



Structure and seismic stratigraphy of deep Tertiary basins in the northern Aegean Sea

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Whereas active basin formation in the Aegean Sea is illustrated by seafloor bathymetry, the sedimentary and tectonic history of Tertiary basins is poorly known as existing offshore industrial seismic and well-log data are not easily accessible. We studied the evolution of the northern Aegean Sea with a focus on the North Aegean Trough and the Northern Skyros Basin, which are amongst the deepest basins of the northern Aegean domain. Structural and seismic stratigraphic interpretation of a 2D seismic dataset retrieved in the 1970's is combined with the well-investigated records of the onshore deep basins of northern Greece and Western Turkey. A general seismic signature chart was established using onshore basin stratigraphy and poorly-constrained well data. The studied domain shows two sharp unconformities that correspond to the Eocene-Oligocene transition and the Miocene-Pliocene shift, respectively. These transitions were then used as pillars for a more detailed structural and seismic stratigraphic interpretation. A NW-SE trending seismic line that cross-cuts the southern part of the NE-SW-trending North Aegean Through displays the main features that are observed in the area: 1) an overall basin geometry that is rather symmetrical; 2) pre-Pliocene units affected by steep normal faults; 3) a rather constant thickness of Oligocene sediments that define a depocenter with an apparent NW-SE orientation; 4) an ablation of Miocene sediments by erosion, likely related to the Messinian Salinity Crises (MSC); (5) thick deltaic/turbiditic deposits in the NE-SW oriented central through of Neogene age; 6) trans-tensional growth patterns in Pliocene and Quaternary sediments that combine NE-SW steeply dipping fault zones, more likely corresponding to strike-slip corridors, and E-W-trending normal faults. The evidence listed above suggest that, in the northern Aegean Sea, (1) extension started at the latest during the Late Eocene/Early Oligocene (data quality does not allow for a more precise age, nor does it excludes a mid-Eocene onset of extension as in the nearby located Rhodope Massif) and (2) sedimentation has been almost continuous from Late Eocene to present-day, however with a short interruption and even local erosion, during the Late Miocene. This tectono-sedimentary history is discussed in the frame of the Aegean extension, driven only by slab rollback from Middle Eocene to Middle Miocene and by the interaction between slab rollback and Anatolia extrusion since Middle Miocene.