Hydrol. Earth Syst. Sci. Discuss.,
doi:10.5194/hess-2016-388-RC1, 2016


Hydrology and Earth System Sciences
Discussions



# *Interactive comment on* "Hydrology of inland tropical lowlands: the Kapuas and Mahakam wetlands" *by* H. Hidayat et al.

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Received and published: 28 September 2016

General comments:

This manuscript is about the analysis of hydrological dynamics of two neighbouring poorly gauged tropical basins; the Kapuas basin (98,700 km2) in West Kalimantan and the Mahakam basin (77,100 km2) in East Kalimantan, Indonesia. Although the topic is interesting and relevant for this journal, the knowledge gap that the manuscript aims to bridge is not clear. The authors gave only general description of the study area without paying attention to show the value of the two wetlands for local communities as well as for the country, which is very important for the significance of the study. Also maybe authors could describe the problem a little bit more, so that the readers can easily understand the gravity of the situation. It is clear that the authors have made a



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substantial effort for collecting field data. However, the methodology has described the collected data, but does not clearly describe the purpose for which the collected hydro-climatological field data were used. Another issue is that, calibration and validation are essential for hydrological modelling before simulating any hydrological processes. Please add a section describing how do you calibrate and validate your HEC-RAS model. Many other specific and technical comments can be found below.

Specific comments: (P=Page, L=Line)

1. P1, L6-7 and P6, L2: The authors have mentioned that the hydro-climatological data were obtained during fieldwork campaigns carried out in the Mahakam over the period 2008-2010, while table1 shows that all data in this catchment was collected between Feb2008-Aug2009.

2. Is this short period of measurements (2008-2009 in Mahakam and 2013-2015 in Kapuas) sufficient enough to capture the hydrological variability in the study area?

3. The hydro-climatological data were carried out separately in the two catchments (in different hydrological years), during 2013-2015 in the Kapuas basin, while in the Mahakam the data were collected during 2008-2009. Is this has any effect on the overall results when comparing results from the two catchments (i.e. comparing vulnerability to hydrological drought)?

4. P1, L8-12: In this paragraph, it is clearly that rainfall estimates from the Tropical Rainfall Measuring Mission (TRMM) was used for analysing the distribution of rainfall and the influence of El-Niño – Southern Oscillation. Flood occurrence maps were derived from the PALSAR images. But it is not clear for which purpose the collected hydro-climatological field data (e.g. rainfall, air temperature, relative humidity, solar radiation, wind speed and direction) was used. Is it for model calibration and validation?

5. P5, L7-9: The Authors reported that due to the global circulation and the regional climate the central and northern parts of Kalimantan have bimodal rainfall patterns with

two peaks of rainfall. Those peaks generally occur in October through November and March through April. Is this consistent with the results of the HEC-RAS model shown in Figure 8 which presented the timing of rising and falling limbs?

6. P6, L6-7: Why both daily 3B42 and monthly 3B43 TRMM rainfall products were used?

7. P7, L8: Do the Authors have any explanation for why a spatial discretization of 3 km and a time step of 20 minutes were chosen to run the HEC-RAS model?

8. P7, L10: What is the accuracy of PALSAR images for estimating the inundated area?

9. P7, L26-27: What is the resolution of the potential evapotranspiration?

10. P8, L 15-16: “Figure 5 shows the relationship between SOI and monthly rainfall depth in the Kapuas and Mahakam wetland regions with correlation coefficients (r) of 0.212 and 0.358, respectively”. Please discuss the physical meaning of such correlations?

11. P17, L11-12: The authors state in their conclusion that this study highlights the merits of H-ADCP continuous flow measurements to obtain accurate discharge estimates when rating curves fail. Using ADCP for flow measurement is not new, but costly and time consuming.

12. How frequent are the discharge measurements using the HADCP, and why?

Technical corrections:

1. P3, L33: Where is the location of Putussibau on the map?

2. P5, Figure 2 caption’s: better indicate the exact year (e.g. during 2013) instead of “during the previous wet period”.

3. P6, L12: For "Horizontal Acoustic Doppler Current Profiler” Please use uppercase

for all abbreviated words.

4. P6, Table 1: groundwater instead of (ground)water. The same on P10, L1.

5. P6, L15: Either remove the dash from (H-ADCP) to be consistent with the previous abbreviation, or add a dash to (HADCP) when first mentioned.

6. P8, L14: Spell out the first use of SOI in the main body of the manuscript.

7. P9, L1-2: Better use back slash "/" between two opposite processes (e.g. increase/decrease) instead of increase (decrease). The same for rainfall/no rainfall instead of rainfall (no rainfall).

8. P9, L6: The peak monthly rainfall has shown in Figure 5 instead of Figure 4.

9. P9, L7-8: “Groundwater and soil moisture are well-correlated. Although. . .etc” instead of “Groundwater and soil moisture are well-correlated although. . .etc”.

10. P9, L10: Figure 6 instead of Figure 5 (hourly rainfall and groundwater levels were presented in Figure 6). The authors should pay more attention when referring to figures.

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