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Performance of Doppler Lidar vs WTR/RASS in fast wind profile detection

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During a two month period in spring 2005 the CLR WindTracer 2μm Doppler Lidar of the Institut für Meteorologie und Klimaforschung, Forschungszentrum Karlsruhe was operated vis-a-vis the Scintec AP 1000 Radar Wind Profiler with RASS of the Deutsche Flugsicherung GmbH at Frankfurt Airport in a continuous 24/7 mode. Both systems generated wind profiles every 2 minutes for 54 height intervals ranging from 60 to 1650 m.

System performance including data availability, measurement accuracy and deviations between the two systems is presented for the entire period as well as separately for day and night time periods. Typical situations (low and high wind speed, frontal passage, local wind regime and turbulence generated by wind shear or convection) were selected to analyse the different behaviour of the two systems depending on the meteorological conditions. Near-surface data are compared with wind measurements from the meteorological station of German Weather Service at Frankfurt Airport. Additionally, the effects of the different measurement volume sizes are studied by application of RHI and PPI scan patterns to the Lidar.