



Melt differentiation in an open-reservoir beneath the south Cleft segment (Juan de Fuca ridge): Evidences from plagioclase zoning and rock geochemistry.

C. Cordier (1), M. Caroff (2)

(1) University of Montpellier II, France, (2) University of Bretagne Occidentale, Plouzané, France (cordier@gm.univ-montp2.fr)

Lava flows and crosscutting dikes have been collected along vertical transects on the northern flank of the Western Blanco Depression (Blanco transform fault, North East Pacific). These lavas and diabases have been emplaced at the Juan de Fuca ridge axis since 2 My. Along verticals, petrology and chemistry of cogenetic samples allow to constrain the temporal evolution of the differentiation modalities. Especially, a dike contains a coarse-grained anorthosite xenolith (0.6*0.5 cm) that we interpret as a fragment of the solidification zone mobilized during magma tapping. Plagioclase xenocrysts achieve very calcic compositions (An_{86}), associated with low MgO contents. These compositions traduce crystallization under hydrous conditions, from H_2O -bearing evolved melts in the mushy zones. The complex zonings of the xenocrysts reveal the transport of the crystals from the anhydrous melt lens toward the mushy solidification zones before their tapping. In addition, two ferrobasalts, sampled 200-300 m upper than the previous dike, are too anomalously Ni-rich to be considered as a differentiation product of a comparable parental melt. Their plagioclase phenocryst zonings highlight mixing between the H_2O -bearing evolved melts and anhydrous mafic liquids. Hydration is supported by other petrographic features such as relatively high magmatic fO_2 values and the presence of clinopyroxene inclusions in the plagioclase phenocrysts. Mixing would be the consequence of the reservoir re-filling by mafic liquids ($Mg\#=70$). These petrological and geochemical evidences are combined with the variations of the rock differentiation along verticals to propose the periodic replenishment of the magma chamber beneath the southern end of the Juan

de Fuca ridge since 2 My.