

Climate change is evident from observations of air and ocean temperatures, widespread melting of snow and ice and global sea level change, and climate change will continue. It is, therefore, important for many sectors both to make use of climate services and to include knowledge on future climate change into their long term planning.

The **Danish Climate Centre** (DKC) at the Danish Meteorological Institute (DMI) provides in-depth information and advice on climate and climate change and collaborates in research projects, both in Denmark and internationally.

One objective of the DKC is to develop climate projections into the 21<sup>st</sup> century. The tasks include development of methods for seasonal forecasting, development of state-of-the art global and regional climate models and studies of climate processes. The tasks also include the use of climate models to simulate global and regional climate variability and change in the past and to predict future changes.

The Centre coordinates a Centre for Regional Change in the Earth System and collaborates with the Greenlandic Climate Centre in Nuuk, Greenland.



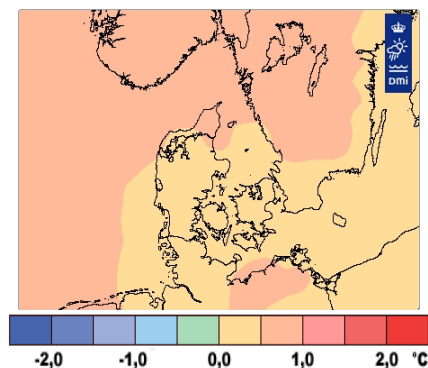
Another important area in DKC is monitoring of the ozone layer and UV radiation and research in the interaction between ozone and climate.

The Centre is active in outreach activities. It publishes books, papers, news and articles in different media and gives presentations on many occasions.

The DKC is currently around 40 staff members and uses the Cray XT5 supercomputer at DMI. Its funding comes from the Danish Government and from research councils and programmes, mainly the European Framework Programmes for Science and Technology.

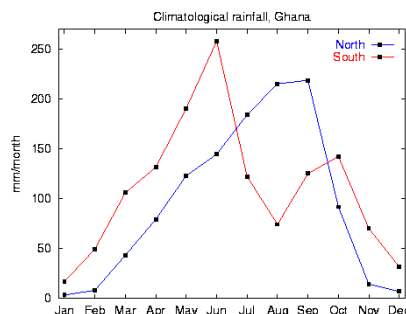
This leaflet describes examples of DKC activities and results.

Some climate variations depend on sea surface temperatures and snow and ice cover, and such variations are partly predictable on timescales of weeks to months. The DMI bases its seasonal forecasts on the ensemble forecast product from the European Centre for Medium-Range Weather Forecasting.



The map shows an example of a seasonal temperature forecast for Denmark. Such forecasts are made available on [www.dmi.dk](http://www.dmi.dk).

Developing countries are especially vulnerable to climate change. For example, changes in precipitation may have an impact on both water resources and agricultural production.



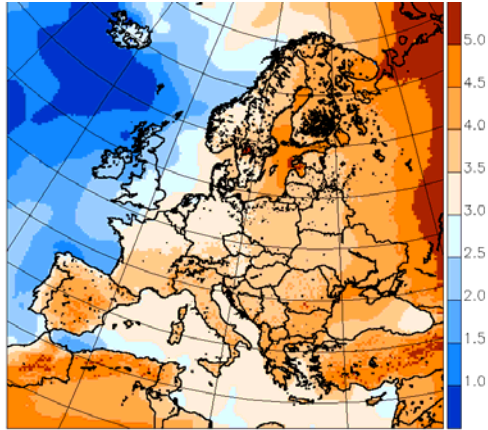
Seasonal climate prediction has improved considerably over the past decade and may be used in agricultural production planning. The DKC carried out studies in a number of countries in Africa and Asia.



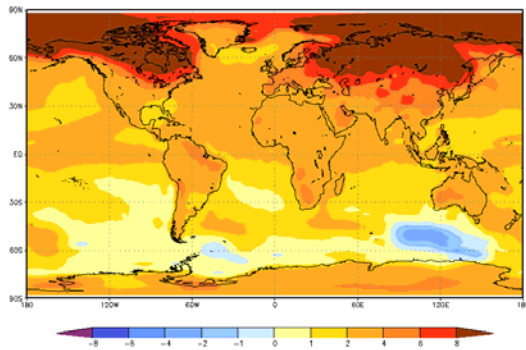
Greenland is another focus area for DKC. Research includes the mass balance of the Greenland Ice Cap – how it affects climate and impacts of climate change on the Ice Cap. An important research area is the impact of climate change on permafrost and on sea ice conditions. Another Arctic project focuses on the carbon cycle in tundra and taiga in Northern Russia.



Climate change, including changes in permafrost due to climate change, may lead to emissions of greenhouse gases from the ground, and this will be a positive feedback to climate change.



The HIRHAM regional climate model at DMI is used for simulating regional climate changes. The map shows temperature change 2071-2100 as compared to 1961-90 for one emissions scenario. Detailed climate scenarios are important for studies of impacts of climate change, vulnerability and adaptation.



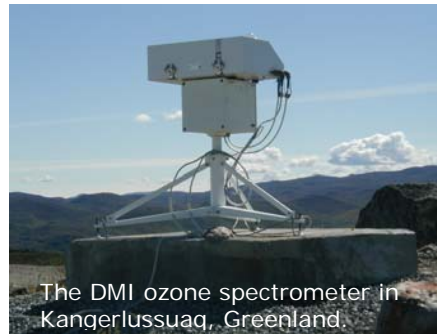
The Danish Climate Centre also operates a global model system and participates in the initiative *EC Earth* to establish a European Earth System Model. The figure above shows changes in winter temperature 2071-2100 as compared to 1961-90 for one scenario for emissions of greenhouse gases and aerosols.

Another international project, in which DKC participated, is the ENSEMBLES project which was supported

by the EU 6<sup>th</sup> Framework Programme and included both global and regional modelling. The DKC hosts the ENSEMBLES data server.



The Centre is actively participating in the work of the Intergovernmental Panel on Climate Change (IPCC), both delivering data and reviewing reports from the IPCC. In addition, staff members have contributed to IPCC reports, one as coordinating lead author.



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# Danish Climate Centre



- Seasonal prediction
- Climate variability
- Ice sheet modelling
- Ozone and UV radiation
- Climate modelling
- Climate projections