DFG Network Workshop
"Atmosphere & Algorithms"

Rachel Carson Center

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Sponsor: German Research Foundation (DFG)

Conveners: Gabriele Gramelsberger (FU Berlin), Helmuth Trischler (RCC Munich)

Participants: Dania Achermann (IPA Oberpfaffenhofen/RCC Munich), Johann Feichter (MPI Meteorology Hamburg/ETH Zurich), Gabriele Gramelsberger (FU Berlin), Helene Guillemont (CNRS A. Koyré Paris), Matthias Heymann (Aarhus University), Emilian Kavalski (University of Western Sydney, Australia/RCC Munich), Matthijs V. Kouw (University of Maastricht), Catharina Landström (University of East Anglia), Thomas Ludwig (DKRZ Hamburg), Cornelia Luedecke (German Meteorological Society), Martin Mahony (University of East Anglia), Sonja Palfner (TU Berlin), Arthur Petersen (Netherlands Environmental Assessment Agency). Birgit Schneider (University of Potsdam), Helmuth Trischler (RCC Munich), Hans Volkert (IPA Oberpfaffenhofen)

The DFG Network "Atmosphere & Algorithms" was established to bring together researchers of different disciplines who concern themselves with the history and philosophy of the atmosphere and with weather and climate modeling. The network provides an interdisciplinary forum for discussion of the ongoing developments in the use of computer based models in the atmospheric sciences.
This workshop was the first of four network meetings scheduled to take place before 2012. Convened by Gabriele Gramelsberger and Helmuth Trischler, it was hosted at the Rachel Carson Center and the Deutsches Museum in Munich.

In a brief introduction into the purpose of the network, **Gabriele Gramelsberger** (Berlin) and **Matthias Heymann** (Aarhus) pointed out the importance of the debate about the ongoing processes in atmospheric sciences and also its historical reflection. The discussion had started last June in Aarhus at the workshop on "Epistemic Shifts in Computer Based Environmental Sciences" in whose aftermath the network was built. The group consists of 16 participants and guests.

In the afternoon session all present members gave a short introduction into their research topic and special interest in the network.

The second day of the workshop was introduced by guest speaker **Emilian Kavalski** (University of Western Sydney, Australia/RCC Munich) with his presentation entitled "Is Complexity the New Framework for the Study of Global Life?" He discussed definitions for global life and complexity, and examined the question of how complexity impacts world affairs. He referred to James Rosenau, who explained "global life" as the coexistant "worlds", "domains", projects", and "texts" of ongoing and overlapping interactions that mark the anthropocene. "Complexity" is a relationship that emerges from the interactions between different participants. Since individuals are complex systems, they are constituted by complex relationships. This complexity leads to a random and uncertain future, since prediction is impossible. One challenge of this (cognitive) complexity was uncertainty. Kavalski referred to the psychiatric theory that human brain was not able to understand technical complexity. In conclusion, he stated that complexity did not represent a new paradigm, but a new way of thinking. The subsequent discussion showed that new scenarios were needed, but that the science of international relations had become resistant to change and uncertainty was no part of it.

The second presentation was contributed by **Martin Mahony** (East Anglia), with the title "Model Migrations: Mobility and Boundary Crossings in Regional Climate Prediction." His main question was concerned with the way in which knowledge travels. Mahony used the PRECIS system (Providing Regional Climates for Impact Studies) as an example to demonstrate that we have to concern ourselves with the geographies of epistemic power and with "how science makes space for itself." PRECIS is a computer model which deals with extreme weather effects. One hundred and four countries have been trained to use this model, making its distribution unique in its breadth. The key factor in transferring knowledge is trusting the people who already use this model. Since the model license may not be modified (a fact that would not be accepted in the scientific world), Mahony raised the questions of "epistemic opacity" and "how science makes space for itself." The open discussion also brought up the question of whether this can be seen as a "new means of colonialism/imperialism."

Following on from this, **Catharina Landström** (East Anglia) presented her new project, "Uncertainty in Environmental Computer Simulation Modeling." She pointed out that uncertainty means risk, and explained different sources of uncertainty. Policy makers are influenced by modeling although they are aware that there is a lot they do not know. Landström observes that there has been a shift from uncertainty reduction to uncertainty science. It has become a research topic itself.

The subsequent discussion showed that there is a need for more research into this issue. It was noted that the Intergovernmental Panel on Climate Change (IPCC) has been heavily implicated by this matter, and it was opined that this could be seen as an institutionalization of uncertainty. It was pointed out that uncertainty is perceived as something negative that has to be overcome, but that it can also open spaces for decision-making.

Uncertainty was also the topic of the fourth presentation. **Arthur Petersen** (Netherlands Environmental Assessment Agency) discussed "Regional Changes in Weather Extremes Caused by Global Warming." He stated that climate simulation models potentially provide a reduction of uncertainties. But we should be aware of where these problems started, and think about how these uncertainties can be communicated. Maps, for instance, should be carefully designed because they are often taken to be reality. Petersen concluded his contribution by proposing that "uncertainties" be regarded as "knowledge": as such, this knowledge can then be subjected to critical examination in extended peer reviews. This is something which would benefit from an institutionalized framework.

The last presentation was given by **Matthias Heymann** (Aarhus) who asked whether we can acquire "An Understanding of Computer Simulation." He pointed out that there was still a widespread lack of understanding of computer simulation. There has only been very limited research on this topic from a historical perspective. An important question for researchers should be "how did practices emerge and differ in different periods of time?" Heymann perceives "cultures of prediction," that is to say, many decisions are based on computer models. He closed his speech by asking for more innovative research methods.

Gabriele Gramelsberger (Berlin) summed up the outcomes of the network meeting: the workshop proved that there is undoubtedly interest in the aims of this network. Reliability, uncertainties, trust, and confidence in modeling are some of the recurring themes. Other important topics for further discussion pertain to the question of visualizing uncertainties, migration of knowledge, knowledge society, and science vs. service. To build further on this interdisciplinary exchange of ideas, another three meetings are scheduled, the next of which will take place in May 2011.

-- Dania Achermann