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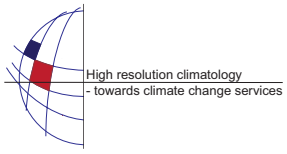

Evaluation of climate reference mast measurements at Debrecen, Hungary for climate studies

Z. Nagy (1), T. Weidinger (2), Gy. Baranka (1), and Z. Popov (3)

(1) Hungarian Meteorological Service, Budapest, Hungary (baranka.gy@met.hu, 36-1-3464809), (2) Department of Meteorology, Eötvös Loránd University, Budapest, Hungary (weidi@ludens.elte.hu), (3) (3) Republic Hydrometeorlogical Service of Serbia, Meteorological Observatory Novi Sad, Serbia (zlatica.popov@hidmet.gov.rs)

In the latest years two climate reference stations were established around Debrecen, which is the second biggest city in Hungary. Eddy covariance measurements (t, H, LE CO2) at 4 m level and profile measurements with 10 m high mast at four levels (1 m, 2 m, 4 m, 10 m) started in 2008, up to now two years database are available. The measurement program of two stations consists of: (i) detection of long term changes in basic climate parameters with the highest accuracy (for all elements of standard synoptic stations), (ii) besides the conventional 2 m measurements, profile measurements (wind speed, temperature and moisture) and calculation of stratification, (iii) high accuracy radiation budget measurements, (iv) soil temperature and moisture profiles, soil energy budget measurements, (v) determination of energy budget components using the eddy covariance and/or the Bowen ratio methodologies.

The aims of measurements are to describe the surface layer characteristics (profiles, energy budget components) with the highest possible accuracy and reliability. Evaluating the measurements possible local effects of the global climate change would be detected. Calculation of surface layer parameters as sensible and latent heat fluxes, Monin-Obukhov length, eddy diffusivity coefficients, Richardson number from flux end profile measurements are also presented. Finally the ambient turbulence for use in calculating dispersion and buoyancy induced dispersion components were also estimated. Mast measurements were compared to standard meteorological measurements located in built-up area of city of Debrecen to indicate the possible effect of urban heat island. The interaction between urban heat island and climate change phenomena as well as the influences and correlations between them were studied on the basis of temperature shifting and moisture parameters.

The final goal is to development a long-term dataset for investigation of effect of long term changes and to provide quality-controlled meteorological dataset for climate modelling. The results will be used as an inputs or background conditions of climate models. Testing and validation of climate models could be also based on this high-quality local meteorological datasets.