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Enhancing the retrieval methodology for GlobSnow long-term snow water equivalent record

K. Luojus (1), J Pulliainen (1), J Lemmetyinen (1), M Takala (1), T. Smolander (1), and C. Derksen (2)

(1) Finnish Meteorological Institute, Arctic research, Helsinki, Finland (kari.luojus@fmi.fi), (2) Environment Canada, Climate Processes Section, Climate Research Division

ABSTRACT

The efforts of the European Space Agency (ESA) GlobSnow project has resulted in a daily hemisphere-scale satellite-based snow water equivalent (SWE) data record spanning more than 30-years. The previous existing daily SWE records have spanned a shorter time period or described the snow conditions on a monthly basis for a similar period. The GlobSnow SWE record, based on methodology by Pulliainen [1] utilizes a data-assimilation based approach for the estimation of SWE which was shown to be superior to the approaches depending solely on satellite-based data [2]. The GlobSnow SWE data record is based on the time-series of measurements by two different space-borne passive radiometers (SMMR and SSM/I) measuring in the microwave region, spanning from 1979 to present day. The utilized sensors provide data at K- and Ka-bands (19 GHz and 37 GHz respectively) at a spatial resolution of approximately 25 km. The GlobSnow SWE data record has been released and is available through the GlobSnow web-pages (www.globsnow.info).

We briefly presents the validation carried out for GlobSnow SWE data with ground-based reference data and the lessons learned from processing a 30-years daily hemispheric record on SWE. Additionally, we present the efforts taking place for the continuous development of the methodology to enhance the satellite-based SWE retrieval and the way this transfers to the reliability of the long-term SWE climate record. The development of SWE retrieval are focused on application of a new HUT multi-layer snow emission model for the retrieval procedure, application of novel techniques to account for lake contamination and mixed pixel effects and efforts carried out to create a homogenized long-term record of weather station-based snow depth observations that are applied within the SWE retrieval scheme.

REFERENCES

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