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The Quantitative Link between Fold Geometry, Mineral Fabric and Mechanical Anisotropy: as Exemplified by the Deformation of Amphibolites Across a Regional Metamorphic Gradient

Lenka BARATOUX[1], Karel SCHULMANN[1], Ondrej LEXA[1] and John W. COSGROVE[2]

[1] *UPSG, PrFUK, Albertov 6, 128 43, Praha 2, Czech Republic*

[2] *Department of Earth Sciences, Imperial College of London, Prince Consort Road 1, United Kingdom*

This work shows the lateral variations in fold geometry affecting an amphibolite unit of constant mineralogical composition showing increasing metamorphic grade from east to west. A systematic decrease in the mechanical anisotropy of the folded fabric is observed with increase in metamorphic grade. These variations are represented by changing fold shapes interpreted as: 1) medium amplification associated with low post buckle flattening in the lowest grade zone, 2) high amplification coupled with medium post buckle flattening in the intermediate grade zone and, 3) passive amplification dominated by intense post buckle flattening in the highest grade zone. Quantitative microstructural study shows contrasting deformational mechanisms associated with folding. This is manifested by: 1) brittle dominated deformation of amphibole forming stress supporting network with a high competence contrast to plagioclase in lowest grade zone, 2) ductile dominated heterogeneous deformation of an interconnected weak layer structure with low competence contrast in the intermediate zone, 3) homogeneous deformation of a stress supporting framework with low competence contrast in the highest grade zone. The difference in the folding style between the garnet and staurolite zones is associated with the lateral variations in microstructure of the amphibolites inherited from a pre-folding metamorphic zonation and with different deformation micromechanisms in hinge zones. However, the change in fold style between the garnet and staurolite zones, and the sillimanite zone is controlled by the recrystallization associated with an important syn-folding heat input from an adjacent granite intrusion.

Petrology of Lamprophyres Occuring in the Northern Part of the Ditrău (Ditró) Alkaline Massif (Jolotca Creek Basin), Romania

Anikó BATKI[1] and Elemér PÁL-MOLNÁR[1]

[1] *Department of Mineralogy, Geochemistry and Petrology, University of Szeged, P. O. Box 651, H-6701 Szeged, Hungary*

Introduction

The Ditro Alkaline Massif (DAM) is one of the most diverse and compound geological formations of the Eastern Carpathians. In the past decades numerous scientific essays were published on the complex geological interpretation of the massif, while the origin of lamprophyre dykes intersecting the different rock-types (granitoids, syenitoids, hornblendites) of DAM and