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Estimation of the high resolution wind speed distribution using ENVISAT ASAR data over the ocean

[Yuji Sakuno](#), [Kazuhiro Oomae](#) and [Toshiaki Koza](#)

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Summary: The estimation of the high resolution wind speed distribution is required for the potential evaluation for the wind power generation over the sea. In this paper an algorithm is presented which enables high-resolution sea surface wind fields to be retrieved from the advanced synthetic aperture radar (ASAR) data acquired by European remote sensing satellite ENVISAT. The wind speeds are compared with the normalized radar cross section (NRCS) around the coast of Amami-Oshima Island. As a result, there is a high correlation ($r=0.97$) in NRCS derived from ASAR and the in-situ sea surface wind speed. The estimation RMSE of the ASAR wind speed is about 1.2 m/s. Thus, if the ENVISAT ASAR data is used, we can estimate the sea surface wind speed distribution with a resolution of about 125m.

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