

## ***Interactive comment on “Impacts of climate change on growth period and planting boundaries of winter wheat in China under RCP4.5 scenario” by Z. Sun et al.***

**Anonymous Referee #2**

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I am commenting specifically on the application of climate change scenarios in this paper.

The method used in this paper seems rather strange, although it is a little hard to tell as is it not explained fully. It would appear that the authors have attempted to use observational constraints to identify one single simulation from the CMIP5 multi-model ensemble which, by their metric, best represents 20th Century climate change in China. They then assume that this provides a credible projection of future climate change in the region (but do not state which GCM has been selected). However, this approach carries a substantial risk of giving a misleading impression of the reliability of the future

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projections. Contrary to the assertion of the authors, a very large component of uncertainty in climate projections at regional scales comes from the model response as opposed to the emissions scenario, and different GCMs can give very different regional climate responses. The observed change over the 20th century is still rather small and rarely regarded as a strong constraint on future projections of regional climate change - instead, it is standard practice to use several climate models, usually capturing a range of future outcomes.

Also, the authors chose the RCP4.5 scenario because they consider it to best represent the future socio-economic and policy conditions associated with future development planning in China. However this misunderstands the nature of the RCPs - the RCPs are based around concentrations, and their mapping on to particular emissions scenarios and hence on to socio-economic scenarios was done after the fact, and there is no strong mapping of concentrations to socio-economic scenarios. The latter is actually represented with the Shared Socioeconomic Pathways (SSPs) which were developed after the RCPs, and the general view is that the RCPs and SSPs can be viewed as largely independent. Of course, the authors can chose to focus only on one particular RCP for other reasons if they wish, but their stated reasons for selecting RCP4.5 indicate a poor understanding of the scenario development process which is consistent with their apparent misunderstanding of the dominant influences on regional climate change uncertainty and methods for addressing this.

Overall then, I am concerned that publication of this study in its present form would lead to unreliable information on the potential for future cropping in China.

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