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Hydrology and Earth System Sciences Discussions

Interactive comment on "A critical assessment of the JULES land surface model hydrology for humid tropical environments" *by* Z. Zulkafli et al.

Anonymous Referee #2

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The article by Z. Zulkafli, W. Buytaert, C. Onof, W. Lavado, and J. L. Guyot entitled "A critical assessment of the JULES land surface model hydrology for humid tropical environments" delivers a clear and important contribution to the evaluation of the JULES UK land surface model in Tropical regions, not previously covered by such studies (e.g. Blyth et al., 2011). Two slightly different model configurations are analyzed: JULES-BASE and the JULES-TOPMODEL (including a variant in the runoff treatment). A river routing scheme based on time-space-lagging is implemented to enable the evaluation of the water cycle by river discharge data. Attention is payed to the choice of precipitation forcing data in which two different dataset are considered (TRMM and NCEP). The Maranon (Peruvian Amazon) River Basin is ideal for encompassing a large variety of land-use and orographic conditions.

San Regis, Borja, Santiago, Chazuta are 4 selected river gauges to illustrate the performance of the two LSM versions when forced by the 2 different precipitation datasets. The dominance of variability introduced by precipitation with superiority of the TRMM dataset is shown. The analysis of the rainfall runoff ratios highlight the difficulties in water budget closure in the chosen areas (already from an observation point of view). Overall the JULES-BASE model version results in a better performance. The weaknesses of the JULES are identified in the poor description of floodplains that in this area may play a crucial role for sustaining ET and partitioning the fluxes. The uncertainty analysis consider 2 important aspects for the hydrological performance (precipitation forcing and runoff parameterization) and I find a pity that a 3 major uncertainty is not represented (that of the ancillary dataset, i.e. soil texture map). While there is a description of the FAO-HWSD dataset there is no attempt to quantify the uncertainty coming from the choice of texture. A set of simulations could include the choice of a uniform vertical texture profile, vs a vertically stratified texture (as in the simulation realized) to enable depicting and quantifying this 3rd important source of uncertainty. I leave this as suggestion to the Authors, and in case it is considered the discussion could be extended consequently.

I recommend the paper for publication in HESS after minor revisions.

Minor errors: P12534 L12: can be significant is repeated twice. P12536 L23: paramos and jalcas need capital letter. P12530 L13: JJF is to be corrected to JJA

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 12523, 2012.