



UK Coastal Research Conference

Liverpool 2025

ASYMMETRY IN WAVE OVERTOPPING HAZARD RELATIVE TO PREDICTED HIGH TIDE

J. Brown, G. Masselink, K. Stokes, T. Poate, M. Yelland, J. Walk, C. Cardwell, R. Pascal, D. Jones, B. Martin, P. Ganderton.

National Oceanography Centre; University of Plymouth

Coastal wave overtopping is becoming an increasingly frequent nuisance to coastal communities, including minor damage to assets, risk to pedestrians, and closure of transport links. In extreme cases, it can cause costly damage to housing and infrastructure and potentially loss of life. One way to reduce coastal flood risk is to increase community preparedness and optimise industry response plans by using early warning systems. To improve our ability to predict overtopping hazard ahead of time, new field datasets are critical to understanding the interactive coastal and weather processes that cause the hazard.

We examine 1-year of observations at Dawlish and 4-months of observations at Penzance (both SW England) to explain the tidal asymmetry in wave overtopping frequency distributions and the variability with distance landward and alongshore. We find that while the overtopping at the crest of a sea wall is dominated by typical wave-tide interactions a single winter storm can bias the asymmetry. For vertical sea wall structures, we find high tide wave overtopping occurrences by moderate wave conditions reduce, while those by the largest waves increase. By investigating the balance between wave breaking and wave reflection potential we can understand the present-day hazard and infer how the frequency of overtopping could change with sea level rise.