

# WIND ESTIMATES AT THE NORWEGIAN WEST COAST FROM MODELLING, IN SITU AND SATELLITE OBSERVATIONS

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The Synthetic Aperture Radar (SAR) is a unique instrument for measuring wind along coasts, in estuaries, fjords and lakes due to the high spatial resolution (about 100m-by100m). SAR is measuring the sea surface roughness due to short gravity waves and these measurements can be translated into wind speed using empirical C-band models. Retrieved wind fields from SAR give an overview of local offshore wind conditions and may act as a supplement to existing methods for wind turbine siting. There is a potential for such satellite data to reduce cost of wind farms planning by improving the efficiency in selecting sites for making in situ observations.

In this work wind fields have been retrieved from available ERS SAR scenes at the Norwegian west coast north of Bergen. The wind speed is retrieved from the normalised radar cross section values and the wind direction information, using the CMOD-IFR2. Wind direction can be retrieved from the SAR scenes about 60% of the time. For the remaining cases the wind direction measured at Hellisøy lighthouse has been used. Using a mathematical flow model (WASP), the in situ wind measurements from Hellisøy have been corrected for topography, terrain and obstacles. These measurements are compared with SAR wind fields and result in about 40 validation points for this site. Furthermore, output from a non-hydrostatic atmospheric model (KAMM) is compared with the SAR retrieved wind fields. Based on this analysis it is possible to assess the usefulness of high spatial resolution wind measurements from satellite for estimating the wind energy potential along a coastline.