

Late Pleistocene and Holocene stratigraphy of the Gulf of Saros; new Chirp seismic data

*Bedri Alpar¹, Denizhan Vardar¹, Hakan Alp²

1. Istanbul University, Institute of Marine Sciences and Management, 2. Istanbul University, Engineering Faculty, Geophysical Engineering

The Gulf of Saros is located at the eastern margin of the North Aegean Trough (NAT), which is a right-stepping horsetail structure developed at the western termination of the North Anatolian Fault (NAF). Its evolution started in the Middle to Late Miocene, under the NW–SE compression caused by the counterclockwise movement of the Thrace and Biga peninsulas along the Thrace Fault Zone. This presentation presents the stratigraphic setting in this active gulf region, depending on the available seismic data sets and as well as new 300 km-line high-resolution shallow chirp data collected at the eastern margin of the gulf. The shear deformations confirmed that the right-lateral North NAT fault zone (NNAT) and left-lateral South NAT fault zone (SNAT) are the most significant structural elements controlling the NW–SE compression deformation. The Neogene sediments overlie the pre-Early Miocene basement on land. The erosion unconformity between these formations forms a characteristic key surface area on all of the marine seismic records, implying a long hiatus from Miocene to Pleistocene, and with some local erosions.

The deposits above the acoustic basement are divided into four distinctive seismic units. The bottommost unit U1d overlies the pre-Early Miocene basement, and accumulated from the onset of coastal transgression until the time of maximum transgression of the coast, with sediments onlap the underlying erosional truncation surface. The unit U1c comprises fluvial sigmoidal reflections with sediments downlap the underlying unit and show highstand - lowstand period. The unit U1b comprises marginal marine and fluvial sediments deposited during the lowstand period. Finally, the topmost unit U1a and its parallel inner reflections represent the last transgression.

Two different depositional characteristics have been defined in the gulf, as they are separated by an actual fault system. On the southern margin, the transgressive deposits of unit U1a lie directly above the pre-Early Miocene basement while fluvial sigmoidal deposits of the unit U1c and marginal marine and fluvial deposits of the unit U1b can be seen on the northern margin, and they form 30-ms (tw) thick sedimentation deposited under the control of northerly riverine inputs during highstand to lowstand periods. The stratigraphic setting in the gulf supports a dextral movement along the NNAT. The unit U1c is widely distributed in the middle of the studied area. Some buried channel geometries of the rivers, which transported the sediments of unit U1c, have been outlined at the northern sector. In addition, some characteristic sand deposits, equivalent with the unit U1d, were defined at the northern sector of the gulf. All these findings show that the northern margin is under the influence of river aggradation whilst the southern margin was an erosional platform during the last glacial maximum.

Keywords: seismic stratigraphy, Chirp seismic, Aegean Sea