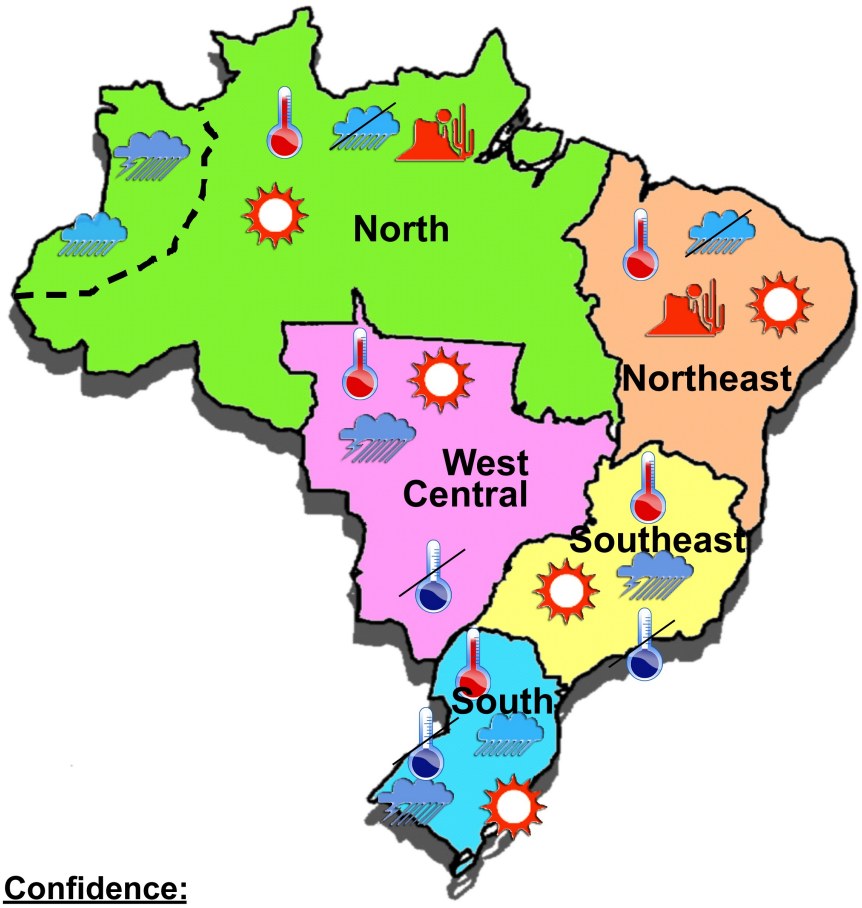
# Atmospheric Sciences Section of AGU Newsletter

Volume 3, Issue 2 May 2009






## Summary of projected climate change for Brazil by the end of the 21st Century.

Image from the CREAS Project (see AS Horizons - page 5). Image provided by Dr. José A. Marengo.

**Project changes:**

- Temperature increase
- Rainfall increase
- Rainfall decrease
- Extreme rainfall increases
- Dry spells increase
- Dry spells decrease
- Heat waves increase
- Cold waves decrease

**Confidence:**

High Medium Low

## AS Newsletter - Editorial -

*Hello Readers,*

*In this new issue of our newsletter we have the honor to present the new JGR Atmospheres editorial board. Steve J. Ghan and Yinon Rudich are continuing. We wish all of them the best of luck.*

*In the section "Policy Spotlight" you will find information about the climate change report that has been requested to the NAS and the NOAA by the USA Congress.*

*Moreover, you will have the opportunity to meet Courenay Strong, the 2008 Holton Award Winner. An article about the CREAS Project has been included in our AS Horizons section and you will find out about how cars can help measure precipitation. The usual sections about opportunities, schools and conferences are also included.*

*It is also of interest that the "NOAA 2010 budget request" has been published and is available online at*

*http://corporateservices.noaa.gov/nbo*

*Remember, we are looking for more contributions and new Contributing Editors for the newsletter. Moreover, if you think that you have a relevant idea or project and that it could be included in any of our sections don't hesitate to contact us with an abstract. For all these questions contact Juan A. Añel (j.anhel@uvigo.es).*

*Happy Reading,*

*Juan A. Añel, Editor-in-Chief*
*j.anhel@uvigo.es*
*CESAM, Univ. of Aveiro, Portugal, and Group of Atmospheric and Ocean Physics, Univ. of Vigo at Ourense, Spain.*



# Section News

*Alan Robock*

## AGU 2009 Joint Assembly

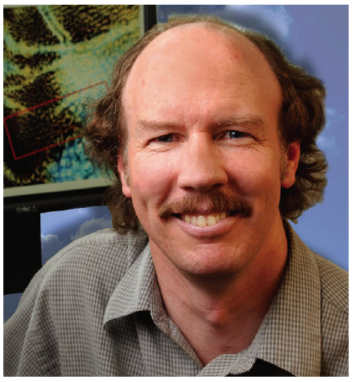
Remember that the next AGU 2009 Joint Assembly, The Meeting of the Americas, is from 24 to 27 May 2009, in Toronto, Ontario, Canada. Please visit the meeting website at http://www.agu.org/meetings/ja09/ for more information. There will be an AS reception on Monday with food and drink.

## AGU 2009 Fall Meeting

Remember that the 12th of June is the deadline for submission of session proposals for the AGU 2009 Fall Meeting which will be held between 14 and 18 of December in San Francisco.
http://www.agu.org/meetings/fm09/

## New JGR Atmospheres Editors

The *Journal of Geophysical Research-Atmospheres* would like to announce changes in its Editors. John Austin and José Fuentes have stepped down after four years of service. I would like to give them our sincere thanks for all their dedicated work toward continuing *JGR-Atmospheres* as the premier journal in its field. As a former Editor myself, I know how much work it was and very much appreciated their dedication. Steve Ghan and Yinon Rudich continue as *JGR-Atmospheres* Editors, and even more thanks goes out to them for their continued dedication. Two new Editors, Renyi Zhang and Joost de Gouw, are just beginning their terms, and I welcome them and thank them for volunteering.

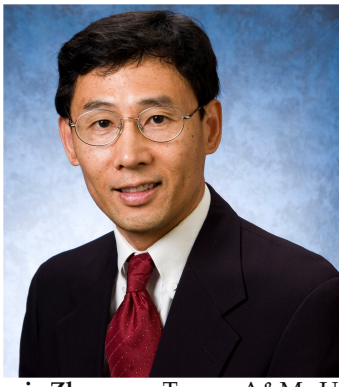


**Steven J. Ghan** - Pacific Northwest National Laboratory, USA.

**Joost de Gouw** - NOAA Earth System Research Laboratory, USA

**Yinon Rudich** - Weizmann Institute, Israel (Image obtained from

http://www.weizmann.ac.il/ESER/People/Yinon-Rudich)



**Renyi Zhang** - Texas A&M University, USA

# Policy Spotlight

*Anna Harper*

## *What is the Role of Science in Climate Change Policy?*

Climate change policy is making headlines and generating heated debate recently, particularly regarding a cap and trade program in the U.S. On the forefront is the balance between mitigating and adapting to climate change, and protecting a faltering U.S. economy. The decisions that will ultimately be made require input from experts in many fields, and the National Academy of Science (NAS) has been asked for advice on climate change policy. While it is essential for policy-makers to be informed of the science behind the decisions they face, it is a precarious situation for scientists to be asked which course of action to follow.

In 2008, Congress asked the NAS (along with NOAA) to investigate and study climate change and to "make recommendations regarding what steps must be taken and what strategies must be adopted in response to global climate change, including science and technology challenges thereof." Giving advice is why President Lincoln originally set up the Academy in 1863. The initial act creating the NAS charged it with investigating, examining, experimenting, and reporting on any scientific subject when called to do so by the government.

In response to Congress' request, the NAS initiated a suite of studies called America's Climate Choices (http://americasclimatechoices.org), which includes panels on limiting, adapting to, and researching climate change, and informing effective decisions and actions regarding climate change. The scientists involved plan to release a series of consensus reports later this year or early in 2010. The NAS also held a Summit on March 30 and 31, 2009 in Washington to discuss the U.S. response to climate change. Several hundred scientists, members of Congress, business leaders, and representatives of NGOs were in attendance.

Meanwhile, on March 31, Congressmen Henry Waxman (D-Calif.) and Edward Markey (D-Mass.) proposed a bill that addresses clean energy, energy efficiency, greenhouse gas emissions and the transition to a clean energy economy. The bill is called the American Clean Energy and Security (ACES) Act of 2009. The bill would require a transition to cap and trade and set target aggregate U.S. GHG emissions at 83% below 2005 levels by 2050, beginning with modest changes over the next few years (3% below 2005 levels by 2012 and 20% below 2005 levels by 2020).

The difficulty for NAS is two-fold. There is a fine line between reporting on the science behind policy and giving prescriptive advice on which policy to pursue. The first problem is defining that line.

The second problem is the timeline. The House Energy and Commerce Committee began debate on the ACES Act on April 22 (Earth Day), but the reports from America's Climate Choices aren't scheduled to be released until the end of the year. On the other hand, House Speaker Nancy Pelosi said on April 21 that climate legislation will be passed this year, and then said on April 22 that it will be ready a year from now [*Eilperin*, 2009]. Either way, a summary report from the NAS could prove beneficial for the House debates, perhaps overviewing the science and progress discussed at the Summit in March.

AGU's position statement on Human Impacts on Climate states that, in regard to climate change, scientists should strive "to pursue research needed to understand it; to educate the public on the causes, risks, and hazards; and to communicate clearly and objectively with those who can implement policies to shape future climate." In regard to Congress' request from the NAS on advice on bills such as the proposed ACES Act, the Academy can take a similar approach – research the underlying climate change and technologies and clearly communicate their findings, all the while paying close attention to the line between objectivity and subjectivity. While this can be difficult, it is of extreme importance.

**The U.S. Capitol. Photo obtained from Wikimedia Commons under the GNU Free Documentation License.**

## *Putting the Proposed ACES Act of 2009 into Perspective*

**Are the emissions suggested aggressive enough to curb "dangerous" levels of climate change?**

Juan A. Añel wrote a relevant article to this question called "New energy and climate change strategy presented by the EU Commission" in Volume 1, Number 2 of the AS Newsletter. In it, he summarized the report from a EU Commission, which states "that global warming has to be limited to no more than 2°C above the pre-industrial temperature to prevent dangerous levels of climate change."

The ACES Act would set U.S. targeted emissions at 20% below 2005 levels by 2020. According to the EU Commission, emissions from developed nations need to be reduced by an average of 30% below 1990 levels by 2020. However, as of 2006, the U.S. increased emissions by 14% since 1990. A 20% reduction from 2005 levels would be only roughly 8% below 1990 levels.

On the other hand, according to the EU Commission's report, global emissions need to be 50% of 1990 levels by 2050. The proposed reduction of 83% of 2005 levels would be much greater than 50% from 1990 levels. This is an ambitious goal, but it would allow for developing nations to cut their emissions relatively less between now and 2050. However, it remains to be seen if *(continued next page)*

modest decreases over the next decade will be enough to prevent 2°C warming over the next several decades. Although the proposed bill should be applauded (from an emissions-cutting standpoint) for its 2050 goal, the 2020 goal may be a case of too little too late.

**Is it realistic to expect an 83% cut in emissions by 2050?**

In 2006, the U.S. emitted approximately 1.4 gigatons of carbon (GtC), according to the UN Framework Convention on Climate Change. Meeting an 83% reduction would require the average American's emissions to drop from 5.45 tons of carbon per year (or 20 tons of CO2/year) to 0.82 tons C/year (3.4 tons CO2/year), assuming no population change. The good news is that the reduction could start small under the Waxman-Markey bill, which would also provide benefits such as "green" job generation and decreased American dependence on foreign oil. The EPA has estimated that the national economy would continue to grow under the bill between 2015 and 2030 (from $15 trillion to $22 trillion), although the average U.S. household would see an increased expense of $98 to $140 a year.

Rob Socolow and Stephen Pacala, co-directors of Princeton University's Carbon Mitigation Initiative, proposed 15 strategies that are currently commercially available which could each prevent the emission of 25 GtC over the next 50 years [*Pacala and Socolow*, 2004]. According to their paper, stabilization of atmospheric $CO_2$ is possible if global emissions stay below 8 GtC/year for the next 50 years. If work begins now, they argue, by 2055 we will have the technology to then begin decreasing global emissions. Naturally, emissions from developing countries will increase as population grows, which leaves it up to developed nations like the U.S. to strongly cut emissions, particularly over the next 50 years. Seeing how these technologies are available today, and that the U.S. is a wealthy nation despite recent economic woes, an 83% decrease by 2050 indeed seems feasible both financially and technologically.

**References**

Añel, J. (2007), New energy and climate change strategy presented by the EU Commission, *AGU Atmospheric Sciences Section Newsletter*, *1*(2), 3.

Eilperin, J. (Apr. 23, 2009), House panel begins debate on climate bill, Washington Post, http://www.washingtonpost.com/wp-dyn/content/article/2009/04/22/AR2009042202006.html

EPA: 2009 U.S. Greenhouse Gas Inventory Report: http://www.epa.gov/climatechange/emissions/usinventoryreport.html

Pacala, S. and R. Socolow (2004), Stabilization wedges: solving the climate problem for the next 50 years with current technologies, *Science*, *305*, 968-972.

U.N. Framework Convention on Climate Change (UNFCCC): National greenhouse gas inventory data for the period 1990-2006.

http://unfccc.int/resource/docs/2008/sbi/eng/12.pdf

# *Profiling Courtenay Strong: 2008 Holton Award Winner*

*Morgan Yarker*

**Dr. Courtenay Strong**

Meet the 2008 Holton Award winner: Courtenay Strong, a postdoctoral researcher at the University of California, Irvine. As a young researcher, Strong has made outstanding contributions to the field in both large and small-scale dynamics. In his short time as a researcher in the atmospheric science community, he has published 14 first-author articles.

Strong began his career as a broadcast meteorologist for local news stations. He had an innate interest in the scientific concepts behind the meteorology, so he enrolled in a masters program for a deeper understanding of the subject. He began his research career studying convective boundary layer growth and the turbulent transport of molecules involved in ozone chemistry. For his PhD, he turned his focus toward large-scale dynamics, studying the climatology of jet streams.

His current research project, co-authored with his postdoctoral mentor, Gudrun Magnusdottir, focuses on the feedback between sea ice and the North Atlantic Oscillation (NAO). Strong said his results "showed a negative feedback between winter sea ice and the atmosphere whereby the sea ice patterns associated with the positive polarity of the North Atlantic Oscillation generate a negative NAO-like atmospheric respnse." His current work includes a deeper exploration of the negative NAO-atmospheric response and its impact on the evolution of sea ice. This involves analyzing satellite-derived sea ice concentrations as well as incorporating code into a Global Climate Model to explore the NAO and sea ice feedback on both daily and monthly time scales.

He attributes part of his research's success to his years of broadcast experience. "The years I spent forecasting have benefited me as a researcher, giving me an intuitive feel for how the atmosphere behaves."

As a professor, Strong is excited to indulge in the research as well as teaching aspects of his career. He said, "I hope to contribute to the understanding of climate variability and to convey to students the excitement and thoughtful science embodied in the Holton Award".

Along with the Holton Award, Strong's previous honors include a National Science Foundation Graduate Research Fellowship, invited participant to the Leverhulme Climate Symposium and to the Advanced Study Program Summer Colloquium, First-Prize for Student Oral Presentation at the American Meteorological Society (AMS) 25th Conference on Agricultural and Forest Meteorology, Outstanding First Year Graduate Student in Atmospheric Science at the University of Virginia, and the AMS Seal of Approval for Broadcast Meteorology.

Strong has served the scientific community as a mentor for the California Alliance for Minority Participation at the University of California Irvine, manuscript reviewer for multiple atmospheric journals, and as a member of AGU, the AMS, and the American Association for the Advancement of Science.

In his free time, Strong said he enjoys playing acoustic guitar and flying dual-line sport kites.

This fall, Strong will be joining the University of Utah Atmospheric Sciences Department as an Assistant Professor.

Congratulations Dr. Strong!

## AS Horizons

# Future Change of Climate in South America in the Late 21st Century: the CREAS Project

*José A. Marengo*

Regional climate change projections for the last half of the 20th Century have been produced for South America, as part of the CREAS (Regional Climate Change Scenarios for South America) project. Three regional climate models (RCMs) (Eta CCS, RegCM3 and HadRM3P) were nested within the HadAM3P global model. The simulations cover a 30-year period representing present climate (1961–1990) and two future scenarios for the IPCC emission scenarios A2 and B2 for the period 2071–2100. The focus was on the changes in the mean circulation and surface variables, in particular, surface air temperature and precipitation for the A2 high emission scenario.

There is a consistent pattern of changes in circulation, rainfall and temperatures as depicted by the three models. There are indications that regions such as Northeast Brazil and central-eastern and southern Amazonia may experience rainfall deficiency in the future, while the Northwest coast of Peru-Ecuador and northern Argentina may experience rainfall excesses in a warmer future, and these changes may vary with the seasons. The three models show warming in the A2 scenario stronger in the tropical region, especially in the 5ºN-15ºS band, both in summer and especially in winter, reaching up to 6-8 °C warmer than in the present. In southern South America, the warming in summer varies between 2-4 °C and in winter between 3-5 °C in the same region from the 3 RCMs. These changes are consistent with changes in low level circulation from the models, and they are comparable with changes in rainfall and temperature extremes reported elsewhere. In summary, some aspects of projected future climate change are quite robust across this set of model runs for some regions, as the Northwest coast of Peru-Ecuador, Northern Argentina, Eastern Amazonia and Northeast Brazil, whereas for other regions they are less robust as in Pantanal and southeastern Brazil.

The CREAS project is a consortium of various universities and institutes in Brazil, lead by the CCST (Earth System Sciences Center) from INPE (Brazilian National Institute for Space Research). The Regional Climate Modeling group at INPE consists of at least 6 senior members from INPE and University of Sao Paulo, that together with 6 post doctoral researchers and 12 post graduate students from the fields of meteorology, climatology, oceanography, biology and agronomy, work together to produce climate change scenarios (and uncertainty analyses) to be used for impacts and vulnerability assessments and to design adaptation measures to cope with climate change. This consortium started with a grant from the Ministry of Environment-Program for Conservation of the Biodiversity (PROBIO), and now continues to be funded by the British Government, the World Bank, the Brazilian National Climate Change Program, The European Union, and private companies from Brazil such as Vale and Petrobras. This project follows the same lines as in similar international projects, such as the European Project PRUDENCE (Prediction of Regional scenarios and Uncertainties for Defining EuropeaN Climate change risks and Effects) and NARCCAP (North American Regional Climate Change Assessment Program). All of them followed a standard experimental design of using one or two global climate models to drive various regional models from meteorological services and research institutions in the regions to provide dynamically downscaled regional climate projections.

We encourage national and international collaboration and exchange of students and scientists. Currently, we have international collaboration with the UK Hadley Centre, the Max Planck Institute for Meteorology, the Centro de Investigaciones del Mar y la Atmósfera (CIMA) from Argentina, Servicio Nacional de Meteorologia e Hidrologia from Peru, the Japanese Meteorological Agency, the Postdam Institute for Climate Change, University of Chile and the Universidad Nacional de Colombia.

# The Future of Rain Gauges?

*Michel dos Santos Mesquita*

Predicting precipitation in weather and climate models accurately is not an easy task. It is especially difficult in complex terrain. Different microphysical schemes have been developed and used to try to tighten the gap between observations and model output. However, a bigger problem seems to be the lack of a larger number of weather stations. If more rain gauges were used, better results could be achieved. Is there an easy solution to the problem? A presentation at the EGU in April 2009 seems to foreshadow what the future of rain gauges could be like.

The European Geosciences Union General Assembly in Vienna (April 19-24) had 9,088 participants and it included 12,977 oral and poster presentations, according to the EGU website at

http://meetings.copernicus.org/egu2009

One presentation in particular caught my attention, because it showed something that has not been tried yet. It is an idea that could change the way we measure weather parameters such as precipitation!

Dr. Haberlandt, from the Inst. of Water Resources Management, Leibniz Universität Hannover, Germany and Dr. Sester, from the Inst. of Cartography and Geoinformatics, Leibniz Universität Hannover, Germany, gave a talk entitled: Assessment of precipitation using moving cars as rain gauges (http://meetingorganizer.copernicus.org/EGU2009/EGU2009-5566.pdf).

Their idea is to use cars as mobile rain gauges with windshield wipers as sensors to detect precipitation.

It is a simple and very effective way to provide scientists with a better precipitation dataset. In order for this idea to work, cars should have (a) GPS equipment and a memory chip to record the time and the wiper frequency. During the presentation at the EGU it was shown, in a computer model, how this system would work. The results were promising and perhaps we will be seeing a new and futuristic way of measuring precipitation soon!

**Image by González-Alba. Creative Commons license: http://www.flickr.com/photos/gonzalez-alba/1433413609/**

# *The Art of Creating and Giving Effective Presentations at Scientific Meetings*

*Charles K. Gatebe*

Nowadays, creating and giving effective presentations at conferences and meetings is considered an art and also a career necessity. It is quite common at scientific meetings to see visuals that are difficult to read or decipher. We also see speakers talking to the "screen" instead of facing the audience or, even worse, a speaker blocking a display without evening realizing it. This is because we release too much adrenaline and cortisol when we have to speak in public. Other more common issues include having a high rate of slides turnover per minute, talking continuously while a visual is being displayed, talking loudly or softly through a microphone, reading every word on the slide, using colors that are virtually invisible or having "busy" slides with invisible letters and graphs. All these factors tend to get in the way of the message, and both the audience and the presenter go home dissatisfied. It is possible to avoid these annoyances and make a presentation simpler, clear and effective.

Here are some thoughts on creating and giving an effective presentation.

A good starting point is to carefully review the material to be presented well in advance and then reduce the number of main points to a manageable amount – no more than four or five. It is important to select a few tables, graphs or other illustrations that clarify each point so as to reinforce the main ideas. It is an advantage to present just a few key points that your audience will remember easily. A simple outline is recommended as a way to organize all the ideas sequentially and in a logical manner. It should include only important details that will help the audience follow and understand the message. When presenting, talk directly to the audience giving only the highlights and using a conversational style as a way to engage the audience. They will appreciate a clear statement of the problem being discussed, a brief explanation of how it was solved, and a review of the paper's conclusions or applications if any, as well as recommendations. Always strive for balance and include any limitations or disadvantages associated with the methods and recommendations.

Visual Aids are now considered an integral part of any scientific presentation. When used properly, visual aids, especially computer –based visuals, can be both informative and entertaining. At times, however, they are abused and may become a distraction. Here are some recommendations or "rules" based on Advanced Communication Series: Technical Presentation (Toastmaster International, Inc.) that may serve you well.

Rule 1. Make letters large. The farthest audience member should be able to see and read your visuals. Letters should be at least one-half inch for every 10 feet between the visual and the farthest audience member and should be projected on a screen or other suitable white space. Ensure that the display is high enough for all to see. When presenting, never stand between visuals and audience.

Rule 2. Keep graphs, diagrams, and tables simple and general with no more than two curves or bars on any graph and should be legible on a display screen.

Rule 3. Keep text writing to a minimum and have one idea per visual. Each visual should have a title. Avoid using too many labels. There should be no more than seven lines and no more than seven words per line. At all cost avoid typewritten lists, computer printouts or pages from a book.

Rule 4. Make visuals colorful. Use no more than two or three colors per visual, other than "photo" slides. Experiment with different color combination to test what works best for your situation. Match font, background, and title style in all your slides.

Rule 5. Use the optimal number. Display each slide between 30 seconds and one minute. For a fast-paced presentation with an ample amount of material, use many visuals with a small quantity of material on each one. It is better to use many visuals with a small quantity of material on each slide than a few that are overloaded with detail.

Rule 6. Present smoothly. Avoid talking continuously while a visual is being displayed; most people can't absorb information from two sources simultaneously. Offer enough explanation to make your visuals clear and easy to understand.

Rule 7. Match your visuals to your text. Your visuals and your words should work together to build understanding. Also, have more to say than what appears on your slides—because slides should be used to add emphasis or clarity.

In summary, it is important that the information is presented elegantly and clearly to strike a formulaic balance between words and pictures. In order to achieve this, break down the material, select only the essential points and humanize statistics with anecdotes and history whenever possible. Describe any real world impact of the research, making it relevant to your audience. It is valuable to know your audience in advance so that you can plan how they might react to your talk. Remember that your speaking brings with it another component to the equation – the human dimension. Simply restating the presentation will not do justice to the information you want to communicate. Computers should only be used to strengthen your verbal presentation and not to replace you. Provide at least one Web address with additional information for those interested in learning more about your verbal presentation. Keep your presentation simple and clear and avoid complicated graphics. You do not need a complicated presentation to make your ideas sound impressive.

Your success in this art will bring you visibility, high regard and growth in many ways.

There is more information on the subject at: http://www.agu.org/sections/atmos/scientific_talk.html

## *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**

* Multiple positions in Atmospheric Chemistry and Climate. Research Scientist and Postdoctoral levels. Laboratory of Atmospheric and Climate Sciences, Spanish National Scientific Research Council (CSIC), Toledo, Spain. Contact: Dr. Alfonso Saiz-López // asaiz [at] cfa.harvard.edu.

* Atmospheric Scientist (atmospheric remote sensing related to Climate Change). Jet Propulsion Laboratory (Job ID #8326).

* Climate Change Scientists, Centre for Australian Weather and Climate Research (Melbourne & Hobart, Australia).

* Full Professorship (W3) for Environmental Physics. Faculty of Geoscience, Univ. of Tuebingen, Germany.

* Lecturer in Atmospheric Sciences. Department of Atmospheric Sciences, University of Illinois at Urbana Champaign.

* Scientific Programmers/Scientists in Climate Modeling and Data Analysis. Center for Climate Systems Modelling. ETH Zurich.

* Two PostDoc Scientist positions (Scientist C) with a PhD in (astro)physics, meteorology, or applied mathematics. SRON (Netherlands Institute for Space Research).

* Micrometeorologist / Biometeorologist position for the AmeriFlux Network. Department of Forest Ecosystems & Society at Oregon State University.

* Research Scientist with experience in molecular scale modeling. Earth Science Division of Lawrence Berkeley National Laboratory.

* Postdoctoral fellow in atmospheric chemistry and cloud microphysics. Department of Atmospheric Sciences, Texas A&M University.

* Postdoctoral Fellowship. CIRA at CSU, for its collaborative research as a Cooperative Institute with the NOAA National Information Services (NESDIS) in Camp Springs, Maryland.

* Two Postdoctoral Research Fellows. Department of Atmospheric & Oceanic Sciences at University of California, Los Angeles (UCLA).

* Project Scientist for research in areas relevant to precipitation frequency analysis. UCAR Visiting Scientist Programs office to work at the NOAA Office of Hydrological Development in Silver Spring, Maryland.

* Research Faculty appointments at the Research Associate, Assistant Research Scientist, Associate Research Scientist, and Senior Research Scientist. Goddard Earth Sciences and Technology Center.

* Researcher on numerical weather prediction and satellite data assimilation techniques. UCAR Visiting Scientist Programs in cooperation with the Air Force Weather Agency (AFWA) for the Joint Center for Satellite Data Assimilation (JCSDA).

* Scientific position in decision support system development. NATO Undersea Research Centre, La Spezia, Italy.

* Supervisory Physical Scientist/Deputy Director. National Climatic Data Center (NCDC), Asheville, North Carolina.

* Postdoctoral Fellow in regional climate modeling. ESRC, St. Francis Xavier University in Nova Scotia. Canada.

**Interdisciplinary**

* Meteorologist Position in Satellite Meteorology. Naval Research Laboratory, Monterey, CA.

* Professor for Climate Impact Research in Mountain Regions, University of Bern, Switzerland.

* Professor of Planetary Science. Department of Atmospheric and Planetary Sciences, Hampton University.

* 4 Scientific Programmers. Max-Planck Institute for Meteorologie.

* Postdoctoral Research Assistant – Climate Modelling. Smith School of Enterprise and the Environment. University of Oxford.

**Student Opportunities**

* Fully funded studentship (MS or PhD). America's Arctic Research University; Atmospheric Sciences Department at the University of Alaska Fairbanks.

## Schools

**## Data Assimilation and its applications in engineering ##**
Sibiu, Romania. 27 July - 7 August 2009. Application deadline: 17 May 2009.
http://ta.twi.tudelft.nl/wagm/users/remus/summerschool2009/
**## 2nd International Summer School: Climate changes in the Mediterranean area ##**
Villa Gussio, Leonforte (EN), Italy. 11 - 15 September 2009. Application deadline: 30 June 2009.
http://www.unikore.it
**## Joint NCAR-NCAS WRF Users Workshop and Tutorial ##**
Cambridge, UK. 28 September - 2 October 2009. Application deadline: 1 June 2009.
http://www.ncas.ac.uk/wrfworkshop

## Conferences

**// CCMVal workshop 2009 //**
Toronto, Canada. 1 - 5 June 2009.
http://www.atmosp.physics.utoronto.ca/SPARC/CCMVal2009/
**// AGU Chapman Conference on Abrupt Climate Change //**
Columbus, Ohio, USA. 15 - 19 June 2009.
http://www.agu.org/meetings/chapman/2009/ccall/
**// International Conference on Fluxes and Structures in Fluids: Physics of Geospheres //**
Moscow, Russia. 24 - 27 June 2009.
http://lfm-ipm.ipmnet.ru
**// 7th International Conference on Urban Climate //**
Yokohama, Japan. 29 June - 3 July 2009.
http://www.ide.titech.ac.jp/~icuc7/
**// PAGES 1st Young Scientists Meeting: Retrospective views on our planet's future //**
Corvallis, USA. 6 - 7 July 2009.
http://www.pages-osm.org
**// PAGES 3rd Open Science Meeting: Retrospective views on our planet's future //**
Corvallis, USA. 8 - 11 July 2009.
http://www.pages-osm.org
**// NCAR ECSA Junior Faculty Forum on Future Scientific Directions 2009 //**
Boulder, CO, USA. 14 - 16 July 2009.
http://www.asp.ucar.edu/ecsa/jff/jff09.php
**// MOCA-09: IAMAS - IAPSO - IACS Joint Assembly //**
Montreal, Canada. 19 - 29 July 2009.
http://www.moca-09.org

**// Workshop on High Resolution Climate Modelling //**
Trieste, Italy. 10 - 14 August 2009.
http://www.ictp.it
**// 18th International Conference on Nucleation & Atmospheric Aerosols //**
Prague, Czech Republic. 10 - 14 August 2009.
http://www.icnaa.cz
**// 1st IEEE GRSS Workshop on Hyperspectral Image and Signal Processing - Evolution in Remote Sensing - //**
Grenoble, France. 26 - 28 August 2009. Application deadline: 31 March 2009.
http://www.ieee-whispers.com/2009/
**// WMO Symposium on Nowcasting //**
Whistler, B.C., Canada. 30 August - 4 September 2009. Abstractsw submission deadline: 31 March 2009.
http://www.nowcasting2009.ca
**// World Climate Conference-3 //**
Geneva, Switzerland. 31 August - 4 September 2009.
http://www.wmo.int/wcc3
**// EcoHCC'09 - International Conference on Ecohydrology and Climate Changes //**
Tomar, Portugal. 10 - 12 September 2009.
http://www.ecohcc09.ipt.pt/
**// First Workshop on Open Source and Internet Technology for Scientific Environment: with case studies from Environmental Monitoring //**
Trieste, Italy. 7 - 25 September 2009.
http://www.ictp.it
**// European Conference on Applications of Meteorology - EMS Annual Meeting //**
Toulouse, France. 28 - 29 September 2009.
http://meetings.copernicus.org/ems2009/
**// Joint ICTP/IAEA Workshop on Alternative Response Actions to Climate Change and Energy Options //**
Trieste, Italy. 5 - 9 October 2009. Application deadline: 10 June 2009.
http://www.ictp.it
**// The Extra-tropical UTLS: observations, concepts and future directions //**
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Front cover: Summary of projected climate change by the end of the 21st Century. Image provided by Dr. José A. Marengo.