

Earth Syst. Sci. Data Discuss., referee comment RC1  
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## Comment on **essd-2021-189**

Anonymous Referee #1

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Referee comment on "The NIEER AVHRR snow cover extent product over China – a long-term daily snow record for regional climate research" by Xiaohua Hao et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-189-RC1>, 2021

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This paper proposes a long-term AVHRR snow cover extent product from 1981 until 2019 over China. The product has the spatial resolution of 5-km and the daily temporal resolution, and is a completely gap-free product, which is produced through quality control, cloud detection, snow discrimination, and gap-filling. The validations based on ground measurement and Landsat-5 snow maps both demonstrate its higher accuracy than that of the JASMES AVHRR product. As a long-term record, the dataset will provide a valuable data source for analyzing the influence of climate changes on the cryosphere on multiple time scales. The need for such an dataset is well justified and the authors cite ample relevant literature. The paper is basically well-written and presented.

First suggestion: it is best to delete "Using the Google Earth Engine (GEE) platform" in the first sentence because GEE is just the platform of producing the product, it is not the main contribution of the study. However, I suggest to add a subsection in the section of "data and preprocessing" to describe the computing platform and the reason of choosing GEE.

Second question: why not add the dataset of 2020 year?

Third question: is it sufficient enough to validate so big product using just eight Landsat-5 images?

There are a few important and minor comments/mistakes that are listed below and should be taken into account.

- Line 17, NIEER is the abbreviation of the authors institute, "the new NIEER product" is

difficult to project to the new AVHRR snow cover extent product, because many products are produced by the institute.

- Line 22, "the producer's accuracy was 81.0% the user's accuracy was 81.3%, and the Cohen's kappa value was 0.717" --> "the producer's accuracy is 81.0%, the user's accuracy is 81.3%, and the Cohen's Kappa value is 0.717".
- Line 27, "nearly 40%" should be changed to precise number.
- Line 37, "these decades" refers to which decades? The citing references was published in 2005 and 2018.
- Line 38, "is not only of particular importance for climate research but also an indispensable indicator of climate change" needs to be rephrased.
- Line 47, "throughout China" should be deleted, because they are global products.
- Line 52, "The polar orbit meteorological satellite of" should be deleted.
- Line 56, the abbreviation SCE has been described in the last paragraph.
- Line 84, "processing" -> "preprocessing".
- Line 99, the sensor attenuation refers to AVHRR? Please specify it. Then, why the AVHRR sensor attenuation requires the algorithm to choose different TM images? And how different?
- Line 101, "true values" -> "ground truth".
- Line 103, where is the main seasonally snow-covered areas in China? Please specify it. This means move the content at Line 122 here.
- Line 124, the usage of the snow depth data for the proposed study (line 127) should be used as the first sentence.
- Line 128, the cloud/snow confusion is generated by averaging the hourly ERA 5 land climate reanalysis dataset?
- Line 137, "between" should be deleted.
- Line 139, "forth" -> "fourth".
- Line 157, did you use the NDVI? If not, the formula (1) is not needed.
- Line 175, "previous" -> "the previous". It is the same in line 272.
- Line 219, "algorithm above" -> "above-mentioned algorithm", and "first" should be deleted.
- Line 230, I suggest to add Huang as one of the co-authors.
- Line 267-268, how to determine these thresholds?
- Line 270, "Methodology" -> "Metrics".
- Line 291, what did cause the poor quality of raw satellite?
- Line 315, delete "new".
- Line 319, delete "the".
- Line 321, "edges" -> "boundaries".
- Line 327 and 328, "snow-covered areas" -> "snow cover".
- Line 353, "poorly" is not good to describe the others' product.
- Line 375, what is the meaning of "GF"? Why not delete it?
- Line 379 and 380, why not list the names according to the increase of the values?
- Line 383, as an ESSD paper, the conclusion should focus on the data, not the method.