

Wind energy

Assessments, analysis, forecasts and projections



Wind atlas

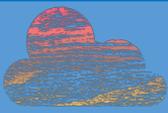
Wind energy resource assessment

Wind power

Forecasting

Local/regional and global scale

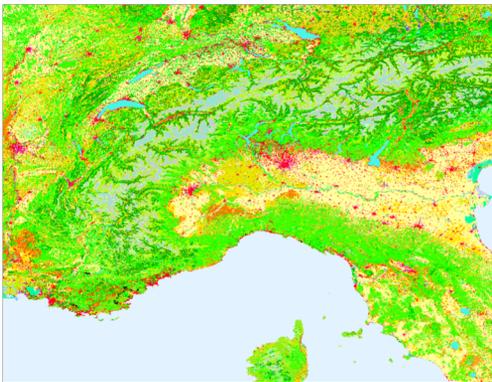
Creative thinking for innovation!



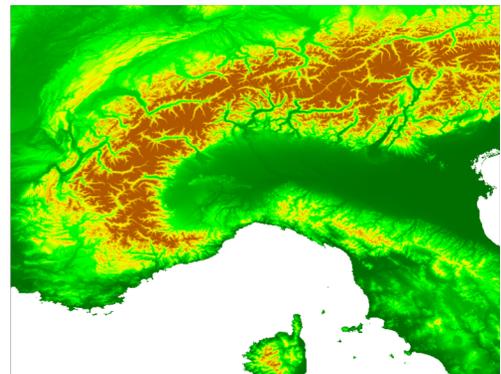
Due to increasing environmental concerns, the capacity of **electricity** production from **wind mill parks** is rising worldwide. Wind electricity production strongly depends on intermittent weather conditions. In the **renewable energy sector** very high resolution of **wind energy assessments and forecasts** are required to capture the topographic effects on wind profiles, especially over mountainous and coastal areas. **Accurate forecasts help optimize the exploitation of wind power plants, improve the management of the electricity grid and improve its integration into the electricity market.**

MetClim can help you with wind energy assessments and forecasts.

An advantage of MetClim wind resource assessments and forecasts is that we use very high-resolution land cover (e.g. Corine) and topography (e.g. SRTM). MetClim demonstrated* an improvement in the accuracy of wind profiles when very high-resolution datasets are used.



Snapshot Corine Land Cover Alps region

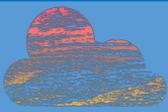


Snapshot SRTM topography Alps region

*- De Meij, A. and J-F. Vinuesa, Impact of SRTM and Corine Land Cover data on meteorological parameters using WRF, Atmos. Res., Volume 143, Pages 351–370, 15 June 2014.

- De Meij, A., Bossioli, E., Vinuesa, J.F., Penard, C., Price, I., The effect of SRTM and Corine Land Cover on calculated gas and PM10 concentrations in WRF-Chem, Atmos. Env. Volume 101, Pages 177–193, January 2015.

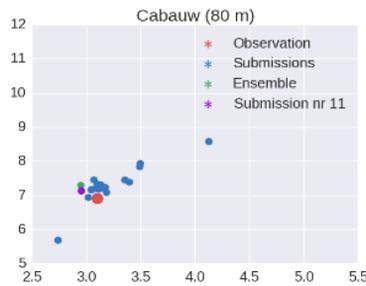
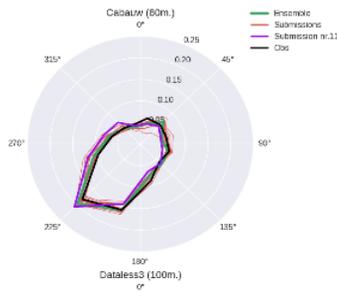
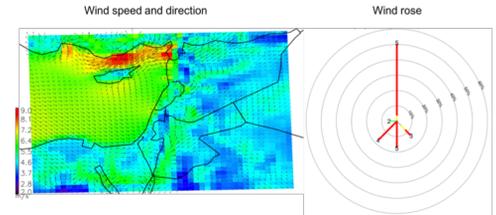
- De Meij, A., Zittis, G. & Christoudias, T., On the uncertainties introduced by land cover data in high-resolution regional simulations, Meteorol. Atmos. Phys. (2018). <https://doi.org/10.1007/s00703-018-0632-3>; <https://rdcu.be/38pt>



How good are we?

EWEA hosted a benchmarking exercise in order to evaluate the capabilities of the mesoscale models in wind speed and direction calculations. The results of the exercise revealed that our biases were very small, more specifically:

- o $< \pm 2\%$ Offshore.
- o $< \pm 3\%$ Coastal site.
- o $< \pm 1\%$ Land site.
- Excellent statistics over land when height increases.
- Excellent representation of the wind rose at all sites.
- Strong evidence that higher resolution reduces biases.



Standard deviation of the wind speed (left) and wind rose (right) for Cabauw (NL) site at 80 m. Observations in red and our results in purple colour.

WIND ASSESSMENTS and FORECASTS

We provide wind resource assessments and forecasts on local and regional scale. Our methodology and result analysis for wind assessments are based on the recommendations set in the Best Practice Guidelines for Mesoscale Wind Mapping Projects for the World Bank. We can provide long-term assessments under different climate change RCP scenarios (up to year 2100) that will help you understand the variations in wind energy under a changing climate.

Reference:

De Meij, A., Vinuesa, J.F., Maupas, V., Waddle, J., Price, I., Yaseen, B., Ismail, A., Wind energy resource mapping of Palestine, Renewable & Sustainable Energy Reviews, 56, 551- 562, doi:10.1016/j.rser.2015.11.090, 2016.