# STORM EMMA:

## REAL-TIME COASTAL FLOODING PREDICTION DURING A 100-YEAR STORM EVENT

**Location**: South Devon and Cornwall, UK.
**Dates**: 1st – 2nd of March, 2018
**Project**: South West Partnership for Environment and Economic Prosperity



A real-time coastal flood warning system is being developed for the entire southwest of England that, for the first time, predicts the potential hazard of wave set-up, runup and overtopping in the region. These elements can contribute many meters to the total elevation of the sea and cause significant flooding during a storm. At the core of the system is a 1 km resolution Delft3D wave and hydrodynamic model. 246 topographic profiles, representing the most at risk areas for each stretch of the ~900 km coastline of south west UK, are used for the prediction of wave runup and overtopping, using different formulae for profiles featuring gravel beaches, sandy beaches, and sea defence structures. During Storm Emma, which featured easterly wave –


Damaged A379 road, Slapton Sands

heights of 5.5 m (~100 year return period - middle figure), the model predicted extreme wave runup far exceeding the crest height of the gravel barrier at Slapton Sands (bottom figure). The runup was predicted to add 6 meters to the vertical reach of the sea during this storm, and caused severe damage to the A379 road atop the barrier (top figure). Predictions of tide and storm surge alone would not have predicted the hazard that this event posed, due to the extreme degree of wave runup. We are working with the Environment Agency to further test the model over the 2018/19 winter.


Wave Height (Hs): 02/03/18 03:00
Slapton Sands, Start Bay


Slapton Sands (profile 6b01257)