

# Rosby Centre Newsletter

No 3 - 2005

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The Rosby Centre is the regional climate modelling research unit of the Swedish Meteorological and Hydrological Institute, SMHI. This Newsletter aims to provide useful information to stakeholders on climate change research and results of the Rosby Centre. This newsletter is published 2-4 times a year.

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## 1. Tornado – now in use

The new Swedish climate computing resource, Tornado, is now in operational use. An opening session was held on the 23th of August at Linköping University.



Lena Sommestad, Minister for the Environment cut a virtual ribbon and spoke of the need of science support for political decisions. Professor

emeritus Bert Bolin stressed the importance of access to powerful computer facilities to learn more about the climate system sensitivity to emissions and changes in land use. The new resource increases the ability for Swedish researchers to participate in the European research. Markku Rummukainen, Head of Rosby Centre, pointed out two specific areas especially important for climate research in Sweden; the regional system around the Baltic and the Arctic region. Maria Ågren, General Director of SMHI, stressed the linkages between climate and environmental research, as well as the importance of both measurements and modelling.

## 2. European Researchers Night at SMHI

Students from schools in Norrköping, Söderköping and Valdemarsvik together with teachers and students from Linköping University visited SMHI on September 23. The arrangement was part of the European Commission's 'Researchers in Europe' initiative to strengthen the interest in science among young people. One part of the initiative is to show that researchers come from numerous backgrounds, have diverse interests, but all have in common a passion for research – and want to share it.

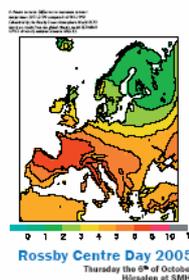
When the event started about 200 people soon milled around at SMHI. Rosby Centre staff participated with lectures, posters and computer stations. The students also took the opportunity to discuss climate change and climate modelling.



### 3. The Rossby Centre Day

The Rossby Centre Day on October 6th 2005 focused on the role of climate scenarios and expert advice as support for society. About 50 researchers and stakeholders were gathered at SMHI to discuss the use of climate scenarios, and how to make them more available.

Chris West from the UKCIP-programme described how they help organisations to understand their sensitivity to climate change and need of adaptation. Susanna Kankaanpää from Finnish Environment Institute presented the FINADAPT-programme for national vulnerability and adaptation and the Climate Change Communication Programme that informs and motivates actors within the Finnish community. Tido Semmler talked about the Community Climate Change Consortium for Ireland that produces decision support with focus on the agricultural and energy sectors. The Norwegian CICERO work interdisciplinary within the climate area and Asbjørn Aaheim presented a study on climate and travelling habits.



Researchers from the Rossby Centre shared their experiences on decision support development within different research projects, such as indices, models and databases. The day rounded with exchange of ideas about how information and expert support can be best provided to users.

The programme and the presentations can be found at:

<http://www.smhi.se/sgn0106/if/rc/RCday.htm>

### 4. Muscad workshop on Climate Variations in Sweden during the Past 2000 Years

On the 3-4 November an interdisciplinary meeting was hosted at SMHI. The workshop was a continuation of "Climate Variability Workshop" held 2002 at Stockholm University, 2003 at Uppsala University, and 2004 at Göteborg University. The overall aim is to bring together scientists working with different types of paleo-archives in Sweden (covering the last 2000 years) and scientists using these data sets as model input for climate systems. The workshop is open

to all interested scientists, researchers and students. During the Norrköping meeting special focus was laid on climate models.

The presentations can be found at:

<http://www.geol.lu.se/proxy/>



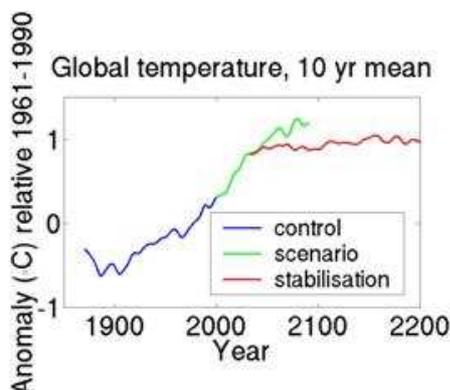
### 5. Rerun of a transient climate change experiment.

During the autumn one of the transient climate change experiments (RCA3-E/B2) reported on earlier (Newsletter 1, 2005) has been rerun in order to introduce some model improvements discussed previously (Newsletter 2, 2005). The area has been slightly altered so that the model domain now includes most of Europe. In addition to the transient simulation, a simulation with an

identical model version but with forcing from the ECMWF reanalysis ERA40 has been undertaken to check the model performance in present day climate after the said changes were made. Early next year an additional experiment (RCA3-E/A2) will be finished. Results are available on contact with [Rossby.Data@smhi.se](mailto:Rossby.Data@smhi.se)

### 6. Global modelling

The stabilisation simulation with the global climate model CCSM3 (see the Rossby Centre Newsletter No 2, 2005) is completed. The stabilisation scenario was built on the historic forcing for the period between 1870 and 2000. This was followed by forcing according to the SRES B1 scenario. The stabilisation level was set, in terms of net radiative forcing change including aerosol effects, to 450 ppm carbon dioxide equivalents. This was reached at year 2032, from that point the simulation was continued without further forcing changes until year 2200.



A corresponding regional climate change simulation using the Rossby Centre RCA model is also run for the period 1961-2200. The work is

### 7. Developing a regional climate model for the Arctic

The EU funded project GLIMPSE that aimed at improving climate models in the Arctic has recently ended. The Rossby Centre worked with the development of a coupled regional climate model as a part of GLIMPSE. The RCAO model was adapted to the Arctic. Both models were tested independently with forcings from ERA-40 data and compared reasonably well with

### 8. Simulating the climate in Scandinavia for parts of the past millennium.

The Rossby Centre regional climate model, RCA3, has been used to downscale two time periods from a 1000 years simulation with ECHO-G model (see also Newsletter 2, 2005). ECHO-G is an atmosphere-ocean general circulation model from the Max-Planck-Institute for Meteorology in Hamburg, Germany. The two periods are; 1000-1200 covering the so-called "Medieval warm period", and 1550-1930 covering the so-called "Little Ice Age" and the subsequent warming. RCA3 has been run on a 1x1 degree horizontal resolution with the model domain focused on Scandinavia and the Baltic Sea region.

### 9. Climate change matters in Southern Africa

We know that climate change is a global concern. The Southern African region already today experiences heavy problems with serious droughts and flooding due to lack of rain or too much rain. Thus, only small changes in climate may have dramatic consequences for this region.

By commission of the United Nation Development Program (UNDP) Rossby Centre is presently performing climate simulations over Southern Africa. The focus of the project for which this work is done is how water resources in the Pungwe river basin in Mozambique and Zimbabwe may be affected by changing climate conditions. Besides Rossby Centre the project involves hydrologists at SMHI and several agencies around the Pungwe

### 10. A new report has been published

"Växthuseffekten" (The Greenhouse Effect) is the title on a report published within the SMHI Meteorology series (Nr 119,2005). The report is written in Swedish and intended for a wider audience. The radiation conception is described as well as the energy balance of the Earth, the role of the atmosphere and natural and anthropogenic greenhouse effect.

The report can be ordered from [anneli.arkler@smhi.se](mailto:anneli.arkler@smhi.se) or printed from

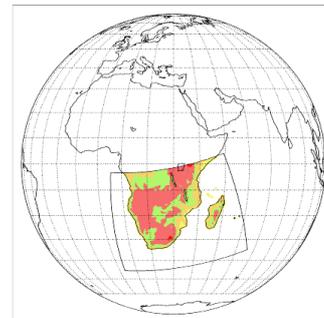
commissioned by Naturvårdsverket (the Swedish EPA).

observations. However, when combining RCA and RCO with the coupler we found an unrealistic strong drift in the Arctic sea ice extent. Sensitivity studies were conducted with a different parameterisation. All of these experiments showed promising results to be followed up in future efforts.

*Footnote: RCAO = coupling (RCA + RCO)*

Preliminary analysis of the simulations show improvements compared to the ECHO-G model in the simulated temperature climate compared to a gridded climatology representing 1900-1930. Also, the simulated temperature climate is in fair agreement with respect to seasonal mean temperatures and interannual variability compared to the temperature observations in Stockholm 1750-1930 on a seasonal basis. The study is commissioned by SKB (Swedish Nuclear Fuel and Waste Management Co) and conducted in cooperation with Stockholm University.

river basin. The final report should be used as input for decisions on what actions to be taken to secure the supply of water in the region on a time scale up to 2050.



[http://www.smhi.se/sgn0106/if/biblioteket/rapporter\\_pdf/meteorologi\\_119\\_webb.pdf](http://www.smhi.se/sgn0106/if/biblioteket/rapporter_pdf/meteorologi_119_webb.pdf)



### **11. Financial support**

The Government suggests, in the Proposition 2005/06, an annual base financing of the Rossby Centre with 10 million SEK within the SMHI budget.

### **12. Basics of the Rossby Centre**

The Centre was built up within SWECLIM, the Swedish Regional Climate Modelling Programme, 1996-2003. The Rossby Centre works on regional climate model development and evaluation as well as model applications on process studies, climate system studies, climate change research and impact studies. The Rossby Centre is also involved in a number of EU-funded and other projects on climate modelling and other aspects of climate and climate change research.

Rosby Centre homepages are in English and can be found via <http://www.smhi.se> (Click on "Forskning" [on the Swedish version] and "Research" [on the English version] at the top of the page, after which the link to Rossby Centre appears on the list to the left of the page that opens.)

### **13. Subscription and cancellation of subscription**

This issue of the Rossby Centre electronic newsletter is sent as a blind copy to provide email address privacy. Should you not wish to receive further copies of this newsletter, please send an e-mail to [Rossby.Data@smhi.se](mailto:Rossby.Data@smhi.se)

Comments and suggestions as to the scope, content and forms of the Rossby Centre electronic newsletter are welcome. Feedback can be provided via the email address mentioned above.