



Wind climate in the Danish Seas observed from the Envisat satellite

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The wind climate offshore in the Danish Seas is mapped using a new method. The offshore wind climate map is based on Envisat Advanced Synthetic Aperture Radar (ASAR) Wide Swath Mode (WSM) images. The new result is presented and compared with previous results from models and offshore in-situ observations collected at masts. The selected satellite images cover the coastal zone in which ten offshore wind farms are operating in the Danish Seas. For each of the images the wind speed is calculated using the Johns Hopkins University, Applied Physics Laboratory software for retrieval. It is chosen to use wind direction from the NOGAPS mesoscale model as input to the CMOD-5 geophysical model function. CMOD-5 then gives the wind speed relative to the normalized backscatter within each grid cell as a function of the satellite view angle and wind direction. In this way wind vector maps are retrieved. The wind maps cover areas of 400 km by 400 km with a grid resolution around 1.6 km. A series of 70 maps are analysed and compared to wind observations at various sites. Near the 10 Danish offshore wind farms the wind statistics are also extracted. Mean wind speed, Weibull A and k and uncertainties are reported for each site for 10 m above sea level. Results from an investigation comparing offshore versus on-shore wind conditions as a function distance to the coastline at various locations are presented and discussed.