



Meteodrones – Meteorological Planetary Boundary Layer Measurements by Vertical Drone Soundings

Jonas Lauer and Martin Fengler

Meteomatics AG, St. Gallen, Switzerland (jlauer@meteomatics.com)

As of today, there is a gap in the operational data collection of meteorological observations in the Planetary Boundary Layer (PBL). This lack of spatially and temporally reliable knowledge of PBL conditions and energy fluxes with the surface causes shortcomings in the prediction of micro- and mesoscale phenomena such as convection, temperature inversions, local wind systems or fog. The currently used remote sensing instruments share the drawback of only partially covering necessary variables.

To fill this data gap, since 2012, Meteomatics has been developing a drone measurement system, the Meteodrone, to measure the parameters wind speed, wind direction, dewpoint, temperature and air pressure of the PBL up to 1.5 km above ground. Both the data quality and the assimilation into a regional numerical weather model could be determined in several pilot studies. Besides, a project in cooperation with the NSSL (National Severe Storms Laboratory) was launched in October 2016 with the goal of capturing pre-convective conditions for improved severe storm forecasts in Oklahoma. Also, related measurements, such as air pollution measurements in the Misox valley to determine LDSP values, were successfully conducted.

The main goal of the project is the operational data collection of PBL measurements and the assimilation of this data into regional numerical weather forecast models. Considering the high data quality indicated in all conducted studies as well as the trouble-free execution, this goal is both worthwhile and realistic.