



Prehistorical tropical cyclones inferred from washover deposits in the Gulf of Exmouth (W Australia)

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The NW Australian coast is impacted by 1–2 tropical cyclones (TCs) making landfall per year, and ten historical tsunamis are recorded since 1858. Notwithstanding, little is known about the geological imprint of both (pre)historical TCs and tsunamis in NW Australia in general. Past coastal flooding events may be inferred from geomorphic and sedimentary archives, i.e. in the form of particular landforms (beach ridges, washover fans), deposits (washover sediments in lagoons) or erosional features. Here we present new data on the sedimentology and chronostratigraphy of prehistorical washover events found in geological archives in the NW part of Western Australia. Along the W coast of the Exmouth Gulf, distinct lobate washover fans consist of shell debris layers, sand, coarse coral fragments and entire shells and exhibit delta-type sedimentation patterns. Using ground penetrating radar, unmanned aerial vehicle survey techniques as well as geomorphological and sedimentological investigations, multiple reactivation of the washover fans due to strong TCs is inferred from their complex pattern of accumulation and incision and a minimum of three palaeosols. Each of the palaeosols indicate one major depositional event and a subsequent period of geomorphological stability. Our study aims at (i) providing a detailed characterization of the washover fans' geomorphology and stratigraphical architecture; (ii) documenting the depositional processes involved in the formation of the fans; and (iii) presenting a consistent OSL-based chronostratigraphy spanning the last ~2000 a, showing how OSL can be a key in establishing late Holocene event chronologies.