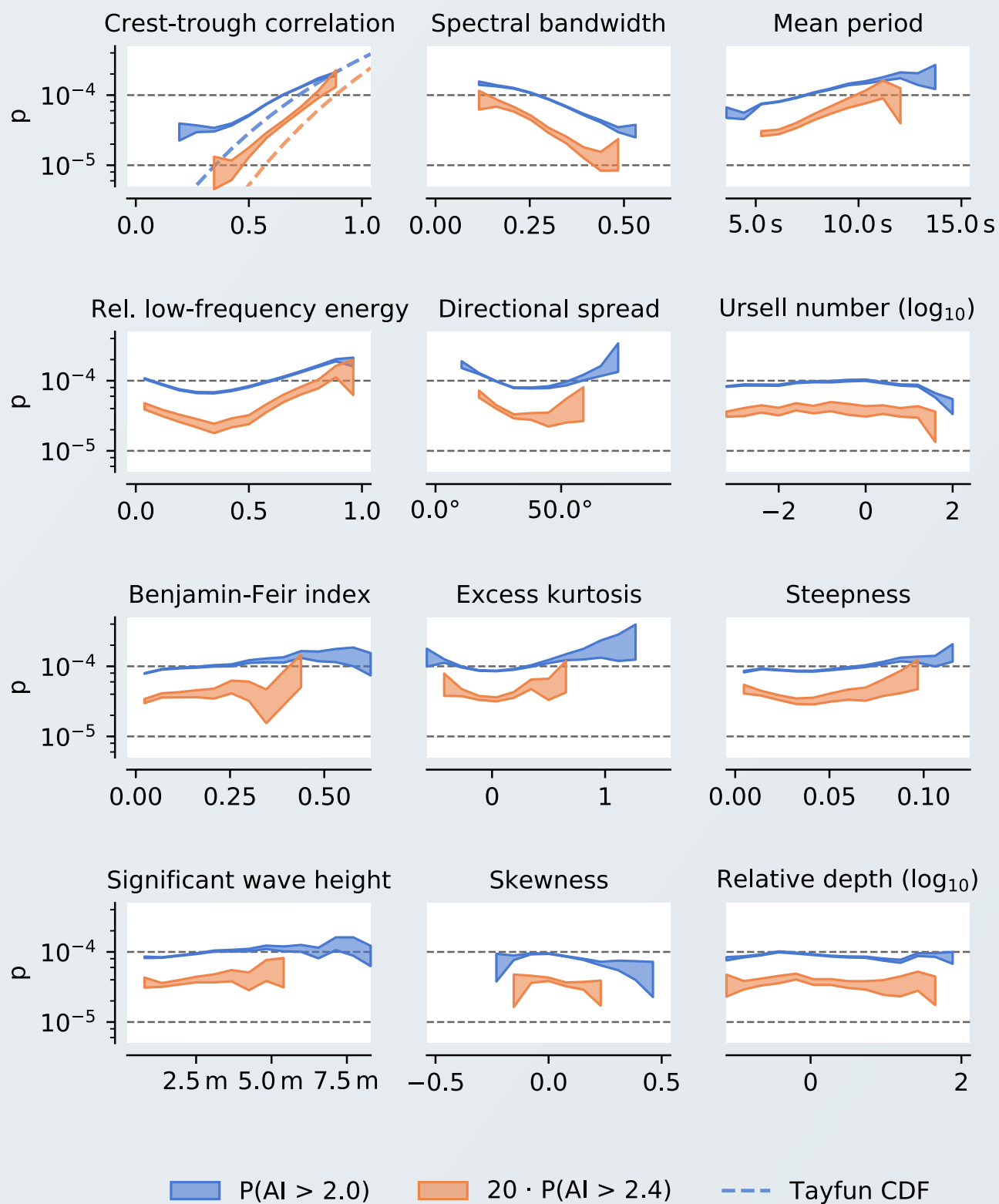


CDIP buoys



4 billion waves

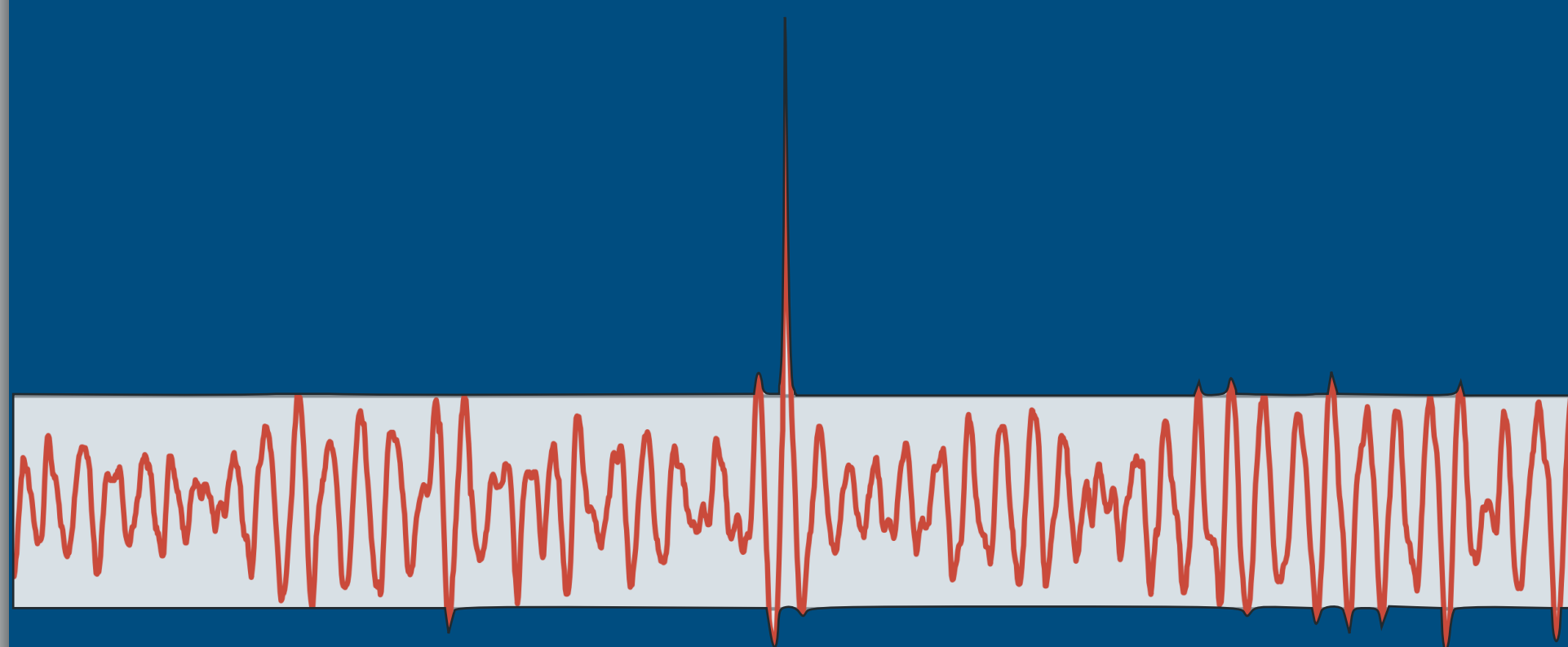
Rogue wave probability as a function of sea state



# Real-World Rogue Wave Probabilities

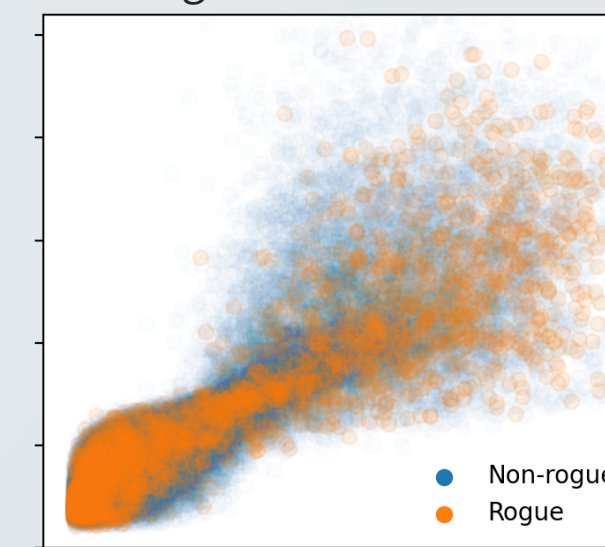
Dion Häfner, Johannes Gemmrich, Markus Jochum

Bandwidth effects are the dominant pathway to rogue waves in the ocean — even when looking at **all parameters** at the same time

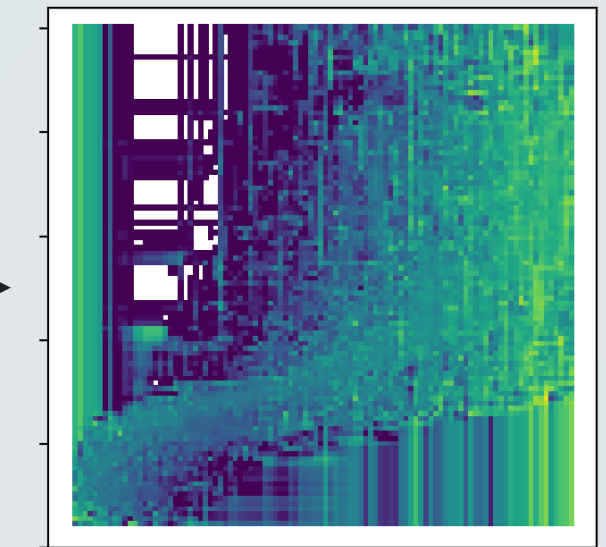


Häfner, Dion, Johannes Gemmrich, and Markus Jochum. "Real-world rogue wave probabilities." *Scientific reports* (2021, in press).

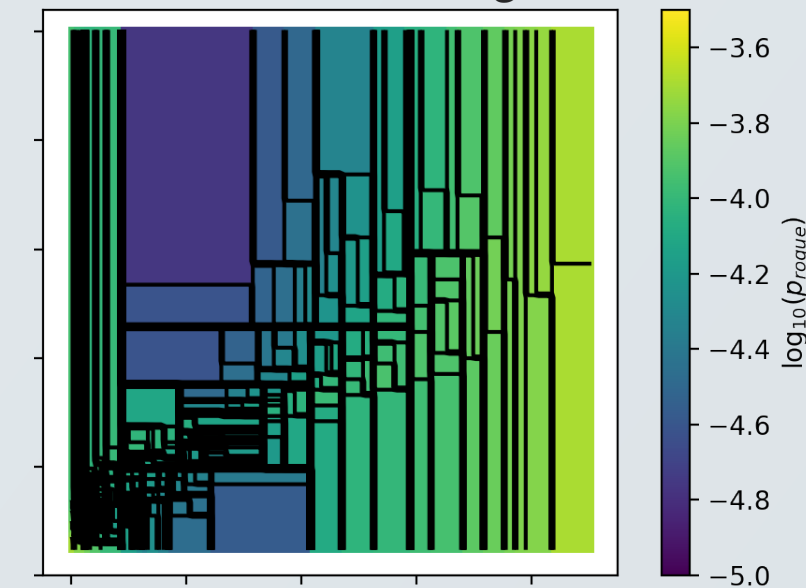
Raw high-dimensional data



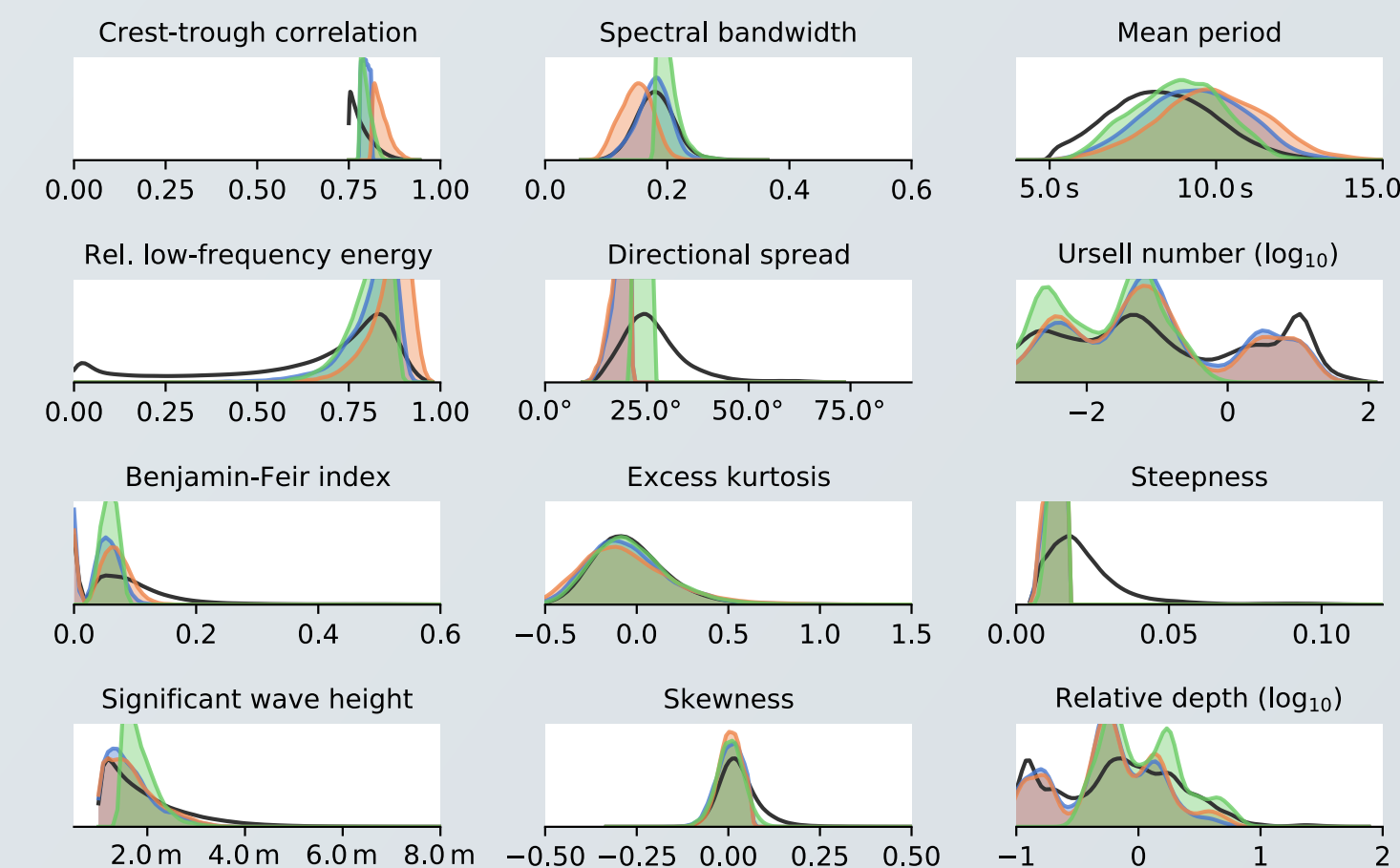
Random forest



Decision tree clustering



Parameter combinations with the highest rogue wave probability



Clusters  
— All data with crest-trough correlation > 0.75  
— P(AI > 2.0) = 2.4e-04 (2.1e-04 - 2.7e-04)  
— P(AI > 2.0) = 2.7e-04 (2.4e-04 - 3.0e-04)  
— P(AI > 2.0) = 2.3e-04 (1.9e-04 - 2.7e-04)