Forecasting winds for wind energy using Aeolus

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Rationale
• Wind farms in Europe contribute a growing share of the energy each year.
• The fast expansion of wind energy both offshore and on land calls for best possible forecasting of winds, i.e. better temporal and spatial resolution.
• Wind forecasting is used for predicting the energy supplied to the grid in time scales from minutes to days ahead, for:
  • Transmission system operators to schedule the balancing of plant (spinning reserve).
  • End-users can choose to charge electrical vehicles at suitable times.
• Forecasting is relevant for all variable resources such as wind, wave and solar.
• Wind energy forecasting is foreseen to include assimilation of wind vector information from the Aeolus satellite into weather forecasting.

Current activities
• DTU Wind Energy is measuring wind profiles, from the ground and up to a few km – when possible, using ground-based lidars.
• The campaign takes place in Alaiz, Spain as part of the New European Wind Atlas.
• We aim to use this unique dataset and compare it to lower altitude Aeolus data¹.
• Ideally, Aeolus data will be assimilated in the weather forecast systems.

Expected Outcome
• It is of great interest in many regions of the world with installed wind capacity to improve forecasting of winds.
• Mapping of global offshore wind resource may potentially be improved especially in regions where Aeolus is expected to contribute significantly, e.g. The Tropics, areas with relatively sparse radiosoundings available.

¹ DTU has applied for Aeolus data and has received positive confirmation.

Conclusion
Valid profiles up to 1000m, where the recovery rate is 39.4%, have been averaged.