Reviewer's original comment in black
Our response to each comment in blue

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.

Thank you for the review and most valuable comments and suggestions. We have carefully considered each of the comments and outlined, following each comment, how we will address these comments and how the manuscript will be revised.

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.

As mentioned in Line 65-70, the equation that relates daily precipitation amounts to rainfall erosivity was developed because of a lack of high-temporal resolution, typically 5-15min, precipitation data. Xie et al. (2016, Line 535 in the manuscript) evaluated the model and showed that the equation is accurate enough to estimate the mean annual rainfall erosivity and its seasonal variations when the erosive daily rainfall threshold was set to 10 mm. We will explain this point further in the revised manuscript.

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?

Precipitation metrics and rainfall erosivity values for individual stations were interpolated using ordinary kriging method, and then resampled to the corresponding spatial resolutions of the gridded precipitation products. Therefore, the comparison was done between the two kinds of average grid cell values. The leave-one-out crossvalidation results show that the accuracy of the spatial interpolation process is quite high and the interpolation errors are acceptably small since the precipitation metrics and rainfall erosivity values have less spatial variability (Table 3), though as pointed out, in the western China the interpolation errors are larger. Besides, the resampling process to obtain areal average values also did not introduce large errors.

We will revise the objectives of this study in the revised version to make these clearer as we have found that the objectives were not clearly stated in the manuscript as follows:
(1) to contrast the gridded daily precipitation products with gauge data in terms of PDFs and extreme precipitation amounts, and to evaluate the smoothing effect of interpolation when areal precipitation for grid cells were generated using point (gauge) observations;
(2) to evaluate the magnitude of underestimation of rainfall erosivity calculated using gridded daily precipitation products compared with that produced by spatial interpolation of rainfall erosivity computed using point (gauge) observations;
(3) to establish bias correction factors to improve the accuracy of rainfall erosivity maps where only gridded precipitation products were available for estimating rainfall erosivity over large areas.

The interpolation and resampling process was done because one of our objectives is to compare the two approaches to obtain rainfall erosivity maps: (1) by calculating rainfall erosivity using gauge observations, and then interpolate the gauge-based erosivity values into different spatial resolutions (spatially averaged rainfall erosivity); (2) by calculating rainfall erosivity from gridded precipitation products directly. Therefore, the comparison needs to be made at a commensurate spatial scale. The same applied to other precipitation metrics. We will make it clearer in the revised version.

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.

As explained above, one objective of this study is to compare the two approaches to obtain rainfall erosivity maps and establishing bias correction factors that can be used in China, not to eliminate the effects of spatial averaging.

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.

There was a typo, and the equation 9 should have been $R_{gri} = a \cdot R_{ref}$. Thank you for pointing this out.

It is true that in general the x-axis is used for observed/reference values. Here our objective is to use gridded products data and equation (2) to estimate a biased R-factor first. The bias can then be largely removed by multiplying an adjustment factor. This adjustment factor happens to the slope of the regression line if we plot the reference R-factor on the y-axis.

Plot original method to do the regressions for the following reason:
The objective of this study is when people have gridded daily precipitation data, they can multiply the R value so computed with the slope to obtain the equivalent R as the values from the reference map. Plotting R_{ref} on the y-axis can establish the linear regression model through the origin and obtain the slope using ordinary least squares regression (OLS):

$$Slope = \frac{\sum_{i=1}^{N} x_i y_i}{\sum_{i=1}^{N} {x_i}^2}$$

the slope of the regression is an unbiased estimate of the correction factor. If we flip the axis, the bias correction becomes the reciprocal of the slope but may not remain unbiased.

Line 215-216: Normally there isn’t a space between a percentage and the percentage sign.
A good point, and we will revise the manuscript accordingly.