

DEVELOPMENT OF A REAL-TIME, REGIONAL COASTAL FLOOD WARNING SYSTEM FOR SOUTHWEST ENGLAND

CHRISTOPHER STOKES¹, TIMOTHY POATE¹, GERD MASSELINK¹, JAK MCCARROL¹,
ERIN KING¹

¹ PLYMOUTH UNIVERSITY, SCHOOL OF BIOLOGICAL AND MARINE SCIENCES, DRAKE CIRCUS, PLYMOUTH, PL4
8AA, UK. CHRISTOPHER.STOKES@PLYMOUTH.AC.UK



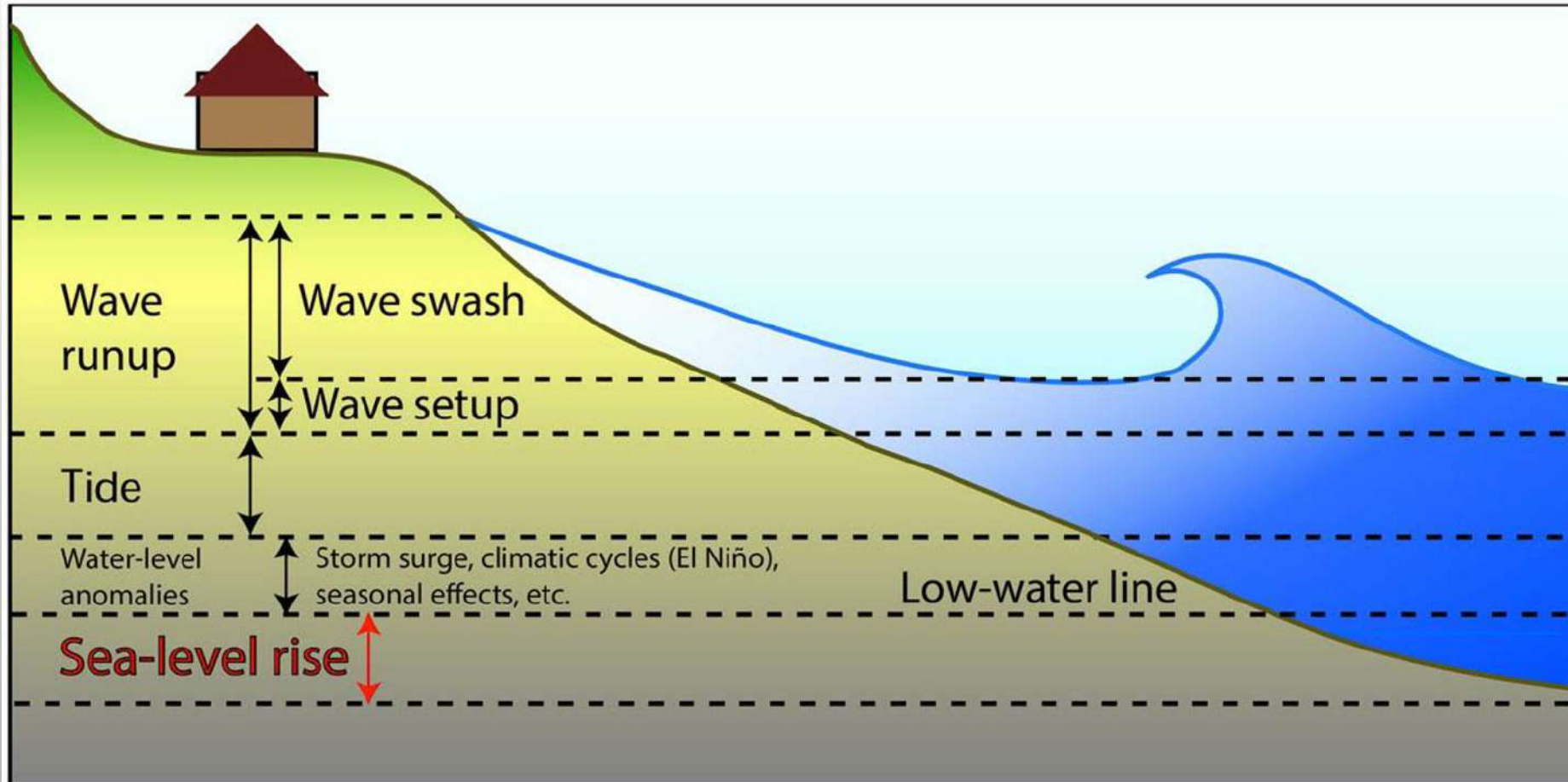
**COASTAL
PROCESSES
WITH
PLYMOUTH
UNIVERSITY**

OVERVIEW

- COASTAL FLOODING
- EXISTING FLOOD WARNINGS
- AN IMPROVED WARNING SYSTEM
- MODEL CONFIGURATION
- CASE STUDIES – STORM ELEANOR AND STORM EMMA
- FUTURE DEVELOPMENTS – ECOLOGICAL APPLICATIONS?



COASTAL FLOODING



“Flooding that occurs from storms where water is driven onto land from an adjacent body of water” (NOAA)





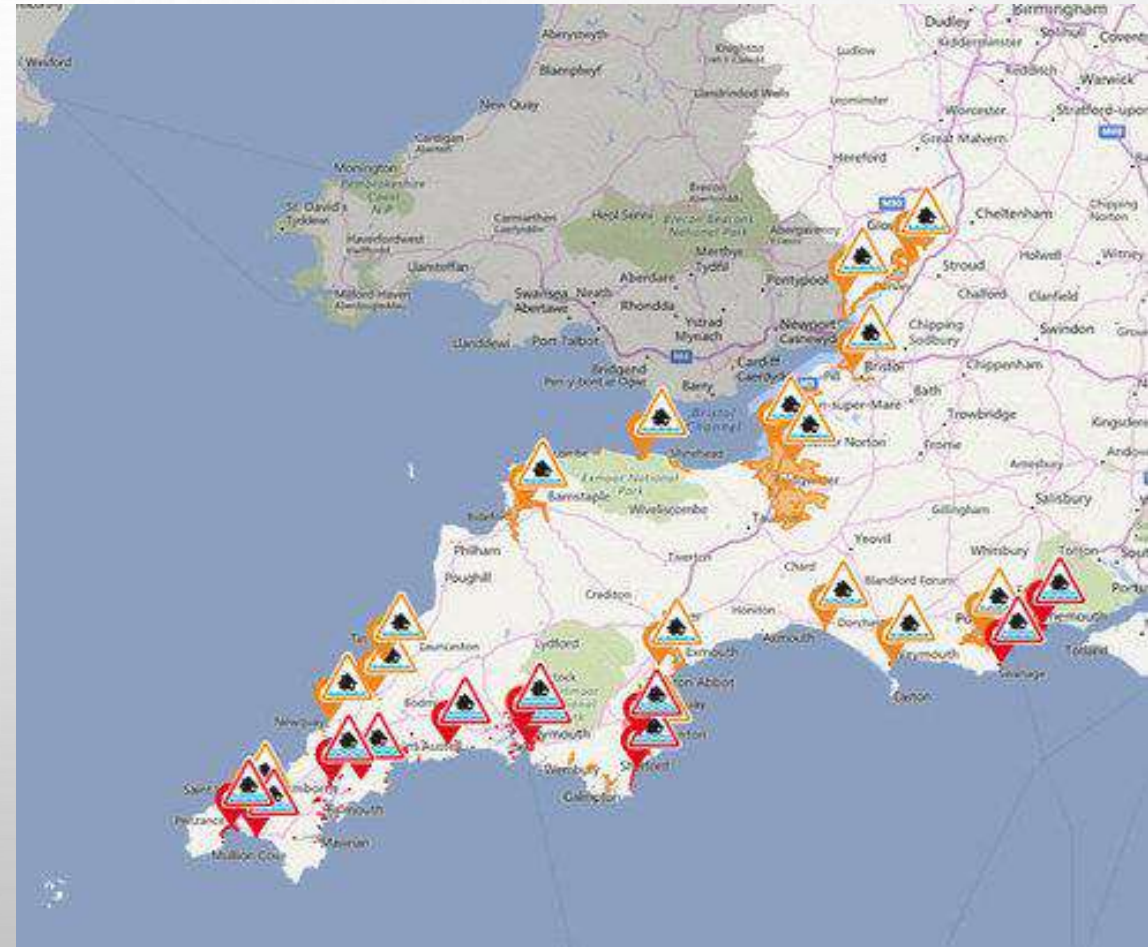
EXISTING FLOOD WARNINGS

Environment Agency uses:

- Water level (tide + storm surge) predicted by Met Office
- Expert opinion of predicted waves (8 km resolution) – no wave runup
- Coarse scale

Improvements required:

- Wave setup and wave runup prediction
- Finer granularity



AN IMPROVED WARNING SYSTEM

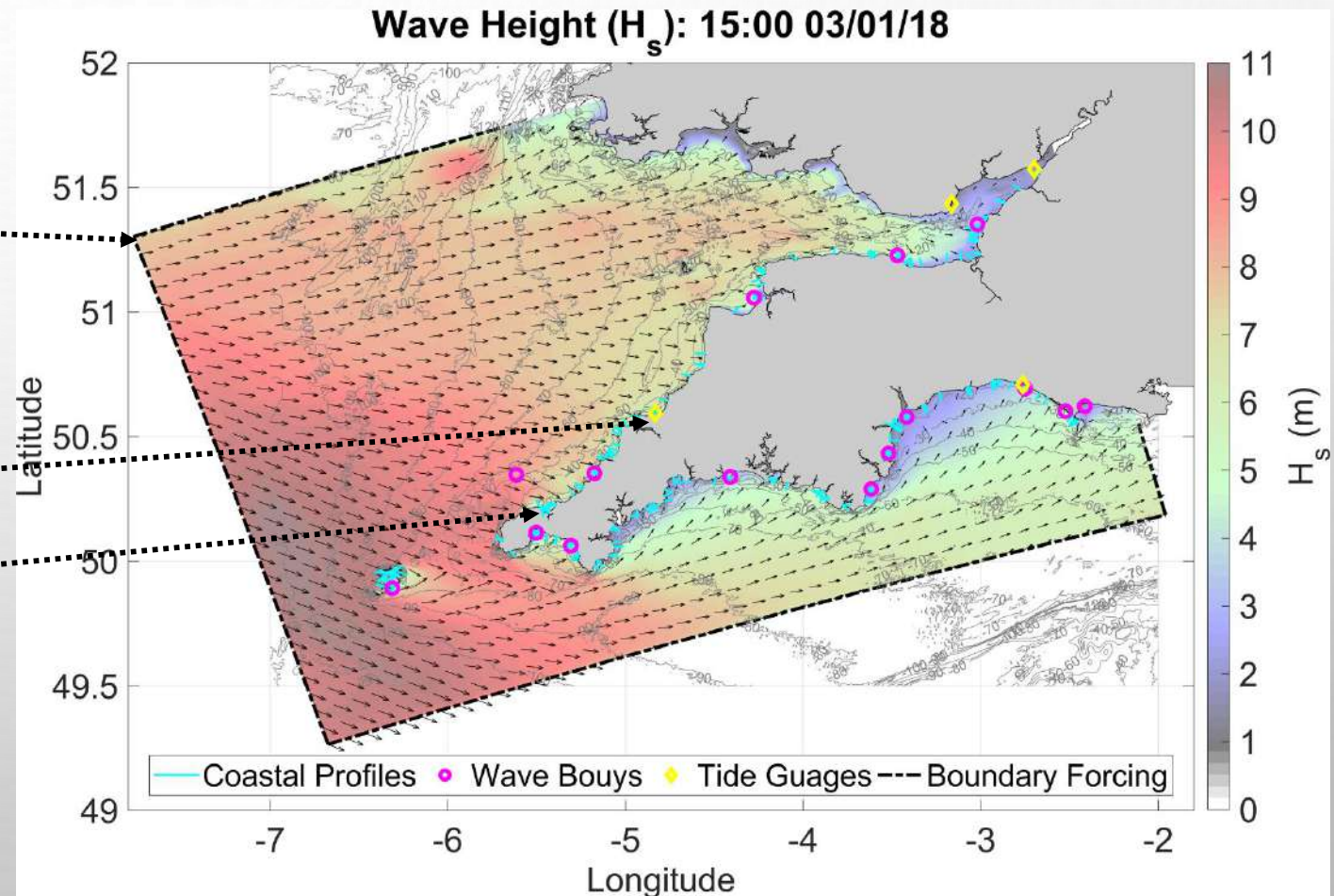
- Wave model resolution must resolve embayed SW coast
- Wave setup and runup must be predicted over
 - Sandy beaches
 - Gravel beaches
 - Sea defences
- Actual flooding volume (l/min) or elevation should be predicted



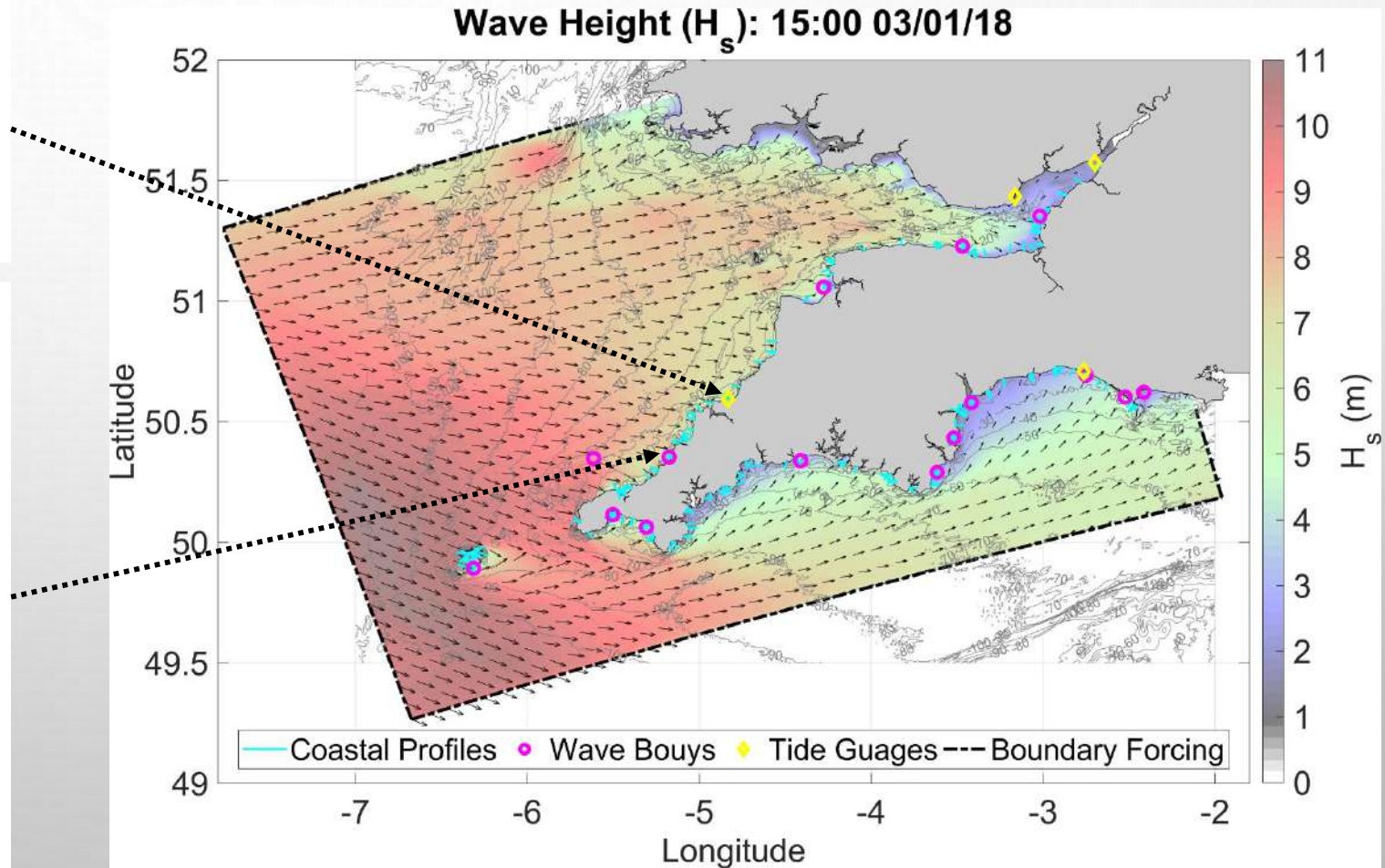
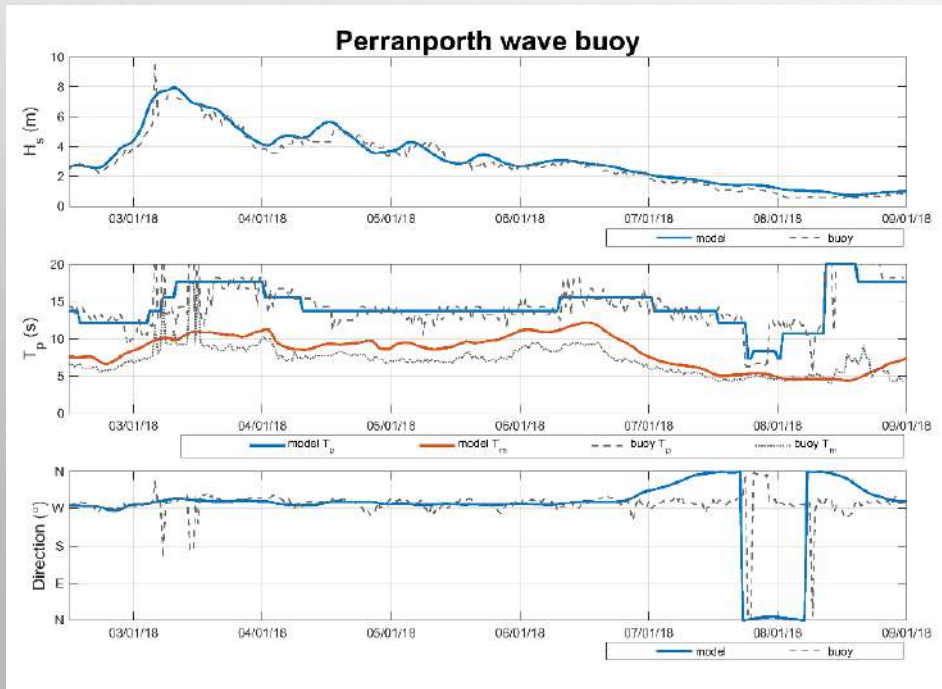
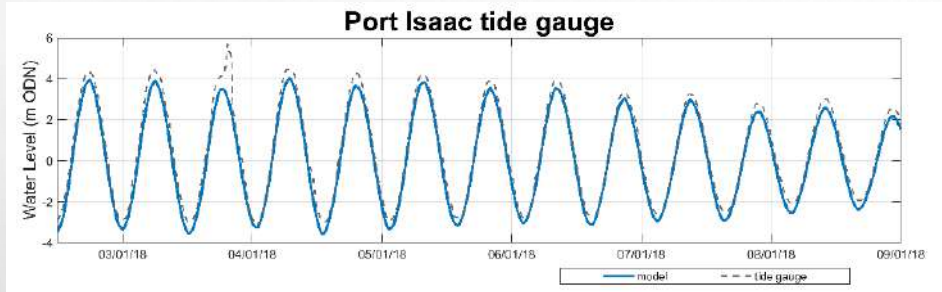
MODEL CONFIGURATION

- 1 km wave and current model (Delft3D)
- UK Met Office boundary data
- Automatically runs a 3-day forecast every day
- Model output at 20 m depth contour
- 246 topographic contours along the coast

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MODEL CONFIGURATION

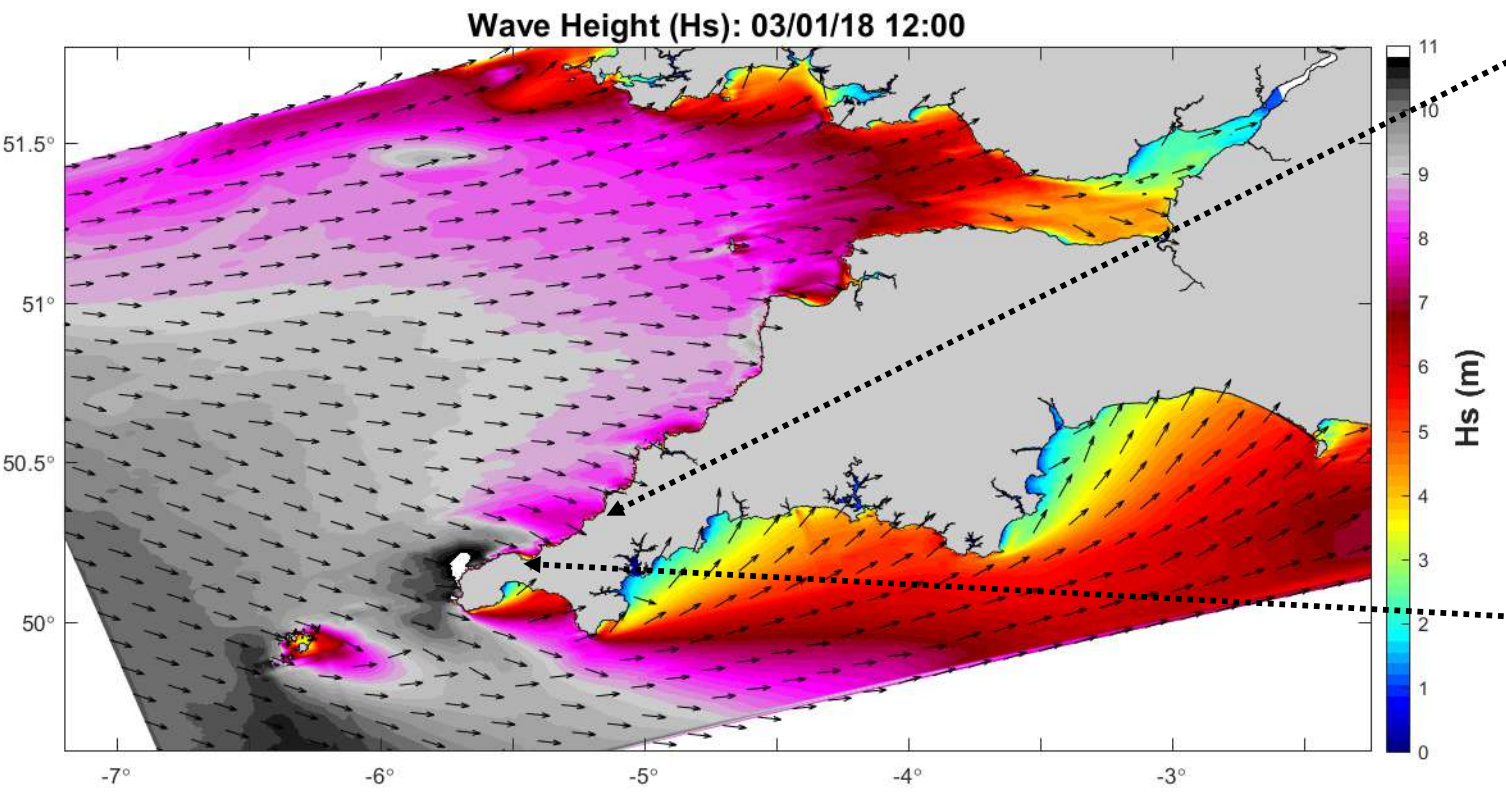


CASE STUDY: STORM ELEANOR 03/01/18

Perranporth beach

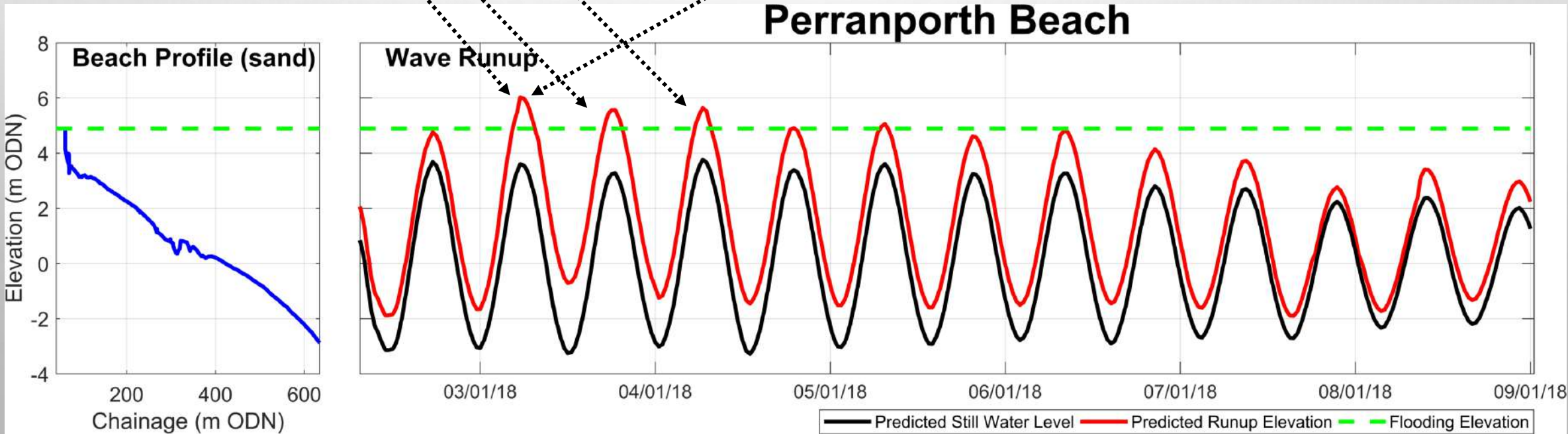
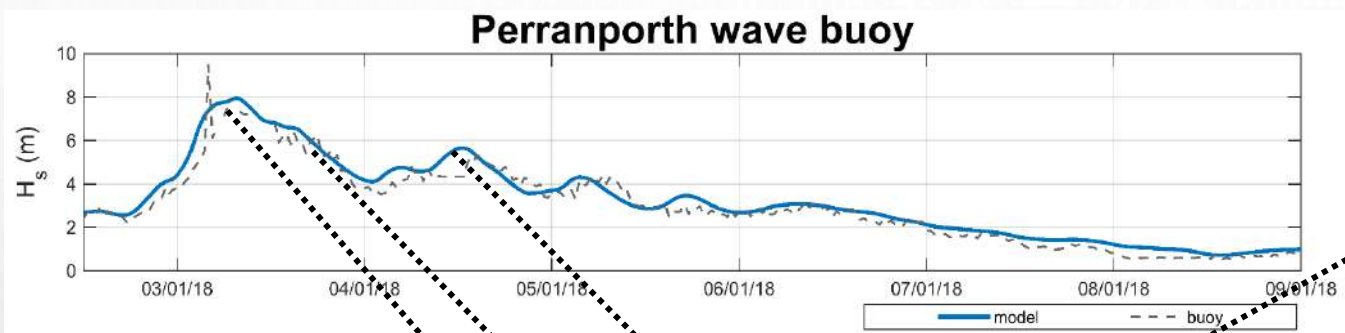


St Ives harbour



CASE STUDY: STORM ELEANOR 03/01/18

Perranporth beach



CASE STUDY: STORM EMMA 01 / 03 / 18

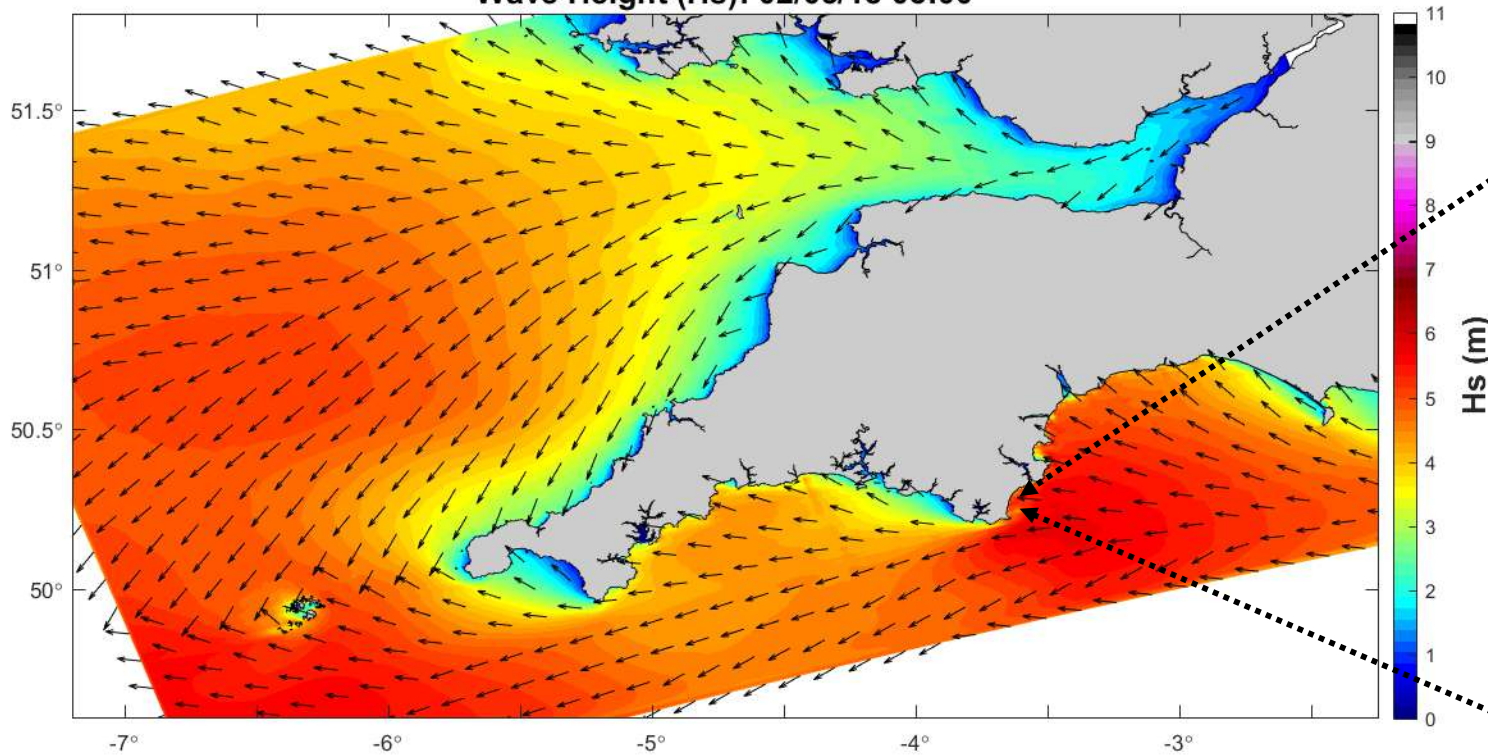
Slapton Sands – A379 road, national nature reserve



Torcross village

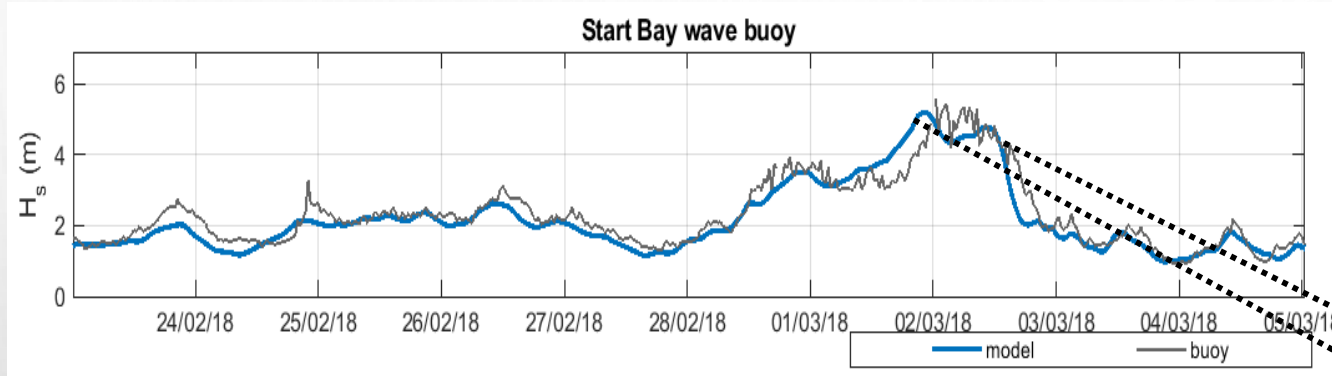


Wave Height (Hs): 02/03/18 03:00

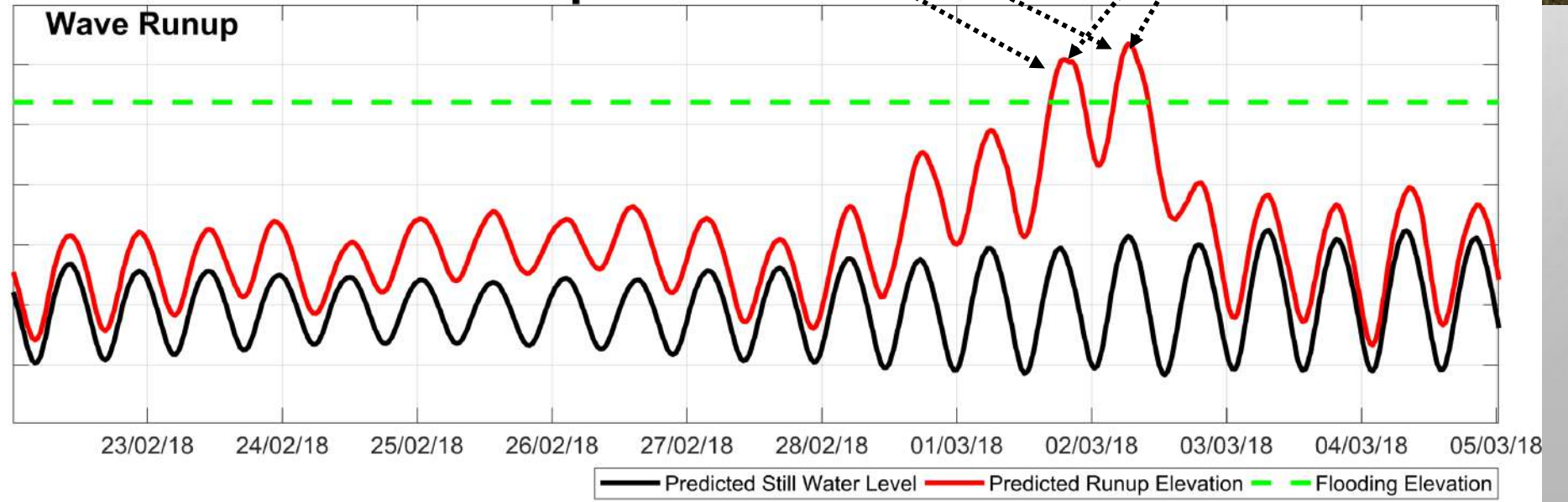
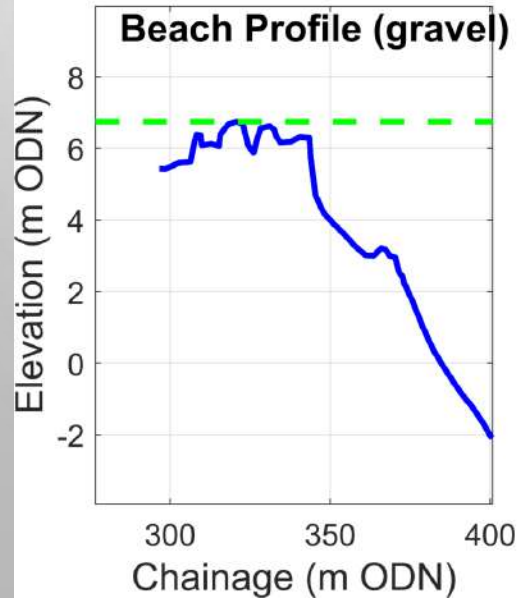


CASE STUDY: STORM EMMA 01 / 03 / 18

Slapton Sands – A379 road, national nature reserve



Slapton Sands Beach

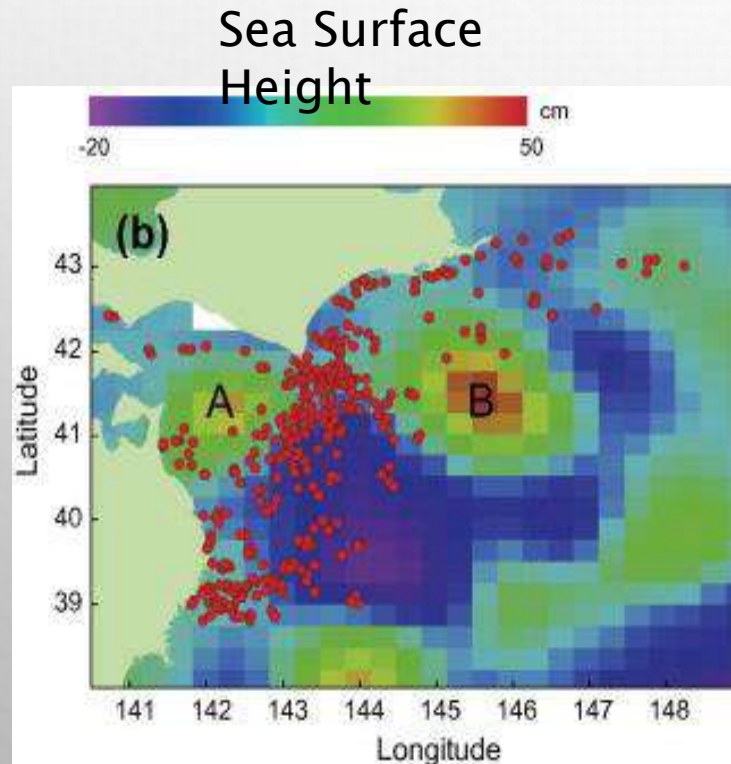


FUTURE DEVELOPMENTS

- Development of coastal flooding forecast
- Coastal erosion forecast
- Extra bolt-on models

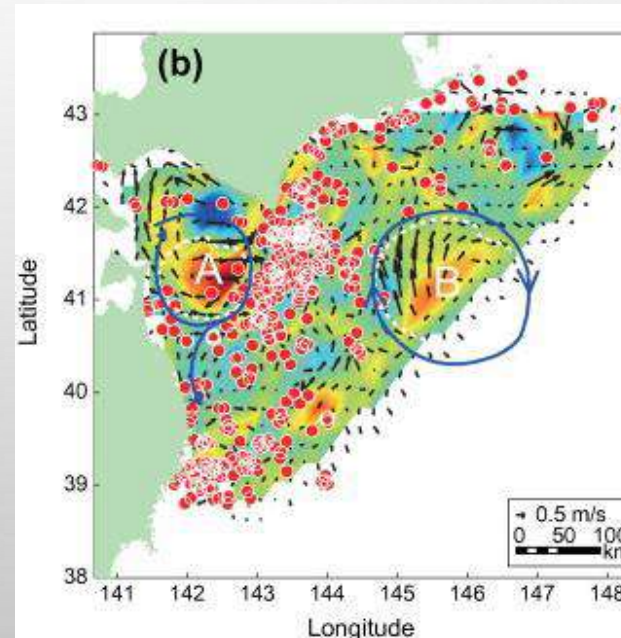
ECOLOGICAL APPLICATIONS?

Shearwater foraging of Japanese
Anchovies



Can our model be used to aid
management of ecosystems in the
southwest?

Current
velocity



Yoda, K., Shiomi, K. and Sato, K.,
2014. Foraging spots of streaked
shearwaters in relation to ocean
surface currents as identified using
their drift movements. *Progress in
Oceanography*, 122, pp.54-64.

THANKS FOR LISTENING!

CHRISTOPHER.STOKES@PLYMOUTH.AC.UK

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