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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Inundation and groundwater dynamics for quantification of evaporative water loss in tropical wetlands" *by* J. Schwerdtfeger et al.

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We thank anonymous referee #1 for the valuable review and her/his comments. They will contribute to raise substantially the quality of the manuscript. According to her/his specific comments we will perform the following changes:

General comments

The main contribution of our work is that we were able to apply and evaluate an approach to simulate first and second stage evaporation in a data scarce region, which needs only water level measurements to transfer our evaporation results to other lo-

cations in the wetland. Approaches presented in the literature so far use either meteorological variables, which are more costly and labor intensive to collect than water level measurements and/or they need soil moisture data, which are often not available in tropical wetlands. For the first time in this difficult-to-access area, our data set of myriad water bodies enabled us to shed light on the differences in ET behavior among a wide range of water body types. We agree with the referee that the concept of using the extinction depth for determining water available in ET science is not a completely novel concept. However, using measured water levels of different types of water bodies in the Pantanal wetland, which was not done in the mentioned studies, enabled us to focus on the differences in evaporation losses of a number of water bodies and not only one location. That way we could show the importance of separately considering first and second stage evaporation.

We are aware that the class A pan located 80 km northeast of the Pantanal study area is suboptimal for comparisons with local measurements. However, it is the only data source available in the region to perform our analysis. Our analysis shows that there is some correlation to the meteorological variables at the study sites on a monthly time scale. We consider this weak correlation better than no data at all and sufficient to proceed with our analysis of the seasonal evaporation characteristics. The reader should also be aware that predictions within the Pantanal often requires the use of meteorological data far away as well. However, as elaborated by the reviewer this weak correlation goes along with uncertainties that we will discuss explicitly in the revised manuscript. In addition, the modified version of the manuscript will include the detailed location of the class A pan in Figure 1.

We chose water table measurements for correcting PET with a simple water availability model, because (1) according to Shoemaker & Sumner (2006), the water table was the data type with the most correction ability at sites that become dry during some parts of the year, (2) water table measurement is possible at various locations in the study area at relatively low costs, and (3) they can also be derived by satellite data allowing

for large scale model applications (e.g. MODIS, Peng et al. 2005 or Feng et al. 2012). We did not consider site specific correction factors such as Ta, RH, VPD, etc. stated in the literature (German 2000, Shoemaker & Sumner 2006) since their measurement would require more time and expensive installation for meteorological stations. Necessary data for calculating these correction factors were only available on three of our study locations. Further measurements of meteorological variables at the other locations were not undertaken due to operational costs and no possibility for long-term maintenance during the two years of data recording at the remote locations. However, we appreciate the reviewers' suggestion to include also the first stage evaporation time period of AET observations to evaluate the preciseness of our PET estimations derived from the remote class A pan analysis and include this in the revised paper.

Specific comments

A global edit of the current manuscript in terms of active/passive voice will be conducted.

Abstract Line 10

The referee is right. According to our statements above, we will include mentioned references (German, 2000 and Shoemaker & Sumner 2006) in the state of the art in the introduction. We will focus on presenting our approach to calculate second stage evaporation in remote tropical wetland areas using only measured water levels at different types of water bodies allowing for a transfer of simulated AET to other locations in a data scarce environment.

References cited in this reply

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 4017, 2014.