



# Application of grain size trend analysis for the determination of sediment transport pathways in intertidal areas

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In this paper, we apply the Gao and Collins procedure of grain size trend analysis for the first time in an intertidal sedimentary system. Our purpose is to evaluate a reliable method to determine residual transport directions in intertidal environments, where sediment movement is not well understood. Residual transport patterns can be determined by grain size trend analysis if the following criteria are applied: (1) a single sediment transport unit must be precisely defined and investigated; (2) the thickness of sampling has to be chosen in order to investigate the most recent sedimentary event; and (3) a regular mesh grid is sampled to avoid bias in the calculation of grain size trends. The Gao and Collins method was undertaken simultaneously with a topographic survey and a tracer experiment, during consecutive meteorological conditions of fair weather and a storm event. The topographic changes observed between these two situations and the directions of sediment movement deduced from tracer tracking are coherent with the residual transport pattern calculated from the grain size trend analysis. The method was tested on a ridge and runnel system which corresponds to the intertidal part of a macrotidal beach, called La Salie beach, located along the southwest French coast, in a high wave energy environment. This study permits us to recognize two different residual transport patterns for this intertidal ridge and runnel system; one for fair weather and a second for storm conditions. During fair weather, specific sites are subject to sand accretion, while during storm conditions these sand stocks are subsequently spread out over the whole area, and remain partly on the beach.

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