



Megaturbidite triggered by the ad 365 Cretan earthquake in the Mediterranean Sea

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Destructive earthquakes/tsunamis have affected repeatedly the circum Mediterranean highly populated coastal regions. A record of these past events can be provided by large-volume turbidites or megaturbidites, detected in the marine sedimentary record (Polonia et al., 2012). Megaturbidites have been identified in the Ionian basin (central Mediterranean) that is located between two tectonically active subduction zones (i.e. the Calabrian Arc to the North and the Hellenic Arc to the East). The uppermost megabed, has been named "Homogenite" (Kastens and Cita, 1981) or "Augias turbidite" (Hieke, 1984). Its well defined stratigraphic position, above the regional marker sapropel bed S1, has been interpreted as evidence that it was deposited in a single, basin-wide event capable to put into suspension simultaneously sediment at a basin-wide scale. Absence of absolute dating of the megabed and of a detailed chronostratigraphy of the deposits above and below the turbidite, have allowed a number of different correlations of this megaturbidite with the 3500 yr BP Minoan eruption of Santorini and related tsunamis in the Aegean Sea (Kastens and Cita, 1981), to the 7.600 ± 130 yr B.P. collapse of a flank of the Etna Volcano (Pareschi et al., 2006) or to the 365 earthquake in the Mediterranean (Vigliotti, 2008).

Based on studies of sediment cores we collected from the Ionian seafloor (mineralogy, micropaleontology, elemental and isotopic geochemistry and radiocarbon dating), we show that the Homogenite/Augias turbidite (HAT), up to 20-25 m thick, was related to multi-source turbidity flows triggered by the 365 AD tsunami. We were able to reconstruct the different units deposited in response to the 365 AD Cretan earthquake/tsunami and the results confirm that the HAT is a unique instance of deep sea tsunami deposit. Backwash flows and related gravity-driven processes are the primary means of downslope sediment transport. An older similar deep sea megaturbidite was deposited in the Ionian Sea about 15.000 years B.P., implying a large recurrence time of such extreme sedimentary events in the Mediterranean Sea.

References:

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