

## **Geodynamic relations between the Black Sea basin and the Bend Area of the Eastern Carpathians (Romania)**

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The analysis of the seismic and well data on the Carpathians-Black Sea area illustrates that its contemporary structure resulted from large-scale extensional-inversional processes.

In the East-Southeast of Europe, before the Middle Jurassic, were two platforms: an old one-East European Platform and a younger one, represented by West European Platform, Panonian-Transylvanian Block and Moesian Platform.

Between these two platforms has existed a suture zone. It is represented by the Green Schists trend.

Initially, on the western and southern margins of the East European Platform a regional detachment surface was formed (RD). On this surface, a huge extensional blocks moved westward and southward (Fig.2). So, a large extensional-depressional area was born.

The western branch of this area represents the trough of the Eastern Carpathians that has been formed by the collapse and slide of the Green Schists westward. The southern branch is more complicate. The regional detachment surface is placed inside of the Eastern European Platform at its southern margin. On this surface, a huge extensional block moved southward opening behind of it, a large West-East depressional area (Bîrlad-Krîlov-Karkinit depression). These two (the high block and depressional area) are well-know as a Scythian Platform. After my opinion these two zones represent parts of the East European Platform and must be named different. So, the depressional area was named Bîrlad-Krîlov-Karkinit depression (in fact a huge trough with riftogene character) and the uplifted and slide block- the Scythian Block (Moroşanu,2002) (Fig.3).

The Scythian Block includes some highs, swells or steps (last two names are especially from the russian terminology) namely: Chilia-Snakes' Island high, Marginal step, Kalamit swell, lower Crimea- Azov-Reazan high.

The opening is progressive southward and a new large depressional area, between Green Schists Block and the Scythian Block, with riftogene characteres also, appears. It is composed by North Dobrogea-Histria depression, Crimea-Caucaz trough and East-Black Sea Basin (s.l.). The last two depressions are separated by the Shatsky ridge (Fig.4). It is possible that this ridge to have the same nature with Scythian Block.

In Central Dobrogea and Black Sea Basin the green schists constitutes a crest, so called Green Schists-Midia Crest (Moroşanu, 2002), which are continued to south-east with Andrusov-Arhangelski ridge. These ridge can be constituted by green schists, too.

Northward and southward this high crest is limited by the normal listric faults (in Romanian area, they are known as the Peceneaga-Camena and Capidava-Ovidiu faults). Southward of this ridge there is Moesian Platform which has been affected by the extensional movements too, and a new riftogene depressional area was formed in Lower Cretaceous. This depression is currently called the West-Black Sea Basin. This depression is limited westward by the north-south Midia-Tiulenovo block and southward, by a crest, currently represented only by Akçakoca high (Fig.4).

So, the Carpathian trough-North Dobrogea-Histria Depression-East Black Sea Basin can be considered a long depressional area with riftogene character, formed between two platforms: East European Platform and West-Southwestern European Platform. It has been progressively opened by the extensional movements, started in Upper Jurassic till Albian inclusive in Black Sea Basin, Upper Cretaceous in Continental Dobrogea, Sarmatian at the west of Danube and Eocene, in the Eastern Carpathians.

Also, in Upper Jurassic-Lower Cretaceous other two depressional areas were opened. These two are situated on the East European Platform (Bîrlad-Krîilov-Karkinit depression) and on the Moesian Platform (West Black Sea Basin) (Fig.4).

The inversional movements carried out differences between Black Sea and Eastern Carpathians areas, especially in the duration and intensity of its. While in the Black Sea area the extensional features are not destroyed by the inversional movements, being visible like a simple reverse faults on the northern margin of the Histria Depression, in the Eastern Carpathians area these are destroyed, and are visible only the overthrust nappes, as result of the inversional movements.

The Black Sea Basin can be considered as a typical, but complex, rift basin. Its margins display the evidence of an extensional tectonic. Here the syn-rift Upper Jurassic-Albian formations were deposited. Later, the post-rift Upper Cretaceous-Eocene formations filled the troughs.

The end of this period is marked by an important erosional surface.

In Oligocene time an important subsidence accompanied by a major inversional period began. In this period Crimea Block began an anti-clockwise rotational movement and, on this way, the megadepressional area has been divided: Histria Basin and Eastern Black Sea Basin (s.s.). Also, the Karkinit Depression, from north, was enlarged taking a triangle form. Due to the same rotational movement an important faulting event appear: the Nistru Fault which affects the Scythian Block and Andrusov-Arhangelsky Ridge and in the same time the Crimea mountains chain were born with east-west direction (Fig.4).

Other main events of this inversional period, in the Black Sea area are: the rise of the Crimea-Caucas belt, together with fore- and back- depressions, the important inversions from Histria Depression (Moroşanu, 1996) and North-Dobrogea, the overthrust of Balkanides- Pontides and the lower intensity inversions from the Moesian Platform and Scythian Block (Moroşanu, 2001, Popovici, 1989).

This compressional period ended in the Upper Oligocene for the West and North Black Sea regions, but it continued in the East-Black Sea regions in Mio-Pliocene to Quaternary.

In the Eastern Carpathians region, it is presumed that the post-extensional period covers the Oligocene time, the inversional movements beginning immediately from Lower Burdigalian.

The intensity of the inversional movements is more than in Black Sea basin. As a result, the Eastern Carpathian Nappes were born. During of Lower Sarmatian these movements have been stopped.

It is possible that the return of the inversional movements to be present in the Pliocene-Quaternary period, especially in the Carpathian Bend area.

In the Black Sea, the rotation of the Crimea Block continued until the Neogene (Okay et al., 1994) and it is possible, the opening of the Braşov-Ciuc depressional area, situated behind of Carpathian Bend area and filled with Pliocene-Quaternary formations, represents a result of it. So, this depression was born by movement of the block from north-eastern compartment of Intra-moesian fault to south-east (Dobrogean Block), towards appeal zone created by rotation of the Crimea block. This appeal zone is sustained by numerous listric faults with slide blocks towards south-east, visible in Cobalcescu area, from Black Sea. These faults affect the Cretaceous to Quaternary formations (Moroşanu,2002).

In conclusion, the Eastern Carpathians Trough, North Dobrogea, Histria Depression and East Black Sea Basin have been formed like a megadepression between East European Platform and Moesian Platform-Transylvanian Block, while the Bîrlad-Karkinit Depression and West Black Sea Basin, as a result of partial destruction of the East European and Moesian Platforms.

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