



## **North Sea Storm Driving of Extreme Wave Heights**

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The relationship between storms and extreme ocean waves in the North sea is assessed using a long-period wave dataset and storms identified in the Interim ECMWF Re-Analysis (ERA-Interim). An ensemble sensitivity analysis is used to provide information on the spatial and temporal forcing from mean sea-level pressure and surface wind associated with extreme ocean wave height responses. Extreme ocean waves in the central North Sea arise due to either the winds in the cold conveyor belt (northerly-wind events) or winds in the warm conveyor belt (southerly-wind events) of extratropical cyclones. The largest wave heights are associated with northerly-wind events which tend to have stronger wind speeds and occur as the cold conveyor belt wraps rearwards round the cyclone to the cold side of the warm front. The northerly-wind events also provide a larger fetch to the central North Sea. Southerly-wind events are associated with the warm conveyor belts of intense extratropical storms developing in the right upper-tropospheric jet exit region. There is predictability in the extreme ocean wave events up to two days before the event associated with a strengthening of a high pressure system to the west (northerly-wind events) and south-west (southerly-wind events) of the British Isles. This acts to increase the pressure gradient over the British Isles and therefore drive stronger wind speeds in the central North sea.