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Seasonal and interannual variability of sinking particulate matter in the deep Ionian Sea: ecological and biogeochemical perspectives

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Sinking particulate matter is the major vehicle for exporting carbon from the sea surface to the deep sea. Biotic and abiotic processes that form, alter, transport, and remineralize particulate organic carbon, silicon, calcium carbonate, and other minor and trace chemical species in the water column are central to the ocean's ecological and biogeochemical functioning and are of fundamental importance to the ocean carbon cycle. Our overall goal in this study is to develop a comprehensive description of carbon fluxes and associated mineral ballast fluxes in the deep Ionian Sea, northeastern Mediterranean. A mooring line of five sediment traps was deployed from 2006 to 2012 at 5 successive water column depths (700, 1200, 2000, 3200 and 4300 m) in the SE Ionian Sea, where the deepest part of the Mediterranean Sea is located ('NESTOR' site). Aiming to investigate the significant ecological and biogeochemical features and provide new insights on the sources and cycles of sinking particulate matter in the Ionian Sea, we have examined long-term records of downward fluxes for Corg, Ntot, δ13Corg and δ15Ntot, along with the associated ballast minerals (opal, lithogenics and $CaCO_3$). Our ultimate goal is to identify the mechanisms governing particle transport in the study area, and to explain (i) the seasonal, and (ii) the interannual variation of mass and main constituent fluxes, in relation to oceanographic conditions, regional and large scale circulation patterns and climate variability.