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Comment

## ***Interactive comment on “Exploring objective climate classification for the Himalayan arc and adjacent regions using gridded data sources” by N. Forsythe et al.***

**M. Disse (Referee)**

markus.disse@tum.de

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The paper explores the potential of climate classification of reanalysis ensembles (4 datasets) by means of PCA and k means clustering. This classification could help to identify future regional changes on water resources and food security and to evaluate the bias and skill of gridded datasets (regional climate models). The paper is well written and has a straightforward and easy to understand composition. I have only minor suggestions to improve the paper:

1. p. 1120 / line 6-11: "In-situ data, be they from national monitoring networks or international databases such as the Global Historical Climatology Network (Lawrimore

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et al., 2011), could be grouped by the derived climate zones and in this way structure the analysis of statistics of “grid-cell vs. station” biases.” This approach should be elaborated in more detail. I do not see how the bias correction can be improved by the derived climate zones. What is the benefit compared to classical bias correction?

2. p. 1122, line 9 - 12: "Thus the climate classification approach presented here is doubly timely as it provides a framework to organise use of in-situ observations to differentiate gridded dataset performance at the sub-regional level and to carry out inter-comparison of gridded dataset performance for these sub-regions." Please explain how the objective climate classification will improve the inter-comparison of gridded dataset performance in the sub-regions. Which new approach will be provided?

3. figures and tables: In order to get a quick understanding of the figures and tables, I would suggest to explain all abbreviations of the respective figures / tables.

4. Figure 4: The unit of the legend is not clear (-5 to +5)

5. Figure 6 and 7: The quality of the figures should be improved. Is the printing resolution sufficient to distinguish the differences? Can you add some (general) statistics in order to evaluate the differences of the four reanalysis datasets (e.g. test statistics for common mean value)

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