List of Presenters with Abstracts

Session I. 1:30-2:50 pm, Friday, April 17, 2009 HU 221-222, UNCA

NOAA's Weather and Climate Toolkit

Stephen Del Greco ('92), Steve Ansari, and Chad Hutchins ('08), NOAA National Climatic Data Center, Asheville, North Carolina 28801

The Weather and Climate Toolkit (WCT) is free, platform independent software distributed from NOAA's National Climatic Data Center (NCDC). The WCT allows the visualization and data export of weather and climate data, including Weather Surveillance Radar 1988 Doppler (WSR-88D) commonly known as NEXRAD, Geostationary Satellite (GOES), Weather and Climate Model and Surface Observation data. By leveraging the NetCDF for Java library and Common Data Model, the WCT is extremely scalable and capable of supporting many new datasets in the future. In addition, the WCT provides access to remote web services for instant access to products such as the Drought Monitor, NEXRAD reflectivity mosaics, multisensory precipitation totals and NCDC's Severe Weather Data Inventory. The WCT Viewer provides tools for custom data overlays, Web Map Service (WMS) background maps, animations and basic filtering. The export of images and movies is provided in multiple formats. The WCT Data Exporter allows for data export in both vector polygon (Shapefile, Well-Known Text) and raster (GeoTIFF, ESRI Grid, VTK, Gridded NetCDF) formats. These data export features promote the interoperability of weather and climate information with various scientific communities and common software packages including ArcGIS, Google Earth, MatLAB, etc…This presentation describes in detail the Weather and Climate Toolkit and provides information for accessing and installing the software.

An Examination of the Tornado Event in Sumter County South Carolina on April 15, 2007

Daniel C. Miller ('90) and Leonard C. Vaughan ('88), NOAA/NWS Forecast Office, Columbia, South Carolina

On the morning of 15 April 2007, a tornado touched down in Sumter County South Carolina. It reached a maximum intensity of EF-3 on the Enhanced Fujita Scale and caused significant damage including one fatality and three injuries. A case study of this event was performed using archived data, including WSR-88D Doppler radar products, upper air and surface analyses, and model forecast data. Meteorological features that contributed to the event are discussed. Selected radar products, such as Base Reflectivity and Storm Relative Velocity, are displayed and explained. Photographs of the damage and a map of the tornado track are also provided.

FAA CWO and SC DHEC

Wes Behrend ('93), DHEC, South Carolina

This presentation is to introduce to you the working environments of the FAA's Contract Weather Observing (CWO) Program and the South Carolina Department of Health & Environmental Control (DHEC). With the FAA CWO, the program provides surface weather observations (METARs) on an hourly basis and special observations (SPECIs) when weather conditions warrant. I have learned from this line of work that you can never rely 100% on fully automated weather reports from the Automated Surface Observing System (ASOS). DHEC's Bureau of Air Quality provides, among other things, forecasts for ozone concentrations and permits to companies that comply with air pollution controls following an air dispersion modeling project of their facility. Due to time constraints, this presentation will focus only on ozone forecasting. Many people in South Carolina, who suffer from respiratory ailments, including the very young and the elderly and those who care for them, rely heavily on our forecasts every season (Ozone season in South Carolina runs from April 1st through September 30th each year.).
With this presentation, it is hoped that you will get a better idea of what each agency does. These weather-related jobs may (or may not) be something that you would want to pursue in your careers in meteorology.

Incorporating Geographic Information Systems (GIS) into the Atmospheric Sciences Curriculum

J. Greg Dobson, GIS Research Coordinator, RENCI at UNC-Asheville / National Environmental Modeling and Analysis Center, UNC-Asheville, Asheville, NC, gdobson@unca.edu, (828) 251-6973

GIS and other Geospatial technologies provide tremendous analytical and visual capabilities to many spatially complex disciplines. However, it has only been in recent years that the Atmospheric Sciences (ATMS) Community (Meteorology, Climatology, Hydrology), including NOAA and the NWS, began to fully incorporate these technologies into daily operations. Therefore, preparing and training students in the use and application of GIS is becoming an important subject for those that are pursuing a degree in a related ATMS discipline.

To date, there are very few ATMS programs in the country that offer GIS classes devoted specifically to Meteorology or a related field. While many standard "Introduction to GIS" type classes exist in most Universities, it is important for the ATMS major to not only understand the basics of GIS, but how it can be directly applied to Meteorology, especially in a forecast situation. In the spring of 2008, the ATMS Department at UNC-Asheville began offering a new elective class titled "GIS in Meteorology". The class focuses on providing students a clear understanding of GIS theory and application, software exposure using standard GIS software, and real-world project examples integrating GIS with ATMS data for analysis, cartography, and situational awareness. The class was well attended and is being offered for a second semester in spring 2009.

This presentation will highlight a brief introduction to GIS, demonstrate how it is currently being utilized in the ATMS related fields, and provide an overview of the GIS in Meteorology Class at UNCA, including course development, delivery, and feedback.

Session II. 3:20-5:00 pm, Friday, April 17, 2009 HU 221-222, UNCA

Snakes, Bears, Lightning, Blimps, Waves, Beaches, Tornadoes, and Electrical Fences: Undergraduate Research in Atmospheric Science at UNC Asheville

Chris Hennon, ATMS, UNCA

Over the last several years, undergraduate research in the Department of Atmospheric Sciences at UNC Asheville has dramatically expanded to include work in northwest snow events, ridge top rain observation, land surface and atmospheric modeling, satellite wind retrieval verification, hurricane intensification, and many more areas. Our students now regularly attend and present papers and posters at university and professional conferences. Field work and field trips are now a common occurrence. These experiences are paying off for our students in the form of graduate school competitiveness and enhanced job prospects. This talk will highlight many of the recent projects, trips, conferences and experiences of our undergraduate research program. It will conclude with a discussion on the future direction of undergraduate research in our department.

An objective algorithm for the identification of convective tropical cloud clusters in geostationary infrared imagery

Chip Helms (’09), Senior, ATMS, UNCA

Tropical cyclones trace their origins to disorganized groups of thunderstorms over tropical waters called "cloud clusters." The transformation from cloud clusters into mature tropical cyclones is not well understood due to the remote location of these clusters (away from the main observation network) and the complexities of the smaller-scale physics that occur during genesis. Several studies have used a catalog of developing and non-developing cloud clusters to search for distinguishing features between the two. The creation of these datasets is cumbersome since they must be identified visually through the application of arbitrary and subjective rules.

An automated algorithm is developed to identify tropical cloud clusters in geostationary infrared satellite imagery. The algorithm proposed here significantly reduces the time and effort needed to identify and catalog cloud clusters by applying objective search criteria in an automated way. This algorithm will enable the creation of a comprehensive, historical cloud cluster database that will have both research and operational applications. The database will be made available to the scientific community and will be updated in real-time.

Development of a Quality Controlled Snowstorm Database

Anna Wilson ('09), Senior, ATMS, UNCA

The National Climatic Data Center has been producing the Northeast Snowfall Impact Scale (NESIS) operationally since the 2004-2005 winter season. In contrast to other severe weather scales, such as the Fujita scale for tornadoes and the Saffir-Simpson scale for hurricanes, NESIS takes into account population as well as meteorological information. Therefore, NESIS is an indication of a snowstorm's societal impact. Climate indices like these put storms in historical perspective, and in the future will aid forecasters to communicate the societal impacts of a snowstorm. Also, emergency planners will be aided in their decision making. NCDC is now developing population weighted snowfall indices for other regions of the U.S.

This presentation will be on the quality control process that NCDC has developed to ensure the 100 largest snowstorms are as accurate as possible, since these storms will be used as the foundation for the creation of the regional indices. There are difficulties inherent in quality controlling snowfall data, due to the complications involved with snowfall measurement and a volunteer observing network. The presentation will detail these difficulties and the methods used to solve these issues. This includes the use of GIS as well as guidelines that assist different experts in finding the same results for each storm.

Women and the National Weather Service

Casey Dail ('05), NWS Newport/Morehead City Office, North Carolina

This presentation will focus on my experience as a meteorologist with the National Weather Service and the path I took to get where I am today. It will also briefly touch on women in the NWS, historically, currently, as well as my thoughts on the future. I will also offer advice for those thinking about a career with the National Weather Service.

Tips to Increase Your Chances of being Hired by the NWS

Steven G. Eddy ('84), National Weather Service WFO at Hastings, Nebraska

To best meet the challenges the future will bring, the National Weather Service (NWS) needs to recruit talented, resourceful and motivated Meteorologists if it wishes to remain the world's best weather agency. As an employee of the National Weather Service (NWS) for over 20 years and a veteran on both sides of the hiring process, I will share some of the tips to improve a person's chances to be hired. I have bid on scores of positions in the agency, both successfully and unsuccessfully and through that experience have learned a few things that may prove helpful to folks considering a career in the NWS. Knowing the high quality and skill level of the operational Meteorologists that graduate from the UNCA program, I wanted to take the opportunity to share these tips in hopes of recruiting a few of them.

Session III. 8:30-10:40 pm, Saturday, April 18, 2009 RH 125, UNCA

From Tornadoes to Teaching: A Professor's Journey

Christopher Godfrey, ATMS, UNCA

Our lives unfold as we follow a path that branches with a series of decisions. From practical advice for current students to graduate school successes and disappointments, join Christopher as he recounts the choices and experiences that brought him to UNC Asheville. Learn about his first trip to Asheville and hear a few stories about tornado movies, horseback riding while storm chasing, and storms that turn the tables and chase people.

Climate Database modernization Program's (CDMP) Historical Marine Data Preservation

Eric Freeman ('04), Mark Seiderman and Heather Anderson, NOAA's National Climatic Data Center

NOAA's Climate Database Modernization Program (CDMP) is managed by the National Climatic Data Center (NCDC). CDMP is dedicated to preserving global climate and environmental data. With a commitment to making data available online for research CDMP supports one of the NOAA's core missions to archive, store and provide public access to valuable historical data, which without preservation, could be lost forever. By working with various national and international agencies, a wide variety of rescue projects has been ongoing since CDMP's inauguration in 2000. Although CDMP preserves many kinds of environmental data, the program continues to faithfully support the global marine community by locating, imaging and keying historical and current marine records and merging the data into national and international data bases. Current rescue activities will be discussed as well as marine operations and contemporary projects in the Remote Sensing and Applications Division (RDAD).

Implementation of GIS for the NWS and Other Regional Decision Makers

Clay Tabor ('09), Senior, ATMS, UNCA

The applications of GIS continue to expand as technologies become more robust, customizable, and affordable. Such is the case for the National Weather Service (NWS) and other regional decision makers whom have recently begun incorporating GIS to improve and simplify tasks. However, due to their recent embrace, the potential benefits of this integration have yet to be fully realized. In attempt to demonstrate the capability of GIS and further promote its integration with the NWS, three GIS based decision support tools were created by the UNC Asheville Renaissance Computing Institute (RENCI) Engagement Center, with support from NCDC and the Greenville-Spartanburg NWS Weather Forecast Office (WFO).

These support tools include an ArcGIS server viewer and two customized Google MashUps. The ArcGIS viewer provides a singular location for easy access to a large variety of spatially referenced data that the NWS can use to improve weather warnings, verify forecasts, and host data. The two Google MashUps were created with Google Maps Application Programming Interface (API) and include a weather stations viewer and webcams viewer. Like the ArcGIS server viewer, these MashUps were an effort to enhance forecast verification, and warnings, and allow better visualization local weather variations. Despite being originally produced for use by the Greenville-Spartanburg NWS WFO, these viewers have proved useful for other regional managers such as emergency managers, media, and the general public. In this presentation, methodology, benefits, and examples of these support tools will be discussed along with the future integration of GIS in the field of atmospheric sciences.

Storm structure, freezing level height, and precipitation in the US Pacific Northwest

Jake Crouch ('07), North Carolina State University, Raleigh, NC

In the winter season, extratropical cyclones pass over the US west coast after developing over the Pacific Ocean. These land-falling cyclones are modified by the coastal and Cascade mountains and yield frequent rainfall. Some west coast orographic precipitation events can become very intense and lead to flooding and mudslides. Several recent severe flooding events in the US Pacific Northwest (e.g. 6-7 November 2006) were associated with higher freezing level altitudes compared to long-term seasonal averages. Operational weather radar and vertically pointing MicroRainRadar data sets as well as regional model output are analyzed for several flooding and non-flooding storm cases. For cases with similar cross-barrier flow and stability, the relation between inflow vertically-integrated water vapor and precipitation is examined for different freezing levels heights to determine if the longer time for particle growth by collision/coalescence within deeper rain layers yields higher precipitation amounts compared to shallower rain layers.

An MIC's View of the Future of the NWS

Steven G. Eddy ('84), National Weather Service WFO at Hastings, Nebraska

The National Weather Service's (NWS) mission is to protect life and property from any weather, water or climatologically related event. The NWS faces great challenges to meet its mission objectives in the future. It has always attempted to adapt quickly to changes in technology and the science. The NWS continues to identify its customer and their needs, while communicating in multiple formats in order to reach the largest possible audience. The NWS is in the midst of refocusing its long range goals in this world of rapid change. This talk will share the views and visions of the future of the agency from the viewpoint of a 20 year veteran of the NWS.

NOAA's National Climatic Data Center: Opportunities in the Age of Climate Services

Timothy W. Owen ('92), NOAA's National Climatic Data Center, Asheville, NC 28801, Tim.Owen@noaa.gov, (828) 271-4358

As it approaches its sixtieth year serving as a national resource for climate information, NOAA's National Climatic Data Center is at a significant organizational crossroads. With growing interest in the climate change issue, the Center has been reassessing its operational practices and engagement with user groups.

This talk summarizes the progress that the Center has recently made in addressing climate services, operationalizing applied research, and engaging partners, stakeholders, and users. The talk also looks ahead at emerging opportunities for the Center as it assumes a prominent role in the new NOAA Climate Services activity.