Ice surface temperature climatology explanation

The climate data record (CDR) presented here is based on the level 3 satellite AASTI (version 2.1) data set produced by DMI (dk)/MET (no) and an intermediate CDR (iCDR) also produced by DMI and MET in the Copernicus Climate Change Service (C3S). The iCDR extends the CDR from June 2019 to June 2022. The data are a climate record of ice and snow surface temperatures (IST) calculated from radiation data in the CLARA-A2.1 climate data record made available by the Climate SAF.

The surface temperature algorithms applied to the radiation data, the cloud mask applied and other methodologies applied are similar to the OSI SAF IST product OSI-205-a.

The IST climatology covers the period 1982 to June 2021 and it covers Antarctic and Greenland ice caps, as well as sea ice on the Northern and Southern hemispheres, pole-wards of 50 degrees North and South.

Data from approximately 10 different AVHRR sensors from NOAA and Metop satellites are included in the data set. Temporal analysis against data from 4 long term automatic weather stations and long term buoy reference data records indicate that small artificial trends do not change the overall picture of the presented climatology

A complete scientific documentation is available from the C3S data.

All input data are in the so called satellite level 3, meaning geographically gridded values with data gaps. The plots are based on monthly mean surface temperatures, monthly sea ice fractions (fraction of time with sea ice) and an ice cap/water mask, where *ice caps* mean the ice caps of Greenland and Antarctica. These three variables are distributed spatially in a 160x1440 (latitude and longitude) grid from 50 degrees in latitude and up for the northern hemisphere and -50 degrees and down in latitude for the southern hemisphere.

Calculating annual means. An annual mean values are calculated as the mean of the 12 monthly means (month approximated to have the same length).

Calculating spatial means. Spatial means are calculated as weighted means over the spatial grid, where each pixel is weighted by the function: $cos(\theta)$, where θ is latitude.

Linear regression analysis. To analyze the development in temperatures over time, a linear regression fit of the temperatures in each spatial point has been performed. Trends and p-values of this analyses are plotted on maps, where low p-values (smaller than 0.05) indicate that a given value is scientifically trustworthy.