Responses to Referee #1:

- The authors motivate the choice of leaving evaporation out of this study by saying that they focus on 'meteorological drought', rather than 'drought'. That is a valid standpoint, but must be made clear. Explain that you mean 'meteorological drought' when you use the terms 'dryness/wetness' or 'drought'.

Answer: New phrases addressed to explain meteorological drought and stated "Meteorological drought" emphases in this paper.

2.2 Drought Indices

Drought is a complex phenomenon that mostly describes a persistent deficit of precipitation, usually of a long duration in a particular area. Dracup et al. (1980) classify drought into three categories: meteorological, agricultural, and hydrological drought. Meteorological drought is defined by a period of substantially diminished precipitation duration and intensity. In general, indices of drought are based on precipitation amount and they may differ in other climatological parameters (such as temperature, pressure, evapotranspiration and soil moisture) that could be taken into account (Bordi and Sutera, 2002).

…

So, the SPI represents a Z-score or the number of standard deviations that an event deviates from the mean. The classification of dry and wet events intensities resulting from SPI computation is shown in Tab.1.

SPI is based on the long-term precipitation record for a selected location and it is a meteorological index (Krysanova et al., 2008), thereafter the analyses about drought in this paper are focused on the meteorological drought.

- In my view, you need to use the information of the spread in the ensemble to estimate the robustness of the results. The current approach, to study the ensemble mean only, fails to take advantage of this information. It is insufficient to ignore this issue with the motivation that this is a topic for a next paper. Additionally, it was not clear to me that you used the average of the three simulations.

Answer: We agree with your comment about the showing and distinguishing of the robust part of the signal and the part which is likely to be related to climate variability by using the three simulations. However, this paper unfortunately could not address it, according to the extreme long time, which would be required for the additional computing. We have currently calculated MK trend tests for 3 times ensemble means to more than 4000 grid cells; this means we have already computed more than 12000 MK trend tests. Making use of the information of the different runs would imply calculating MK trend tests for 13 times (different runs and ensemble means) to more than 4000 grid cells; this means about 40000 additional MK trend tests would be necessary. According to this, we would highly appreciate to address this issue in

another paper. In order to show that we have used ensamble means, we have added the following phrase to chapter 2.1:

This paper just focus on the basic variation of dryness/wetness in the future in China, so we just have calculated the SPI based on the averaged results of the 3 runs for the A1B and B1 scenarios, and of the 4 runs for the A2 scenario.

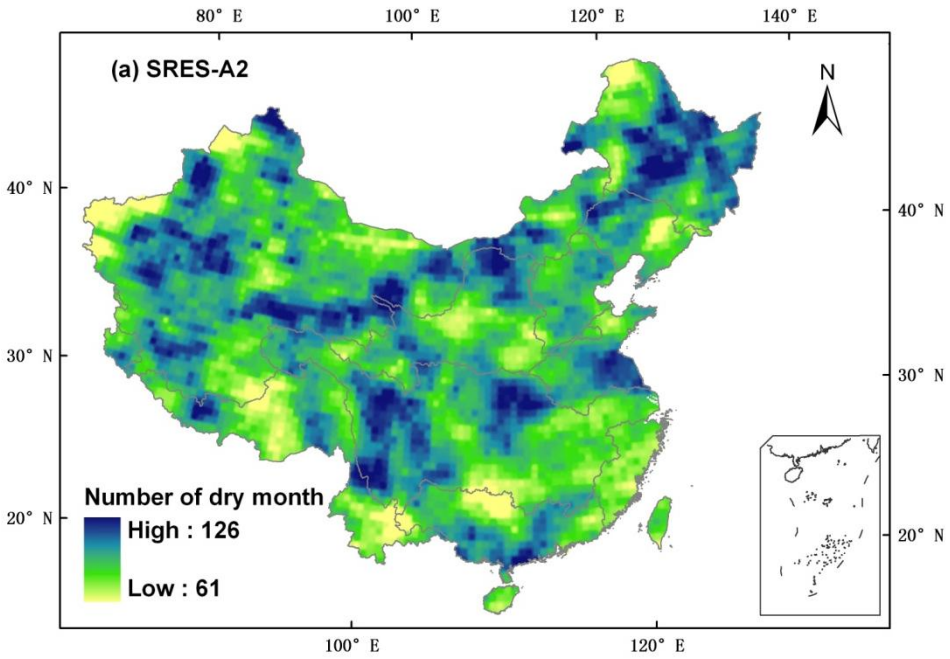
It is mean that we used the averaged values of 3 runs or 4 runs for every scenarios.

- If I understand the method right, you make a selection of gridboxes that have more than 100 months with SPI values < -1. I do not see why you need this selection; this is the point you have to explain. However, if my understanding of the method is incorrect, then this indicates that you need to spend more effort in a clear explanation.

Answer: No, we did not do any pre-selection. Our proceeding was exactly the same as you suggested: we counted the number of dry month with SPI values <-1 in every grid box. The 100 months did not have any specific meaning, just show the map clearly. We have plotted 3 new maps (see below).

4.1 Spatial distribution of dryness/wetness

The number of dry months with SPI values<-1, which have been classified as dry months using the SPI as drought metric, is counted for each gridbox for the three scenarios for the first 50 years of the 21st century.



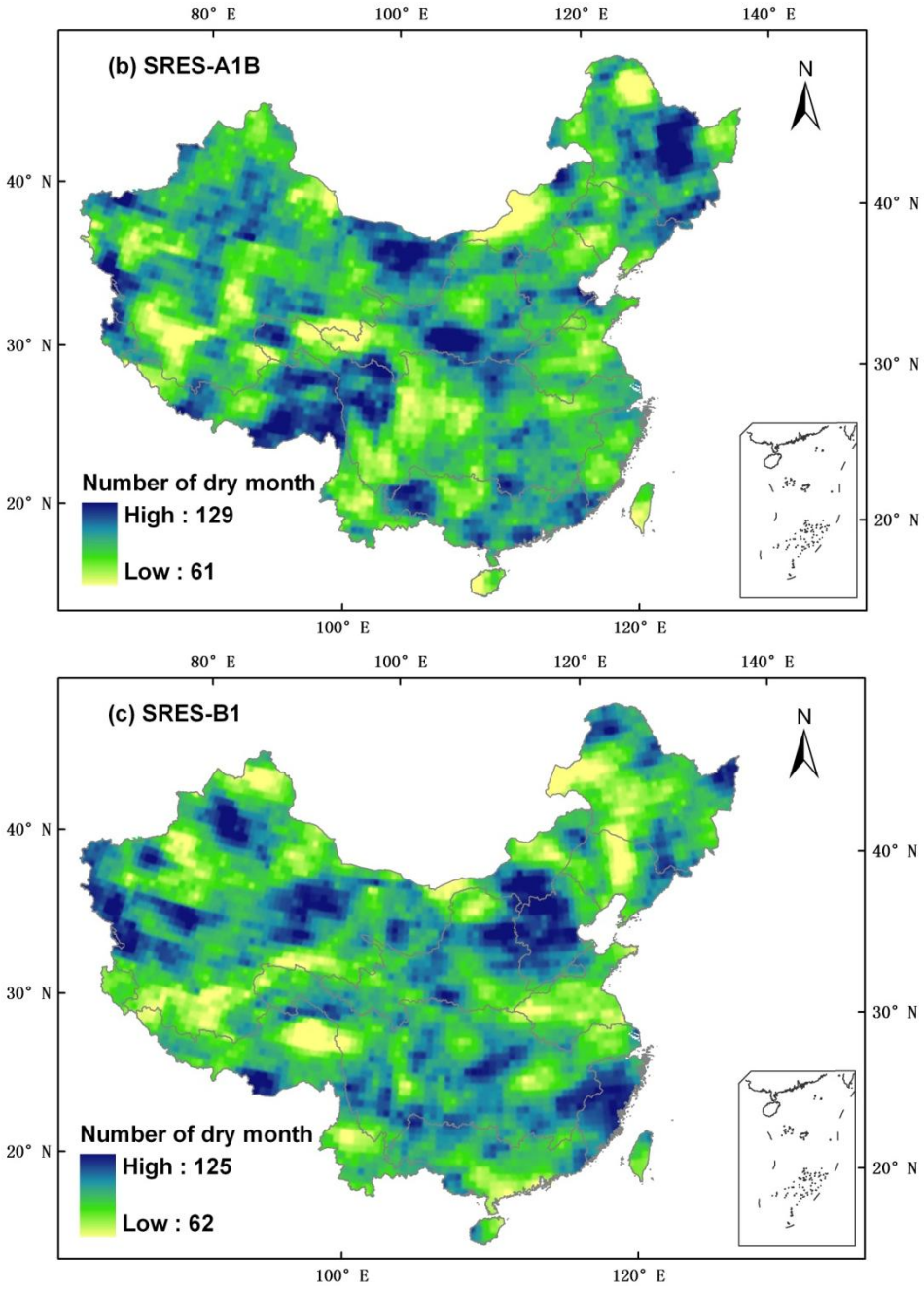


Fig.4 The number of all dry months during 2002-2050 (588 months)