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Hydrology and Earth System Sciences Discussions

Interactive comment on "A framework to utilize turbulent flux measurements for mesoscale models and remote sensing applications" *by* W. Babel et al.

Anonymous Referee #2

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The topic of the manuscript addresses a pressing issue relevant for global estimation of evaporation or mesoscale hydrologic models. Even globally only few EC sites are representative enough to offer validation or calibration for satellite-based evaporation algorithms at scales of 1 to 25 km pixel edge lengths.

In the manuscript a proof-of-concept of an upscaling approach for EC flux measurements is presented. The concept itself is thoroughly described and applied. My main points of criticism are the relatively large amount of data required for adjacent land cover types (as already pointed out by the authors) and the homogeneity of the test

case.

Concerning the required data: Given that, "... validation of model performance for adjacent land-use types, where typically no flux measurements are available, remains a major issue ...", points out that without flux measurements for each land cover the scaling approach has major shortcomings.

Concerning the homogeneous test case: The authors have chosen an extremely homogeneous EC site composition to prove their concept. For the majority of EC sites, being much more heterogeneous within and around their footprints, the validity upscaling method still requires to be demonstrated. For an applicable upscaling framework the authors would require to show that the method works for land cover with significantly different fluxes. Basically, I would expect that section 3.2.2. 'Mixed case' is further included.

The manuscript as such, offering too little applicability for mesoscale hydrology or remote sensing studies considering the initial motivation, is in my opinion not covering the scope of HESS and I can only reject it.

Minor changes: The paper is written in a very detailed, but also convoluted manner. The quite elaborate methods section should be focussing on the actual upscaling approach and not so much on describing every model component in great detail. Whereas section 3 highlights the actual upscaling, section 2 should be shortened in most parts. I also suggest to refer to both, section 2 and 3, as methods. Shortening sentences, such as "...corrected following Twine et al.(2002) as suggested in Foken(2008)..." or "... developed by Mengelkamp et al. (1999) in the former GKSS Research Center, Geesthacht, Germany, ..." and less crossreferences to the different sections would immensely enhance the clarity of the manuscript.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 5165, 2011.