

***Interactive comment on* “Temporal variations of evapotranspiration: reconstruction using instantaneous satellite measurements in the thermal infra red domain” by E. Delogu et al.**

Anonymous Referee #4

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The paper discusses one of the most important issues in the operational use of instantaneous thermal infrared satellite images for evapotranspiration estimates. For many purposes it is important to extrapolate instantaneous evapotranspiration results to daily values. Furthermore, evapotranspiration estimates should be interpolated for cloudy days in order to derive seasonal evapotranspiration. After an interesting literature review of existing methods, two methods are tested on large datasets in Southern France and Morocco. Errors associated with the commonly used "self preservation" assumption for evaporative fraction and stress factor were identified and possible improvements of the use of evaporative fraction were suggested. Also a useful method for estimating cloud-free MODIS images is presented.

The methods, results and following discussion need to be presented in a better structured way to increase the comprehension by the reader. The subcaptions used in the paper do not always cover the contents in a proper way and are sometimes popularly formulated (e.g. section 3.2.3 "About the time of overpass").

Most importantly, a separate discussion section should discuss the reasons why and under which circumstances the authors reject the "self preservation" assumption that is often used in literature. Furthermore, it should be discussed what the effect of uncertainties in LE and AE estimations is on the interpolation/extrapolation, because in this study these errors are ignored.

Section 2.4 discusses the determination of stress periods. Stress periods are defined as follows "stress starts when a large deviation between the potential evapotranspiration and the measured actual evapotranspiration rate is observed ...". What is considered as a large deviation? Is this dependend on the type of vegetation?

In Section 3.1.4 it is discussed that Fig. 4 shows the deterioration of the Nash-Sutcliffe efficiency when satellite overpass time deviates from noon. Fig. 4, however, also shows that for Sorghum the efficiency increases after 13h. This should be explained.

I suggest to accept the paper with minor revisions, taking into account the remarks above and the technical corrections below.

Some technical corrections:

Replace "Nash efficiency" with "Nash-Sutcliffe efficiency".

Page 1703, line 8: change to "...as defined in Allen et al. (1998)."

Page 1705, line 23 and 25: change "...it's..." to "...it is...".

Page 1708, line 2: change "...the same assumption than..." in "...the same assumption as..."

Page 1708, eq. 3: LETd not defined

Page 1712, line 2: change "orchad" to "orchard"

Page 1712, line 22: change "remote sensing informations" to "remote sensing data"

Page 1713, line 25: IRT not defined

Page 1714, lines 16-19: reformulate clearer

Page 1716, line 6: remove duplicate "the"

Page 1723, lines 18-20: rephrase "An improved (...) to parametrized".

Fig.4: rephrase caption, eg. "Deterioration of the Nash-Sutcliffe efficiency for evapotranspiration estimation using the evaporative fraction".

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 1699, 2012.

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