

## Evidence of prograde metamorphism in the Parece Vela Rift, Philippine Sea: metagabbro of the Godzilla Mullion

# Yumiko Harigane[1]; Katsuyoshi Michibayashi[2]; Yasuhiko Ohara[3]

[1] Shizuoka Univ.; [2] Inst. Geosciences, Shizuoka Univ; [3] Hydrographic and Oceanographic Dept.of Japan

Microstructural and petrological analyses of gabbroic rocks dredged from the Godzilla Mullion (dredge site D10), located along the Parece Vela Basin spreading ridge (Parece Vela Rift), Philippine Sea, reveal the existence of metagabbro formed by the prograde metamorphism in association with the magmatic activity.

The metagabbro consists of plagioclase, amphibole, ilmenite and chlorite and shows intense foliations defined by plagioclase layer and amphibole+chlorite layer. Plagioclase has coarse grained porphyroclasts in fine grained neoblasts. Plagioclase porphyroclasts show features of intracrystalline deformation such as undulose extinction, subgrain and subgrain boundary. The compositions of plagioclase show very low An contents (An0-10) in both porphyroclasts and neoblasts. Crystal-preferred orientation (CPO) of plagioclase shows an alignment of [100] axis parallel to the lineation and a girdle of (010) planes normal to the lineation. Amphibole consists of porphyroclasts and fibrous grains. Porphyroclasts show the evidence of intracrystalline deformation such as undulose extinction and subgrain. Although the amphibole porphyroclasts are predominantly edenite composition, some porphyroclasts are identified by compositional zoning and vary from core to rim: magnesiohornblende (low-Al[T1] and Ti[M2] contents), edenite (high-Al[T1] and Ti[M2] contents), magnesiohornblende (Low-Al[T1] and Ti[M2] contents). The fibrous grains are actinolite and occur along the rim of porphyroclasts. The fibrous grains are undeformed. Hornblende CPO data show a strong concentration of [001] axis parallel to the lineation and (100) plane normal to the foliation.

Given that the compositional zoning of amphibole porphyroclasts potentially results from a change in temperature, this finding suggests that the metagabbro resulted from the prograde metamorphism. The heating source for the prograde metamorphism may result from the magmatic activity in spreading axis, since D10 dredge site is close to the Parece Vela Rift.

The microstructures and CPO data of plagioclase and amphibole resulted from intracrystalline deformation, whereas the compositional zoning of amphibole porphyroclast was formed by the prograde metamorphism. This indicates that the metagabbro have deformed during the prograde metamorphism. The intracrystalline deformation in the metagabbro may be related to the detachment faulting in the Godzilla Mullion. Since the undeformed fibrous amphibole was formed along the rim of amphibole porphyroclasts, the formation of fibrous amphibole could occur after the detachment faulting under low-temperature after the prograde metamorphism.