

## **Minutes of the BALTEX Working Group Meeting on the Utility of Regional Climate Models**

Place: Max-Planck-Institute für Meteorologie, Bundesstrasse 53, Hamburg, Germany

Time: 23 September 2009, 13.00-19.00

Participating members: Lars Bärring, Ole Bøssing Christensen, Erik Kjellström, Philip Lorenz, Markus Meier (Chair), Burkhardt Rockel, Eduardo Zorita

Guests: Marcus Reckermann (International BALTEX Secretariat), Birgit Hünicke (GKSS)

- 1) Welcome by the chair and short explanation of the scope of the meeting and the tasks of the WG
- 2) Information on
  - RCM conference in Lund, 4-8 May 2009
  - IAMAS-IAPSO-IACS Joint Assembly in Montreal, 19-24 July 2009, with session on “Regional Climate Modeling”
  - International BALTEX summer school on “Threats and challenges for the Baltic Sea environment under climate change”, Nexø, Bornholm, 27 July – 8 August 2009
  - TELLUS-BALTEX workshop, 1-2 December 2009
  - Conference on “Climate Change – The environmental and socio-economic response in the southern Baltic region”, Szczecin, 25-28 May 2009
  - SMHI: RCA-GUESS simulations forced with ERA40 were performed in Lund, new coupled simulations with RCAO forced with ERA40 are in preparation, transient simulations 1960-2100 are planned for 2009
  - MPI: Today no activities on coupled RCM development but within the Excellence Center CliSAP a PhD student will continue to work on the coupled system BALTIMOS, the output will be used for impact studies on fish
  - DMI: no new RCM simulations because of a new computer, coupling with a ice-sheet model over Greenland is planned
  - GKSS: RCM simulations coupled to the HAMSOM model for the Baltic Sea and North Sea are planned

- A new project (ECOSUPPORT) funded by the BONUS+ program utilizing downscaling with RCAO will start in January 2009.
- 3) Presentations on the added value of RCMs (7 ppt or pdf files from everybody are available on the internal working group homepage at the BALTEX site [www.baltex-research.eu](http://www.baltex-research.eu), see Organization, or direct at [www.baltex-research.eu/organisation/bwg\\_rcm.html](http://www.baltex-research.eu/organisation/bwg_rcm.html)), brief summary of the presentations and the discussion:
- due to the higher resolution of RCMs topographical details, land-sea masks, lakes, soil moisture, and the feedback of snow covered areas are better represented (especially important for the variables surface wind and precipitation), improvements emphasized where strong local forcing exists, examples: Zahn, M., H. von Storch, and S. Bakan, 2008, Climate mode simulation of North Atlantic Polar Lows in a limited area model, *TellusA*, Vol. 60, pp 620-631, proxy data for past climate reconstructions are often located in mountain regions requiring high-resolution modeling
  - RCMs can generate small-scale variability in a realistic way (evidence supported by Big-Brother experiment) but no added value on the large-scale resolved by the GCMs. However, there is currently a debate whether RCMs can provide also added value on the large scales (e.g. see <http://cires.colorado.edu/science/groups/pielke/links/Downscale/>)
  - dynamical downscaling is physically consistent (in contrast to statistical downscaling) and consistent for all variables, areas, times; consistent scenarios are requested from end-users; RCMs are necessary prerequisites for environmental modeling and climate change impact studies in dynamical downscaling experiments
  - RCMs enable to separate between internal (generated within the model domain) and external variability (large scale forcing), thus insight into dynamical processes is gained
  - RCMs can help to identify common details of various scenarios (testing dynamical hypotheses)
  - Sampling network design (Feser, F., and H. von Storch, 2005: A spatial two-dimensional discrete filter for limited-area-model evaluation purposes. *Mon. Wea. Rev.*, 133, 1774–1786).
  - Detection studies, e.g. Bhend, J. and H. von Storch, 2008: Is greenhouse gas forcing a plausible explanation for the observed warming in the Baltic Sea catchment area? *Boreal Environment*

Research, accepted

- Bhend, J. and H. von Storch, 2007: Consistency of observed winter precipitation trends in northern Europe with regional climate change projections. Climate Dynamics, DOI: 10.1007/s00382-007-0335-9
  - Two-way nesting and spectral nudging improve a RCM simulation. Spectral Nudging improves RCM simulations when driven by global re-analysis data. However, this is not necessarily true for RCMs driven by global climate models.
  - Discussion about downscaling with RCMs can be found at <http://cires.colorado.edu/science/groups/pielke/links/Downscale>
- 4) The work on the report/paper will start after the Lund conference on RCMs. It is decided to focus on environmental modeling in changing climate requiring a consistent dynamical downscaling approach.
  - 5) Next meeting at the RCM conference in Lund, 4-8 May 2009.
  - 6) Other: It is decided to prepare a **common poster for the Lund conference about the added value of RCMs** with input from all working group members (deadline for the input is 1<sup>st</sup> December 2009). **The focus will be on the Baltic Sea Region and on coupling to impact models.** The writing of the abstract and the preparation of the poster will be performed by Markus. Input: consistent datasets (Lars), quantifying uncertainty in ENSEMBLES simulations (Ole), coupled atmosphere-ice-ocean RCMs (RCAO and BALTIMOS) (Philip), coastal resolution effects or Polar Lows (Burkhardt), influence of topography and dynamical versus statistical downscaling (Erik), feedback related to ice cover (Eduardo), dynamical downscaling is needed for environmental decision support systems (Markus)