

Geophysical and Geological data on the Black Sea Basin
and its margin

J. LETOUZEY[‡], B. BIJU-DUVAL[‡], A. DORKEL^{‡‡}, R. GONNARD[‡], K. KRISTCHEV^{‡‡‡}
and L. MONTADERT[‡]

[‡] Institut Français du Pétrole, 1 & 4, avenue de Bois-Préau, 92502 -
Rueil-Malmaison (France), ^{‡‡} SNEA (P), 26 avenue des Lilas, 64001 -
Pau (France), ^{‡‡‡} Académie Bulgare des Sciences, Institut Géologi-
que "Strasimir Dimitrov, Sofia XII (Bulgarie).

"Cette communication ne peut-être citée sans autorisation préalable
des auteurs".

Résumé : La Mer Noire est interprétée comme un bassin marginal qui
s'est développé sur la marge sud-européenne pendant que se fermait
la Téthys au Sud. Sa formation daterait du Crétacé supérieur mais une
initiation plus ancienne (Lias-Jurassique) peut être envisagée à l'Est.
Les données géologiques et géophysiques montrent que des mouvements
compressifs ont affecté les marges NE et S. Durant le Plio-Quaternai-
re, la sédimentation et la subsidence s'accroissent considérablement.

The origin of the Black Sea is discussed in the frame of the
evolution of the Mediterranean Alpine area since the beginning of the
Mesozoic : the Black Sea is considered as a marginal basin formed
between Lias to Upper Cretaceous in relation with the consumption of
the Tethys.

In the NW, Scythian Platform and Moesian Platform can be con-
sidered as stable margin at least since the Upper Jurassic. The rela-
tionships that may exist between the folded systems that outcrop in
the Dobrudja region, in the Crimean Mountains and in the Greater Cau-
casus are still subject to discussion : the paleogeography and tectonic
development during the Jurassic times is not well understood. The
present Danube-Dniepr deltas are the most important features of this
margin only affected by the subsidence.

The greater Caucasus in the NE margin is a very complex struc-
ture : the great extension of volcanism in the Jurassic period sug-
gests an old tectonic development in relation with the evolution of
the northern part of the Mesozoic Tethys. The effects of the Alpine
phase and more recent deformations are now better known as the result
of onshore geological data and new offshore studies.

The Southern margin from Balkans to lesser Caucasus is rela-
tively homogenous and give good evidence to discuss the origin of the
Black Sea. Different facies known before upper Cretaceous as well in
Balkans as in Pontides are typically European (ex : Malm, Urgonian)
Then the indispread volcanicism and flysch deposits of Upper Creta-
ceous are interpreted as related to the strong orogeny which affects

the northern part of the Tethys at that time. It is probably the age of opening of the Black Sea, South of European Margin, Behind the subduction zone where the ophiolites were obducted (May be the initiation of this active margin is more ancient as marked by several disconformities (Triassic, Liassic,...) by Liassic volcanicism and granitisation). After the collision between Europe and Anatolia, this margin is again tectonized in the Upper Eocene with northward overthrusts from lesser Caucasus to Balkans. The present margin of the Black Sea is located on the northern part of these overthrusts. Tectonized sedimentary series can be seen on the seismic profiles.

In the basin itself, thick little disturbed sedimentary series buried the reliefs. For example the West Black Sea Basin is bounded to the SE of Crimea by a high zone of reliefs buried underneath recent sedimentary series. Some undercompaction phenomena (mud diapirism) is noticed and it can show the extension of Maikopian series in the Black Sea Basin. As opposed to the Mediterranean no Messinian salt deposits are found.

During Plio-Quaternary, the subsidence and the sedimentation appear to have speeded up. Prograding structures of the pro-delta extend widely toward the abyssal plain. The largest of these structures is the Danube-Dniepr fan which covers the entire western basin. The thickness of Pleistocene deposits could exceed 2500 meters. The narrow margins are cut by sedimentary channels and ridges that are affected by numerous sliding phenomena.