



Estimating wind speed and wind direction with a simple wave buoy

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Weather prediction relies on the resolution and accuracy of wind and wave characteristics. With the development of low-cost wave-buoys, opportunities arise to use low-cost wave-buoy networks to improve wave and weather forecasting. However, wave-buoys do not measure wind properties. In this study we investigate the possibility of estimating local wind speed and mean wind direction on wave measurements alone.

Wind speed and wind direction can be reasonably predicted based on wave measurements, but only for wind speeds larger than 6–7m/s. Discrepancies between measured and predicted wind properties for low wind speeds are argued to be the results of (1) missing physical complexities (e.g. momentum transfer to surface currents by means of viscous shear) and (2) a possible limitation in the accuracy of the buoys to resolve the high frequency spectral tail.