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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Variations of future precipitations in Poyang Lake Watershed under the global warming using a spatiotemporally distributed downscaling model" *by* Ling Zhang et al.

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General comment

This manuscripts developed a spatiotemporally distributed downscaling method and analyzed the precipitation changes under climate warming. The method was applied in the Poyang Lake watershed. Climate warming is a hot topic and the spatial downscaling method is interesting. I do, however, have a number of suggestions and questions that needs to be addressed clearly before it can be published.

Special comment

1. The authors use MRI-CGCM3 data to estimate the future precipitation changes. Why do you choose MRI-CGCM3 data, not other Global Climate Models?

2. The authors use precipitation simulations in RCP8.5 scenario form MRI-CGCMs to estimate precipitation changes under future climate warming. Why do you choose only RCP8.5 scenario, instead of other scenarios?

3. The authors analyze the future precipitation changes in the Poyang Lake watershed using a Global Climate Model. The Poyang Lake watershed is a small area; while the Global Climate Model is coarse with resolution larger than 1°x1°, which is difficult to be applied in a local scale such as the Poyang Lake watershed. The application could be reconsidered.

4. In the methodology section, there is some confusions. What is the relationship between the STDDM and linear-scale algorithm? That should be explained more clearly.

5. By STDDM, you calculate the precipitation of each grid separately and get the downscaled precipitations. The downscaled precipitation is grid data. There may be some outstanding grid in which the precipitation is far different from the adjacent grids. According to first law of geography, near things are more related than distant things. So I suggest that the downscaled precipitation should be smoothed by smoothing filter.

6. In 4.1 section, the validation period is from 1986 to 2005. However the observation data is from 1961 to 2005. Why not validate the downscaled precipitation in the same period from 1961 to 2005?

7. Line199: The sentence missed a comma.

8. There are 69 references. Please provide the reference number for each reference. Is every reference useful to the research? If not, please delete some.

9. Line197-200: Monthly precipitations, > 75% percentile of the 12 monthly precipita-

tions, were classified as the extreme wet monthly precipitations for each year of the 103 years; monthly precipitations, $\leq$ 25% percentile were classified as the extreme dry monthly precipitation. The monthly precipitation of 25%-50% and 50%-75% quantiles are classified as normal dry and wet monthly precipitations. Why do the author classify the monthly precipitation into 4 categories, not 5 or 7? Why choose 25%, 50%, 50% and 75% quantiles as the classified boundary?

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