**Hydrology and
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Discussions

Interactive comment on "Swath altimetry
measurements of the mainstem Amazon River:
measurement errors and hydraulic implications"
by M. D. Wilson et al.

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Received and published: 25 August 2014

The manuscript addresses an important new method of measurements that has the potential to improve step-wise the information content of hydrological observations. The Surface Water and Ocean Topography (SWOT) mission is planned to be launched in 2020. It will provide the first routine measurements of water surface elevations in two-dimensional space. It is still in the future, but there is no doubt that it will come. Therefore it is important to develop a background of new methods, and to understand their possibilities and limitations. The authors present a virtual-reality experiment simulating the spatio - temporal sampling scheme of SWOT for the River Amazon. The experiment

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employs the numerical flow routing model LISFLOOD-FP. The water surface elevation errors derived from the SWOT characteristics were added to water levels simulated by the hydraulic model. The scientific approach and applied methods are suitable for a problem. The authors refer to the latest work related to the subject of their research. I have some concerns regarding the presentation of the research. Sentences are too long and the description is not always clear (see the specific comments). Otherwise, the structure of the paper is good.

There are some aspects of the paper that need improvement. The question arises if there were any real observational data used in the experiment, or was it only a model-to-model comparison? Another question is on the applicability of the approach. The authors test it on the River Amazon. It would be useful for the reader if a list of rivers where SWOT could be successfully applied were to be given. The answer to this question would also specify how wide the possible audience of this paper might be. The other points concern the assumptions of additivity of a noise related to SWOT measurements and a perfect knowledge of channel friction and bed elevation. These are very strong assumptions. The authors are asked to expand on those issues and provide some estimates of outcomes resulting from a situation where those assumptions are not met.

I found the description of SWOT observations very difficult to understand. The sentence (page 9408, lines 18-19) saying: "500m SWOT errors were downscaled to 100m resolution" is an example of a lack of precision in the description. Downscaling is an operation that can produce a serious error that has not been taken into account in the further discussion. It would be useful if the authors could provide a scheme of their virtual experiment that would include all the steps involved in matching the hydraulic model to the remotely-sensed data.

Specific comments: page 9408, lines 1-3: It is not clear how the LISFLOOD_FP was validated. Page 9412, lines 24-27: It is not clear to me how the errors are reduced by averaging. That reasoning assumes that there is no bias.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 9399, 2014.