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The stability assessment of the AVHRR thermal channels using in-situ temperature measurements at five stations in Antarctica for 25-year period.

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More than 25 years of continuous data from the Advanced Very High Resolution Radiometers (AVHRR) mounted on series of NOAA satellites constitute the longest record of measurements from space-based sensor. Therefore, the data from AVHRRs are extensively used in climate studies and wide variety of other applications. Among these studies, AVHRR data are often used to develop cloud climatology (e.g. ISCCP, PATMOS, and other groups at DLR, SMHI, and University of Hamburg etc). In order to achieve accuracy while preparing such climatology, the calibration and inter-calibration of both solar and thermal channels of the AVHRR are necessary so as to directly compare and homogenise the data obtained from different AVHRRs. The brightness temperatures derived from the thermal channels of AVHRR (channels 4 and 5) are important in any threshold-based hierarchical decision-tree cloud detection and classification algorithm. The output from such algorithms is then used for further retrievals and trend analysis. It is, therefore, crucial to evaluate the stability of the thermal channel calibration and inter-calibration at cold temperatures. Here, we compared and analysed the AVHRR channel 4 and 5 brightness temperatures at five stations in the Antartica, namely, Amundsen-Scott, Bellinghausen, Mirny, Scott Base and Vostok. The calibration coefficients for AVHRR thermal channels were provided by the Center for Satellite Applications and Research of the NOAA. The data for the period of June, July and August (coldest months of every year and minimal atmospheric in-

fluence) from 1982 to 2006 are used for the evaluations. The root-mean squared error is found to be around 1.85K and the correlation coefficients range from 0.85 to 0.90. The calibration and inter-calibration of the thermal channels are found to be very robust and there was no indication of any artifacts or artificial jumps in the brightness temperatures after the change of satellite platform.