

## TECTONIC HISTORY AND MODELLING OF BLACK SEA BASIN

Maxim V. Korotaev , Anatoly M. Nikishin , Andrey V. Ershov, Marie-Francoise Brunet

The Black Sea is situated in an area between Ukraine, Russia, Georgia, Turkey, Bulgaria and Romania and surrounded mainly by late Cenozoic mountain areas with thickened continental crust (the Caucasus, the Pontides, Southern Crimea, the Balkanides). There are two deep basins in the crustal structure of the Black Sea Basin: the Western Black Sea Basin with oceanic to suboceanic crust and the Eastern Black Sea Basin with thinned up to 10 km continental. Five main seismic sedimentary complexes of the Black Sea Basin are recognized: upper Cretaceous(?), Paleocene-Eocene, Oligocene-Early Miocene, Late Miocene and Pliocene -Quaternary. Sedimentary thickness reaches up to 19 km. The Black Sea Basin had originated as a back-arc basin during the Cretaceous times. Continental rifting took place during the Aptian to Albian. Crustal large-scale thinning and separation was since the Cenomanian mainly along a former Albian volcanic arc. The both Western and Eastern Black Sea basins had been opened nearly simultaneously during Cenomanian to Coniacian times. Since the Santonian to the Paleocene the Black Sea region was affected by compressional deformations. Tension event in eastern part of the region was in the Eocene. Since the latest Eocene to recent times the basin region has been induced by compressional deformations. Rapid Pliocene to Quaternary basin subsidence took place in connection with regional compression. 1D and 2D modelling of burial history were done for the Black Sea. For each our model of burial history we can recognise some stages of subsidence: Late Cretaceous - Eocene, Oligocene - Miocene and Pliocene-Quaternary. We propose model of syncompressional downward bending of the Black Sea Basin lithosphere for explanation of rapid Pliocene-Quaternary subsidence. Rheological modeling of the Black Sea lithosphere shows that EET in the central part of the basin is 60-70 km and EET in the margin of the basin is 30 km. EMS is downflexured with amplitude about 15-25 km. Under compression with force  $5 \cdot 10^{12}$  N/m central part of modeled profile subsides on 0.4 km, that is similar to tectonic subsidence, obtained from modeling of the burial history. Kinematic and dynamic modelling of the Black Sea Basin subsidence show that compression-induced downward bending of the basin lithosphere could be the reason of this rapid additional non-thermal subsidence.