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Hydrology and Earth System Sciences Discussions

Interactive comment on "On the uncertainties associated with using gridded rainfall data as a proxy for observed" *by* C. R. Tozer et al.

Anonymous Referee #2

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On the uncertainties associated with using gridded rainfall data as a proxy for observed.

By Tozer et al.

This paper evaluates the hydrological significant of differences between three raster monthly rainfall products that are used in Australia. The three products are compared against rain gauges and a hydrological model is forced with the raster data and the results are compared. Significant biases between the three products were found to exist at spatial scales that are important to hydrology and these resulted in significant differences between the three time series of hydrological model output.

A mention of the fundamental difference between the mean areal rainfall of the raster

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Interactive Discussion
Discussion Paper

product and the point rainfall of the gauge observation is required in the text. I do not expect that this is significant at the monthly and annual time scales that are used in the analysis, but it is worthwhile to discuss this in the paper.

I missed a more formal evaluation of the probability distribution functions of the three products and the gauge data, a plot of the logarithm of the exceedence probability against the logarithm of rainfall would provide a clear evaluation of the differences between the tails of the four PDFs.

The spatial and temporal structure of the differences between the products provides the key to understanding the impact of these differences in a hydrological model. If the residuals are essentially unbiased white noise then the hydrological model will smooth them out, but if the residuals have significant structure in space and time relative to the catchment scale then these biases will be manifest in the model output. Therefore a more formal evaluation of the spatial and temporal structure of the residuals would greatly assist one in understanding the likely impact of these residuals on a particular catchment scale. Variograms of the temporal and spatial differences would assist in evaluating this structure and a power spectrum of the spatial residuals will help with evaluating the structure at the larger scales.

Figure 5 used the percentage difference in annual totals, but perhaps the difference should be used instead since there are likely to be some extremely dry years where a modest absolute difference results in a large percentage difference.

Figure 6 was difficult to read and understand, perhaps a plot more like a box and whisker plot could be used rather than representing the individual gauges. I was impressed at the range in annual totals within a single pixel, perhaps this is worth a comment in the paper. I assume that there are orographic influences at play.

I think that the term “pixel” would be better than “grid”, eg the last sentence in the discussion.

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