

Principal geological and geophysical characteristic of the Alpine-Carpathian-Pannonian junction

Michal Kováč¹, Ján Šefara², Dušan Plašienka³ and Oldrich Krejčí⁴

¹ Dep. Geol. Paleont., Comenius Univ., Bratislava, Slovakia

² Dep. Geophysics, Comenius University, Bratislava, Slovakia

³ Geological Institute, Slovak Academy of Sciences, Bratislava

⁴ Czech Geological Survey, Brno, Czech Republic

The map of general tectonic structure of the Western Carpathians and surrounding areas can be divided to following zones:

The outer zone, represented by the autochthonous sedimentary fill of the Carpathian foredeep and by allochthonous accretionary wedge of the Flysch Belt units overthrust on the slopes of the Bohemian Massif (part of the North European platform).

The suture zone between the outer and central zones is reflected on the surface by the Pieniny Klippen Belt. Southwards the closing of the South-Penninic ocean basin (Ligurian-Piemontais or Vahic ocean respectively) is supposed during the latest Cretaceous and earliest Paleogene.

The central zone is formed by the pre-Alpine and paleo-Alpine complexes of the Central Western Carpathians. The present nappe structural pattern of the zone has been formed during the Middle to Upper Cretaceous; the deformational structures reflect outward (northward) polarity. Besides the overthrusting of the superficial nappes (Hronicum, Fatricum and Silicicum) composed mainly of carbonate rocks, also the large basement nappes (Tatricum, Veporicum and Gemericum) have been formed. The Lower, Middle and Upper Austroalpine units in the Eastern Alps and in the pre-Neogene basement of the Vienna Basin represent the analogous units to the Carpathian nappes.

The inner zone was as a whole formed during the paleo-Alpine and/or Late Cimmerian (Late Jurassic - Early Cretaceous) tectonic movements; later its structure was modified by the Late Cretaceous and mainly by the Tertiary extensional and wrench tectonics. This crustal segment, named also the Pelso Unit, is bordered from the NW and N by the Rába-Hurbanovo-Diosjenő fault-lines, from the south by the mid-Hungarian lineament. Surficial part - the Transdanubian Central Range is in the nappe position with respect to the Austroalpine units.

Geophysical characteristics of the examined area reflect the processes connected with the Neogene development of the Eastern Alps, Western Carpathians and Pannonian Basin s.l. junction area.

Lithosphere thickness diminishes considerably from the west, from the Bohemian Massif and Eastern Alps, eastwards. Below the Transdanubian Central Range it reaches only about 60 km. This anomalous phenomenon can be explained as a result of the mantle upwelling in the back arc area.

Gravity minimum characteristic for the Alpine orogene as well as for the Eastern Carpathians is not so pronounced in the Western Carpathians as is evident in the Bouguer gravity map. The origin of this anomaly is in the folded accretionary wedge complexes of the Flysch Belt and in the basement (Bohemian Massif) overridden by the Carpathians during the Neogene oblique collision.

Crustal thickness ranges within 34-26 km in the majority of the examined area. Considerable thinning is characteristic for the Pannonian region s.l., except the Transdanubian Range. The zone of thinned crust is situated in the centre of the Danube Basin.

The values of heat flow density are most expressive in the Slovak part of the Danube Basin, since the high thermal gradient area coincides with buried volcanic bodies. Outer Carpathians itself, as well as the majority of the Central Western Carpathians, are characteristic by a low thermal activity.

The pre-Tertiary basement contour map documents situation of depocentres in the central part of the Vienna and Danube basins, as well as in depocenters in the northern embayments of the Danube Basin (Blatné, Rišòovce and Komjatice depressions).

Geological evolution and hydrocarbon habitat of the External Albanides

Peter Krois

OMV Aktiengesellschaft, EP-EXP, Vienna, Austria

Albania is part of the Alpine-Mediterranean orogenic belt. Its Mesozoic and Tertiary evolution was controlled by relative movements between the Adriatic subplate and the European plate.

The External Albanides (Krasta-Cukali, Kruja, Ionian and Sazan Zones) are characterised by a thick series of mainly passive margin Triassic to Tertiary carbonates diachronously overlain by syntectonic Tertiary Flysch, Pre-Molasse and Molasse sediments.

Sediments of the Neogene Periadriatic Depression cover the north-western parts of the Ionian and Kruja Zone. Large scale northwest-southeast striking ramp anticlines characterise the internal structural style of those two zones.

Oil and Gas Plays in Albania: Oil and gas exploration and production has a long history in