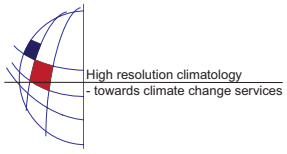
EMS Annual Meeting Abstracts
Vol. 7, EMS2010-441, 2010
10th EMS / 8th ECAC



Evaluation of simple model for net radiation estimates above various vegetation covers

P. Hlavinka (1), M. Trnka (1), M. Fischer (1), J. Kucera (2), M. Mozny (3), and Z. Zalud (1)

(1) Mendel University Brno, Institute of agrosystems and bioclimatology, Brno, Czech Republic (phlavinka@centrum.cz), (2) Environmental Measurements Systems, Brno, Czech Republic, (3) Czech Hydrometeorological Institute, Doksany Observatory, Czech Republic

The main objective of submitted study was to calibrate and verify the simple model for net radiation (Rn) estimates during the growing periods of selected agricultural crops. In the same time the soil heat flux (G) measurements were analysed. The model needs incoming solar radiation, air temperature, vapor pressure measurements and information about albedo as input. The net radiation is determined as difference between the incoming net shortwave radiation (Rns) and the outgoing net longwave radiation (Rnl). The Rns is estimated from incoming solar radiation using albedo. The Rnl is estimated from daily maximum and minimum temperature, vapour pressure, incoming solar radiation and derived clear-sky radiation. The accuracy of the model was assessed on the basis of radiation balance measurements (by Net radiometer Schenk 8110) at two experimental stations in the Czech Republic (i.e. Polkovice 49°23′ (N), 17°17′ (E), 205 m a.s.l.; Domanínek 49°32′ (N), 16°15′ (E), 544 m a.s.l.) during the years 2009 and 2010. The parameter G was measured by Hukseflux Thermal Sensor HFP01. For the purpose of mentioned analyses the measurements were conducted during the growing season of spring barley, winter wheat, winter rape, grass, poplars and above field after harvest of cereals (after/without tillage). These covers are very common type of surface within agricultural landscape in Central Europe. The enhanced method of Rn and G estimation were then used for the SoilClim model runs. The present version of SoilClim uses very simple algorithm for radiation balance and should be modified to be closer to reality. Namely the estimates of reference evapotranspiration (ETo), actual evapotranspiration (ETa) and soil water content could be substantially improved by this way.

Acknowledgement:
We gratefully acknowledge the support of the Grant Agency of the Czech Republic (no. 521/09/P479) and Research plan No. MSM6215648905 “Biological and technological aspects of sustainability of controlled ecosystems and their adaptability to climate change“ .