

Interactive comment on “Effects of multi-temporal high-resolution remote sensing products on simulated hydrometeorological variables in a cultivated area (southwestern France)” by Jordi Etchanchu et al.

Anonymous Referee #2

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General comments

This paper focuses on the impact of vegetation dynamic on the simulation of evapotranspiration from a land surface model. It shows the benefits of using decametric resolution and high revisit frequency satellite imagery (FORMOSAT-2) to resolve the spatial and temporal dynamic of vegetation at the landscape scale and to drive the SURFEX/ISBA-A-gs land surface model. The authors compare

- evapotranspiration (ET) simulated using the leaf area index (LAI) and a land cover map derived from FORMOSAT-2 satellite imagery,

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and

- ET simulated using vegetation variables taken from the ECOCLIMAP-II database which is the land surface parameter database used for the spatial integration of the model and provides a monthly climatology for LAI at 1 km spatial resolution.

The authors showed that the use of FORMOSAT-2 LAI improves the performances of simulated ET. The effects are more significant for summer crops than for winter crops. The issue addressed by this paper is of great interest for the land surface community. It shows the potential of new high spatial and temporal resolution satellite (SENTINEL-2) to drive land surface models using more accurate land surface characteristics.

However, major revisions of the paper are needed before considering it for publication in HESS. There are a lot of confusing sentences, inaccurate definitions, some references are missing, some justifications are missing. The analysis of the results is not deep enough. A dedicated discussion section is missing. This alters the quality of the paper whilst there is enough scientific content for publication. I provide below some evidences and some suggestions for improvement. But this is not exhaustive. Substantial improvement of English and paper structure are also expected.

Specific comments

- Abstract: it is too long, too many methodological details are given

- Introduction - page 2, line 4: please clarify the idea, provide examples of agricultural practices (irrigation, crop rotation, seeding date, . . .) - choose between Land surface model and SVAT to use in the rest of the text - line 7: references are needed for SURFEX and VIC, - the meaning of SURFEX acronym needs to be given - the definition of LAI is not exact, it is defined as - “half the total developed area of green (i.e., photosynthetic active) leaves per unit ground horizontal surface area [Chen and Black, 1992]” - page2 , line 10: LAI is not an index. It is a variable that can be simulated by the model or used as a forcing variable to drive the model - page 2, line 10: please justify, a refer-

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ence is needed here. LAI is the scaling factor to compute the stomatal conductance at the canopy scale. It is not necessary the most influential parameter on the simulated evapotranspiration. - Page 2, Line 12: too many references, select one or two. This remark applies for the rest of the paper. - Page 2, Line 14: no needs to defined a climatology - page 2, line 14: use the term climatology instead of climatological - page 20, line 20: This holds for Europe but not for the US. - Page 2, line 20-25: Redundancies, confusing sentences - page 2 line 25-26: why ? References are needed - page 2, line 27-30: redudancies with above - page 2, line 31-32: ISBA should be defined - page 3, line5: ECOCLIMAP-II LAI are derived from the analysis of MODIS LAI and not SPOT/VEGETATION - page 3, line 7-8: this is not clear. Provide thorough explanation on how LAI is computed in ECOCLIMAP-II - page 3, line 10-20: good and clear paragraph

Section 2.1 - not enough model details are given - which version of SURFEX is used ? - Which type of water transfer scheme? Energy balance ? - Is ISBA includes includes a coupled stomatal conductance-photosynthesis scheme (A-gs version) - what about irrigation, is it simulated by the model ? the reference for the ISBA pedotrasnfer function is not correct, use Noilhan, J. and Lacarrère, P.: GCM Grid-Scale Evaporation from Mesocale Modeling, J. Climate, 8, 206–223, 1994 ? -page 4, line 3-5: the description of ECOCLIMAP-II is not accurate. No vegetation parameters are derived from satellite observations. Some parameters are fixed for each plant functional type. Other parameter or variables vary geographically with the type of ecosystem. This part must be properly edited.

Section 2.2: -page 4, line 17: “non-irrigated rotation”: this is not a correct term

The authors should provide a dedicated Discussion section. They should properly discuss the main outcomes of the work and discuss their limits. The issue of uncertainties need to be addressed: uncertainty in the measurements, uncertainty in the satellite imagery (registration ...), uncertainty in the land surface model affecting the simulation of ET ? Conclusion: Conclusion should be re-written giving the main outcomes

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of the paper. It should be a summary and should not contain analysis or discussion statements (line 20-25)

English : English must be carefully edited, I provide some examples here

page 2 line 4: “vegetation cover present”→ “present vegetation cover”

page 2 line 5 “ the more accurate”→ “ more accurate”

page 2 line 6 “to improving”→ “critical to improve”

page 3, line 10 “rather than”→ “instead of “

check in the document the use of “the”

page 3, line 9: vegetation type and LAI

Page 4, line 4-5: “the ISBA”→ “ISBA”,

Shorter sentences are needed

the title is too long, some suggestions: use Earth observation instead of remote sensing products use cropland instead of cultivated area use high spatial and temporal resolution

acronyms must be defined

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-661, 2017.

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