

Differences in the Western Carpathians Mesozoic volcanism: reflection on geodynamic regime

Ján Spišiak¹ & Dušan Hovorka²

¹*Geological Institute, Slovak Academy of Science, Severná 5, 974 01 Banská Bystrica, Slovakia*

²*Faculty of Sciences, Mlynská dolina, 842 15 Bratislava, Slovakia*

Evidence of volcanic activity during the Mesozoic can be found in all the main Western Carpathian geotectonic zones/units. In a NW–SE cross-section through the Western Carpathians of Poland, Czech Republic, Slovak Republic and Hungary a wide range of volcanic rock types outcrops in various Mesozoic units. Using the division of the Western Carpathians into three main zones Outer, Central and Inner, with the Peri–Pieniny lineament and the Margecany–Ubenik deep fault zones as dividing lines — it is clear that each unit is characterized by a particular type of volcanism active in various times. From the stratigraphical point of view, the volcanic activity of the Western Carpathians sector of the Tethyan belt took place within a long period (Triassic–Early Cretaceous). In the innermost tectonic zones it occurred in the Cretaceous period.

Within the time span from the Upper Barremian till the end of the Albian, volcanic activity is documented in Outer (Silezic unit) and Central (Tatric unit, Križna nappe) Western Carpathians. Thus, volcanic activity took place within

the pre-nappe emplacement time period. Geochemical studies came to the conclusion that volcanics have the characteristics of alkali basalt/basanites (rarely alkali lamprophyres). In the Outer Western Carpathians, a wider differentiation range of rocks is found (from picrites to syenites), while in the Central Western Carpathians the rock composition corresponds mostly to basanites (rarely picrites). Generally, approx. 100–120 Ma ago, in these units there was extensional, non-subduction, supra-continental regime. However, the riftogenesis lasted only a short time; compression processes started in the next period, closing the volcanic vents.

The volcanic-sedimentary sequences of the Triassic–Jurassic age, which are the integral part of the Inner Western Carpathians, in contrast to the previous units contain volcanics of a tholeiitic (MORB) and calc–alkaline character. These sequences occur in a geotectonically very complicated zone of tectonic/orogenic activity (island arc, active continental margin) on the one hand, and simultaneously in the domain of the Meliata ocean on the other one. The dismembered portions of the oceanic crust are known as incomplete ophiolites. The diverse character of volcanic rocks in individual tectonic units demonstrates that the processes of spreading, as well as compression and subsequent

subduction fundamentally influenced the volcanic activity and their products. From this point of view, the presence of dismembered ophiolites (Meliata unit, Szarvasko unit) in the Inner Western Carpathians is characteristic.