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Paleoseismological investigation offshore eastern Sicily and south Calabria (Ionian Sea).

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The Ionian Sea is a deep and narrow basin in the Central Mediterranean Sea, bounded by two accretionary wedges formed by the Calabrian and the Hellenic subduction zones, respectively to the North West and to the East. Eastern Sicily and Calabria have been repeatedly struck by destructive historical earthquakes and tsunamis (1693 AD Catania M7.4, 1908 AD Messina M7.2). The latter triggered a submarine landslide and turbidity current that ruptured submarine cables. In the Ionian Sea, preliminary sedimentological studies show that recent turbidite deposits could be directly correlated with large historical earthquakes. Other thick deposits imaged in seismic data as thick transparent layers in the Ionian abyssal plain have been termed megaturbidites or homogenites.

This study is focused on the interpretation of turbidites and megaturbidites on the basis of new sediment cores located in the northwestern Ionian Sea. Understanding the sources and the origin of these deposits is crucial to interpret the paleoseismological record contained in the deep sediments of the Ionian Sea. The objective is to improve our understanding of the chronology and origin of large catastrophic events, which have affected the area.

New data, including piston cores and CHIRP echosounder profiles, were collected during the CIRCEE cruise, with R/V Le Suroit in October 2013, in the western Ionian Sea, including the western part of Calabrian accretionary wedge and the base of the Malta Escarpment. With a wide regional distribution of the cores, this new dataset allows to refine the interpretation of gravity deposits in terms of sedimentary processes and to establish an event stratigraphy based on radiocarbon dating. The Augias megaturbidite was completely sampled in six cores: the origin of this deposit is associated to the 365 AD Crete mega-thrust earthquake. The sedimentological study and correlation of turbidite deposits provide the opportunity to obtain a paleoseismological record extending over the past 20 000 years. The uneven distribution of turbidites observed, suggests the possibility of earthquake clustering.