Comparison of 3D turbulence measurements using three staring wind lidars and a sonic anemometer - DTU Orbit (05/08/2019)

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The goals are to compare lidar volume averaged wind measurement with point measurement reference sensors and to demonstrate the feasibility of performing 3D turbulence measurements with lidars. For that purpose three pulsed lidars were used in staring mode, placed so that their beams crossed close to a 3D sonic anemometer mounted at 78 m above the ground. The results show generally very good correlation between the lidar and the sonic times series, except that the variance of the velocity measured by the lidar is attenuated due to spatial filtering. The amount of attenuation can however be predicted theoretically by use of a spectral tensor model of the atmospheric surface-layer turbulence

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Contributors: Mann, J., Cariou, J., Courtney, M., Parmentier, R., Mikkelsen, T., Wagner, R., Lindelöw, P. J. P., Sjöholm, M., Enevoldsen, K.
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