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Significant Wave Height Comparison using *in situ* and Satellite Measurements

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1. Introduction

Wind generated waves have been studied by University of Alaska Fairbanks (UAF) researchers to assess the impacts significant wave heights (SWHs) in the south-east Chukchi Sea, Alaska region. To gather *in situ* measurements, UAF researchers used Recording Doppler Current Profilers manufactured by Aanderaa Data Instruments AS (AADI) from Bergen, Norway [1].

Past studies have been done which compare *in situ* measurements to satellite radar altimeter measurements [2],[3],[4],[5] including the systematic calibration and cross-validation of the SWH data from different sensors. An analysis of satellite (Envisat) and *in situ* observations of significant wave heights (SWHs) was conducted using three fixed bottom-mounted Recording Doppler Current Profiler (RDCP) instruments in the south-eastern Chukchi Sea in 2007 (offshore) and 2009-2010 (nearshore) (Fig 1).

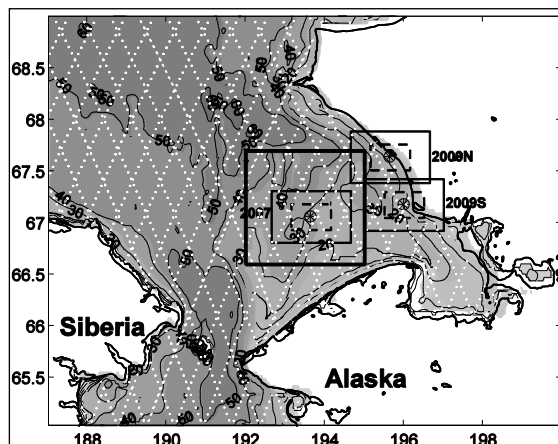


Figure 1. Region, satellite tracks (ERS-1/2, Envisat), locations, squares.

2. Results and Conclusions

The results revealed a high cross-correlation of 0.96 between the RDGP and satellite data sets for the offshore region. For the nearshore regions, the cross-correlations were less, at values between 0.58-0.92. Fig. 2 shows the linear comparisons for the offshore (Fig. 2a,b) and nearshore (Fig. 2c-f).

Nearshore cross-correlations were concluded to be lower due to steeper bathymetry nearshore, and an insufficient number of satellite data points. This confirms the importance of *in situ* observations, nearshore wave modeling, and data assimilation for nearshore applications since satellite measurements appear rather insufficient in the nearshore region.

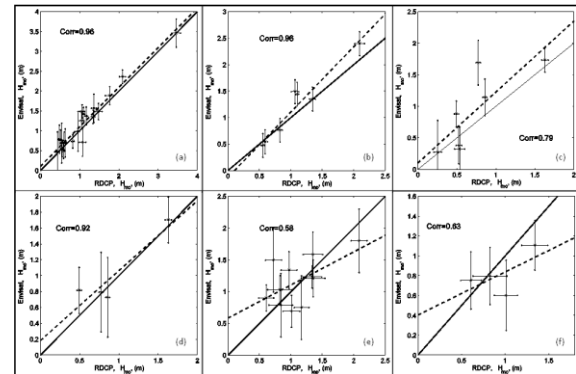


Figure 2. Figure 2a-f (top left, clockwise). Significant wave height H_{m0} linear comparison from Recording Doppler Current Profiler (RDGP) dataset (x-axis) versus Envisat satellite altimeter dataset (y-axis) for (a) Station 2007 large domain (solid line, Fig 1), (b) Station 2007 small domain (dashed line, Fig 1), (c) Station 2009N large domain (solid line, Fig 1), (d) Station 2009N small domain (dashed line, Fig 1), (e) Station 2009S large domain (solid line, Fig 1), (f) Station 2009S small domain (dashed line, Fig 1).

3. Acknowledgement

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4. References

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