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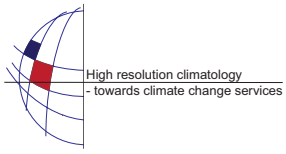

Long-term operation and intercomparison of scintillometers for flux measurements

F. Beyrich (1) and H.A.R. de Bruin (2)

(1) Deutscher Wetterdienst, Meteorologisches Observatorium Lindenberg, Tauche - OT Lindenberg, Germany (frank.beyrich@dwd.de, +49 33677 60280), (2) Associate Professor Emeritus, Wageningen University Freelance consultant, Overboslaan 52, NL - 3722 BM Bilthoven

The turbulent exchange of heat and water vapour are essential land surface – atmosphere interaction processes in the local, regional and global energy and water cycles. Scintillometry can be considered as the only technique presently available for the quasi-operational experimental determination of area-averaged turbulent fluxes needed to validate the fluxes simulated by regional atmospheric models or derived from satellite images at a horizontal scale of a few kilometres. The scintillometer principle is based on the quantitative evaluation of intensity fluctuations of electromagnetic radiation propagating across the turbulent atmosphere over distances up to several kilometres.

Different types of scintillometers are presently available for operational use: Laser scintillometers are typically operated over a path of between 100 m and 250 m and can thus provide the sensible heat flux at the patch scale. Large-aperture sintillometers have a typical path length of between 2 and 10 km providing an area-average of the sensible heat flux at the scale of a grid cell of current regional numerical weather prediction and climate models. For the latter, instruments of different technical design have been introduced during the last years. These different types of scintillometers have been in operation at the Meteorological Observatory Lindenberg (MOL) over periods of several years. The presentation will give an overview on the operational experiences with these instruments. Special emphasis will be put on the intercomparison of different scintillometers and on the comparison of the scintillometer-based fluxes with other measurements and with model results.