



HF Radar Measurements at the Alderney Race

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The HYD2M project (HYDroynamics of Raz Blanchard: Measurements and Modelling) constitutes a research program designed to study how surface waves and extreme events modify the tidal stream energy estimate, with the ultimate goal of improving such estimates. In order to achieve this goal, the project relies on a combination of models, in situ measurements, and remote sensing. The later group is represented by a pair of HF radars set to transmit at two frequencies, 13.5 MHz and 24.5 MHz, with measurements at each frequency being collected twice in each hour.

In this work, the performance of HF radar in measuring the wave field and the highly energetic current of the Alderney Race (Raz Blanchard in French) is examined by comparing its results against measurements collected by a bottom-mounted ADCP deployed in the area. In addition, the spatial currents are compared against numerical results obtained with MARS3D. Discrepancies between methods increase with increasing current speeds, and in relation to the location within the radar's field of view. Over a tidal cycle, the bias between the radar and ADCP velocity estimates is 11 cm/s, while the absolute differences range between few mm/s to a maximum of 53 cm/s at the time of maximum current velocity. Similarly, inspection of the radar's wave results indicate a variation on the quality and extent of the results over the tidal cycle. The reasons of the discrepancies are discussed, and the driving mechanisms of the differences examined.