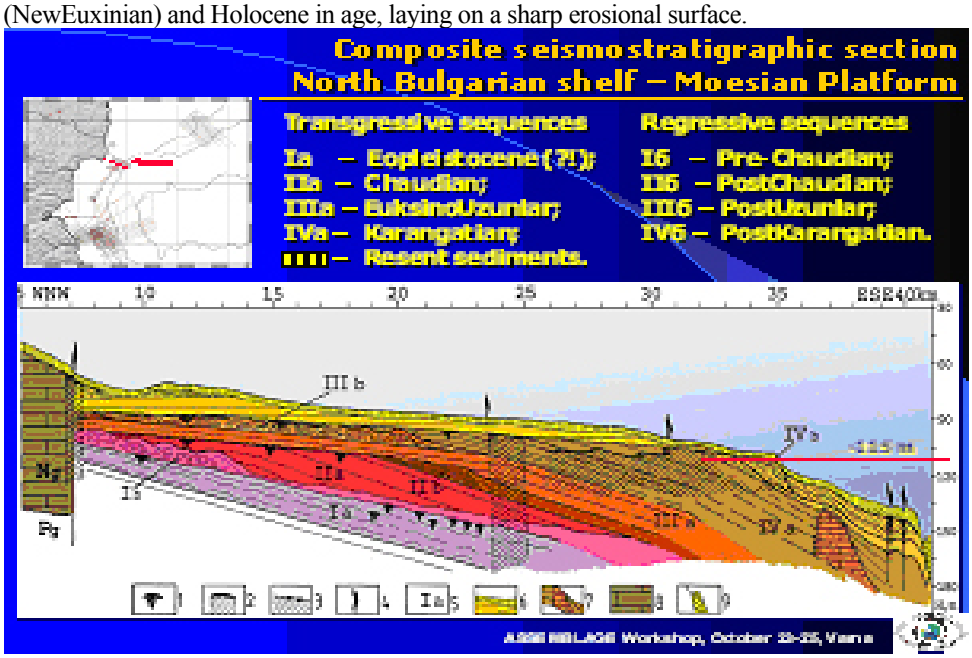
SEISMIC STRATIGRAPHY OF QUATERNARY SEDIMENTS ON THE WESTERN BLACK SEA SHELF

Lyubomir DIMITROV

Institute of Oceanology, P.O.Box 152, Varna 9000, Bulgaria - e-mail: ldimitrov@io-bas.bg

Interpretation of more than 1,500 km single channel (sparker and boomer) records obtained within Western Black Sea shelf, revealed the sediment history of Bulgarian shelf during the Quaternary. A correlation of seismic sections with data from site survey wells deep up to about 50 m at sites Aprilska, Nanevo and Yurii Godin was made.

Four seismic sequences (SS) have been distinguished on the shallow seismic profiles divided by sharp unconformities. Each of the SS consist of two depositional sequences (DS): The lower ones (numbered as Ia, IIa, IIIa, IVa correspondingly) are assumed to be formed in a low-energy sedimentation environment of open sea, while the upper ones (Ib, IIb, IIIb) are accumulative bodies deposited under high energy shallow water conditions and most probably represent beach deposits. The uppermost SS is overlain by few meters tick drape of resent sediments, Upper Pleistocene (NewEuxinian) and Holocene in age, laying on a sharp erosional surface.



The lowest depositional sequence (Ia) observed in the northern shelf only, is not reached by the inspected wells and is assigned as Pliocene in age. We assume that these fine grained sediments are an analog of clays found at the head of C-3 well on the Samotino-East structure situated in northern part of Varna Bay, which are defined with some uncertainties as Gurian (Eopleistocene) in age.

The Lower Pleistocene sequence comprises three DS - Ib, IIa, IIIb, which reflect fluctuating environment conditions. The lowest one (Ib) is an accumulative body which might be correlated to the sandy sediments described as Upper Chaudian at site Aprilska C-3. Because of nomenclature difficulties we could not conclude if this body is formed during Early Chauda or it reflects a stage in the development of depositional environment during Late Chauda. They are overlayned transgresively by the fine grained deposits of DS IIa. The accumulative body of DS IIb lies above these clayey sediments in seaward arts of shelf and more possibly marks the position of shoreline during Postchaudian (Mindel) regressive stage.

The third seismic sequence (DS IIIa and IIIb) correspond to sediments of Middle Pleistocene (Mindel - Riss) subseries. The lower part of Old Euxinian sequence (IIIa) consists of clays recovered in Nanevo C-5 and C-4 wells. The upper part of this SS (DS IIIb) is represented by a system of linear ridges composed of sand and shell detritus sampled in all five wells in Nanevosite and in Aprilska C-2 well. The space between ridges is filled with more fine-grained sediments, which recovered in Aprilska C-3 well.

Sediments of DS IVa are deposited during the largest Quaternary transgression Karangatian (Upper Pleistocene) when a climate optimum existed and salinity of the sea water reached values over 33 ‰ provoke coral reefs to grew up in the Black Sea.

In the central parts of the southern Bulgarian shelf all the DS from IIa to IVa have much bigger thickness due to subsidence of the Bourgas Depression during all Quaternary.

The accumulative body (DS IVb) near the modern shelf break indicates the position of shoreline during the maximal fall of the sea level in the Würm glacial. The difference of the water depths on which the beach forehead situates all along the shelf edge indicates that the northern shelf remains relatively stable, while the central parts is uplifting and southern is deeping.