Geophysical Research Abstracts
Vol. 18, EGU2016-14119-1, 2016
EGU General Assembly 2016

Analysis of plant available water in the context of climate change using Thornthwaite type monthly water balance model

Andras Herceg, Zoltan Gribovszki, and Peter Kalicz
University of West Hungary, Institute of Geomatics and Civil Engineering, Sopron, Hungary (herceg.andras88@gmail.com)

The hydrological impact of climate change can be dramatic. The primary objective of this paper was to analyze plant available water in the context of climate change using Thornthwaite type monthly water balance calibrated by remote sensing based ET maps. The calibrated model was used for projection on the basis of 4 climate model datasets. The 3 periods of projection were: 2010-2040, 2040-2070, and 2070-2100. The benefit of this method is its robust build up, which can be applied if temperature and precipitation time series are accessible. The key parameter is the water storage capacity of the soil (SOILMAX), which can be calibrated using the actual available evapotranspiration data. If the soil's physical properties are available, the maximal rooting depth is also projectable. Plant available water was evaluated for future scenarios focusing water stress periods. For testing the model, a dataset of an agricultural parcel next to Mosonmagyaróvár and a dataset of a small forest covered catchment next to Sopron were successfully used. Each of the models projected slightly ascending evapotranspiration values (+7 percent), but strongly decreasing soil moisture values (-15 percent) for the 21st century. The soil moisture minimum values (generally appeared at the end of the summer) reduced more than 50 percent which indicate almost critical water stress for vegetation.

This research has been supported by Agroclimate.2 VKSZ_12-1-2013-0034 project.