

SAT change at Relay Station in the interior East Antarctica during the last 30 years

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A new near-surface air temperature (SAT) record for Relay Station in the interior East Antarctica, in which AWSs observations have been corrected and gaps have been filled using reanalysis data, is presented. In the east Dronning Maud Land (DLM), the AWSs were installed in early 1990s, and since then the observations have continued to the present at Relay Station, Dome Fuji and Mizuho. However, due to the harsh climate conditions in Antarctic interior, the observed data is fragmentary and is far from near-continuous records. In addition to the lack of data continuity, there are some sources of errors in the AWS observations. A major source of error comes from the heating of temperature sensor by solar radiation during the insufficient ventilation of the sensor. In this study, we applied the quality controlled (QC) procedure to remove suspicious data that were unlikely to reflect the natural variability (see details in Lazzara et al. (2012)). Then, the radiation errors are reduced by using the regression model approach (Morino et al 2021). After the data correction, monthly means are calculated based on the hourly data at 0000, 0600, 1200, and 1800 UTC following the criteria used in Scientific Committee on Antarctic Research (SCAR) Reference Antarctic Data for Environmental Research (READER) project (Turner et al. 2004). Missing observations are estimated using monthly 2-m temperature (T2m) from the global reanalysis data. We found that the impact of the AWS temperatures on the ERA5 T2m is negligibly small in the east DLM interior, so we used the ERA5 T2m for infilling gaps of Relay Station temperature record. In this presentation, we present not only a new reconstruction of the Relay Station temperature but also the temperature trend at Relay station over the most recent 30-years (1993-2022).