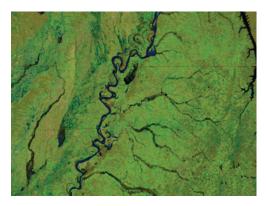


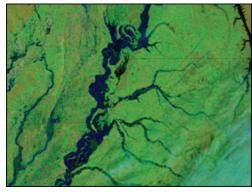
# NEWSLETTER

National Weather Association

No. 08 - 4 APRIL 2008

## Reaching New Rainfall Extremes





These two MODIS (Moderate Resolution Imaging Spectrometer) satellite images capture the Mississippi River prior to flooding on February 19, 2008 (left) and on April 7 (right) when minor to moderate flooding was occurring.

Images at http://modis.gsfc.nasa.gov/gallery/individual.php?db\_date=2008-04-14#. They are courtesy of Jeff Schmaltz, MODIS Land Rapid Response Team, NASA GSFC.

Many rivers from the Upper Midwest to the lower Mississippi Valley have experienced moderate to major flooding recently, while some locations in Hawai'i have experienced record low rainfall amounts.

Based on preliminary data from the NOAA/NWS, Harrison, Arkansas. which is located near the Missouri border in northwest Arkansas, received 11.82 inches of rain in March. This was a new record for March breaking the old record of 11.59 inches in 1945. Normal March rainfall at Harrison is 4.29 inches. During the period from April 1-12, the town had received 5.28 inches of additional rain bringing the total since January 1 to 20.66 inches which is almost two times the normal amount for the period. The high rainfall amounts and related flooding were not the only severe weather events Arkansas residents experienced.

Several rounds of severe thunderstorms produced large hail and tornadoes.

To see more information about the current status of rivers across the U.S., go to the NOAA/NWS Advanced Hydrologic Prediction Service (AHPS) Web page at www.nws.noaa.gov/ahps/. More detailed information about a specific river forecast point, including the current hydrograph, forecast and record stages, can be found by clicking on that forecast point on the map.

Lihue and Kahului, Hawai'i both recorded record low rainfall amounts for March 2008. In Lihue, the normal March rainfall is 3.58 inches but only 0.19 inches fell. This broke the old record of 0.30 inches in 1957. Normal March rainfall for Kahului is 2.35 inches and they received only 0.01 inches in March. The old record was 0.09 inches in 1957.

Janice Bunting Contributing Editor

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NWA Member Rear Admiral David W. Titley named Commander, Naval Meteorology and Oceanography Command See page 6

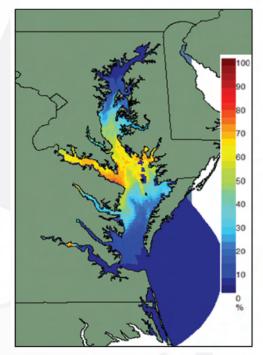
June 1: Abstracts due for 2008 Annual Meeting

#### REMOTE SENSING OF THE MARINE ECOSYSTEM

Due to several recent natural and man-made disasters, the monitoring of the marine environment has gained considerable attention by state and national agencies. This can be attributed to several factors, including the number of people who either live nearby or visit coastal regions, the delicate nature of the marine ecosystem which can impact the habitat in the region, and the strong economic dependence of local and regional industry on these ecosystems. Advanced remote sensing techniques, such as the use of multi-spectral satellite measurements, can contribute to the monitoring of the marine environment. Sensors such as NOAA's Advanced Very High Resolution Radiometer (AVHRR) and NASA's Moderate Resolution Imaging Spectrometer (MODIS) all contribute information (refer to Table 1 for a more complete summary of sensors). This article will present two applications of satellite remote sensing in the monitoring of the marine ecosystem.

The Chesapeake Bay contributes hundreds of millions of dollars to the state economies of Maryland, Delaware, and Virginia through commercial and recreational fishing and tourism. Those who are familiar with the area can only describe the consumption of softshell Blue Crabs as a dining experience unique to Chesapeake Bay! Farming is also a major industry on the Delmarva Peninsula. However, pollutants from these farms (fertilizers, animal waste, etc.) run off into the Bay and can have a catastrophic effect on the bay's ecosystem and fisheries.

Through a project that represents collaboration between local universities and NOAA scientists, a prototype ecological forecast system was developed for the Chesapeake Bay. The system, which routinely generates predictions of several noxious marine organisms, was deemed necessary because various noxious marine biota, such as jellyfish and harmful algal blooms, periodically afflict the waters of the Chesapeake Bay. Knowing where and when to expect these biotic events may help one to avoid or react to them. Harmful algal blooms (HABs), such as the dinoflagellate Karlodinium veneficum, have contributed to several fish kills at an aquaculture facility on the Eastern Shore of Maryland. Prediction of these HABs



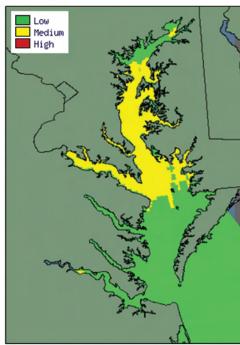


Figure 1 - Predicted likelihood of encountering sea nettle, a species of stinging jellyfish, (left) and the relative abundance of Karlodinium veneficum, a species of phytoplankton attributed to fish kills(right) on August 17, 2007.

Variable	Observational Category	Example Sensors
Bio-Optical	Visible – Near Infrared	MERIS, MODIS, Or- bView-2 (SeaWiFS), Landsat, SPOT, IKO- NOS
Sea-Surface Tempera- ture	Thermal Infrared Microwave Radiometers	AVHRR SSM/I, WindSat
Salinity	Microwave Radiometers & Scatterometers	AAquarious (planned)
Sea-Surface Roughness, Waves & Tides	Synthetic Aperture Radar Microwave Scatterom- eters & Altimeters	ERS-1 & -2, QuikSCAT
Sea-Surface Height	Altimeters	Topex/Poseidon, Jason-1
Sea Ice	Visible — Near Infrared Microwave Radiom- eters, Scatterometers & Altimeters Synthetic Aperture Radar	AVHRR SSM/I AMSR-E
Surface Currents & Circulation	Visible — Near Infrared Microwave Scatterom- eters & Altimeters	AVHRR, DMSP

Table 1. A listing of remotely sensed oceanographic parameters, their observational / instrument class and representative sensors. Modified from Brown et al., 2005.

may allow the aquaculture facility to prepare for their arrival and transfer the fish to other areas or to relocate the fish pens. Avoiding areas known to harbor sea nettles also has an obvious advantage if one wishes to go swimming in the bay. As any boater on the bay knows, the best way to cool off during those long, hot summer days is to jump into the water. That is, unless there are sea nettles nearby. A "sting" by their tentacles can be excruciatingly painful and will take the joy out of a dip in the bay.

The prediction technique is relatively straight forward and exploits our knowledge of the environmental conditions associated with sea nettles and our ability to acquire relevant environmental variables in near-real time. Daily nowcasts of sea nettles are generated by applying a statistical habitat suitability model to near-real time estimates of salinity and temperature in the Chesapeake Bay. The habitat model, developed using historically collected data, quantitatively relates these ambient conditions to the likelihood of encountering sea nettles in Chesapeake Bay (Decker et al., 2007). Ambient salinity is estimated from a numerical hydrographic model of Chesapeake Bay and sea-surface temperature is derived either from the same hydrographic model or from NOAA satellite imagery. An example of this product is shown in Figure 1. The sea nettle predictions are

#### Remote Sensing Acronyms

AMSR-E – Advanced Microwave Scanning Radiometer on EOS Aqua Satellite

AVHRR – Advanced Very High Resolution Radiometer

DMSP – Defense Meteorological Satellite Program

**ERS- European Remote-Sensing Satellite** 

Jason-1 – Name of a joint US/French altimeter mission

LANDSAT- Land remote sensing Satellite

**MERIS - Medium Resolution Imaging Spectrometer** 

**MODIS - Moderate Resolution Imaging Spectrometer** 

**QuikSCAT** – **Quick Scatterometer** 

SeaWiFs - Sea-viewing Wide Field-of-view Sensor

SSM/I - Special Sensor Microwave/Imager

SPOT - Systeme Probatoire d'Observation de la Terre satellite

TOPEX – Topography Experiment, the US altimeter on TOPEX/Poseidon Topex/Poseidon - Name of a joint US/French altimeter mission

available at http://coastwatch.noaa.gov/seanettles.

Remotely sensed data also permit us to assess the health and functioning of marine ecosystems by monitoring marine algae, both noxious and helpful, at coastal and global scales. These microscopic "plants" constitute the base of the oceanic food web and play a significant role in the Earth's carbon cycle. In some cases, specific types of phytoplankton can be identified from space. For example, high concentrations

or "blooms" of the phytoplankton *Emiliania huxleyi*, which belongs to a group of phytoplankton that produces and surrounds itself in calcareous plates (Fig. 2, insert), can significantly affect a region by acting as a source of organic sulfur (i.e., dimethyl sulfide) to the atmosphere and calcium carbonate to the sediments, and by altering the optical properties of the marine surface layer. Documenting the occurrence of its blooms in time and space is

Continued on page 6

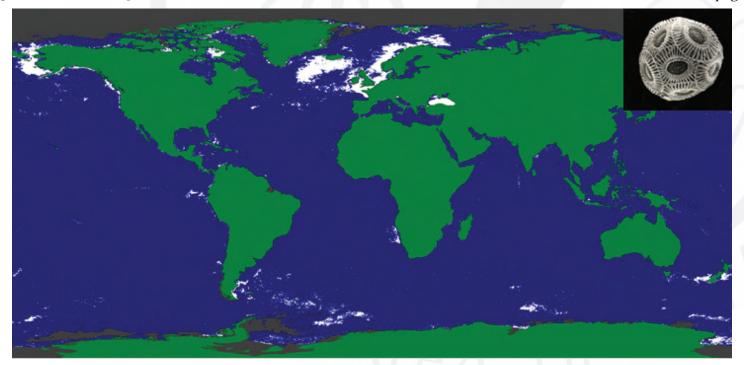


Figure 2 – Annual composite of detected coccolithophorid blooms in SeaWiFS imagery during 1998. Their blooms are colored white in the image. Blue represents regions where blooms were not detected and grey indicates locations where data are lacking. The inset in the upper right is an enlarged photo of the Emiliania huxlei.

#### CHAPTER NEWS

The Southern New England NWA Chapter (Psi Chapter) met on Feb. 16 at the Holiday Inn in Taunton, Mass. Twelve members attended, along with Vice President Frank Baker. Chapter president Eleanor Vallier-Talbot opened the meeting with a short synopsis of the NWA Annual meeting in Reno, Nev.

Hayden Frank, meteorologist at the NOAA/NWS office in Taunton, gave the presentation "Ocean Effect Snow on Cape Cod and Nantucket." He discussed the synoptic and mesoscale parameters involved in forecasting ocean effect snow, including winds from the north or slightly west of north, saturated air near the surface, and a vertical motion maximum in the area of greatest dendritic growth. Mr. Frank showed screen shots of forecaster tools including Skew-T, BUFKIT and NWS Taunton ETA model forecasts. He described how the forecaster used these tools to make a mesoscale forecast for ocean effect snow. Mr. Frank reviewed two recent events with similar synoptic patterns: Jan. 3, which saw significant ocean effect snow on outer Cape Cod and Nantucket, and Jan. 25, 2008, which saw very little snow.

Christopher Legro, a graduate student at the University of Massachusetts at Lowell and student intern at NWS Taunton, then gave a presentation — "Climatology of Southern New England Ice Storms" based on research he conducted as a part of his internship. Mr. Legro recounted several significant ice storms and discussed the correlations between observed ice accumulation and the synoptic situation - an upper level trough in the vicinity of Ohio, which brings warm air advection aloft while cold air becomes trapped at the surface, known as cold air damming. One such event recounted was the Great Ice Storm of January 1998, which devastated northern New England, New York, Quebec and Ontario. Portions of southern New Hampshire into northern Massachusetts were also affected. Mr. Legro concluded by endorsing the NCEP Web site as a source of abundant useful data, including the North American data reanalysis.

Ms. Vallier-Talbot concluded the meeting with a recommendation to members to attend the Blue Hill Observatory open house on May 3, 2008 (see page 7).

Frank Baker Chapter Vice President

## **Molding NWA's Tomorrow ...**

## President's Message



I enjoy speaking to kids at the local elementary and middle schools. The grade level determines how I approach the discussion but every presentation relies on several classic experiments, vivid imagery, thought-provoking questions and plenty of stories to feed their enthusiasm for weather and science in general. These opportunities at the elementary school level carry great "ahh" potential. An equally great promise to educate exists here as well. We can bring not only the jaw-dropping beauty and power of the atmosphere but also the wonder of science to the classroom that young students respond to. Dr. Joanne

Simpson confided in me on more than one occasion during my post-doctoral years at NASA Goddard Space Flight Center that if we could encourage students to embrace the sciences by the 8th grade then the odds that one or more of them would pursue a career in a scientific discipline were in our favor. The membership of the National Weather Association is uniquely positioned to convey the love of learning to the next generation of scientists.

I recalled Dr. Simpson's words recently when I spoke to a group of more than 100 eighth graders about climate change, atmospheric fundamentals

and the power of severe weather. Lalso discussed how Hollywood film makers take extensive liberties with the physical world despite utilizing our colleagues as consultants. I mentioned that being science educated means acquiring the ability to separate fact from fiction within a presidential candidate's address as he/she crosses your state stumping for a primary. It also means being able to identify the flaws in an argument which form the basis of an opinion or decision, often with far reaching consequences.

I was given the unique honor in March of welcoming the winners, the participants, their parents and their teachers to the awards ceremony of the annual Lancaster (PA) Newspapers Science and Engineering Fair. The stage design provided me with the opportunity to look into

Kean University students Braden Ward (left front) and Mike Szczepanski (front middle) take a break discussing their poster titled "Summer Season convective Initiation in new Jersey Initial Analysis" to pose with other NWA 2007 Annual Meeting attendees. NWA Past-President Dr. Paul J. Croft and Melissa Rod, both of Kean University, collaborated with Braden and Mike on the poster.

the eyes of more than 600 people as I ascended the podium, a markedly more personal experience than the hollow view offered by the lens of a camera. I talked about the importance of extending their involvement in science beyond the process of simply acquiring knowledge. The next generation of students must

## **By Bringing Students in Today**

develop the skills to become more effective communicators of sound science to an ever-growing population that finds itself increasingly at risk.

Students can take an important step in their maturation by attending the 33<sup>rd</sup> Annual Meeting of the National Weather Association. They will be able take advantage of an opportunity that was not available to me as an undergraduate: personal conversation with a nationally or in some cases internationally recognized expert at a national meeting in a non-intimidating environment. Students can also choose to participate in their own scientific forum in Louisville, rub elbows with established professionals or simply soak up what promises to be a selection of carefully choreographed sessions that will be as entertaining as it will be stimulating.

I encourage you to contact me with your suggestions, ideas, ramblings, and of course concerns at <a href="mailto:President@nwas.org">President@nwas.org</a>. I look forward to seeing you in Louisville!

John Scala, President President@nwas.org

# 2008 Annual Meeting Update "Utilizing Our Past to Better Our Future"

The 33rd NWA Annual Meeting scheduled for October 11-16 on the waterfront in downtown Louisville promises to be a unique experience compared to previous annual gatherings. Several new sessions are planned, highlighted by exciting presentations each morning, following the lunch break, and at the conclusion of each day. The inaugural NWA Student Session on Sunday October 12 will focus on preparing graduates for the highly competitive job market. The NWA will also offer for the first time a student poster session scheduled to follow both broadcaster and student sessions to facilitate discussion between both. John Gordon attended the Southeastern Coastal and Atmospheric Processes (SeCAPS) conference at South Alabama University in March and found poster presentations on historical events like the 1998 Salt Lake City F2 tornado and the devastating 2007 Greensburg KS EF5. The aim of this year's NWA meeting is to go beyond a cursory view of memorable events like these and utilize the knowledge gained from them to

improve future forecasts.

The 2008 annual meeting will consist of 16 oral and poster sessions including three historical weather sessions with one of these specifically dedicated to catastrophic weather in the western US. Others will target Weather Hazards (Intense Cold & Heat, and Wind), Tropical Weather, Ensemble Prediction & Pattern Recognition, Instrumentation & Techniques (Radar, Satellite, Observations and Mesonet), Severe Weather (Tornadoes, Wind and Hail, Lightning, and Cool Season Tornadoes), Winter Weather, HAZMAT & Emergency Response, Weather and Societal Impacts, Flooding, and much more. Several invited talks are planned to compliment the sessions. We welcome your abstracts on this year's annual meeting theme of "Utilizing Our Past to Better our Future" no later than June 1.

Pictured to the right: NWA Treasurer Steve Zubrick and North Carolina State University student Adele Lichtenberger with their poster titled "A Comparison of Precipitable Water Measurements from Radiosondes, Ground-Based GPS receivers and GOES Sounders." Poster presented at 2007 Annual Meeting in Reno.

#### New Guidelines for NWA Electronic Journal

The guidelines for the NWA Electronic Journal of Meteorology (EJOM) have undergone some changes. Most notably, the purpose of the EJOM has been refined to draw attention to studies with the following attributes: 1) contains new or preliminary results; 2) are relatively short and limited in scope; and 3) contains high-resolution color images and/or animations of meteorological data that are especially suited for electronic publication. In addition, shorter papers are now required, and should be double-spaced and no longer than 10 pages including the title page, abstract, and body; references, figures, and tables are excluded from the 10-page limit.

The publication charges have not changed yet, but some restructuring is anticipated, and will be reported on in a future newsletter.

The following articles are now online (www. nwas.org/ej/):

"A Proposed Methodology for Reconciling High-Resolution Numerical Modeling Guidance with Pattern Recognition to Predict Lake-Effect Snow," by Michael Evans and Ron Murphy of the NWS WFO in Binghamton, N.Y.

"Heat Burst Detection by a Temporally Fine-Scale Mesonet" by Jay Trobec of KELO-TV in Sioux Falls. S.D.

> Dr. Matthew Bunkers 2008 EJOM Editor



#### NWA MEMBER NEWS

Rear Admiral David W. Titley, a member of the NWA for over 20 years, assumed the duties of Commander, Naval Meteorology and Oceanography Command in December 2007. Titley was commissioned through the Naval Reserve Officers Training Commissioning program in 1980, after graduating from Pennsylvania State University. He was ordered to Naval Postgraduate School in the late 1980s, where he received a Master of Science in meteorology and oceanography.

In June 1998, Rear Adm. Titley completed his tropical cyclone intensification research, and was awarded a Doctor of Philosophy in meteorology from the Naval Postgraduate School. He then reported to Commander, 7th Fleet, where he served as Fleet Meteorologist and Oceanographer, and frequently acted as the Current Operations Officer. Rear Adm. Titley has completed seven deployments to the Mediterranean, Indian Ocean and Western Pacific theaters.

Rear Adm. Titley reported to the staff of the Assistant Secretary of the Navy (Research, Development and Acquisition) in June 2000, where he served in the office of Mine and Undersea Warfare. In the summer of 2001, he served as the Executive Assistant to the Principal Deputy Assistant Secretary of the Navy (Research, Development and Acquisition).

Rear Adm. Titley then reported to the U.S. Commission on Ocean Policy chaired by retired Adm. James D. Watkins, in March 2002, as the Special Assistant to the Chairman for Physical Oceanography. In May 2003, he was assigned to the Office of the Secretary of Defense Director of Net Assessment and assumed duties as Senior Military Assistant. He then assumed command of Fleet Numerical Meteorology and Oceanography Center in Monterey, Calif., in August 2004. The following year Rear Adm. Titley was named the first Commanding Officer of the Naval Oceanographic Operations Command. In April 2007, he was selected for promotion to the rank of Rear Admiral (lower half), and in May he began as the Chief of Staff for the Naval Meteorology and Oceanography Command.

Remote Sensing continued

therefore essential in characterizing the biogeochemical environment of a region. Furthermore, their distribution pattern can be employed to define the environmental conditions favorable for their occurrence. E. huxleyi blooms can be distinguished from most other conditions in visible satellite imagery by their milky white to turquoise appearance. This relatively unique spectral signature can be used to detect the presence of these blooms in satellite ocean color imagery. (Ocean color is defined as the spectrum of water-leaving radiances in the visible (400 -700 nm) and near infrared (0.7 - 1.0)µm) exiting the water column. Ocean color observations are acquired by measuring the radiances of different visible to near infrared wavelengths at the sensor, computing and subtracting components of this total radiance due to specular reflection and the atmospheric contributions, and converting the resulting water-leaving radiances into meaningful geophysical parameters, such as chlorophyll and suspended sediment concentrations.) Figure 2 on the previous page presents an example of this product derived from GeoEye's OrbView-2 (also known as SeaWiFS). Tracking the location, magnitude and timing of these blooms, as well as phytoplankton in general, over a sufficient period of time will be useful in detecting whether changes in their distribution pattern have occurred, and by association, assessing the marine ecosystem's response to climate change. The importance of the marine ecosystem cannot be overstated. Satellite remote sensing data help scientists to study and monitor the health of the marine ecosystem and may be used in coupled ocean-atmosphere-ecological models. Within the US, both NASA and NOAA

satellites routinely provide satellite imagery for monitoring and investigating the physical, chemical, geological and biological aspects of the world's ecosystems. Hopefully, this capability will continue. Although a hyperspectral sensor capable of retrieving ocean color products was in the original design for the GOES-R satellite series, it has since been removed from the

satellite due to budgetary

constraints. An operational ocean color capable sensor, the Visible/ **Infrared Imager Radiometer Suite** (VIIRS), will be carried on the National **Polar-orbiting Operational** Environmental Satellite System (NPOESS), the next generation of polar-orbiting operational satellite system. With an eye on detail and adequate planning, this and other satellite sensors will allow us

Christopher Brown and Ralph Ferraro NOAA/NESDIS/Center for Satellite Applications and Research

# References for Marine Sensing Article

to monitor the ocean's ecosystems in

coming years.

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Decker M.B., Brown C.W., Hood R.R., Purcell J.E., Gross T.F., Matanoski J.C., Bannon R.O. & Setzler-Hamilton E.E. 2007. Predicting the distribution of the scyphomedua *Chrysaora quinquecirrha* in Chesapeake Bay. *Mar. Ecol. Prog. Ser.*, 329, 99-113.

## 2008 Professional Development Opportunities

#### **Blue Hill Observatory Spring Open House: May 3**

Enjoy lectures on the weather and the Observatory history along with exhibits by the Mount Washington Observatory and local amateur radio and kite clubs. The Observatory (pictured) is 10 miles south of Boston in Milton, Mass. More information is online at www.bluehill.org/events.html.

# AMS Short Course on Dual-Polarization Weather Radar: Fundamentals and Applications: June 25

This AMS Short Course will precede the 36th Conference on Broadcast Meteorology to be held in Denver, Colo. Learn more at www.ametsoc.org/MEET/fainst/200836broadcast.html.

#### 36th Conference on Broadcast Meteorology: June 26-29

The 36th Conference on Broadcast Meteorology, sponsored by the American Meteorological Society, and organized by the AMS Board of Broadcast Meteorology, will be held in Denver Colorado. Go to www.ametsoc.org/MEET/fainst/200836broadcast.html for more information.

#### 2008 American Association of State Climatologists Annual Meeting: July 7-10

The AASC will hold their Annual Meeting at the Sheraton Burlington Hotel and Conference Center in Burlington, Vt. More information can be found at http://www.stateclimate.org/.

#### 2008 Air Weather Association Reunion: Aug. 6-10

The reunion will be at the Best Western Tacoma Dome Hotel at 2611 East E Street in Tacoma, Wash. The hotel phone is (800) 973-7110. Details at www.airweaassn.org/ or contact Don Farrington (cdfcsf@aol.com) or Kevin Lavin (airweaassn@aol.com).

#### 12th High Plains Conference: Sept. 4-5

The 12<sup>th</sup> High Plains Conference will be held in Hays, Kan. The High Plains Chapter of the AMS/NWA sponsors it. Paper abstract can be submitted to David.L.Floyd@noaa.gov. Watch www.highplains-amsnwa.org/ for details.

#### 12th Annual Great Divide Workshop: Oct. 7-9

The Workshop will be held in Billings, Mont., and is sponsored by the NOAA/NWS Forecast Offices in Billings and Glasgow. More information is located at www.wrh.noaa.gov/byz/local\_news/2008/divide08.php?wfo=byz or at 406-652-0851.

#### 33rd NWA Annual Meeting: Oct. 11 - 16

The 33rd NWA Annual Meeting will be at the Galt House Hotel and Suites (www.galthouse.com) on the waterfront in Louisville, Ky. Log on to www.nwas.org/meetings/mwa2008 for more information. Note: abstracts due June 1, 2008. (www.nwas.org/2008abstracts.html).

#### 8th NOAA Satellite Direct Readout Conference: Dec. 8-12

This conference will be in Miami, Fl. It will provide information regarding the direct readout from meteorological and environmental satellites and prepare users for upcoming changes to both satellite series. Conference details are at: http://directreadout.noaa.gov/miami08/. Email abstracts to nesdis.dro.conference@noaa.gov by July 1, 2008.

MAY 15 DEADLINE

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SCHOLARSHIPS



#### NWA MEMBER NEWS

On April 2 in Harrisburg, Penn., NWA member Tom Russell and his WHP CBS 21 weather team hosted their annual Weather Summit, a town-hall style meeting devoted entirely to weather. The evening, free and open to the public, included a presentation on severe weather history in Central Pennsylvania by State College NWS Meteorologist Dave Ondrejik. The featured speaker was Dr. Roy Spencer from the University of Alabama, Huntsville. Dr. Spencer elaborated on themes in his new book, "Climate Confusion." Over 200 people attended the event.

"We were thrilled that there are so many weather nuts willing to spend the evening with us," Russell said.

Pictured are (l-r) sponsor Bob Carey, Dr. Roy Spencer and Tom Russell enjoying the WHP CBS 21 Weather Summit.

## Dates 2 Remember

May 15: Scofield and AccuWeather Scholarship applications due

June 15: Meteorological Satellite Award papers due

June 1: Abstracts due for 2008 Annual Meeting

July 1: NWA Annual Award nominations due

**August 1:** Sol Hirsch Education Fund Grant applications due

October 11 – 16: 33rd NWA Annual Meeting, Louisville, Ky.

For more information on these and other Professional Development Opportunities see page 7 or go online and visit www.nwas.org/events.php.

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