

## **AQ510 - 3 Month 180m Comparison of Atmospheric Stability and Turbulence Intensity**

*In a 3 month study by Uppsala University comparing AQ510 with a 180m met tower the atmospheric stability was examined using sonic anemometry to assess the performance of the AQ510 in varying atmospheric stabilities. The results show that neither atmospheric stability nor turbulence intensity has any effect on the agreement between the SoDAR and the cup anemometers.*



For any questions regarding the comparison please contact either:

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If you would like to receive a copy of the full report when it becomes available please email [info@aqsystem.se](mailto:info@aqsystem.se) with the code 3M180M in the subject box.

## Measurement campaign by Uppsala University

As part of an ongoing study, to assess the effects of forestry on wind conditions, an AQ510 has been installed on a forested site in Sweden. The project has a 180m met mast equipped with Thies first class and Vaisala anemometry at seven heights from 40m to 180m. The AQ510 is installed at a distance of over 200m from the met mast.

The first three months of collected data show excellent agreement and consistency with all anemometers between 60m and 180m, but particularly with the Thies anemometry. The highest deviation can be seen at the lowest level, 40 m, where the local heterogeneity of the landscape is expected to influence the wind speed to a larger extent.

The three month comparison has been through winter conditions in Sweden so a wide range of weather and wind have been experienced. The deviation shows that, even with no data filtering for heavy snow or tower shadow effects, between 60m and 180m deviation is less than  $\pm 2\%$ .

The atmospheric stability was examined using sonic anemometry to assess the performance of the AQ510 in varying atmospheric stabilities. The results can be seen in Figure 2 which show that neither atmospheric stability nor turbulence intensity has any effect on the agreement between the SoDAR and the cup anemometers.

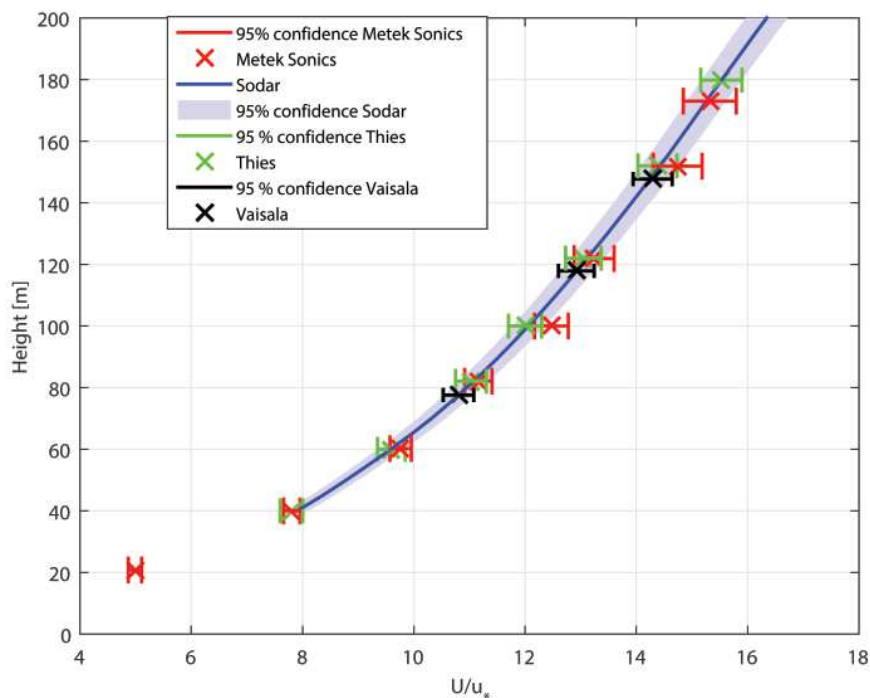


Figure 1, Mean wind profile from the different anemometers. The true mean value is expected to lie within the errorbars with a 95 % probability.

The AQ510 data availability during the 3 months campaign:

Height (m)	40	60	77,6	82,1	100	117,9	122	147,7	152	180
Data availability	98 %	98 %	98 %	98 %	98 %	96 %	96 %	90 %	90 %	84

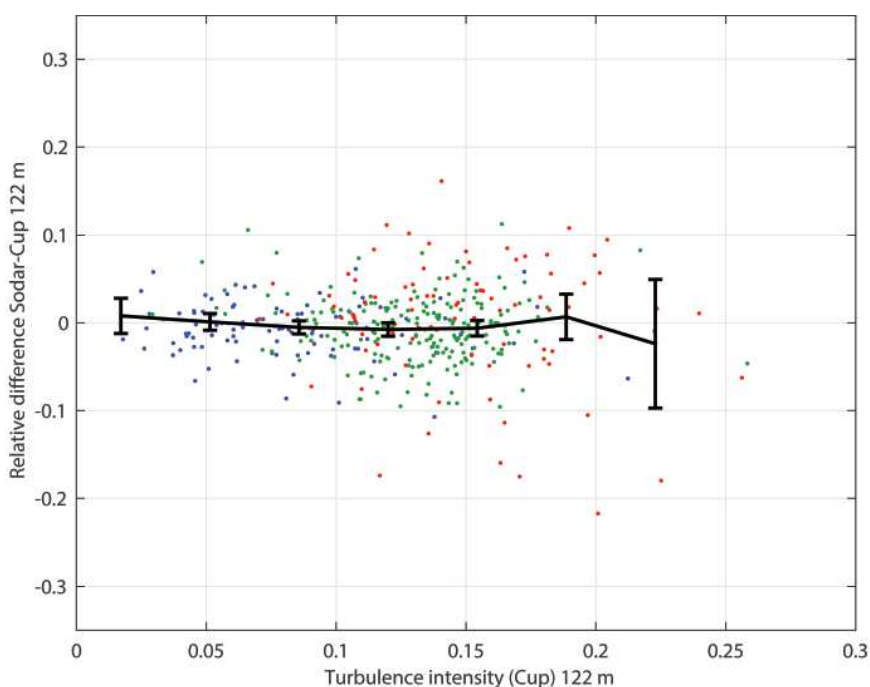


Figure 2, Relative difference between the SoDAR and the cup at 117.9 m as function of the turbulence intensity. The mean value of the points is expected to lie within the errorbars with a 95 % probability. Blue dots show data points from stable stratification, green points from neutral stratification and red dots from unstable stratification.

