Climate for Culture

- Climate Modeling
- Building Simulation
- Mitigation and Adaptation Strategies
- Impact Assessment
- Stakeholder Experiences
- Climate for Culture Products

Dataset of climate indicators

Lead Beneficiary: Max-Planck-Institute for Meterology

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Climate indicators are required for vulnerability and damage assessment of cultural heritage A joint initiative of WP1, WP4 and WP5 have been initiated.

The climate parameters which are useful for the damage risk assessment have been defined and are summarized in Table 1 and Figure 1 & 2.

Table 1

NN	Definition	Description	Unit	Region	Resolution
1	Time of wetness	Rh> 95 %, TSURF-DEW2 <0, precipitation	days	entire Europe	hour per month
2	Freeze-taw cycle		events	entire Europe	
3	Relative humidity		%	entire Europe	
4	Specific humidity		g/kg	entire Europe	
5	Sea level rise			entire Europe	
6	Max/min precipitation		mm	entire Europe	daily/monthly/yearly
7	Max/min RH		%	entire Europe	daily/monthly/yearly
8	Max/min temperature		ºC	entire Europe	daily/monthly/yearly

In addition, the Project Matrix summarized all indoor and outdoor variables was developed and published as D5.1

The data for outdoor climate are stored at the Max-Planck-Institute for Meteorology and are available for the project partners. Some examples are presented below.

Figure 1 Maximum of 2m temperature for the period of 1961-1990 (control run fo RCP4.5 simulations)

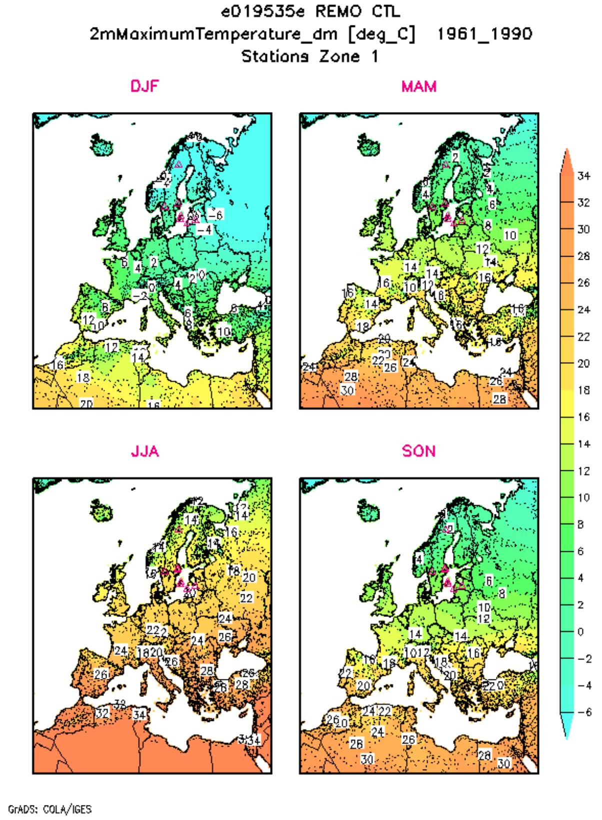
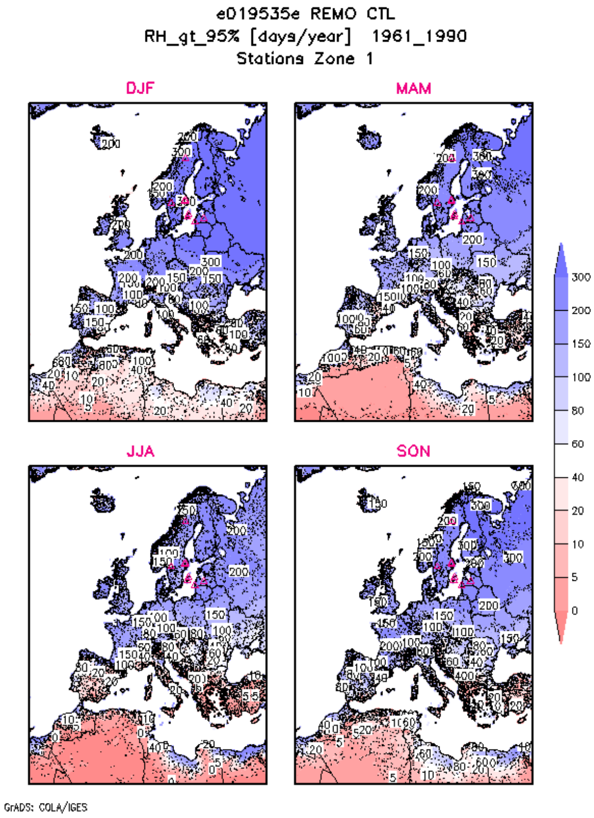


Figure 2. Number of days with relative humidity > 95 % for the period of 1961-1990 (control run for RCP4.5)



Sea Level Rise

In addition to different meteorological variables, the datasets for sea level rise were created. This work is done at the Group of Ocean Physic.

The regionally coupled atmosphere-ocean-sea ice model REMO/MPIOM has been used to dynamically downscale the AR4-A1B scenario simulation with global ECHAM5/MPIOM. The model consists of the regional atmospheric model REMO and the formally global ocean model MPIOM.

The ocean model has been set up with one pole close to Strassburg, the other pole close to Chicago. With the choice of these poles the model yields quite high resolution on the northwest European shelf, but also in the northern parts of the Mediterranean. The model simulates the changes in sea level originating from thermal expansion of sea water and from changes in ocean circulation.

At the end of the 21st century the simulated global mean sea level rise due to thermal expansion is approximately 22 cm. Regionally the changes show quite different values. In the North Sea the simulated sea level rise is slightly higher than the global mean due to reduced salinity, in the Mediterranean the sea level rise is less than the global average due to enhanced net fresh water loss and resulting saltier water masses. In the Baltic the sea level rise is substantially higher due to enhanced river runoff and a subsequent freshening.

In order to get the completed sea level rise, the contribution from land ice (Grenland and Antarctic ice sheets, ant the other glaciers and ice caps), the relative movement of land relative to the sea level (most important term is the glacial isostatic adjustment) and a minor contribution from changes in fershwater storage on land (dams, depletion of groundwater) need to be taken into account.