

***Interactive comment on “A GCMs-based  
mathematic model for droughts prediction in the  
Haihe Basin, China: Multi-GCM Divide-Integration”  
by Dongmei Han et al.***

**Anonymous Referee #1**

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The paper deals with an application of a standard statistical downscaling technique, namely multi-linear regression, to some CMIP5 runs over the Chinese region of the Haihe Basin, using an observational high resolution precipitation analysis. Although the topic of the paper may be of interest and publishable, the overall level of the paper is too poor for publication. The English is poor to the point that understanding what is written by the authors is more an imagination than a reading exercise. There is no point making a list of the English mistakes: the language should be improved by someone who has a sufficient English knowledge. As for the scientific contents, I can see at least two major concerns. The first problem is that the authors do not apply the statistical downscaling method in cross validation, that is the data used to

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calibrate the multi-linear regression scheme are the same used to validate the results. As a result, the evaluation of the skill of the downscaling is affected by over-fitting. The authors should divide the observational and present day model data (1960 to 2010) into two parts: one used to calibrate and the other to validate the downscaling scheme. Possibly they should re-do the exercise inverting the two data-sets and see if the results obtained in the two cases are consistent. This should prove the robustness of the results. The second problem is that the authors probably reassured by the high correlation values of the downscaling results, describe the results obtained with great confidence, comparing the climate predictions obtained for different decades, and indicating the exact number of droughts that will occur in each decade together with their intensity, using as drought index the SPI. Now, even if the downscaling scheme output skill were correctly evaluated, the precipitation trend over the Haihe Basin would be known within 40 to 50% of relative error (I have computed these numbers starting from the Table 4). This does not allow to express the prediction by a number. The authors are actually using an ensemble of predictions, which is correct, and they should produce a probabilistic prediction, not a deterministic one. Once the authors have completely rewritten the manuscript they should also choose a more appropriate title for it. Although math is always involved in all climate predictions, the present title would suggest that the topic is a description of results obtained by applying a theoretical approach, which is absolutely not the case for this paper.

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