Variability of fine-grained basin floor turbidites and evaluation of controls on their development: Late Pleistocene, Gulf of Corinth, Greece

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The Gulf of Corinth is one of the World's fastest extending continental rift basins. During the Late Pleistocene, it alternated between marine and lacustrine conditions due to climate-driven sea-level fluctuations connecting or isolating/semi-isolating it from the open ocean. Core from IODP Expedition 381 (Corinth Active Rift Development) provide a continuous record of depositional processes operating within this deep-water rift and the interaction of tectonic and climate drivers controlling deep-water deposition over the Middle to Late Pleistocene. Subaqueous sediment density flows affect the Gulf of Corinth and are classified either by physical flow properties and grain support mechanisms or by depositional processes. Existing classifications mainly describe deposits from decimetre to 10's of meter scale with an emphasis on sandy beds. Thinner (millimetre to centimetre scale) and finer (muddy to sandy) subaqueous sedimentary density flows beds are understudied. Low energy flows and tail of flow processes need a better understanding and are the target of this work. The aim of this study is to characterise the variability of fine-grained subaqueous sedimentary gravity flow deposits and the controls on their development based on core data from Site M0079 (IODP Expedition 381). This site is located in the deepest part of the Gulf of Corinth (857 m water depth), in the most distal part of the sediment routing system. Analyses were performed within a 100 m interval covering Marine Isotope Stages 6 and 7 (from ~130 to ~250 ka). Detailed, sub-centimetre visual logging recorded over 2 000 beds classified according to (1) the presence/absence of a coarse base, (2) the grain-size (silty or sandy) of the base (if any), (3) the presence/absence of laminations within the muddy intervals, (4) sedimentary structures. The bed types reflect the diversity of the sedimentary processes and the subaqueous sediment density flows are thus organised within the depositional model. Bed frequency analysis provides insight into the variability between marine and lacustrine conditions. Relative chemical composition obtained from high resolution (2 mm) X-ray fluorescence scanning is used: (1) to examine the interactions between tail of the flow and background sedimentation in the basin and (2) to assess the provenance of the sediments.

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