



AOS & CICS Newsletter

February 2008

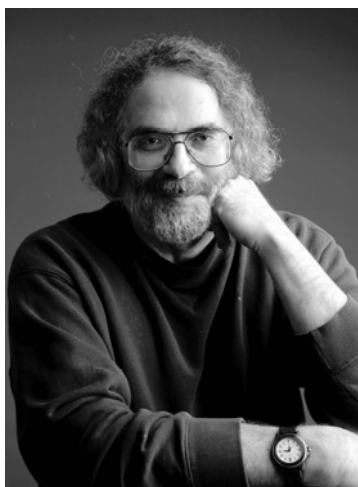
Volume 2, Number 1

Program in Atmospheric and Oceanic Sciences (AOS) & The Cooperative Institute for Climate Science (CICS)

This Issue:

- *Scientist receives Highest Award from AMS..... 1*
- *Nobel Prize Winners Honored.....2*
- *Outstanding Scientific Paper Award Winners Announced....2*
- *The "Royal" Connection...3*
- *Gold Medal Awarded.....4*
- *Director's Corner.....4*
- *AOS & CICS Research in Action.....5*
- *AOS & CICS News.....7*

GFDL Senior Research Scientist Receives Highest Award from AMS



Senior Research Scientist Isaac Held

Isaac Held, a senior research scientist at GFDL and lecturer with rank of professor in the AOS program, received the Carl-Gustaf Rossby Research Medal from the American Meteorological Society (AMS) for "for fundamental insights into the dynamics of the Earth's climate through studies of idealized dynamical models and comprehensive climate simulations." For over 35 years, Isaac has conducted research in both theoretical and applied atmospheric science, focusing on the scale of cyclones and anticyclones, landscape effects on atmospheric circulation, factors controlling the temperature gradient between the poles and the equator, and overall mechanisms and impacts of global warming. He is known for modeling Hadley cells, which describe the properties of atmospheric circulation in Earth's

equatorial zone. Isaac was presented with the Rossby Medal, at the 88th Annual Meeting of the AMS in New Orleans, on January 23, 2008. The award is presented to individuals on the basis of outstanding contributions to the understanding of the structure or behavior of the atmosphere. The medallion represents the highest honor that the Society can bestow upon an atmospheric scientist.

Along with Isaac, Tom Knutson, a research meteorologist at GFDL, received the *Journal of Climate* Editor's award, for "his thorough, thoughtful and insightful reviews that have greatly assisted Journal of Climate editors in some of their most difficult manuscript submissions." The formal presentation was also made at AMS's annual meeting in January.

Reception to Honor US Nobel Prize Winners

By Laura Stouffer, GFDL volunteer

U.S. Nobel laureates were honored at a reception in the Indian Treaty room of the Eisenhower Executive Office Building on November 26, 2007. A number of NOAA employees including several IPCC authors and U.S. delegates were in attendance. Former Vice President Al Gore, and his wife Tipper, also attended the reception, hosted by President George W. Bush's National Science Advisor, Dr. John Marburger.

The Nobel Peace Prize was awarded on October 12, 2007 to the IPCC and Former Vice President Al Gore "for their

efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change."

Other Nobel laureates attending the reception included the winners for medicine, chemistry, literature, physics and economics. The reception was a congenial event for the Nobel laureates to discuss their accomplishments and goals for the future in a relaxed setting. Approximately 60 people, including guests, enjoyed hors d'oeuvres, wine, and lively conversation in the ornate room, which overlooks the White House and its grounds.



The photo above shows the Department of Commerce Secretary Carlos M. Gutierrez, along with other NOAA attendees. From left to right: Ron Stouffer (GFDL), Ko Barrett (OAR), Robin Webb, Secretary Gutierrez, Randy Dole (OAR), Susan Solomon (ESRL) and Daniel Walker (National Ocean Service).

2007 OAR Outstanding Scientific Paper Award Winners Announced

Six GFDL scientists were among the winners of the 2007 NOAA Office of Oceanic and Atmospheric Research (OAR) Outstanding Scientific Paper Award. Gabriel Vecchi, a research scientist at GFDL, Brian Soden, a former GFDL scientist who is currently an Associate Professor at the University of Miami, Andrew Wittenberg, a research scientist at GFDL ('02 AOS Graduate Student), Isaac Held, a senior research scientist at GFDL, Ants Leetmaa, the former Director of GFDL, now retired, and Matthew Harrison, a research scientist at

*Alumni News --
Please send your
news, or news of
friends and
colleagues, to:
jcurcio@princeton
.edu*

GFDL were recognized for their 2006 paper, Weakening of tropical Pacific atmospheric circulation due to anthropogenic forcing, *Nature* 441, 73-76. The Outstanding Scientific Paper Awards were established to recognize the NOAA OAR Federal employees and Cooperative Institute scientists associated with OAR who published outstanding scientific peer-reviewed research papers, review papers, books, monographs and chapters of books that have contributed to or contain the results of research sponsored by OAR. OAR research is considered a driving force behind environmental products and services that protect life and property and promote sustainable economic growth. We are proud to have these fine scientists in our midst.

Alumni News . . .

Former AOS/GFDL Visiting Scientist Knighted

Former AOS/GFDL Visiting Scientist, Brian Hoskins, was recently awarded Knighthood for his services to environmental science in honor of the Queen of England's birthday. A world authority on climate and a former head of the University of Reading's meteorological department, Hoskins is a leading authority on climate and meteorological issues and a recent contributor to the Stern and Intergovernmental Panel on Climate Change (IPCC) reports. During the early 1970's, Hoskin worked with Kirk Bryan and interacted with many at GFDL. According to Bryan, Hoskin "did a lot to improve atmospheric modeling at GFDL by introducing the model based on spherical harmonics from Canada." During a career spanning more 35 years, most of it spent at the University of Reading, Hoskins has conducted research on climate change and variability, with particular focus on the understanding of atmospheric motion from frontal to global scales. He has served as vice-chair of the World Climate Research Programme, President of the International Association of Meteorology and also of the Royal Meteorological Society, member of the Royal Commission on Environmental Pollution, and Chair of the Scientific Advisory Committee of the Met Office. This is the second time Hoskins has been recognized on the Queen's Birthday Honors List.



*Former AOS/GFDL Visiting
Scientist Brian Hoskins*

GFDL Scientists Awarded Gold Medal

By Laura Stouffer, GFDL volunteer

GFDL's Acting Director V. Ramaswamy and Research Meteorologist John Lanzante were awarded the Department of Commerce Gold Medal last month for their contributions to the Climate Change Science Program (CCSP) report on Temperature Trends in the Lower Atmosphere. Ram, John and several NOAA colleagues were recognized with the Department's highest honor for "Improving the understanding of observed climate change and causes by showing that global average atmospheric warming is similar to surface warming."

Earlier research revealed discrepancies between the amount of warming in the surface and upper layers of the atmosphere. Errors in observational data were then identified and corrected. The GFDL researchers were part of a team that completed an analysis using the corrected data. Their analysis is described in the CCSP report, increasing confidence in the understanding of observed climate changes and their causes.

The Department of Commerce award ceremony took place on November 15, 2007 at the Ronald Reagan Building in Washington, D.C. A breakfast, sponsored by NOAA's Oceanic and Atmospheric Research, preceded the ceremony, and a reception followed. NOAA collaborators who also received the Gold Medal for this work were Thomas Karl, Christopher Miller, Dian Seidel, Thomas Peterson, Russel Vose, and Richard W. Reynolds.

Story Ideas?

We'd love to hear from you! Please send your suggestions to:

jcurcio@princeton.edu



Director's Corner

As part of my sabbatical this academic year, I had the great pleasure of spending the Fall semester in Europe hosted by several of our graduate student and postdoc alumni who now hold important positions in Switzerland and Italy. Nicolas Gruber, who was a postdoc in my research group between 1997 and 1999, began a new faculty position at ETH-Zurich in 2006 after spending the intervening years as a professor at UCLA. He is now building up an exciting research group focusing on ocean biogeochemistry and climate problems while teaching and supervising graduate students. It was a pleasure visiting him for 6 weeks in September and October and having the chance to work with him on a couple of papers as well as enjoy the beauty of Zurich and Switzerland.

After visiting Nicolas, my wife and I boarded a train through the Alps to Bologna, where three of our PhD alumni and one of our post-doc alumni are helping to run Italy's principal climate modeling and operational oceanography research efforts. Antonio Navarra, who received his PhD in 1986 under the supervision of Kiku Miyakoda, and then spent time here as a visiting scientist during the period between 1992 and 1994, is now president of the Centro Euro-Mediterraneo per i Cambiamenti Climatici, which is a multi institutional consortium of institutes dealing with a wide range of climate related issues.

He also directs one of the major components of this institute, which is associated with the Istituto Nazionale di Geofisica e Vulcanologia at the University of Bologna, and focuses on climate dynamics. Together with Elisa Manzini, class of 1992 who did her PhD with Prof. Kevin Hamilton, and, Simona Masina class of 1996 who did her PhD with Prof. George Philander, Antonio's group has succeeded in developing an IPCC class coupled climate model. This is the only such model in existence in all of Italy. Elisa's focus has been on chemistry and climate, whereas Simona has focused on the global ocean and climate.

Meanwhile, Nadia Pinardi, who was a visiting scientist under Kiku Miyakoda during the period 1992-94, and who last year won the Fridtjof Nansen Medal of the European Geophysical Union, is Scientific Coordinator of the remarkable Mediterranean Ocean Forecasting System, which currently produces daily analyses and 10-day forecasts for the entire Mediterranean at 10 km resolution. Nadia, who is a Professor at the University of Bologna along with Marco Zavatarelli, who was a postdoc under Prof. George Mellor from 1989-91, has a large research group and many enthusiastic undergraduate and graduate students, amongst whom we can count one of our present graduate students, Daniele Bianchi, who is doing his research with me on the ocean meridional overturning circulation and biogeochemistry. Nadia was the host for my visit and it was a pleasure for me to have an office next to hers where I could see for myself the enormous amount of energy and enthusiasm that she brings to her work. I had the wonderful opportunity to be briefed by her group and by Antonio's group and to see the remarkable accomplishments and exciting research that is occurring in these institutions, much of it led by our alumni. My only regret was that I never was able to greet another of our alumni, Valentina Pavan class of 1994 with Prof. Isaac Held as advisor, who works for the Servizio Idrometeorologico in the center of Bologna.

My time in Zurich and Bologna were highly productive and I greatly enjoyed the scientific interactions that I had with my colleagues there, but perhaps the greatest pleasure of all was to see how our alumni have come to play such a central role in their own countries.

AOS & CICS Research in Action

[This column is intended to focus on AOS & CICS research accomplishments and milestones, past, present, and future. In this issue, we highlight the accomplishments of Sara Mikaloff Fletcher who recently accepted a position at the National Institute of Water and Atmospheric Research (NIWA) in Wellington, New Zealand after almost two years in the AOS program.]

A native of Seattle, Washington, Sara earned her B.S. in Chemistry at The Evergreen State College in Olympia, Washington. She then went on to pursue a Ph.D. in Physical Chemistry at the University of Colorado,



Sara Mikaloff Fletcher, Associate Research Scholar

Boulder in Pieter Tans's research group. During her Ph.D. work, Sara used atmospheric inversions to estimate regional CH₄ fluxes from atmospheric observations of CH₄ and ¹³C/¹²C isotopic ratios in CH₄ and an atmospheric tracer transport model. This work suggested that CH₄ flux from wetlands is substantially larger than was previously thought (Mikaloff Fletcher et al., 2004a). Furthermore, this work provided insight into the strong role of wetlands in the 1998 growth rate anomaly in atmospheric CH₄, which has been a topic of considerable debate in the atmospheric CH₄ community (Mikaloff Fletcher et al., 2004b).

After finishing her Ph.D., she turned her attention to the oceans and joined Nicolas Gruber's group at the University of California, Los Angeles. Her post doctoral research focused on using an analogous inverse approach to estimate air-sea fluxes of CO₂ from ocean interior tracer observations and Ocean General Circulation Models (OGCMs) (Mikaloff Fletcher et al., 2006, Mikaloff Fletcher et al., 2007). In addition, she conducted an international model inter-comparison project using model output from ten OGCMs contributed by six ocean modeling groups in order to assess the robustness of the inverse estimates and understand the role of differences between OGCMs in the inverse system.

While at UCLA, she worked closely with colleagues at Princeton on developing a joint ocean-atmosphere inversion (Jacobson et al., 2007a,b) and using model simulations to interpret atmospheric observations of O₂/N₂ and CO₂ (Battle et al., 2006). Therefore, when her post doctoral research ended, Jorge Sarmiento invited her to join his group at Princeton.

Together with Cyril Crevoisier (Now at Laboratoire de Météorologie Dynamique), Sara has started to develop a multi-species approach to infer carbon surface fluxes through a combined atmospheric and oceanic inversion constrained by observations of various gases (CO₂, CO, CH₄, O₃, O₂). In particular, the simultaneous use of observations of CO₂ and CO made at the surface and from space (by the AIRS and MOPITT instruments) is being studied. This approach takes advantage of the correlation existing between different species to add additional constraints on the fluxes and the atmospheric transport. The results will inform the development of the full carbon observing system.

Furthermore, Sara has been using atmospheric simulations of ¹³C/¹²C in CO₂ to evaluate the fluxes from the joint ocean-atmosphere inversion (Jacobson et al., 2006a,b). These studies found a strong terrestrial carbon source in the tropics and southern hemisphere, which was not detected in the atmosphere-only inversions. Since the terrestrial biosphere discriminates strongly against ¹³C while air-sea fluxes discriminate only slightly against ¹³C, one would expect to see a signal from this terrestrial source in the latitudinal gradient of ¹³C/¹²C. Sara's model simulations support the hypothesis of a large terrestrial land source.

Sara has recently accepted a research position in Wellington, New Zealand at the National Institute for Water and Air Research (NIWA). She will be responsible for using atmospheric and oceanic observations and models to elucidate regional and global fluxes of CO₂, CH₄, and related tracers. Due to NIWA's affiliation with Victoria University in Wellington, she will also have the opportunity to teach, write proposals for projects outside NIWA's general scope, and advise graduate students.

NIWA's Māori name, Taihoro Nukurangi, comes from the combination of Taihoro, which is the flow and movement of water, and Nukurangi, which is the interface between the sea and the sky. Together, this phrase loosely translates to 'where the waters meet the sky', which also happens to be a perfect description of Sara's research interests.

Sara would like to take this opportunity to thank all her colleagues at Princeton for two wonderful years.

Selected publications

Gruber, N., M. Gloor, S. E. Mikaloff Fletcher, T. Takahashi, S. C. Doney, M. Gerber, A. R. Jacobson, K. Lindsay, D. Menemenlis, A. Mouchet, and J. L. Sarmiento, Toward consistent estimates of the oceanic sources and sinks for atmospheric CO₂, in revisions for *Global Biogeochem. Cycles*, 2007.

Jacobson, A. R., S. E. Mikaloff Fletcher, N. Gruber, J. L. Sarmiento, and M. Gloor, A joint atmosphere-ocean inversion for surface fluxes of carbon dioxide, I: Methods and global-scale fluxes, *Global Biogeochem. Cycles*, 21, doi: 10.1029/2005GB002556, 2007.

Jacobson, A. R., S. E. Mikaloff Fletcher, N. Gruber, J. L. Sarmiento, and M. Gloor, A joint atmosphere-ocean inversion for surface fluxes of carbon dioxide, II: Regional Results, *Global Biogeochem. Cycles*, 21, doi: 10.1029/2006GB002703, 2007.

Mikaloff Fletcher, S. E., N. Gruber, A. R. Jacobson, S. C. Doney, S. Dutkiewicz, M. Gerber, M. Gloor, M. Follows, F. Joos, K. Lindsay, D. Menemenlis, A. Mouchet, S. A. Müller, and J. L. Sarmiento, Inverse estimates of the oceanic sources and sinks of natural CO₂ and the implied oceanic transport, *Global Biogeochem. Cycles*, 21, GB1010, doi:10.1029/2006GB002751, 2007.

Mikaloff Fletcher, S. E., N. Gruber, A. R. Jacobson, S. C. Doney, S. Dutkiewicz, M. Gerber, M. Follows, F. Joos, K. Lindsay, D. Menemenlis, A. Mouchet, S. A. Müller, and J. L. Sarmiento, Inverse estimates of anthropogenic CO₂ uptake, transport, and storage by the ocean, *Global Biogeochem. Cycles*, 20, doi: 10.1029/2005GB002530, 2006.

Battle, M. S. E. Mikaloff Fletcher, M. L. Bender, R. F. Keeling, A. C. Manning, N. Gruber, P. P. Tans, M. B. Hendricks, D. T. Ho, C. Simonds, R. Mika, and B. Paplawsky, Atmospheric potential oxygen: New observations and their implications for some atmospheric and oceanic models, *Global Biogeochem. Cycles*, 20, doi: 10.1029/2005GB002534, 2006.

Mikaloff Fletcher, S. E., P. P. Tans, L. M. Bruhwiler, J. B. Miller, and M. Heimann, CH₄ sources estimated from atmospheric observations of CH₄ and 13C/12C Ratios: Part 1. Inverse modeling of source processes, *Global Biogeochem. Cycles*, 18, doi:10.1029/2004GB002223, 2004.

Mikaloff Fletcher, S. E., P. P. Tans, L. M. Bruhwiler, J. B. Miller, and M. Heimann, CH₄ sources estimated from atmospheric observations of CH₄ and 13C/12C Ratios: Part 2. Inverse modeling of regional CH₄ fluxes, *Global Biogeochem. Cycles*, 18, doi:10.1029/2004GB002224, 2004.

AOS & CICS News

On Sunday, October 14th, six GFDL "Model Runners" raced for a cure at Six Flags Great Adventure in Jackson. **Remik Ziemiński** claimed the trophy for the fastest Model Runner. Events included a 5K, a 4K, a one mile health walk, and kiddie races. The Runners raised an additional \$270 for this worthwhile cause and express their gratitude to donors who helped them achieve that goal.

As is the tradition in Sayre Hall, the AOS Holiday party, held on Tuesday, December 18th, brought together many of those who have contributed to success of the AOS Program in 2007. Holiday cheer, along with good food and

conversation, once again made the festivities enjoyable for all. A special thanks to **Anna Valerio** for coordinating the event, and to all of you who make the AOS Program what it is today and promise to shape the AOS of tomorrow.

GFDL's Winter Blood Drive will be held on Monday, February 11, 2008 from noon until 3:30 pm. Be a part of the less than 5% of people who donate blood in the U.S. . . . your donation could ultimately save up to THREE lives. Free Dunkin Donuts, bagels, freshly ground coffee, and other beverages will be available for all donors. Please direct any questions to Rich Gudgel at (609) 452-6533 or rich.gudgel@noaa.gov.

BIRTHS

Congratulations to **Brian Magi** and his wife, Heidi, on the birth of their daughter Anja Davin Magi born on November 10th, 2007 weighing 8 lbs 10 oz and measuring 21 inches long.

Congratulations to **Mike Hiscock** and his wife, Christine, on the birth of their son, Benjamin Canyon Joseph Hiscock, who was born on December 5th, 2007, weighing 8lbs 15oz and measuring 21 inches long.

Congratulations to **Xiaohua Lin** and her husband, Weidong, on the birth of their baby girl, Zihan, who was born on December 8th, 2007, weighing 6.5 pounds and measuring 20 inches long.

Congratulations to **Riccardo Farneti** and **Anna Pirani** on the birth of their son, Alessandro, who was born on December 26th, 2007, weighing 7 lbs 15 oz and measuring 21 inches long.

ON THE MOVE

Xiaohua Lin, a Senior Research Specialist, who has been working with Leo Oey for the past 3½ years, is now also working with Bob Key helping to assemble a large oceanographic data base. The data base will be called CARINA and will be composed primarily of previously unavailable data sets measured by European Scientists. Most of the CARINA data are from the far North Atlantic and Arctic Oceans - areas that are very poorly covered or not covered at all in the existing oceanic database (which is called GLODAP and was also assembled at Princeton). The database assembly requires finding and gathering the original data, reformatting to common units, etc., and various levels of quality control. Once completed the data are made available to the public both as individual cruise files with metadata and as a compiled fully calibrated data product. CARINA will be used with GLODAP for large scale studies of global climate change and the ocean carbon cycle. The CARINA assembly is organized under the European Union sponsored CARBOOCEAN project. Princeton participation is funded by NOAA. Additional information on CARINA and CARBOOCEAN can be found at:

CARINA: http://cdiac.ornl.gov/oceans/CARINA/Carina_inv.html

CARBOOCEAN: <http://www.carboocean.org/>

Transfer :

Ming Zhao, former AOS Research Scholar, now supported by UCAR, will continue his work with Isaac Held at GFDL.

Arrivals:

Torge Martin, a Postdoctoral Research Associate from the University of Bremen, will be working with Mike Winton (GFDL) and Geoff Vallis (AOS) on coupled processes of atmosphere, sea ice and ocean, and related feedback mechanisms along with the variability of the system.

Joke Leubbecke, a visiting Graduate Student from the University of Kiel will be working with Geoff Vallis.

Stephanie Henson, Associate Research Scholar from the University of Maine, will be working along side of Jorge Sarmiento to develop empirical models for the prediction of the biological response to global warming.

ALUMNI NEWS

Alex Hall '98 was promoted to Associate Professor at UCLA's Department of Atmospheric Sciences

Kenneth Bowman '84 was named Chairperson in the Department of Atmospheric Sciences at Texas A&M.

SAYRE HALL'S 7th IRON CHEF COMPETITION



Jennifer Simeon's winning entry ginger-lemon zested custard

Inspired by the exceptionally productive (or dare I say *reproductive* year) for Sayre-hallians, Sayre Hall's "Baby Boom" themed 7th Iron Chef Competition took place on Monday December 10th. Jennifer Simeon was declared the winner with a grand total of 33 delectable points. In keeping with December's secret ingredient: ROOTS, her winning entry was a ginger-lemon zested custard. Not to be outdone was 2nd place winner, Graduate Student Kelly Kearney with a dynamic duo of gingerbread babies and "Kearny" family gingerbreads. Always a fierce Iron Chef competitor, Sara Mikaloff Fletcher came in 3rd place for her tasty Swiss style baby carrot and

almond torte with lime glaze. Although not in the top three, reigning champion of Iron Chef VI, Anna Valerio's gingerbread babies were a diaper-clad, sweet success.



*Iron Chef VII 2nd place winner
Kelly Kearney*



*Anna Valerio and her baby
boom-inspired treats*

Iron Chef VIII took place earlier this week on February 5th. Jennifer Simeon's **Creating Carnival Chaos** theme attracted Fat Tuesday enthusiasts from both Sayre Hall and GFDL. The results of the highly-anticipated competition, which included bonus themes and actions, will be posted on the Iron Chef website in the near future thanks to Yves Plancherel, who graciously agreed to take over the Iron Chef website in Cyril's absence. The site can be accessed at: <http://aos.princeton.edu/WWWPUBLIC/ironchef> (Please note: Due to a bug in the latest version of Internet Explorer, please be sure to access the site through Mozilla Firefox.)



Please visit the site for: official rules, information regarding upcoming competitions, recipes, photos of past Iron Chef competitions and a special section entitled, "Food Court," which aims at collecting names and addresses of recommended restaurants around the globe.

AOS Program
Princeton University
Sayre Hall
300 Forrestal Road
Princeton, NJ 08544-
0710

Phone:
(609) 258-6047

Fax:
(609) 258-2850

We're on the Web!
www.aos.princeton.edu

Editor: Joanne Curcio
E-mail:
jcurcio@princeton.edu