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Discussions

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Interactive comment on "High-resolution ensemble projections and uncertainty assessment of regional climate change over China in CORDEX East Asia" *by* Huanghe Gu et al.

Anonymous Referee #2

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Focusing on five sub-regions in China, this study collected five regional climate model simulations from CORDEX-EA, and evaluated their climatology, spatiotemporal variability, and seasonal cycles of the simulated precipitation and temperature. Future projections with uncertainties under RCP4.5 scenario during 2030~2049 were also analyzed. Generally, this study can provide some insights on dynamical downscaling of regional climate change. However, its novelty is greatly limited partly due to a lack of clarification and a lot of grammar mistakes. Therefore, I suggest a major revision.

Major comments (1) Introduction. The limitation and development of GCMs are reviewed, but the advantages and applications of RCMs are not clearly discussed. A

more detailed introduction on the progress and limitation on dynamical downscaling is needed. As mentioned by the authors, "The CORDEX-EA has been evaluated for simulating the precipitation and temperature over East Asia (Huang et al., 2015; Jin et al., 2016; Lee and Hong, 2014; Oh et al., 2013; Park et al., 2013; Suh et al., 2012; Zou et al., 2014)." Therefore, how does this study differ from previous CORDEX-EA studies should be clearly stated.

(2) Uncertainty quantification method. P5, L5~7. The paper by Hawkins and Sutton (2009, BAMS) used a model-weighted variance when calculating inter-model variability M(t), while eq. 5 in this paper seemed to get a unweighted value. Given that eq. 4 defined a weighted mean of variance as V (same as Hawkins and Sutton's paper), I suggest keeping it consistent in the manuscript, because RCM simulations may differ a lot in both magnitude and variation. If the eq. 5 is just a typo and this study does calculate weights for different models, both simple multi-model ensemble (MME) and weighted MME should be compared in the evaluation (e.g., Figures 2-4).

(3) The abstract needs a careful revision. For example, how does the CORDEX-EA future projection over China or East Asia differ from existing reports (e.g., IPCC AR5 report or at least the driven GCM in this study)? Are the 5 models (RCMs) enough to quantify the model variability? What is the added value for dynamical downscaling (e.g., how much error has been reduced)?

(4) Figure 4b. Why there is a decrease in precipitation correlation, where GCM outperforms all RCMs over North China?

(5) There are a lot of grammar errors while I just mentioned quite a few below. Please proofread the paper carefully or ask a native English speaker for help.

Minor comments (6) P3, Section 2.1. Two datasets were used as reference precipitation, CRU and APHRO. The reason why both datasets are necessary is equivocal, partly because of little comparison between them. Which one was chosen as reference value when calculating precipitation biases (%) in Figure 3 and why? (7) P1, L16,

"decreases -7.8%" -> "decreases by -7.8%". (8) P1, L20, "contribute" -> "contributes". (9) P1, L21, "which" -> "where". (10) P2, L22, "forces on" -> "focusing on". (11) P2, L24-27, this sentence is awkward. (12) P2, L32, "simulating"->"simulation" (13) P3, L2, "will became"->"will become" (14) P3, L13, "Scection 3" ->"Section 3". (15) P4, L1, "include" -> "including", ".. of each of the RCM..." -> "of each RCM ...". (16) Several sentences in the manuscript are difficult to read with grammar mistakes, for instance, P2 L2, P2 L7∼L8, P3 L1, P3 L19∼21, etc. The authors should improve the presentation, especially for Abstract and Introduction Section. (17) Caption of Figure 4 needs revision, where the information for temperature (red rectangles) is missing.