

APPLICANTS

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TOPIC

Low pressure differentiation of basalts at the Mid-Atlantic Ridge near Ascension - Constraints from experiments at controlled volatile and oxygen fugacities.

CODE NAME

Experimental differentiation of MAR basalts

SCIENTIFIC DISCIPLINE AND FIELD OF WORK

Experimental geochemistry

ABSTRACT

Recent investigations on rocks from the Mid-Atlantic Ridge (MAR) near the Ascension Island indicate that major differentiation processes of basaltic melts occurred at low pressure (less than 200 MPa). At such low pressure, even low amounts of volatiles dissolved in the melt result in relatively high volatile activities which may influence significantly the stability of phases and differentiation processes. Different fractionation paths have been identified, but there is no experimental database to interpret their origin. The aim of this research project is to clarify the influence of pressure, oxygen fugacity and fugacities of the volatiles (in particular water, but also S and Cl) on the differentiation of basaltic melts along the MAR near Ascension. The high pressure and high temperature experiments will be performed with natural compositions collected during previous cruises. Compositions representing different stages of the differentiation will be used to model the "liquid lines of descent". Particular attention will be given to the effects of small pressure variations on differentiation processes. The experimental results will be compared with the natural phase assemblages to constrain the conditions of differentiation and to understand the origin of different fractionation paths in different segments from the MAR east of the Ascension Island.