



Monitoring vertical wind profiles at a coastal area using a lidar doppler for wind energy applications

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Coastal areas both onshore and offshore offer suitable sites for developing rentable wind farms projects. Developing projects need high quality databases under a wide range of atmospheric conditions or high resolution models that could resolve the effect of the coastal discontinuity in the surface properties. High quality databases are also needed for formulating and testing new parameterizations. Ground-based remote sensing devices such as lidars have been shown to be functional for studying the evolution of the vertical wind structure coastal atmospheric boundary layer both on- and offshore.

Here, we present results from a monitoring programme started in July 2013 campaign at a site located in the Italian Calabria Region, Central Mediterranean, 600m from the Thyrrenian coastline, where a Lidar Doppler, ZephIr (ZephIr ltd) has been operative since July 2013, providing vertical profiles of wind speed and direction.

The lidar monitors wind speed and direction from 10m up to 300m at 10 vertical levels with an average of 10 minutes and is supported by other instruments providing: Atmospheric Pressure, Solar Radiation, Number of Particles by size (Optical Particle Counter, OPC), Precipitation, Relative Humidity, Temperature, Wind Speed and Direction at 10m.

We present the characterization of wind profiles during one year period according to the time of the day to transition periods night/day/night classified relating the local scale to the large scale conditions.

The ZephIR show the capability of reaching 300m height; however, from the OPC measurements it seems there is a correlation between the number of particles and missing data during the night time;

The dataset is also functional for techniques for short-term prediction of wind and solar radiation for the renewable energy integration in the distribution grids. The site infrastructure is funded within the Project “Infrastructure of High Technology for Environmental and Climate Monitoring” (I-AMICA) (PONa3_00363) by the Italian National Operative Program (PON 2007-2013) and European Regional Development Fund. Real-time data are show on http://www.i-amica.it/i-amica/?page_id=1122.