
Variability of Thickness and Occurrence of Turbidite-Homogenite Units: Interaction of Paleogeographic and Climatic Conditions, Kumburgaz Basin, Sea of Marmara

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Abstract

Sedimentary basins of Sea of Marmara (SoM) that aligns along the North Anatolian Fault (NAF) provide a long sedimentary record of gravity flow deposits interpreted as earthquake triggered. Turbidite-Homogenite Units (THUs) are used as a tool in subaqueous environments that are currently affected by active faulting, in order to determine the seismic cycles. THUs need a better characterization in terms of their boundaries between overlying hemipelagic/lacustrine sediments in order to provide an accurate age-depth model which will lead a consistent chronostratigraphy of the core. We combined μ -XRF, anisotropy of magnetic susceptibility (AMS) and rock magnetism parameters to define stratigraphic boundaries of seismoturbidites in a 21 m long calypso core recovered from Kumburgaz Basin, SoM. In the core, 15 kyr long record is revealed covering the marine (containing lower and upper sapropelic layers) and lacustrine units of the SoM and intercalated with \sim 70 THUs. Boundaries of homogenites and overlying background sediments are determined by the combination of μ -XRF and high value of magnetic foliation parameter. Coarse basal parts have a higher concentration of ferromagnetic minerals than other lithologies. However, there is no clear indication showing that magnetic mineralogy is different between homogenites and overlying or underlying background sediments. With these boundary criteria, we established a robust age-depth model to show the variations in terms of THU thicknesses and occurrence intervals. In the core, THU average occurrence intervals are 235 ± 85 , 287 ± 254 , 114 ± 62 , 174 ± 112 yrs in lacustrine, lower sapropel, upper sapropel and non-sapropelic marine units respectively and are larger than 400 years in the laminated part of the lower sapropel. This implies that occurrence intervals for THUs are not consistently associated with large earthquake recurrence intervals. The observed variability probably results from variations in oceanographic

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and climatic conditions. Moreover, thicknesses of THUs also varies in lacustrine (208 mm), lower sapropel (157 mm), upper sapropel (61 mm) and non-sapropelic marine (70 mm) units. Differences in THUs intervals and thicknesses may be due to variations in the sediment input to the Sea of Marmara, to changes in submarine canyon activity related to sea or lake level variations, and/or to variations of the sensitivity of slope sediments to ground shaking as a function of environmental conditions.