as two distinct units between the metamorphosed dike complexes. These were defined as gabbro 1 (52 m thick) and gabbro 2 (12 m thick) from above (Teagle et al., 2006). The sheeted dike complex just above the gabbro 1 is highly metamorphosed and called as granoblastic dikes. The Similar metamorphosed dike complex appears between the gabbro 1 and 2, and also the deepest part of the hole below the gabbro 2, and is called as dike screen 1 and 2, respectively.

Exp. 335 was operated as the fourth expedition at the hole 1256D. This expedition drilled 14.5 m of metamorphosed dike complex. Because of numerous fractures and very hard lithofacies, recovery was very low. Instead, a large amount of rock samples were collected from junk baskets. Some of the samples from the junk baskets were larger then core samples and showed the lithofacies that have not reported before at this hole.

The samples collected from Exp. 335 are mainly composed granoblastic dikes that are characterized by granular clinopyroxene and orthopyroxene with minor dioritic to tonalitic veins and patches. These granoblastic dikes correspond to the lithofacies of the dike screen 2 in the hole 1256D. We report petrological and geochemical features of granoblastic dikes from Exp. 335. On the basis of petrographic and petrological facts, we present evidence suggesting partial melting in the deepest part of the granoblastic dikes, which may be responsible to the generation of silicic melts.

Keywords: oceanic crust, magma, partial melting, IODP, superfast spreading ridge, Hole 1256D