

Interactive comment on “A satellite-based snow cover climatology (1985–2011) for the European Alps derived from AVHRR data” by F. Hüsler et al.

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General comments

This study introduces a snow cover (extent) climatology for the Alpine region, as derived from satellite (AVHRR) data. The analysis is based on daily satellite images in the period 1985–2011. The main objectives of the study are: 1) to compile a cloud-free dataset by applying a gap-filling (10days temporal filter) approach; 2) to examine the spatio-temporal patterns of snow cover distribution over the European Alps region. The results indicate significant regional trends of decreasing snow cover duration at lower elevations and any significant trends in the monthly snow cover area in the last 27 years. The authors conclude that applied gap-filling procedure is appropriate for cloud removal at the regional scale.

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Overall the study is interesting and within the scope of the journal. The authors present a unique dataset of satellite snow cover maps that has a good potential to describe snow extent climatology over the Alps. The manuscript has a good structure and is concisely written. On the other hand, the scientific contribution of the paper would benefit from adding some more deeper analyses. Particularly, I would suggest:

1) to extend the validation of gap-filling method. Presenting just comparison for short January–April period is rather short and does not allow to infer robust interpretations. I would expect that forward and backward variants might have some distinct features/differences in the spatial and temporal (i.e. snow onset/melt and snow poor/rich periods) distribution. I understand that the gridded snow dataset is available only for the Switzerland, but analyzing longer records and maybe splitting the Switzerland into two climate regions (i.e. NW, SW) would allow to draw more general conclusions about the seasonal performance of the filtering method.

2) to consider adding some quantitative assessment of some results (e.g. correlation between altitude and some snow cover characteristics in different regions) and attribution of trends found. What are the main controls affecting shorter snow cover duration in some regions in recent years? Is it increased air temperature (in winter, spring), less precipitation or more rain-on-snow events?

Specific comments

1) Abstract (last paragraph): It is too general. Please consider to delete or to be more specific.

2) Section 3.1 (p.3008, l.27): "the best results". Please consider to be more specific, why 10 days filter performs the best. In terms of what?

3) Section 3.2: It is not clear how is the X (Eq.1) derived? Please be also more specific how the SCA is estimated. Is it a ratio of snow covered pixels to all pixels or to the sum of land and snow pixels?

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- 4) Methodology: Please consider to add a section describing how is the AVHRR compared to snow gridded climatology.
- 5) Section 4.3: It is not clear how is the monthly statistics derived.
- 6) Figure 1: Please add the Swiss border to the map.

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