MESOZOIC AND CENOZOIC GEODYNAMICAL EVOLUTION
OF THE EASTERN BALKANIDES (BULGARIA)

BERGERAT F. ¹, VANGELOV D. ², DIMOV D. ², IVANOV Ž. ²

¹ Laboratoire de Tectonique, UMR 7072 CNRS-UPMC, Case 117, 4 place Jussieu, 75252 Paris cedex 05, France., Author: bergerat@ccr.jussieu.fr ² Faculty of Geology and geography, University St-Kliment Ohridsky, 15 Tzar Osvoboditel Blvd., 1504, Sofia, Bulgaria

Since the emergence of the plate-tectonics concepts in the seventies, the Balkanides has not been revisited as a whole in terms of global geodynamics and many of the ideas are yet based on information concerning separated areas. Particularly, the Early Alpine structures need to be better understood, correlated and interpreted. Several tectonic phases are classically accepted in this orogen. Some of them are demonstrated by clear structural features in the field, others have been described on the basis of seismic profiles, others are only suspected on occurrence of unconformities. The present work concerns principally the eastern part of Balkanides (Fig. 1) including the Central Balkan-Forebalkan p.p., East Balkan, Srednogorie and Sakar-Strandja zones. It aims at characterising (i) the main cycles of the basin evolution on the basis of both existing data and new data collected in the field, and (ii) the tectonic evolution by both structural and micro-structural observations and paleostress tensor computations, in order to constrain the geometrical and mechanical characters of each successive tectonic event.


Characteristics of the main transgressive-regressive cycles: Based on lithology, facies distribution, thickness and other basin characteristics like sedimentation rate, subsidence and burial history, the Mesozoic and Cenozoic formations have been subdivided in transgressive-regressive cycles, corresponding to major basin systems, which are in age: Permian-Triassic, Jurassic-Lower Cretaceous, Upper-Cretaceous-Middle Eocene, Upper Eocene-Oligocene, and Miocene-Pliocene.

Main structures, faulting events and paleostress field reconstructions: The structural description of Eastern Balkanides (Fig. 2) is completed by an analysis of brittle deformation and the reconstruction of the successive paleostress fields based on the investigation of 79 sites in Triassic to Paleocene formations. These sites are mainly road cuts, quarries and coastal cliffs of the Black Sea (Figs. 3 and 4).

The Sakar-Strandja zone (inner Balkanides) is composed mainly of strongly deformed and metamorphosed Triassic and Jurassic sediments metamor-phosed after the end of the Middle Jurassic. This zone consists of several thrust of syn- and post-metamorphic origin. Two Early Alpine major structural events are recorded during (i) the Late Jurassic and (ii) Early Cretaceous. Its northern part is involved within the Srednogorie zone during the Late Cretaceous. The Late Alpine tectonic evolution is the result of collision and post-collision
processes during the Late Eocene and Oligocene and has been associated with the tectonics of the adjacent zones of the Balkanides.

The West Balkan and Central Balkan-Forebalkan (external Balkanides) are mostly constituted by folded Jurassic-Lower Cretaceous formations. The anticlines generally present north vergency, salt diapirs in the core (Late Triassic evaporites) and thrusts at their northern boundary (fault-propagation folds). These E-W to ESE-WNW fold axes and thrusts (Fig. 4) correspond to the Late Alpine tectonics of Middle Eocene age. At the boundary with the Moesian platform, the Preslav anticline is due to the reactivation of the normal faults bounding the platform. A post-compression extension is also characterised by half grabens at the top of the main ramp zones of the major thrusts.

The East Balkan Zone and the Srednogorie Zone (Intermediate Balkanides) are generally considered as separate tectonic zones but neither tectonic boundary between them, nor interruption in deposition, exist. The main difference is the occurrence of Upper Cretaceous volcanic rocks in the Srednogorie (often considered as an island-arc system). The first important compressional event is documented at the beginning of Campanian in the Srednogorie while it is Early Paleocene in East Balkan. Both zones were affected by post-compression collapse resulting in half-graben forming on the tops of the ramps (Fig. 3). The Post-Lutetian tectonics is marked by regional north vergent thrustings.

The West Balkan and Central Balkan-Forebalkan (external Balkanides) are mostly constituted by folded Jurassic-Lower Cretaceous formations. The anticlines generally present north vergency, salt diapirs in the core (Late Triassic evaporites) and thrusts at their northern boundary (fault-propagation folds). These E-W to ESE-WNW fold axes and thrusts (Fig. 4) correspond to the Late Alpine tectonics of Middle Eocene age. At the boundary with the Moesian platform, the Preslav anticline is due to the reactivation of the normal faults bounding the platform. A post-compression extension is also characterised by half grabens at the top of the main ramp zones of the major thrusts.