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 9.455945 secs

Get ERA:
Time difference of 0.09600997 secs

Adjust resolution:
Time difference of 19.60796 secs

Mask data:
Time difference of 2.387239 secs

Wrap data:
Time difference of 15.42354 secs

Do all:
Time difference of 47.55175 secs
```
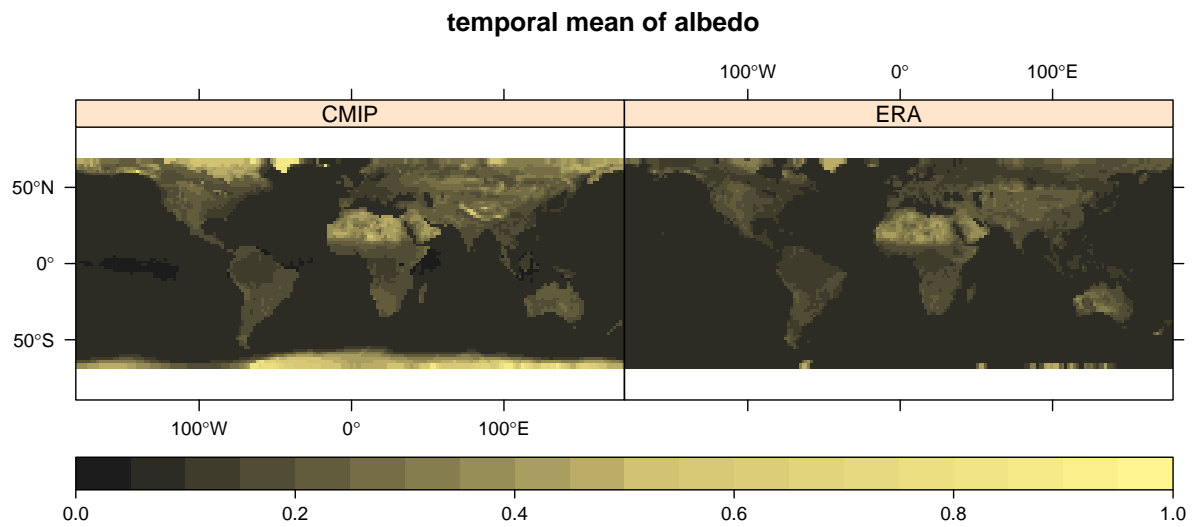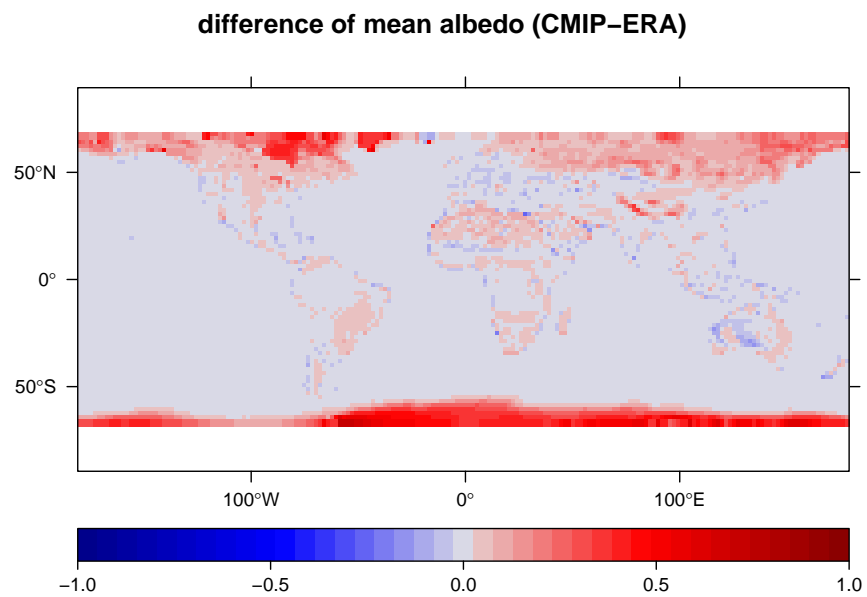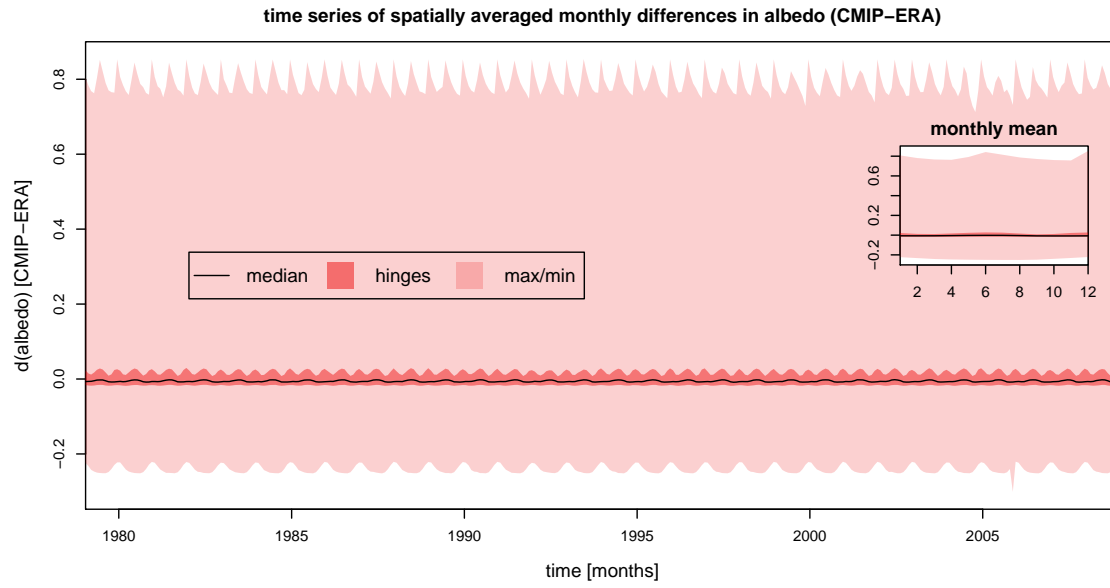
Overview on the datasets ...

temporal mean of albedo


... and their differences

difference of mean albedo (CMIP−ERA)

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

time series of spatially averaged monthly differences in albedo (CMIP−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

distribution of spatial minima, maxima, boxplot−like hinge levels and median
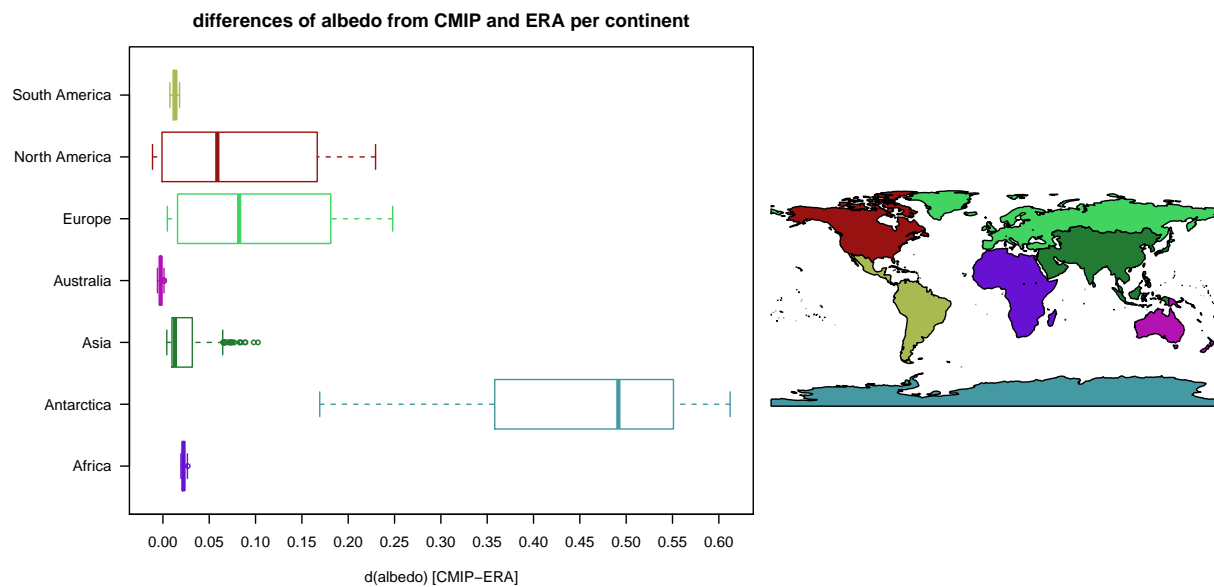**of differences between CMIP and ERA [CMIP−ERA]**
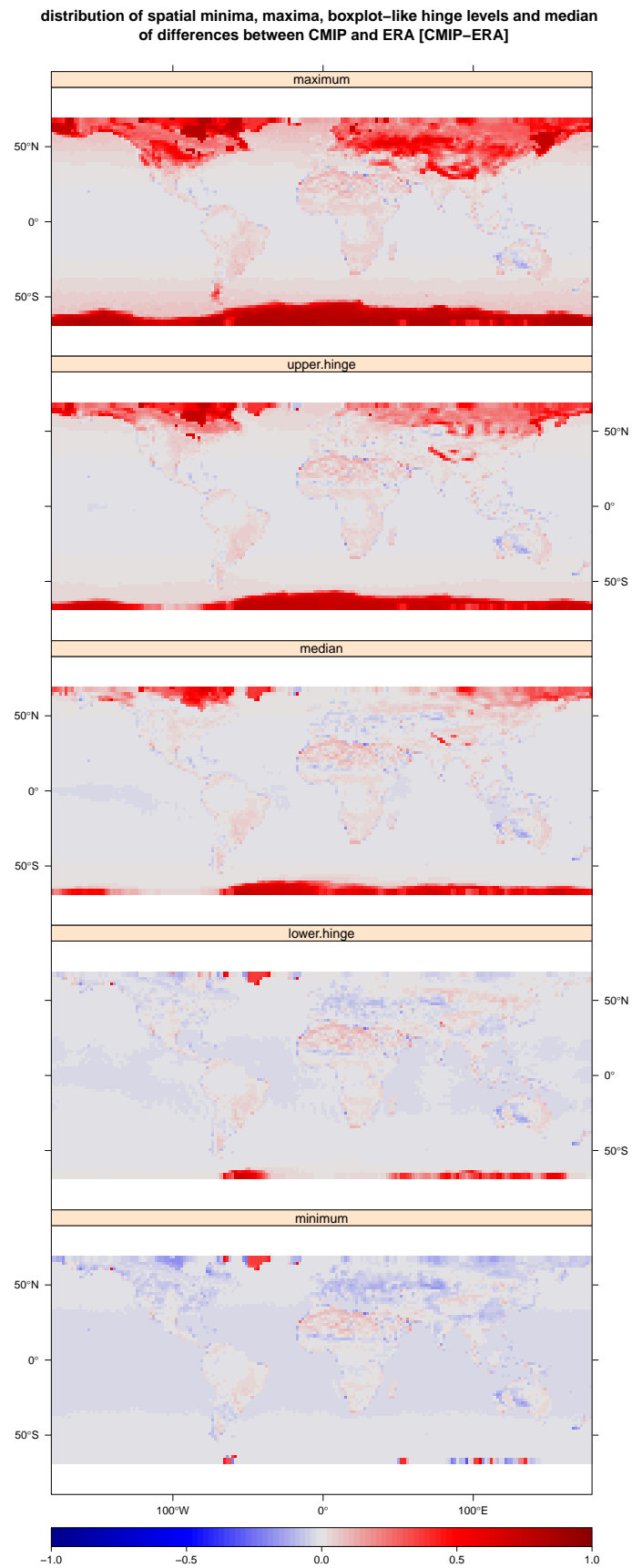
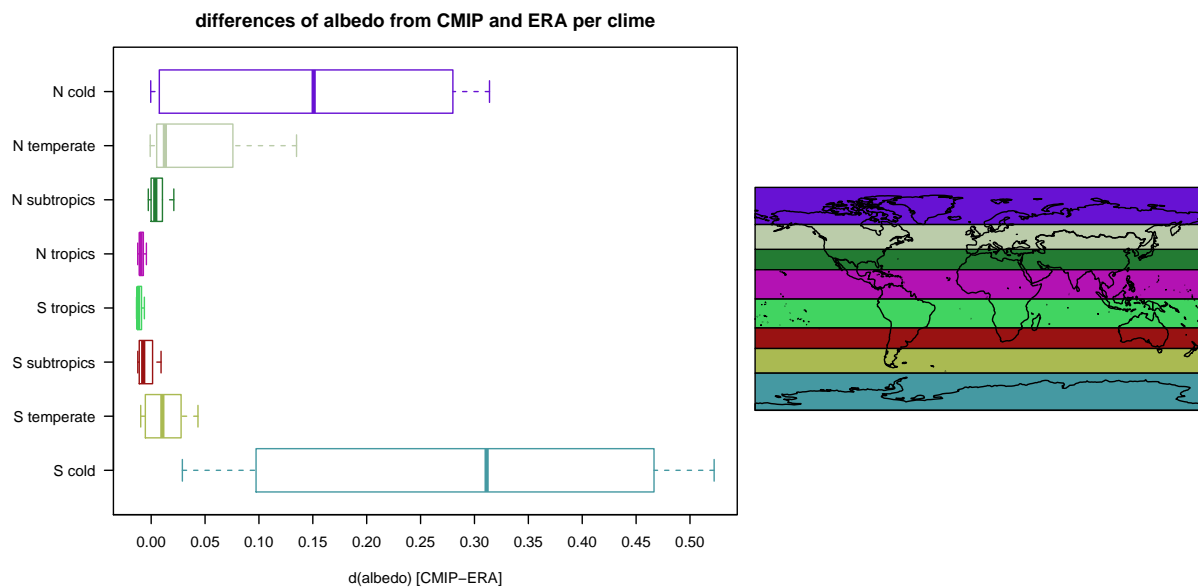Mapped boxplot-like calculations of pixel-wise time series data of differences between CMIP and ERA.

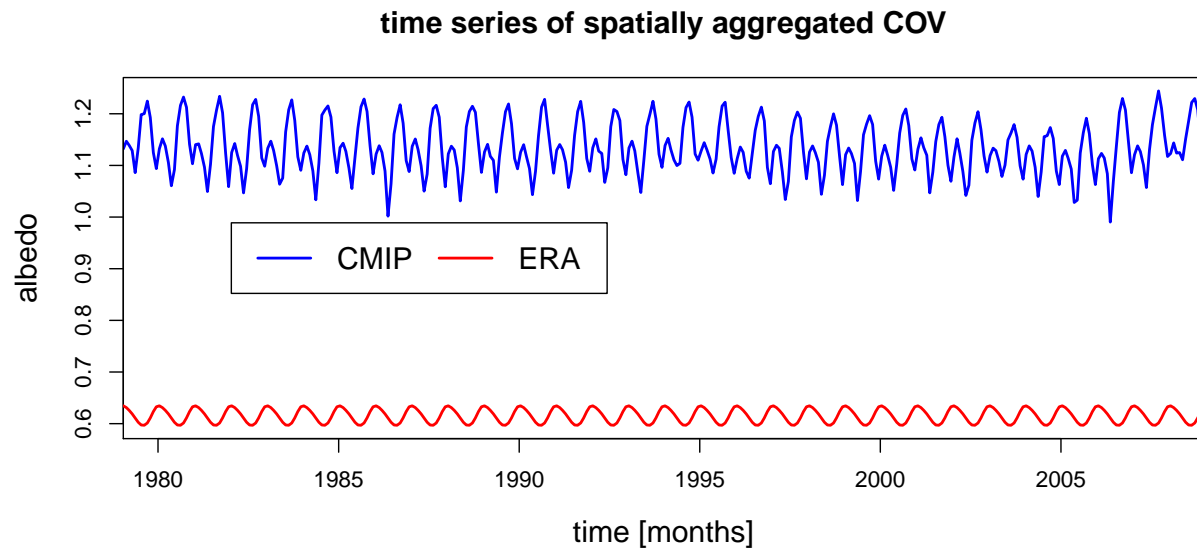**Spatial aggregated temporal differences between CMIP and ERA ...**

... by continent

differences of albedo from CMIP and ERA per continent

... by latitude

differences of albedo from CMIP and ERA per clime

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