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Storm group impact on beach erosion and recovery at microtidal semiexposed beach

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The morphodynamic response of a microtidal beach (Cala Millor, Mallorca, Western Mediterranean) under a storm group is analyzed and the effects of each individual event inferred from a numerical model, in situ measurements and video imaging.
The analysis of beach evolution shows two different characteristic time scales for the erosion and recovery processes associated with the storms and mild conditions respectively. Besides, the response depends largely on the previous beach morphological state. The larger changes in sediment mobilization occur from the transition between the reflective to the dissipative states, where the beach adjusts its profile to the incoming wave conditions. The first storm of moderate conditions (ca. Hs=1m) active during 6 hours eroded the aerial beach generating a submerged sandbar in the breaking zone. The bar is further directed offshore during the more energetic second event (Hs = 3.5m) with a duration of 32 hours. The third storm, similar to the first one, did not affect the beach morphology, thus stressing the importance of the previous morphological state. The volume of sand mobilized during the storm group is around 30,000 m3. The following two months are characterized by mild wave conditions and during this period the dry beach recovered half of the volume of sand that was transported offshore during the storm group (ca. 15,1800 m3).