

Coupled High-resolution Atmosphere Sea Modelling

Publieke samenvatting / Public summary

Background

Uncertainty in meteorological and ocean conditions (often abbreviated as metocean conditions) forms probably the main source of risk and subsequently conservatism in the design, planning, construction and operation of offshore wind farms. Numerical modelling of metocean conditions is a crucial asset to support all these phases of offshore wind developments, where the wind and waves metocean parameters are the most relevant. However, the current applied numerical modelling techniques in the industry can be much improved, specifically in their representation of the atmospheric and wave processes.

Objective

The objective of this project is to significantly reduce uncertainty in the numerical modelling of metocean conditions at offshore wind farms. To this end, a beyond the state-of-the-art high-resolution coupled atmosphere-sea model will be developed by coupling the existing atmospheric GRASP model and wave SWAN model. This project focuses in particular on having an impact on the

- a) Design phase; i.e. wind resource assessment and wind and wave design conditions, as well as on
- b) Operation and Maintenance phase, i.e. weather forecast for improving yield prediction as well as planning of offshore activities.

Short description of activities

A coupled high-resolution atmosphere-sea model

Projectinformatie / Project information

Projectnummer / Project number
TEHE117023

Subsidiebedrag / Grant amount
€ 361.750,00

Algemene informatie / General information

Penvoerder / Secretariat
Whiffle B.V.

Publicaties en materialen / Publications and attachments

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will be developed. The model runs on ~50m resolution on wind farm scale, captures small-scale effects like turbulence, wake effects, wind-wave interaction, bathymetry and all their interactions. It can be used in hindcasting mode to produce long-term time series for design, planning and yield assessments, but also in (day-ahead) forecasting mode for power forecasting/trading and maintenance planning

Results

The coupled models will be implemented in Whiffle's operational forecasting system, so that market parties benefit directly from the improvements in forecast skill.

In addition, two types of results will be disseminated, to the public domain, as part of the project:

- 1) Reports and scientific papers describing the methodology, validation and analysis of the results of the coupled atmosphere-wave model,
- 2) Hindcast datasets for the 'Hollandse Kust Noord' and 'IJmuiden Ver' sites. Both hourly averaged and spatially averaged data as well as a 10 second resolution virtual met-mast data will be made public.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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