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Interactive comment on "Hydromorphological attributes for all Australian river reaches derived from Landsat dynamic inundation remote sensing" *by* Jiawei Hou et al.

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We thank the reviewer for the time and effort spent on the review of our manuscript. The reviewer provided us with helpful comments and technical corrections, which will greatly improve our manuscript. Below please find our response to reviewer's comments in detail.

Comment #1

"Figure 1d: The vector stream network is much more generalized than the actual stream course in the image, so is this problematic? How are vector layers linked to

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the inundation frequency raster?"

Response #1

We agree with the reviewer that the vector stream network cannot reflect the real stream course thoroughly everywhere, but the Geofabric Surface Network is able to display most of the river network accurately. In addition, Mueller et al. (2016) demonstrated that there is a strong agreement between Geofabric watercourse and WOfS surface water.

The sub-catchment polygon is used to select the area and extract information from the inundation frequency raster for its corresponding river polyline. We will add this description in the Data section.

Comment #2

"Pg. 5, line 10: How does WOfS get 25 m pixels when Landsat has 30 m pixels?"

Response #2

The Landsat images used for producing WOfS were derived from raw data using the USGS Landsat Product Generation System with a pixel size of 0.00025°, which is approximately 25 m resolution (Mueller et al., 2016). We will add this description in the Data section.

Comment #3

"Pg. 5, Line 25: Does this imply some bias in the frequency data, as the rivers are more likely to be imaged under clear sky conditions when flows are likely to be relatively low?"

Response #3

As the unequal number of clear observations is mainly caused by overlapping Landsat scenes (major influence), not cloud and shadow frequency (minor influence), this would not be the main cause for bias in the frequency data. We will rephrase this sentence

to make it clear.

Comment #4

“Pg. 6, line 7: A figure illustrating different distributions for different values of the gamma parameter would be helpful.”

Response #4

Thank you for your suggestion. We will add a new figure to explain how the gamma parameter reflects different river width distributions.

Comment #5

“Table 3 and figures 3 and 6 should be presented as percentages rather than absolute lengths.”

Response #5

Agreed. We will change absolute lengths to percentages for Table 3, Figure 3 and 6.

Comment #6

“Pg. 7, line 29: A map showing the width variations in your data set vs. those in GRWL would be informative and could be added as a new figure.”

Response #6

Thank you for your comment. We will add a new figure to show the Spearman’s rank correlations between these two datasets in 111 river regions across Australia.

Comment #7

“Pg. 8, line 5: How were "standard differences" calculated?”

Response #7

We calculated the standard differences by the equation of SD = (1/n $\times$ Σ (O-M) ˆ2) ˆ1/2,

where O is the observation matrix, M the estimate matrix, n the number of elements, and SD the standard difference. We will add this equation in the Method section.

Comment #8

“Pg. 10, line 19: You should refer to the recent work by Jones in Remote Sensing on the Dynamic Surface Water Extent (DSWE) product derived from landsat time series.”

Response #8

Thank you for your suggestion. We will include this very relevant reference.

Technical Corrections

Thank you. We will accept all edits by the reviewer and clarify the sentences that were unclear.

Reference

Mueller, N., Lewis, A., Roberts, D., Ring, S., Melrose, R., Sixsmith, J., Lymburner, L., McIntyre, A., Tan, P., and Curnow, S., Ip, A. (2016). Water observations from space: Mapping surface water from 25 years of Landsat imagery across Australia. Remote Sensing of Environment, 174, 341-352.

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