

***Interactive comment on “Estimation of
Mediterranean crops evapotranspiration by means
of remote-sensing based models” by
M. Minacapilli et al.***

Anonymous Referee #1

Received and published: 24 February 2009

General remarks

The title of this manuscript suggests that the objective of the paper is to present a method to determine ET of Mediterranean crops by means of remote-sensing based models. Actually, two existing RS-based models, notably SEBAL and TSEB are compared, where the SWAP model is used as ‘reference’. For the latter a spatial distribution method is applied using remotely sensed crop factors and LAI’s. Validation against independent field data is confined to SWAP soil moisture. For that reason the SWAP model is taken as a reference. This validation concerns a limited number of *in situ* observations.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



The nature of the study is highly determined by the fact that RS-images are used gathered during a NERC airborne campaign that took place on 16 May 2005. These images has pixel sizes of about 3 x 3 m. For that reason, the three models are applied on this pixel scale. Using the assumption of constant ratio of ET and the available energy, daily ET values are obtained for each pixel as well for each Mediterranean crop that is considered, notably citrus, olive and vine grapes.

My main criticism concerns the question whether the nature of the applied models allow applications to pixels as small as 3 x 3 m. In this context, I miss a proper review of the methods used. Quantities such as surface temperature, albedo, LAI, crop coefficients, vegetation directional fractional cover, roughness length, zero-plane displacement playing a role in the models and method of observation do not have a clear physical meaning on such a small spatial scale. similar remarks can be made about the air temperature and humidity, wind speed, radiation components etc.. Effects such as heterogeneous shading, distributions of leaves, soil moisture etc. avoid applications of these quantities on small scales. Tacitly, they are defined for field scales only. For that reason, I think that all comparisons between models for individual pixels does not make sense. What is left is then are the ET values derived for the considered crops shown in Fig. 11. Because this concerns only one day, I wonder whether one can draw clear conclusions from these results. I don't think so.

Minor criticism.

For me it is not clear which criterion has been used in selecting the three RS-based models from the different models published in the open literature. Vaguely, the text suggests that this is linked to the controversy between so-called *single*- and *dual source* modelers. In that case, I miss a proper discussion of basic differences between the two approaches.

An alternative classification of vegetation models might be:

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



Crops covering the surface entirely:

- a. big- leave method by Monteith;
- b. as a), but for short and tall vegetation;
- c. as a) but with an additional soil/root zone module;
- d. multi-layer crop models;

Crops not covering the surface entirely:

- a. a tile approach;
- b. a mosaic approach

Furthermore, atmospheric processes are described differently, e.g. full Monin-Obukhov stability effects or an approximate wind function. Assumption about spatial variability of the meteorological input data are relevant also. Topics like this is missing in the introduction in which the rationale of this study is pointed out.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 1, 2009.

HESSD

6, S152–S154, 2009

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

