



Anomalies in the ratio of actual to reference evapotranspiration over the Czech Republic

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The study investigates anomalies in the ratio of actual to reference evapotranspiration (ET) retrieved from two different models: The Atmosphere Land Exchange Inverse (ALEXI) model and SoilClim model.

The ALEXI model uses day/night differences in land surface temperature retrieved from the Moderate Resolution Imaging Spectroradiometer (MODIS) sensor on board of the polar orbiting Aqua satellite. The Evaporative Stress Index (ESI) is an output of ALEXI model and represents standardized anomalies in a normalized ratio of actual to reference ET. ESI is an indicator of agricultural drought and is available as a global product at a spatial resolution 0.05° (i.e. ~ 5 km resolution). ESI represents standardized anomalies in a normalized clear-sky ratio of actual to reference evapotranspiration (ET) and is defined as $f_{RET} = ET_a/ET_o$, where ET_a represents actual ET from ALEXI model and ET_o is the FAO-56 Penman-Monteith reference ET for grass as described by Allen et al. (1998). ESI is expressed as a standardized anomaly in f_{RET} with respect to long-term baseline conditions in order to identify areas where f_{RET} is higher or lower than normal for a given time part of the growing season.

SoilClim is a water balance based model which uses basic meteorological inputs measured *in-situ* and information about soil and land cover. It is routinely used for drought monitoring for the area of the Czech Republic. SoilClim works at a spatial resolution 500 m and its outputs are available on www.intersucho.cz. In this study, anomalies in f_{RET} from SoilClim were calculated in the same way as for ESI.

Anomalies in a normalized f_{RET} from ALEXI and SoilClim models are compared for six different sites located in the Czech Republic. These six sites represent different land use classes and are part of the network ensuring long-term observations of greenhouse gases and energy fluxes. Two sites represent forest ecosystems, other two represent agricultural land and remaining two are located on grassland. The anomalies were compared over the growing season of the year 2017.

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