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THE MECHANISM OF EMPLACEMENT OF TREBIC DURBACHITE MASSIF BASED ON PETROFABRIC STUDY

SCHULMANN, K., MELKA, R., HOLUB, F. & VENERA, Z.

Department of Petrology, Charles University, Prague

The Trebic durbachite massif is a triangular shaped pluton intruding high grade rocks of Moldanubicum at the eastern margin of the Bohemian Massif. This plutonic body occurs at the boundary between two important intra-Moldanubian units: migmatites of Gföhl unit at the east and monotonous greywackes of Drosendorf unit at the west.

The rocks have a fairly homogeneous composition throughout the whole body ranging from dark magnesium rich type at the margins to clearly high potassium varieties prevailing at the core. The associated dyke swarm is mostly aplitic in composition. The internal fabric of durbachitic body is very strong and was studied in great detail both mesoscopically in the field and also using optical goniometry in the laboratory. This tedious work was done in samples in which both magmatic foliation and lineation were hardly distinguishable. In order to study the fabric elements of prophyric rocks a special apparatus was designed allowing measurements of orientations of feldspar clasts by optical means. The orientation of magmatic fabric elements was further calculated using standard eigenvalue method allowing precise determination of directions of principal axes of fabric ellipsoid elements. Another apparatus was devised to determine the sense of magmatic flow using asymmetry in preferred orientation of phenocrysts of different axial ratio.

A numerical computer model based on simulation of movement of rigid triaxial particles in slowly moving viscous Newtonian fluid was established to model the behavior of rigid feldspar phenocrysts in durbachitic magma. It was found that an asymmetric fabric develops, but only if the flow is not strictly non-coaxial and if a small amount of contemporaneous shortening occurs. This condition plays a decisive role for estimation of kinematics in flowing viscous Newtonian magma.

The internal structural pattern of the magmatic body exhibits geometrical coherency with the surrounding metamorphic sequences. The southern part of the intrusion is marked by steep east-dipping flow planes and almost a subhorizontal flow direction with consistent sinistral kinematics. There is a clear transition from postsolidus magmatic fabric prevailing at the core to subsolidus SC fabrics dominating at the

margins. The magmatic fabric is partly overprinted by late extensional shear zones indicating mostly top to the SW oriented movements under subsolidus conditions.

The part of the durbachite body north from the Trebic fault exhibit mostly vertical fabrics indicating subvertical magma movements near the feeding chimney of the intrusion. Going to the margins of the apparatus the foliation changes its trend being subparallel to the margins of the pluton. Flow direction is almost subhorizontal and associated with sinistral movements. The early magmatic fabric is here overprinted by subhorizontal flat postsolidus shear zones indicating outward magma upwelling during late stages.

The structural and petrofabric study of the Trebic durbachite massif reveals complicated interplay between regional tectonic evolution of intra-Moldanubian nappes and dynamics of magma flow. The body is emplaced along major intra-Moldanubian thrust boundary and probably reflects the change of direction of nappe movement at the northern termination of the Moldanubian zone. Here, to a NE oriented transpressional tectonics typical for eastern margin of the Bohemian Massif is gradually converted into a NW oriented transtensional one. This process led to the opening of elongated space in considerable depth of the crust which was filled by deep-seated durbachitic intrusion.

THE PRE-ALPINE METAMORPHIC AND PALAEOGEOGRAPHIC PATTERN OF THE AUSTROALPINE UNITS EAST OF THE TAUERN WINDOW

SCHUSTER, R. & FRANK, W.

Institute of Geology, University of Vienna, Universitätsstraße 7, A-1010 Vienna

Based on metamorphic petrology and geochronological investigations an important new Alpine thrust at the base of the Bundschuh Crystalline below the Gurktal Nappe was discovered. This new observation leads to an palaeogeographic evolution model which is much more simple than previous ones in respect of the relationship of the Austroalpine tectonic elements before the Early Alpine orogenic events and the pre-Alpine reconstruction of the crystalline basement units.

Today the tectonically lowest units of the Austroalpine crystalline E of the Tauern Window are the polymetamorphic Schladming- and Seckau Crystalline in the north and the lithologically different polymetamorphic Millstatt Serie in the south. Based on the lithology and the types of Variscan garnet zoning pattern, the Millstatt Serie represents an equivalent of the Saualm- and Koralm Crystalline E of the Gurktal Nappe.

The Wölz Crystalline, comprising the Radenthein serie, Wölz micaschists and the Klieningand Wolfsberg window, is overlying these units W and N of the Gurktal