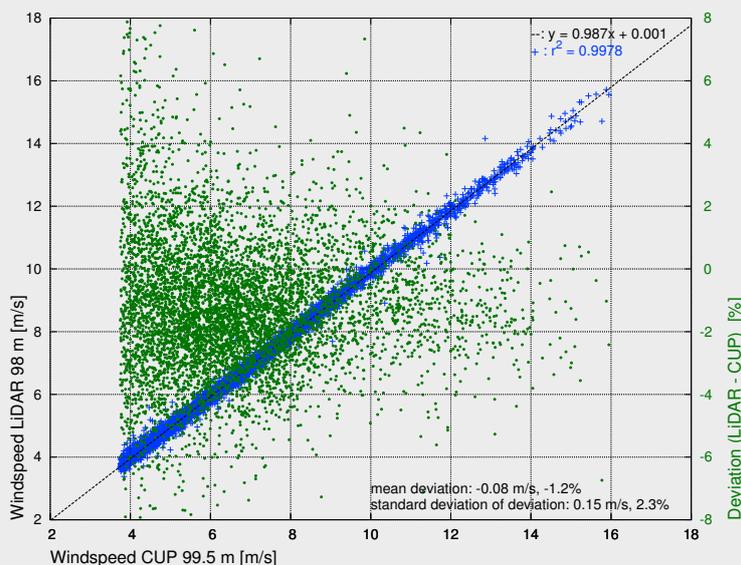




Application and Benefits of LiDAR Measurements



Windspeed LIDAR (98 m) vs CUP (99.5 m) in sector 150 - 0



LiDAR (Light Detection And Ranging) measurements have become very popular in the last years. Because its compact dimensions and the capability to measure up to 200 m and higher with great precision more and more measurements are conducted with LiDARs. Do we still need met mast based measurements?

Most projects do significantly benefit from using a LiDAR for site assessment because of its advantages compared to met masts and pressure of time within the project schedules. When looking into detail on the method of measurement, some points have to be kept in mind for application.

LiDAR measures wind speed by determining the speed of dust particles (aerosol) on different locations above the LiDAR. Compared to the rotating cups of an Anemometer the weight of the particles is negligible small. Therefore, measurements taken during gusts or slowdowns of the wind speed will be measured different compared to cup anemometers.

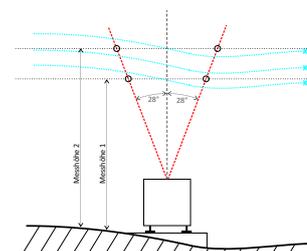
Caused by the cone angle of 28° (the angle of each beam to the vertical), the distance between single measurement points increases with measurement height. Wind conditions are different on each measurement point and also taken measurement values are different compared to single point cup anemometer measurements.

For this reason verification tests have to be carried out in order to compare the measurements to calibrated cup anemometer measurements. During these tests the lidar is placed next to the met mast and values taken are compared and analyzed in greater detail. Depending on the complexity of the terrain at the target site, verification should be carried out on site or prior to the application on a testing site.

Hence, there are applications when the LiDAR can operate on its own but some applications in complex terrain may still require a measuring mast. However, on complex sites significant improvements can be reached when using a LiDAR to measure wind on selected turbine locations. These measurements are used for validation of model results and uncertainties (P50, P75, P90) of the wind study are reduced significantly.

Advantages

- + Compact size
- + Easy to transport
- + No building permission required
- + Measures up to 200 m and higher



Disadvantages

- + Precision of measurement is significantly depending on surrounding terrain
- + Verification with calibrated anemometer required to safeguard bankability

Service of GEO-NET

- + Conception of LiDAR measurement campaigns and estimation of uncertainties before implementation
- + Verification of LiDARs
- + Conduction of LiDAR measurements with or without met mast
- + Supervision of LiDAR measurement campaigns

