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Intense storm activity during the Little Ice Age on the French Mediterranean Coast

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Understanding long-term variability in the frequency of intense storm activity is important for assessing whether changes are controlled by climate evolution. Understanding this variability is also important for predicting present and future community vulnerability and economic loss. Our ability to make these assessments has been limited by the short (less than 100 years) instrument record of storm activity. Storm-induced deposits preserved in the sediments of coastal lagoons offer the opportunity to study the links between climatic conditions and storm activity on longer timescales. Here we present a record of these extreme climatic events in the French mediterrannean coast over the past 1,500 years based on sediment cores from Gulf of Aigues-Mortes lagoons that contain a specific sedimentary and geochemical signature associated with intense storms.

Overwash deposits correlate with floods and landfalls of the most intense documented storms in the area. There is no evidence of intense storm landfalls in the region for several hunderd years prior to the late 17th century A.D. The apparent increase in intense storms around 250 years ago occurs during the latter half of the Little Ice Age, a time of lower continental surface temperatures. Comparison of the sediment record with palaeoclimate records indicates that this variability was probably modulated by atmospheric dynamics associated with variations in the North Atlantic Oscillation.