

## ***Interactive comment on “Evapotranspiration modelling at large scale using near-real time MSG SEVIRI derived data” by N. Ghilain et al.***

**N. Ghilain et al.**

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The authors thank the S. Sinclair (Referee #2) for his comments that are very helpful to improve the quality of the manuscript and the understanding of the presented work.

The reply is structured in the same order than the given comments. The reviewer comments are first reported and are followed by the authors' reply.

### **1. General comment:**

An operational evapotranspiration model is presented, which is driven by a combination of MSG SEVIRI derived products (albedo and short/long-wave fluxes) and ECMWF operational forecast variables. The authors examine the performance of the evapotran-

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spiration model using location specific comparisons between measured and modelled evapotranspiration over Europe, and by comparing the modelled results with those of two other coarser resolution C3462 modelling systems (GLDAS and ECMWF) over Europe, Africa and portions of South America. The model is shown to have good overall performance when compared with the observed data and to be reasonably consistent with the other model outputs. In general the paper is a valuable contribution and suitable for publication. The introductory sections and model concepts are clearly explained and the conclusions are well considered. However, I found that the writing style of the section which describes the inter-comparison with GLDAS and ECMWF evapotranspiration (Sect. 5) was not as polished, as a result this discussion can be difficult for the reader to follow. I feel that the paper will benefit if the authors rework the wording of this section so that the presentation of the paper does justice to its content.

Response: Section 5 has been re-elaborated, taking also into account suggestions of referee #1: a. We have separated it into 2 sub-sections: the first one is dealing with the intercomparison itself, the second one is based on the interpretation of the possible sources of differences between models results. b. Long recurrent name of variables have been defined, and symbols are then used instead in the rest of the text. c. The choice of the three possible sources of ET differences is now explained. d. Sentences have been re-worded.

### **2. Specific comments:**

Pg. 7088 paragraph starting at line 4 - How is the source (and treatment) of these forecasts different from the ECMWF forecasts of soil moisture and soil temperature mentioned in the following paragraph?

Response p. 7088 (4): That is made clearer in the new manuscript. The sentence p. 7088 (15) has been deleted and information added in the previous paragraph: 'Air and dew point temperatures at 2 m, 10-meters wind speed, surface atmospheric pressure, soil moisture and temperature in the 4 soil layers, reinitialized twice a day by

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the ECMWF 4DVAR analysis process, are retrieved.' There is only one source and treatment for ECMWF soil moisture and temperature for MET model.

In the discussion of Fig. 5, it would be useful if the authors could clarify what is meant by "3-h mean image correlation", it's not clear which sequence of correlations a mean is being calculated for. My understanding from the figure is that the authors computed a cross-correlation between images for three distinct time-steps each day and plotted these values.

Response Discussion Fig.5: We have reformulated in the new version. First, we have better defined the material of comparison: 'Three maps per day are then produced by averaging ET rates over periods of three hours each. P1 covers the time interval from 9:00 to 12:00 UTC, P2 from 12:00 to 15:00 UTC and P3 from 15:00 to 18:00 UTC.' After defining the material and symbols, we explain Fig. 5: 'First, we compute two-dimensional correlation between LSA SAF MET images and respectively ECMWF and GLDAS ET images. Figure 5 displays the correlation evolution, for time periods P1 to P3 over Europe, between LSA-SAF ET and ET forecasts from ECMWF on one hand, and with GLDAS ET images on the other hand'.

Pg. 7091 line 19 - "...Table 5." should read "...Table 3."

Response p. 7091 (19): changed accordingly

Pg. 7094 line 21 - The sentence starting "Land cover difference..." is confusing to me. According to the caption for Fig. 6 the ECMWF comparison is in the left-hand panel.

Response p. 7094 (21): GLDAS and ECMWF are now inverted in the sentence.

Pg. 7097 line 7 - "...activities will demonstrate..." should be "activities can demonstrate...".

Response p. 7097 (7): changed accordingly.

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