



Assessment of satellite-derived evapotranspiration trends: A case study for Marksovsky and Izobilnensky districts of Russia.

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Actual evapotranspiration (ET) is a fundamental variable of the hydrological cycle playing a principal role on surface water balance. Detailed ET estimation data is important subject for numerous applications including irrigation management, water resources planning and environmental studies.

At the plot scale ET can be accurately determined from detailed ground observations but at regional (even field) scale, numerous time-consuming and expensive installations would be required. In the last few decades, earth observation technology become provide spatially distributed cost-effective information for ET maps production at regional scale. The increased availability of observed data for long monitoring periods and of advanced techniques for the spatiotemporal analysis of acquired information allows to describe trends in evapotranspiration behavior and find the reason of it.

In this study the MODerate Resolution Imaging Spectroradiometer (MODIS) ET product data (8 days temporal resolution for the period of 2000-2017) were integrated and processed in GIS environment in order to obtain the final goal of finding spatiotemporal distribution of the ET for the territory of two study sites with high agricultural activities. Methodology used to assess spatial distribution of ET trend over study regions for warm year periods (spring, summer and autumn) is consisted on: (1) building gridded time series datasets; (2) time series testing for stationary; (3) trend calculation by modified Mann-Kendall test for non-stationary time series; (4) analyzing of spatial patterns distribution. Obtained results show evidence of strong correlation in ET behavior and agriculture farming changes (crop water demand). This means that losses due to evapotranspiration in agriculture can be handled in a way allowing to assure the best conditions for agricultural needs of the region.

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