Experimental Validation of ADM-Aeolus with the
ALADIN Airborne Demonstrator (EVA4D)

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Abstract

The objective of the proposal is to validate the ADM-Aeolus L1B and L2B wind product and the related instrument calibration modes and algorithms and assess the benefit of the observation for numerical weather prediction (NWP). The validation will be performed by means of co-located wind observations gathered during a ground and two airborne campaigns, a long-term comparison, and a thorough characterisation of the observed atmospheric state (aerosol content, clouds, temperature, pressure). The representativity of the co-located observations w.r.t. the satellite observations will be assessed by use of high-resolution model simulations. The ground campaign is planned at the sites of the Richard-Aßmann Observatory of DWD Lindenberg (and for long-term comparison also at other DWD wind profiler sites), the Leibniz Institute for Tropospheric Research Leipzig and at DLR Oberpfaffenhofen during a period of 10-12 weeks. Two airborne campaigns are planned for a duration of 2-3 weeks each with DLR Oberpfaffenhofen as operation base of for the first campaign and an operation base in Northern latitudes for the second campaign. The ALADIN airborne demonstrator A2D will be the key reference instrument for the satellite ALADIN instrument during ground and airborne campaigns. The ground campaign instrumentation includes up to four tropospheric radar wind profilers, radiosondes and coherent wind lidars as reference for wind observations. The characterisation of the atmospheric state will be performed by the Raman lidars, radiosondes, ceilometers and sun photometers at Lindenberg and Leipzig and by the aerosol lidar POLIS at DLR Oberpfaffenhofen. The payload for the airborne campaigns will be the ALADIN airborne demonstrator A2D combined with a 2-µm wind lidar. The benefit of the observations for NWP will be assessed through data denial experiments with the experimental global ensemble data assimilation system of DWD and a recently developed tool for ensemble-based estimates of observation impact.