

# Atmospheric Sciences

## Section of AGU Newsletter

Volume 4, Issue 1 January 2010

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**Richard Alley receives the diploma corresponding to the Bjerknes Lecture from Alan Robock. AGU Fall Meeting 2009.**

[Click here to watch the lecture](#) and [click here to download it.](#)

Schools and Conferences

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## AS Newsletter - Editorial -

Dear Readers,

Welcome to the first issue of our newsletter in 2010. It is brief but full of information. You can find a brief report from the 2009 AGU Fall Meeting held in San Francisco one month ago. I would like to thank to Warren Wiscombe and Alan Robock for sharing the pictures that we include. I recommend that you read two concise statements from the candidates for President-Elect of our section and of course that you vote on the AGU web page:

<http://www.agu.org/elections>

In this issue we also include an article about the COP-15 meeting held in Denmark, another article about the meteorological services in Norway and an interview with Christoph Kottmeier, experienced meteorologist and head of a new research institute in Germany.

Do not forget to check the sections about opportunities, congresses and schools; they include a lot of interesting things.

Finally I would like to thank all the contributors that make this newsletter possible with their invaluable work. Happy reading,

Juan A. Añel, Editor-in-Chief  
EPhysLab, Univ. of Vigo at Ourense, Spain

### Newsletter Editors:

\* Charles K. Gatebe - Goddard Earth Science and Technology Center, Univ. of Maryland, Baltimore County, U.S.A.

\* Hans von Storch - Univ. of Hamburg, Germany.

### Contributors to this issue:

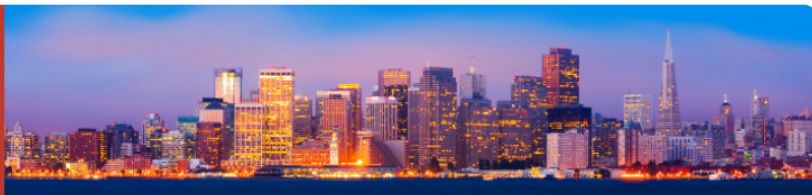
\* Knut Iden - Norwegian Meteorological Institute, Norway.

## Section News

### Report from the 2009 AGU Fall Meeting.

The AGU Fall Meeting was another success with more than 16,000 people attending. The Atmospheric Sciences Section celebrated its traditional dinner and several awards were presented. In this issue we include some pictures with the winners.

Our cover in this issue is for Richard Alley just before the Bjerknes Lecture. He gave a very interesting and enthusiast lecture entitled "The Biggest Control Knob - Carbon Dioxide in Earth's Climate History" to a packed audience (there were more than 1000 people in the room).



Rachel Chang receives the Outstanding Student Paper Award for her presentation at the 2009 Joint Assembly.

## Announcement

### Education Chair for AS Section

We are seeking a new volunteer to fill the position of Education Chair for the Atmospheric Sciences section. Duties include coordinating the student paper awards at AGU meetings, helping to convene atmosphere-related education sessions at meetings, and occasionally helping to coordinate the Geophysical Information for Teachers (GIFT) workshop at meetings. If interested, please contact the current chair, Dr. Lin Chambers, at [lin.h.chambers@nasa.gov](mailto:lin.h.chambers@nasa.gov)





Ralph Kahn and Ross Salawitch received the first Yoram J. Kaufman Unselfish Cooperation in Research Awards. Here, left to right, are Warren Wiscombe (Past President of the Atmospheric Sciences Section), President Alan Robock, Ross Salawitch, President-Elect Anne Thompson, Jean Kaufman (Yoram's widow), and Ralph Kahn.



Simona Bordini received the James R. Holton Junior Scientist Award for 2009.

# AGU Elections - from the candidates for President-Elect



## Charles E. Kolb

It's a pleasure to respond to the Editor-in-Chief's request to briefly address readers of the Atmospheric Sciences Section Newsletter. This publication is a terrific example of how a few AGU/AS-section members, endowed with energy and initiative, can create an effective new tool for enhancing communication links between and sense community among atmospheric scientists worldwide. Since atmospheric science is inherently global, such links are critical to establish the understanding and collaborations we need to better characterize and mitigate major atmospheric challenges, including: severe weather threats; climate change; poor air quality and how to educate nearly seven billion people that a healthy atmosphere is integral to our planet's habitability. This publication's success is a great example that member initiative can create a more vibrant and useful Atmospheric Sciences Section

and its staff deserves our thanks.

This newsletter is possible because modern information technology eliminates the hassle and cost of printing presses, mailing labels, postal services, etc. Given our current ability to communicate widely and rapidly using modern IT tools, I suspect that there are additional ways we can use the collective knowledge and experience of AS members to help us address our individual professional challenges. For instance, we all might benefit from a well-organized electronic forum where we could request input and advice from each other. AS members seeking insight on instrument or software selection, data availability, potential collaborators, local knowledge about logistical issues, etc. could post queries and advertise opportunities. If I am selected to lead the Section, I would like to engage IT savvy AS members to see if such a forum could be designed and implemented.



## Peter J. Webster

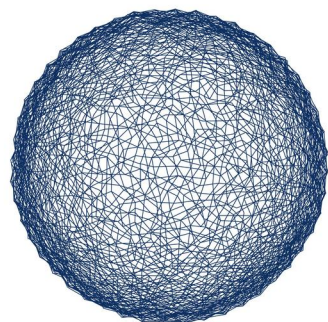
As a new graduate student, Jule Charney gave me a paper he had written, probably to get me out of the way. It was entitled "Some Remaining Problems in Numerical Weather Prediction." I was mortified! I had entered a field that only had four problems to solve and clearly the very bright people I had met in my very short graduate career would quickly dispense with them before I graduated. I had entered a blind alley of a field! However, I hasten to add that all of the problems Charney listed (e.g., cumulus parameterization) are still topics of intense research. And, I have been fortunate to see our field expand almost exponentially both in depth and in its interdisciplinary nature. Each year brings forth new problems to be solved and new ideas to address them. Furthermore, our expanding field has come to address problems at the forefront of societal issues such as

climate prediction and the determination of attribution in global warming. With an increasing relevance of our field, though, comes a higher bar of responsibility. It is not sufficient for our field to be "squeaky clean," it must also be seen to be "squeaky clean." This can only be accomplished by making data, models and methodologies open, accessible and transparent. Recent losses of credibility in climate science cannot be regained by appealing to our own authority. It can only be regained by an aggressive campaign. I believe that the AGU can be the leader in this endeavor and allow our field to expand its influence and expertise unfettered. I hope to help make this progress possible.



## What's next after the UN climate talks in Copenhagen?

Charles Kironji Gatebe



COP15  
COPENHAGEN  
UN CLIMATE CHANGE CONFERENCE 2009

The Copenhagen Climate conference now belongs to history and so the media attention is bound to shift from the global climate policy issues that characterized the Conference of Parties (COP)-15 (<http://en.cop15.dk/>), at least for now. With this shift in media attention, the case of stolen emails from a British climate center (<http://www.nature.com/news/2009/091124/full/462397a.html>) seems to have been forgotten. See also the American Geophysical Union (AGU) statement ([http://www.agu.org/news/archives/2009-12-08\\_hacked-emails-climate-research.shtml](http://www.agu.org/news/archives/2009-12-08_hacked-emails-climate-research.shtml)). So what's next after the Copenhagen climate summit?

Although the Climate summit was left with little to show for itself except a vague commitment to limit global warming, and therefore the media regarded it as a failure after two years of preparations, it did manage to attract over 45,000 attendees comprised of politicians, diplomats, scientists, journalists, lobbyists and NGO activists from around the world (193 nations were represented, with as many as 100 countries sending heads of states or governments) to address climate issues, which is a first real step to fighting climate change in the 21st century ([http://www.time.com/time/specials/packages/article/0,28804,1929071\\_1929070\\_1949054](http://www.time.com/time/specials/packages/article/0,28804,1929071_1929070_1949054)

,00.html). That number far exceeded the official capacity of the Bella Center of about 15,000, which is a good sign that global warming is attracting more attention and becoming influential in domestic politics, and so it can no longer be wished away. It may also indicate that global warming is now part of the economic reality. Therefore, we have to believe that people are not ready to compromise their own planet, but they are ready to hold leaders accountable for their actions or inactions.

The next Climate summit (COP-16, December 2010) in Mexico City is around the corner, less than 12 months away. Scientists must continue to play an active role in this process and if possible, more should be involved. The effort made by the AGU to organize Q&A for the Copenhagen climate conference, where scientists fielded inquiries from the media outlets over the course of the Climate summit is a step in the right direction (over 650 Ph.D.-trained climate science experts signed up and about 55 inquiries from 25 media outlets were addressed – email communication, Stacy C. Jackson, University of California, Berkeley). Future efforts by the scientist themselves to improve climate science in the media need to be encouraged and supported by our society.

But the question we need to ask is, should we wait for another summit to start talking to the public about climate change or global warming?

Looking back on the news coverage of a few weeks prior to and during the Copenhagen Climate conference, climate news got widespread coverage, which is something that does not happen commonly. But undeniably, there is a cruel irony in the fact that the stolen emails were treated by the media as a matter of life and death and received even wider coverage than the conference itself, even though there was nothing to disprove the scientific consensus on global warming (<http://nature.com/nature/journal/v462/n7273/full/462545a.html>).

It was disheartening to see reputable scientists being put on the defensive by journalists about this scam, and only a handful of scientists coming out in their support. AS Section President Alan Robock appeared twice on CNN discussing the stolen emails and the Copenhagen conference, on December 7, 2009, on American Morning with Kiran Chetry, and on December 9, 2009, on the Campbell Brown show, but both times CNN had someone else to try to argue with him. In a time of such great distortion of reality by the media, the scientists need to come out and not wait to be

accused of manipulating data, withholding information and suppressing dissent. Silence can easily attract public distrust and disbelief in the science of global warming as seen in the polls (e.g., Washington Post-ABC News poll: <http://www.washingtonpost.com/wp-dyn/content/article/2009/12/18/AR2009121800002.html> and Pew Research poll: <http://people-press.org/report/556/global-warming>). However, it is encouraging to see that many of those polled support limiting greenhouse gas emissions, and many want the U.S. to join an international climate-change plan. See also what the public knows and thinks about science in a Pew Research poll (<http://people-press.org/report/528/>) and an interesting report on the gap between journalists and scientists (<http://www.firstamendmentcenter.org/PDF/worldsapart.PDF>).

A discourse by scientists hosted by scientific societies such as the AGU could certainly help open a space for interacting with the media through the social media such as blogs, wikis and others. Though scientists have never been trained in how to talk to the public in a world of blogs, cable news and talk radio, and therefore, they are poorly equipped to communicate their knowledge and to respond when science comes under attack, they must conquer their fear and reluctance to face the media. The new technological innovations can still be used to close this gap and help scientists learn how to frame a simple media message for maximum impact, avoiding the jargons and nuances that so much dominate most of our writings. The public confidence can be won by demonstrating through the social media that science has built in checks and balances, and it can work against excesses.

We need to take a new look at how we report climate science to be able to inform and equip the public in a way that allows them to participate in the growing debate of the climate change science. This will strengthen the public resolution to demand a new treaty that replaces the Kyoto Protocol that is set to expire in 2012. We need to increase the support of climate science by raising our voices and be more vocal about the global warming. But those voices must be guided by sound scientific principles and not demagoguery.

# History, Service and Science of Meteorology in Norway

Knut Iden

## History

The oldest regular meteorological observations in Norway are from the 18th century, and they were made by Johan Daniel Berlin in Trondheim, from 1762 to 1787, and next by Diderik Fester, from 1788 to 1802. From around the same period are Nils Hertzberg's series from Ullensvang, from 1798 to 1840. Fredrik Arentz (1777): "Om de naturlige Aarsager til den i Bergen jevnlig faldende Regn" and Jacob Nicolaj Wilse (1778): "Meteorographia compendiosa" are early meteorological publications.

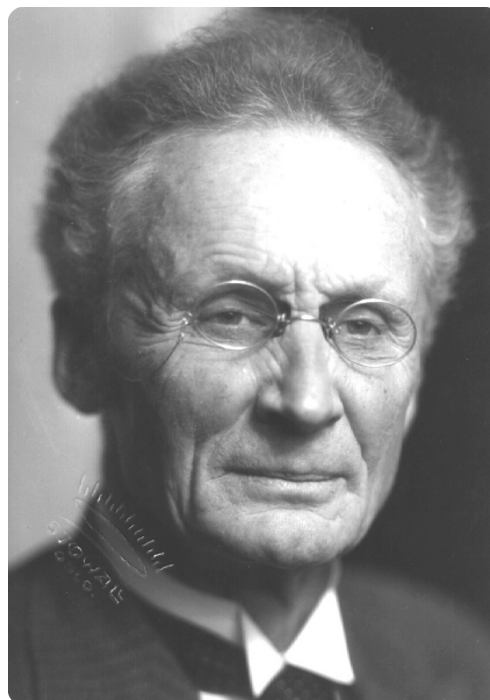
The first regular observation series were gathered from 1816 to 1838 by Professor Jens Esmark in the first Norwegian University, which was founded in Christiania (now Oslo) in 1811. Later, the measurements were taken at the "Observatory" from 1837 until 1933. In 1937 the observations started at Oslo-Blindern.

The Norwegian Meteorological Institute was established on 1 December 1866, with Henrik Mohn as Director. The stations in Bergen and Christiania were added to the network run by the telegraph service, and more were added gradually. In 1871 the network consisted of 53 stations. In 1870 Mohn published "Det Norske Meteorologiske Instituts Stormatlas" containing synoptic maps of several storms in Norwegian waters. Comparing the different occurrences he arrived at a theoretical model, which was a first step towards the cyclone model worked out in Bergen almost 50 years later.

Vilhelm Bjerknes (1862-1951) was a giant in international physics and geophysics. His name is connected to a circulation theorem from 1898 which can explain how circulation in the atmosphere and the ocean generates, intensifies and decays. He was the first scientist to analyse the problem of weather forecasting using the laws of physics, creating a new discipline, dynamic meteorology. He formulated a scheme for how the state of the atmosphere could be computed from one point of time to the next (1904). His "Bergen school of meteorology 1917-1926" revised the practice of weather forecasting with methods that later were used all over the world. He inspired his many assistants, among them Jack Bjerknes,

Halvor Solberg, Tor Bergeron, Carl Gustaf Rossby, Svein Rosseland, Harald Ulrik Sverdrup, Einar Høiland and Carl L. Godske.

The Norwegian meteorologists Arnt Eliassen and Ragnar Fjørtoft participated in 1948-1949 in John von Neumann's project on computer-based weather forecasting at the Institute for Advanced Study in Princeton. Their results published in 1950 became a milestone in the history of meteorology.



Vilhelm Bjerknes.

## Service

Norway participated in the international conference in Brussels in 1853 (Nils Ihlen). In 1860, the telegraph service in Norway started a weather forecasting service based on three daily reports from five different stations (Kristiansund, Ålesund, Skudenes, Mandal, Sandøsund and later Dombås). Observations were forwarded to Stockholm and from there to Paris.

Nowadays, the Norwegian Meteorological Institute (MI) is responsible for the public meteorological service for civil and military activities in Norway, which includes:

- 1) Regular observations within the meteorological network in Norway, Norwegian waters and Svalbard, including radars and measurements from oil platforms and buoys.
- 2) Collecting, storing, controlling the quality, archiving and making observations and measurements available for the public.
- 3) Preparing forecasts and warnings protecting society and economy.

4) Preparing warnings about extreme weather events.

5) Forecasting the air quality (in cooperation with NILU).

6) Studying the climate of Norway of the past, present and future.

7) Participating in international meteorological cooperation with WMO, ECMWF and EUMETSAT.

Free access by the community to meteorological information is provided by several web portals: [www.yr.no](http://www.yr.no) - weather forecasts; [www.eklima.no](http://www.eklima.no) - the Norwegian Climate database; [www.senorge.no](http://www.senorge.no) - daily maps of temperature, precipitation and several snow issues since 1961; [www.luftkvalitet.info](http://www.luftkvalitet.info) - daily information on air quality.

## Science

Scientific studies in meteorology are conducted at several institutions. Among them are the Universities in (U1) Oslo, (U2) Bergen, and (U3) The University Centre in Svalbard as well as (L1) The Life Science University (former High Agriculture School) in Ås. Research is also conducted at Research Institutes such as the (E1) Norwegian Institute for Air Research (NILU) and (E2) the Norwegian Polar Institute (Tromsø, Svalbard, Antarctica) and also (O1) the NERSC, Nansen Environmental and Remote Sensing Center, affiliated with the University of Bergen, and (O2) CICERO, Center for International Climate And Environmental Research associated with the University of Oslo. The Norwegian Meteorological Institute (MI) is located in Oslo, Bergen and Tromsø.

The main areas of scientific interest in meteorology include:

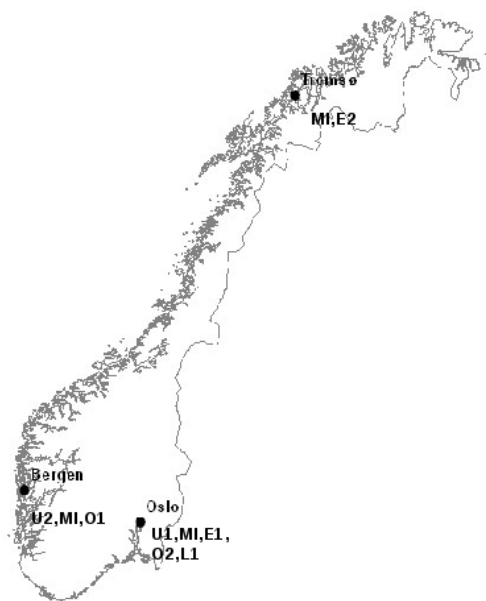
**Weather forecasting:** In addition to developing new models for weather forecasting and new observing techniques, the research is focused on understanding the physical processes that determine the weather (U1, U2, MI). Solar radiation is also an important topic (U2). The Hirlam model is used for 48-hour forecasts. For forecasts beyond 48 hours, the ECMWF prognoses are used. A WAM model with a 10-km grid is used for wave predictions for the Norwegian waters (MI).

**Climatology:** Identification and understanding of natural climate fluctuations in Norway and the Arctic by combining analyses of available instrumental data from land and the ocean for the past 50 to 100 years and unique high-resolution time series

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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.

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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 credited 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/member-ship\\_services/joblistings.cgi](http://www.agu.org/cgi-bin/member-ship_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).



- \* Consultant (Scientist) position in reanalysis (Ref.: AP09-17), ECMWF Headquarters, Shinfield Park, Reading, UK. Details: <http://www.ecmwf.int>
- \* Scientist/Senior Scientist in boundary layer parametrization (Ref.: AP10-02), ECMWF Headquarters, Shinfield Park, Reading, UK. Details: <http://www.ecmwf.int>
- \* Postdoctoral Research Associate Positions in Climate Science, Joint Institute for the Study of the Atmosphere and Ocean (JISAO) and Program on Climate Change, University of Washington, Seattle, Washington. Contact: Marjorie Ann Reeves. (mar@atmos.washington.edu).
- \* Postdoctoral Position in Climate Prediction, Department of Geosciences, Penn State University. Contact: Klaus Keller (klaus@psu.edu).
- \* Postdoctoral position in atmospheric chemistry-climate modeling, KNMI, The Netherlands. Contact: Twan van Noije (noije@knmi.nl).
- \* Postdoctoral position in modeling land use change, Department of Physical Geography and Ecosystems Analysis, Lund University, Sweden. Contact: Almut Arneth (almut.arneth@nateko.lu.se).
- \* Postdoctoral position in modeling vegetation-fire-climate interaction, Department of Physical Geography and Ecosystems Analysis, Lund University, Sweden. Contact: Almut Arneth (almut.arneth@nateko.lu.se).
- \* Postdoctoral position in modeling effects of climate change on African ecosystems, Department of Physical Geography and Ecosystems Analysis, Lund University, Sweden. Contact: Almut Arneth (almut.arneth@nateko.lu.se).
- \* Postdoctoral position in Coupling of an Ice Sheet Model to an Earth System Model (SAS2010-01), Max Planck Institute for Meteorology, Hamburg, Germany. Contact: Uwe Mikolajewicz (uwe.mikolajewicz@zmaw.de).
- \* Scientist/Postdoc in climate-carbon cycle feedbacks, Max Planck Institute for Meteorology, Hamburg, Germany. Contact: Jochem Marotzke (jochem.marotzke@zmaw.de).
- \* Postdoctoral position in radar polarimetry at X-band, Météo France, Toulouse, France. Contact: Pierre Tabary (pierre.tabary@meteo.fr).
- \* Tenure-Track Cold Regions Hydrology Position, School of Geography and Earth Sciences, McMaster University, Hamilton, Ontario, Canada. Details: <http://www.science.mcmaster.ca/geo/>
- \* Postdoc/Scientist in aerosol research, Laboratory of Atmospheric Chemistry, Paul Scherrer Institute, Villigen, Switzerland. Contact: Andre Prevot (andre.prevot@psi.ch).
- \* Postdoctoral position in parallel algorithm development for Earth and atmospheric science modeling, Swiss National Supercomputing Centre, Zurich, Switzerland. Further information: <http://www.cscs.ch>
- \* Tenure Track/Tenured Faculty Position, Center for Atmosphere Ocean Science, New York University, New York.
- \* World class Scientist in active optical remote sensing (Ref.: LA10N0009), NASA Langley Research Center, Hampton, Virginia. Further information: <http://www.usajobs.gov>
- \* Assistant Professor in climate system modeling, Department of Earth Sciences, University of Southern California. Contact: Karen Young (kayoung@usc.edu).

### **Interdisciplinary**

- \* Postdoctoral Research Associate, Illinois State Water Survey/University of Illinois at Urbana-Champaign, Champaign, Illinois. Further information: <http://www.sws.uiuc.edu/jobs/joblist.asp>
- \* 2010-11 Goddard Visiting Fellowship positions, Goddard Earth Sciences and Technology Center (GEST), Maryland, Baltimore County. Further information: [http://gest.umbc.edu/employment\\_opp/201011\\_goddard\\_visiting\\_fellow.html](http://gest.umbc.edu/employment_opp/201011_goddard_visiting_fellow.html)
- \* Tenure Track Faculty position at the Assistant, Associate or Professor levels in LiDAR and remote sensing, Department of Electrical & Computer Engineering, University of Houston. Further information: <http://www.egr.uh.edu/ece>
- \* Head of the Division of Environment, Hong Kong University of Science and Technology, Kowloon, Hong Kong. Further information: <http://www.envr.ust.hk>

### **Student Opportunities**

- \* 2 Ph.D. Student Positions within the project "links between local scale and catchment scale measurements and modelling of gas exchange processes over land surfaces," Jülich Forschungszentrum and Wageningen University. Dr. Dirk Schuettmeyer (dirk.schuettmeyer@uni-bonn.de).
- \* Graduate Student Positions (M.S. and Ph.D.), Department of Earth and Environment, Florida International University, Miami, Florida (<http://www.fiu.edu/orgs/geology/Content/AcademicPrograms/Graduate/graduateprograms.html>).
- \* Ph.D. position in "numerical modelling of halogenation processes based on laboratory and field measurements," Atmospheric Chemistry Modelling Group, University of East Anglia. Details: <http://www.uea.ac.uk/~fkd06bju>
- \* Ph.D. position in "Chemistry-cloud-climate links in the Marine Boundary Layer," Atmospheric Chemistry Modelling Group, University of East Anglia. Details: <http://www.uea.ac.uk/~fkd06bju>
- \* Ph.D. position in "Coastal Megacities and their atmospheric implications," Atmospheric Chemistry Modelling Group, University of East Anglia. Details: <http://www.uea.ac.uk/~fkd06bju>

- \* Ph.D. position in "role of primary and secondary organic particles for the chemistry of the marine boundary layer," Atmospheric Chemistry Modelling Group, University of East Anglia. Details: <http://www.uea.ac.uk/~fkd06bj>
- \* Ph.D. position in paleoclimate modeling (Ref.: A208/09), Department of Geosciences, University of Bremen, Bremen, Germany. Contact: Matthias Prange ([mprange@marum.de](mailto:mprange@marum.de)).
- \* Ph.D. position (Marie-Curie grant) in "probabilistic forecast of extreme winds" (Ref.: WAUDIT), Faculty of Physics, Complutense University of Madrid, Madrid, Spain. Contact: Francisco Valero ([valero@fis.ucm.es](mailto:valero@fis.ucm.es)).
- \* Ph.D. position in "modelling terrestrial biogeochemical cycles in natural and crop ecosystems," Department of Physical Geography and Ecosystems Analysis, Lund University, Lund, Sweden. Contact: Almut Arneth ([almut.arneth@nateko.lu.se](mailto:almut.arneth@nateko.lu.se)).
- \* Ph.D. position in "modelling land use change," Department of Physical Geography and Ecosystems Analysis, Lund University, Lund, Sweden. Contact: Almut Arneth ([almut.arneth@nateko.lu.se](mailto:almut.arneth@nateko.lu.se)).
- \* Graduate positions in wind energy research, Department of Geography, Indiana University, Bloomington, Indiana. Contact: Rebecca Barthelmie ([rbarthel@indiana.edu](mailto:rbarthel@indiana.edu)).
- \* Scholarships for Masters in "Climate Change and Policy," Univ. of Sussex, UK. Contact: ([climate@sussex.ac.uk](mailto:climate@sussex.ac.uk)). Further information: <http://www.sussex.ac.uk/climatechange>
- \* Ph.D. Position in the area of regional climate research, Wegener Center for Climate and Global Change, University of Graz, Graz, Austria. Contact: Sabine Tschuertz ([sabine.tschuertz@uni-graz.at](mailto:sabine.tschuertz@uni-graz.at)).
- \* Ph.D. position on formation of secondary organic aerosol, ICG-2 Troposphere, Forschungszentrum Jülich, Jülich, Germany. Contact: Astrid Kiendler-Scharr ([a.kiendler-scharr@fz-juelich.de](mailto:a.kiendler-scharr@fz-juelich.de)).
- \* Masters Degree Scholarship, Centre of Excellence for Climate Change Research (CECCR), King Abdulaziz University, Jeddah, Saudi Arabia. Contact: Mansour Almazroui ([mansour@kau.edu.sa](mailto:mansour@kau.edu.sa)).
- \* Multiple Ph.D. Projects opportunities, Department of Physics, University of Oxford, Further information: <http://www.atm.ox.ac.uk/main/Graduates/rp.html>.
- \* Graduate stipends in ocean and Earth sciences, Department of Ocean, Earth & Atmospheric Sciences, Old Dominion University, Norfolk, Virginia. Contact: Fred Dobbs ([fdobbs@odu.edu](mailto:fdobbs@odu.edu)).
- \* NASA Student Airborne Research Program (SARP 2010), University of California Irvine and NASA's Dryden Aircraft Operations Facility, Palmdale, California. Contact: Rick Shetter ([r.shetter@nserc.und.edu](mailto:r.shetter@nserc.und.edu)).
- \* Research & Discover Undergraduate Summer Internships and Graduate Fellowships in Earth System Science, University of New Hampshire-Goddard Joint Center for the Earth Sciences. Further information: <http://www.eos.unh.edu/ResearchAndDiscover/>

## Schools

**## 9<sup>th</sup> International NCCR Climate Summer School - "Adaptation and Mitigation: Responses to Climate Change" - ##**

Grindelwald, Switzerland. 29 August - 3 September 2010.

[http://www.nccr-climate.unibe.ch/summer\\_school/2010/](http://www.nccr-climate.unibe.ch/summer_school/2010/)

## Conferences

**// Local Air Quality and its Interactions with Vegetation //**

Antwerp, Belgium, 21 - 22 January 2010.

<http://www.vito.be/aq-vegetation-workshop>

**// Local Air Quality and its Interactions with Vegetation //**

Antwerp, Belgium, 21 - 22 January 2010.

<http://www.vito.be/aq-vegetation-workshop>

**// Arctic Frontiers 2010 //**

Tromsø, Norway, 27 - 29 January 2010.

<http://www.articfrontiers.com>

**// International Conference on Polar Climate and Environmental Change in the Last Millennium //**

Torun, Poland, from 1 - 3 February 2010.

<http://www.zklim.umk.pl/nowa/polarna>

**// AGU Chapman Conference on Complexity and Extreme Events in Geosciences //**

Hyderabad, India, 15-19 February 2010.

<http://www.agu.org/meetings/chapman/2010/bcall/>



**// 6<sup>th</sup> EGU Alexander von Humboldt Int'l Conference on Climate Change, Natural Hazards and Societies//**

Merida, Mexico. 14-19 March 2010.

[http://www.egu.eu/fileadmin/user\\_upload/AvH\\_6\\_Second\\_Circular.pdf](http://www.egu.eu/fileadmin/user_upload/AvH_6_Second_Circular.pdf)

**// 7th BIOMET Conference //**

Freiburg, Germany. 12-14 April 2010.

<http://www.mif.uni-freiburg.de/biomet/bm7>

**// Earth System Science 2010: Climate, Global Change and People //**

Edinburgh International Conference Centre, Edinburgh, UK. 10-13 May 2010.

<http://earthsystemscience2010.org/>

**// 29<sup>th</sup> Conference on Hurricanes and Tropical Meteorology //**

Tucson, Arizona, 10 – 14 May 2010.

**// CWE2010 - Fifth International Symposium on Computational Wind Engineering //**

Chapel Hill, North Carolina, USA. 23-27 May 2010.

<http://www.cwe2010.org>

**// 13<sup>th</sup> Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes //**

Paris, France, 1 - 4 June 2010.

<http://www.aria.fr/harmo/>

**// 2010 Western Pacific Geophysics Meeting //**

Taipei, Taiwan, 22 - 25 June 2010.

<http://www.agu.org/meetings/wp10/>

**// Water 2010 //**

Quebec City, Canada, 5 - 7 July 2010.

<http://www.water2010.org>

**// 11th International Meeting on Statistical Climatology //**

Edinburgh, Scotland, 12 - 16 July 2010.

<http://cccma.seos.uvic.ca/imsc/11imsc.shtml>

**// 9<sup>th</sup> Symposium on the Urban Environment; AMS 19<sup>th</sup> Symposium on Boundary Layers and Turbulence; 28<sup>th</sup> Conference on Agricultural and Forest Meteorology //**

Keystone, Colorado, 2 - 6 August 2010.

<http://www.ametsoc.org/meet/annual/>

**// 2010 The Meeting of the Americas //**

Foz do Iguaçu, Brasil, 8 - 13 August 2010.

<http://www.agu.org/meetings/ja10/>

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