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Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

Turbulence characteristics and energy balance on urbanized area – Lodz case study.

K. Fortuniak and W. Pawlak

University of Lodz, Meteorology and Cimatology, Lodz, Poland (kfortun@uni.lodz.pl)

Lodz is a third largest town in Poland with population around 750 thousands. As it is located on a flat area, far from large water reservoirs and it is characterized by regular city arrangements with a clear roof level, the town is a good polygon for urban studies. The measurements of turbulent fluxes with eddy-covariance method are provided in Lodz since year 2000. The first system was installed on the thin mast (more than 2 times higher than mean buildings height) at the point situated near to the city centre. The system worked until 2003. Since 2005 and 2006 two new eddy-covariance systems continuously work in the core of old city centre. In last two years turbulence intensity and sensible heat flux were measured on a path of 3.2 km over a city centre with the aid of scintillometer BLS 900. The proposed presentation will discuss selected results of these recent measurements: integral and spectral characteristics of turbulence, like normalized standard deviations of wind components, temperature, water vapor and carbon dioxide concentration as well as normalized spectra of these variables. The data from Lodz show general agreement with Monin-Obukhov similarity functions commonly used in literature. Turbulent fluxes demonstrate typical diurnal variation with Bowen ratio close to 2 in noon hours. Turbulent fluxes at both long-term points are comparable which suggests that sensors are located above roughness sub-layer and results really represent a typical values for centre of Lodz. Additional comparison of sensible heat fluxes measured with the aid of eddy-covariance method with scintillometer data confirms applicability of this method for urban studies.