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Hydrology and Earth System Sciences Discussions

Interactive comment on "Combining satellite radar altimetry, SAR surface soil moisture and GRACE total storage changes for model calibration and validation in a large ungauged catchment" *by* C. Milzow et al.

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We appreciate the comments made by the reviewer and will adapt our article accordingly.

1) Usage of the term "ungauged" and available data

We agree that it is not correct to label the Okavango basin as ungauged since two

discharge stations are operational presently and data from more discharge stations are available for the period 1960-1970. We will adapt the terminology and review the available data for the past period more in detail. To our best knowledge available data are as follows:

In-situ precipitation data, historic

Monthly Nicholson database (1954-1984): 12 stations in the catchment, records of variable length, more stations in the suroundings of the catchment.

In-situ precipitation data, operational

Rundu precipitation gauge. (No data from the runoff generating catchment)

Runoff data, historic

17 stations spread accros the catchment with monthly datasets of variable length for the period 1957-1974.

Runoff data, operational

Daily discharge measurements at Rundu (since 1945), Mukwe (since 1949) and Mohembo (since 1974, monthly since 1933).

2) Usage of historic data for model calibration

Our model cannot be calibrated/validated against the historic data available because of the monthly time step of these data. We do not think that it would be useful to generate daily data from the historic monthly datasets of precipitation. The uncertainty associated with such generated data would again make a calibration of the hydrological model difficult.

3) Physical nature and resolution of the model

We agree that our SWAT model loses part of its physical nature through the low spatial resolution. We will discuss this in the revised paper. However a SWAT model will still provide a better description of the physical processes occurring in the catchment than a model that does not explicitly account for those processes. Water uptake by plants is a key element here. We use a complex daily model because it is necessary to obtain not only evapotranspiration estimates but also the related plant growth and especially irrigation requirements. The present manuscript describes the setup of the model and the use of remote sensing data sources for its calibration. For further work the model will be applied to study land use change scenarios including economic valuation of agricultural production. This justifies the complexity of the model structure chosen.

4) Terminology on remote observations

We will clarify that additional sources for errors occur as remote sensed data are converted to hydrological states or fluxes.

5) Accuracy of rainfall input

Yes, for flood and drought forecasts issues besides the accuracy of the precipitation data become secondary. For long term water management involving for example planning of future land use, the errors in precipitation data are irrelevant only if they are not systematic in time or space. We will discuss this issue in the revised paper.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 9123, 2010.