



Storm and tsunami deposited sandsheets: a review

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Palaeostorm and palaeotsunami research now incorporates not only geologists and geomorphologists but computer and mathematical modellers, geophysicists, chronology experts, palaeontologists, hydrologists and ecologists. Recent studies on modern events such as the 2004 Indian Ocean tsunami and several large cyclone events (eg Hurricane Katrina) have provided new insights and now present the research community with a good opportunity to reflect on the progress made in the field, evaluate some recent criticisms and highlight knowledge gaps for future study.

There are no globally applicable sedimentological criteria for differentiating between tsunami and storms in washover sandsheets. What can be compiled for the many deposits attributed to palaeo-washover is a suite of sedimentary features or commonalities, often called signatures. These signatures must be considered in terms of the local setting as they are very much site dependant. Palaeo-washover deposits can only be attributed to an event type through careful analysis of spatial features such as the elevation, lateral extent and run-up of the deposit along with sedimentary features such as grading, the presence of intraclasts, and particle size distribution of the sediments. These analyses when combined may lead to a suite of evidence that can point to storm or tsunami as the likely depositional agent. Unfortunately when considered alone many of the characteristics are equivocal. In fact most of the signatures presented in the literature for tsunami deposition, including the presence of marine diatoms or increases in particular elemental concentrations only indicate the marine origin of the sediments and inundation by ocean water. Hence storm surges, sea level change or regional subsidence may show similar sedimentological characteristics.

Recent work has recognized the equivocal nature of many so called tsunami signatures found in sandsheets. This stated, there remain many cases in the literature where a tsunami or storm origin is stated with little consideration given to alternative interpretations. Although work continues on the differences between tsunami and storm deposits, their preservation and recognition in the geological record remains subject to much uncertainty and conjecture.