GRAIN SIZE AND HEAVY MINERALS OF THE LATE QUATERNARY EOLIAN SEDIMENTS FROM THE IMBITUBA-JAGUARUNA COAST, SOUTHERN BRAZIL: DEPOSITIONAL CONTROLS LINKED TO RELATIVE SEA LEVEL CHANGES

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Some large coastal zones worldwide, like coastal sectors of Brazil and Australia, show many generations of Quaternary dunefields. Dune sands show a wide variety of geomorphologic aspects, but they show poor fossil content and a low range of sedimentary facies. Thus, the stratigraphic division and correlation of dune deposits is difficult when dating methods are not applied. Studies of the relationship between the eolian system dynamics, operating on a thousand year timescale, and the heavy minerals and grain size of dune sands are scarce. Models of the controls on texture and composition of eolian sands are necessary to interpret ancient eolian sediments. In this context, the Imbituba-Jaguaruna coastal zone (Southern Brazil, 28º-29ºS) stands out due to its four well-preserved Late Pleistocene (eolian generation 1) to Holocene eolian units (eolian generations 2, 3, and 4). In this study, we evaluate the grain size and heavy mineral characteristics of the Imbituba-Jaguaruna eolian units through a statistical analysis of hundreds of sediment samples. The grain size and heavy minerals discriminate the Pleistocene from the Holocene eolian generations. The grain size shows a pattern of fining and better sorting from eolian generation 1 (older) to 4 (younger). The content of denser and harder heavy minerals decreases from eolian generation 1 to 4. The variation in grain size and heavy minerals relates to shifts in the origin and balance (input vs. output) of the eolian sedimentary supply controlled by relative sea level changes. Dunefields present at low relative sea level phases (eolian generation 1) show low accumulation rates due to the lack of accommodation space for the development of coastal depositional systems. Low accumulation rates favor deflation in the eolian system. The deflation of low sea level dunefields concentrates denser and harder heavy minerals (increase of ZTR index) and promotes coarsening and decreasing of sorting of the eolian sands. Under a high rate of relative sea level rise and coastline transgression (eolian generation 2), coastal erosion prevents deflation through a high input of sediments to the coastal eolian source. This condition favors dunefield growth. However, coastal erosion feeds the eolian system with sand from local sources, including sands from previous dunefields (eolian generation 1). Therefore, dunefields of transgressive phases inherit the grain size and heavy mineral characteristics of previous dunefields. Eolian generations 3 and 4 develop during a regressive-progradational phase (Holocene relative sea level highstand). The high sediment supply of the highstand phase prevents deflation. The lack of coastal erosion favors the sediment supply from distal sources (fluvial sediments rich in unstable heavy minerals). Thus, high rates of accumulation (low deflation) set apart the transgressive and highstand sea level dunefields from the low sea level ones. The origin of the sediment supply distinguishes the transgressive (high input of previously deposited coastal sands) from the highstand dunefields (high input of fluvial distal sands). Based on this case study, we hypothesize a general framework to explain the relation between relative sea level, sediment supply and the texture and mineralogy of coastal eolian sediments deposited in analogous settings.

CAMBIOS DEL NIVEL DEL MAR: PERSPECTIVA GLOBAL, ESCENARIOS DE ACELERACION Y PROGNOSIS PARA LA COSTA ARGENTINA

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Durante el siglo pasado el nivel del mar ascendió globalmente ~1-2 mm/año, la mayor parte por la adición de agua al océano debido al derretimiento de hielo terrestre y en menor proporción por expansión térmica del océano. Según algunas evidencias, la mayor contribución proviene del derretimiento de Groenlandia, con aportes menores de la Antártida, glaciares de montaña y pequeños casquetes de hielo. Recientemente se han planteado distintos escenarios de aceleración del aumento