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Sediment partitioning and winnowing in a mixed eolian-marine system (Mauritanian shelf)

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Continental shelf systems are highly dynamic sedimentary areas. The sediment from biogenic production as well as from terrigenous sources is redistributed in the shelf depositional system and is partly exported off the shelf to the slope and the deep sea. The Golfe d'Arguin (Mauritania, NW Africa) is a sedimentary environment that is dominated by such redistribution processes of clastic silt imported as dust from the Sahara desert, and biogenic carbonates. Surface-sediment grain size and mineralogy show a clear north-south partitioning of sediment type. Fine material is winnowed from the northern part and transported toward the southern part off the bank, where coarse silt settles on the outer shelf and slope, at least down to 600 meters water depth. The finer grain-size range of the silt fraction, as measured in eolian material from shipboard traps, is thought to be exported further downslope as it corresponds well with grain sizes previously reported from deep sea sediments. These findings caution that the interpretation of dust records on the slope and in the deep sea might be modified by a reworking and partitioning processes on the shelf.