Geophysical Research Abstracts
Vol. 12, EGU2010-12951-1, 2010
EGU General Assembly 2010

Geochemical and petrologic investigation of the Ola Plateau-basalts from the Okhotsk-Chukotka Volcanic Belt (NE Russia)

Jürgen Leitner (1), Theodoros Ntaflos (1), Vyacheslav Akinin (2), and Cornelius Tschegg (1)

(1) Department of Lithospheric Research, University of Vienna, Austria (Lighty1@gmx.at), (2) North East Interdisciplinary Scientific Research Institute, Magadan, Russia

The Okhotsk-Chukotka volcanic belt to a large degree consists of coeval Cretaceous and Early Tertiary volcanic and plutonic rocks that occur along the continental margin in northeast Russia. These igneous-arc related rocks build up an Andean-style magmatic arc sequence that occurs for about 3.500 km along the entire length of the Eurasian continent, from Chukotka Peninsula in the north down to north-east China. The rocks of the Okhotsk-Chukotka Volcanic Belt (OCVB) comprise Late Cretaceous, andesitic basalts, andesites, dacites, rhyolites, tuffs, rare beds of nonmarine clastic rocks with conglomerates and sandstones in the base and locally Paleocene gently dipping basalts. The duration of the magmatic activity in the Okhotsk-Chukotka volcanic belt is still in debate but generally it has been estimated from middle of Albian to Campanian.

The studied area, the Ola Plateau Basalts (OPB) and the Hypotetica Basalts (HB), comprise basaltic andesites, trachy- basalts, basaltic trachy- andesite and rhyolitic dykes, belongs to the Okhotsk-Cukotka volcanic belt and represents the last volcanic activity related to the subduction of the palaeo-Pacific plate in this region. The exposed lavas have a thickness of 0.5 km and the estimated volume is about 222 km^3. Fine grained 4 m thick rhyolitic dykes represent the very last event of the studied sequence.

According to Ar/Ar and U/Pb dating (Hourigan, Akinin, 2004;), the average age of the OPB/ HB is 78.8 to 74 Ma. The basaltic rocks that build up the Ola Plateau are mainly fine grained calc- alkaline basalts with clinopyroxene, plagioclase and strongly to moderately altered olivine phenocrysts with spinel inclusions. The Mg# of the calc-alkaline basalts vary from 0.35 to 0.57 and the TiO2 from 1.2 to 2.2 wt% whereas CaO correlates positive with MgO contents.

The OPB and HB lavas, according to their primitive mantle normalized trace elements, can be divided into three groups: Group (I) is characterized by positive Sr anomaly with respect to the neighbor elements, group (II) has negative Sr anomaly and group (III) does not show any Sr depletion or enrichment. Common features of all three groups are the prominent negative Nb and Ta anomalies and the positive Ba and Pb anomalies. The trough at Sr in the group (II) patterns is associated with negative Eu anomalies attributed to the variable degrees of plagioclase fractionation.

As can be inferred from the elevated LILE concentrations and the prominent negative Nb and Ta anomalies, the OPB and HB lavas clearly have been affected by fluids released from the subducted paleo-Pacific plate. The fact that magma chamber processes took place (plagioclase fractionation), crustal contamination additionally affecting these lavas could not be excluded.