

Petrological character of the gabbronorites and the metabasalts in fast-spreading oceanic crust : Hole 1256D in IODP Exp. 312

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Hole 1256D is located in the equatorial East Pacific and consist of ~15 Ma ago oceanic crust that formed at the East Pacific Rise during a period of superfast spreading (~200 mm/y). Hole 1256D was deepened to 750 mbsf during ODP Leg 206, deepened to 1255 mbsf through IODP Exp. 309 and deepened to 1507.7 mbsf. it was sampled basaltic lava from 250 to 1004 mbsf, sheeted dike complex from 1060 to 1406 mbsf and gabbroic rock below 1406 mbsf. it is the first time in the ocean drilling history that reaching the gabbro through the basaltic lava and sheeted dike complex in the fast-spreading oceanic crust.

The gabbroic rocks of Hole 1256D is present as intrusive rocks into basaltic dikes. The gabbroic rocks consist of two units; a 52.3m thick Upper Gabbro unit (1406.6-1458.9 mbsf) and a 24.1 m Gabbro 2 unit (1483.1-1507.1 mbsf). The two gabbro units are separated by a 24.2 m thick dike screen, consisting of fine-grained metabasalt with granoblastic texture. The gabbroic rocks range from gabbro to disseminated oxide gabbro, oxide gabbro, orthopyroxene-bearing gabbro, gabbronorite, quartz diorite, and quartz-rich oxide diorite. Gabbro 2 unit include several basaltic fragments.

In the lower portion of the sheeted dikes, from 1348.3 to 1406.6 mbsf, the rocks are locally recrystallized to granoblastic textures. These rocks are designated as the granoblastic dikes. The texture of the granoblastic dikes consist of completely recrystallized to secondary plagioclase and equant secondary clinopyroxene, magnetite, ilmenite, and rare orthopyroxene. The mineralogy and texture of the granoblastic dikes indicate recrystallization at high temperatures attaining granulite facies conditions. At the base of Gabbro 2 unit is a 12.1 m thick gabbronorite unit of uncertain origin. This may be a metabasalt derived from younger sheeted dikes or a fine-grained intrusive gabbronorite.

On the basis of petrography and plagioclase and pyroxene compositions of the gabbronorites from two gabbro units and the metabasalt with granoblastic textuer, petrogenesis of these rocks is documented in this report.