Smart4RES

RES-dedicated weather forecasting models

METEO FRANCE · whiffle · DLR

Research challenges

Improved numerical weather predictions (NWP) and new tailored forecasting products are needed to meet the needs of the renewable energy sector at different time horizons.

Main outcomes

In WP2, Météo-France, Whiffle and DLR partners demonstrated that existing tools could be refined to produce more reliable and more relevant weather forecasts than the operational products currently available, with positive impacts for any end-user relying on weather forecasting products.
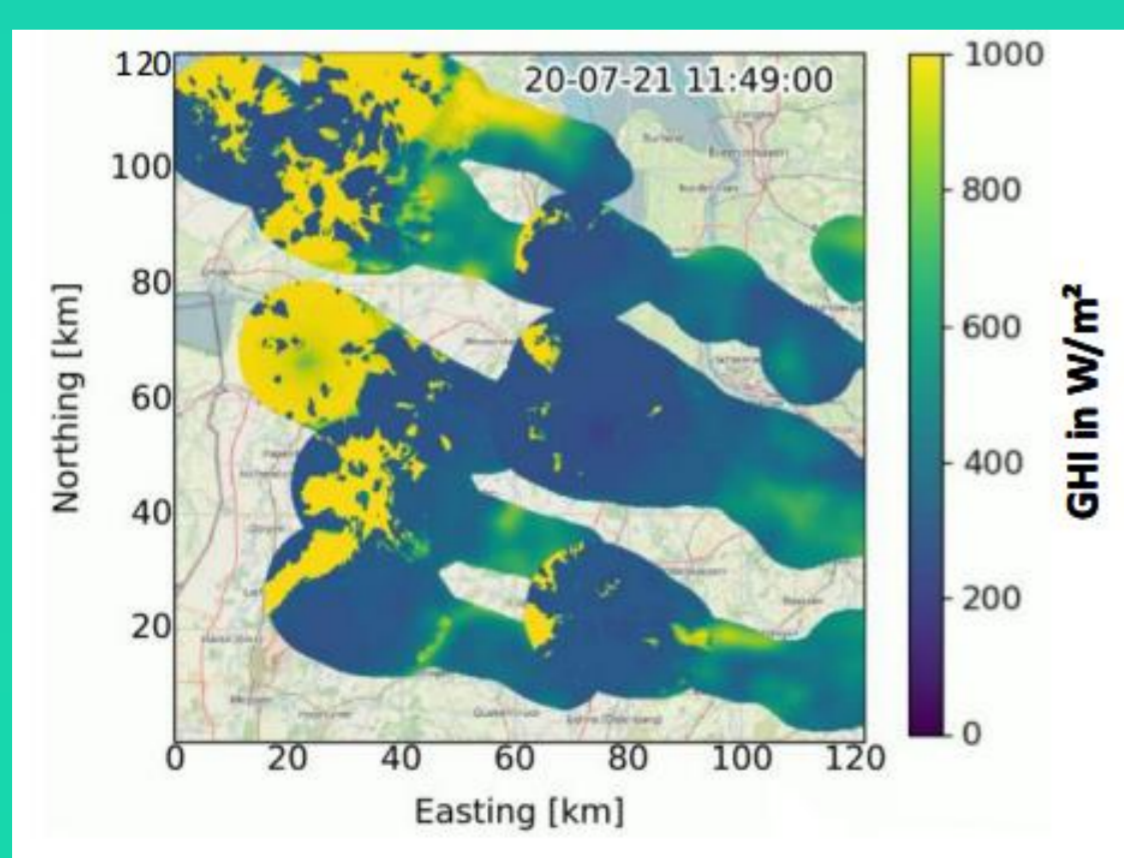
Improvements in NWP models

Pseudo-deterministic forecasts carefully constructed from large ensembles can improve wind speed forecasts by **15%** compared to the ensemble mean

Critical and rare events are better predicted when **combining high temporal resolution forecasts and ensembles**

Increasing the **spatial resolution** improves NWP models performances for wind and solar irradiance by **3-5%**

New variables can be extracted from simulations (wind speed at hub height, cloud optical thickness, spectral and angular distribution of solar irradiance)

## Innovative products for local forecasts

A network of **all-sky-imagers** provides instantaneous maps of solar irradiance, and improves the very-short-term prediction (up to 1 hour) in cloudy conditions **up to 10%**

Weather forecasts based on **Large Eddy Simulation** increase the accuracy of local wind speed forecasts **at 100 m – 10 sec resolution over complex terrain**

High resolved nowcast: limited in coverage and horizon
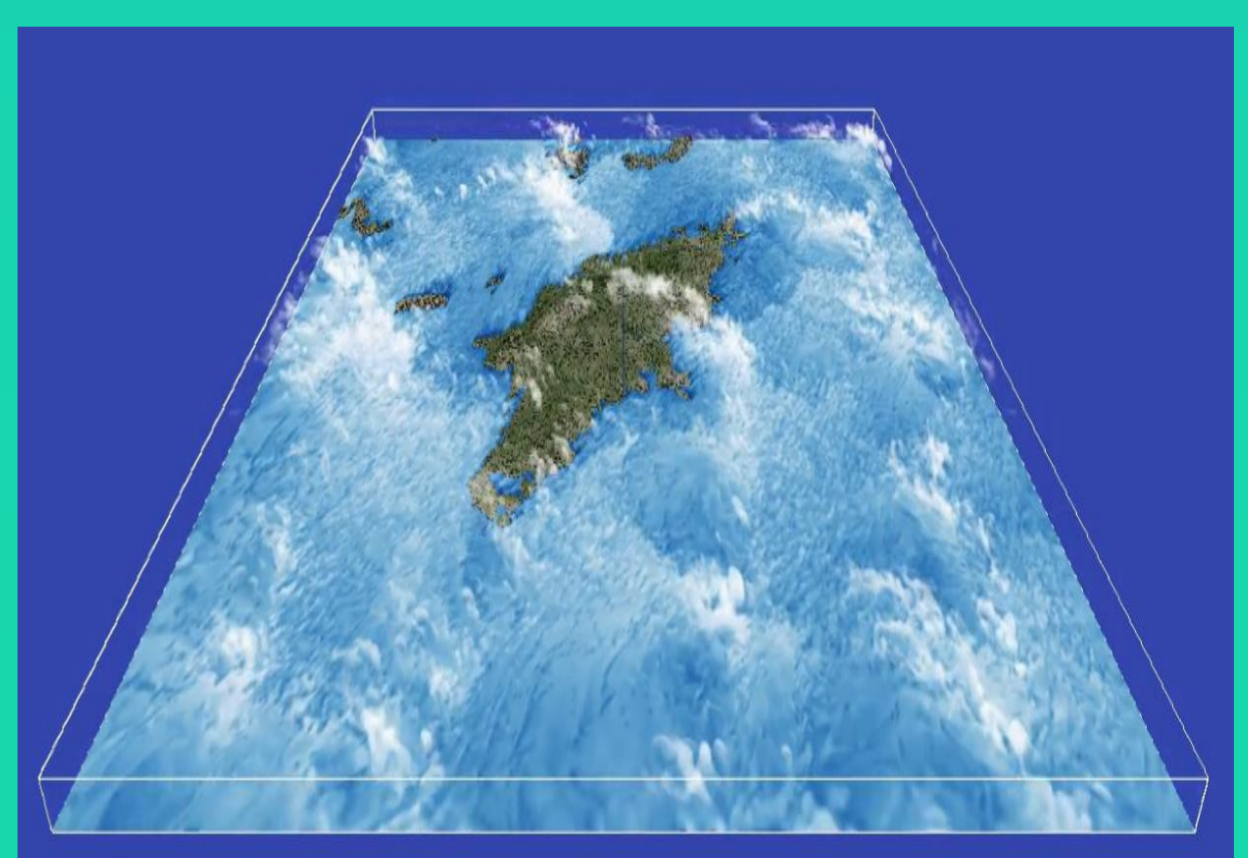
LES over the Greek island of Rhodes. Correlated wind (blue) and cloud (white) patterns

Combining all-sky imagers and satellite forecasts outperforms individual forecasts and extracts the best of both approaches for short-term forecasts

Download WP2 deliverables

SCAN ME

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