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Reference crop evapotranspiration derived from stationary satellite imagery: a case study for the Fogera flood plain, NW-Ethiopia and the Jordan Valley, Jordan

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Abstract. First results are shown of a project aiming to estimate daily values of reference crop evapotranspiration ET_0 from geo-stationary satellite imagery. In particular, for Woreta, a site in the Ethiopian Rift at an elevation of about 1800 m, we tested a radiation-temperature approximate formula proposed by Makkink (MAK), adopting ET_0 evaluation with the version of the Penman-Monteith equation described in the Irrigation and Drainage paper 56 as the most accurate estimate. More precisely we used the latter with measured daily solar radiation as (denoted by PMFAO-Rs). Our data set for Woreta concerns a period where the surface was fully covered with short green non-stressed vegetation. Our project was carried out in the context of the Satellite Application Facility on Land Surface Analysis (LANDSAF) facility. Among others, the scope of LANDSAF is to increase benefit from the EUMETSAT Satellite Meteorology and Oceanography Second Generation (MSG). In this study we applied daily downward solar radiation at the surface obtained from the Spin Enhanced Visible and Infrared Imager (SEVIRI) radiometer. In addition, air temperature at 2 m was obtained from 3-hourly forecasts provided by the European Centre for Medium-Range Weather Forecasts (ECMWF).

Both MAK and PMFAO-Rs contain the psychrometric "constant", which is proportional to air pressure, which, in turn, decreases with elevation. In order to test elevation effects we tested MAK and its LANDSAF implementation for 2 sites in the Jordan Valley located about 250 m b.s.l.

Except for a small underestimation of air temperature at the Ethiopian site at 1800 m, the first results of our LANDSAF- ET_0 project are promising. Our approach to derive ET_0 proves successful, then the LANDSAF will be able to initiate nearly real time free distribution of ET_0 for the full MSG data set.

[Final Revised Paper](#) (PDF, 3022 KB) [Discussion Paper](#) (HESSD)

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