

Interactive comment on “Hydrological differentiation and spatial distribution of high altitude wetlands in a semi-arid Andean region derived from satellite data” by M. Otto et al.

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Received and published: 24 March 2011

We are thankful for the referee interactive comments and would like to respond to it. Specific Comments of the Referee (RC:) and authors response (AC:):

RC: The last sentence in abstract very hard to understand and needs to be re-written.

AC: proposed changes: Annual changes in spatial extend of perennial HAWA mapped in this study might serve as a proxy for alterations in water supply effecting PAV within HAWA.

RC: Page 1293: Is it necessary to have both paragraph and bullet outlined summary

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of types of HAWA? One or the other are needed, but not both - perhaps a table would be more helpful than the bulleted points.

AC: We agree proposing to include a new table instead of bullet outlined summary in the revised version of the manuscript.

RC: Page 1298, line 9: Why are the land uses are described again in a detailed manner, rather than referring back to the descriptions earlier? This sentence should be removed.

AC: We included this information to state in short terms the applied general land cover scheme (IGBP), since HAWA have to be separated from other land covers which also exist in the study area. This information is also represented in the supplementary material. So we propose to put a reference here to our supplement material which then will be included in an appendix as also recommended by the second referee.

RC: Page 1299, lines 16 to 20: The purpose of this equation should be foreshadowed further – the exact point of it is not clear at all at this point in the paper.

AC: We agree with the referee's comment and propose to put a new sentence with a more detailed explanation to the purpose of the equation earlier into the text.

RC: Page 1300, lines 4 to 6: This sentence is extremely unclear and, it needs to be reworded. As is, it seems to say that this mapping design is the conceptual basis for Landsat, which makes no sense and I don't believe was the point of the authors.

AC: The sentence will be improved.

RC: Page 1300, lines 25 to 28: This final sentence should come before explaining the differences in NDII. As it is now, it was difficult to understand why these different subtypes were being identified.

AC: We propose to put the explanation before the description of the differences in NDII.

RC: The difference between HAWA subtype and subclass could be explained a bit

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better.

AC: The term “HAWA subtypes” is used in the development of the HAWA-conception based on observation and literature review. The term “HAWA subclasses” is used for technical implementation of the HAWA-concept using remote sensing data. We will point this out when introducing the new table in section 2.1 as suggested by the first referee. We will also revise the manuscript to assure that the terms "HAWA subtypes" and "HAWA subclasses" are always used within the right context.

RC: Page 1304, lines 8 to 11: I was a little confused about what area you were talking about here, because the percentages don't add up to 100 and the area doesn't add up to the total area of 11000 km². You need to explain why this is, because it was not clear.

AC: The numbers need to be corrected because area not classified (no class) was not included in the calculation, therefore it will be calculated more precisely.

RC: Page 1305, lines 7 to 9: This sentence was difficult and should be pre-empted with a sentence stating explicitly what your goal is in performing these procedures. You've stated that we need better time consistency, so it would be helpful to say something like “in order to address this using NDVI data. . .”

AC: We agree with the referee's comment and will introduce this statement.

RC: The conclusion could have a few more specifics about potential future work of hydrologists using this data

AC: We think that the applied methodology and data has great potential for initiating a HAW- inventory for these often remote regions. It must be further evaluated if the findings can be also concluded in other regions where HAWA occur and how these processes are connected to regional climates. It might be interesting to know if the observed changes along the gradient have any consequences for ecosystem functions usually related with wetlands as e.g. water storage capacity, biomass production or

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critical habitat features for flora and fauna within the semi-arid high Andes. Hence, a combination of hydrologic models with climate models using the results of the study for parameterization could serve as bases to evaluate effects of climate change on these potential ecosystem functions. We also believe that HAWA might serve as proxies for detecting changes on the background of projected decrease in precipitation, increase of temperatures and increased tropical glacier retreat.

We will include the above described specifics into the conclusion. In this way we hope that the importance of our study for future work regarding hydrology is more explicitly pronounced.

The technical correction will be done following the comments made by the referee.

Thank you very much for the valuable comments and corrections.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 1287, 2011.

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