Student Research in ATMS

Chris Hennon
Assistant Professor, ATMS
ATMS Symposium
April 17, 2009

Outline

• Undergraduate research (UGR) at UNCA
• Recent research in ATMS
  – Field studies/experiments
  – Research projects
  – Conferences, papers, posters
• Conclusions
Undergraduate Research at UNCA

- Beginnings in the early 1970s
- 1986 – UNCA organizes first National Conferences on Undergraduate Research (NCUR)

How Do Students Get Involved in ATMS Research?

- Good GPA
- At least a ‘B’ in ATMS 103
- Attend an organizational meeting

Photo: M. Erb
Field Experiments and Studies

Meteorology/Oceanography Field Study (2006)

- Pawleys Island SC
- 18 students
  - Boundary layer observation
  - Beach erosion
  - Ocean measurement
  - Long shore transport
  - Dune profiling
  - Wave height
Severe Weather Field Experience

- Annual van trip to tornado alley (May)
- Storm chasing
- Map discussion
- Tours of NWC, radar
- Talks by famous meteorologists

Photo: Clay Tabor

The Severe Weather Field Experience Crew (2008)
Must have missed the memo on “Red Blazer Day”
Mixed Precipitation Experiment (2006-2007)

• Goal: Measure temperature/wind for mixed precip events
• 5 students
• Vertical extent of cold dome
Winter Snowfall Experiment (2007-2009)

- Determine vertical evolution of moisture, temperature, and winds during snow events
- 16 students over 2 years

Could use some heat, please
AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE GREENVILLE-SPARTANBURG SC
236 PM EDT TUE APR 7 2009

NEAR TERM /THROUGH WEDNESDAY/...
-- Changed Discussion --
RADARS SHOWING SNOW SHOWERS CONTINUING ACROSS THE NC MTNS
AND BACK TO THE OH VALLEY. THE INTENSE SNOW SHOWERS OUTSIDE
OF THE WARNING AREA HAVE BECOME LIGHT AS EXPECTED...WITH
WIDESPREAD SNOW SHOWERS CONTINUING OVER THE WARNING
AREA. 15Z SOUNDING LAUNCHED BY THE UNIVERSITY RESEARCH
PROJECT FROM JOHNSON CITY TN...STILL SHOWS EXCELLENT
CONDITIONS FOR SNOW SHOWERS WITH GOOD LOW LEVEL LAPSE
RATES AND A NEARLY SATURATED AIR MASS UP TO NEARLY 700 MB
AND -20 DEGREES C

Time perfect to study weather

By Max Barber
Press Staff Writer
mbarber@johnsoncitypress.com

The perfect opportunity to find out is coming as a snow storm is brewing over the
area for the next few days. Gathering data on it are students from the University of
North Carolina-Chapel Hill, the group will be launching weather balloons every three
hours from East Tennessee State University’s Harry D. Powell Observatory to collect
data on temperature, humidity, wind direction, wind speed and elevation.

“The National Weather Service in Monticello issued a winter storm warning for the
mountain areas, so normally when that occurs we come out here and launch
weather balloons on their behalf to figure out exactly what the conditions are in the
upper atmosphere,” said Philippe Faiz, a sophomore at UNC-Chapel Hill majoring in
atmospheric science.

Faiz and fellow atmospheric science students Jessica Teawiner and Jeremy
Michael will be launching the balloons and analyzing the data they collect. The first
balloon was sent up at 3 p.m. Monday. The balloons will continue to go up until
Tuesday night or until Wednesday morning, whenever the storm passes.
Rain Gauge Experiment
(2007 – Present)

• Observe ridge top precipitation
• Pigeon River Basin
• IOP – July 2008
• 8 students
Research Projects
By the Numbers

- 35 students involved in over 20 diverse research projects (last 5 years)
- Topics
  - Asheville ozone and air quality
  - Hurricane spawned tornadoes
  - WRF model, MCSs, and NC mountains
  - Mixed precipitation
  - Hurricane intensity change / rapid intensification
  - Latent heat flux parameterization in WRF
  - QuikSCAT ocean wind vector improvements
  - Orographic precipitation
  - Spring thunderstorm events

Current Research Efforts

- Miller
  - Continue observation and analysis of winter events / ridge top precipitation
  - Modeling efforts (WRF)
- Hennon
  - NASA sponsored grant (QuikSCAT and hurricanes)
  - Tropical cloud cluster analysis (Helms, NCDC)
- Godfrey
  - Land surface modeling
  - Observational studies (Balsam Mt. Preserve)
Professional Activities

Papers, Posters, Conferences

Attending Conferences

• AMS National (Atlanta 2006)  
  – 13 students
• AMS Mesoscale (New Hampshire 2007)  
  – 2 students
• NWA (2008)  
  – 1 student
• AMS Tropical (2008)  
  – 1 student
Cool, a Wx Channel OCM. I think she likes me.

UNC Asheville – that’s like a branch campus for UNC Chapel Hill, right?

Hey, check out my green ribbon.

AMS Satellite/EUMETSAT

- Amsterdam (2007)
  - 2 students
  - Presented a poster
  - Only attended the conference
  - Did not have any fun
  - Did not experience Amsterdam
  - Did crash bike into a car

Late September, northern Europe, no coat!!
Hurricane Research Experience For Undergraduates (REU)

- University of South Florida
- 1 student (Joe Phillips)
- Performed independent research project
- Presented a poster

Conclusions

- UGR in ATMS has increased dramatically in the last 5 years
- UGR is a critical part of the undergraduate experience in ATMS
  - Prep for grad school
  - Professional contacts
  - Experience for government/private employment
- UGR will continue to be a large part of the ATMS student experience