

## ***Interactive comment on “Statistical downscaling of precipitation: state-of-the-art and application of bayesian multi-model approach for uncertainty assessment” by M. Z. Hashmi et al.***

### **Anonymous Referee #2**

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The focus of the paper is to quantify the uncertainty in statistical downscaling using Bayesian model averaging. Based on three different downscaling methods predictions and uncertainties on monthly mean precipitation are obtained. The study highlights the importance of the choice of downscaling method on the results on climate change studies. Additionally, the study shows how Bayesian techniques can be used to obtain improved (hopefully) predictions of future local climate and to quantify the uncertainty of the results. Hence, the publication provides a valuable input to the ongoing discussion on application of climate model results.

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Specific comments: 1. The title of the paper could be more representative if “state-of-the-art” was removed and “statistical downscaling” was included. 2. It is confusing that the description of downscaling and uncertainty assessment is mixed in several sections of the manuscript. E.g., a short description of the downscaling methods used in the work are listed in paragraph 1 (p. 6538, l. 2-11), a review is given in paragraph 3, and a longer description is given in paragraph 5. It would be easier to read, e.g., if the description given in paragraph 1 was moved to paragraph 3 and placed in the sections describing the actual class of downscaling. 3. p. 6539, l. 10: Insert new line after “. . .flooding potential”. 4. p. 6539, l. 14: The baseline period is not defined. 5. p. 6541, l. 3: Wilks and Wilby (1999) is not found in the reference list. 6. p. 6548, l. 21: Reference to Fig. 3 is made before reference to Table 1. Hence, the reader don’t know the meaning of the x-axis on Fig. 3. 7. p. 6551, l. 23-27: Results from the methods should be moved to section 6.3. 8. p. 6552, l. 13-15: It is not clear how the weights for each model is derived from the “bias” and the “convergence” defined on p. 6546. Some explanation is needed. 9. p. 6553, l. 10-11: It is stated that “the model is successfully validated”. However, the monthly precipitation is underestimated in 11 out of 12 months and annual precipitation must be severely underestimated. An objective measure of successful validation is required. Additionally, a comment on the impact of the error on the scenario period (2070-2099) would be relevant. 10. p. 6553, l. 22-28: Is validation of the LARS-WG method not possible? 11. p. 6554, l. 10-20: Please show validation results for the GEP method. 12. Table 2: Units missing on “Optimal lag with Clutha precipitation”. 13. Table 4: Units missing. 14. Figure 1: The quality of the illustration should be improved. 15. Figure 12: Text on both axis missing. 16. Figure 13: Text on y-axis missing.

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