



Technical Report 12-10

Climate Grid Denmark

Dataset for use in research and education

Daily and monthly values 1989-2010

10x10 km observed precipitation

20x20 km temperature, potential evaporation (Makkink), wind speed, global radiation



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20x20 km Climate Grid Denmark



Content:

Abstract	4
Resumé.....	4
Introduction & disclaimer	5
Methods description	6
Definition of Climate Grid Denmark	7
Description of grid data files.....	8
Description of grid ID lists.....	9
References.....	10
Previous reports.....	10
Appendix 1: Map of Denmark with the location of 10x10 km grids.....	11
Appendix 2: Map of Denmark with the location of 20x20 km grids.....	12



Abstract

The purpose of the present report is to make the dataset “Climate Grid Denmark, Daily and monthly values, 1989-2010, 10x10 km observed precipitation sum & 20x20 km average temperature, potential evaporation (Makkink), average wind speed, accumulated global radiation” available for use in non-commercial research and education.

Resumé

Formålet med denne rapport er at gøre datasættet “KlimaGridDanmark, Døgn og månedsværdier, 1989-2010, 10x10 km observeret nedbørsum & 20x20 km lufttemperatur, potentiel fordampning (Makkink), vindhastighed og stråling” tilgængelig for brug i ikke kommerciel forskning og undervisning.

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Introduction & disclaimer

The purpose of the present report is to make the dataset “Climate Grid Denmark, Daily and monthly values, 1989-2010, 10x10 km observed precipitation sum & 20x20 km average temperature, accumulated potential evaporation (Makkink), average wind speed, accumulated global radiation” available for use in non-commercial research and educational use.

The Climate Grid Denmark dataset provided with this report, is identical to the dataset [for the period 1 January 1989 up to 31 December 2010] used as reference and input in many national studies within the fields of applied technical and scientific studies like environmental monitoring and assessment, hydrology, climatology, agricultural studies, waste disposal regulation, technical planning, publication and information services, and others.

The dataset, grid ID lists and grid maps are stored in the zip file tr12-10.zip and can be downloaded by clicking on the “Hent data/Get data” link located under the link to this report.

The dataset is the property of DMI and may not be used for any other purposes than non commercial research and education uses without prior agreement with DMI.

Please note that the Danish Meteorological Institute (DMI) cannot be held responsible for any errors in the data, for the use of incorrect data, for the interpretation or use of data in general, or any consequences of such actions.



Methods description

Generally, the single most important factor with the greatest impact on the local climate in Denmark is the distance to the ocean. Consequently, the uneven station coverage constitutes a problem in connection with a classical (non-weighted) interpolation, because areas with poor coverage may risk being affected by remote stations which are climatically very different from the climate prevailing at the interpolation point.

In Climate Grid Denmark the interpolation problem described above has been attempted to be offset by carrying out two interpolations – one involving near-coast stations and one involving inland stations. The importance of the two interpolation results is then weighted for each individual grid cell on the basis of the distance to the ocean. The double interpolation method is used when calculating temperature and wind speed. Precipitation and global radiation are interpolated using only one interpolation and potential evaporation is derived from interpolated temperature and global radiation values.

The algorithm which is used for the interpolation calculation is “inverse distance weighted”; an algorithm that the DMI also uses in other connections. The program interpolates point values which may be arbitrarily placed. Consequently it is possible to reduce the calculation time by interpolating only over land areas, and in connection with Climate Grid Denmark that means grid points located at intervals of 5 km for precipitation and 10 km for all other parameters. The interpolation points are subsequently aggregated into 10x10 (precipitation) or 20x20 km (all other parameters) grids respectively, so that the values obtained represent an area value.

Monthly values are calculated on the basis of the interpolated daily point values so that any rounding errors are minimized.

The data that are used as input for the grid production are for precipitation measurements from DMIs manual operated Hellman gauges network and for the other parameters measurements from DMIs automatically operated weather station network.

The input data has been through a quality check before use.

For more information on Climate Grid Denmark see references.



Definition of Climate Grid Denmark

Climate grid Denmark is defined as follow:

Area resolution: 10x10 km (precipitation), 20x20 km (other parameters)

Grid ID: There are 609 10x10 km grid cells and 178 20x20 km grid cells covering Danish land area, see grid maps appendix 1 and 2. 10x10 km grids are numbered from ID 10001 up to ID 10609. 20x20 km grids are numbered from ID 20001 up to ID 20178, see the grid lists for more information.

Time resolution: daily or monthly. Daily values are calculated using observations measured in the interval from 06 UTC the day before and ending 06 UTC on the day stated in the time stamp.

Monthly values are calculated using observations measured in the interval from 06 UTC the first day in the month and ending 06 UTC the first day in the following month.

Geographical system: UTM.

Datum: ED50

Units: precipitation sum (mm), average temperature (°C), accumulated potential evaporation (mm), average wind speed (m/s), accumulated global radiation (MJ/m²)



Description of grid data files

The data provided in this report covers the period from 1 January 1989 up to 31 December 2010.

The files are stored in ASCII format and named as follow:

Daily files: daily_<grid resolution>_<parameter name>_1989-2010.txt

Monthly files: monthly_<grid resolution>_<parameter name>_1989-2010.txt

File description

Daily files:

Line 1 is a header.

From line 2 the following is stated:

- Column 1: Year
- Column 2: Month
- Column 3: Day
- Column 4: Grid ID number
- Column 5: UTM zone
- Column 6: E coordinate – centre of the grid cell (meters)
- Column 7: N coordinate – centre of the grid cell (meters)
- Column 8: Interpolated daily value for the grid cell
- Column 9: Data release date

Monthly files:

Line 1 is a header.

From line 2 the following is stated:

- Column 1: Year
- Column 2: Month
- Column 3: Grid ID number
- Column 4: UTM zone
- Column 5: E coordinate – centre of the grid cell (meters)
- Column 6: N coordinate – centre of the grid cell (meters)
- Column 7: Interpolated monthly value for the grid cell
- Column 8: Data release date



Description of grid ID lists

The files are stored in ASCII format and named as follow:

10x10km.txt and 20x20km.txt

File description

- Column 1: Grid ID
- Column 2: E coordinate – centre of the grid cell (meters)
- Column 3: N coordinate – centre of the grid cell (meters)



References

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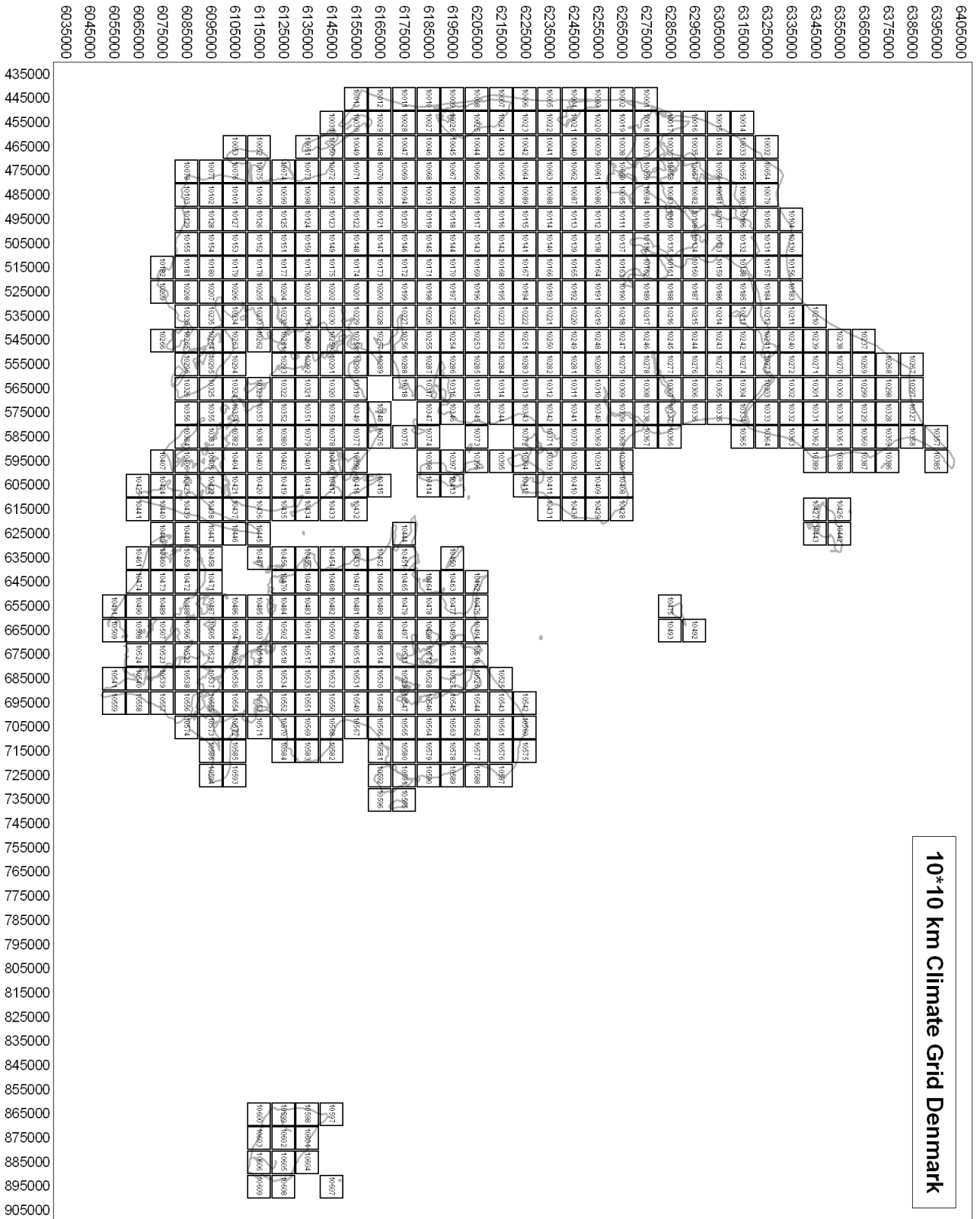
Previous reports

Previous reports from the Danish Meteorological Institute can be found on:

<http://www.dmi.dk/dmi/dmi-publikationer.htm>



Appendix 1: Map of Denmark with the location of 10x10 km grids





Appendix 2: Map of Denmark with the location of 20x20 km grids

