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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Rainfall erosivity estimation using gridded daily precipitation datasets" *by* Maoqing Wang et al.

Anonymous Referee #1

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This paper is well written and has an interesting objective. As the authors state, gridded precipitation products are increasingly used in environmental applications but may have significant biases because of spatial averaging. My primary criticisms have to do with methodology and the approach taken, though the analysis itself is well done.

Line 143 (equation 2): Some discussion of how this equation relates to RUSLE/RUSLE2 definitions for rainfall erosivity and criteria for erosive events might be helpful for making comparisons.

Line 156: I do not see a need for interpolating the gauge data to coincide with the grid locations. Presumably, none of the gauge locations happened to coincide with the grid locations, so basically, all observed/reference data came from interpolation, which introduces interpolation error. The gridded products actually represent cells (which the

authors nicely explain on line 57), and every gauge location is inside one of these cells such that the gauge values can be paired with the cell values. I suppose in eastern China with high data density, interpolation error isn't a problem, but in western China, it seems like it would be more of an issue. Is there a reason for doing it this way that could be clarified? How far away, on average, are the gauge stations from the grid points?

Line 190-193: Why resample the Yue et al. (2020b) map to the spatial resolutions of the gridded products? Doing this means that the correction factors are based on a comparison of a spatially averaged erosivity map to spatially averaged gridded climate data. So, it seems applying the determined bias correction factor to the gridded products doesn't eliminate the effects of spatial averaging, which I got the impression was an objective of the study. It seems to me that the Yue et al. (2020b) map should not be resampled; rather, the map should be sampled at its original resolution at the grid point locations.

Line 203 (equation 9): Rref is used twice (typo). In my opinion, it makes more sense for the equation to be Rgri=a·Rref so that the observed/reference data would be on the x-axis (the opposite is done in this paper). Linear regression assumes error is distributed along the y-axis (which should be the axis with gridded values), and in the calculation of slope, the variance of the x-axis data (which should be the reference values) standardizes the covariance of x and y. If the regression is done this way, the bias correction becomes the reciprocal of the slope.

Line 215-216: Normally there isn't a space between a percentage and the percentage sign.

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