The Cryosphere Discuss., 5, C469–C471, 2011
www.the-cryosphere-discuss.net/5/C469/2011/

The Cryosphere Discussions

Interactive comment on "Changes in seasonal snow cover in Hindu Kush-Himalayan region" *by* D. R. Gurung et al.

Anonymous Referee #3

Received and published: 16 May 2011

The Gurung et al paper using the MODIS snow cover product (8-day) to study the snow cover change over the Tibetan Plateau and Hindu Kush-Himalaya region and gives some results that I believe they are questionable, the methods mentioned (combining Terra and Auqa, temporal filter, spatial filter) in the paper are not new and are not used to produce new data for analysis. Anyway, I do not recommend the paper for a publication. Here I summarize some major concerns:

1. The study area from figure 1 includes the entire Tibetan Plateau and the Hindu Kush-Himalaya (HKH), but the paper names it as HKH. I think this is misled. In the paper, they mentioned Qinghai-Xizang Plateau and Tibetan Plateau, but never put them as one region, this further confuse readers. In page 762, lines 14-17, they define the west HKH, east HKH, and Central HKH. This should be in the instruction or in the Study Site

section, not in the result section.

2. Regarding to the methods, such as combining Terra and Aqua, temporal filter, spatial filter, those methods are not new and are used for daily MODIS snow cover products to develop cloudless multiday snow cover products. There are many recent publications, but authors seem not aware of them and did not cite them. The NASA 8-day standard products are based on the daily snow cover products in order to remove cloud cover, while probably overestimate the snow cover. The methods mentioned in the paper are to do temporal filter to further remove the cloud cover, which will further overestimate the snow cover. With said that, authors did not use the methods to produce new products for further analysis, then why bother to mention those methods? They eventually used the 8-day standard products.

3. For accuracy assessment, it seems they used the new products (not the standard 8-day products), but they only use less than 1 week (Jan 16-21, 2006) data to do so, while the MODIS product is 8-day product, plus they used the temporal filter, which means it could be 16 day products or longer. With such a small dataset for accuracy assessment is not valid, also the error matrix is not provided. The authors claim the overall accuracy of 93%, while the Kappa coefficient is zero. This is impossible.

4. Figure 3,4,5 show comparison of snowfall and snow cover plots. However, the paper did not mention anything about the snowfall. I believe they come from stations, but there is no information about those stations and data, or data quality. While for snow cover from MODIS, it is also questionable. How big an area the snow cover is extracted to compared with a station-measured snowfall? There is no information at all, thus no basis to evaluate the three figures.

5. Figure 6,7 not mentioned or cited in the text.

6. Figure 8 has only 8 points, based on this limited data, they conclude that snow cover change is primarily related to air circulation pattern. Too simple to believe.

7. Page 763, line10, they mentioned the depletion cover for each hydrological year, but the figure is not provided.

8. Table 1 has big problem. For example, in the summer and annual, all sub regions show positive trends, but the combined data show negative trend. Is this possible?

Interactive comment on The Cryosphere Discuss., 5, 755, 2011.