

## ***Interactive comment on “Spatio-temporal dynamics of snow cover based on multi-source remote sensing data in China” by Xiaodong Huang et al.***

**Anonymous Referee #1**

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The Huang et al paper used the combined MODIS snow cover and passive microwave snow depth data to produce a daily cloudless snow cover and 500 m snow depth (not daily based on the eqn 1), to analyze the snow cover day, snow cover area, and snow depth variation for China for the period of 2000-2014. They found the overall annual number of snow covered days increased (except in summer), average snow covered area did not change much (summer and winter decreased, spring and fall increased), and snow depth decreased (except in spring). They also analyze their spatial distribution of these changes and found snow cover significantly increased in south china and northeast China, but decreased in Xinjiang. Overall, I found the paper has some good results and may be publishable with carefully addressing my comments below. One of

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my major comments is the English writing that needs to be carefully edited throughout the paper. The second one is the lack of discussion of their results with other published results, (such as the recent published Ke et al., 2016); without discussion, we do not know how this result differing from or similar as the known literature. The third one is the possible reason behind to all of the variation and changes. I know the last one is hard and I do not expect a thorough explanation, but some qualitative discussions are needed.

Below are some general comments: Abstract: the abstract writing is not very clear and needs to rewrite and more organized and more clarification. For example, in Line 15-19, they talked about the snow covered days and snow cover area, but these two contents are mixed in several sentences; snow depth is also mentioned here, but later in line 20-21, snow depth is mentioned again. I also confused in the line 15, they said snow depth increased, but 20-21, snow depth was decreased except in spring. Unless the increase in spring is much larger than the decreased in other seasons, it is not possible to see the annual snow depth was increased as stated in line 15. If this is the case, then authors should make this statement clear, not let readers to figure it out. Also the last sentence in the abstract, authors should say all regions with increase together, then all regions with decrease together, not as did here. Also it is not clear in the last sentence, snow cover means snow cover area, days, or depth?

1. Introduction: the part should be more focused on the topic of study and does not need to include everything that does not link to the topic of snow cover change in China. From 52 to 92, authors list many snow cover studies, I don't think it make sense, you should only mention the most relevant and should discuss in the end of the paper that how your results differ from, similar with or extent those studies, so your study is not just a study, but a significant addition to the current literature.

2.1 study area: you include “why your study is important” here, but you do not need to repeat here again and it should be in the introduction. It is clear based on the figure 1, you should basically talk more about the elevation distribution, a little bit about the

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population distribution and economy, etc. . .

3. Results The current organization is very confusing and not easy to follow. You should reorganize the content into: snow covered days, snow covered area, snow depth. One at a time, not mixing them together.

4. you need a discussion section, to put your results in the big picture of literature, how your results differ from, similar as, or extent in certain degree of the current literature. You also need to include a paragraph on the possible explanations to the observed change, difference, or extension.

The paper needs a thorough English edits and I only catch a few below and will do a detailed comments after the first revision.

Line13, change “for December . . .” to “from the period of December. . .” L14, change “the snow cover” to “snow cover” L15, change “indicated” to “indicate” L140, by Dr. Huang, should be replace by “by Huang et al. 2014”, L147, change “continent” to “land” L151-157, the equation is not clear, SDsp, what sp means here? The equation only give the annual snow depth for each snow pixel, right? Then make it clear here.

figures 4-8, captions, remove the "analysis result maps of the"

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