Monthly albedo comparison of CMIP and ERA datasets

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Analysis

Basic calculations for CMIP and ERA-Interim data

Setting the operating directories for CMIP and ERA-interim data ...

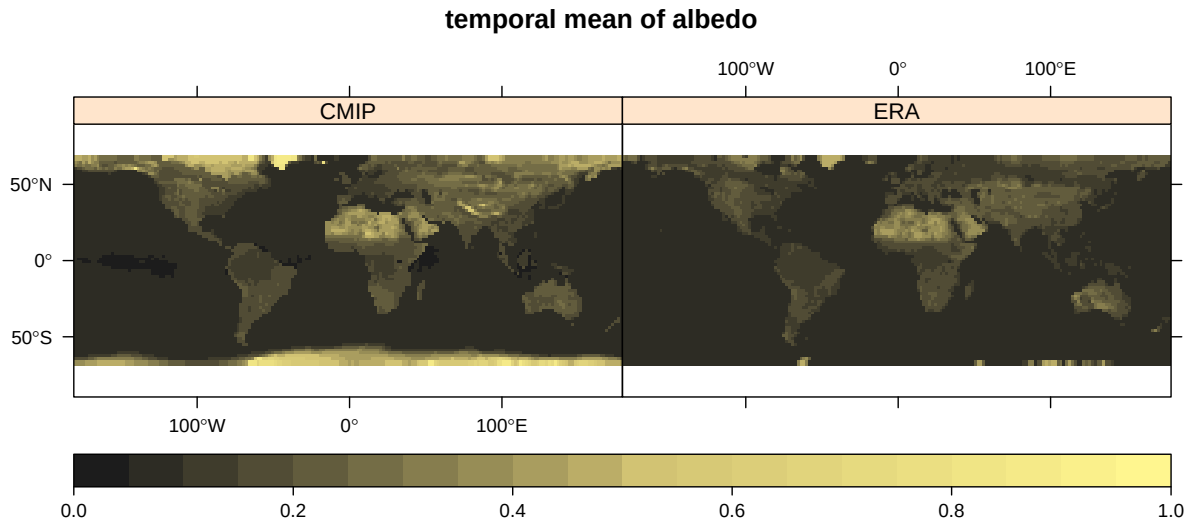
```
##### Operating directories #####

WD.CMIP = "MPI-M.CMIP5.AMIP\\Amon\\r2i1p1"

WD.ERA = "ERA-Interim"
```

and run *source('Main.R')* will start the preprocessing, including:

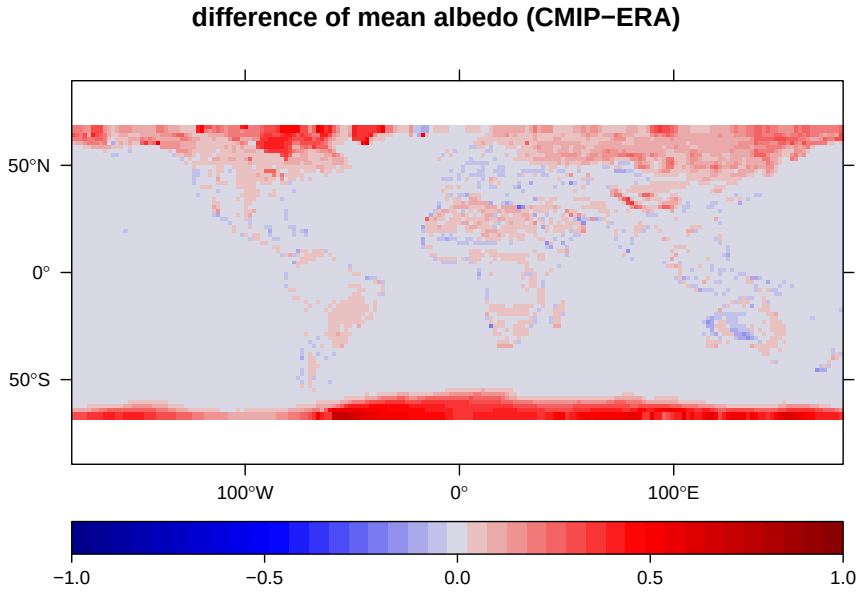
- loading monthly CMIP data for upwelling and downwelling short wave data,
- calculating albedo from the ratio of shortwave data,
- if necessary, aggregating daily ERA-Interim albedo data at 12:00 am to monthly data,
- loading monthly ERA-Interim albedo data,
- adjusting the resolution of the finer ERA-Interim data to the coarser CMIP data,
- masking data that is NA in one of the datasets, and
- wraping data to center the maps on the Atlantic ocean.

```
Get CMIP:
Time difference of 9.788 secs

Get ERA:
Time difference of 0.09800005 secs

Adjust resolution:
Time difference of 20.115 secs

Mask data:
Time difference of 2.369 secs

Wrap data:
Time difference of 15.245 secs

Do all:
Time difference of 48.266 secs
```

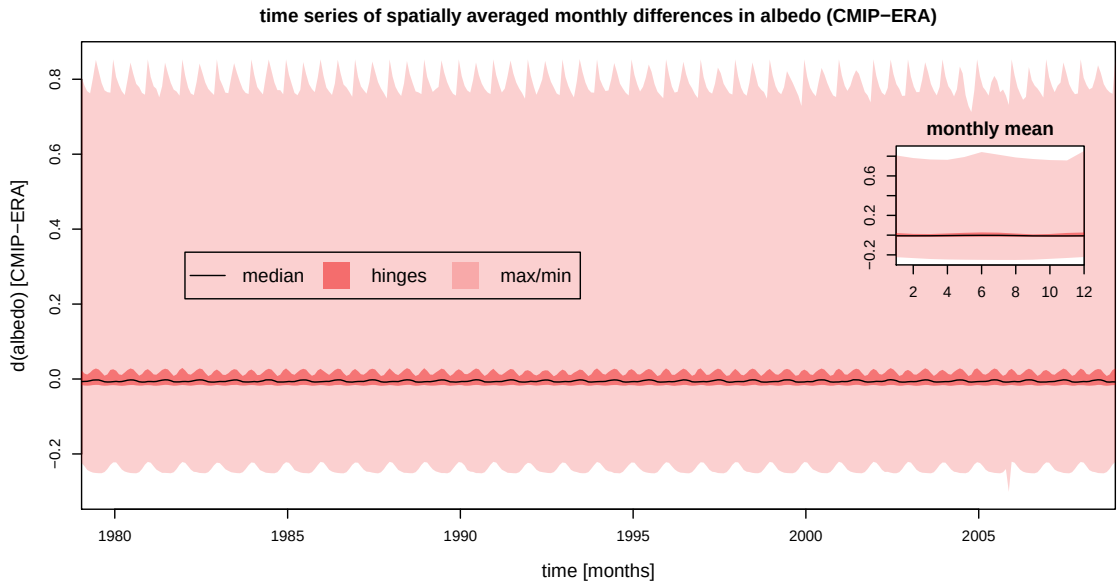
Overview on the datasets ...



... and their differences

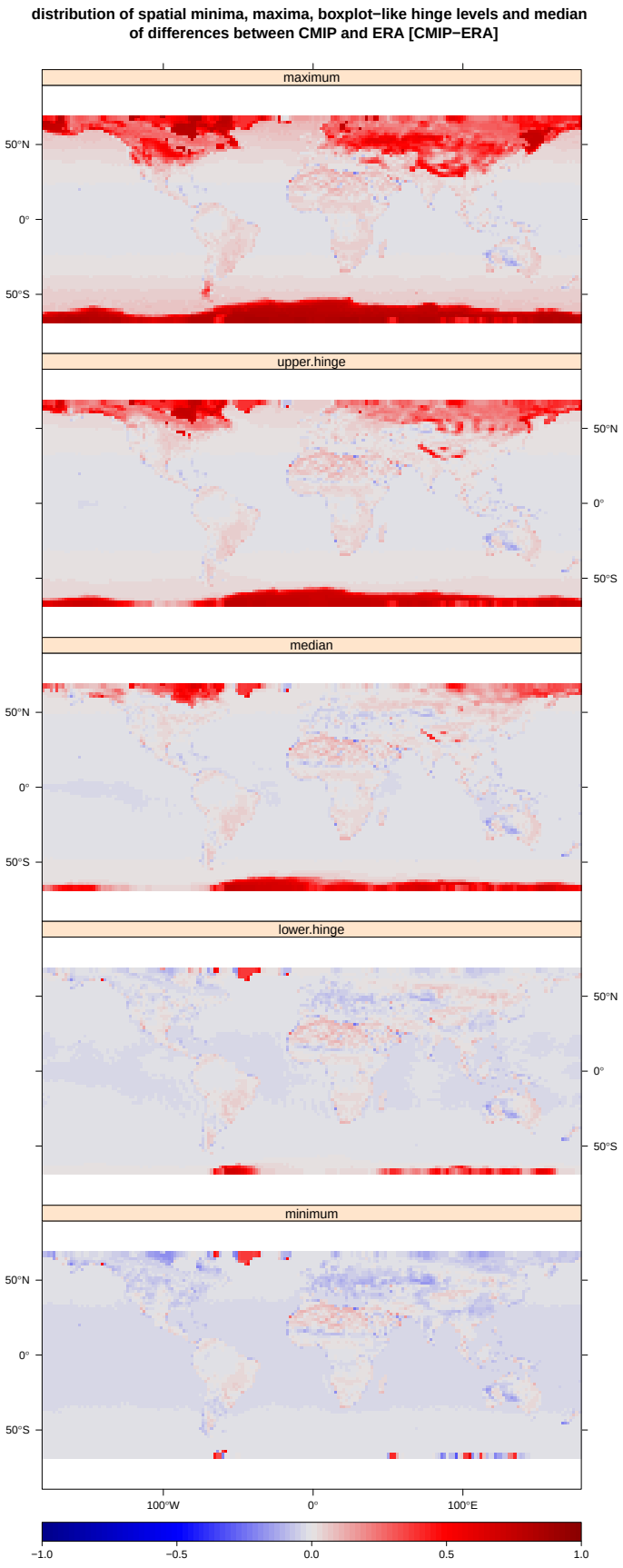


Spatially aggregated differences analysis in the time series of CMIP and ERA



The time steps are aggregated in spatial means of differences and boxplot-like calculations lead to the determination of the hinges.

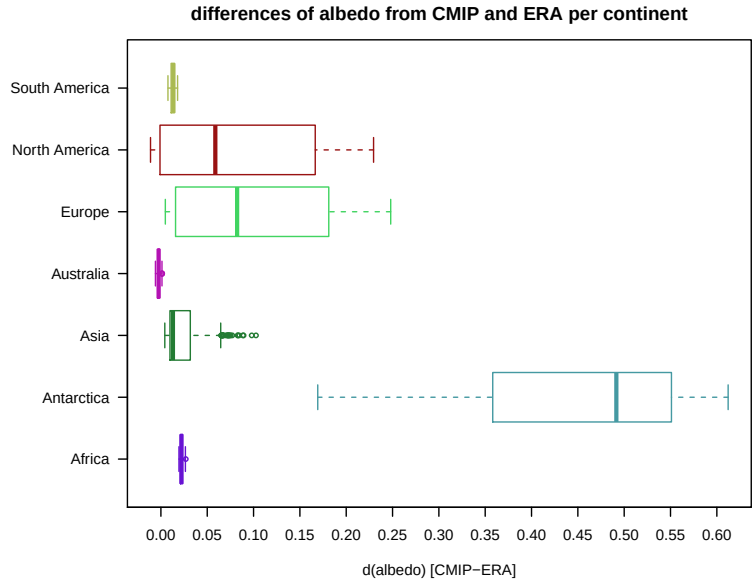
Temporally differences between CMIP and ERA as maps of boxplot-like occurence

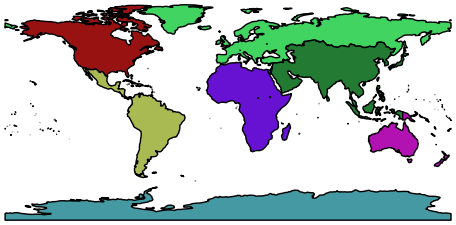


Mapped boxplot-like calculations of pixel-wise time series data of differences between CMIP and ERA.

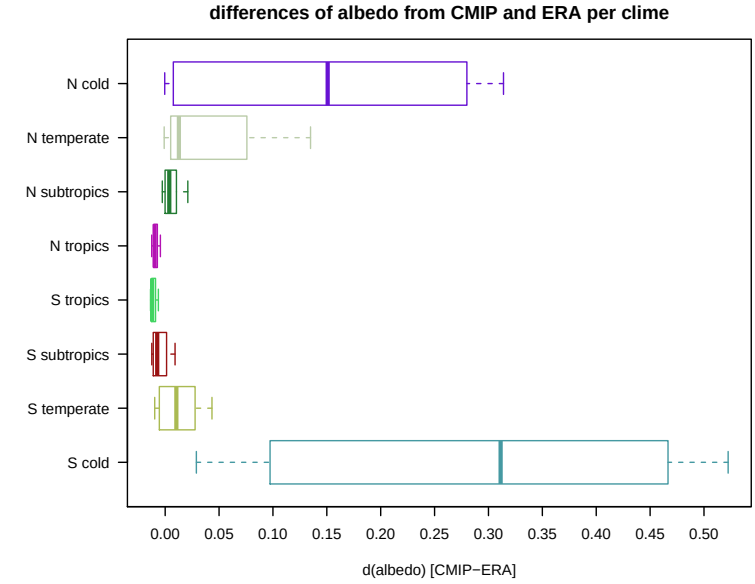
Spatially aggregated temporal differences between CMIP and ERA ...

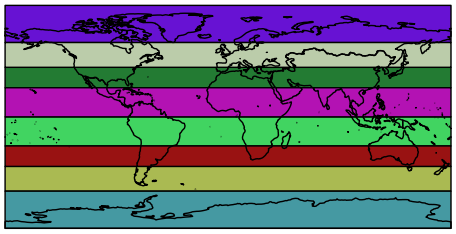
... by continent





... by latitude

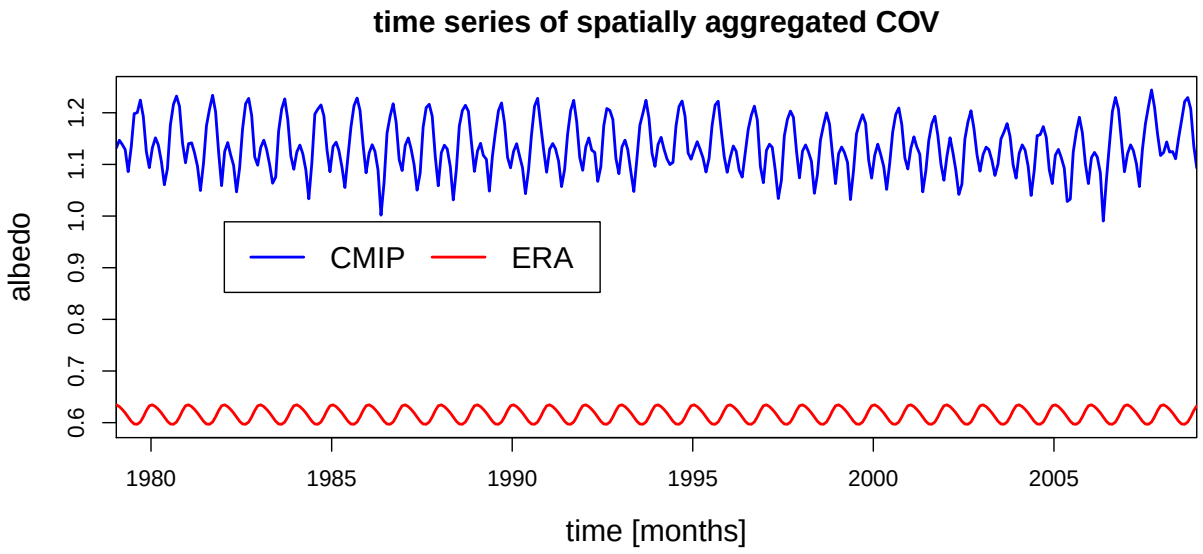




Coefficient of variation (COV) for CMIP and ERA

The coefficient of variation is calculated as: $\frac{\sigma}{\mu}$

Time series of spatial COV



Maps of temporal COV