

## ***Interactive comment on “Boreal summer intraseasonal oscillation in a superparameterized GCM: effects of air-sea coupling and ocean mean state” by Yingxia Gao et al.***

### **Anonymous Referee #1**

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With a set of comprehensive experimental design, this work studied the effects of air-sea coupling and ocean mean state in the boreal summer intraseasonal oscillation simulation. An interesting finding is that a cold ocean mean-state bias improved the simulated BSISO amplitude and spatial distribution by reducing overestimated subtropical summer mean rainfall, which results from the model systematic error. Although air-sea coupling captured correct SST-rainfall phase relationship, the current work shows that it has little effect in the BSISO northward propagating. This also makes incremental progress towards understanding such a debatable topic. The manuscript is well organized and the results are robust and clearly presented. I recommend the publication of this paper after my minor concerns below are addressed.

1. It is recommended to draw the grids of the axes in figures 4 and 5, so that the latitudes of the maximum centers can be easily recognized.
2. L207. I do not agree that rainfall and SST anomalies are out-of-phase over off-equatorial regions. since the zero contour lines of SST still locate near the maximum centers of rainfall (Figure 7f, g, h, k, l, m). Please consider adding the SST contours to figures 4 and 5, so that the associated propagations of SST and its phase relationship with rainfall can be clearly revealed.
3. L285. I don't think "large" is a nice adjective for "relationship".
4. L287-288. Please explain why "it is easy to surmise the effect of air-sea coupling on the amplitude of convection, while its effect on the propagation is not obvious". Is it because of the correct phase relationship, or is it from the shorter delay?

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Discussion paper

