

Above: A computer modeling study led by Carl Drews (NESL/ACD) probes a Biblical mystery (page 11).

Below: This image, taken from a simulation of 20th century climate, depicts different aspects of Earth's climate system. The two color scales show sea surface temperatures and sea ice concentrations; sea level pressure and low-level winds are also illustrated, including warmer air moving north on the eastern side of low-pressure regions and colder air moving south on the western side of the lows. Scientists used the CCSM to produce this simulation. The newly released CESM, of which the CCSM is now a subset, will allow them to study the climate system in even greater complexity.

THE COMMUNITY EARTH SYSTEM MODEL

NCAR'S LATEST STEP IN THE QUEST TO MODEL EARTH'S CLIMATE

IN THE EARLY 1960s, NCAR scientists Warren Washington and Akira Kasahara began developing one of the world's first computer models of atmospheric circulation. They used a CDC 6600 computer in the basement of the Mesa Lab, before today's computing room was even built. The machine received input via punch cards and seven-channel digital magnetic tape, and generated output via two line printers, a card punch, a photographic plotter, and standard magnetic

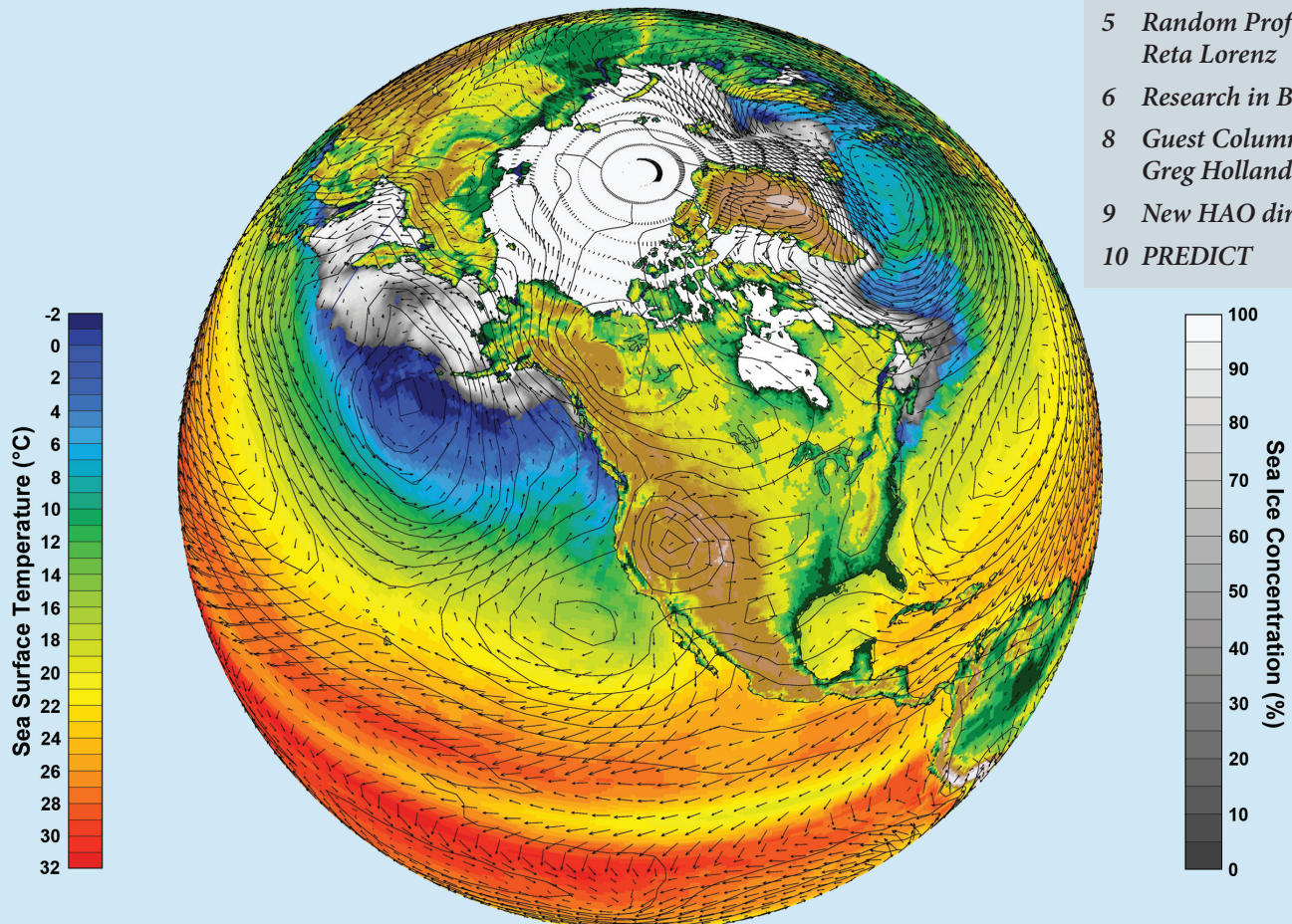
tape. In 1967, the pair published their first journal paper, "NCAR Global General Circulation Model of the Atmosphere."

Climate modeling has come a long way since the days of punch cards. In August, NCAR released its latest and most advanced tool: the Community Earth System Model (CESM), a fully coupled, global model that provides state-of-the-art computer simulations of Earth's past, present, and future climates. CESM will be one of the primary models used to conduct simulations in support of the next assessment by the Intergovernmental Panel on Climate Change (IPCC), due in 2013-14.

Building on CCSM

CESM is the successor to the CCSM (Community Climate System Model), whose first version, the

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Weather Trail gets a facelift

ABOUT A DOZEN staff gathered behind the Mesa Lab on September 16 to celebrate the refurbishment of the Walter Orr Roberts Weather Trail. The weather made its own appearance in the form of a beautiful fall day.

The trail, which opened in 1997, has been outfitted with new interpretive signs that feature revised text and more colorful graphics.

After remarks from Jack Fellows (UCAR vice president for finance and administration) and a brief ribbon cutting ceremony, Bob Henson (Communications) led the group in a tour of the trail, followed by refreshments in the Damon Room.

The idea for the NCAR weather trail came from Bob, who saw a poster presentation about a weather trail in Switzerland while at a meteorology education conference in Scotland in 1996. EO's Linda Carbone and colleagues had already been thinking about upgrading the existing nature trail behind the Mesa Lab. "I came back with the idea, and the trail was born," Bob says.

Linda oversaw the design and coordination of the trail refurbishment project. The black-and-white sketches on the original trail signs were replaced with color photos by UCAR photographer Carlye Calvin and other contributors. A team from FMS led by Dave Maddy and Bruce Kowalski handled installation.

For more about the history of the trail, see "Walt Roberts Weather Trail is open for business" (*Staff Notes*, July 1997) at the link below.

www.ucar.edu/communications/staffnotes/9707/trail.html



Above: Bob Henson (right) leads a tour of the updated Walter Orr Roberts Weather Trail.

A new look for Center Green

THE CG1 BEAUTIFICATION project is under way. Inside the construction fence near the building's entrance are the makings of a 50th anniversary commemorative garden that will include a sun shade, seating areas, and a short path leading to a concrete UCAR star logo on the ground.

The first phase of the project, which covers the hardscape portion, is scheduled for completion in mid- to late November. FMS plans to temporarily remove the construction fence for the annual UCAR Members' Meeting on October 5–6.

The 15-foot-high sun shade, consisting of metal lattice structures, will feature a canvas roof that can be removed in the winter to allow direct sunlight into the area.

During the second phase of the project, slated for next spring, a sustainable garden of perennials with low water requirements will be planted. Former EO employee Sandra Henderson, who led Project BudBurst, helped with planning the garden, giving it a phenological twist—observers can monitor the plants for first bloom and other indicators of weather and climate.

Watch for more information in *Staff Notes* as the project nears completion. Contact Brad Pattison (bradp@ucar.edu; ext. 2403) with questions.



Above: A computer-generated image of the CG1 sun shade. (Image courtesy Turnburke & Associates.)

NCAR Library makes searching and browsing easier

SEARCHING THE NCAR Library got a whole lot easier and more efficient in early September, when the Library launched OpenCat, a new online catalog.

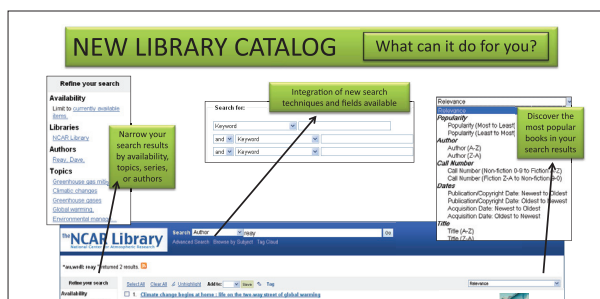
The open source application offers new advanced searching capabilities along with additional features that highlight the Library's resources and collections. A more flexible, user-friendly interface includes images of book covers, a virtual bookshelf that enables users to browse related items on the shelf containing the resource they have selected, and other enhancements.

The Library plans to introduce more OpenCat features over time and offer tutorials on its website. It is also initiating a Catalog Feature of the Week that will be publicized in *Staff Notes Daily*.

"We are very excited to offer this new application that provides enhanced access to our resources and collections as well as lends additional research support to the scientific community," says librarian Loretta Melhado, adding that the Library welcomes feedback and comments.

For further information regarding OpenCat, please contact Leslie Forehand (forehand@ucar.edu; ext. 8505).

<https://opencat.library.ucar.edu>



Community Climate Model, was created at NCAR in 1983. Scientists steadily improved and added capabilities to the model over the years, renaming it CCSM in 2001. A third version of CCSM was one of the main climate models used for the IPCC's 2007 assessment report, for which NCAR scientists shared a Nobel Peace Prize. The CCSM's fourth version, released last April, is now considered a subset of CESM.

CESM builds on CCSM, giving scientists a broader picture of Earth's climate system by incorporating more influences and feedbacks. With the new model, for instance, researchers can simulate the interaction of marine ecosystems with greenhouse gases; the climatic influence of ozone, dust, and other atmospheric constituents; the cycling of carbon through the atmosphere, oceans, and land surfaces; and the influence of greenhouse gases on the upper atmosphere. In addition, an entirely new representation of atmospheric processes in the CESM will allow researchers to pursue a much wider variety of applications, including studies of air quality and the role of aerosols in climate.

The improved realism of the model should also be helpful for studying and perhaps forecasting the evolution of ocean-atmosphere patterns (such as the El Niño/Southern Oscillation, the North Atlantic Oscillation, and the Pacific Decadal Oscillation), which dominate regional changes in weather and climate on interannual to decadal time scales.

"With CESM, we can pursue scientific questions that we could not address previously," says Jim Hurrell (NESL/CGD), who is the current chair of the CESM Scientific Steering Committee. "Thanks to its improved physics and expanded capabilities, it gives us a better representation of the real world."

Some specific questions that the model will be applied to include:

- What impact might warming temperatures have on the massive ice sheets of Greenland and Antarctica?
- How might patterns in the ocean and atmosphere affect regional climate in coming decades?
- How might climate change influence the severity and frequency of tropical cyclones, including hurricanes?
- What are the effects of tiny airborne particles, known as aerosols, on clouds and temperatures?



Left: Akira Kasahara, pictured here, and Warren Washington relied on a CDC 6600 super-computer to run the NCAR General Circulation Model that they developed in the 1960s and '70s. The model's output was stored in the IBM nine-track magnetic tapes shown in this picture.

Preparing for the IPCC

CESM's advanced capabilities will help scientists study climate change in greater detail, and they've already begun using the model for an extremely ambitious set of climate experiments to be featured in the next IPCC assessment. Although the publication of the assessment is still several years off, most of the simulations are scheduled for completion and public release beginning later this year, so that the broader research community can complete its analyses in time for inclusion in the report.

"We are working day and night to get all of the long-term climate change runs completed," Jim says. "It takes the commitment of nearly everyone in the project, as well as strong collaboration with CISL."

"It's a big investment of time and takes a lot of effort from a lot of people," concurs CGD/ACD scientist Jean-François Lamarque, who is working on the atmospheric chemistry component of the IPCC runs.

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On the Web

Community Earth System Model
www.cesm.ucar.edu

New computer model advances climate change research (NCAR & UCAR News Center, August 18, 2010)
www2.ucar.edu/news/new-computer-model-advances-climate-change-research



Above: Jim Hurrell.

One of the advantages of CESM for Jean-François is its ability to simulate interactive chemistry. “By having interactive chemistry, you can better capture feedbacks between chemistry and climate,” he says. “We can do this in CESM, but couldn’t in CCSM4.”

The long-term IPCC runs are being carried out mainly on CISL’s bluefire supercomputer. “Through a combination of careful planning both by the CGD and CESM teams and cooperation from CISL staff, the CESM team is able to carry out the IPCC runs on the necessary schedule while still allowing bluefire to

support the computational needs of many users from the university and NCAR communities,” says Dave Hart, CISL’s user services manager.

CESM, which is supported by NSF and the Department of Energy, is freely available to researchers worldwide.

THE LONG AND THE SHORT OF NCAR’S LATEST IPCC RUNS

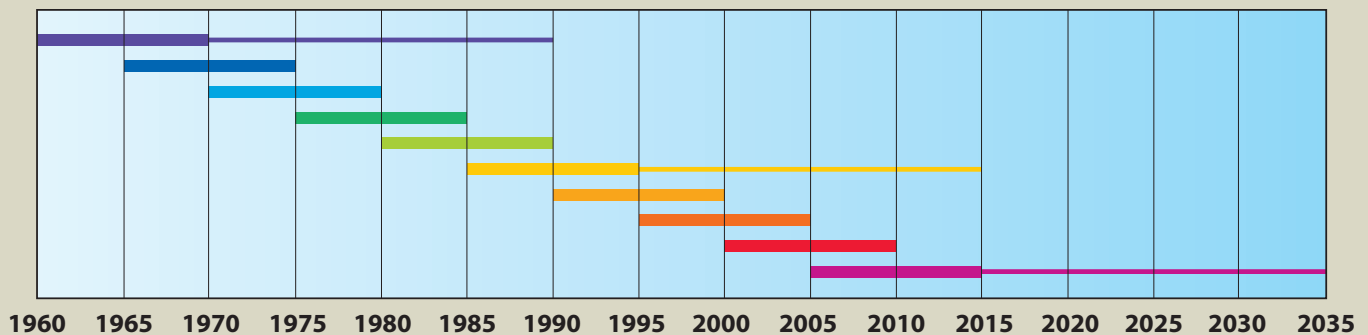
Simulating a century or more of climate is nothing new for NCAR’s community climate models. But this year the CESM is also zeroing in on shorter decadal time-scale predictions for the next IPCC assessment. One of the major advances in the new report will be attempts by modeling groups to incorporate the recent, observed history of slow-moving ocean currents and other factors that determine climate’s path over a decade or more. “Potential forecasting skill has been going untapped because we haven’t been assimilating the present state of the oceans,” says Jim Hurrell (NESL/CGD).

With this new approach, NCAR and other research centers are producing the first “decadal predictions.” These will reveal how well the models reproduce past climate and what they have to say about the near future. For each of the decadal predictions, the CESM will produce an ensemble of simulations, each with slightly different starting conditions to capture uncertainty in the observed atmosphere and ocean.

The time frames to be simulated (see graphic) include

- decade-long spans starting every five years from 1960 to 2005;
- 30-year spans starting in 1960, 1985, and 2005; and
- as in past IPCC reports, a variety of periods out to 2100 and beyond (not shown in graphic)—but with more sophisticated models and a wider variety of conditions and scenarios.

Beyond these core experiments, each center will carry out additional runs suited to that lab’s particular model and the interests of its scientists.



Each issue, *Staff Notes* spotlights a staff member selected at random from the phone directory. This month we profile Reta Lorenz.

Reta Lorenz

NESL/ACD

Reta has been ACD's division administrator since 2005. She's worked at UCAR/NCAR since 1992 in a variety of roles, first as a budget analyst followed by stints in sponsored agreements and ATD (now EOL).

Staff Notes: What is your typical day like?

Reta: It's never the same thing twice, which is sort of the good and bad of the job. I love that it's always busy and I'm never bored, but I also feel like I'm never done. It's interesting and I like working in a division where I'm close to the science.

Staff Notes: What are some of the things you handle as administrator?

Reta: A little bit of everything. Finance, HR, travel, property. Pretty much everything that isn't science or engineering. Somebody once explained to me that the job of administrator is that you handle multimillion dollar budgets but you're also the person they come to if the toilets aren't working. It was a very good explanation.

Staff Notes: What do you like best about your job?

Reta: I like the mix. I enjoy getting to delve into a really detailed, complicated spreadsheet and build something, or maybe write a report, but I also really love the people interaction. So I feel like it's the best of both worlds in that way. I work with a wide variety of people throughout the organization and outside NCAR.

Staff Notes: What is most challenging?

Reta: Anything where you have to fill out forms.

Staff Notes: What's your background? How did you end up at NCAR?

Reta: I've got a bachelor's in marketing, which I've never done. And I have an MBA with a statistics emphasis. I've pretty much always worked at nonprofits.

Staff Notes: Tell us about your life outside work. Those are some cute dog photos on your office walls.

Reta: That's Ella. She's a Leonberger. The breed is from Germany, a mix of Newfoundlands, Great Pyrenees, and St. Bernards. So she's big—110 pounds—and furry. Stubborn, but sweet.

Staff Notes: Do you and Ella live in Boulder?

Reta: Yes, we do, and in a major, positive life change—which you can put in *Staff Notes*—I'm getting married in December and we will be sharing a home with my fiancé Joe, three teenagers, two more dogs, and two cats.


Staff Notes: Wow!

Reta: I think it will be very exciting. The dogs all get along, and Ella is fascinated by the cats.

Staff Notes: What do you do in your free time?

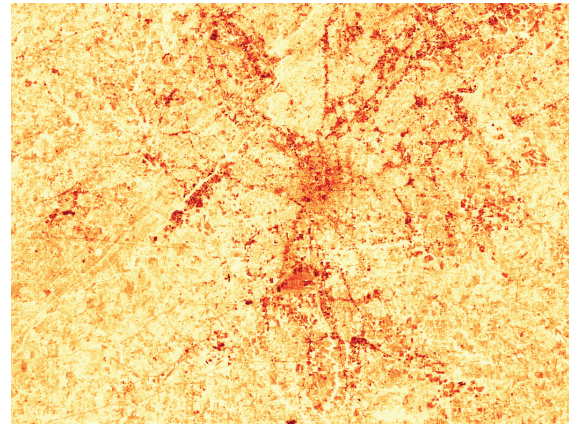
Reta: Walking the dogs takes a lot of time. I like hiking, running, photography, watercolor painting. And I love to travel. Italy is one of my favorites. More recently, I was in Nicaragua with Habitat for Humanity. I've also done a lot of volunteer work with kids and have found that I really enjoy that.

Staff Notes: Where did you grow up?

Reta: I was born in Iowa and grew up in Wyoming. I originally moved down here for a job in Denver, but then was called almost immediately about a job at NCAR. I really struggled with what to do, but decided that I wanted this job at NCAR. This has been an absolutely wonderful place to work. I like working someplace where you're participating in something bigger than just yourself or just making a profit. I like the people and the culture. 



Right: This pair of satellite images provides two views of Atlanta, with the city's urban core at the center of both images. The left image is a photo-like view of the area, while the right image is a land surface map with cooler temperatures in yellow and hotter temperatures in red. Because vegetation cools Earth's surface through evaporation, the most densely vegetated areas (darkest green in left image) are the coolest areas (palest yellow in right image). (Images courtesy NASA Earth Observatory.)



>>>Capturing heat islands in climate models

A TEAM OF SCIENTISTS led by NESL/CGD's Keith Oleson has incorporated urban areas into a global climate model. The development is important because most models used for predicting future climate change do not account for the urban "heat island" effect. The study will be published in the *International Journal of Climatology*.

Keith and colleagues used the CCSM, an NCAR-based model that uses trillions of calculations to simulate the chemical and physical processes that drive Earth's climate. After inserting a parameterization for urban surfaces into the CCSM's land surface component, the researchers ran the model from present day to 2100 under the Intergovernmental Panel on Climate Change A2 emissions scenario, which assumes that global fossil fuel emissions will continue to rise at high levels over the coming century.

Results from the modeling experiment show that present-day annual mean urban air temperatures are up to 4°C (7.2°F) warmer than temperatures for surrounding rural areas, a finding that is important for verifying the model's accuracy since scientists already

have observational evidence that urban areas are warmer than surrounding rural areas.

The study found that both urban and rural areas warm substantially by the end of this century as emissions rise, with rural areas warming slightly more than urban—resulting in a decrease in the urban-to-rural contrast. In addition, nighttime urban warming is much greater than daytime urban warming, resulting in a reduced diurnal range in temperature compared to rural areas.

"This study demonstrates that climate models need to begin to account for urban surfaces to more realistically evaluate the

impact of climate change on people in the environments where they live," Keith says.

He cautions that the study does not account for urban growth or changes in urban form or function; nor does it account for changes in the atmosphere other than increased carbon dioxide concentrations, such as aerosols or other kinds of pollution.

>>>Mountain waves and aviation safety

ON DECEMBER 20, 2008, a Boeing 737 with Continental Airlines encountered a crosswind gust during takeoff at Denver

(continued on p. 7)

Right: Lenticular, or lee wave, clouds indicate the presence of mountain wave activity. Lenticular clouds such as these are often seen along the Front Range of the Rocky Mountains.



International Airport (DIA), causing it to veer off the runway. A post-crash fire ensued, along with 37 injuries and substantial aircraft damage.

Simulations from RAL indicate that a mountain lee wave amplified over DIA within minutes of the accident. It marks the first time that research models have simulated these observed wind gusts at the airport.

Mountain waves, a type of atmospheric gravity wave, are generated when air blowing across a mountain range is forced up and over the top. On the lee side, gravity pulls the air down and forms waves. Patches of turbulence associated with large amplitude waves can pose a hazard to aviation.

In support of a National Transportation Safety Board (NTSB) accident investigation, the RAL team ran a high-resolution, numerical model (Clark-Hall) to simulate weather conditions at the time of the accident. Results from the simulation indicate mountain wave activity with a well-defined lee wave increasing significantly in amplitude shortly before the accident, creating strong gusts propagating across the runway of the accident.

"Instead of a downslope windstorm, we saw a mountain lee wave amplifying in a stable layer aloft above the airport," says scientist Teddie Keller.

The team's research could lead to changes in the weather information given to pilots, as analysis of wind data from the Low Level Windshear Alert System revealed substantial variability in gustiness across the airport, indicating that data from more than a single sensor should be used for airport operations. The NTSB report

"This is a theme for many of our projects in RAL. We've learned that you need to work concurrently with the physical and social sciences."

—Mary Hayden

recommends that the Federal Aviation Administration require air traffic controllers to provide pilots with additional LLWAS information that better captures localized crosswinds and gusts.

»»Physical and social sciences unite against plague


NCAR SCIENTISTS ARE collaborating with the Centers for Disease Control and Prevention (CDC) to help fight plague in Uganda in a project that merges physical and social sciences.

Plague, which is believed to have been responsible for the Black Death pandemic that swept Europe in the 14th century and killed more than 25 million people, is transmitted from rodents to humans via fleas. In Uganda, plague fluctuations appear to be closely tied to climate variability. Plague cases rise during the rainy season, likely because plague-infested rat populations seek shelter in villages and come into contact with humans.

Andy Monaghan, an atmospheric scientist in RAL, used the Weather Research and Forecasting model (WRF) to create a high-resolution climate data set for Uganda, where observational networks are sparse. "The climate data will be employed by CDC to develop an epidemiological model to predict plague outbreaks in Ugandan villages," he explains.

Predicting plague is the first step; making sure people in affected villages receive treatment is the second. Mary Hayden (ISP/RAL), a social scientist, is working with local health personnel in Uganda to train traditional healers to recognize plague cases, which are usually curable with antibiotics provided the drugs are administered quickly enough. Mary and Andy traveled to Uganda in September to train traditional healers in rural northwest Uganda and deliver cell phones and bicycles that will allow the healers to call cases of plague into health clinics and retrieve antibiotics.

"This is a theme for many of our projects in RAL," Mary says about the merging of climate modeling and social applications. "We've learned that you need to work concurrently with the physical and social sciences."

The research is funded by CDC. 

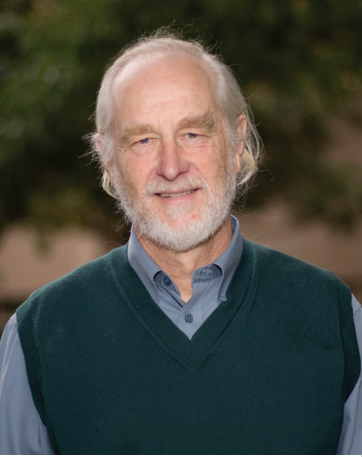


Above: Plague is transmitted from rodents to humans via fleas. In Uganda, plague cases rise during the rainy season, likely because plague-infested rat populations seek shelter in villages and come into contact with humans. (Image courtesy iStockphoto.com/ralphoto.)

COMMUNICATING SCIENCE IN A CHANGING MEDIA LANDSCAPE: UCAR/NCAR COMMUNITY READY TO ENGAGE

Greg Holland

Director, NCAR Earth System Laboratory



WE ARE IN AN ERA of rapidly changing communications media, which is driving a major evolution in the modes of communicating science. In the past, a mainstay of scientific communication in popular media was through science “translators”—science journalists and presenters. These have now nearly disappeared and are being replaced by widespread dissemination of information through the Internet, including blogs, YouTube, and social networking, as well as by journalists who often have little scientific background and sharp deadlines.

Thus, scientists and science organizations are required to assume increasing responsibility for translating our scientific findings and calibrating our communications to nontechnical audiences, a task for which we are often ill prepared. And this is compounded for controversial societal issues such as tobacco, evolution, and most recently, climate change—issues that are also prone to being politicized and hijacked by ideological belief systems to the detriment of constructive dialogue.

Perhaps not surprisingly, the need to accurately communicate weather and climate science is high on the community agenda: it is the theme of the 2010 UCAR Members’ Meeting and the 2011 meeting of the American Meteorological Society, and it will be discussed in several sessions and workshops at the fall meeting of the American Geophysical Union. Over the past several months, a group of UCAR/NCAR staff and external collaborators has been examining the issue of communicating science through a series of workshops and detailed discussions. Our goals are to develop new approaches to science communication and to equip present and future scientists with the requisite skills.

If we start from a sound scientific finding with general scientific consensus, such as the warming of the planet by greenhouse gases, then the primary emphasis moves from the “science” to the “art” of communication. The art cannot have free rein, however, as there remains a strong requirement for objectivity,

honesty, consistency, and above all, a resistance to advocating particular policy positions.

Logical and dispassionate presentation of evidence works for a target *scientific* audience, and most scientists are excellent communicators *to their peers*. But these qualities can become liabilities when communicating to a nonscientific audience where entertainment, attention grabbing, 10-second sound bites, and self-assuredness reign.

Major societal decisions from the policy to the personal level are influenced by many factors, including immediacy, economics, culture, community leaders, emotional framing, and ideological filters. One approach of considerable merit, therefore, is to target specific social groups by utilizing their own communication channels and peer groups and by translating scientific messages into familiar terms that are consistent with the group’s attitudes and beliefs. My view is that this will substantially improve the impact of the scientific message. It does require effort, particularly specialists who can develop an understanding of an audience and repackage messages to their perspective.

For UCAR/NCAR, the next step in the investigative process is a gathering on October 21–22, with a group of invited communicators discussing and helping finalize a white paper outlining future action. This will include town hall meetings that all are welcome to attend.

The way ahead is not an easy one. It requires a cultural change amongst scientists and science organizations to enable accurate, but relevant, translation of the message in a manner suitable for target audiences and the new generation of instant messages. Nevertheless, it is a path that we have to take, and my view is that it will be to the ultimate benefit of the science. ■

AN INTERVIEW WITH MICHAEL THOMPSON, HAO'S NEW DIRECTOR

MICHAEL THOMPSON IS NO STRANGER to NCAR—he's been visiting regularly ever since completing a postdoctoral appointment with HAO in 1988–89. He recently left the United Kingdom's University of Sheffield, where he headed the School of Mathematics and Statistics and was a professor of applied math and solar physics, to take the helm of HAO. He replaces Michael Knölker, who held the position since 1994.

Michael, who has been an NCAR affiliate scientist since 2003, uses mathematical concepts to study the physics, evolution, and internal structures of the Sun and other stars. He holds a doctorate from Cambridge University in helioseismology (the study of the Sun's oscillations).

His résumé also includes postdoctoral stints at Denmark's Aarhus University and the University of California, Santa Barbara. He was a lecturer at the University of London and professor at Imperial College London, and has long been involved in projects such as SOHO (the Solar and Heliospheric Observatory) and GONG (the Global Oscillation Network Group).

Staff Notes caught up with Michael to talk about HAO, his own research, and life in Boulder.

Staff Notes: What attracted you to the director position?

Michael: First of all, I'm really enjoying working with the fantastic staff in HAO. I've found everybody to be extremely welcoming and supportive, and strongly committed to HAO.

I think that HAO has done and continues to do great science. The observatory is very dynamic, with a broad research program in all aspects of solar and upper-atmospheric physics.

Boulder is probably the best place in world to be involved in solar physics research, with HAO, CU-Boulder, CoRA [Colorado Research Associates], and SwRI [Southwest Research Institute]. It's an attractor that brings many solar physicists into town, so you get to interact with leading researchers. The director position was a rare opportunity.

Staff Notes: What are your plans as director?

Michael: I see opportunities for greater interaction between HAO and the rest of NCAR. The Sun is the

main driver for everything that happens in the Earth system, so understanding the Sun and its impacts on Earth is quite rightly a significant element of the NCAR program.

In addition to making stronger ties with the rest of NCAR, I'm looking to strengthen our outreach and our support for the university community. HAO already does a lot in terms of contributing to community models and with the facilities that it provides at Mauna Loa Solar Observatory, but I don't think we necessarily always make enough noise about it.


We have important contributions to make in terms of education and training for early-career researchers in solar physics, solar-terrestrial physics, and instrumentation. Linked to that, one of the greatest strengths of HAO over the years has been its visitor program, which is one of the best at NCAR. I want to make sure we preserve its strength.

Staff Notes: Are you going to continue your own research while you are director?

Michael: I am indeed. I'm involved in the Solar Dynamics Observatory [SDO], a NASA mission that was launched earlier this year. I'm a co-investigator on SDO's Helioseismic Magnetic Imager, which is gathering new data on the Sun's oscillations and magnetic field.

I'm also involved in the Kepler satellite, which is looking to detect Earth-sized extrasolar planets. My involvement is analyzing oscillations of the stars to study the properties of Sun-like stars, including those whose mass and age differ from our own Sun.

Staff Notes: You moved here from England for this job. Any thoughts on life in Boulder?


Michael: We're living up in the foothills, near Walker Ranch, and greatly enjoying observing the wildlife. We've already been visited by a bobcat and wild turkeys and are looking forward to seeing our first bears and mountain lions up there. I'm really enjoying life and work in Boulder. 



Above: Michael Thompson.

INTO THE HEART OF HURRICANE SEASON

A TEAM OF NCAR researchers recently convened in St. Croix, U.S. Virgin Islands, to investigate tropical cyclogenesis (how tropical cyclones develop and strengthen), one of the most challenging aspects of atmospheric science. The field project, called PREDICT (PRE-Depression Investigation of Cloud-systems in the Tropics), ran from August 15 to September 30. Scientists used the Gulfstream V to analyze tropical disturbances that showed the potential for developing further. Among the storms they sampled across the Caribbean early in their lifespans were Hurricane Karl and Tropical Storm Matthew.

Check out the PREDICT project website at the link below, and watch for more in the fall issue of *UCAR Magazine*. 

www.eol.ucar.edu/field_projects/field-projects/predict



Upper right: Carlos Lopez Carrillo (New Mexico Tech) and Jeff Stith (EOL) inside the Gulfstream V.

Middle left: EOLs David Allbee and John Cowan preparing for flight.

Middle right: Laura Tudor (EOL) gets ready to release dropsondes during flight.

Bottom: The Gulfstream V sits on the runway in St. Croix on September 5 with remnants of Tropical Storm Gustav brewing in the background.




MODELING STUDY PROBES BIBLICAL MYSTERY

THE BIBLICAL ACCOUNT of the parting of the Red Sea—in which Moses and the Israelites are trapped between the Pharaoh’s advancing chariots and a body of water—has mystified people for millennia. A new computer modeling study led by Carl Drews (NESL/ACD) shows how the movement of wind as described in the Exodus account could have parted the waters.

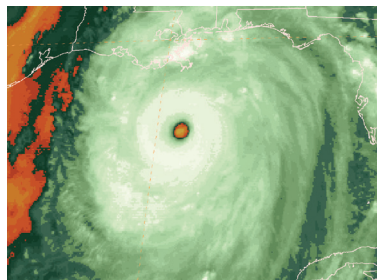
According to the simulations, a strong east wind blowing overnight could have pushed water back at a bend where an ancient river is believed to have merged with a coastal lagoon along the Mediterranean Sea. A land bridge would have opened

at the bend, enabling people to walk across exposed mud flats. As soon as the wind died down, the waters would have rushed back in.

The study was part of a larger research program analyzing typhoon-driven storm surge. Carl completed the work for his master’s thesis at CU-Boulder.

For more, including an animation, see “Parting the waters: Computer modeling applies physics to Red Sea escape route,” from the NCAR & UCAR News Center. 

www2.ucar.edu/news/parting-waters-computer-modeling-applies-physics-red-sea-escape-route



Hurricanes reaching to the edge of space

Can a distant hurricane play havoc with a GPS unit? Research at NCAR may shed light on the unexpected reach of hurricanes.

www2.ucar.edu/staffnotes/news/hurricanes-may-reach-edge-space



take a look

TAKE ANOTHER LOOK ONLINE: www.ucar.edu/staffnotes

UCAR PHOTOGRAPHER Carlye Calvin captured this rainbow in Nederland on the morning of September 23. It was a sunny day down in Boulder, but a number of storms were blowing through the mountains, setting up perfect conditions for rainbows. "The rain was pouring on me, and at the same time, a rainbow was moving over Barker Reservoir," Carlye says. For another shot from the same morning showing a double rainbow, visit www2.ucar.edu/staffnotes/take-a-look/double-rainbow.



Joachim Kuettner, renaissance man of meteorology, celebrated his 101st birthday on September 21. His amazing life is chronicled on a new website found at www.archives.ucar.edu/exhibits/kuettner.



Charlie Knight (NESL/MMM) prepares to make a mold of the giant Vivian hailstone, which set a new national record when it fell in South Dakota on July 23. Watch for more in the fall issue of *UCAR Magazine*.



Mark your calendar for Super Science Saturday on October 30. This year's theme is "Science with a Blast." For more information, visit www.ucar.edu/outreach/sss.