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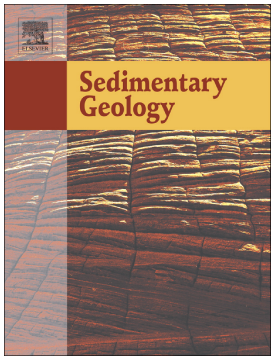

(Mallorca, Western Mediterranean)

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Late Pleistocene dune–sourced alluvial fans in coastal settings: sedimentary facies and related processes (Mallorca, Western Mediterranean)

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ABSTRACT

Aeolian-alluvial sedimentary interaction results in the formation of deposits characterized by typical alluvial sedimentary structures, but is composed of conspicuous amounts of aeolian sediments. The literature on this topic is limited and most works relate more with continental aeolian dunes or fluvial dune interference with fan bodies. Furthermore, there is a lack of examples of aeolian-alluvial sedimentary interference in coastal settings. In the western Mediterranean, there are many Pleistocene alluvial fan deposits built up partly by sediment originating from coastal dunes dismantled by alluvial streams. Very often, these deposits show a continuous sedimentary sequence through which we can derive the contribution and predominance of coastal, alluvial-colluvial and aeolian processes and their controls on landscape formation. This is an outstanding feature within coastal systems since it shows marine sediments reworked and integrated within coastal dune fields by aeolian transport, and the latter built up into alluvial fan bodies. In this sense, aeolian-alluvial interaction is the geomorphic–sedimentary expression of the coexistence and overlapping of alluvial and aeolian environments resulting in deposits sharing sedimentary features from both environments. The aim of this paper is to unravel the contribution of coastal dunes in the construction of alluvial fans bodies and identify the main sedimentary facies that constitute these deposits, as well as their climatic controls. For this reason, Es Caló fan (northern Mallorca) has been selected due to its well-exposed deposits exhibiting the alternation of aeolian, alluvial and colluvial deposits. Sedimentological and stratigraphic analyses based on 33 logs and complementary analyses demonstrate that most of the facies constituting the fan body are made up completely of marine bioclastic sands. These deposits record an alluvial fan sedimentary environment characterized by sediments