



Washover fans in the Exmouth Gulf (NW Australia) – chronostratigraphical and geomorphological investigations and palaeotempestological significance

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Typically formed during barrier overwash or breaching and coastal inundation, washover fans represent depositional evidence of strong storms in most cases. While only few studies have investigated washover landforms in order to infer magnitude/frequency patterns of tropical cyclones (TCs) over millennial time scales, we here present a consistent chronostratigraphy of late Holocene washover fans in the Gulf of Exmouth (Western Australia). Using geomorphological, sedimentological and chronological investigations, combined with ground penetrating radar and unmanned aerial vehicle (UAV) survey techniques, we characterize the washover fans' geomorphology and stratigraphical architecture, document depositional processes involved in the washover formation, establish a chronostratigraphy based on optically stimulated luminescence (OSL), and evaluate the significance of the washover fans for inferring past (local to regional) TC activity. Multiple phases of washover fan reactivation are inferred based on sequences of sandy depositional units, related to TC-induced inundation, and intercalating palaeo-surfaces with incipient soil formation, suggesting reduced depositional activity. Our washover fans record TC deposition on millennial time scales, suggesting TC-induced deposition at ~ 170 , ~ 360 , ~ 850 and ~ 1300 as well as ~ 1950 , ~ 2300 , and ~ 2850 years ago. Since this pattern of TC activity is consistent with data on late Holocene ENSO and SST patterns, we infer a regional palaeotempestological relevance of this unique geomorphological record.