Experimental determination of the hydrous basalt liquidus

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A series of experimental liquidus determinations have been carried out on a hydrous primitive basalt at a range of lower crustal pressures. The starting composition replicates the major element chemistry of an olivine picrite from South East Mountain, Grenada, Lesser Antilles with 15.3 wt % MgO and Mg# = 73. The island is known for erupting primary mantle melts, and products of the arc volcanism from Grenada yield evidence for magmatic water contents of ≤ 6.4 wt % H_2O [1].

The ulimate aim of this experimental series is to map out the topology of the hydrous basalt liquidus. The position of the liquids relative to a mantle adiabat determines the amount of superheating experienced by a magma as it ascends to lower pressures. This in turn has implications for the manner in which mantle-derived melts interact with the crust.

Equilibrium experiments are being conducted using both piston cylinder and TZM apparatus at pressures ≤ 1.7 GPa and water contents of 2.5 and 5.0 wt % at fO_2 = NNO. Experiments on the most hydrous starting composition are ongoing and have bracketed the liquidus between temperatures of 1265-1280°C at 1.3 GPa and 1250-1280°C at 1.7 GPa.

These experiments are also being used to explore phase relations at high temperatures and investigate the potential for multiple saturation points. At 1.7 and 1.3 GPa the liquids phases are olivine, clinopyroxene and Cr-rich spinel.

A further objective of this project is to extend the P-T range of experiments in an attempt to recreate the assemblages found in cumulate xenoliths from Grenada.

[1] Bouvier, Métrich & Deloule (2010) *Geochem. Geophys. Geosyst.* **11**, Q09004.

Effects of diagenesis in Triassic limestone of Opolskie Voivodesip

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Introduction

During Middle Triassic time (Muschelkalk) the SW part of Poland was situated in the SE part of the Germanic Epicontinental Sea. Full profile of Lower Muschelkalk was found in the SW part of Poland (area of Silesia- Opolskie Voivodesip). Formation contains strata of Gogolin Beds, Górażdże Beds, Terebratula Beds and Karchowice Beds [1, 2]. The effects of destructive and constructive diagenesis were observed in Triassic limestone of Opolskie Voivodesip.

Discussion of Results

The effects of destructive diagenesis are longitudinal channels created by sea organisms and micritic coats in marginal areas of allochemes and peloides. Effects of eogenetic stage of constructive diagenesis are: first generation cement (micritic, orthosparitic and palisade), Mg- calcite, early diagenetic dolomite and clay minerals. During mesogenetic stage pseudosparitic, mosaic cement (second generation cement) was formed. It fills in the space in the rock between allochemes and builds together with the micritic cement the rock mass of limestone poor in allochemes. Neomorphic processes like transformation of aragonite into low magnesian calcite, recrystallization of calcite crystals which build the trochites of Crinoideas, recrystallization and agradation of crystals which build the cement and dissolution which caused the formation of stylolites fill in with the iron compounds, were also going during the mesogenetic stage. Telogenetic stage characterized by karst processes, dedolomitization and silification. Effects of karst processes are karst funnels and karst formations present in some areas of strata. During dedolomitization dolomite pseudomorphs were formed. During silification processes small pores in rocks were filled in with quarz or chalcedony and silica concretions, which create special levels in some limestone strata, were formed.

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