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# Coaxial magnetic fabrics in metamorphic and granitic rocks of the Western Carpathians: a Variscan phenomenon within the Alpine edifice

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The magnetic fabric of granitic bodies is traditionally interpreted in terms of magma flow, because it primarily originates during the process of emplacement of these rocks into the upper layers of the Earth's crust. However, granitic rocks can be after their intrusion affected by tectonic deformations giving rise to deformational magnetic fabrics superimposed on the primary magnetic fabrics, which is frequent case of the Western Carpathians. In some Core Mountains of the Western Carpathians, the magnetic fabrics show similar patterns in metamorphic, granitic and covering sedimentary rocks within each Core Mountains, but different orientations between the Core Mountains. This magnetic fabric is regarded as resulting from ductile deformation associated with regional metamorphism operating during Alpine Upper Cretaceous collision comprising formation and motion of the Central Western Carpathian nappes. During these processes, granites were softened secondarily and could easily undergo ductile deformation. However, the above magnetic fabric relationship is not valid in all Core Mountains. In some of them, the magnetic fabrics in crystalline rocks are in general non-coaxial with those in cover sediments thus indicating weak or even no effect of the Alpine ductile deformation. While the coaxial magnetic fabrics occur in the centrally located Veporic Superunit of the Central Western Carpathians where the basement was strongly re-activated during collisional burial in a collisional wedge, while the non-coaxial magnetic fabrics occur at the outer margins of the Central Western Carpathians. Hence, the magnetic fabric method offers itself as an indicator of the extent of the occurrence of the collisional burial. In all Core Mountains, the magnetic fabrics in granitic rocks, which are mostly Carboniferous in age, are coaxial

with the magnetic fabrics in metamorphic rocks, which are in general older than Carboniferous. In the Core Mountains where the magnetic fabrics in crystalline rocks are non-coaxial with those in cover sediments, the coaxiality between magnetic fabrics in granitic and metamorphic rocks is interpreted as resulting from Variscan ductile deformations that operated evidently before Triassic (sometimes before Upper Permian) when started the sedimentation in Palaeo-Tethys. In the Core Mountains where the magnetic fabrics in crystalline rocks are coaxial with those in cover sediments, the Variscan magnetic fabrics were overprinted by Alpine deformations. The Variscan ductile deformation took evidently place in relatively deep parts of the crust (thick-skinned tectonics), while the Alpine deformations are rather superficial (thin-skinned tectonics). Even though the magnetic fabrics of crystalline rocks are oriented in different ways in individual Core Mountains, the degree of AMS and the magnetic fabric shapes are relatively homogeneous in all Core Mountains. Consequently, it is very unlikely that the stress and strain fields controlling the formation of the magnetic fabric had more or less the same magnitudes in all Core Mountains, but different orientations of the principal directions in each Core Mountains. It seems to be more probable that the orientation of the magnetic fabric was rather homogeneous originally, reflecting the Variscan and/or palaeo-Alpine stress and strain fields, and only later, probably in Neogene, during splitting the superunits into smaller blocks, tilting and rigid body rotations of smaller segments took place and the magnetic fabric was differentiated in orientation as observed today.