

Ephemeral Flow

A NEWSLETTER ABOUT SAHRA

JANUARY/FEBRUARY 2006

Welcome to the January/February issue of Ephemeral Flow, a newsletter for sharing information within the SAHRA community. Ephemeral Flow is sent to SAHRA researchers, staff, and students at all participating institutions approximately every two months. Your contributions and suggestions are always welcome. Please send items to Mary Black at mblack@sahra.arizona.edu.

FEATURES

Research Blossoming at UC Irvine

The SAHRA research effort at the University of California, Irvine (UCI) is led by SAHRA Founding Director Soroosh Sorooshian and includes researchers **Xiaogang Gao**, **Kuolin Hsu**, **Jialun Li**, **Hamid Moradkhani**, and programming specialist, **Dan Braithwaite**. Three Ph.D. students involved in the SAHRA studies graduated in the past three years

(**Yang Hong**, 2003; **Hamid Moradkhani**, 2004; and **Huiling Yuan**, 2005). The research goal of this group is to develop long-term (10-20 years) multi-resolution precipitation and meteorological forcing data over the SAHRA study regions using satellite remote sensing and regional climate modeling. These long-term, high-resolution (sub-daily and 4-km) data, now available for 2000-2004, are needed to drive and examine the new land surface, hydrologic, and water management models under development by SAHRA integrated modeling researchers.

Partially supported by SAHRA and leveraged by NASA funding, the UCI research team has developed precipitation estimates using cloud classification techniques developed by Hong et al.

They have been able to enhance the spatial and temporal resolutions of the precipitation estimation over the southwest more accurately. Some specific deliverables by UCI team include:



The Laurel L. Wilkening Rose Garden at UCI

1) The near real-time high-resolution precipitation data were made available through a public website for global 6-hourly $0.25^\circ \times 0.25^\circ$ data (hydis8.eng.edu/hydis-unesco) and for North American hourly $0.04^\circ \times 0.04^\circ$ data (hydis8.eng.edu/ccs). Recently, NESDIS selected UCI's global dataset as one of the major precipitation data sources for the United States and will include the data in its popular website at www.nesdis.noaa.gov.

2) Analysis of the 5-year meteorological data from the high-resolution regional climate modeling revealed important information about the interannual-to-seasonal variability of climate and hydrology in the semiarid southwestern U.S. (Li et al. and Gao et al.), which is useful for the improvement of southwest hydrologic forecasting and water management proposed by SAHRA.

3) Techniques of sequential state-parameter estimation were developed to improve hydrologic forecast via ensemble data assimilation (Moradkhani et al.). This approach directly contributes to the modeling effort of SAHRA.

UPCOMING EVENTS

Feb. 17: WSP workshop on Innovations in Arsenic Management for Water Providers, Tucson, AZ; contact Louise MacDermott (louisem@sahra.arizona.edu) for more info.

March 7-8: Executive Committee retreat, Marshall Bldg., Tucson, AZ

March 30-31: Integrated Modeling workshop, Socorro, NM (see details under Research)

May 18-19: SAHRA External Advisory Board meeting, Tucson AZ

July 9-12: Scenario Development Workshop, Environmental Modeling and Software Summit of the IEMS Biennial Meeting, Burlington, VT; contact Thorsten Wagener (thorsten@engr.psu.edu) for more info.

CONTACT US!

Please let us know when you have news to share or a reason to brag. Students, let us know for example when you have completed your oral exam, defended your thesis/dissertation, or accepted a position in the real world (or even academia). Faculty members, are you offering a new course, hosting a workshop, leading a panel, editing a new journal? Too bashful to talk about your own accomplishments? Anonymous or second-party tips on newsworthy announcements are also gratefully accepted.

Features, continued from previous page

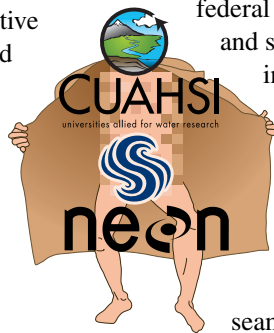
SAHRA's NEON and CUAHSI Collaborations Exposed!

by James Hogan

SAHRA researchers remain active in a variety of efforts associated with CUAHSI (Consortium of Universities Allied for Hydrologic Sciences, www.cuahsi.org) and NEON (National Ecological Observatory Network, www.neoninc.org).

CUAHSI is an organization sponsored by the NSF to develop infrastructure and services for the advancement of hydrologic science and education in the United States, and represents more than a hundred universities in the U.S. CUAHSI is presently writing a National Hydrologic Science Plan, led by SAHRA researcher **John Wilson** and former SAHRA graduate student **Kevin Dressler**. The plan supports CUAHSI's HydroView, a shared infrastructure that represents the first nationwide, coordinated effort to collect, synthesize and disseminate hydrologic information. **HydroView** includes four integrated facilities: the Hydrologic Measurement Facility (HMF), Hydrologic Information Systems (HIS), Hydrologic Observatories (HO), and a National Center for Hydrologic Synthesis (NCHS).

SAHRA is presently active in several efforts related to HydroView. The pilot HIS effort, led by **David Maidment** of the University of Texas has been underway for the past three years. A second phase is now being proposed in which SAHRA's Rio Grande and San Pedro database



efforts would serve as testbeds for the development and proof-of-concept for an HIS system to operate at watershed and regional scales, integrate local, state, federal and researcher data streams, and support "observatory" and integrating modeling activities.

One relevant question for SAHRA's involvement with the HIS effort is whether it is possible to create a distributed (multiple node) database that appears seamless. For example, could data for the lower Rio Grande below El Paso be stored in Austin, and the data for the northern reaches stored at SAHRA? SAHRA researchers also remain interested in the possibility of an environmental observatory that would build on the infrastructure that SAHRA and its collaborators have developed in the Rio Grande. Currently, the path forward for HOs or other environmental observatories is unclear and will certainly not be short. SAHRA's efforts in the Rio Grande, however, serve as a smaller-scale proof-of-concept for the hydrological science that an observatory might enable. Finally, the UA plans to submit a proposal for the CUAHSI Synthesis Center when the RFP is released.

NEON is an NSF initiative to develop the first national ecological measurement and observation system designed both to answer regional- to continental-scale scientific questions and to have the interdisciplinary participation necessary to achieve credible ecological forecasting and prediction. NEON is addressing three Grand Challenges, including one in Hydroecology. SAHRA researcher

Dave Breshears is involved in NEON leadership at multiple levels, including the steering committee for the Southwestern Ecological Observatory network and NEON's design subcommittee on climate change impacts. Dave is also the current chair of the Consortium of Regional Ecological Observatories (COREO, www.neoncoreo.org), NEON's primary user community. COREO was created in Oct. 2004 by representatives from regions self-organized to support NEON's creation. In Jan. 2005, COREO received funding from NSF to support regional meetings of scientists to contribute local expertise and perspectives to national observatory discussions.

One outgrowth of NEON planning in the Southwest is the development of a new USA National Phenology Network that will focus on the timing of key biological events such as time of plant blooming. Such a network is needed to detect regional-scale environmental responses to temporal dynamics in the water budget (www.uwm.edu/Dept/Geography/npn/). Last August, the Institute for the Study of Planet Earth at UA sponsored and helped organize a workshop in Tucson to begin developing an implementation plan for a USA-National Phenology Network (USA-NPN). The workshop summary, which appeared in the December 20 issue of EOS, is available online at www.uwm.edu/Dept/Geography/npn/meetings/2005/betancourt_etal_2005.pdf. A team will meet this spring, probably in Tucson, to further develop the implementation plan. An important issue is the location, management, and funding for a national network office, which could be established at the UA.

ADMIN NOTES

Jacobs Assumes New Position

SAHRA Deputy Director **Kathy Jacobs** has been named Executive Director of the new Arizona Water Institute by Governor Janet Napolitano, effective Jan. 1. Jacobs will also retain her position at SAHRA. The new organization is a



consortium of the three state universities, and will draw on faculty and researchers on issues pertaining to sustainable water resources. The institute will also work with

state agencies and communities to advance technologies related to water and provide support for policy makers. Good work, Kathy! The Arizona Water Institute will cohabitate with SAHRA, on the 5th floor of the Marshall Building at the University of Arizona.

PEOPLE

Student and Faculty News/Milestones

We regret to report the impending departure of **Kat Wilson**, who will leave SAHRA in February for a position as trainer and education programs manager at the National Aviary in Pittsburgh. Kat first came to SAHRA in fall 2003 as the graduate assistant for the WATER Kits program, received her MA last spring, and continued on at SAHRA in the position of statewide program coordinator for WATER Kits. Kat's good humor, keen intelligence, and winning ways with children and educators will be missed at SAHRA and throughout the state!



Kat says goodbye to a pal, a distraught American kestrel.

Students who finished degrees

Our latest OMS info-gathering exercise revealed a number of recent graduates who nearly slipped past our notice. Among them:

Renee Sandvig received an MS degree in hydrology from New Mexico Tech in May 2005. Her thesis, "Ecohydrological control on soil-moisture fluxes in arid vadose zones," was completed under the mentorship of Fred Phillips. Renee is now working on contaminated site remediation at ENVIRON, an environmental consulting firm in Princeton, NJ.

Congratulations to **Jesus Gastelum**, who in December successfully defended his dissertation, "An analysis of water resources alternatives to improve water allocation on the Conchos Basin during drought situations." His work was undertaken at the UA under the direction of Juan Valdes and involved creation of a

DSS which carries out simulation of water resources allocation, reservoir operation policies, increased water distribution efficiencies, and temporary water rights transfers. His work also analyzed the current water right allocation mechanism from an institutional perspective to identify management alternatives on the Conchos Basin and facilitate Mexico's compliance with treaty requirements.

Daniel Potts received his Ph.D. from the UA in December 2005 in ecology and evolutionary biology. Daniel started as a CATTs fellow at SAHRA, working for two years with Gary Woodard, Jim Washbourne and Liz Hancock on SPLASH. Later he worked as a graduate research assistant with Travis Huxman, Dave Goodrich, and Russ Scott at the San Pedro River tower sites and at the Santa Rita Experimental Range, linking leaf-level plant gas exchange with ecosystem-level gas exchange measured by the eddy covariance towers. Daniel says that intellectual, financial and logistical support from SAHRA was a critical factor in allowing him to complete his degree in just 3 1/2 years. His dissertation was titled "Rainfall variability and carbon cycling in semi-arid ecosystems." He now is a postdoc at UC-Irvine.

Amy Defreese is the first in her class to complete the M.Eng. degree from the UA, which allows a flexible approach for working water professionals to complete their master's degrees, requiring only one full-time semester in residence. Amy's culminating project was "Riparian wetlands of East Canyon Creek in Summit, County, Utah: losses authorized under Section 404 of the Clean Water Act within the context of overall historic losses." She continues to work for the Army Corps of Engineers in Salt Lake City.

Publicity/Honors

Joe McConnell, of the Desert Research Institute in Reno, Nevada, has received a Fulbright to lecture and conduct research in Argentina from March to June of this year. His research will focus on an Argentine ice core from the tip of the Antarctic Peninsula.

As Joe says, "They've got a unique ice core; I've got a unique ice core analytical system, so it is a win-win situation." He also expects to work with Argentineans, French, and Chilean researchers in examining the impact of global climate change on water resources with respect to snow and glacier melt; more than 90% of the water resources in the region comes from these sources. It is hoped that this will lead to collection and analyses of one or more Andean ice cores to document changes in snowfall and precipitation chemistry over the past centuries to millennia. Joe expects to also present one or more lectures on SAHRA activities in semi-arid hydrology, particularly sustainability, and will soon be contacting his SAHRA colleagues with respect to this.

Soroosh Sorooshian gave the Robert E. Horton Lecture at the 86th Annual Meeting of the American Meteorological Society, February 1 in Atlanta. The lecture, entitled "Our Journey Towards Improved River Flow & Flood Forecasting," was included in a session sponsored by the 20th Conference on Hydrology.

Congratulations to **Karletta Chief**, Ph.D. candidate in hydrology and water resources, who was named one of six recipients for 2005 of the prestigious Marshall Foundation Dissertation Fellowship at the University of Arizona. The award includes a \$12,945 stipend and tuition for two semesters. Karletta's dissertation title is "Wildfires in Arizona: Soil physical changes and their effect on the spatial distribution of infiltration and runoff generation."

And *Southwest Hydrology* continues to garner awards, this time an Award of Excellence in the regional Publications, Art, and Online competition (Arizona, New Mexico, and Oklahoma) of the Society for Technical Communication. Entries were judged against standards for each category, not against each other. Next year, *Southwest Hydrology* hopes to nab a "Distinguished" Award, which would automatically move the entry into national competition.

RESEARCH

Water Banking Work Generates Interest from NM State Engineer

As a direct consequence of the stakeholder engagement session at SAHRA's 5th Annual Meeting in October, SAHRA representatives met on Jan. 12 with New Mexico State Engineer John D' Antonio and Estevan Lopez, Director of the Interstate Stream Commission, to discuss SAHRA's work on water markets and water banking and to strengthen ties with the Office of the New Mexico State



Engineer (NMSE). As a result of these discussions, The State Engineer's staff is investigating establishing a formal working agreement between NMSE and SAHRA. SAHRA will develop a water markets/trading model for the Mimbres River Basin as a pilot study,

since considerable current efforts are being focused there and the knowledge base is stronger. The work will involve developing and running scenarios and will supplement ongoing model development for the Middle Rio Grande area.

IM Workshop Looms

SAHRA's Integrated Modeling team is planning a two-day workshop in Socorro, NM on March 30-31, 2006. The first day will focus on "Where We Are," with the goal of establishing answers to important questions as to how the integrated modeling activities are contributing to answering the three SAHRA science questions. The second day's focus, "Where We Are Going," will be devoted entirely to advancing the development of scenarios. Attendance for the first day is open to all interested parties including SAHRA PIs, co-PIs, students, and stakeholders. The second day will mainly be attended by the SAHRA Scenario Development team, key PIs in each question area, SAHRA administrators, and relevant stakeholders. Other interested parties are also welcome. Contact **Yuqiong Liu** (yqliu@hwr.arizona.edu) for more information.

R & R

What ^(!^&#% Words Would You Like to Ban?*

We recently received several suggestions for words that SAHRA should ban in 2006. Please email your own suggestions to mblack@sahra.arizona.edu. We'll compile them and include a ballot in the next issue of *Ephemeral Flow* for the favorite word/phrase to banish! Apologies to all who have a sentimental attachment to any of following words, phrases, or concepts:

Suggestions for words to ban:

- biogeochemical, biogeochemical, or any similar utterance by Paul Brooks
- cyberinfrastructure
- hydrologic literacy
- integrated (and variations thereof)
- knowledge transfer
- OMS (Note: you can try to ban the word, but you'll never be rid of the database)
- strawman

Suggestions for previously banned words to revive:

- thrust area

On a related note, SAHRA will no longer consider employment applications or student or research affiliations/appointments for any individuals with the following common-as-dirt names: James/Jim, David/Dave, Jennifer/Jen/Jenny.