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The impact of eddy-permitting ocean model currents on a forecast of surface waves from a storm.

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When ocean storm waves propagate against a current they can become dangerously high. As a step towards forecasting such events, the Met Office's 2nd generation wave model was used to simulate a case in September 2003 in which swell from Hurricane Fabian was directed against the meandering Gulf Stream current. The hourly winds for driving the wave model were obtained from the Met Office's Numerical Weather Prediction (NWP) model, and the Gulf Stream currents were obtained from the Met Office's 1/9-degree ocean forecast model (FOAM).

Wherever the waves' direction opposed the 2 m/s currents in the Gulf Stream there was a 1m increase in wave height, for waves initially 5m high, and a 1s increase in wave period. The effect on wave height was largest within the current, but the effect on the wave period was also large inshore of the current. The meanders in the Gulf Stream seemed to act like prisms, refracting the northwestward travelling waves at angles depending on their period. This caused variations in the period of 2s near the coast, which may be detectable using buoy data.