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Operational assessment of evapotranspiration from geostationary satellite data.

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EUMETSAT (http://www.eumetsat.int) has set up a network of decentralized meteorological satellite data processing centres named 'Satellite Application Facilities' (SAFs). These centres develop and achieve data products derived from European meteorological satellites.

The 'Land-Surface-Analysis' SAF (LSA-SAF, http://landsaf.meteo.pt/), develops algorithms for the operational monitoring of land surface related variables. RMI participates to the LSA-SAF by developing an evapotranspiration (ET) product, ET being one of the most important water balance component [1]. As ET cannot be observed directly by remote sensing, it is assessed indirectly through modelling. The proposed model is based on a set of parameterizations of the SVAT scheme developed at ECMWF and it is adapted to be forced by real-time data derived from Meteosat Second Generation (MSG) satellites data. The SEVIRI instrument, on-board MSG, is designed to provide a wide area coverage and is able to monitor quick changing surface variables affected by cloudiness and diurnal cycle. It has a 3 km spatial resolution at sub-satellite point and a high observation repetition rate (15 min).

The ET algorithm produces in near real time ET estimates at SEVIRI spatial resolution each 30 minutes. Results are generated since mid 2009 over four regions (Europe, North and South Africa and the Eastern part of South America) defined inside the MSG field of view. A daily product, available since end 2010, is also obtained through integration of the instantaneous estimates. Validation already carried out attests the robustness of the proposed algorithm, notably over Europe. Nevertheless, research will be pursued during coming years, looking for additional validation sites and evolving towards an improved combination of remote sensed observations and models.

In this contribution we first present the LSA-SAF framework and we summarize how ET is deduced from MSG-SEVIRI data. In a second step, we compare LSA-SAF ET to ET products provided operationally by NWP models. Examples are specially illustrated for the location of a set of automatic weather stations in Belgium. LSA-SAF ET products characteristics are given in fine as well as information about accessibility of ET products to users.

Reference:
[1] N. Ghilain, A. Arboleda and F. Gellens-Meulenberghs, 2011, Hydrol. Earth Syst. Sci., doi:10.5194/hess-15-771-2011, 15, 771–786.