

Seasonal comparison of two spatially distributed evapotranspiration mapping methods

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More rainfall is disposed of through evapotranspiration (ET) on a global scale than through runoff and storage combined. In Hungary, about 90% of the precipitation evapotranspirates from the land and only 10% goes to surface runoff and groundwater recharge. Therefore, evapotranspiration is a very important element of the water balance, so it is a suitable parameter for the calibration of hydrological models.

Monthly ET values of two MODIS-data based ET products were compared for the area of Hungary and for the vegetation period of the year 2008. The differences were assessed by land cover types and by elevation zones. One ET map was the MOD16, aiming at global coverage and provided by the MODIS Global Evaporation Project. The other method is called CREMAP, it was developed at the Budapest University of Technology and Economics for regional scale ET mapping. CREMAP was validated for the area of Hungary with good results, but ET maps were produced only for the period of 2000-2008. The aim of this research was to evaluate the performance of the MOD16 product compared to the CREMAP method.

The average difference between the two products was the highest during summer, CREMAP estimating higher ET values by about 25 mm/month. In the spring and autumn, MOD16 ET values were higher by an average of 6 mm/month.

The differences by land cover types showed a similar seasonal pattern to the average differences, and they correlated strongly with each other. Practically the same difference values could be calculated for arable lands and forests that together cover nearly 75% of the area of the country. Therefore, it can be said that the seasonal changes had the same effect on the two method's ET estimations in each land cover type areas.

The analysis by elevation zones showed that on elevations lower than 200 m AMSL the trends of the difference values were similar to the average differences. The correlation between the values of these elevation zones was also strong. However weaker correlation was found between the values of the elevation zones under and above 200 m AMSL. Therefore, elevation has some effect on the differences between the ET values of the CREMAP and the MOD16 method.

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