The Cryosphere

Discussions

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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 #2

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In this manuscript, a synthesized snow cover product was produced first, which combined optical and passive remote sensing snow cover products. Cloud removal method and downscaling method were developed to retain the advantage of both optical and passive remote sending product, i.e., fine spatial resolution and cloudless, respectively. Then, based on the product, spatiotemporal dynamics of snow cover in China over the past 14 years were carefully analyzed. As a good data is the foundation of a reliable analysis. This synthesized snow cover product is considered of high quality, due to reasonable cloud removal and downscaling method. Also the analyses are well-organized, the results are quite specific. So, this manuscript is considered quite suitable to this journal. But still, some minor revisions are needed.

1. The descriptions of sentences need to be more carefully considered, especially some improper prepositions. In addition, some confused words or sentences are listed below: a) Line 31: "Middle-latitude". Usually we say middle latitude, or mid-latitude, but merely middle-latitude. b) Line 155: "SDi is the 25-km spatial resolution snow depth value in year i". This definition is not clear to me, as I cannot tell if SDi should be a daily result or annual mean result. c) Line 194: "Because some remote sensing data were lost". This sentence is quite confusing, especially with the word "lost". d) Line 268: "(December-February next year". There should be a ")" after "(" .

2. Some detailed problems in figures. a) Resolution of figures (dpi) should be enhanced, especially the maps. b) In figure titles, when it refers to "average annual", it is suggested to add time duration. Take Figure 3 for example, it is advised to be: ". . . annual average snow depth in China from 2001to 2014".

3. There are some strange "missing" words or blanks throughout the manuscript. a) Line 173, Line 177: "at a given significance level " b) Line 233: "(<0) "

4. There are some leap years during the study period, but it seems that you assumed every year to be 365 days. Explanations are needed.

5. As you speak highly of the M-K method in analyzing the variation and trend of snow cover data, why you used Sen's median method "to test the accuracy of this result" (Line 230)? Do you have any explanations?

6. The long time series of snow depth in China you used in WESTDC have been updated based on the following publications:

a) Che, T., Dai, L.Y., Zheng, X.M., Li, X.F., Zhao, K., 2016. Estimation of snow depth from MWRI and AMSR-E data in forest regions of Northeast China. Remote Sensing of Environment 183, 334-349. b) Dai, L., Che, T., Ding, Y., 2015. Inter-Calibrating SMMR, SSM/I and SSMI/S Data to Improve the Consistency of Snow-Depth Products in China. Remote Sensing 7, 7212. c) Dai, L.Y., Che, T., Wang, J., Zhang, P., 2012.

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Snow depth and snow water equivalent estimation from AMSR-E data based on a priori snow characteristics in Xinjiang, China. Remote Sensing of Environment 127, 14-29.