

AMERICAN METEOROLOGICAL SOCIETY – JULY SCIENCE HIGHLIGHTS

Following are story ideas and tips about upcoming AMS meetings, papers in our peer-reviewed journals, and other happenings in the atmospheric and related sciences community.

Climate, Extreme Heat, and Electricity Demand in California. Since 1980, U.S. electricity demand has increased by more than 75%, with the largest increases in the residential and commercial sectors for space heating and cooling. As the southwestern United States becomes more populated, and as extreme-heat days become more frequent, electricity demand in these areas will continue to rise. The energy infrastructure, the refinery capacity, and the electricity line transmission system in the United States have not adequately kept up with peak demand, and electricity supply shortfalls have resulted. Electricity generation and transmission deregulation have compounded these problems as remote transmission and energy gaming have pushed electricity flow up to and beyond the capacity limit, often resulting in electricity supply failure. This has already occurred during extreme summer heat events over the last several years, most notably in the summer of 2003, when a system failure resulted in the largest blackout in U.S. history, leaving as many as 50 million people without power for several days. A paper in the June issue of the *AMS Journal of Applied Meteorology and Climatology* describes research on determining historical and projected extreme-heat frequency, intensity, and duration; cooling degree-days; and electricity demand for California. According to the researcher, Calculations of electricity demand under a range of human comfort levels also highlight the potential for adaptation to play a major role, reducing projected increases in electricity demand by roughly one-third for inland cities and by as much as 95% for cooler coastal cities. For a copy of the paper, contact Stephanie Kenitzer.

Effects of Black Carbon Aerosols on the Indian Monsoon. What effect do black carbon aerosols have on the Indian monsoon? Researchers from the National Center for Atmospheric Research explore this topic in a paper in the 15 June issue of the *AMS Journal of Climate*. The scientists analyzed a six-member ensemble of twentieth-century simulations with changes to only time-evolving global distributions of black carbon aerosols in a global coupled climate model to study the effects of black carbon (BC) aerosols on the Indian monsoon. According to their findings, the BC aerosols act to increase lower-tropospheric heating over South Asia and reduce the amount of solar radiation reaching the surface during the dry season. With the onset of the monsoon, the reduced surface temperatures in the Bay of Bengal, Arabian Sea, and over India that extend to the Himalayas act to reduce monsoon rainfall over India itself, with some small increases over the Tibetan Plateau. Precipitation over China generally decreases due to the BC aerosol effects. During the summer monsoon season, the model experiments show that BC aerosols have likely contributed to observed decreasing precipitation trends over parts of India, Bangladesh, Burma, and Thailand. These experiments point to the regional importance of BC aerosols for rainfall patterns over much of Asia, and in the Indian monsoon region in particular, and rely in part on changes to sea surface temperatures in the Arabian Sea and Bay of Bengal during March-April-May period that extend to the

summer monsoon season to contribute to the decreases of rainfall over parts of India due to BC aerosols. For a copy of the paper, contact Stephanie Kenitzer.

Climate Change Education. Global warming has become one of the most important scientific, political, and social issues of our era. In designing an effective mitigation strategy, it is clear that public education must play an important role. A study in the June issue of the *Bulletin of the American Meteorological Society* looks at various components of climate change literacy within a cohort of university students and investigates the impact of action-oriented learning on student understanding. In agreement with prior research, this study finds that significant student misconceptions exist regarding the causes of global warming and the relationship between global warming and ozone depletion. Most students seem to connect global warming only with visible pollution, such as exhaust from either a car or factory, while discounting more indirect emissions such as from electricity use and through product or food consumption. The authors also explore how a learning activity designed around the “ecological footprint” affects student ideas about their personal energy use and connections with global warming. The results show that a relatively simple learning activity that personally engages the student improves understanding of the connection between personal energy use and global warming. This work suggests that similar curricula, employing methods of personal engagement and social activism, be further developed to aid in the teaching of climate change. The paper is available online at <http://ams.allenpress.com/archive/1520-0477/89/6/pdf/i1520-0477-89-6-865.pdf>

U.S. Undergraduate Meteorology Population is at a 40 Year High. According to research by a University of Georgia professor, the U.S. undergraduate meteorology population is at a 40-year high and growing rapidly. Using data derived from the American Meteorological Society–University Corporation for Atmospheric Research *Curricula* and U.S. Department of Education statistics, the study found that the number of meteorology bachelor's degree recipients in the United States has reached a level unprecedented in at least the past 40 years: from 600 to possibly 1,000 graduates per year. And, this number is increasing at a rate of approximately 8%–11% per year. The number of meteorology majors has also increased up to 10% per year since the late 1990s. The number of meteorology bachelor's degree recipients is projected to increase at a rate of approximately 5%–12% per year through 2011. However, the number of entry-level meteorology positions in the United States available each year appears to be no more than about half the number of new degreed meteorologists. According to data from the U.S. Bureau of Labor Statistics, growth in meteorology employment has averaged 1.2% per year from 1994–2004 and is expected to be no more than 1.6% per year through 2014. These numbers and trends portend an increasing oversupply of meteorology graduates versus meteorology employment opportunities if current enrollment and employment trends continue. The paper explore possible responses of the meteorology community. The paper is available online at <http://ams.allenpress.com/archive/1520-0477/89/6/pdf/i1520-0477-89-6-873.pdf>

Getting to Know Us Part 2. The June issue of the *Bulletin of the American Meteorological Society* features several articles about the 2005 AMS membership survey.

Articles include “Who are the Student Members of the AMS?” “A Synopsis of Academic Members of the AMS” and “Profile of AMS Membership Residing Outside the United States of America.” See <http://ams.allenpress.com/perlserv/?request=get-toc&issn=1520-0477&volume=89&issue=6>

Getting to the Source. The ability to determine the source of a contaminant plume in urban environments is crucial for emergency-response applications. Locating the source and determining its strength based on downwind concentration measurements, however, are complicated by the presence of buildings that can divert flow in unexpected directions. Research featured in the June issue of the AMS’ *Journal of Applied Meteorology and Climatology* shows that high-resolution flow simulations are now possible for predicting plume evolution in complex urban geometries using complex numerical models. According to the researchers, it is possible to successfully invert the dispersion problems to determine the source location and release rate to within narrow confidence intervals even with such complex geometries. This can be used by emergency responders as a tool to determine the likelihood of concentration at a particular location being above a threshold value. For a copy of the paper, contact Stephanie Kenitzer.

Extraordinary Weather in Sacramento. A paper in the June issue of the AMS *Weather and Forecasting* takes a closer look at extraordinary weather events in the Sacramento, California, region using a simple compositing technique. Several types of extraordinary events are highlighted, including the hardest freezes, heaviest prolonged rain events, longest-duration fog, and worst heat waves (onset and end) in a 21-year period. Bootstrap resampling establishes the statistical significance of features on the composite maps. The composite maps with statistically significant features highlighted allow a forecaster to search for key features in forecast maps that coexist with or that precede an extraordinary weather event. For a copy of the paper, contact Stephanie Kenitzer.

Water Resources in the 21st Century. A new AMS policy statement on Water Resources in the 21st Century is a call to action for organizations at all levels in the public, private, and academic sectors to pursue sustainable solutions to the provision of adequate fresh-water resources for people and ecosystems. Water will be one of the most critical and potentially contentious issues facing society and governments at all levels during the 21st century. Water is fundamental to our lives – for agriculture, energy production, sanitation, ecosystem health, transportation, and recreation. Yet the limits of this irreplaceable resource are not well understood or appreciated. This important statement outlines the communication, observational and research, and operational challenges related to water resources facing society and governments at all levels. View the statement online at http://www.ametsoc.org/policy/2008enhancingweatherinformation_amsstatement.html
All AMS statements are online at http://www.ametsoc.org/policy/amsstatements_inforce.html

Mountain Meteorology Conference. The AMS 13th Conference on Mountain Meteorology and 17th Conference on Applied Climatology will be held 11-15 August

2008 at the Telus Conference Center in Whistler, British Columbia, Canada. The program is now online at

<http://www.ametsoc.org/MEET/fainst/200813MontMet17AP.html>

Severe Storms Conference. The AMS 24th Conference on Severe Local Storms will be held 27-31 October 2008 at The Hilton DeSoto Hotel in Savannah, Georgia. Media are invited to attend. The program is still being finalized but preliminary details are online at <http://www.ametsoc.org/MEET/fainst/200824sls.html>

With more than 12,000 members, the AMS (<http://www.ametsoc.org>) is the nation's leading professional society for those involved in the atmospheric and related sciences.

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