EMS Annual Meeting Abstracts
Vol. 9, EMS2012-404, 2012
12th EMS / 9th ECAC

Evapotranspiration characteristics of urban surface using eddy correlation measurement and Penman method

M. Siedlecki, W. Pawlak, and K. Fortuniak
University of Lodz, Department of Meteorology and Climatology, Lodz, Poland (siedlec@geo.uni.lodz.pl)

Evapotranspiration is one of important component of water balance however difficult to measure especially over urbanized area. Due to contrast of hydrologic properties of building materials and vegetation covered soils evapotranspiration from urban areas is assumed to be less than from neighbor rural areas. The most direct way of measuring evapotranspiration at urban area involves the eddy correlation approach. This method requires special sensor which measured rapid fluctuations (10 Hz) in the vertical velocity and moisture properties of air. Moreover, measuring equipment must be mounted on tall towers, at appropriate height to be in the constant flux of the urban boundary layer. For this reasons the measurement with eddy correlation are quite rare. However, there is a question about possibility of using classical methods of evapotranspiration assessment.
This study presents the comparison of urban surface evapotranspiration asses with two methods: eddy covariance method and Penman formula. This work bases on measurement made at three stations located in city center of Lodz and it covers period from 2006 to 2011.
The analysis shows that the evaporation in Lodz is characterized by clear annual course with maximum during the summer and minimum in winter. During the summer period the mean monthly sum of evaporation is about 50-60 mm on Narutowicza station and 40-50 mm on Lipowa station. This higher values of evaporation on Narutowicza station are caused by two small parks located in the nearest neighborhood in west and east direction. The comparison shows that the values from empirical method are higher that the values from eddy covariance method.