Cl-rich hornblende and reducing reactions in oceanic gabbro

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We present mineralogical evidences of the high-temperature hydrothermal processes affected MAR lower-crust gabbro at two sites: 10°43'N, 41°35'W (I), and 12°59'N, 44°52'W (II). Hydrothermal processes in the gabbros and associated mantle peridotites occurred within the MAR axial zone (I, [1]) or at the detachment fault (II, [2]). The gabbros contain hydrothermal hornblende (*Hbl*) enriched in Cl (up to 1.4-1.7 wt.%). The Cl-enrichment correlates with Fe^{2+}/Mg increase in *Hbl* due to reducing reactions involving magnetite. Fluid inclusions in locally re-crystallized plagioclase and apatite show high-salinity hydrochloride fluid composition. The conditions are summarized in Fig. 1.

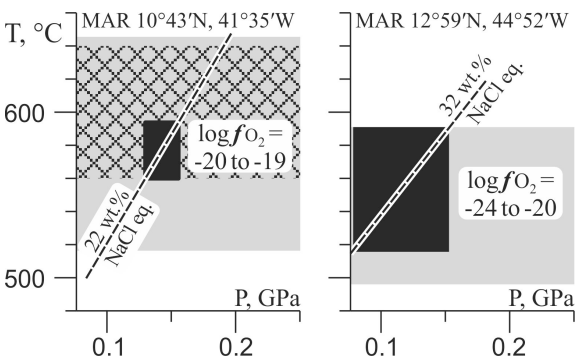

Fig. 1. Hydrothermal conditions constrained by highest-temperature isochors of fluid inclusions (dashed lines), *Mt+Ilm* (grey), and *Ol+Opx* (hatched) thermometry [3]. Black fields indicate the most probable PT conditions. The shown log$f$O$_2$ values calculated from *Opx+Mt=Ol*(corona) and *Mt+Ilm* local equilibria [3].

The reducing nature and high salinity of the hydrothermal fluid responcible for the formation of the Cl- and Fe^{2+}-rich *Hbl* may have resulted from preceding lower-T serpentinization reactions of seawater with mantle peridotite.

[1] Boschi *et al*. (2013) *Lithos* **178**, 3-23. [2] Smith *et al*., (2008) *Geoch. Geoph. Geosyst*. **9**. [3] Andersen *et al*. (1993) *Comp. & Geosci*. **19**, 1333-1350.