A SENSITIVITY STUDY OF WIND FORCING ON THE ACCURACY OF WAVE RESOURCE MODELING

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The development of wave energy projects relies on consistent and accurate wave resource characterization using fine-resolution wave modeling, which is typically forced by global-scale wind model products such as the Climate Forecast System Reanalysis (CFSR) wind. Therefore, the quality of wind products is critical to the accuracy of simulated wave climate and the success of wave resource assessment, especially in the nearshore regions where wave energy projects are most likely to occur. The previous wave resource modeling study focused on the U.S. West Coast [1] indicates that the model tended to under-predict significant wave height and energy density for large waves (e.g., >90th percentile Hs) using CSFR wind although overall satisfactory model skills were achieved. This discrepancy appears to be consistent with that in the comparison between CFSR wind and observed buoy wind (Figure 1). Thus, it is important to investigate if wave model results can be improved by using more accurate wind forcing products, such as higher-resolution regional wind modeling products and observed wind at buoys. This poster presents our study that is designed to evaluate the sensitivity of wave models to various wind forcing datasets and to identify a feasible approach to improve wave model results through improved wind forcing. A series of sensitivity tests have been conducted at selected representative NDBC buoy sites in the U.S. West Coast and East Coast with various wind forcing products. The sensitivity modeling results were compared to those of the baseline condition forced by the CFSR wind. The results suggest that wave model results, especially those during the large wave events, can be improved with more accurate wind dataset such as the observed wind (Figure 1).

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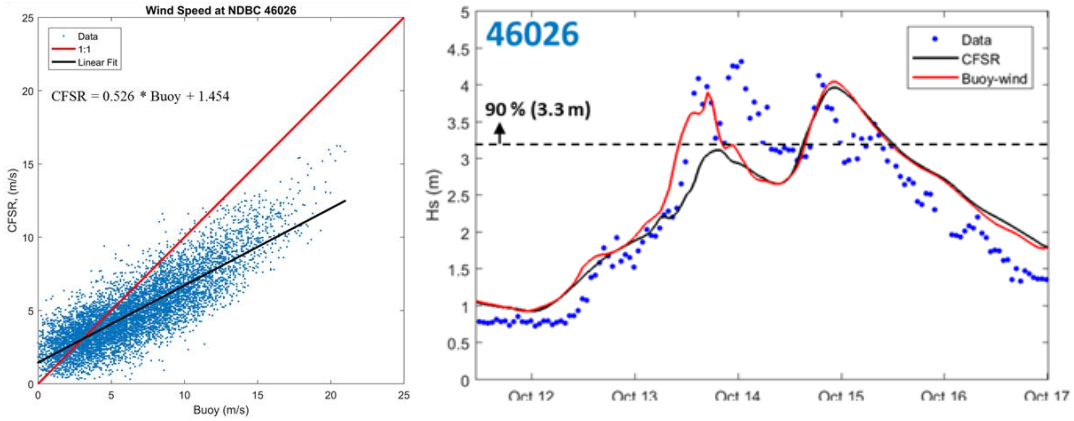

FIGURE 1. SCATTERPLOT COMPARISONS OF OBSERVED WIND SPEED AND CFSR PREDICTIONS (LEFT) AND MODEL SIMULATED LARGE WAVES DRIVEN BY CFSR AND OBSERVED WIND AT NDBC BUOY 46026.

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