



The eastern Gulf of Aden: A case study for the setting up of the deep-sea gravity sedimentation on a young continental margin

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The study of sedimentary processes across a young and segmented passive margin under the influence of the Asian monsoon-climate, provide a potential record of tectonic, climatic and high-resolution eustatic events. The northern margin of the eastern Gulf of Aden is one of the world rare examples to study the setting up of gravity sedimentation in a deep basin and the related control parameters. Using multibeam data, Chirp profiles, and sediment cores, we show that this gravity sedimentation highlights the importance of flooding of wadis on the sediment transfer from onshore to the deep basin. The drainage network is not mature on this starved margin, which is affected by post-rift uplift. The main channelized turbidite systems are localized in the western part of the margin, while mass-transport deposits and sheet turbidite deposits are concentrated along the eastern part of the margin affected by a late post-rift uplift. The deep-basin sedimentation is composed of many coarse-grained carbonate turbidites that are related to the lithology of the onshore sedimentary cover. The central part of the uplifted margin does not exhibit coarse-grained turbidites since about 70 ka BP, while the eastern part displays turbidites until recently.

This monsoon-influenced margin is characterized by strong along-strike variability in tectonics and fluvial input distribution that might directly influence and segment the gravity sedimentation: (i) the western channelized turbidite system formation depend mainly of the wide catchment area onshore in combination with the geometry of the deep basin; (ii) the starved part of the margin, characterized by mass-transport deposits is mainly controlled by the post-rift uplift; (iii) along the eastern part of the uplifted margin, the unchannelized turbidite deposits seem to be primarily controlled by the presence of a well-developed continental shelf combined to the late uplift impact on the sedimentary supply.