DATA SOURCES AND STATION HOMOGENISATION

Nick Rayner, Science Coordinator

EUSTACE Splinter Meeting, 19th April, EGU.

DATA SOURCES
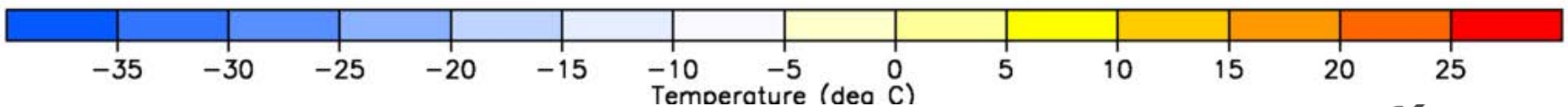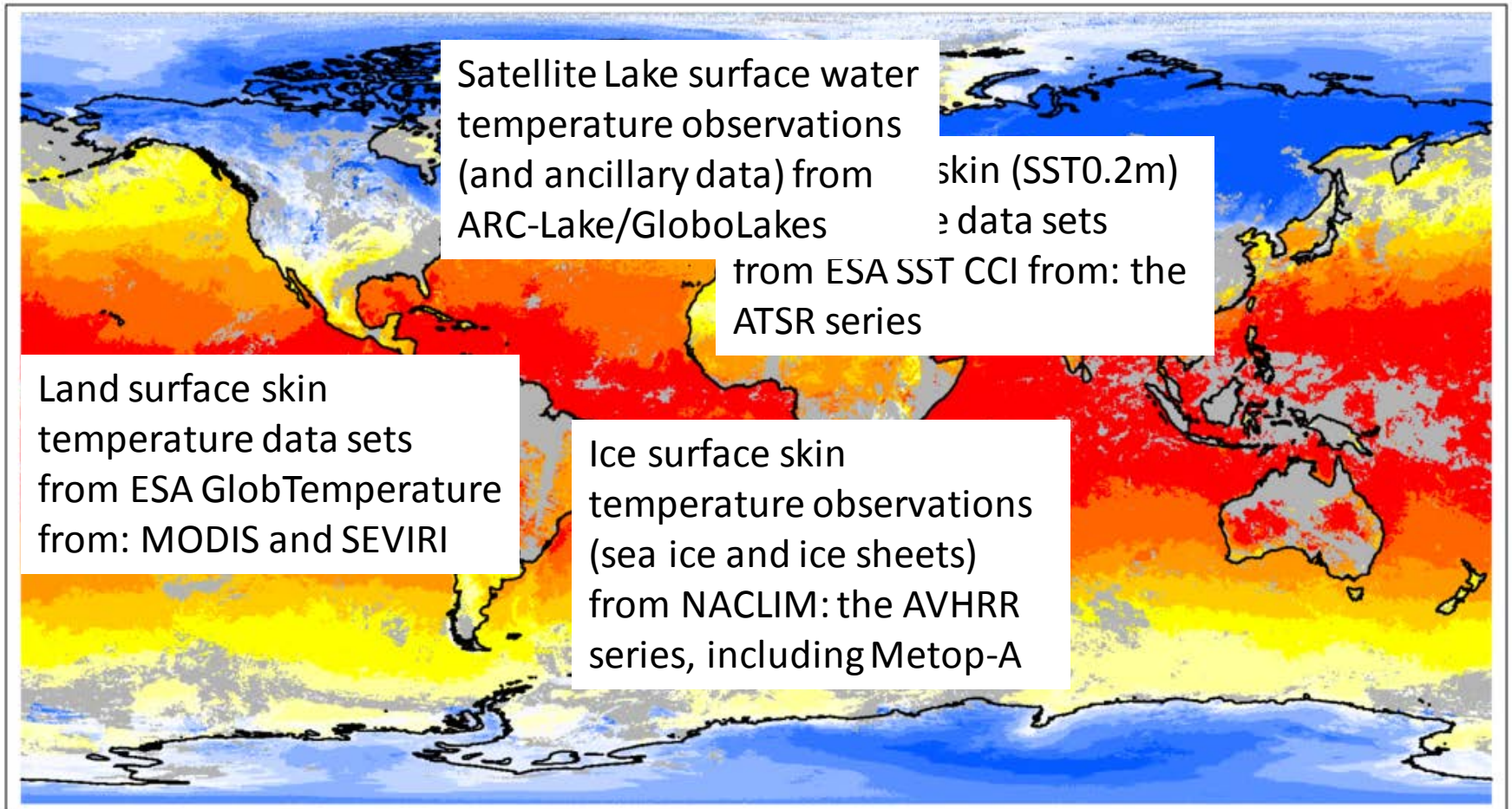
Satellite and in situ observations we will use

SATELLITE OBSERVATIONS (TSKIN)

Satellite Lake surface water temperature observations (and ancillary data) from ARC-Lake/GloboLakes

skin (SST0.2m) e data sets from ESA SST CCI from: the ATSR series

Land surface skin temperature data sets from ESA GlobTemperature from: MODIS and SEVIRI

Ice surface skin temperature observations (sea ice and ice sheets) from NACLIM: the AVHRR series, including Metop-A

Temperature (deg C)

EUSTACE

Data Sources

TEST DATASET

ECA&D
ISTI
GHCN-D
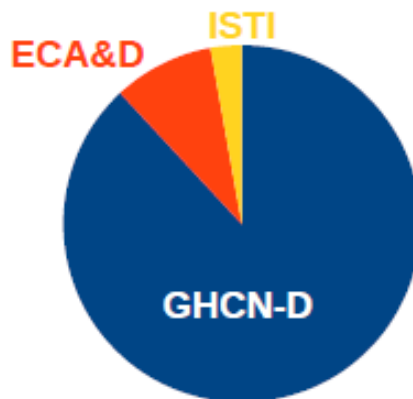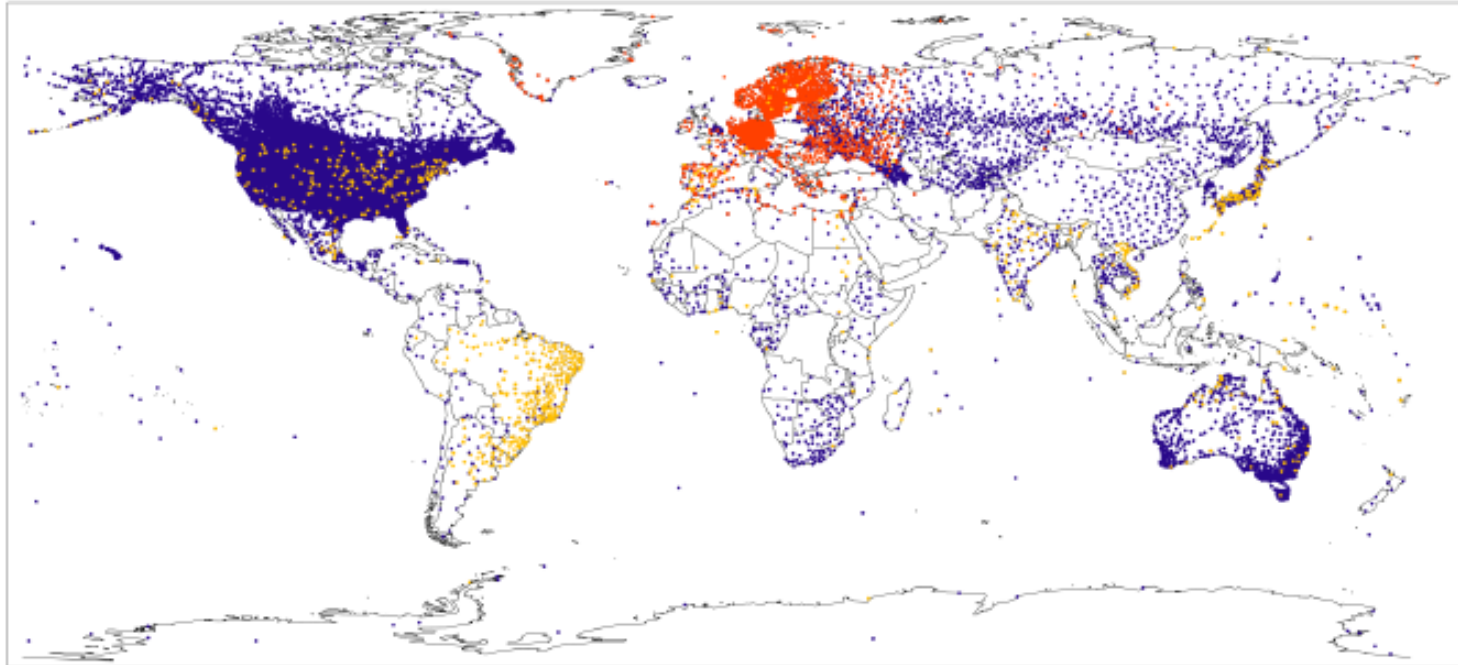
33'511 stations
(32'041 Tmax + 32'265 Tmin)

(Data are stored on EUSTACE workspace
in a common ASCII and NetCDF format)

u^b
UNIVERSITÄT
BERN
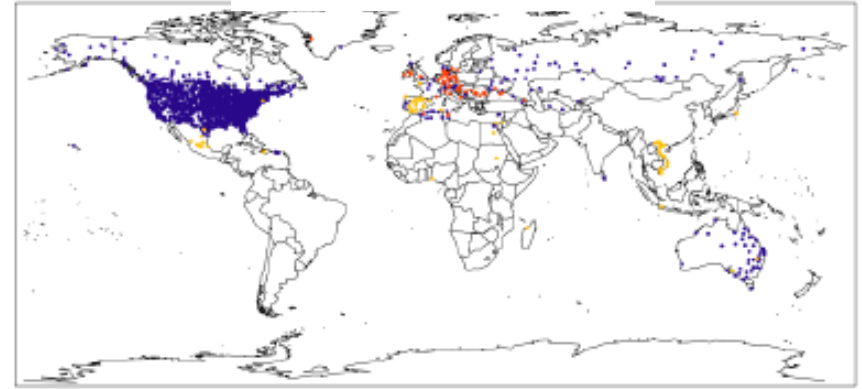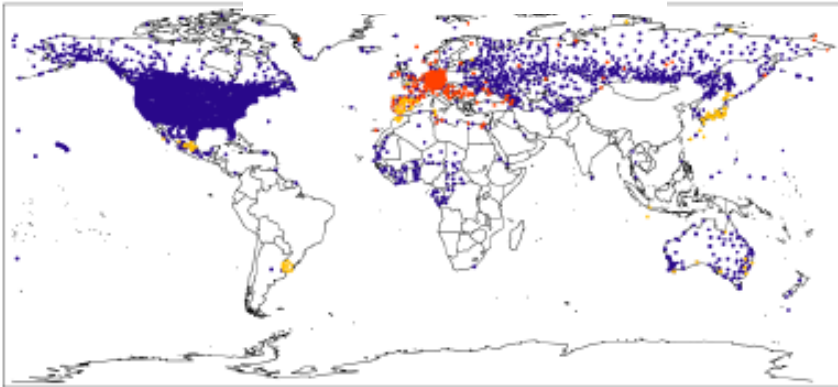
EUSTACE

Temporal availability

TEST DATASET
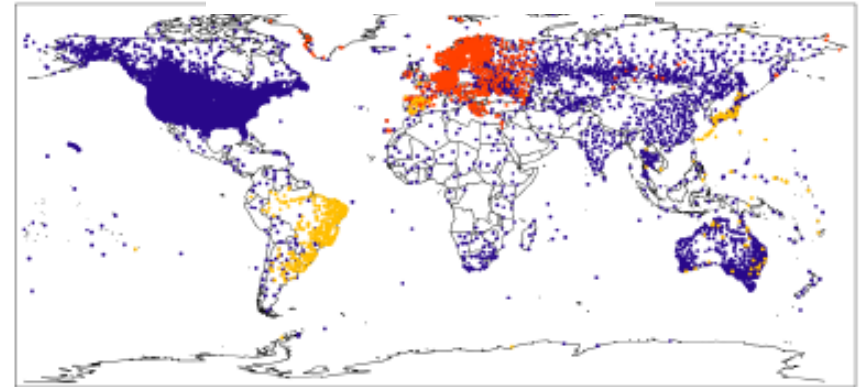
1850, 11 stations

1900, 1872 stations

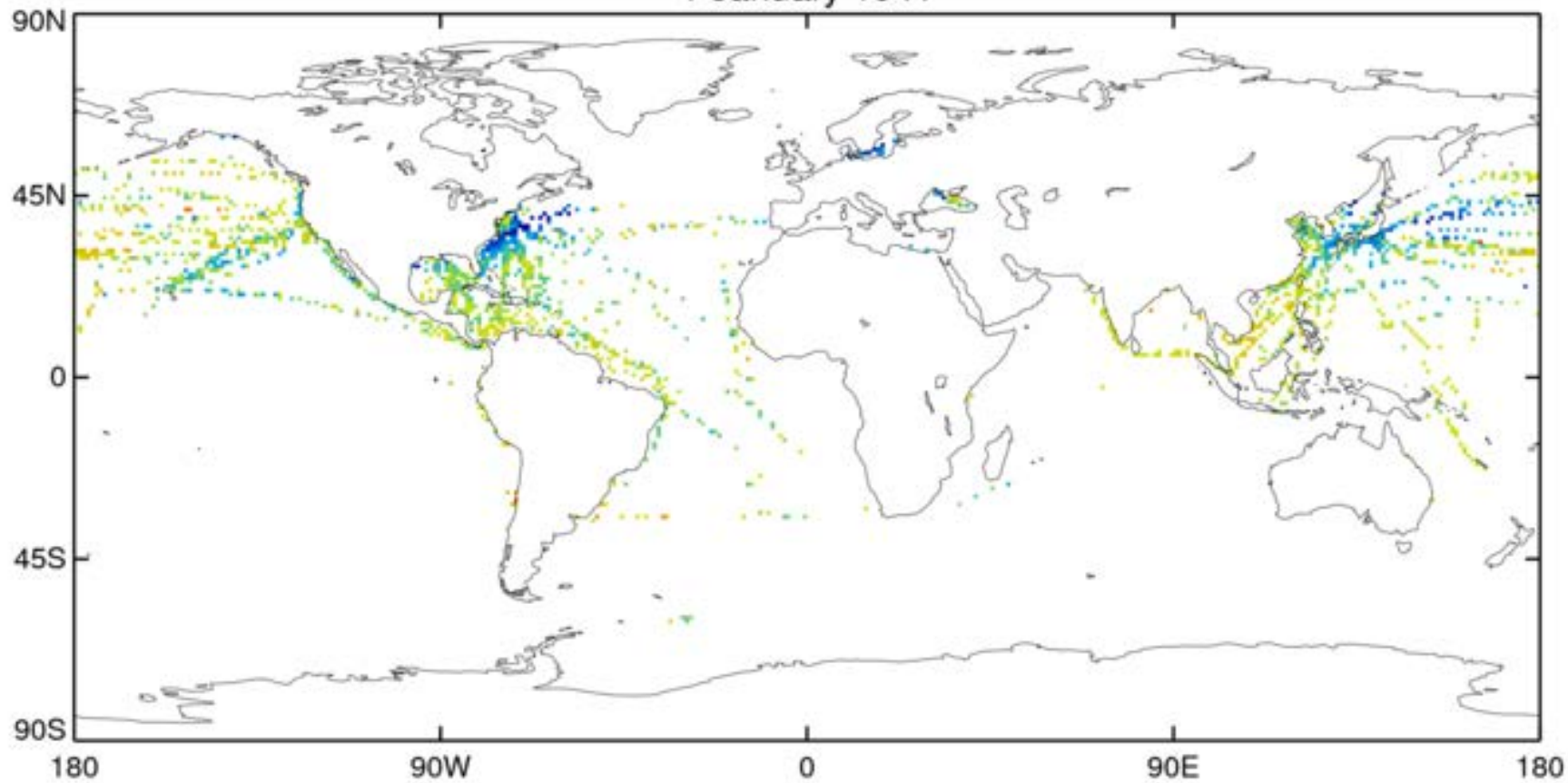### 1950, 6407 stations
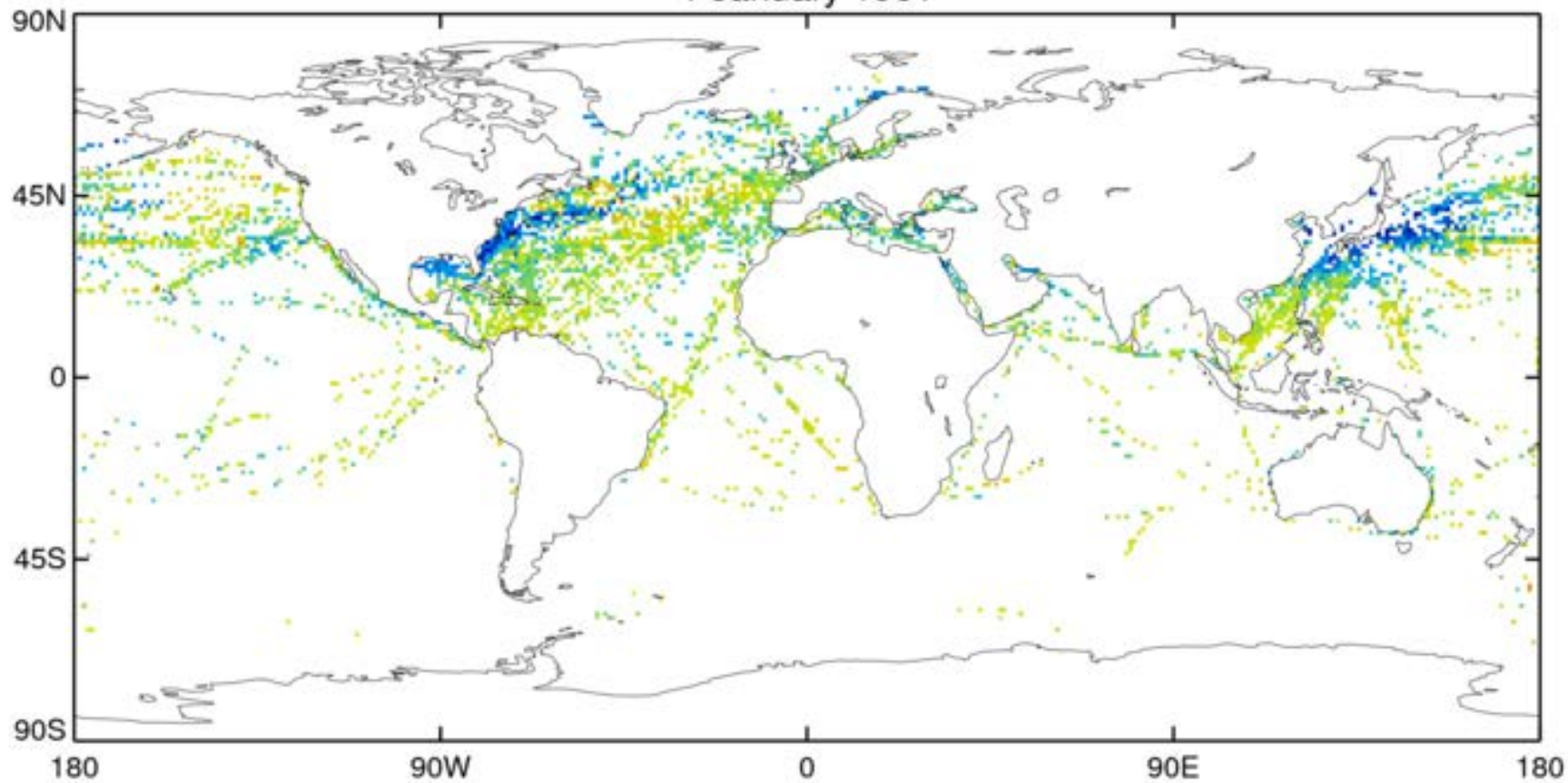

2000, 12876 stations
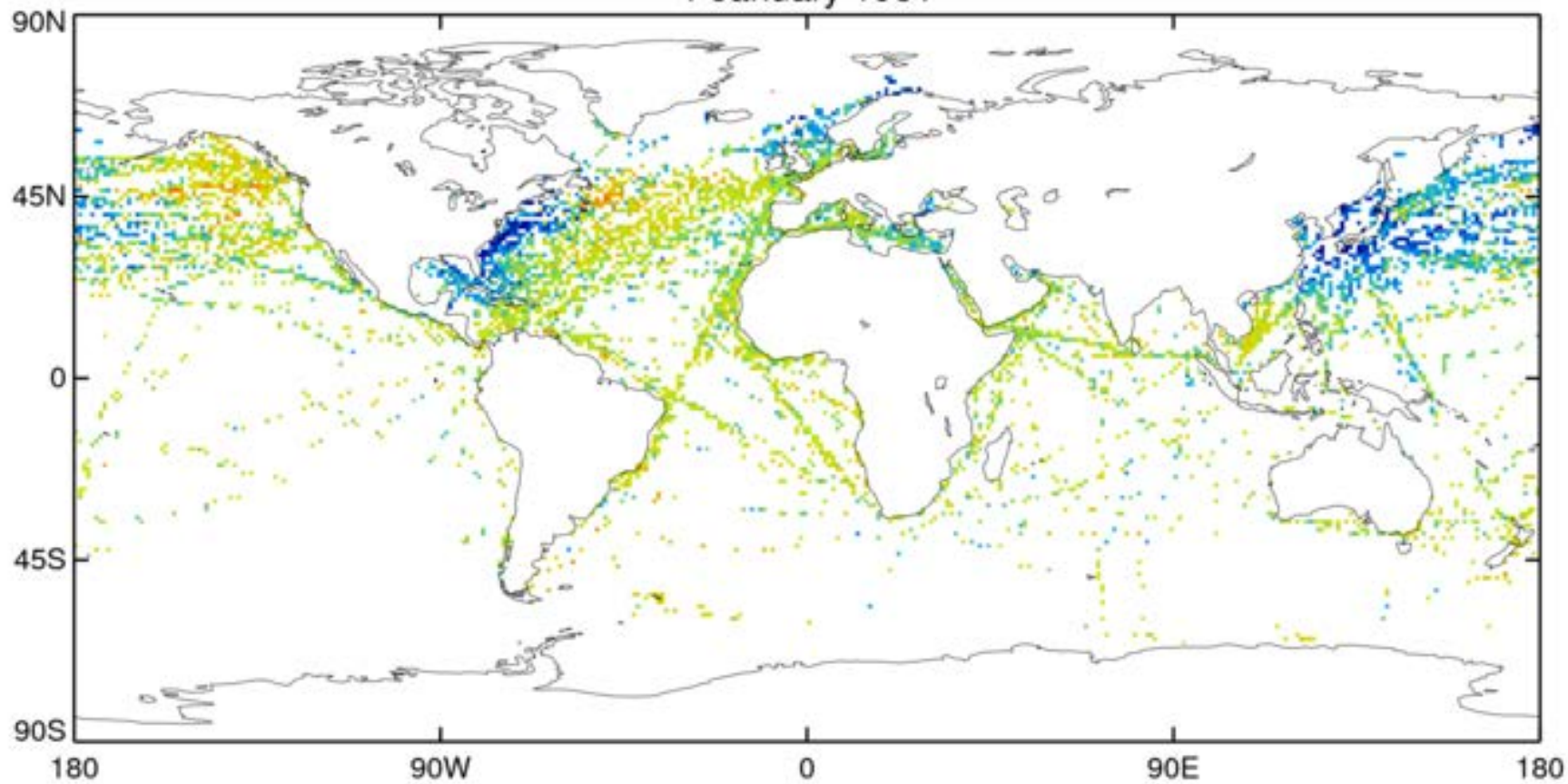
Ship observations

1 January 1941

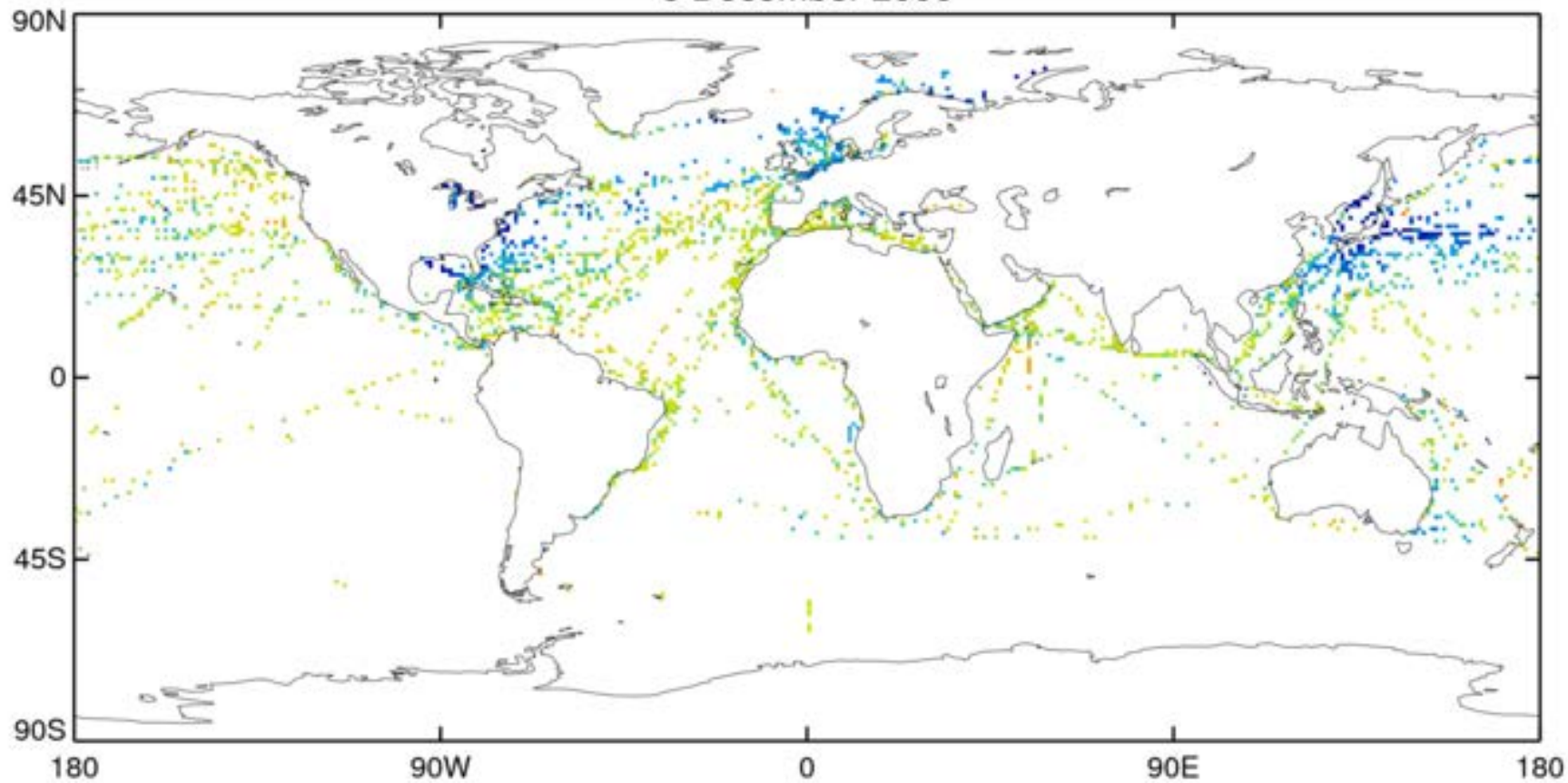# Ship observations

1 January 1961

Ship observations

1 January 1981

Ship observations

6 December 2000

NORTHERN HEMISPHERE
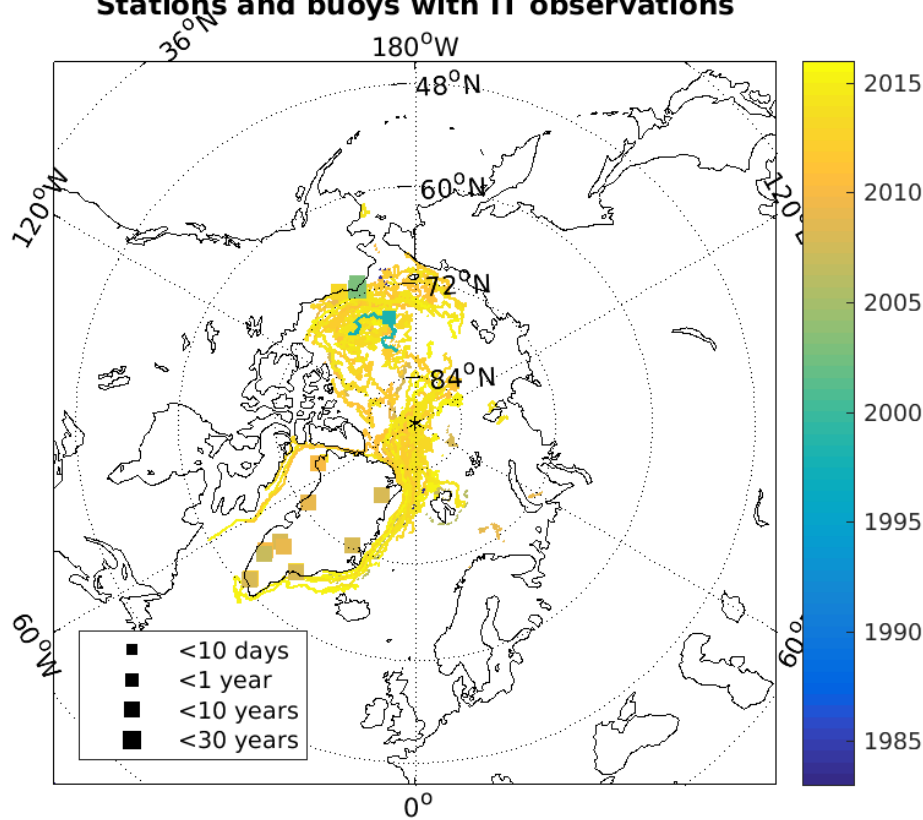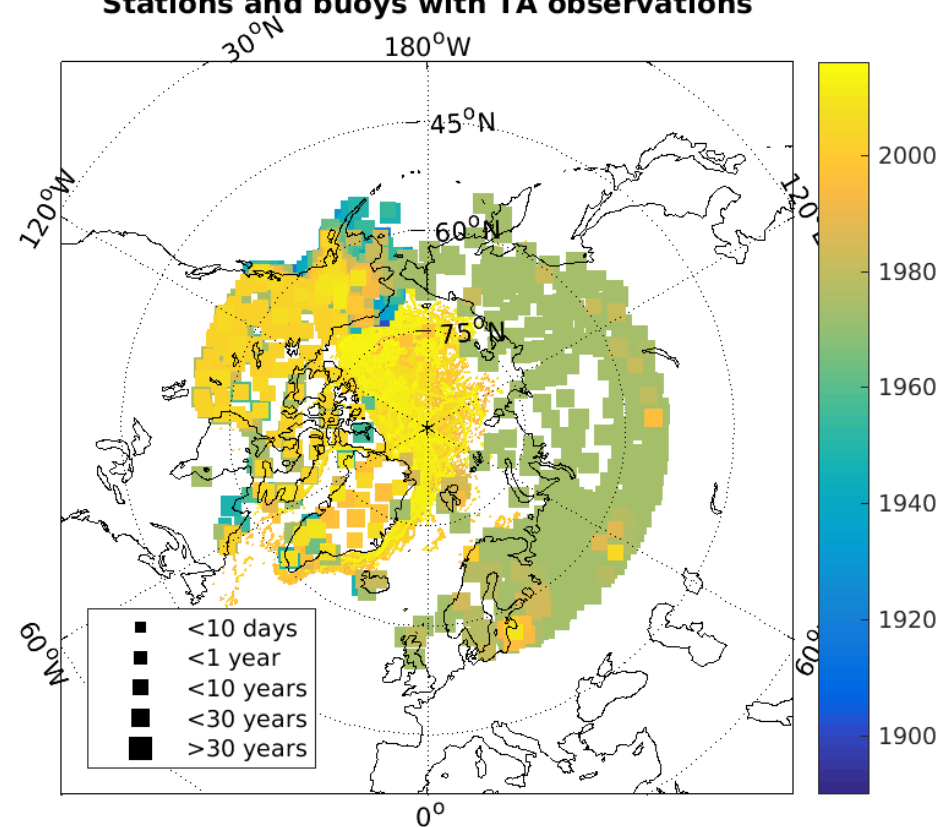
Overview of stations with surface temperature (IT) and air temperature (TA) observations in Arctic. The color determines the starting year of observations, while the marker size defines the length of period with observations.
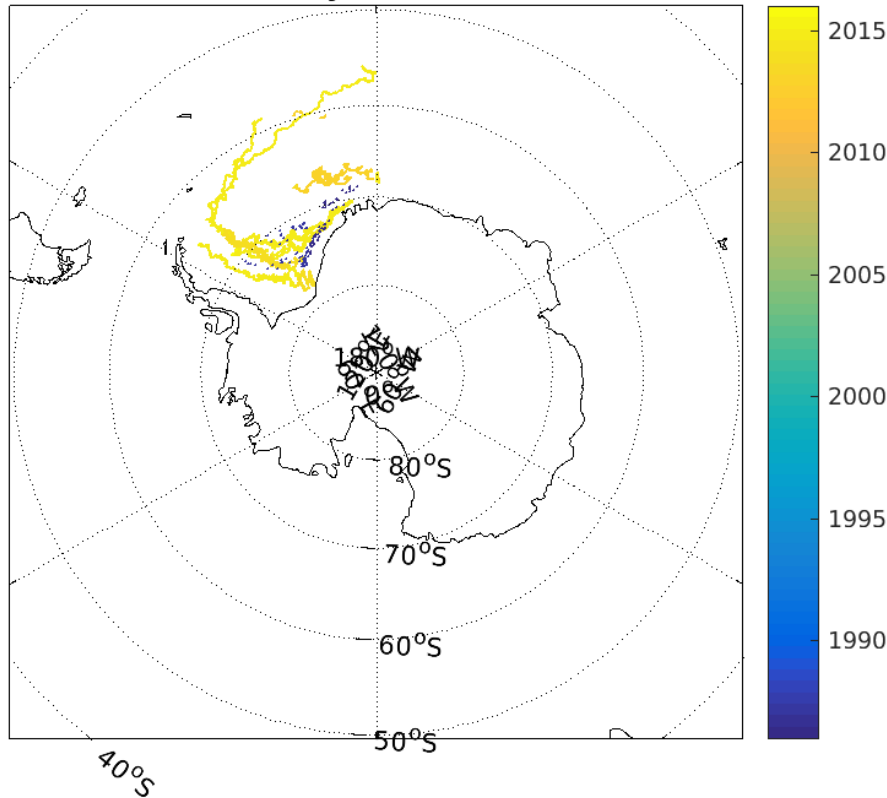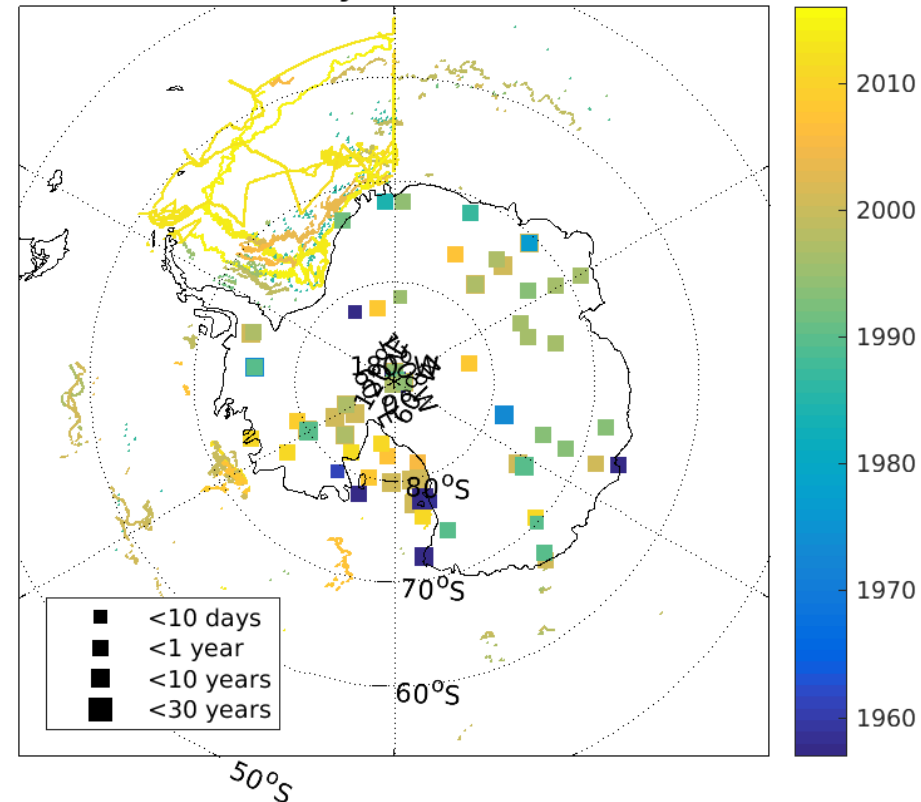
SOUTHERN HEMISPHERE

Overview of stations with surface temperature (IT) and air temperature (TA) observations in Antarctica. The color determines the starting year of observations, while the marker size defines the length of period with observations. Currently, the data set lacks observations of IT by land stations in Antarctica.

IDENTIFYING NON-CLIMATIC DISCONTINUITIES IN LAND STATION DATA

"Break detection"

AIMING FOR

- Global station data set with discontinuities/break points identified, where possible
- European station data set with discontinuities/break points removed

Break detection

The algorithm used for the detection of discontinuities (or breakpoints) is adapted from *Kuglitsch et al. (2012)*.

CANDIDATE STATION
(Basel Binningen)

Annual and semi-annual means (pairwise detection)

n CORRELATED **REFERENCE STATIONS**

3 DETECTION METHODS
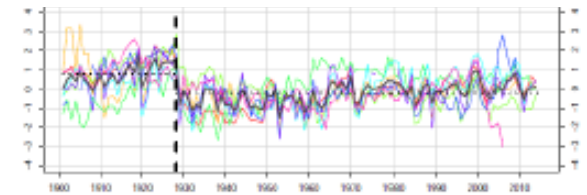**Caussinus-Mestre**
RHtests
GAHMDI
combined:
a discontinuity is significant if confirmed by at least
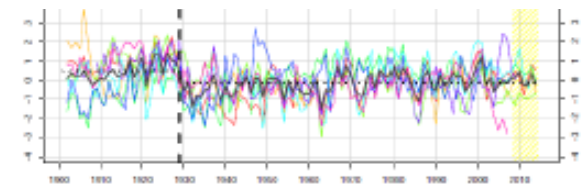**3 reference stations using at least 2 of the methods**

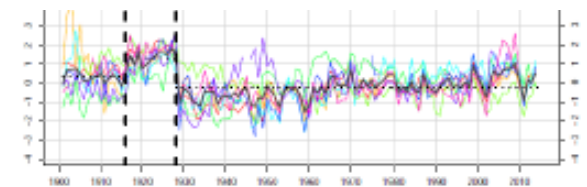Delivered breakpoints Basel:
1916 and **1928**

Yearly standardised differences from reference series (Tmin)

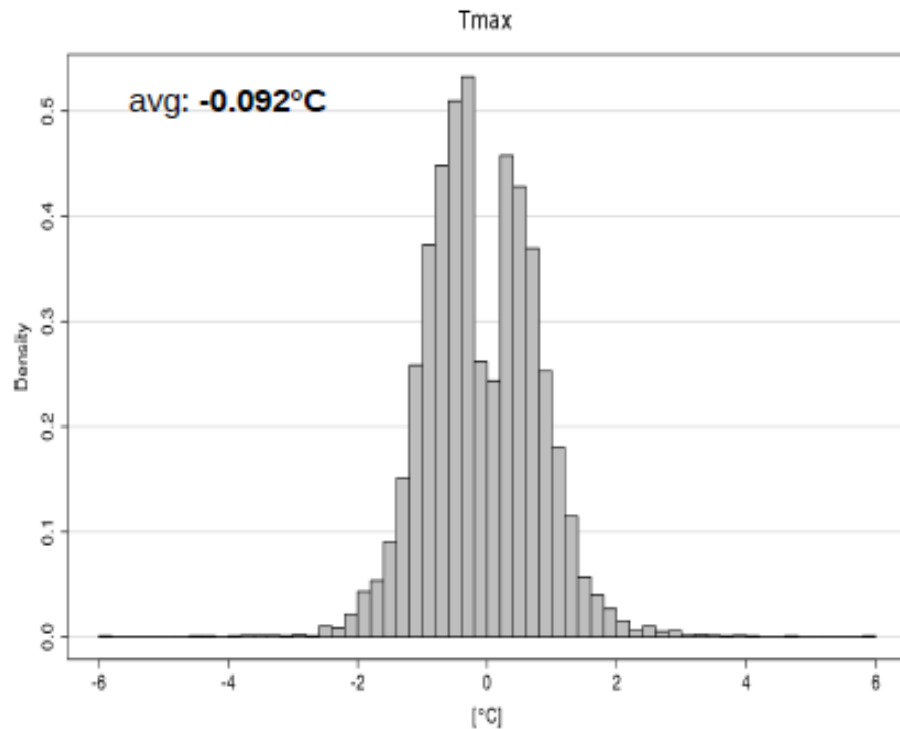October-March standardised differences from reference series (Tmin)

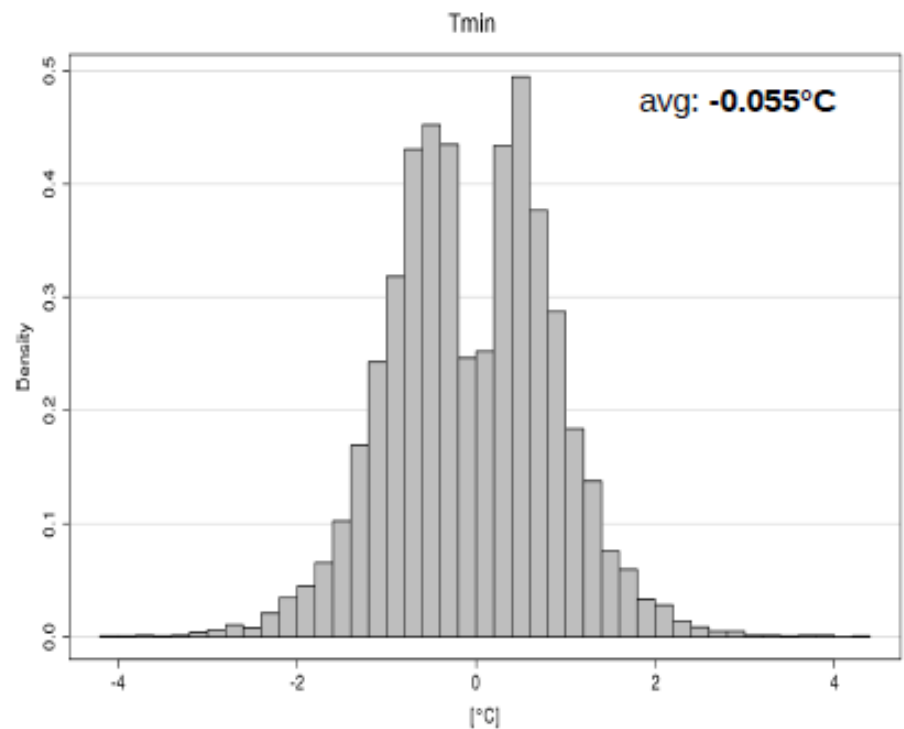April-September standardised differences from reference series (Tmin)

u^b

UNIVERSITÄT BERN

EUSTACE

Break detection

Amplitude of the inhomogeneities
in the test dataset

Tmax — avg: **-0.092°C**

winter -0.137°C
summer -0.094°C

Tmin — avg: **-0.055°C**
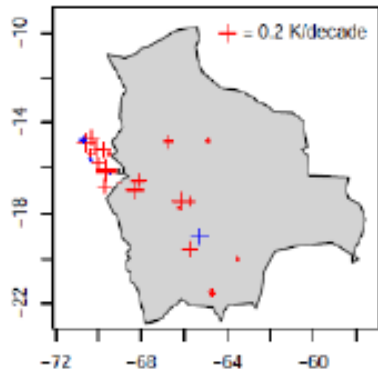
winter -0.078°C
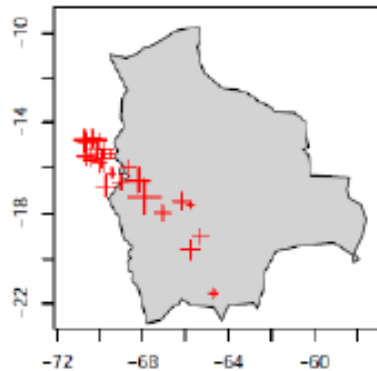summer -0.045°C

Negative = overestimation before the breakpoint
(For example: radiation screen replaced with a more effective one → larger impact on maximum temperatures)
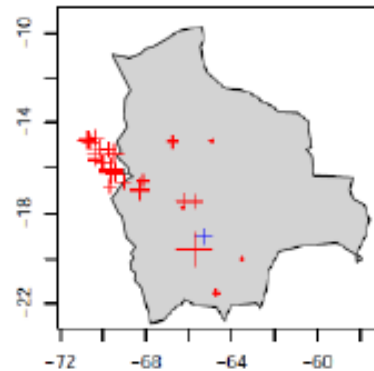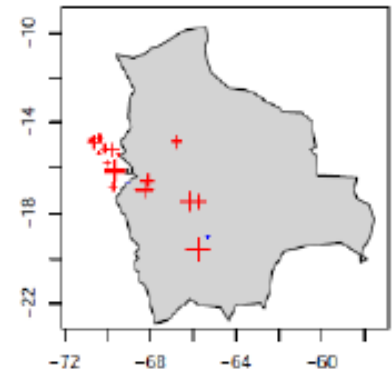
Homogenisation

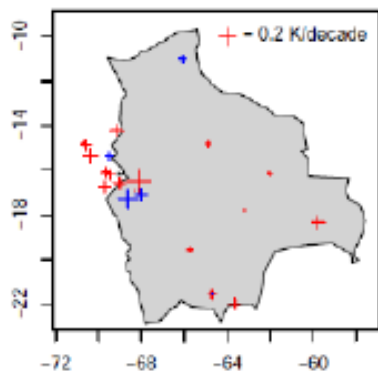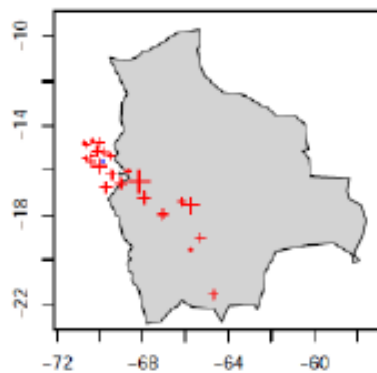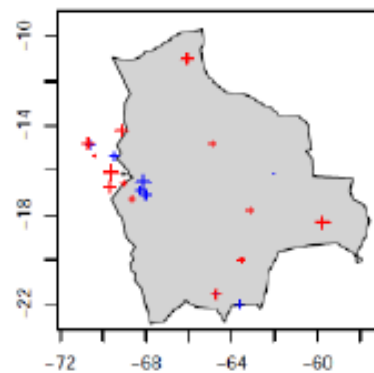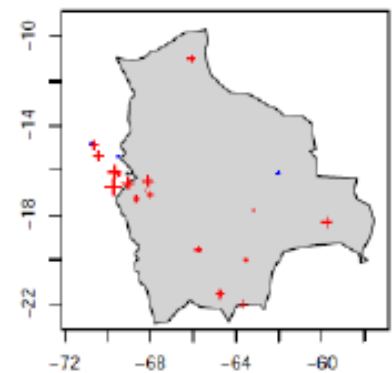Linear trends in mean annual Tmax and Tmin over the period 1965-2012
(the grey region depicts Bolivia)

MANY THANKS FOR LISTENING

TIME FOR QUESTIONS

QUESTIONS RELATED TO DATA SOURCES

- Which temperature datasets do you use currently?

- Would the homogenized gridded dataset be interesting for you? If yes, why?

- What is most important for you during homogenization: good representation of averages, trends or extremes?

- How important is it that the datasets used for the development of EUSTACE are freely available?

- Which currently available (global) datasets, the EUSTACE dataset should be compared with?

EUSTACE