

Seismic stratigraphic analysis of Late Oligocene-Recent deltaic-turbiditic systems, Kırklareli and Bogazici 3D seismic survey areas, Western Black Sea

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Located in the western part of the Turkish Western Black Sea, the study area is situated in a geologically complex area, which is characterized by three fold belts that portray a progradational trend towards east-northeast: (1) Strandzha Thrust Belt, (2) Srednogorie Thrust Belt, and (3) Balkanide Thrust Belt. Two 3D seismic surveys, Kırklareli and Bogazici, have been used to study the Late Oligocene-Recent sedimentary package, which was deposited on the irregular topography created by such deformation belts.

Late Oligocene sedimentary package, which thins out towards the basin margin to the west, southwest and south, are hard to track on shelfal areas. The package, on the contrary, displays a thickening trend towards the basin center to the northeast. This thickening is accompanied by increase in the frequency of high amplitude seismic facies with channel/fan geometries in both 3D seismic survey areas (SSAs). Characterized by progradational clinoforms that downlap the Late Oligocene package in Karaburun 3D SSA, the Early-Middle Miocene succession suggests the presence of a delta to the southwest of the block during this period. The prograding clinoforms evolve downslope into horizontal, variable amplitude and semi-continuous reflectors towards the north, northeast, and east. Amplitude maps obtained from Bogazici 3D SSA portray southwest-northeast-oriented axial meandering channel and fan geometries. Such geometries are interpreted as the distal turbiditic equivalents of the delta observed in Karaburun 3D SSA. Upper part of the Late Miocene is a regional erosional surface displaying several canyon geometries in both SSA. The canyons in Karaburun 3D SSA are downlapped by Plio-Quaternary prograding clinoforms, whereas they are filled by transparent and chaotic reflectors representing mass transport complexes (MTCs) in Boğaziçi 3D SSA, which also dominate the whole Late Miocene strata in the area. In contrast to their fluvio-deltaic nature in Karaburun 3D SSA, the Plio-Quaternary package in Bogazici 3D SSA, display several elements of deep water depositional systems such as channel complexes and MTCs.

Sediment entry points and depositional geometries were controlled by not only the morphologies created by fold belts but also the growth and strike slip fault systems that were prominent especially during the Miocene. The presence of different sediment dispersal systems in different time periods show the change in interplay between several principle controls on the depositional framework of the basin fill such as, location of sediment source, sedimentation rate, tectonism and relative sea-level, through time.