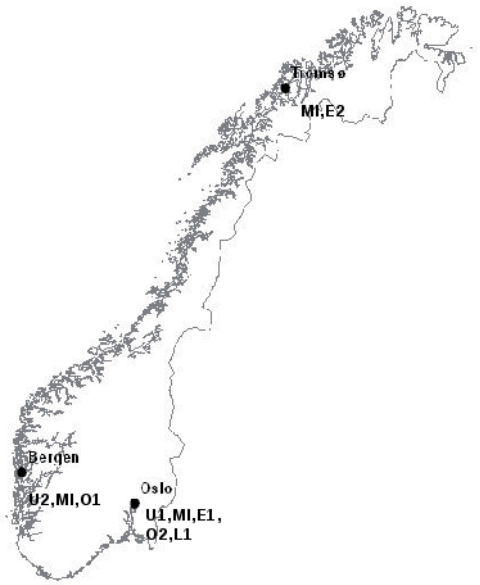
for the last millennium based on marine and terrestrial climate proxies. This observation-based analysis explores interannual and multidecadal fluctuations in the region for the last millennium. Based on this analysis, and with support from climate models, the potential and skills for climate predictions on time scales up to a decade are examined. Dynamical and statistical downscaling methods are used to provide regional climate scenarios for the period 2030 to 2100 (U1, U2, MI).




**Map of Norway with several universities and research centers.**

In-depth knowledge of key physical processes is required for understanding climate fluctuations and the sensitivity of the climate system to external forcing. Therefore, processes with particular importance for the climate in Norway and the Arctic are studied. An Earth System Model (ESM) addressing also biogeochemical feedback processes is in preparation (U1, U2, MI, O1).

Information of past climate change on a longer time scale derived from instrumental and historical climate data is considered relevant for assessing the skill of projection predictions of climate change (U2, E2).

Polar meteorology: Ice conditions in the Barents Sea and the Greenland Sea have been mapped since 1966 on a weekly basis (MI, E2). At present, daily maps are prepared (MI).

The long time development of the climate in the Arctic including temperature, precipitation, snow and ice conditions is studied as well as physical processes involving ocean, sea ice and terrestrial ice (U2, MI, E2). Deep water formation and sea ice in Fram Strait and the size and mass balance of Svalbard's glaciers are being investigated. Ice cores in the thick inland ice of Dronning Maud Land - providing information reaching 900 000 years back in time – have been drilled (E2). Ny-Ålesund, Svalbard, comprises stations from ten nations from around the world, and its activities have been expanded rapidly in the last few years. During the polar year, Polar Lows were a topic for an international project (U1, U2, MI).

The issues of agricultural meteorology are studied at L1, and the processes relevant to local climates at U2, MI, and L1. The thawing of frozen soil (Permafrost) is studied at several places in Norway (U1, MI). The research in air chemistry includes field measurements, instrument development, chemical analyses, model development, air pollution forecasts, dose/response analyses, international co-ordination and training support (U1, E1, MI).

## *Interview with Christoph Kottmeier*

*Hans von Storch*

The German meteorologist Christoph Kottmeier heads the Institute of Meteorology and Climate Research (Tropospheric branch) at the Karlsruhe Institute of Technology (KIT), a recent merger of the University of Karlsruhe and the Research Center Karlsruhe. He was born in 1952 and obtained his diploma in meteorology at the University of Hannover, Germany in 1977 and his Ph.D. in 1982, with a thesis on low level jets in the nocturnal boundary layer. From 1983 to 1989 he became involved in Antarctic Research. He made two long trips with the German icebreaker POLARSTERN to the Antarctic and performed various boundary layer measurements. He used radiosondes, sodar, turbulence towers, tethered balloons, and instrumented kites both from the vessel and at the German polar station Neumayer. In 1989 he moved to the Alfred Wegener Institute of Polar and Marine Research. In the following years he conducted three Arctic measurement programmes on sea ice-atmosphere interaction with his group, mainly based on measurements with two extensively equipped aircraft. In the Antarctic, he started a long series of buoy deployments to study the dynamics of sea ice and polynya formation. In 1997 he became a professor of meteorology at Karlsruhe University and engaged in experimental and applied modelling work on atmospheric convection, flow over complex terrain, meteorological hazards and regional climate.

In recent years has become the spokesman of several large research programmes, such as the Helmholtz Programme "Atmosphere and Climate" and the KIT-Center "Climate and Environment."

**What was your reason for studying meteorology?**

I was considering studying electrical engineering or meteorology. In the end I opted for meteorology, mainly because I had been a glider pilot since my 14th birthday. I was always impressed that the convective gliding conditions could be forecasted quite reliably just from the midnight sounding before. So I wanted to improve my own skills in forecasting convection to become a better crosscountry glider pilot in competitions. That did not work out too well and I never got a top place in a major competition. But this experience with aircraft helped me define the way I approach problems in general and also in science.

**Why do different types of measurements play an important role in your work?**

I really believe that a good understanding of atmospheric processes can only be achieved by merging observations with modeling. Since not many meteorologists know which instruments to use in specific problems, I put more effort in measurements, but made sure that the needed modelling work was done.

Basically all measurements, even those from 3D scanning radars and lidars or satellite remote sensing are snapshots gathering very limited and undersampled information of what is going on. Numerical models, which somehow represent the physics correctly, may result in a completely inadequate description of the real world, if initial, lateral boundary conditions, parametrizations and the background state are not considered properly.

Last but not least, participating in field programmes in different regions of the world gives a lot of motivation, both from contacts with colleagues in science and with local people.

**In which international activities have you been involved?**

During my Polar research period I had several tasks: I was the national representative in SCAR/IASC working groups, responsible for the substantial German contributions to the WCRP Arctic and Antarctic Buoy Programmes (IABP, IPAB), and chairman of the executive committee for WCRP-IPAB for several years.

(continued in the next page)

C. Kottmeier's own way of coping with strong winds.

In recent years I became member of the ISSC or of the Governing Boards of major atmospheric and climate programmes such as AMMA in West Africa, COPS in Germany/France, and the planned large Mediterranean Programme HyMeX.

**What do you consider your most important scientific achievement?**

My contributions to understanding the small-scale dynamics and thermodynamics of Polar sea ice are worth mentioning. The work was based on buoy measurements, coupled modelling, and satellite observations. The significance of tidal and inertial motion as well as winds for polynya formation and associated atmospheric turbulent fluxes, salt injection and the mass balance is still referred to in the literature. The focus of my recent work is quantifying the effects of convection over complex orography. I have had results on the initiation of convection in relation to surface conditions, the structure of the PBL and the entrainment zone, the transition from shallow to deep convection, but also the model representation of convection in weather forecast and regional climate. Even if most of the results have to be creditted to the scientists at my institute, I claim to have set the right aims and prepared the ground to go.

**What is your role in the local and national meteorological community?**

There are surprisingly many chairmanships in boards, new research initiatives, and review processes offered to a university professor like me. That may be partly due to the fact that competitors are either too young or too old, or just too smart to get selected. The fact that I have spent time at different meteorological communities in Germany is the reason why my colleagues consider me as being close enough to understand what they do and far enough from them to develop an independent view.

In the Helmholtz Society and locally in the Karlsruhe Institute of Technology it is a permanent challenge to keep atmospheric and physical climate sciences properly acknowledged.

**Is there a politicization of atmospheric science?**

In present times, when climate change is a hot topic, and even weather science is an accepted research issue, atmospheric research is receiving attention by more people than ever. Politicians and important stakeholders need to believe or not what scientists tell them about climate change. When they accept climate change as a problem, they need to react according to their role and responsibilities. Together with the media attention this puts certain stress on the leading scientists. There seems to be more competition in the research community itself but also between organizations which, from my point of view, should serve science instead of just counting papers and citation numbers.

**What constitutes good science?**

There should be well defined, really open questions, originality at least in applied methods, clarity in conceptual approaches, and transparency in descriptions.

**What is the subjective element in scientific practice? Does culture matter? What is the role of instinct?**

I think that subjective elements play a larger role in atmospheric and climate science than we would like to admit. We develop a lot of physical reasoning in intermediate steps of rational thinking. But we basically begin with just believing certain facts, which sometimes may be questionable. This becomes obvious when we meet people who have arrived at results that contradict our own. Full objectivity would enable us to resolve contradictory points of view, which often does not happen. Cultural differences do matter, and this becomes evident when talking to people from research communities of other disciplines or in other countries.

The classical theory in science remains obviously valid: there is no way of proving a scientific fact, there is only a common belief in it, and we have to change our mind when someone proves that it is wrong even if it is only in one case.

## Opportunities

Note: You may be asked for your AGU member # to open the following links. Visit the AS Section website for links to other job opportunities not listed here.

**Some of these job postings and others can be found at:**

http://www.agu.org/cgi-bin/membership_services/joblistings.cgi

**Atmospheric Sciences**

* Faculty Position in Climate Sciences, Department of Earth and Planetary Sciences, Johns Hopkins University. Contact: Kristen Gaines (kgaines@jhu.edu).

* Manager, Climate System Research Center, Dept of Geosciences, University of Massachusetts, Amherst. Contact: Raymond S. Bradley (rbradley@geo.umass.edu).

* Post-doctoral scientist position in socioeconomics of weather, NCAR, Boulder, Colorado. Contacts: Dr. Rebecca Morss (morss@ucar.edu) and Dr. Jeffrey Lazo (lazo@ucar.edu).

* Postdoctoral research position in land surface-atmosphere exchange of greenhouse gases, Atmospheric Science Department, Lawrence Berkeley National Laboratory, Berkeley, California. Contact: Marc Fischer (mlfischer@lbl.gov).

* NCAS-Weather Research Fellow in pollution transport (Ref.: A001), Lancaster Environment Centre, Lancaster University, Lancaster, UK. Contact: Oliver Wild (o.wild@lancaster.ac.uk).