

***Interactive comment on “Modeling sensitivity study of the possible impact of snow and glaciers developing over Tibetan Plateau on Holocene African-Asian summer monsoon climate” by L. Jin et al.***

**Anonymous Referee #1**

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This manuscript analyze the impact of ice glacier and snow over the Tibetan Plateau on the global climate, using a coupled earth system model with intermediate complexity. It is informative to show the physical mechanism how the snow and ice glacier influences climate. However, the authors do not describe the model’s ability to reproduce paleo-climate throughoutly and explain physical mechanism for impact of glacier and snow, thus I recommend this manuscript to be accepted with major revisions.

Major issues to be addressed :

1. I suggested that the authors had better add some figures to show the basic ability of the model to reproduce large-scale atmospheric circulation, e.g., climatological mean surface air temperature, precipitation, 850hPa wind etc. 2. Both the temperature and rainfall differences between 6ka and 0ka are shown in Figure 2. The detailed methodology to calculate the difference should be described in the text, e.g., how many years are used to represent mean climatology at 6ka and 0ka? How about the statistical significance of the difference between 0ka and 6ka? 3. It is concluded that the latent flux and albedo play an important role in climate change, thus the authors had better plot changes in solar radiation and latent heat flux. 4. In order to discuss the mechanism for change in South Asian monsoon, besides the thermal contrast between ocean and continent, I suggested that the authors had better show the change in monsoon index, e.g., Webster-Yang index. 5. I suggested that the paleo-climate simulation should be validated by paleo-climate proxy data, especially, among some numerical experiments, which experiment is closer to proxy data and why?

Minor comments:

1. P1268 L1 : What is the implication of the word "ca" ? 2. P1270 L1: Here the CLIMBER-2 is called "earth system model", but in the other paragraphs it is called "climate model", "climate system model"? Which one should be correct? Usually, when the carbon cycle processes are included in a model, it can be called "earth system model". How about in CLIMBER-2?

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Interactive comment on Clim. Past Discuss., 4, 1265, 2008.

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