



An oceanographic observation of the 2013 Mt.Etna pyroclastic fallout in the Ionian deep seafloor: multiparametric investigation through benthic observatory

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Very large amounts of volcanic ash are released into the atmosphere during eruptive events. Taken over the atmospheric forcing tephra may be carried over great distances remaining in suspension for a long time. Nevertheless, the wind is not the only responsible for transport and dispersion of volcanic particles, but, especially in volcanic areas close to the coast, the ash fallout in marine areas plays an interesting role in the sedimentation processes affecting the benthic environments.

During the Mt. Etna eruptive events of 2013, the volcanic ash fallout occurred in the Western Ionian Sea deep layers was recorded by an oceanographic sensor mounted on the cabled benthic node NEMO-SN1. The seafloor observatory was deployed in the framework of the European Research Infrastructure EMSO (European Multidisciplinary Seafloor and water-column Observatory) at a depth of 2100 m, about 25 km off-shore Eastern Sicily. The presence of a specific Acoustic Doppler Current Profiler (ADCP) able to monitor currents and direction of water particles in a depth range of about 30-50m above the seafloor, allowed to watch interesting episodes of suspended matter at the deep layers in correspondence with the pyroclastic activity which affected the ESE sector of the Etna volcano. The analysis of the acoustic backscattering signal of this sensor, combined with seismological and oceanographic data recorded by the benthic station, allowed to carry out a multidisciplinary study about the possible interaction between the Mt. Etna eruptive activity and the local oceanographic dynamic. This approach leads to consider that sedimentation processes of volcanic ash occurred, allowing to investigate on the very fast horizontal and vertical transport observed. Moreover, the surprising sedimentation rate recorded, probably results from intense aggregation and alteration processes affecting the ash particles in seawater.

The importance of the presence of a multidisciplinary benthic observatory in sensible areas, such as the Western Ionian Sea, is confirmed by the possibility to record and monitor important processes otherwise unexplored, and also by the opportunity to carry out multidisciplinary studies indispensable to explain the observed processes.