Operational Wave and Water Level model Impact Case Study #1

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What threat did Hurricane Epsilon pose in terms of coastal flooding?

The remnants of Hurricane Epsilon moved into the North Atlantic driving storm-force winds between 26th - 28th October, 2020. This had the potential to develop unusually large and extremely long-period waves affecting western facing coasts of the UK.

Wave overtopping at Perranporth beach during Hurricane Epsilon

What was your job in relation to this?

As part of my incident management role in Cornwall's EA flood warning team, I needed to consider the potential flooding impacts of this event on our coastal communities.

Initially, astronomical tides were being rated as only small to moderate and it seemed unlikely that water level alert criteria would to be activated. However, due to the unusual nature of this swell event, and the lack of previous observations for such conditions, it was clear I needed to utilise all available forecast information products to best understand likely impacts. This would assist my decision making about any requirement for precautionary alerts, and ensure I gave the most effective advice to duty managers for appropriate responses to protect local communities.

My primary specific concern was the potential for the very substantial energy in the waves to drive extreme wave run-up and infragravity surge, overcoming what would ordinarily be an unproblematic water level.

What forecasting products does the EA have?

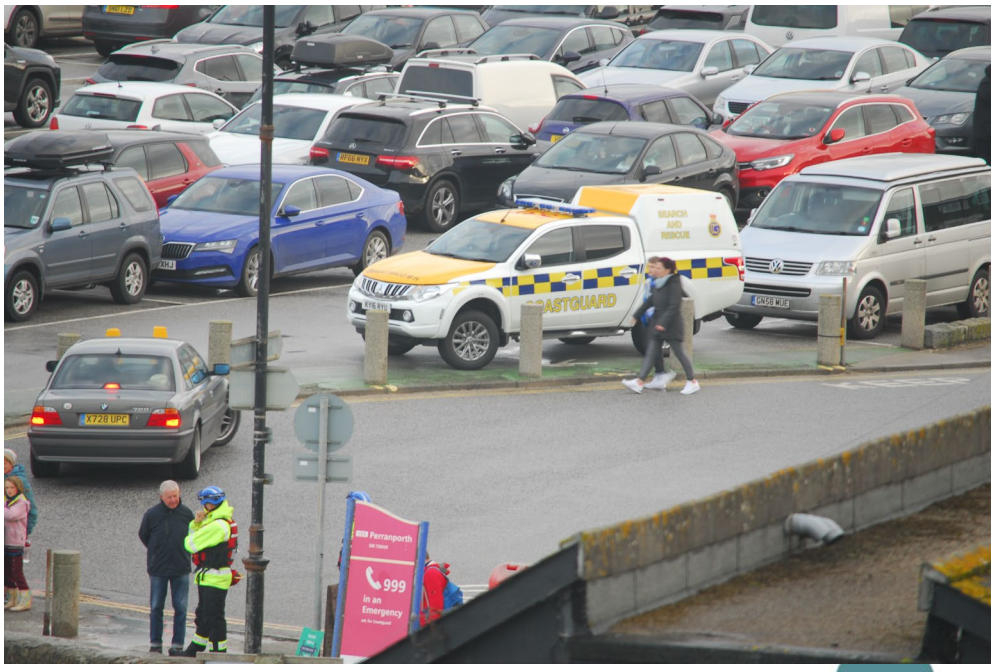
The EA has a range of forecasting data and modelling products which feed into our National Flood Forecasting System (NFFS), providing detailed information for operational duty officers. These include a variety of wave parameters, wind, and water level, with values provided for a series of offshore node points around the coast and referenced to class A inshore tidal gauge sites.

What additional value did the SWEEP-OWWL model offer you?

With concerns about how the offshore conditions of Hurricane Epsilon might translate specifically to wave impacts at the shoreline, the SWEEP-OWWL model provided an obvious complimentary layer of information to our forecasting system, with locally tailored wave overtopping forecasts available for specific defences.

The model outputs translated these very unusual wave climate parameters into quantified overtopping forecasts and having this, strengthened my decision making and helped me tailor the advice I was providing for an more effective management response. I would say the key benefits of the SWEEP's OWWL model outputs during this event were:

- Supporting the theory that some minor impacts in different coastal locations were possible, despite the perceived unproblematic water levels –also the thinking that these were unlikely to become significant impacts in any locations.
- Supporting my advice that issuing precautionary flood alerts was the right thing to do for certain locations, (i.e. property flooding was *possible*, but not *probable*, plus general conditions in exposed coastal locations might be hazardous).
- Informing and targeting reconnaissance efforts in areas where we would learn the most by having observers on location.



Emergency services monitoring the wave overtopping situation at Perranporth during Hurricane Epsilon