

A regional climate model downscaling projection of China future climate change

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Introduction:

- Northern China has experienced more severe drought events with significantly decreased annual precipitation.
- Eastern China has observed decreasing light rain amount and a reduced number of rainy days.
- Western China, the Yangtze River Basin and the southeastern coast have experienced pronounced precipitation increase with more frequent extreme events.
- South China precipitation has experienced remarkable decrease in spring, while persistent inter-decadal increase in summer.

Model and Data:

Model:

- RegCM3(Regional Climate Model version 3)

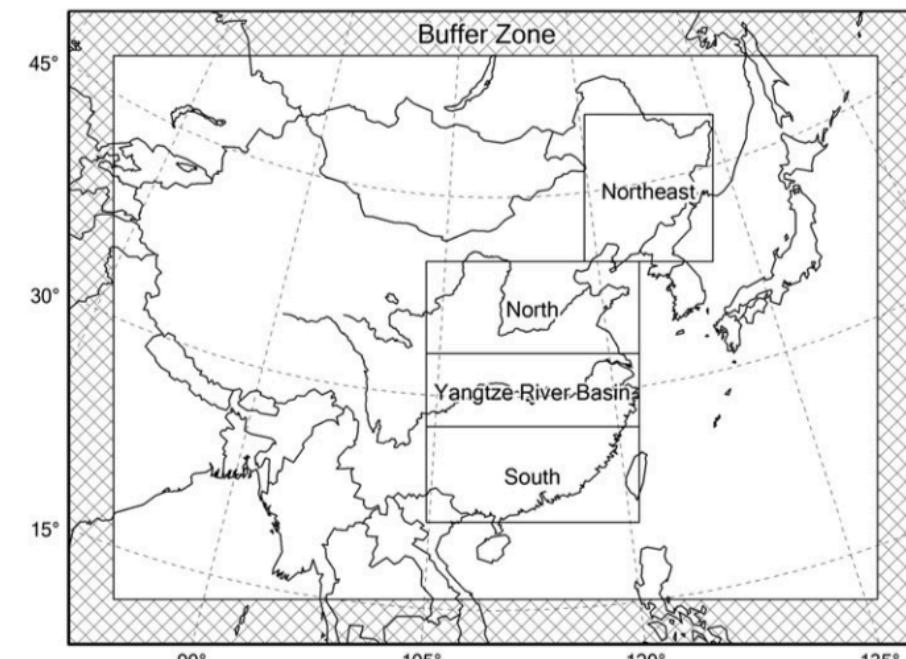
• CCSM

• Model for Interdisciplinary Research Climate (MIROC)

Observation:

- The observational data were from Xie et al. (2007) and Xu et al. (2009) for precipitation and surface air temperature, respectively.

Fig. 1 Computational domain and observation stations and the four key analysis regions. Hatched lines denote buffer zone area



Conclusions:

- CdR具有更高的分辨率，能更好的阐述区域天气过程，对于降水和地表温度的模拟比CCSM更精确；
- 在A1F1和A1B两种情境下，CCSM和CdR关于未来降水变化表现出不同的特征；
- 对于地表温度的未来变化，CCSM和CdR得到的空间特征基本一致(A1F1和A1B情境)；
- 除了不同情境导致的不确定性，不同的GCMs同样也会得到很大的不确定性(MIROC, CCSM driven RegCM3).

Results:

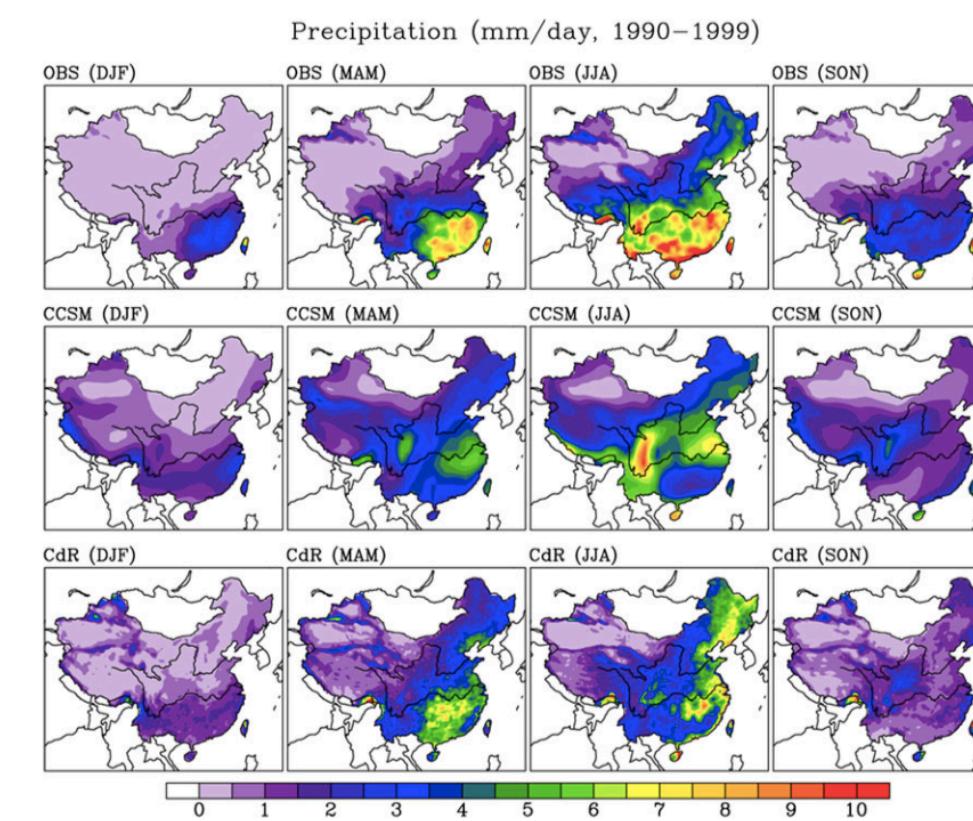


Fig. 2 Geographic distributions of seasonal (DJF, MAM, JJA, SON) mean precipitation (mm/day) averaged during 1990–1999 as observed (OBS) and simulated by CCSM and downscaled by RegCM3 (CdR)

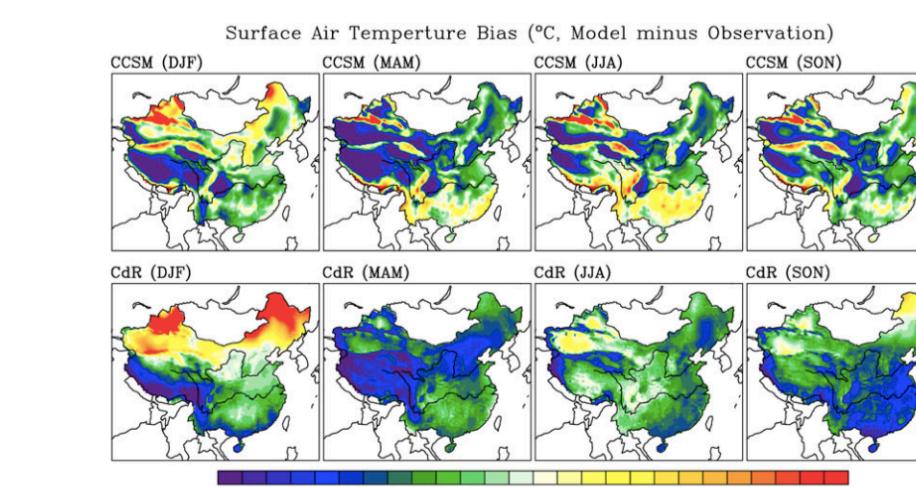


Fig. 4 Geographic distributions of seasonal (DJF, MAM, JJA, SON) mean surface air temperature bias (°C, model minus observations) averaged during 1990–1999 as simulated by CCSM and downscaled by RegCM3 (CdR)

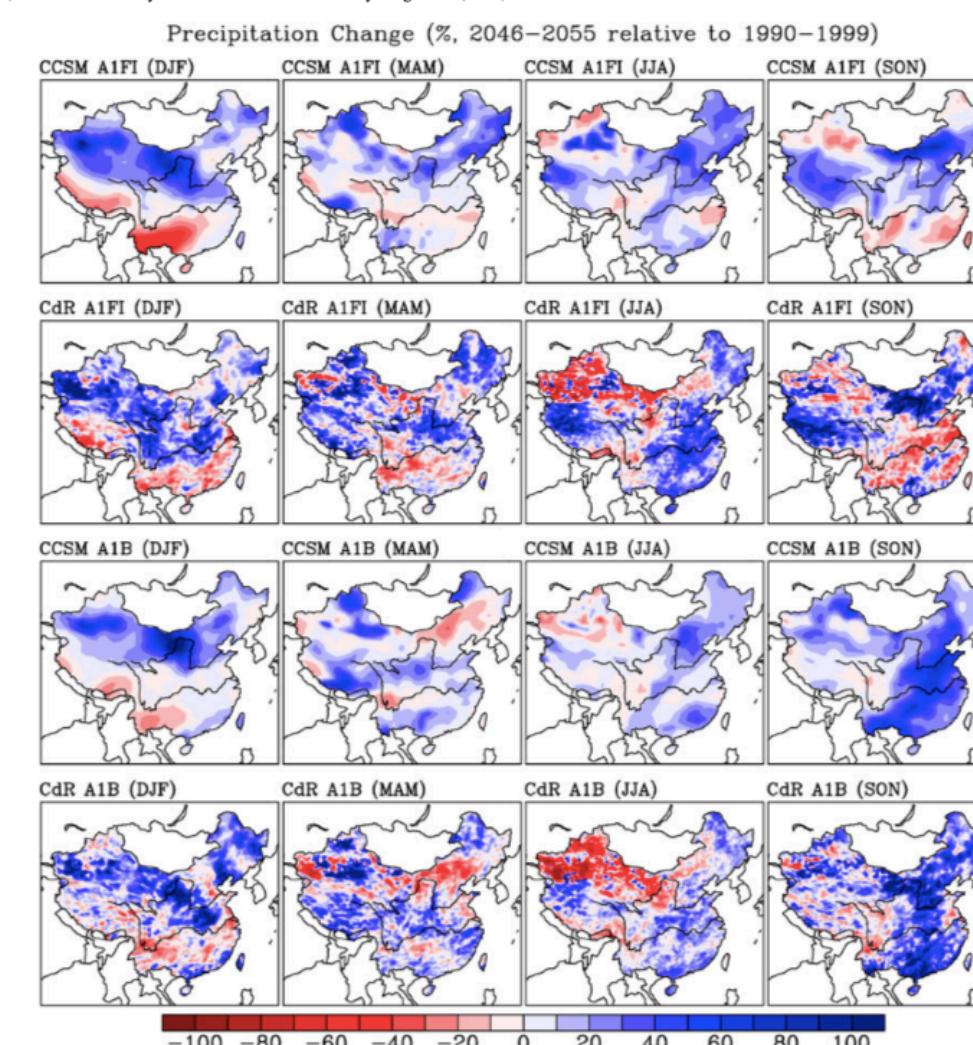


Fig. 5 Geographic distributions of projected future seasonal (DJF, MAM, JJA, SON) mean precipitation change (%) differences between the averages during 1990–1999 under A1FI and A1B scenarios as simulated by CCSM and downscaled by RegCM3 (CdR)

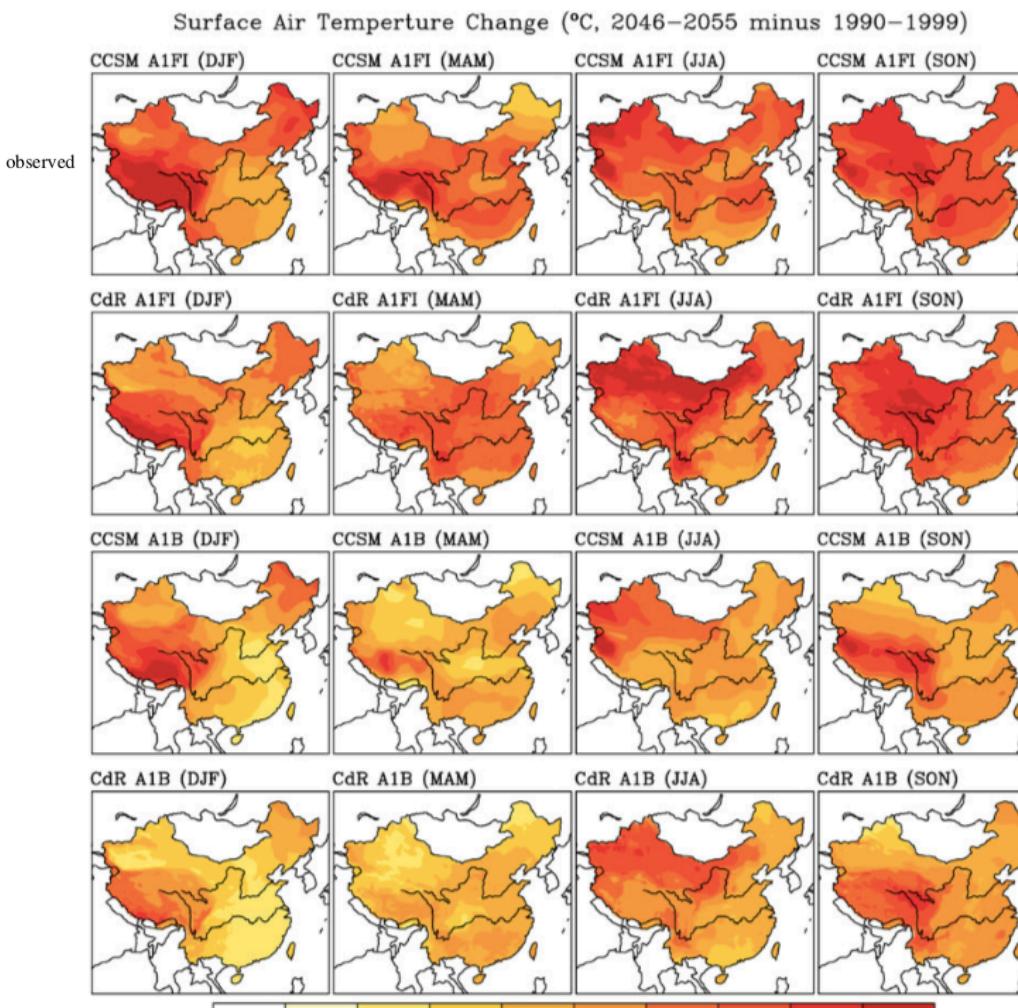


Fig. 6 Geographic distributions of projected seasonal (DJF, MAM, JJA, SON) mean surface air temperature change (°C) differences between the averages during 2046–2055 and 1990–1999 under A1FI and A1B as simulated by CCSM and downscaled by RegCM3 (CdR)

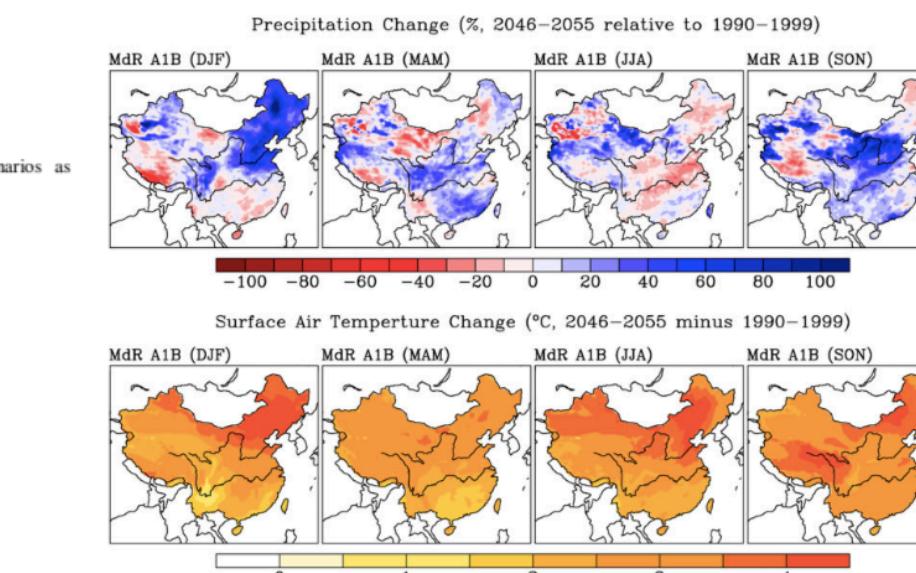


Fig. 7 Geographic distributions of projected seasonal (DJF, MAM, JJA, SON) mean precipitation change (%) differences between the averages during 2046–2055 and 1990–1999 relative to 1990–1999 under A1B as downscaled by MIROC driven RegCM3 (MdR)

Report

2020.4.6

張慕琪

Methods

实验设计：

已完成图片记录： time series (Beijing, China)

待完成绘图：

1. Maps_differences;
2. taylor diagram (Beijing, China);
3. *histgram(Beijing, China).*

时间： Train & validation (=historical)

数据： CCSM, GMFD, ANN(before BC) , ANN(after BC), Linear

变量：

· Temperature:

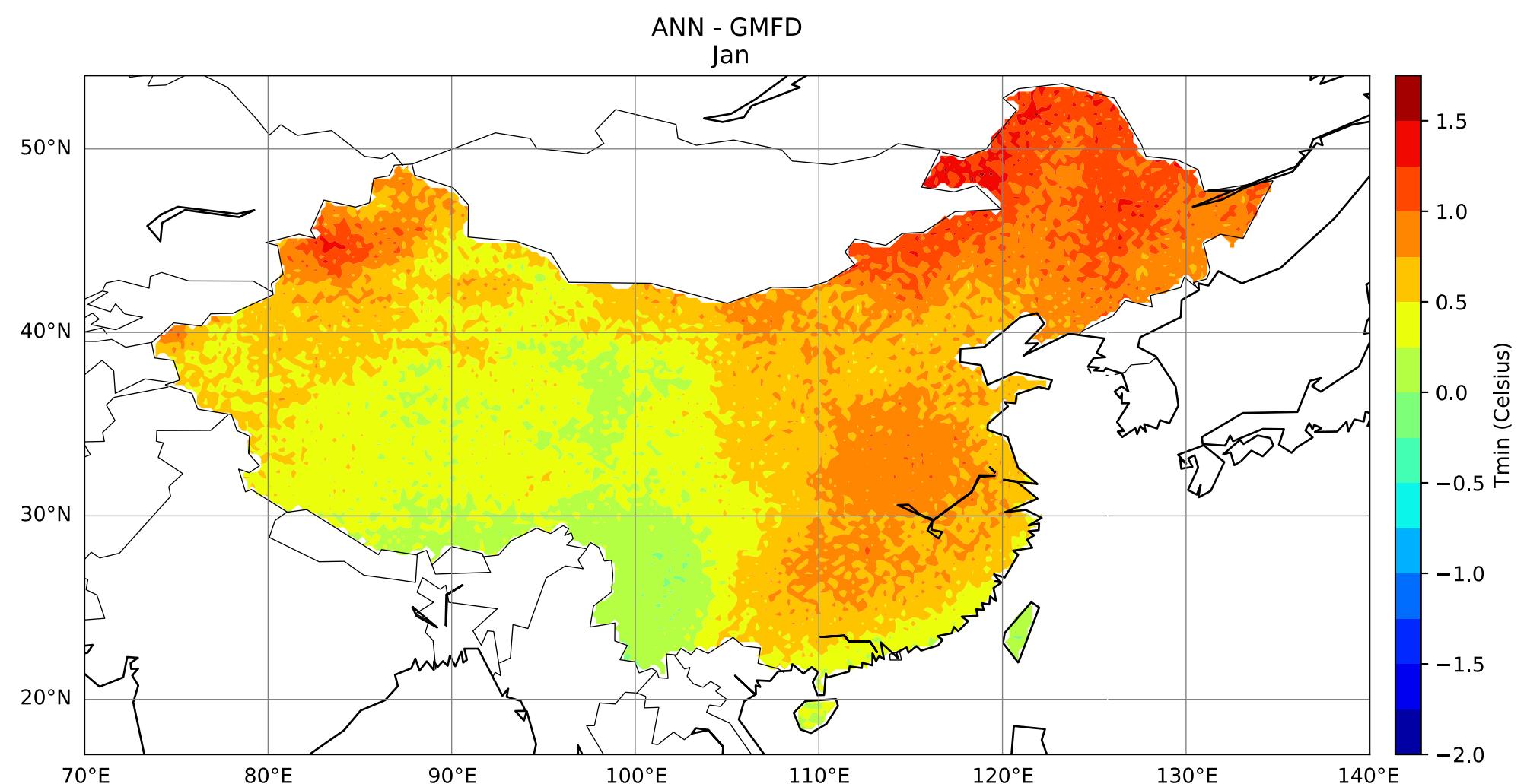
1. Time series

Results

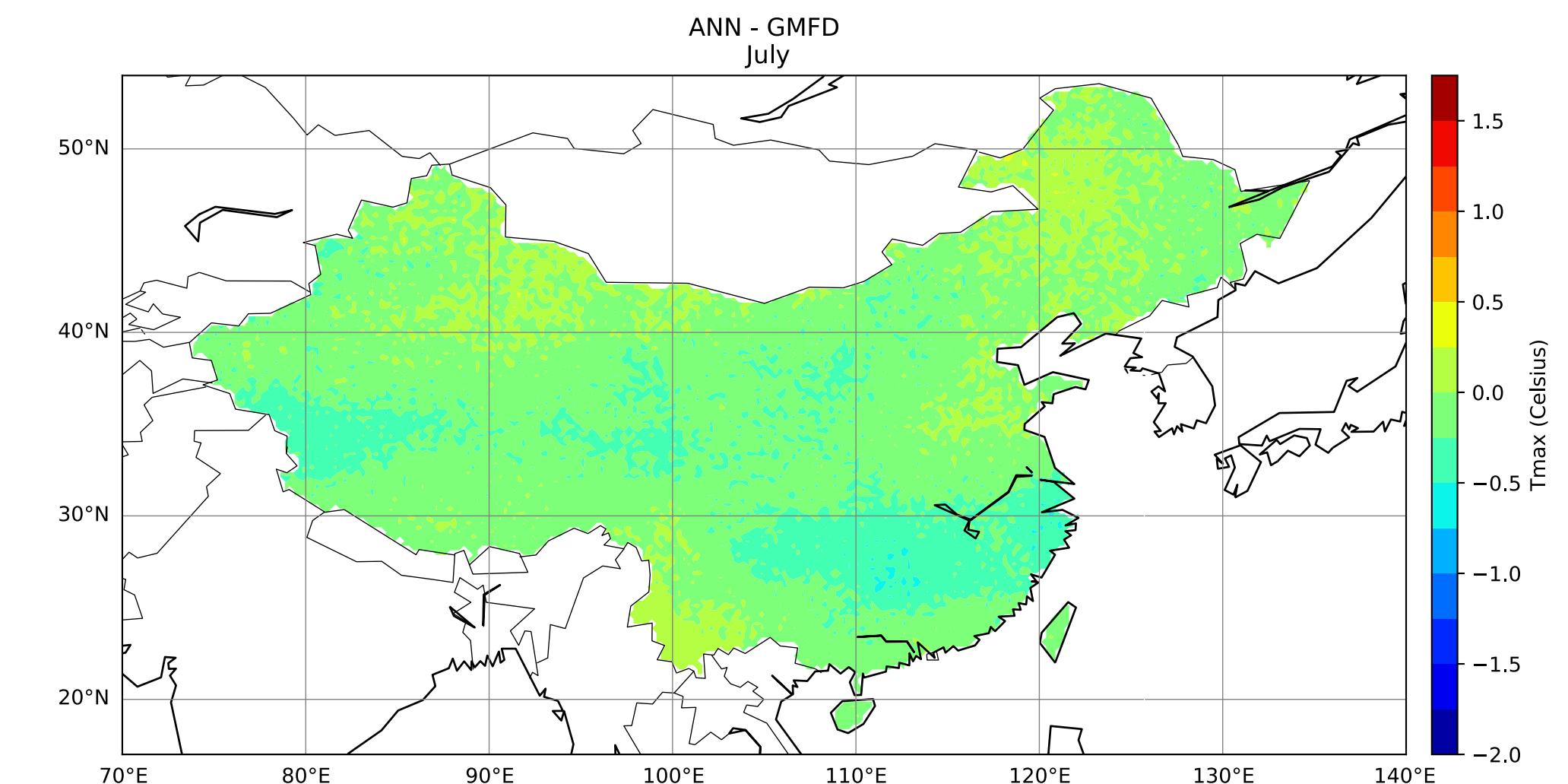
Maps

China

Tmin



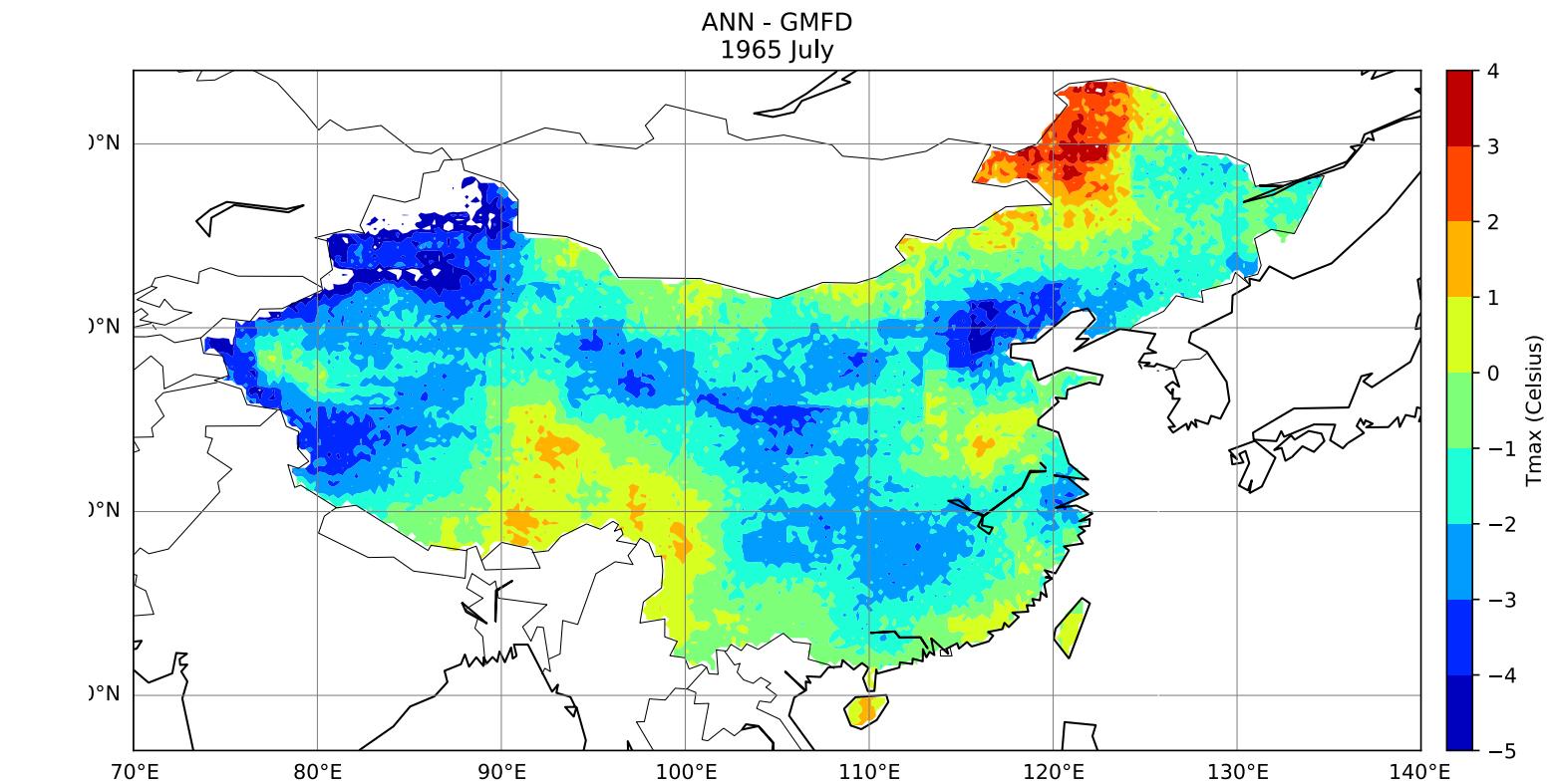
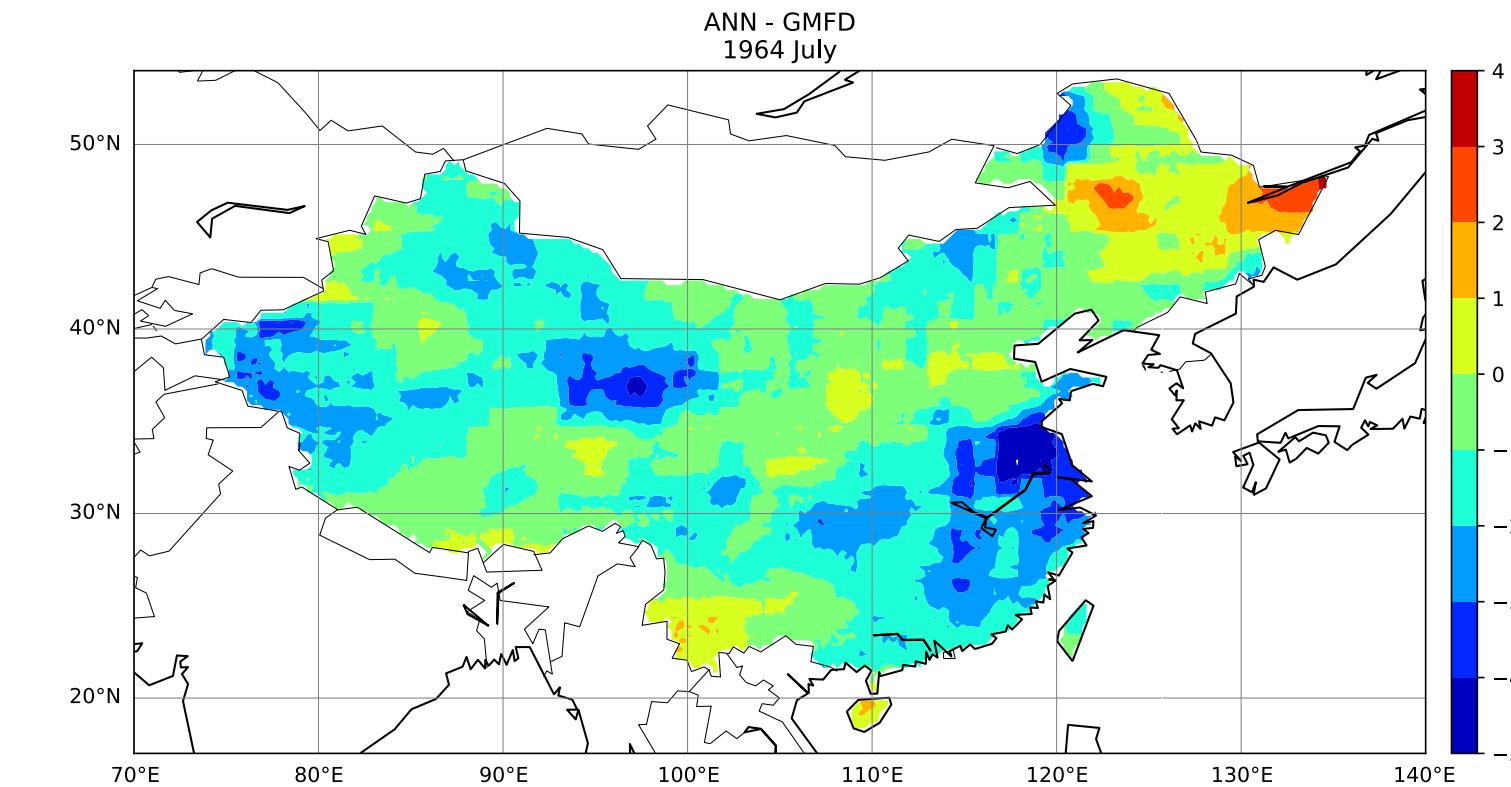
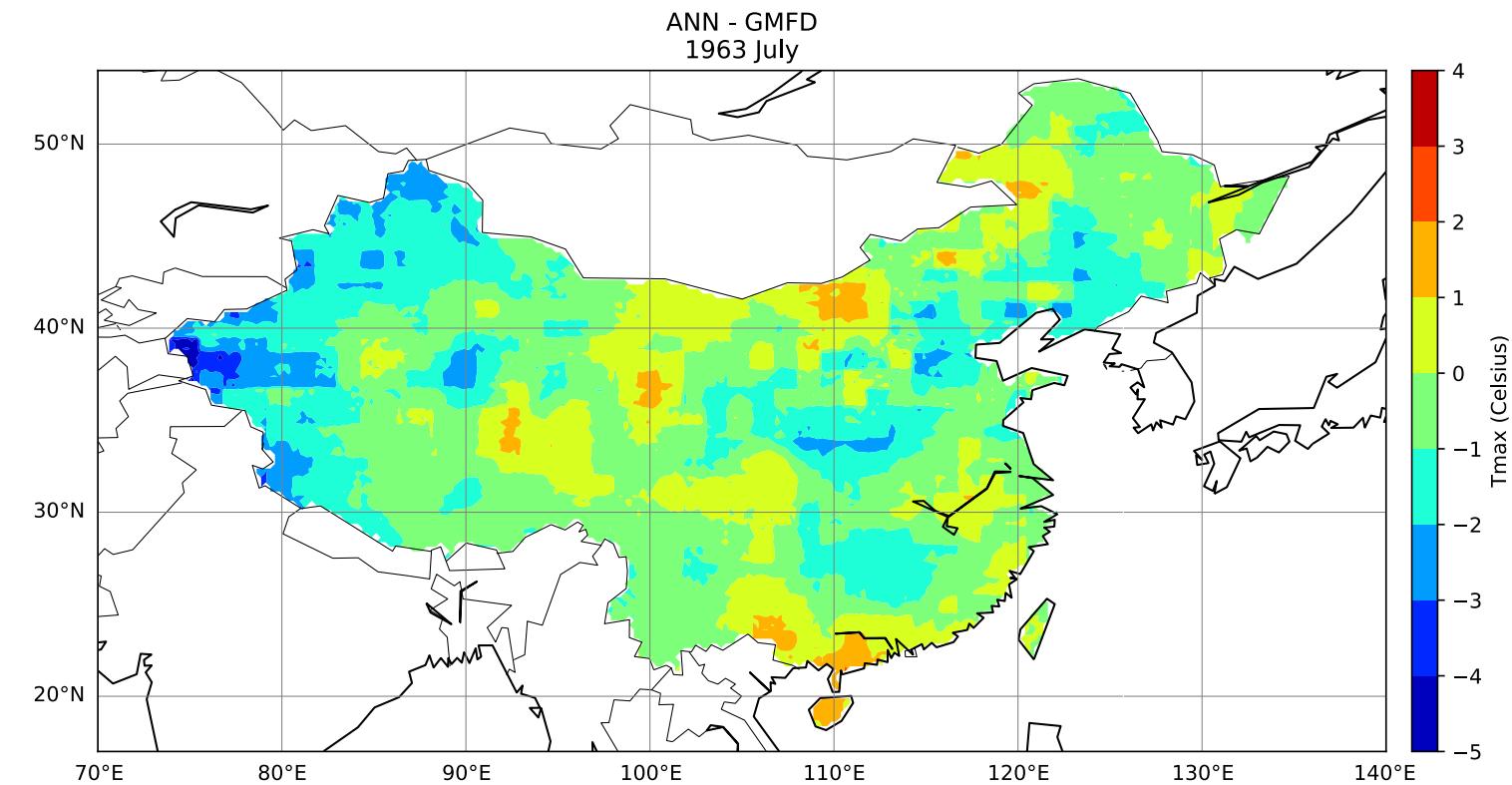
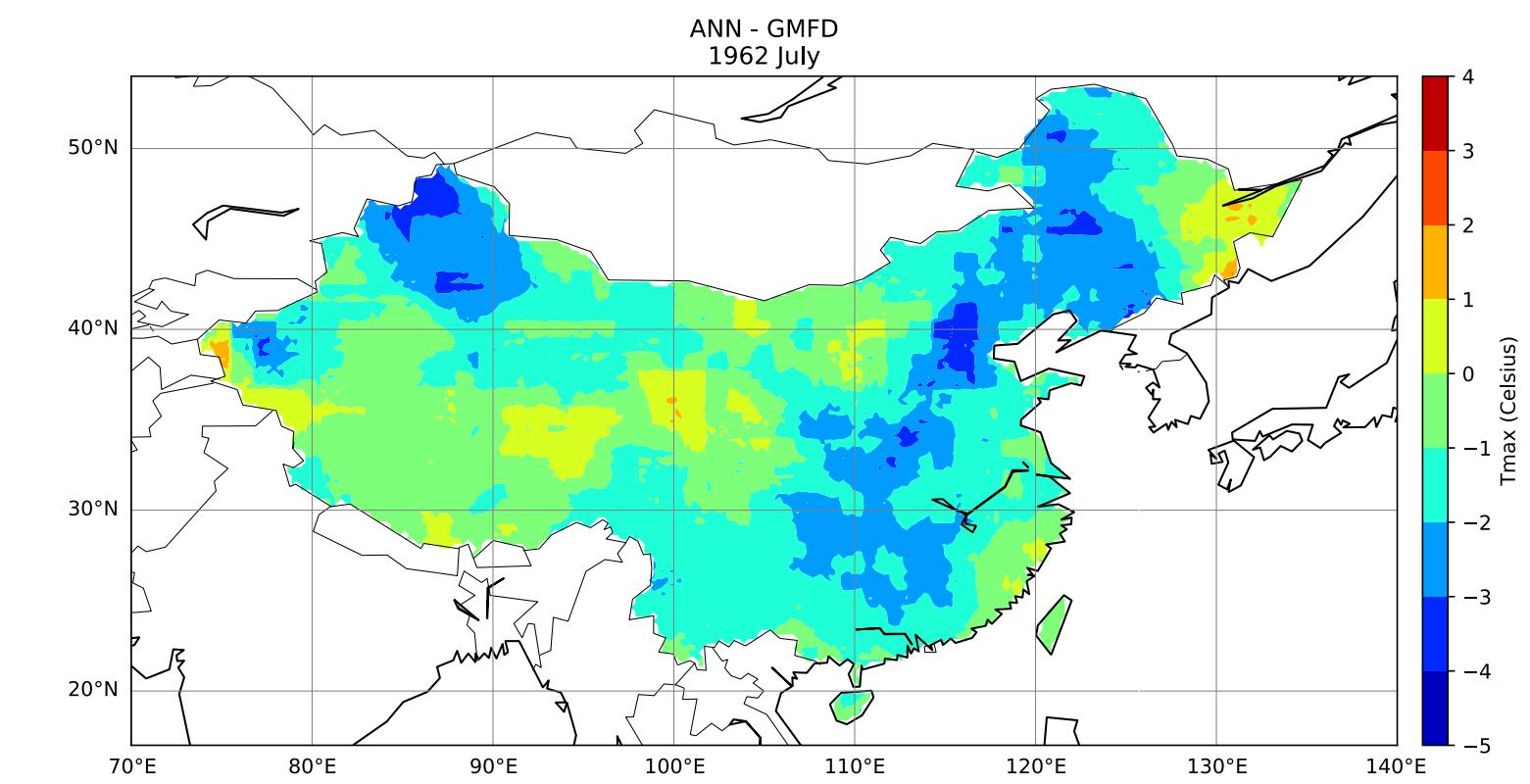
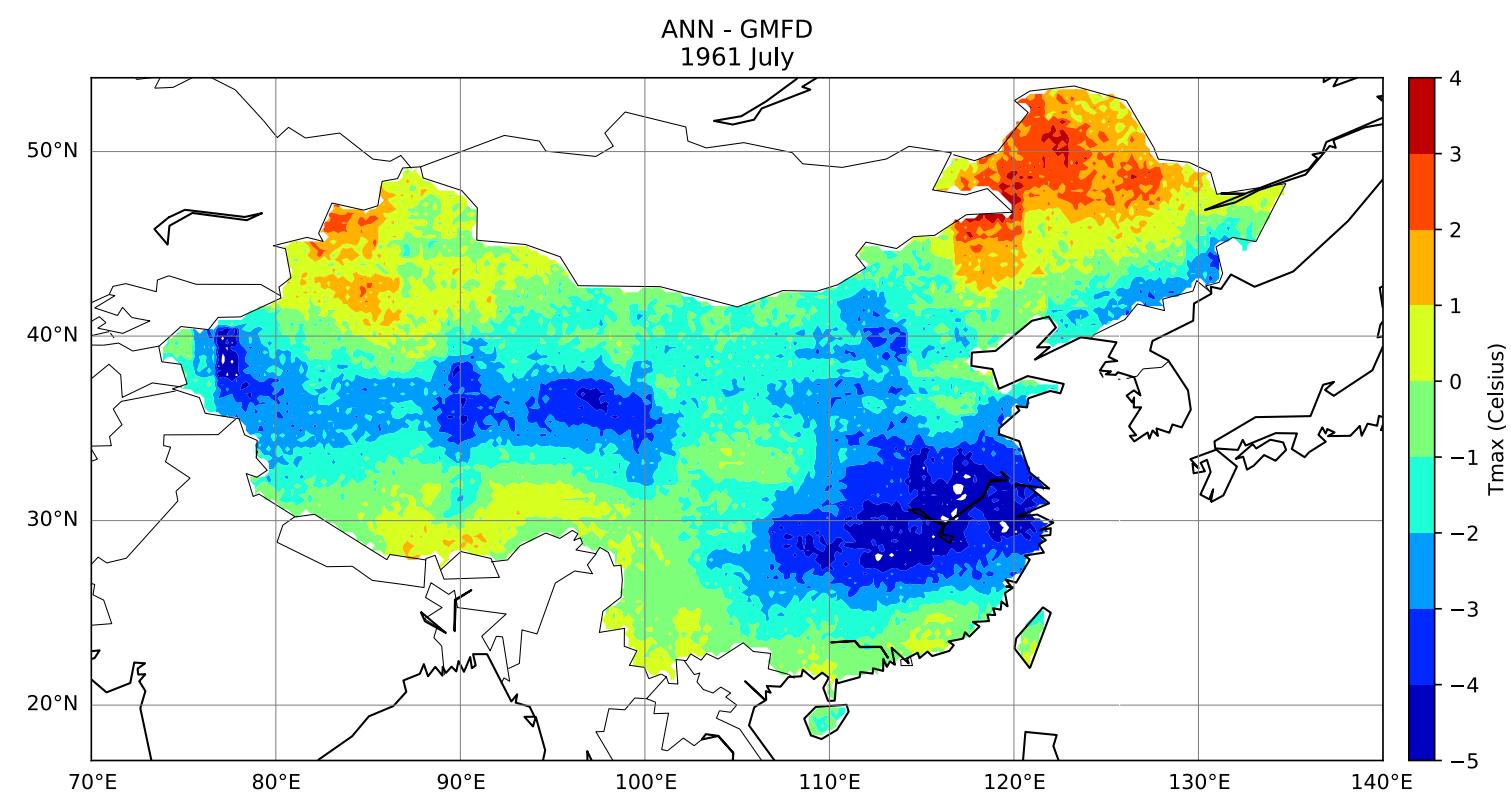
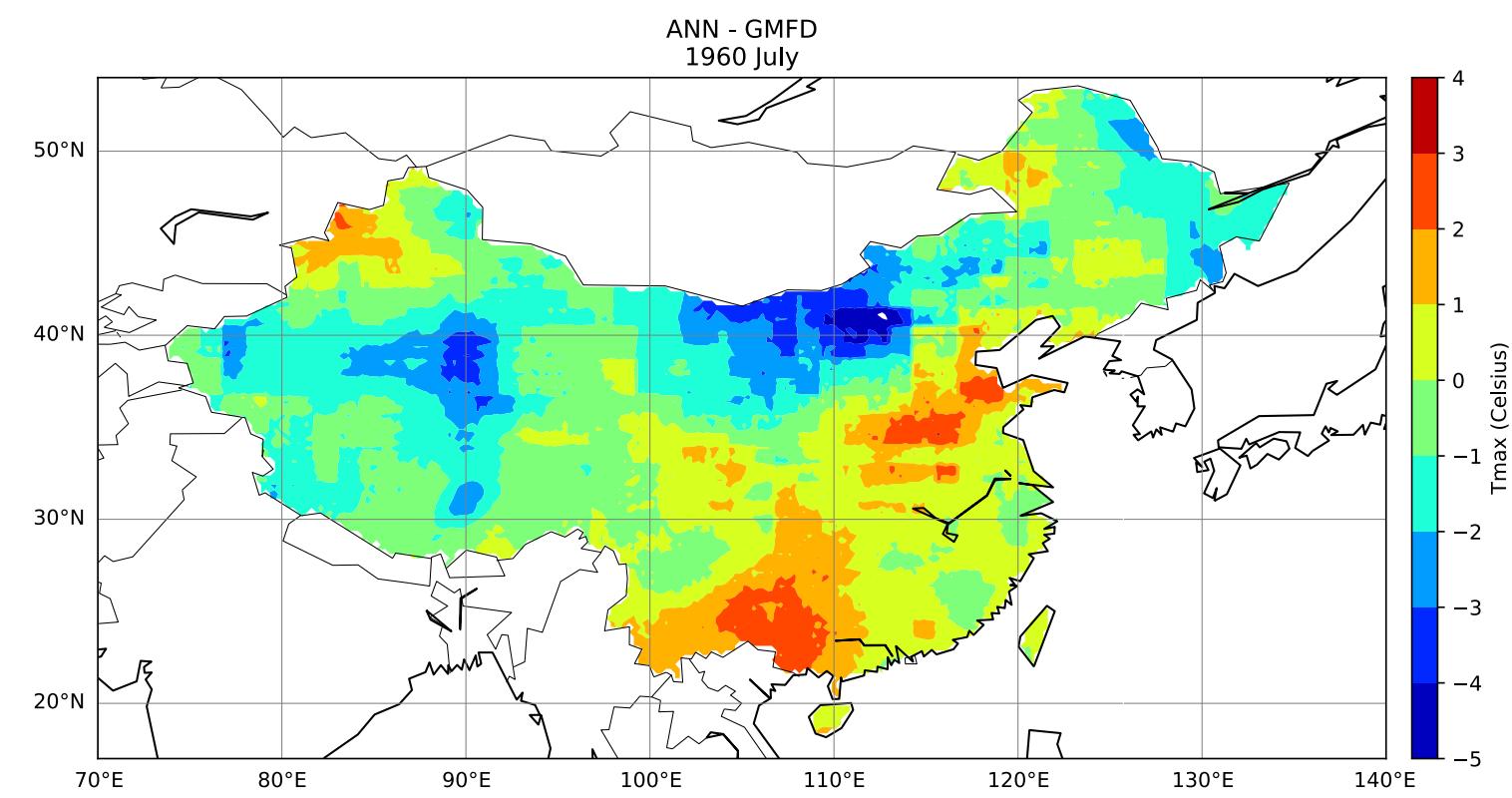
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Results

Maps China

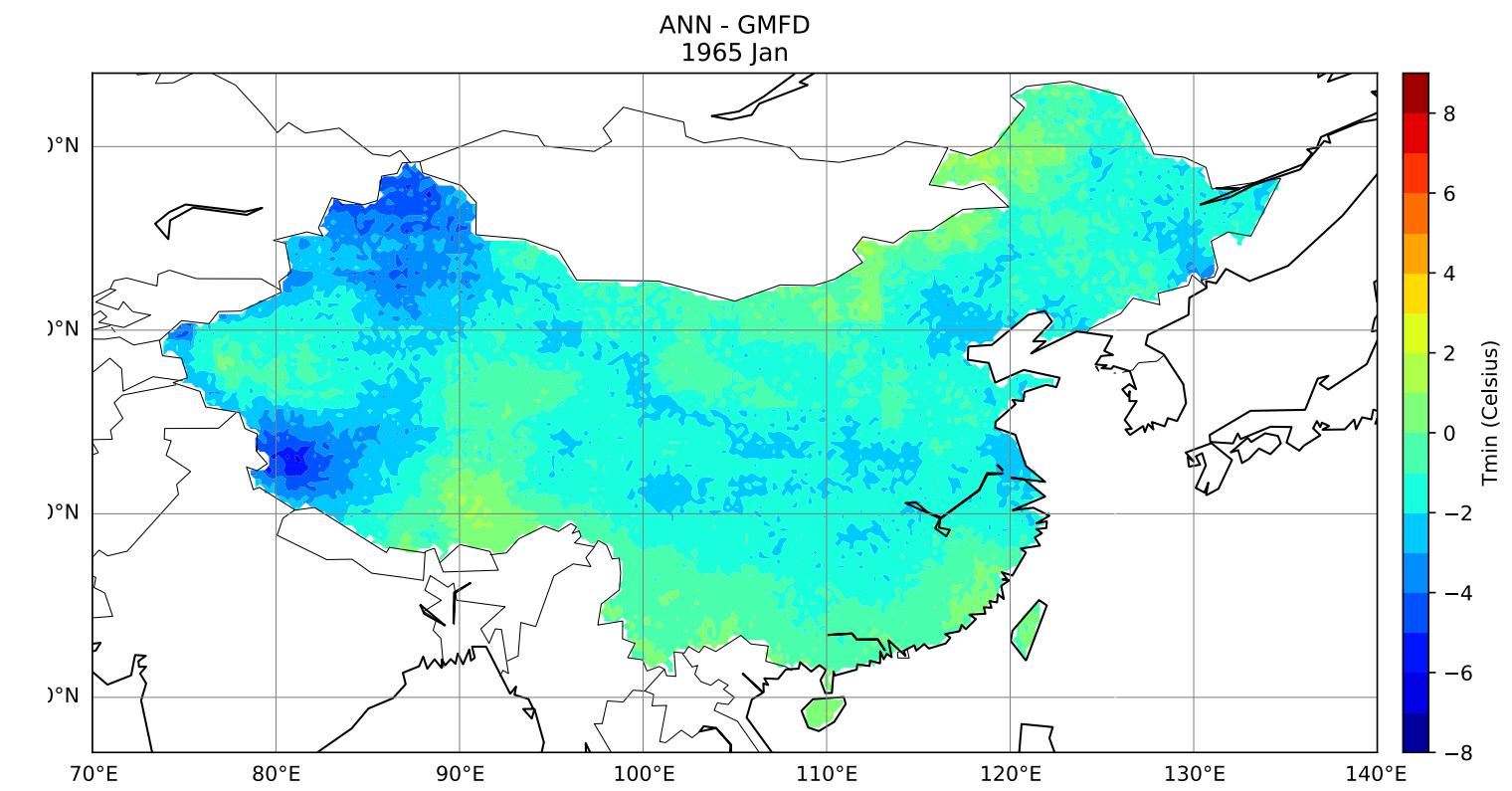
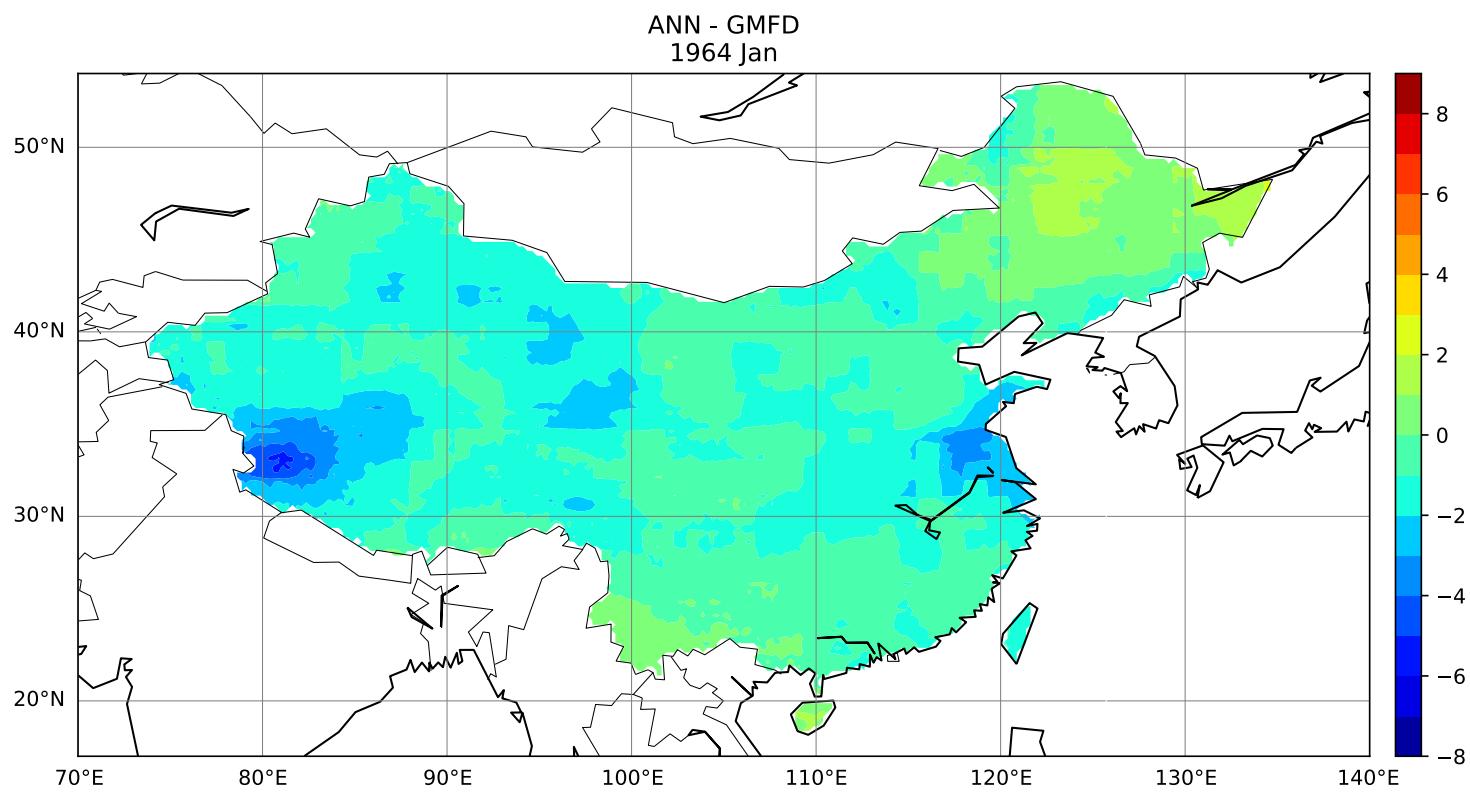
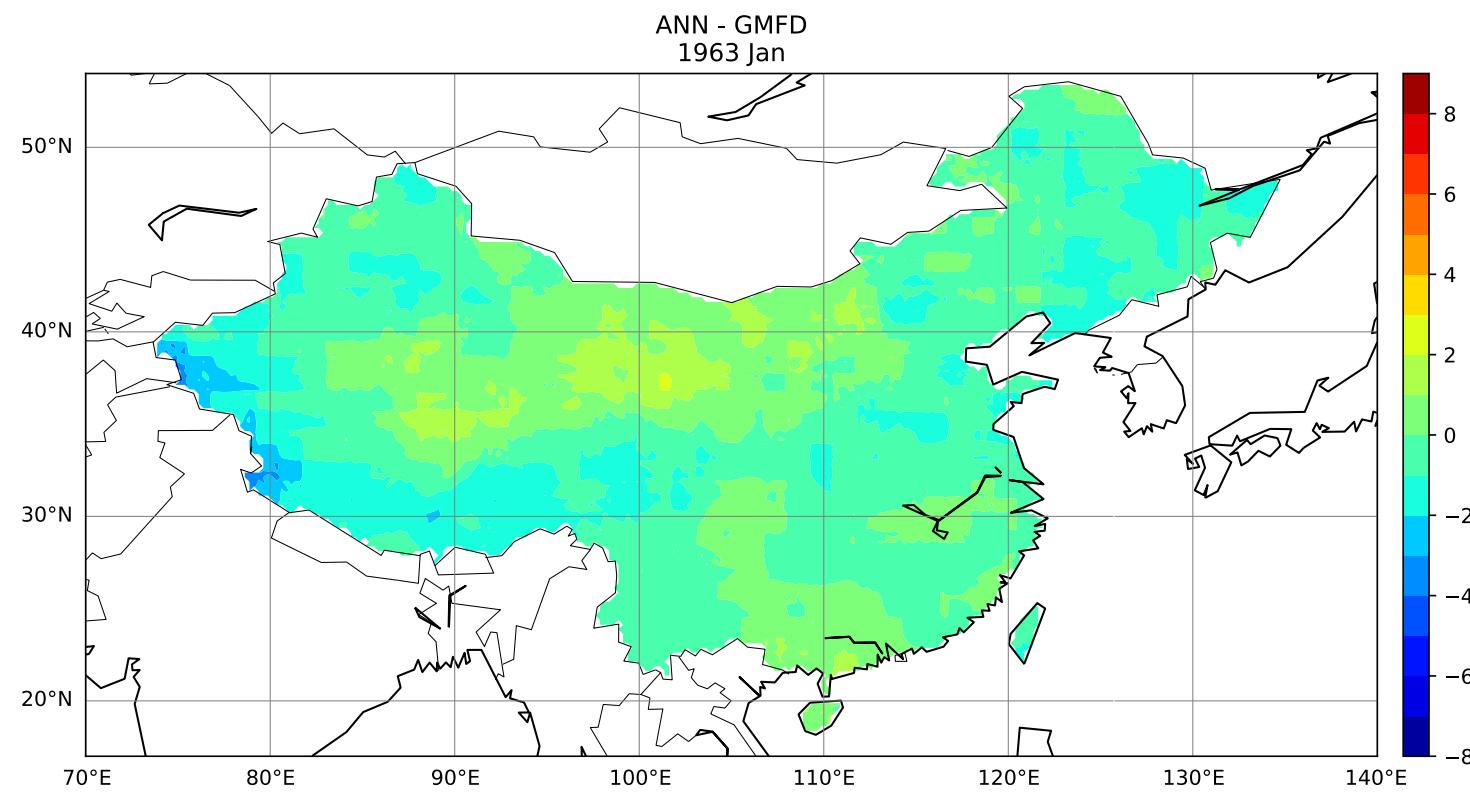
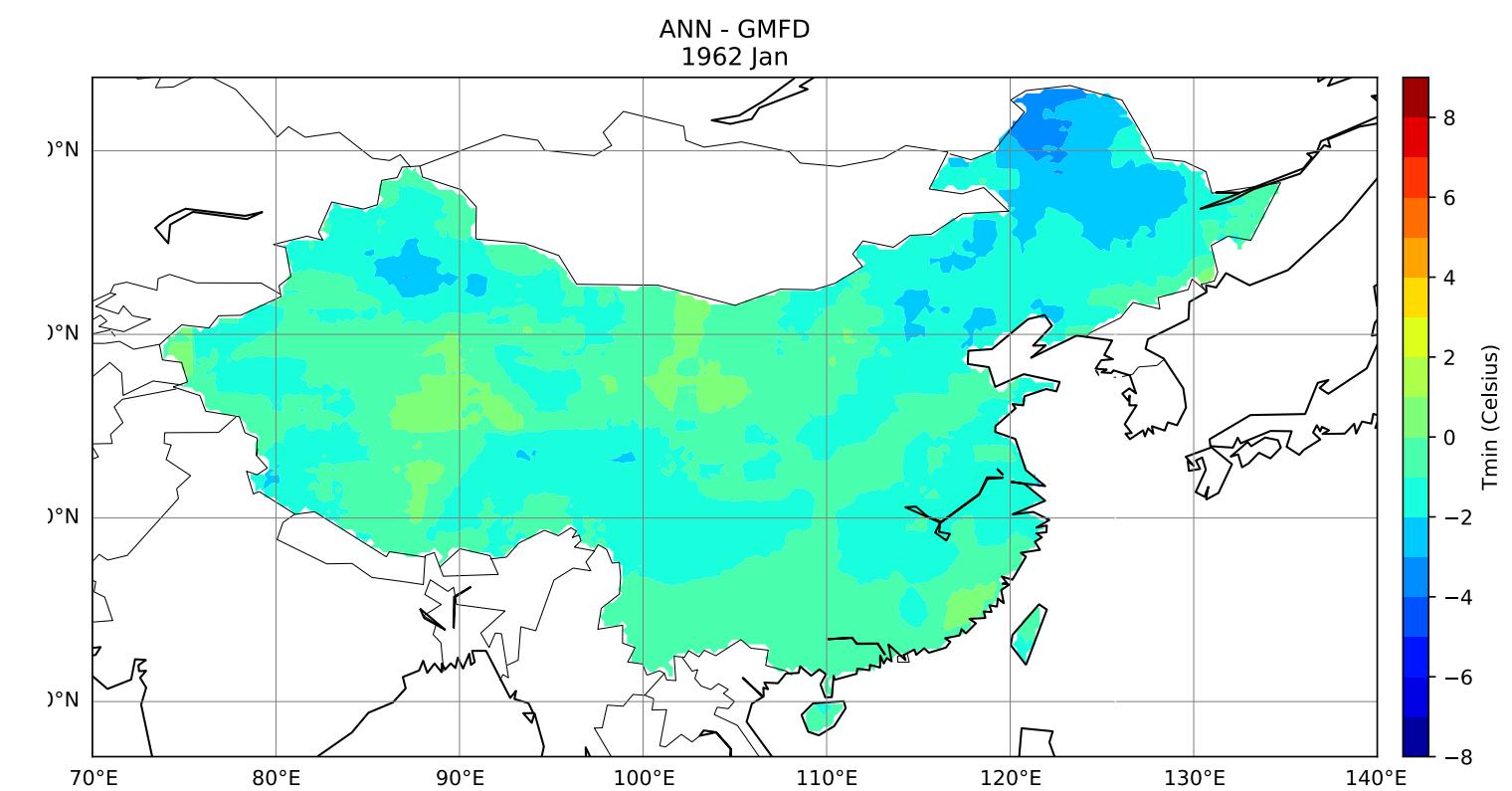
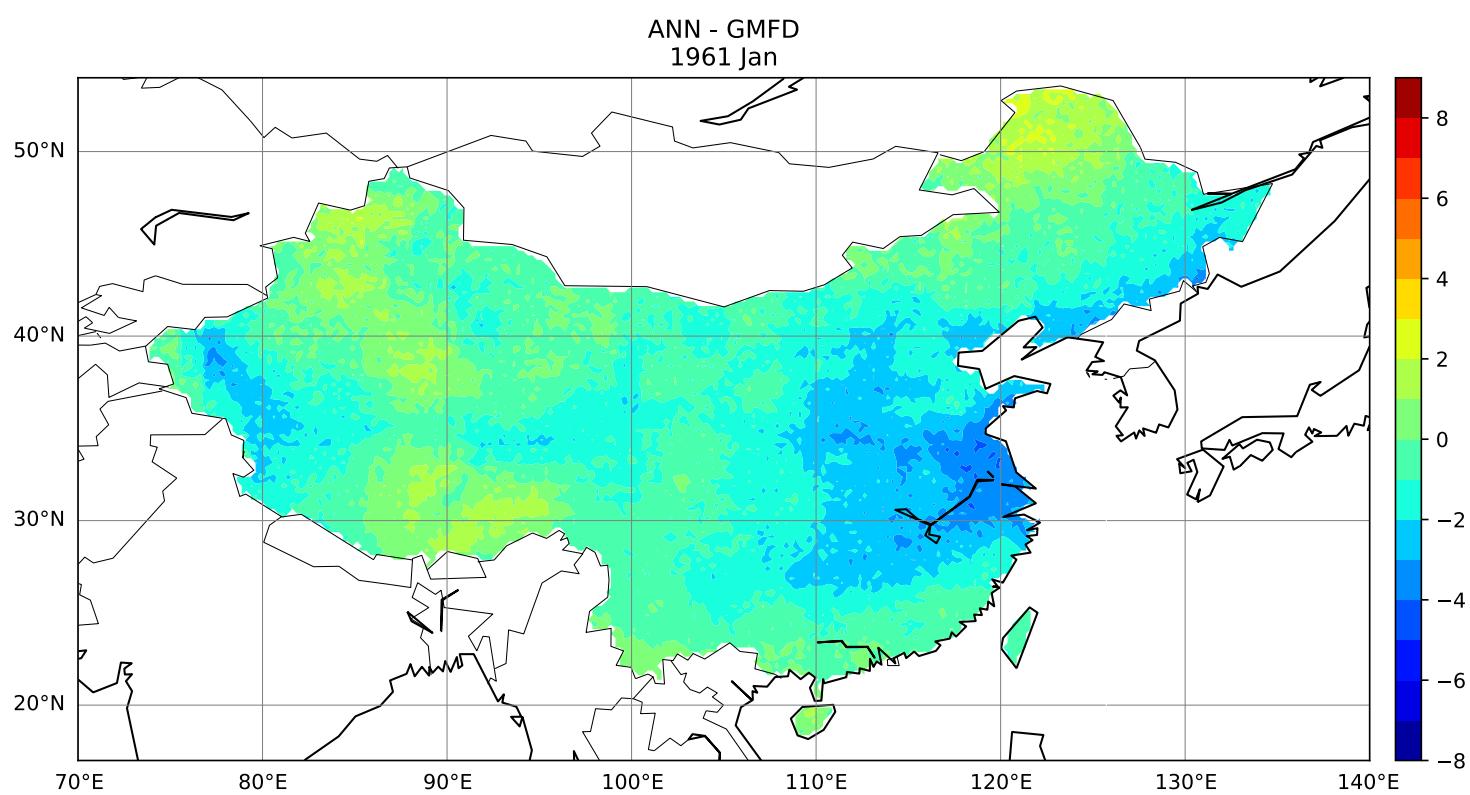
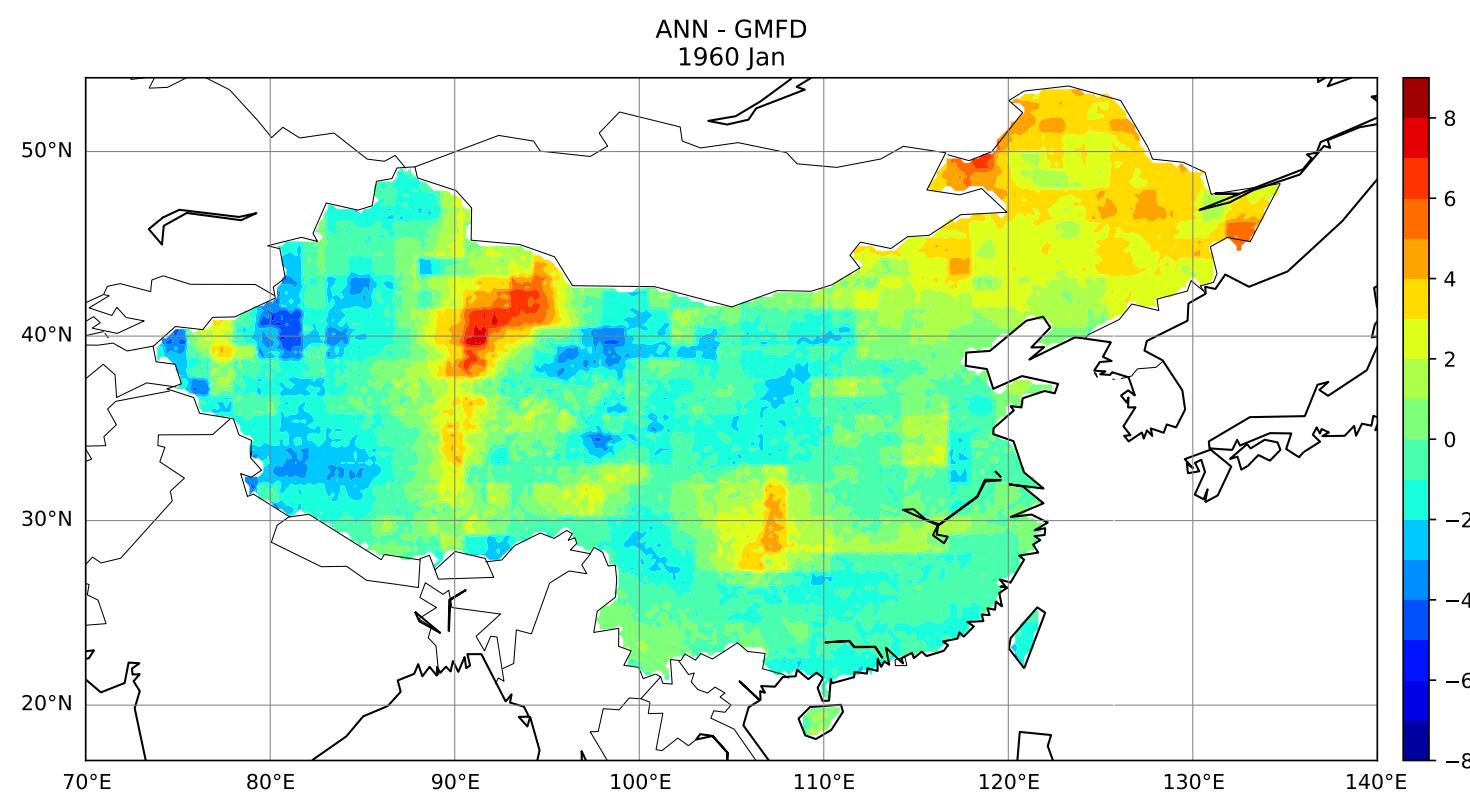
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Results

Maps China

Tmin



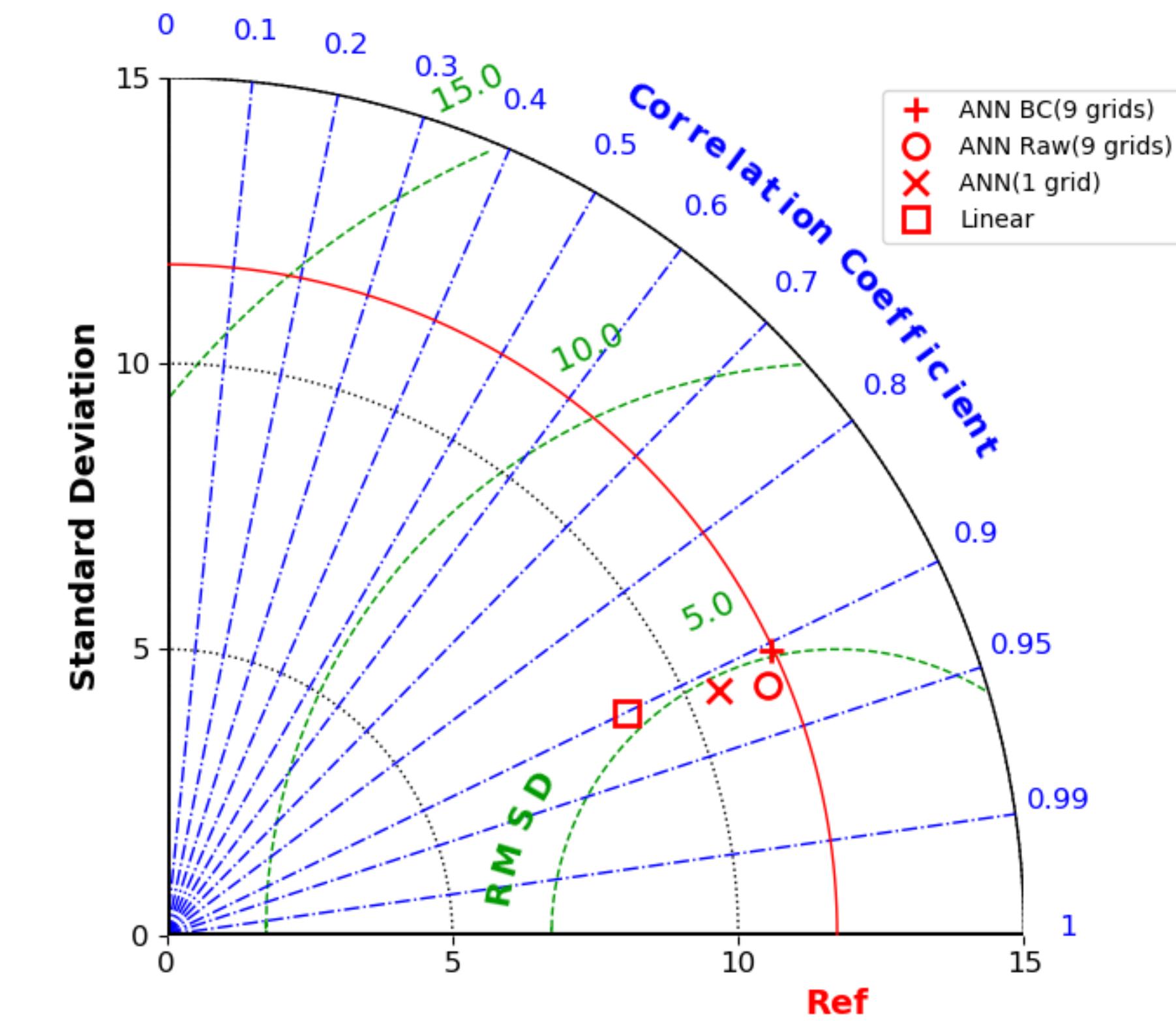
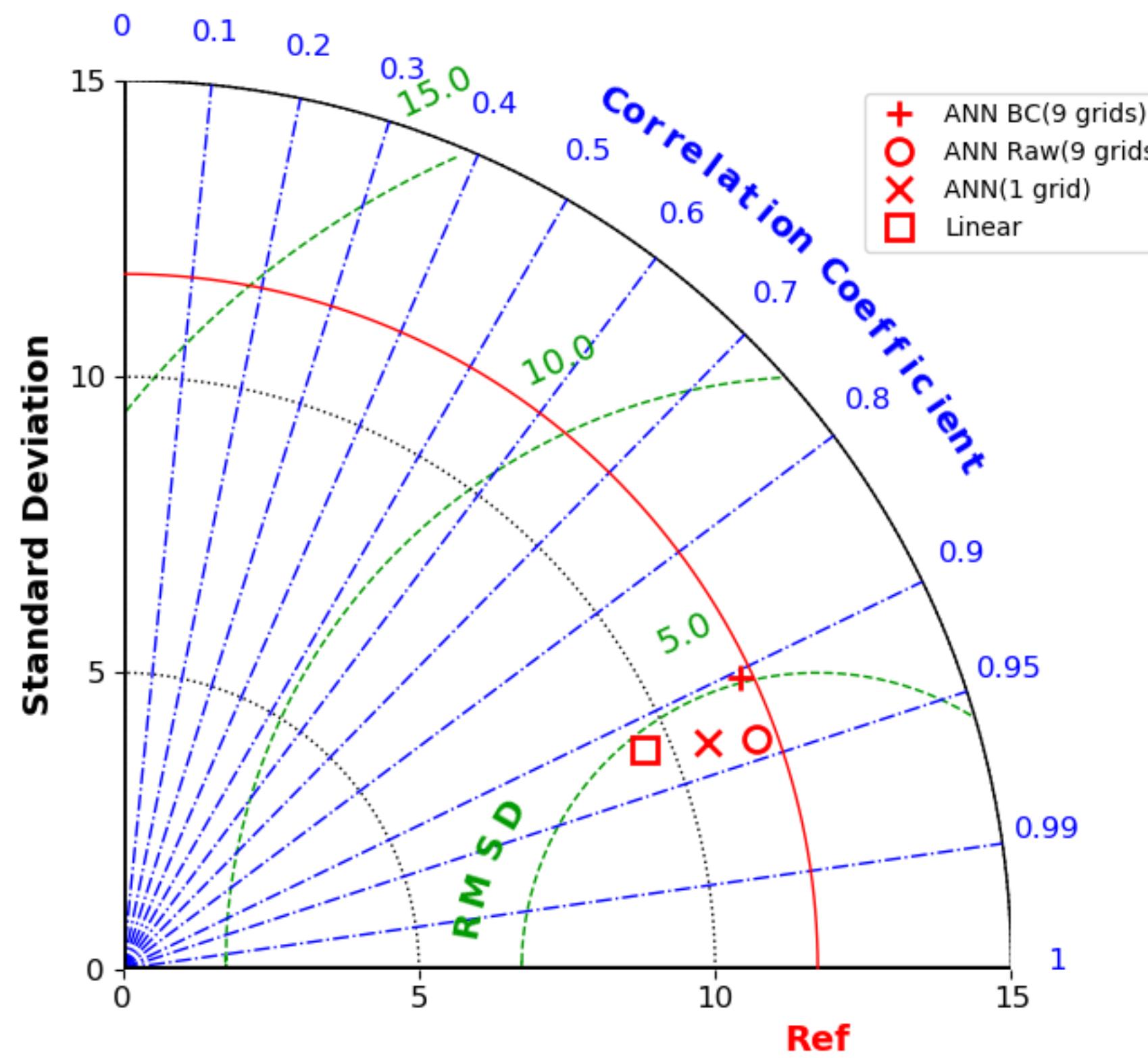
Results

Taylor diagram

Beijing

Tmin

Tmax



謝謝