

# MACHINE LEARNING METHODS CAN IMPROVE OPERATIONAL WAVE FORECAST PERFORMANCE THROUGH BIAS CORRECTION

**BEFORE:**

Mean Squared Error  
Significant Wave Height (Hs)  
2022  
MO forecast vs HC



**AFTER:**

Mean Squared Error  
Significant Wave Height (Hs)  
2022  
MaLCOM bias corrected MO forecast vs HC



Apply MaLCOM  
Bias Correction

**Approach:**

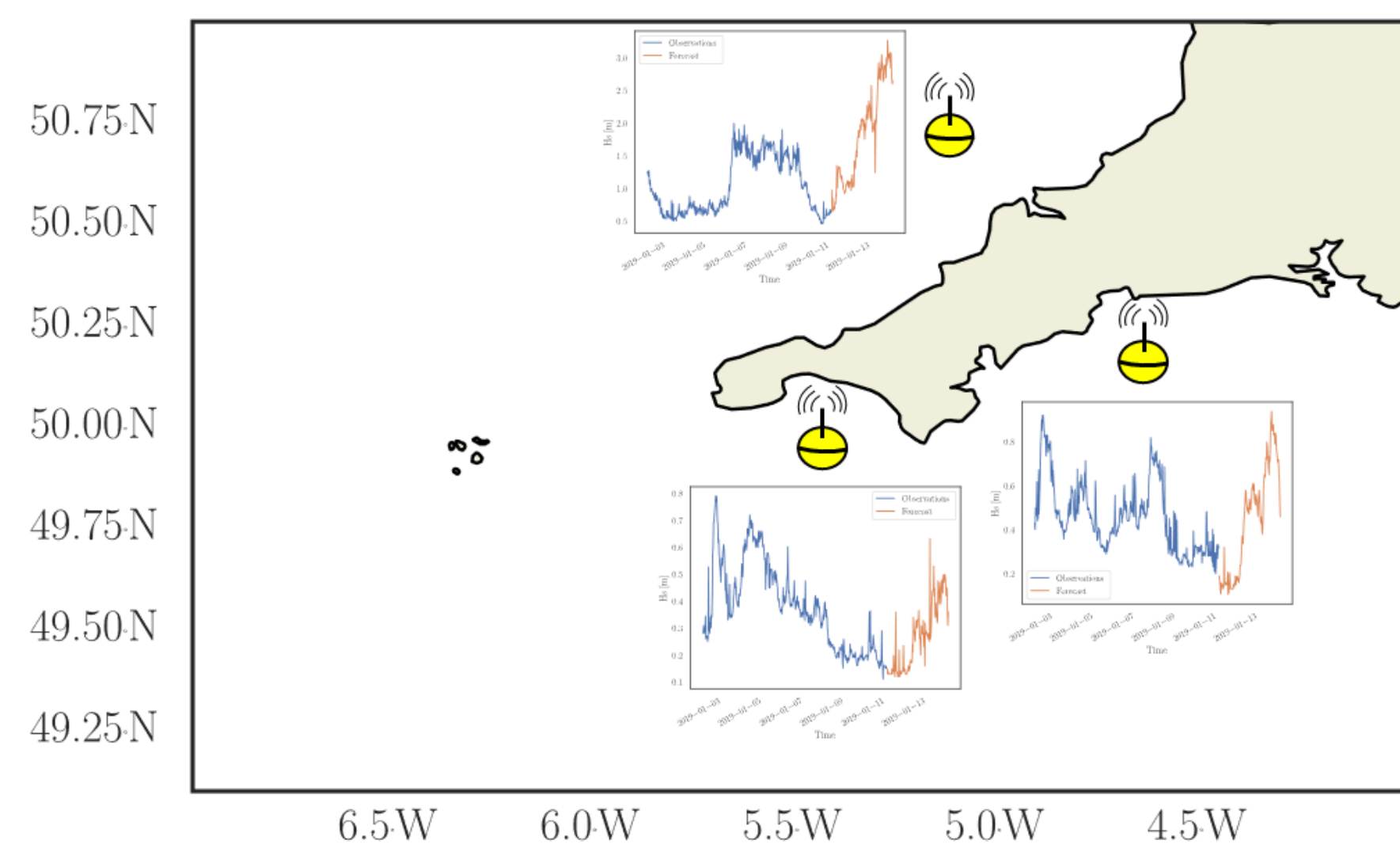
A machine learning framework, MaLCOM, is utilised to bias correct the Met Office (MO) wave forecasts to align with hindcast data.

MaLCOM is trained to predict the bias between hindcast and MO wave forecasts using the wave observations at Penzance and Perranporth (red dots in figures).

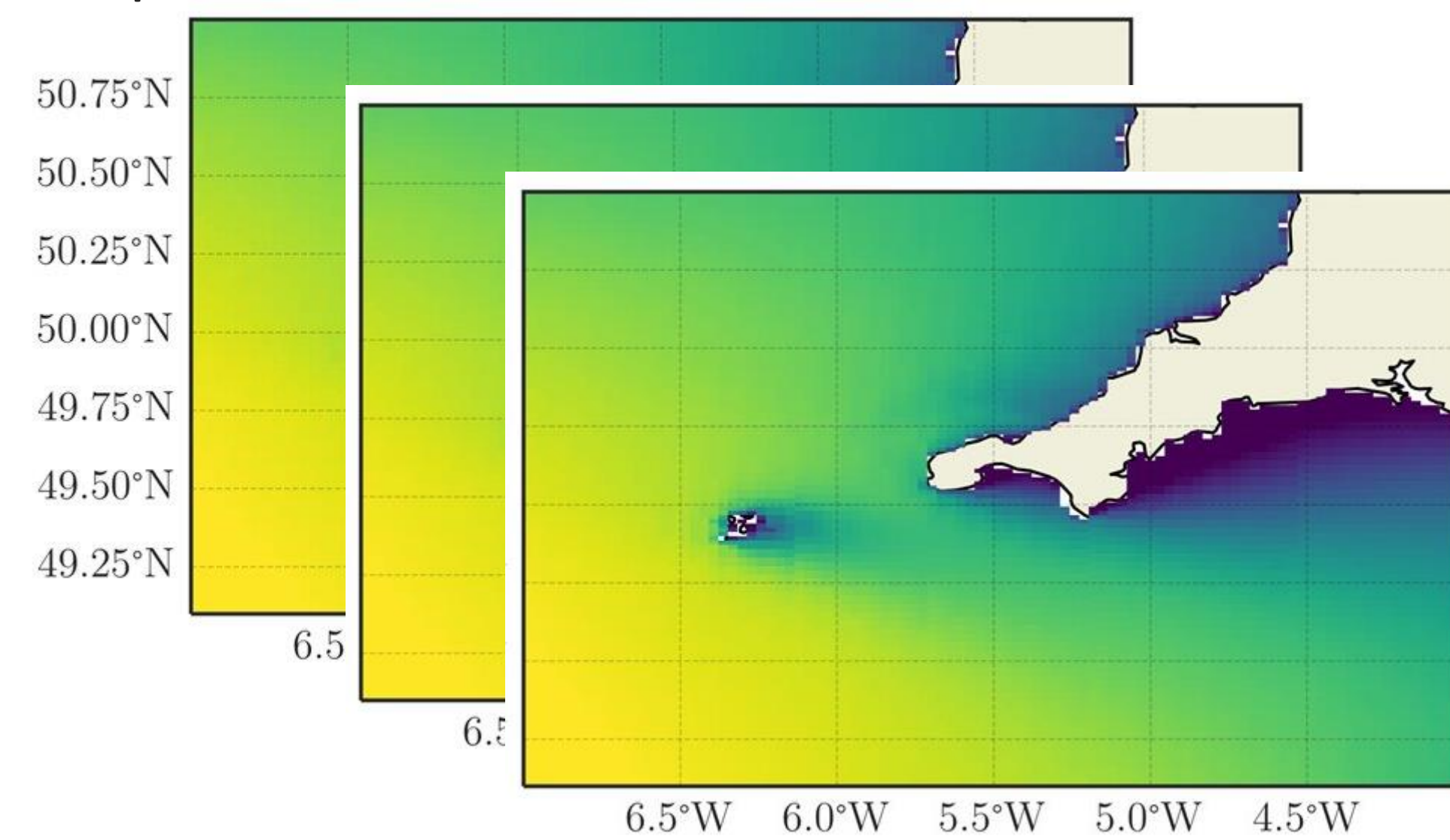
	Met Office Forecast	Bias Corrected Forecast
MAE	0.10814	<b>0.10686</b>
MSE	0.02696	<b>0.02424</b>
RMSE	0.1403	<b>0.13259</b>
R2	0.87632	<b>0.89521</b>

**MaLCOM prediction process:**

1) Use LSTM to create a forecast at selected observation locations



2) At each forecast timestep use a random forest to create a spatial prediction.



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Related papers: "A Real-Time Spatiotemporal Machine Learning Framework for the Prediction of Nearshore Wave Conditions", 2023, J. Chen, I. Ashton, E. Steele, A. C. Pillai

**SCAN TO CONTACT THE CORRESPONDING AUTHOR:**

