# Rossby Centre Newsletter

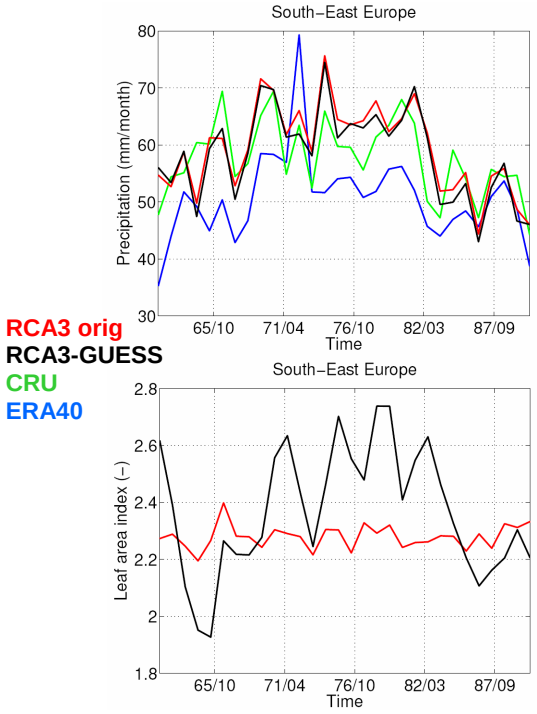
**No 2 - 2007** **June 2007**

The Rossby 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 Rossby Centre. The newsletter is published 2-4 times a year. The following topics are covered in this Newsletter:



## 1. RCA + GUESS = true

In cooperation between Rossby Centre and Ben Smith and Anna Wramneby at Lunds University, RCA3 has been coupled to the dynamic vegetation model GUESS. During a simulation GUESS continuously receives atmospheric and soil state variables from RCA3 and provides RCA3 with updated Leaf Area Index, forest fraction, type of forest and vegetation cover over open land. A first simulation with the coupled system on European scale has just been done for the period 1961-1990. The ERA40 dataset has been used as lateral boundary condition. The results are promising and we can now go on with coupled transient scenarios. As far as we know this is the first RCM now running coupled to a dynamic vegetation model (!).




*Precipitation and Leaf Area Index (LAI) 1961-1990 for south-East Europe as simulated in coupled RCA3-GUESS (black) and original RCA3 (red). Precipitation from the CRU dataset and reanalyzed ERA40 is shown in green and blue respectively. The LAI clearly follows the precipitation pattern in the coupled model version.*

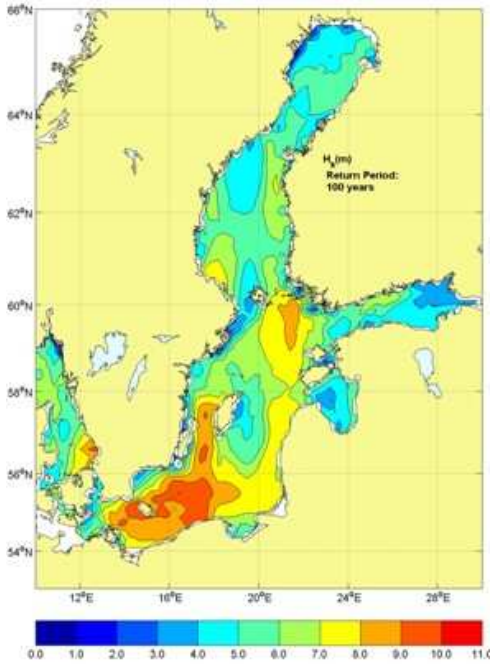
## 2. BALTEX conference

The 5th Study Conference on BALTEX (the Baltic Sea Experiment) was held in Kuressaare, Estonia, 4-8 June. Staff from the Rossby Centre contributed with presentations on the water and energy budgets in the BALTEX area in today's and future climates, climate change indices and the work for the Swedish Commission on adaptation and vulnerability (see item 2 in Newsletter 1-2007), past and future changes in runoff and river flow in the BALTEX area (see item 2 in Newsletter 1-2006) and possible changes in the wave climate of the Baltic Sea (see next item).

For more details about the conference see:
http://dvsun3.gkss.de/baltex/conf2007/aftermath.html

## 3. Hindcast of waves in the Baltic for 25 years (1980-2004)

Waves are formed after the action of wind over the sea. The wave height is dependent on the wind-speed, the length over which it acts (fetch) and the duration. Since ice reduces waves, information on ice coverage is also needed to estimate the wave height. A simple formula based on a nomogram in WMOs Guide to wave analysis and forecasting was used to determine significant wave height (mean of highest 1/3 of the waves). A database with 1223 points regularly distributed in the Baltic with 10'x20' resolution provided information on fetches in 8 directions. Wind-speed and wind-direction for the period 1980-2004 with 3-hourly values were interpolated to all the points. Ice coverage was collected from digitized ice maps. If ice coverage was above 50% the wave height was assumed to be zero.




Modelled data compared to measurements show fairly good resemblance. As an example of the result the 100 year return value is shown in the map. As a follow up, winds from climate scenarios will be used to study future wave climate development.

## 4. Rossby Centre Day October 3 2007

*Higher resolution* is the theme for this year's Rossby Centre Day. Why should climate models move towards higher resolution? Is it possible to achieve higher resolution by replacing some model key components, for instance a non-hydrostatic dynamic core, or would it be wiser to use other approaches, such as statistical downscaling. Keynote speakers will present their view on the whys and hows, and there will be opportunity for animated discussions and sharing of experience.

The Rossby Centre Day will take place at SMHI on October 3 and we would like to welcome a large audience. Further information will follow after summer.

## 5. Workshop on Arctic October 29-31 2007

A workshop on Arctic climate modelling and associated observational needs will be organized under the umbrella of SEARCH FOR DAMOCLES (S4D) on Oct 29-31 2007 in Paris. S4D is a specific support action to foster US-EU collaboration in Arctic research, jointly funded by the EU and NSF (US).

The workshop will review the current situation of Arctic modelling in the intercomparison projects AOMIP (ocean) and ARCMIP (atmosphere), and coordinate coming activities. A strategy for the newly initiated CARCMIP (coupled models) will also be discussed. Other topics are forcing data for regional Arctic modelling and possible model support for observational network design. A detailed program will be published on the DAMOCLES website http://www.damocles-eu.org/index.shtml, during August 2007.

Rossby Centre plays a leading role in the management and science activities of DAMOCLES and S4D.

## 6. Rossby Centre 1997-2007

The Rossby Centre started in 1997 and was built up as the climate modelling node of the Mistra financed programme Sweclim, Swedish Regional Climate Modelling Programme. Rossby Centre has been a part of SMHI from the start.

The 10-year anniversary was celebrated on June 14 with a seminar followed by a dinner for the staff at the SMHI Research Department.

*Left: Karin Borenäs is cutting the celebration cake*

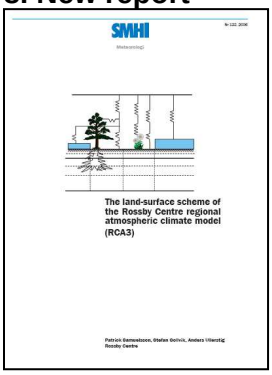
*Lively discussions at dinner between colleagues at SMHI and also with former Rossby Centre employees.*

## 7. Rossby Centre staff news

*Göran Broström*, senior researcher in ocean and climate modelling. Docent and PhD in Physical Oceanography.

Göran started his employment at Rossby Centre in March 2007. His prime interest is the dynamics of the large scale ocean circulation and its role in the climate system. He has over the last few years worked on idealised numerical modelling experiment to study the basic structure of the ocean current system and its stability. His current research is mainly on the ocean and sea-ice dynamics in the Arctic Ocean. The tools are the Rossby Centre Ocean (RCO) model and the newly started EC-Earth global climate model.

## 8. New report




Samuelsson, P., Gollvik, S. and Ullerstig, A. 2006. The land-surface scheme of the Rossby Centre regional atmospheric climate model (RCA3). *SMHI Meteorologi* no 122. 25 pp.

A description of the physics in the the Land-Surface Scheme (LSS) as used in the RCA3-model has recently been published as a report at SMHI. RCA3 has been our official RCA model the latest years and it is the model version that has been used for all ENSEMBLES simulations. The report is available upon request (anneli.arkler@smhi.se)

## 9. New webb

SMHI has new webb pages and the updating process is ongoing. The Rossby Centre pages are found at www.smhi.se. Click on "Forskning/Research" and Rossby Centre is found in the left column. A direct link to the English pages is: http://www.smhi.se/cmp/jsp/polopoly.jsp?d=6024&l=en

## General information

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.

The Rossby Centre newsletter is sent as an email blind copy to those who wish so. Comments and suggestions as to the scope, content and forms of the newsletter are welcome. Feedback can be provided via rossby.data@smhi.se.