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Comment on essd-2021-395

Anonymous Referee #1

Referee comment on "STAR NDSI collection: a cloud-free MODIS NDSI dataset (2001–2020) for China" by Yinghong Jing et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-395-RC1, 2022

The Normalized Difference Snow Index (NDSI) is vital in snow cover extent, snow cover fraction, and snow depth retrieving in case of using optical satellite observations. In this study, the authors developed an integrated cloud-free MODIS NDSI over China with the help of a spatio-temporal Adaptive fusion method. However, the following global and regional cloud-free gap-filled NDSI and snow cover extent dataset are excluded in this study, neither in the introduction section, nor in the cross-comparison section. Therefore, it is difficult for me to evaluate whether this dataset is uniqueness or usefulness.

The existing cloud-free NDSI dataset and snow cover extent datasets including:

- MODIS/Terra CGF Snow Cover Daily L3 Global 500m SIN Grid, Version 61 (https://doi.org/10.5067/MODIS/MOD10A1F.061), which provide a cloud-gap-filled daily MODIS NDSI dataset at 500m spatial resolution.
- The NIEER AVHRR snow cover extent product over China (https://essd.copernicus.org/articles/13/4711/2021/, https://doi.org/10.5194/essd-13-4711-2021), which provide a cloud-gap-filled daily AVHRR snow cover extent dataset over China.
- The daily MODIS 500m snow cover extent over China (http://data.casnw.net/portal/metadata/be3a4134-2e5c-467f-8a5e-b1c0ed6cc341, doi:10.12072/ncdc.I-SNOW.db0001.2020)
- Daily fractional snow cover dataset over High Asia during 2002 to 2018 (http://www.ncdc.ac.cn/portal/metadata/0e277d66-d89b-4e54-8a75-fe22fcc3adee, doi: 10.11922/sciencedb.457)

Although the study may content material worthy of publication, the paper in its current version needs major revision and resubmission to meet the level expected of ESSD, for the following reasons.

- Literature review in Introduction disregards former studies on NDSI retrievals from satellite data, including both datasets retrieval methods. Thus, the contribution of the current study in accordance to existing knowledge and methods is not clear. Please add the above listed cloud-free NDSI dataset and snow cover extent datasets in the introduction section.
- The lack of innovation in accordance to existing knowledge. Please add the comparison between NDSI dataset in present study and MODIS/Terra CGF Snow Cover Daily L3 Global 500m SIN Grid, Version 61, both in fusion method and results.
- The lack of depth in the result analysis that makes the study inconclusive. Please emphasize the unique contributions in the present study in the comparison with the above listed cloud-free NDSI dataset and snow cover extent datasets over China.