MORB INTRUSION INTO DENUDATED SUBCONTINENTAL MANTLE AND SUBSEQUENT RODINGITIZATION (MONTE DEL FORNO, RHETIC ALPS)

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The Forno ophiolite suite (Val Forno, Val Malenco/Switzerland, N-Italy) is formed by metabasaltic rocks and an overlying Mid-Late Jurassic to Cretaceous sedimentary sequence consisting of metaradiolarites, calcsilicates and marbles (interpreted as Calpionella or Aptychus Limestones), metapelites and metaarkoses. The Malenco ultramafics represent pre-rift subcontinental mantle of the Adriatic plate (TROMMSDORFF et al., 1993). The Malenco-Fomo nappe is a part of the Austroalpine-Penninic border region of the Alps and is partially cut by the Oligocene Bergell intrusion. The Forno unit was affected (1) by an Alpine regional metamorphism reaching upper greenschist facies conditions, (2) by a polyphase Alpine deformation history and (3) by the contact metamorphism of the Bergell intrusives. The Forno unit preserves most features of an ocean floor sequence with metapillows, metapillow breccias and oceanic mineralizations.

Mafic rocks of the Forno unit have MORB character (PERETTI & KÖPPEL, 1986). One MORB body of the suite (Cassandra) is entirely surrounded by ultramafic rocks and has no metasedimentary cover. The Forno MOR basalts crosscut partly as dykes, partly as intrusive bodies the layering and pre-Alpine structures of the ultramafic rocks. Ocean floor metamorphism leads to the serpentinization of the ultramafic rocks and accompagnied rodingitization of the mafic dykes and the MOR intrusives. Despite this metasomatic process the MORB character is still preserved in most of the major and trace element chemistry of the metarodingites. Good correlations among Ti, Zr and V indicate that these elements remained almost immobile, whereas Y shows little mobility as effect of rodingitization, regional and contact metamorphism or other alteration. The process of rodingitization was not accompagnied by significant REE mobility. Apart from a slight depletion of the LREE the REE remained immobile. These observations agree with those from high-grade metarodingites from the Central Alps (EVANS et al., 1981).

In metabasaltic rocks the following processes from a Jurassic oceanic stage to an Oligocene contact metamorphism are documented: (1) Rodingitization leads to a static crystallization of an equigranular paragenesis of diopside + grossular ± epidote ± titanite and two generations of crosscutting grossular veins (pre-Alpine metasomatism I, Ca-metasomatism). (2) An irregular blackwall formation during an Alpine deformational and metamorphic overprint (D_1) is documented by boudinage and locally internal deformation of rodingitized dykes with their veins and synkinematic growth of chlorite + magnetite (Alpine metasomatism II, Mg-metasomatism). (3) The Bergell contact metamorphism is only documented by postkinematic overgrowth of pargasitic amphibole on the chlorite blackwall.

Pre-Alpine rifting leads to the denudation and emplacement of subcontinental mantle as floor of the opening Jurassic ocean (TROMMSDORFF et al., 1993) followed by ophi-

carbonate deposition (TROMMSDORFF et al., 1993; POZZORINI, 1996). Further opening of the Piemont-Liguria ocean was accompanied by Mid-Jurassic MORB intrusions into and extrusion on denudated subcontinental mantle. Ocean floor metamorphism leads to serpentinization and subsequent rodingitization of metabasaltic rocks that were in contact with the ultramafics.

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