



## Contrasting Permo – Carboniferous Evolution of Resita and Sirinia – Presacina Basins (South Carpathians, Romania); an overview.

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Two important Permo-Carboniferous molasses basins Resita and Sirinia - Presacina occur in Romanian Banat (south-western part of Carpathian chain), unconformable overlie the Getic and Danubian domains with different pre-Variscan and Variscan geodynamic history. They show differences in their lithology reflecting various geotectonic settings and evolutions.

In the Resita domain the Upper Carboniferous deposits (Westphalian – Stephanian in age, according to the previous paleobotanic and palynological data) are important in volume and they contain terrigenous siliciclastic rocks represented by sandy – conglomerate and argillaceous – sandy rocks variable in thickness with siltstone, carbonaceous shale and coal beds interlayering. There are not volcanic rocks present in Upper Carboniferous of Resita domain. In contrast with Resita in the Sirinia – Presacina basins the Upper Carboniferous deposits are volumetrically more restrictive. These deposits transgressively overlie pre-Sudetian formations and consist of continental - lacustrine terrigenous formations, rarely associated with limnic carbonatic rocks. In this association the alternating conglomerate, siliceous sandstone, siltstone and clay with lens – like coal inter-layers prevails. In two small areas Dragosela – Telinecea – Camenita (in the western part) and Baia Noua – Cucuiova (in the eastern part) the terrigenous deposits are associated with basaltic andesite and andesite rocks with alkaline affinity.

In both of these basins the Lower Permian deposits (according to the paleobotanic data) unconformably overlie the Upper Carboniferous formations and/or pre-Sudetian basements. The Lower Permian deposits in the Resita basin occur in two superposed formations (Nastaseanu, 1987): (1) Walchia Beds dominated by black argillaceous shales, slightly bituminous with rare sandy-conglomerate interlayers and (2) Red Beds composed by sandy-conglomerate deposits with some argillaceous intercalations, all red in color, with rarely lens-like fresh water limestone. During the Permian in the Resita basin the volcanic activity was absent. In the Sirinia – Presacina basin the Lower Permian deposits are characterized by huge volcanic and volcano – sedimentary assemblages inter-fingering with red beds detritic formations. The Permian volcanism in the Sirinia – Presacina basin is dominant rhyolitic and started in subaqueous conditions. Early subaqueous domes (as isolated or as clusters) and lava flows led to the generation at their margins of huge volume of hyaloclastic breccias that turn unstable forming marginally turbiditic hyaloclastite aprons. In the Sirinia zone, where the magmas get to the shallower waters and/or to subaerial, the volcanic activity turned progressively to be explosive, generating phreatomagmatic eruptions. The result of this activity is up to several hundred meters of various deposits represented by pyroclastic flow (dominantly non-welded and welded ignimbrites), pyroclastic surge and fall out, all rich in accretionary lapilli. At the distal, marginal part of the volcanic environs the epiclastic, mostly lahar deposits are dominating, sometimes including layers of fallout deposits with accretionary lapilli that suggest their contemporaneous deposition.

In the eastern part of Sirinia – Presacina basin (Cucuiova Hill) the presence of basalts as sills in the Permian sandstone deposits may be a sign of bimodal magmatic activity. As in the some of the Central Europe Permian basins the volcanic activity from Sirinia – Presacina basin is related to intra-basinal active faults and in particular with the intersection of fault systems having a pull-apart features (e.g. Stollhofen et al., 1999).

The most important factor which was controlled the Permo – Carboniferous complex evolution of the Western and Central Europe was tectonic. The continue convergence between Laurasia and Gondwana during the Upper Carboniferous – Lower Permian (Ziegler, 1990) was generated a conjugate dextral – sinistral shear fault system adjacent to the Tornquist – Teisseyre Line, which induced the fragmentation of Variscan fold belt. With this process was associated the formation of many transtensional pull-apart continental – lacustrine sedimentary basins and intra-continental rifts in which or in adjacent areas the intrusive – extrusive magmatism was widespread and

where the deep crustal fractures were active. From climatic point of view the main consequence of continue convergence between Laurasia and Gondwana is the transition from relatively wet regime during Stephanian to arid during the Permian induced by the elevation of the equatorial highlands Variscan fold belt was acted as a precipitation barrier for the whole territory located to the north.

Tacking into account of all these aspects, the Resita domain presents the similarities in the lithological composition with Autun Basin and the Sirinia – Presacina zone displays many common features with Saar – Nahe and Thuringian Forest Basins and North German/Polish Depression.

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#### References

Nastaseanu S. 1987. In: Flügel E., Sassi F. & Grecula P. (eds): Pre-Variscan and Variscan events in the Alpine-Mediterranean mountain belts. – Mineralia Slovaca. Alfa Bratislava, 371-378.

Stollhofen H., Frommherz B., Stanistreet I. G. 1999. J. Geol. Soc. London 156, 801-808.

Ziegler P. A. 1990. Shell Int. Petrol. Mij. Dist. Geol. Soc. Publ. House, Bath, 1-239.