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OBSERVING AND MODELLING SURFACE MELTING IN ANTARCTICA

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Surface melting occurs every summer on a thin margin of the Antarctic continent. Observing the occurrences of the state change is of interest for climate analysis. Remote sensing in the microwave domain is able to detect such changes. Using passive microwave radiometer it is even possible to distinguish daily melting events at a resolution of few tens of kilometers, a resolution compatible with global and regional climate models. Microwave observations are available continuously since 1979 from four slightly different sensors. These provide potentially 26-year long series of surface melting suitable for climate analysis as long as the sensor changes do not bias the detection. We found that changes of observation hours by the satellite causes significant is a problem as surface melting has strong diurnal cycle. We developed a statistical method to correct this problem. The new un-biased 26-year long series are presented in this paper.

To provide a better in-sight in the processes governing surface melting, we performed simulations at the Antarctic scale with three snow models SISVAT (LGGE, France), CROCUS (Météo France) and SNTHERM (CRELL) forced by the re-analysis ERA-40 (ECMWF). Although the three models compare well each other, comparison between models and remote sensing observations is contrasted: the spatial mapping of melting occurrence largely differs between the model and the observations although the temporal signals (e.g. onset and offset of melting, melting duration, melting peaks) are well estimated.