UNIVERSITY AT ALBANY
State University of New York

Department of Atmospheric and Environmental Sciences
College of Arts and Sciences

28 November 2011

Dr. Curtis H. Marshall
1325 East-West Highway
SSMC2; Mailcode W/OST12
Room 15360
Silver Spring, MD 20910

Dear Dr. Marshall:

We are transmitting a summary of our CSTAR IV project activities for the six-month period ending 31 October 2011. Research conducted during this period has continued to address both cool- and warm-season heavy precipitation events and forecasting problems over the Northeast U.S.

Two second-year graduate students have been funded by the CSTAR IV project during the present reporting period: 1) Christopher Castellano and 2) Daniel Thompson. Their respective research projects and NWS focal points are: 1) Ice storms and freezing precipitation in the northeastern U.S. (John Quinlan, WFO ALY, and Michael Evans, WFO BGM; section 1a), and 2) Deep convection, severe weather, and Appalachian lee troughs (Thomas Wasula, WFO ALY, and Matthew Kramar, WFO LWX; section 1b). A third graduate student, Jaymes Kenyon, has been recruited to the CSTAR IV project starting in the 2011-2012 academic year. His research project and NWS focal point are: Mesoscale substructure in winter storms (Michael Evans, WFO BGM). The CSTAR IV project has also leveraged a UAlbany NCEP/UCAR project on the topic of the reintensification of tropical cyclones (TCs) over land resulting from TC-jet streak interactions (section 1c). This topic is being addressed by second-year graduate student Matthew Potter, who is investigating the inland reintensification of TC Danny (1997) in comparison to TC Camille (1969), which did not reintensify over land, for his M.S. thesis research.

During the present reporting period, UAlbany Co-PIs, graduate students, and NWS personnel from across the Northeast participated in the Spring 2011 CSTAR meeting, held in Albany, NY, on 6 May 2011. CSTAR-related research was presented at the 14th American Meteorological Society Conference on Mesoscale Processes, held in Los Angeles, CA, on 1-4 August 2011 (see section 2c).

Documentation of CSTAR-related refereed publications is provided in section 2d. An NWS perspective on CSTAR IV project activities is provided by Warren Snyder in section 3, where it is stated in the closing paragraph that "CSTAR research continues to provide a large

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payback to the NWS for the modest amounts expended" in the form of highly qualified entry-level personnel and the involvement of large numbers of NWS staff members at multiple WFOs in applied research of operational interest. In addition to these benefits to the NWS that accrue from CSTAR research, there is the rapid integration of emerging project results into operational forecasting practice. Recent examples include: predecessor rain events, mesoscale banding, heavy precipitation in landfalling tropical cyclones, cool- and warm-season precipitation associated with 500 hPa cutoff cyclones, and cool season high-wind events over the Northeast.

Section 4 follows with summaries of project activities and work performed during the present reporting period by NWS personnel at WFO ALY and participating WFOs in the Northeast (sections 4a and 4b). Section 4c contains a comprehensive status and progress report on the "Snyder Plan," which continues to provide a sustainable governing framework for NWS participation in cooperative research and technology transfer. Section 5 describes activities performed by David Knight that address various computing and technology transfer issues. Finally, examples of UAlbany CSTAR project research that has transitioned into NWS forecast operations are documented chronologically in section 6 in the form of an extensive selection of AFDs that explicitly refer to UAlbany CSTAR project research during the present reporting period.

In closing, the UAlbany CSTAR IV project is addressing research that leverages the activities of the UAlbany Co-PIs and graduate students for the benefit of NWS forecast operations in the ER and other NWS regions. We look forward to continuing to work with you on the cooperative UAlbany-NWS research effort on high-impact cool- and warm-season forecasting problems in the Northeast.

Sincerely,

Lance Bosart Daniel Keyser

Lance F. Bosart
Professor

Daniel Keyser
Professor

cc: Raymond O'Keefe
Warren Snyder
Ken Johnson
Jeff Waldstreicher
David Knight
Christopher Castellano
Daniel Thompson
Jaymes Kenyon
Matthew Potter

"The Collaborative Science, Technology, and Applied Research (CSTAR) Program"

Title:

"Cooperative Research with the National Weather Service on Cool- and Warm-Season Precipitation Forecasting over the Northeastern United States"

University: University at Albany

Name of University Researchers Preparing Report: Lance F. Bosart and Daniel Keyser

NWS/AFWA/Navy Office: National Weather Service, Albany, New York

Name of NWS/AFWA/Navy Researcher Preparing Report: Raymond O'Keefe

National Oceanic and Atmospheric Administration Award Number: NA01NWS4680002

Date: 28 November 2011

SECTION 1: Summary of Graduate Student Research Activities

(a) Synoptic and Mesoscale Aspects of Freezing Rain in the Northeastern U.S. (Christopher Castellano)

Focal Points: John Quinlan, National Weather Service, Albany, NY
Mike Evans, National Weather Service, Binghamton, NY

Research Summary:

This report addresses CSTAR research on freezing rain and ice storms in the northeastern United States. Freezing rain undermines public infrastructure, disrupts local and regional economies, damages natural resources and personal property, and endangers human life and safety (Robbins and Cortinas Jr., 2002). Previous studies have demonstrated that freezing rain is most prevalent and destructive in the eastern U.S. (Changnon, 2003), with the greatest frequency of freezing rain in upstate New York and New England (Changnon and Karl, 2003; Houston and Changnon, 2007). Moreover, given the combined influence of synoptic, mesoscale, and microphysical processes, freezing rain presents a major operational forecast challenge. In consideration of these issues, we have identified several primary objectives: 1) construct a long-term (1975–2010) climatology of freezing rain for the eastern U.S., 2) identify and classify significant freezing rain events based on impacts (ice accretion and damage), spatial characteristics, and relevant meteorological aspects (thermal structure, precipitation regimes, and surface cyclone/anticyclone tracks), 3) evaluate synoptic environments and mesoscale features conducive to significant freezing rain events, and 4) provide operational forecasters with greater situational awareness of the synoptic and mesoscale processes that modulate the evolution of freezing rain events.

Our climatology utilizes hourly surface observations from NCDC's Integrated Surface Database, with the cool season defined as Oct–Apr. The geographical domain is bounded by 32°N, 90°W;48°N, 66°W, and includes 91 first-order stations east of the Mississippi River (see Figure 1). Here, we place an emphasis on the spatial and temporal variability of freezing rain and freezing drizzle throughout the eastern U.S. Individual freezing rain events are defined as one or more hours of measurable freezing rain (FZRA) and/or freezing drizzle (FZDZ), while significant freezing rain events are defined as 6 or more hours of measurable freezing rain (FZRA) within a 24-hour period. In addition, sequential FZRA/FZDZ observations must be within 6 hours of each other to be considered part of the same event. These criteria will help ensure that sequential observations are associated with the same synoptic forcing and precipitation event. Lastly, NCEP/NCAR reanalysis data are used to generate synoptic composite maps for significant freezing rain events at various stations. These composites convey large-scale circulations, upper-level jet structures, thermodynamic environments, and synoptic and mesoscale processes associated with significant freezing rain events. For the purpose of this report, we have included the results of our composite analysis for Worcester, MA (ORH).

Figures 2–4 illustrate some particularly noteworthy results of our climatology. As Figure 2 indicates, the greatest seasonal frequency in freezing rain/freezing drizzle hours occurs east of the Southern Appalachians, in upstate New York, and in central New England. Moreover, we

notice sharp zonal gradients in seasonal frequency across the Appalachians, as well as along the Mid-Atlantic and New England coasts. Figures 3 and 4 illustrate the average seasonal number of *freezing rain events* and *significant freezing rain events*, respectively. Consistent with Figure 2, Figures 3 and 4 depict a maximum in the interior Northeast, and minima in the Deep South and along the Atlantic coast. However, an interesting discrepancy between Figures 3 and 4 exists in the interior Southeast. Although locations east of the southern Appalachians experience substantially fewer total freezing rain events than the interior Northeast, these two regions experience nearly equal frequencies of significant freezing rain events. As a result, a considerably higher percentage of freezing rain events qualify as significant in the interior Southeast than in the interior Northeast. Thus, albeit less common, freezing rain events tend to be more severe in the interior Southeast. A similar relationship exists in the Deep South, but presumably arises because freezing rain is a very rare occurrence in this region. Overall, the observed spatial variability reveals an important connection between topography and freezing rain. Evidence suggests that the presence of synoptic-scale mountain ranges, prominent river valleys, and other smaller-scale terrain features, greatly influences the spatial distribution of freezing rain.

Figures 5–7 demonstrate the predominant synoptic-scale forcing associated with 44 composited events at Worcester, MA (ORH). All composite analyses are centered on t = 0, or the time which best corresponds to the core of each event. Figure 5 illustrates the 500-hPa geopotential heights and anomalies. The large-scale flow pattern exhibits an amplified ridge off the East Coast (z'_{500} > +120 m across New England), an upstream trough in the Midwest, and negative height anomalies over the North Atlantic Ocean. Additionally, the height contours reveal confluent flow over southeastern Canada, thereby implying the presence of an upper-level jet entrance region. Figure 6 illustrates the 300-hPa wind speed, 1000–500-hPa thickness, and mean sea-level pressure. Worcester, MA, is located near the equatorward entrance region of a 300-hPa jet, where we expect to find a thermally direct circulation. Below the jet core, a low-level baroclinic zone exists over the Canadian – U.S. border, with an amplified thermal ridge over southern New England ($Z_{500\text{-}1000}$ > 540 dam). At the surface, the composite analysis yields a closed low in central Pennsylvania, and a dissipating area of weak high pressure near the Gulf of St. Lawrence. Moreover, the orientation of the isobars suggests the presence of a mature warm front south of Worcester, MA. Since surface fronts beneath jet entrance regions are often accompanied by ageostrophic cross-frontal circulations, one may expect ageostrophic northerly winds that reinforce cold air near the surface on the poleward side. Lastly, Figure 7 illustrates the total column precipitable water, standardized precipitable water anomalies, 850–700-hPa layer-averaged wind, and 850–700-hPa layer-averaged 0°C isotherm. An axis of high precipitable water values (PWAT > 20 mm) extends poleward along the East Coast, with standardized anomalies exceeding 2σ in southern New England. Consistent with the 1000–500-hPa thickness plot, the 0°C isotherm is located north of Worcester, MA, at this time. Given the positions of the precipitable water axis and thermal ridge, enhanced south-southeasterly flow implies low-to-midlevel moisture transport and warm-air advection over New England. Assuming the air remains sufficiently cold at the surface, these processes create a favorable thermodynamic environment for prolonged freezing rain events.

National Weather Service Interactions:

Since May 2011, John Quinlan and I have met on several occasions to discuss research progress and short-term project goals. In collaboration with Kevin Lipton, John previously created a 16-year (1993–2008) climatology of significant freezing rain events in NWS WFO Albany's CWA. As of November 2010, John and Kevin had identified 27 events, created composites of anomaly fields, and performed multiple case study analyses. Our meetings have primarily focused on expanding the existing climatology by including all CWAs within the domain of the Northeast Regional Climate Center. For each event catalogued, we use NCDC *Storm Data* in conjunction with hourly surface observations to determine the spatial extent, ice accretion, damage, and precipitation regime.

Publications and Workshop Submissions:

As of November 2011, this research has been presented at the 14th AMS Conference on Mesoscale Processes (Los Angeles, CA, 1–4 August 2011) and the 13th Northeast Regional Operational Workshop (Albany, NY, 2–3 November 2011). In addition, we outlined ongoing work and future opportunities for technology transfer at the annual CSTAR meeting (Albany, NY, 4 November 2011). These presentations have discussed the climatological aspects of freezing rain in the eastern U.S., as well as predominant synoptic and mesoscale features associated with significant freezing rain events. Looking ahead, we anticipate presenting updated research at the 37th Northeastern Storms Conference in Rutland, VT (2–4 March 2012).

Figures:

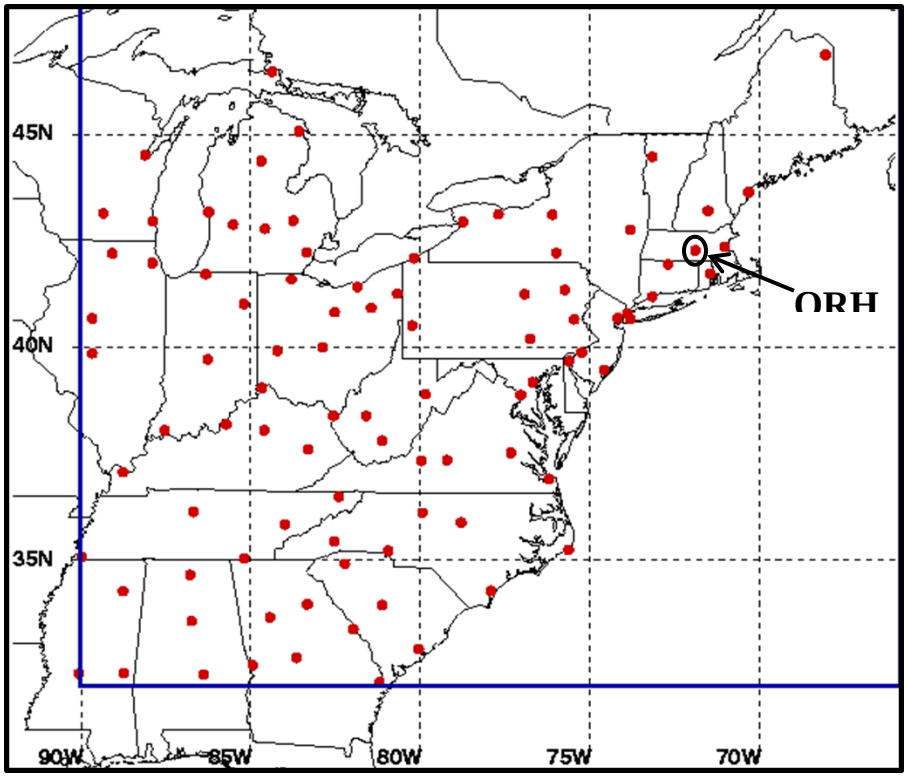

Fig 1. Geographical domain (outlined in blue) and first-order stations (denoted by red dots).

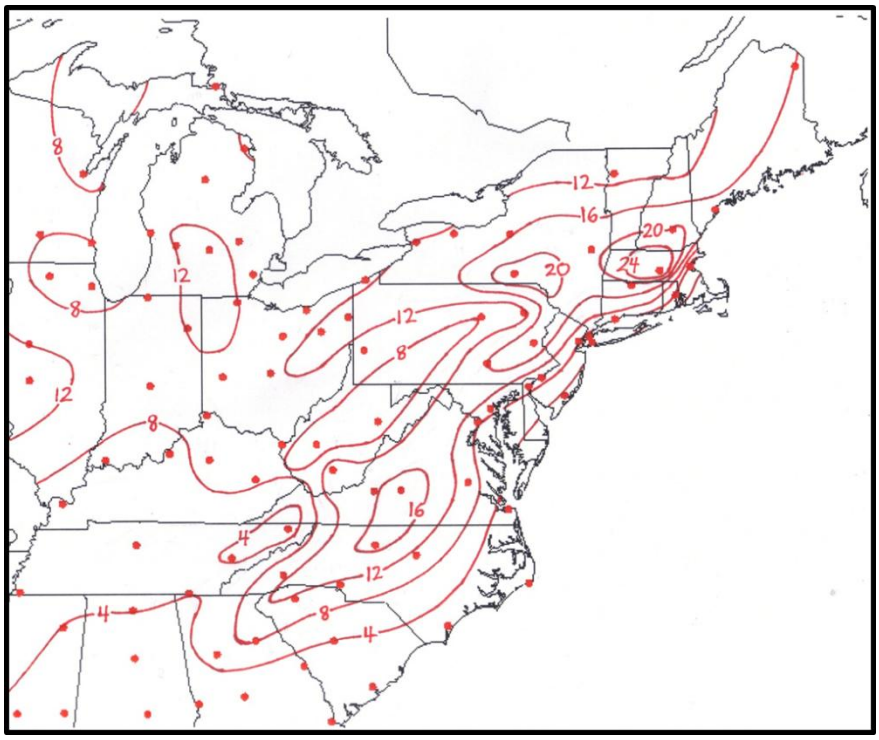

Fig 2. Average number of hours of freezing rain/freezing drizzle per season.

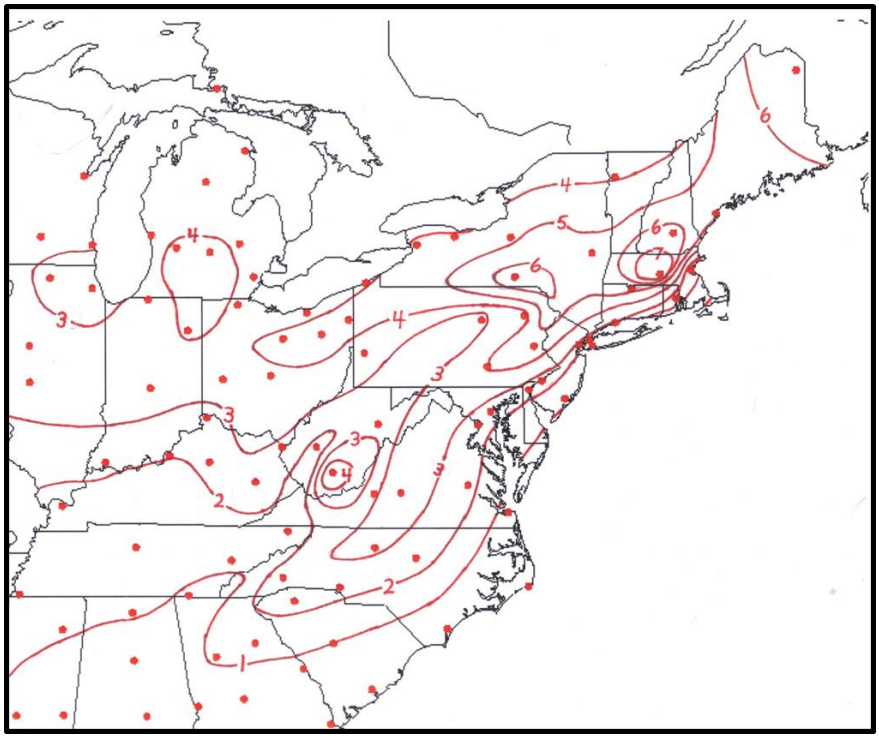

Fig 3. Average number of freezing rain events per season.

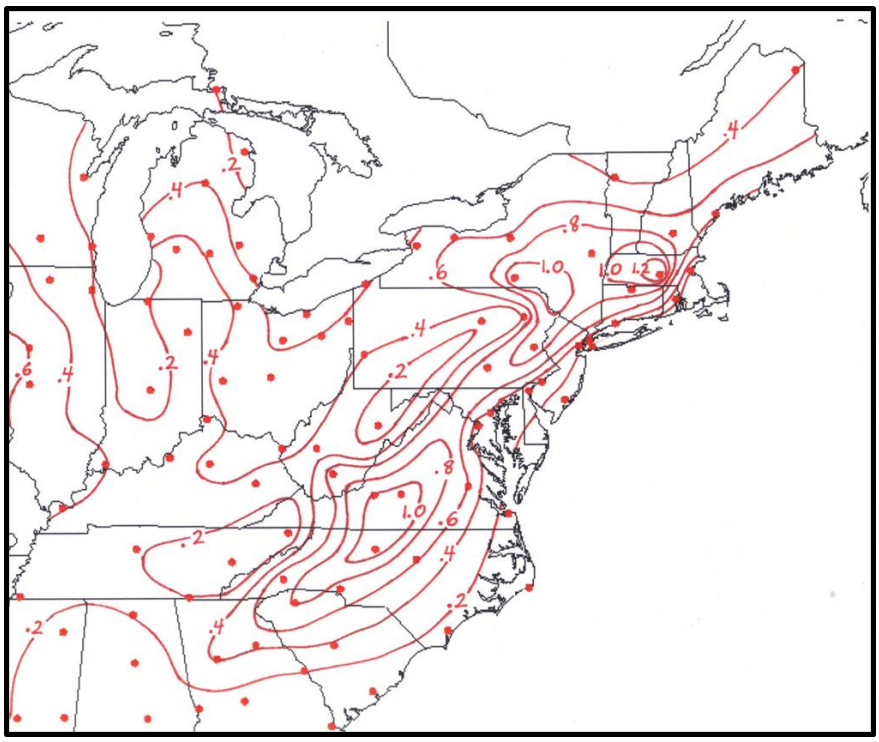

Fig 4. Average number of significant freezing rain events per season.

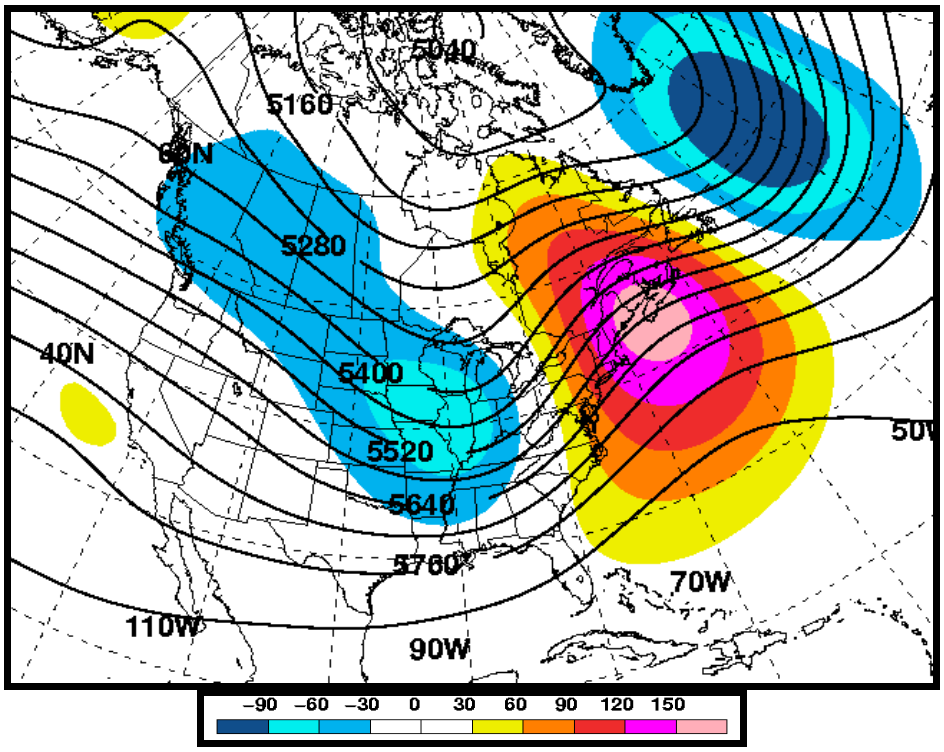

Fig 5. 500-hPa geopotential height (contours, every 60 m) and anomalies (shaded, every 30 m).

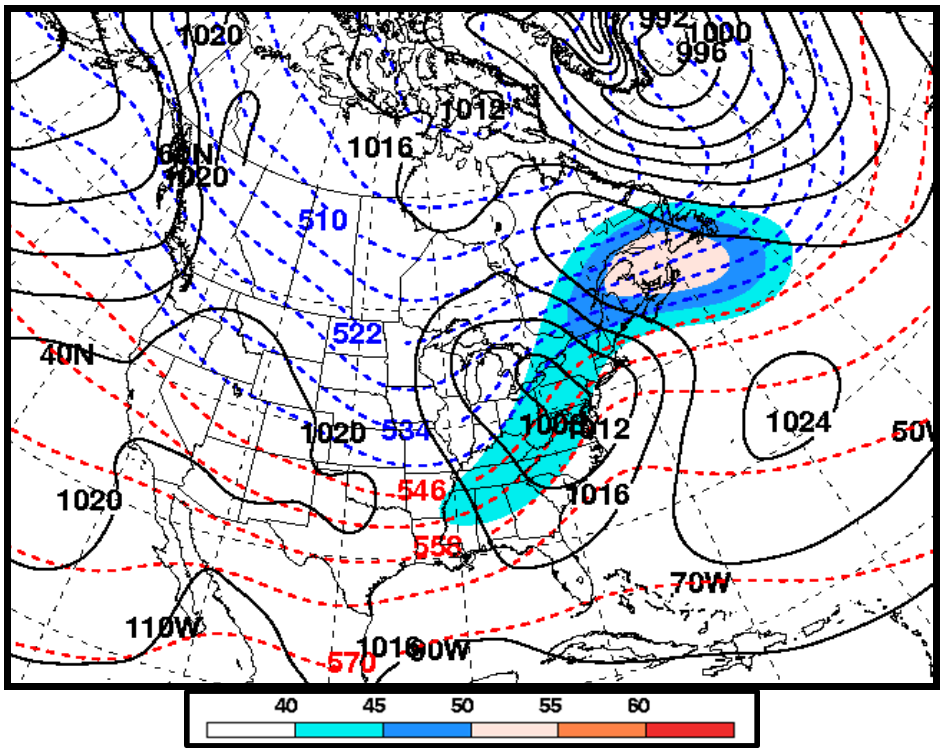

Fig 6. 300-hPa wind speed (shaded, every 5 m s-1), 1000–500-hPa thickness (dashed contours, every 6 dam), and mean sea-level pressure (solid contours, every 4 hPa).

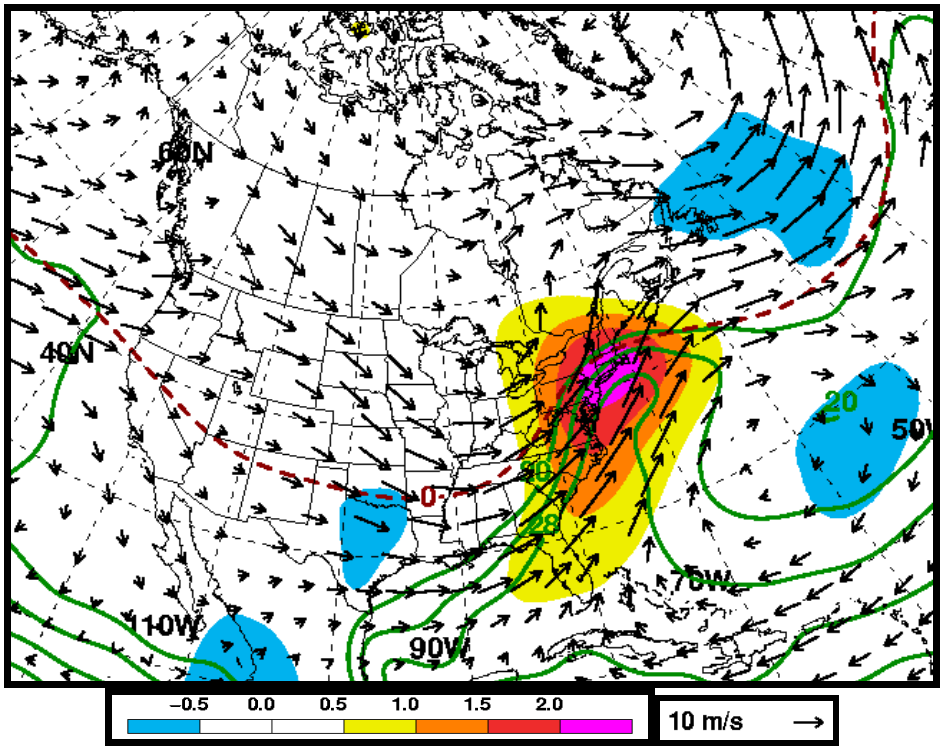

Fig 7. 850–700-hPa layer wind (arrows, m s-1), 850–700-hPa layer 0°C isotherm (dashed contour), precipitable water (green contours, every 4 mm), and standardized precipitable water anomalies (shaded, every 0.5 σ).

(b) Deep convection, severe weather, and Appalachian lee / prefrontal troughs (Daniel B. Thompson)

Focal points: Thomas A. Wasula, National Weather Service, Albany, NY
Matthew Kramar, National Weather Service, Sterling, VA

Research Summary (1 May 2011 – 31 October 2011):

This CSTAR-IV six month report describes ongoing research begun in spring 2011. This research is focused on the structure and formation of both Appalachian lee troughs (ALTs) and prefrontal troughs (PFTs), as well as their role in initiating deep convection and severe weather in the eastern U.S. ALTs can play an important role in the development of convective storms, some of which may become severe, to the lee of the Appalachians from the Carolinas northeastward to southern Pennsylvania. Accurately forecasting the location, mode, and severity of convection associated with ALTs is important due to the proximity of the convective initiation region to the densely populated Eastern Seaboard. Forecasting convection associated with ALTs can be challenging, especially in weak upper-level flow regimes that are characteristic of the region to the lee of the Appalachians during the summer months. It is theorized that PFTs differ from ALTs in that PFTs are more intimately tied to synoptic-scale frontal cyclones. However, ALTs can be manifested as PFTs when ALTs occur in advance of surface cold fronts. Since both PFTs and ALTs may have common characteristics and since there is operational interest in both features, both are the subject of this research.

To investigate the structure of ALTs, 13 cases of ALT events associated with severe convection that affected the Sterling, VA (LWX), County Warning Area between May and September were analyzed using 0.5º resolution gridded data from the NCEP CFSR (Climate Forecast System Reanalysis). A climatology of ALTs in the lee of the Appalachians from the Carolinas northeastward to southern Pennsylvania, referred to as the "ALT zone" (Figure 1), was constructed for May–September, 2000–2009. This climatology was based on criteria derived from the following low-level features that are common to the 13 cases: (1) a wind component orthogonal to and downslope of the mountain barrier, (2) a thickness ridge, (3) a thermal vorticity minimum, and (4) a geostrophic relative vorticity maximum. Horizontal maps of the thickness ridge and negative thermal vorticity, as well as vertical cross sections of geostrophic relative vorticity and potential temperature, suggest that ALTs are shallow, warm-core phenomena.

Results of the ALT climatology with respect to varying MSLP and low-level temperature anomalies are shown in Figure 2. The MSLP anomalies correspond to the magnitude of the ALT itself, while the low-level temperature anomalies correspond to the magnitude of the thickness ridge. The criteria adopted as the definition of an ALT for the remainder of the study were (1) an MSLP anomaly less than −0.75 hPa and (2) a 1000–850-hPa layer-mean temperature anomaly greater than 1°C. Under these criteria an ALT was recorded 26.6% of the time during the climatology period. These criteria were chosen so as to be tight enough to exclude weak ALTs, and loose enough to include enough events to construct a climatology. The diurnal and monthly distributions of ALTs under this definition show that ALTs form preferentially during times of peak diurnal and seasonal heating (Figure 3).

ALTs identified in the climatology were categorized based on their orientation and relationship to synoptic-scale cold fronts. The categories are: (1) Inverted (trough extending northward from south of the ALT zone), (2) No PFT (trough occurs in the absence of a synoptic-scale cold front and is not inverted), (3) PFT with partial FROPA (prefrontal trough where the front does not pass through the entire ALT zone within 24 h), and (4) PFT with total FROPA (prefrontal trough where the front passes through the entire ALT zone within 24 h). Category 2 ALTs occur the most frequently, accounting for 50.8% of all ALTs, while the two prefrontal trough categories account for 44.8% of all ALTs (Figure 4).

The method used for constructing the climatology within the ALT zone was also employed in the Northeastern U.S. The Northeastern U.S. was divided into two zones: (1) the Northeast Intermountain Region (NEI), which contains most of the higher terrain in the Northeastern U.S., and (2) the Northeast Coastal Plain (NECP), which contains the area to the lee of the NEI (Figure 5). Figure 6 shows that ALTs occur more frequently in the ALT zone than either of the Northeastern U.S. zones. Additionally, a significant subset (39%) of ALTs in the NECP occur in the wake of cold frontal passages, a setup which is usually unfavorable for convective development.

Severe local storm reports, obtained from NCDC's *Storm Data* publication, were examined in order to understand the distribution of severe convection in the ALT zone. All tornado, severe thunderstorm wind, and severe hail (greater than one inch diameter) reports within the ALT zone over the length of the climatology were included. Of the 1530 days in the climatology, 754 had at least one storm report (49%, Figure 7). Additionally, 199 days (13%) had more than 20 storm reports, representing fairly active severe weather days. The diurnal distribution of storm reports shows a maximum in the late afternoon and early evening hours, peaking between 2100 and 2300 UTC, as well as a distinct minimum during the nighttime hours (Figure 8). This distribution is indicative of the importance of the diurnal heating cycle to severe local storm formation. Progress has also been made in examining the spatial distribution of severe local storm reports in a domain encompassing the ALT zone. Figure 9 shows three local maxima in percentage of days with at least one storm report: (1) near the Washington, D.C. metro area, (2) in northwestern South Carolina, and (3) in eastern Tennessee. Attempts made to control for population bias in the dataset were met with little success given the extreme spatial variance in population density in the eastern U.S. These attempts were deemed unnecessary given that the dataset likely has preexisting inconsistencies (M. Kramar, personal communication).

NWS Interactions:

Matthew Kramar provided the 13 cases of ALT-related convection, and Thomas Wasula assisted in the acquisition of the severe local storm reports. The research was discussed at length with Thomas Wasula during meetings on 20 July and 25 October. In addition, I have been in frequent contact via email with the focal points.

Publications and Workshop Submissions:

Research has been presented at the CSTAR Spring Meeting in Albany, NY, on 6 May 2011 and during a poster session at the 14th AMS Conference on Mesoscale Processes in Los Angeles, CA,

from 1–4 August 2011. Research will be presented at the following conferences/meetings: (1) the Northeast Regional Operational Workshop in Albany, NY, from 1–3 November 2011, (2) the CSTAR Fall Meeting in Albany, NY, on 3 November 2011, and (3) the 37th Annual Northeastern Storm Conference in Rutland, VT, from 2–4 March 2012.

Figure 1. The Mid-Atlantic zone for which the initial ALT climatology was constructed.

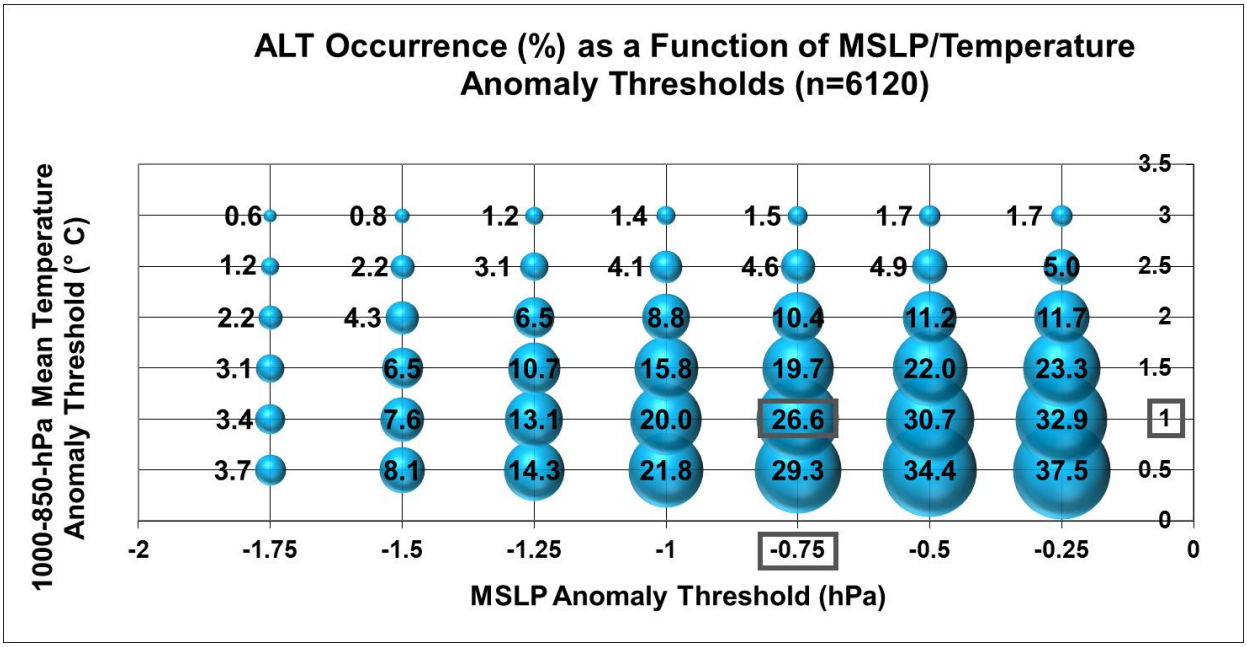

Figure 2. Sensitivity of ALT definition to varying MSLP/thermal anomaly criteria. Each bubble is sized proportionally to the percentage of ALT occurrence with respect to a particular criteria threshold. Boxes indicate the criteria adopted for the remainder of the study (MSLP criterion < −0.75 hPa, layer-mean temperature criterion > 1°C).

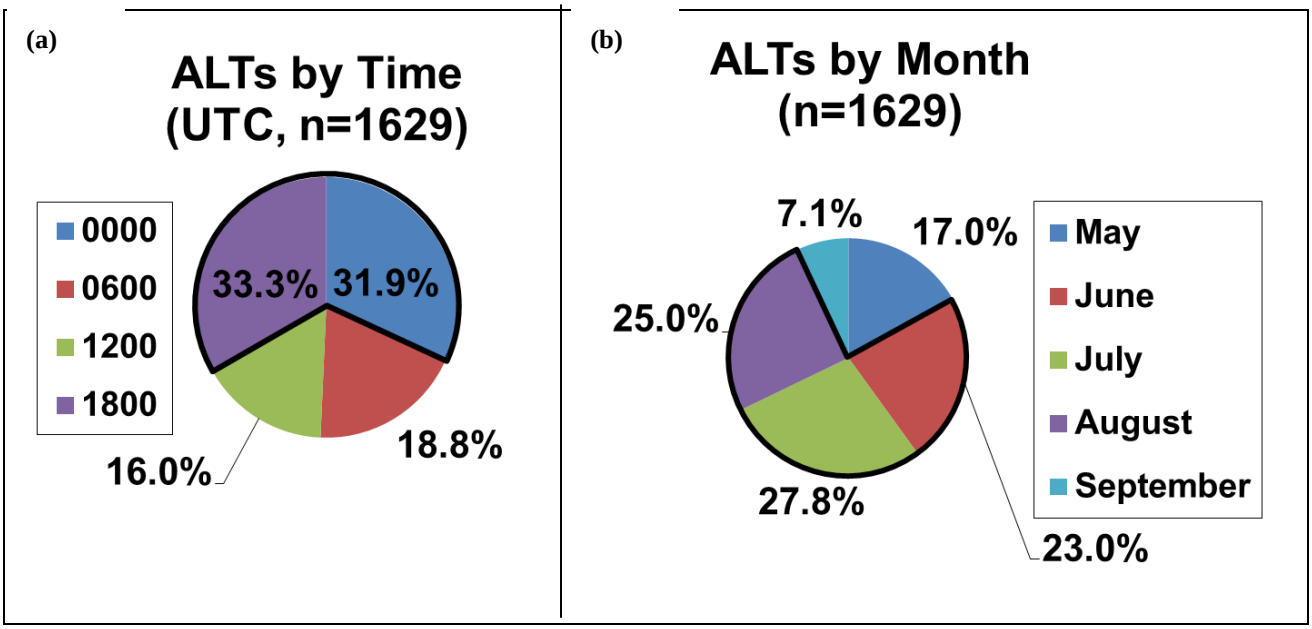

Figure 3. Percentage of ALT occurrence as a function of (a) time of day and (b) month. Black outlines indicate times of peak diurnal and seasonal heating.

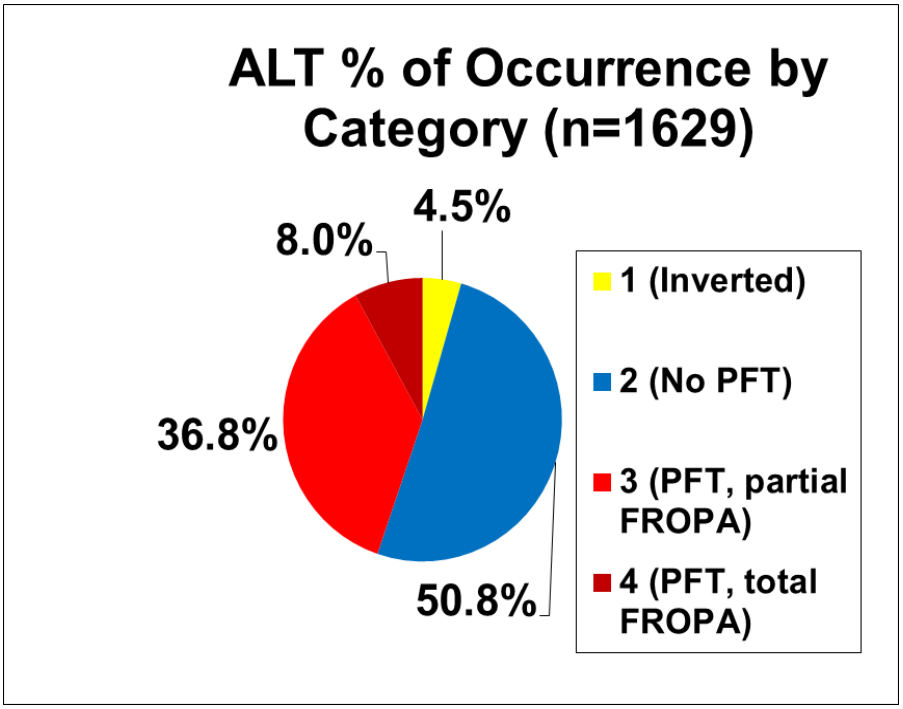

Figure 4. Relative percentage of occurrence of each ALT category.

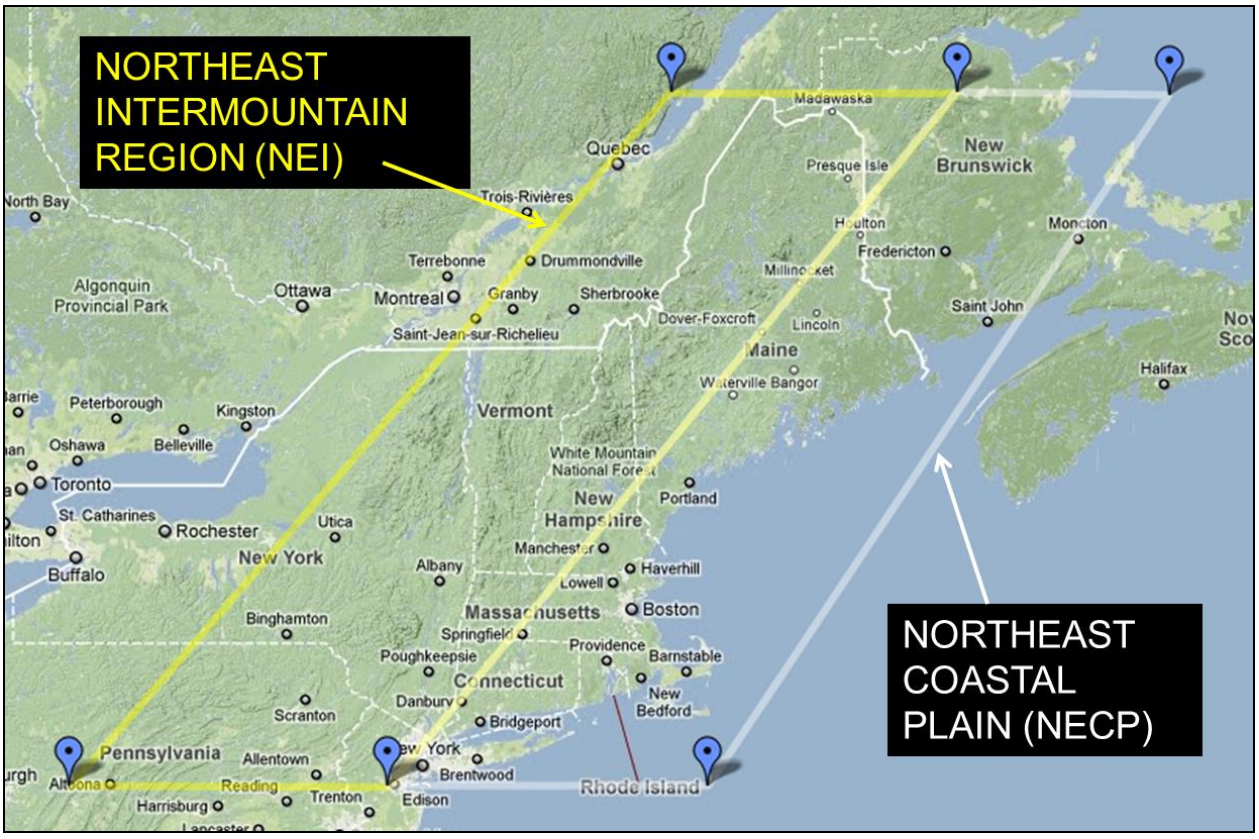

Figure 5. The Northeast zones for which the ALT climatology was constructed.

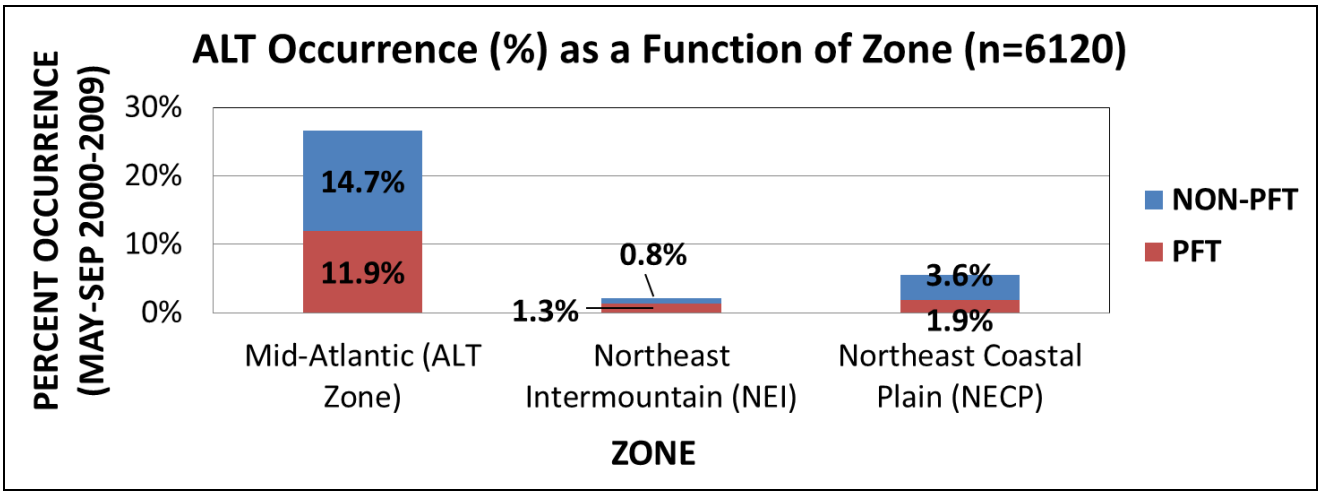

Figure 6. Percentage of occurrence of ALTs in three different zones over the length of the climatology. Red (blue) bars indicated ALTs that are also prefrontal (non-prefrontal).

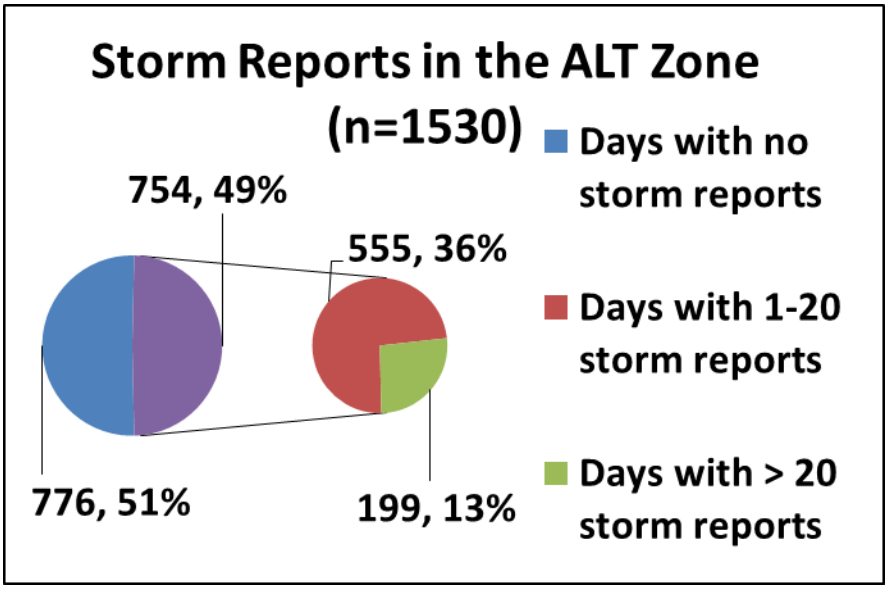

Figure 7. The amount of severe local storm reports per day in the ALT Zone. A day is defined as 0400 to 0400 UTC.

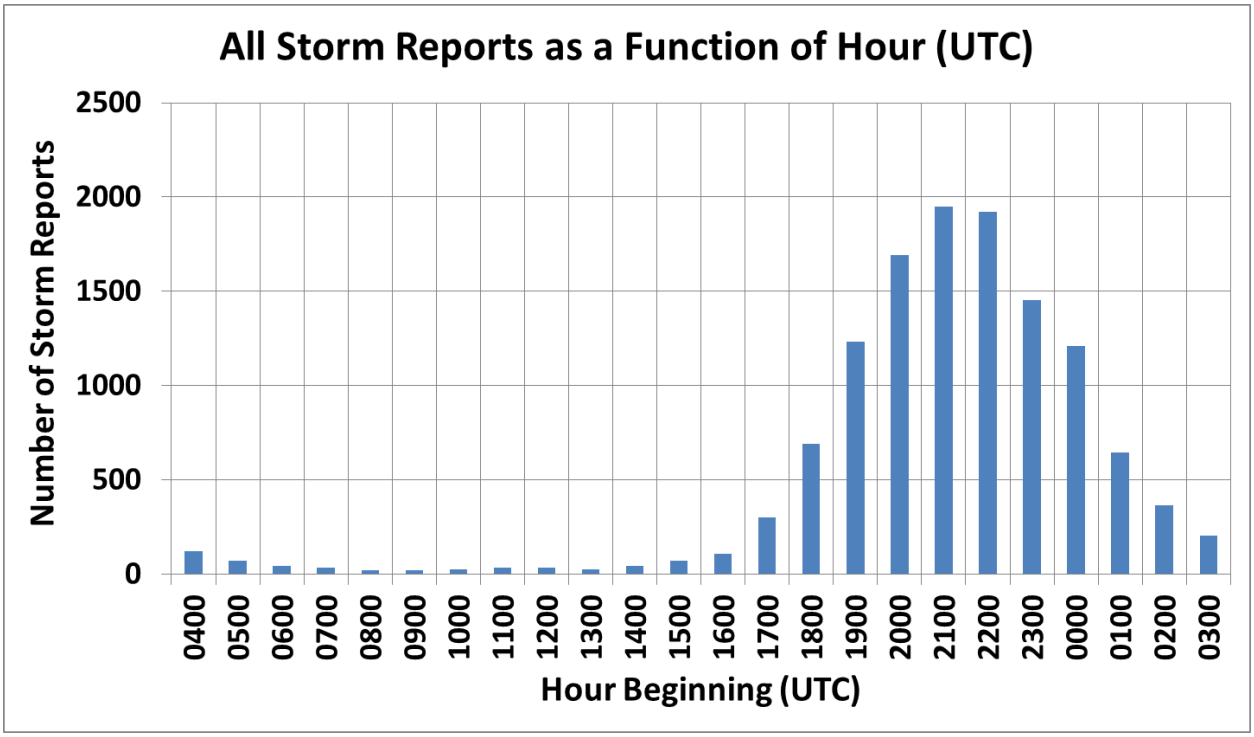

Figure 8. Severe local storm reports as a function of hour within the ALT zone.

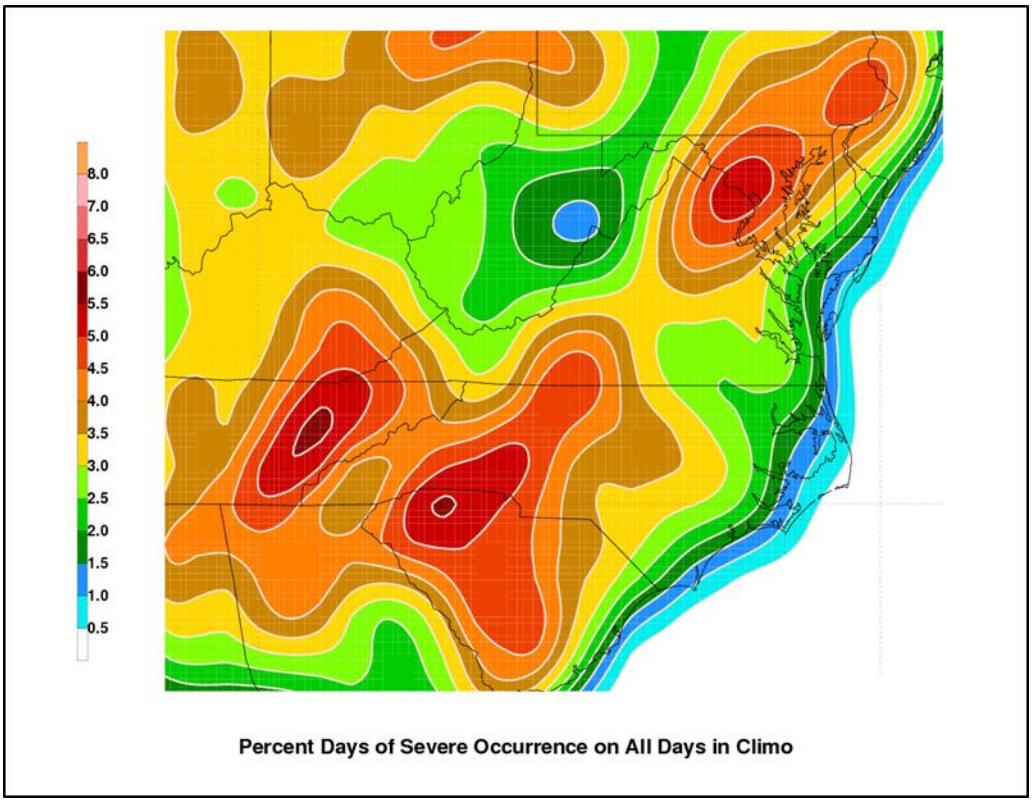

Figure 9. Percentage of days in which at least one severe local storm report was received over the length of the climatology (n=6120).

(c) Multiscale Analysis of the Inland Reintensification of Tropical Cyclone Danny (1997) within an Equatorward Jet-Entrance Region (Matthew Potter)

Research Summary (1 May 2011 – 31 October 2011):

This CSTAR-IV six-month report describes the research that started in spring 2011 and is currently in progress. This research is focused on a continuing study of a multiscale analysis on the unexpected inland reintensification of Tropical Cyclone (TC) Danny in a low-level baroclinic zone beneath an equatorward jet-entrance region on 24 July 1997. To put TC Danny into perspective, a list of inland reintensifying TCs over the eastern half of the United States was constructed for a 61-year time period (1950–2010). Using NHC best track data, 2.5° NCEP-NCAR Reanalysis datasets, and archived NCDC North American surface maps, candidate cases of inland reintensifying TCs were subjectively selected. Implementing subjective criteria produced a final list of inland reintensifying TCs (Table 1). The multiscale analysis of TC Danny was conducted using 0.5° NCEP Climate Forecast System Reanalysis (CFSR) datasets, WSR-88D radar datasets, and Unidata–Wisconsin data stream satellite imagery. A similar synoptic setup was seen during TC Camille from 19-20 August 1969, which produced copious amounts of rainfall over west-central Virginia. A multiscale analysis of TC Camille case has recently been conducted and is being used as a null case of an inland reintensifying TC. The preliminary multiscale analysis of TC Camille was conducted using 2.5° ECMWF 40-year Reanalysis (ERA-40) datasets.

The list of inland reintensifying TCs (Table 1) displays 10 TCs which have been deemed to have reintensified inland. A quick analysis of each storm shows that each had some interaction with an upper-level jet, with the exception of Erin (2007), which reintensified due a favorable thermodynamic environment, high soil moisture, and the presence of a low-level jet (Evans et al. 2007). Compared with the other inland reintensifying TCs, TC Danny had the largest pressure fall (12 hPa) and wind speed increase (15 m s^{-1}) while over land.

The multiscale analysis of the inland reintensification of TC Danny starts with an examination of the synoptic overview. A low-shear environment around TC Danny preceding its inland reintensification was favorable for keeping the preexisting vortex intact (not shown). A midlatitude influence in the form of a digging trough allowed TC Danny to make a turn towards the east-northeast while over north-central Alabama. The reintensification of TC Danny took place once the cyclone became collocated with an equatorward jet-entrance region of an upper-level jet as it crossed the Carolinas and continued through 1800 UTC 24 July 1997 (Fig. 1). An examination of the dynamic tropopause at the same time shows the favorable location of TC Danny downstream of an upper-tropospheric cold pool (Fig. 2a). A cross section taken through the center of TC Danny and the jet-entrance region displays a steepened tropopause in the location of the jet maximum (Fig. 2b). The figure also shows higher values of lower-tropospheric PV, which corresponds with the location of TC Danny. Negative PV found in the upper-troposphere north of TC Danny may have come about through a redistribution of PV, which helped to strengthen the PV gradient and upper-level jet. The organization of convection around TC Danny (Fig. 3) and corresponding diabatic outflow (Fig. 4) are thought to have impacted this redistribution of PV in the upper-troposphere. A north-south cross section of frontogenesis and the ageostrophic circulation taken at 1800 UTC 24 July 1997 shows lower-tropospheric

frontogenesis taking place in and around TC Danny's central circulation, which reinforced the tropospheric-deep ascent that was present (Fig. 5). The diverging ageostrophic wind vectors above TC Danny indicate divergence in the upper troposphere, creating a favorable environment for TC Danny to reintensify.

The TC Camille case study is centered on the mechanisms that caused the copious amounts of rain (>250 mm) that were seen in west-central Virginia from 19–20 August 1969. Although TC Camille happened to be in similar position under an equatorward jet-entrance region of an upper-level jet (Fig. 6), the cyclone did not undergo inland reintensification. Lower-tropospheric frontogenesis, in addition to strong, moist southerly flow ahead of TC Camille, allowed for a favorable setup of inland flooding (Fig. 7). In addition, the complex terrain of the Appalachians is thought to have contributed to the severe inland flooding.

A completion of these case studies will benefit operational forecasting threefold: (1) establish a basis for identifying the physical mechanisms that allow a TC to reintensify inland; (2) allow for identification of possible enhanced precipitation and inland flooding events; and (3) provide additional guidance for issuing high wind warnings/advisories.

Successes and Problems:

Much of the success of this research has been in the form of good feedback, which has helped to guide the direction of the research. As for problems, the lack of radar data in the NCDC radar inventory for the Raleigh/Durham (KRAX) site is not ideal, especially since the convection around TC Danny was in the process of organizing as it crossed near the radar site. Radar sites closest to the Raleigh/Durham radar have been used to fill in this gap. The 2.5° ERA-40 datasets used thus far for the TC Camille case study are not at a high enough resolution to resolve mesoscale features. A future use of 1.125° ERA-40 datasets will improve the analysis.

Publications and Workshop Submissions:

Results produced during summer 2011 were presented in a poster session at the 14th AMS Conference on Mesoscale Processes in Los Angeles, CA, on 1–4 August 2011. A formal presentation was given at the 13th Annual Northeast Regional Operational Workshop (NROW-XIII) on 2–3 November 2011. Future presentations are expected at the 37th Annual Northeast Storms Conference in Rutland, VT, on 2–4 March 2012 and the 30th AMS Conference on Hurricanes and Tropical Meteorology in Ponte Vedra Beach, FL, on 15–20 April 2012. No formal publications have been produced yet.

Cindy (1959)	**Danny (1997)**
Cleo (1964)	Helene (2000)
Agnes (1972)	Allison (2001)
David (1979)	Gaston (2004)
Diana (1984)	Erin (2007)

Table 1. List of inland reintensifying TCs during a 61-year time period (1950 – 2010). TC Danny highlighted in **bold**.

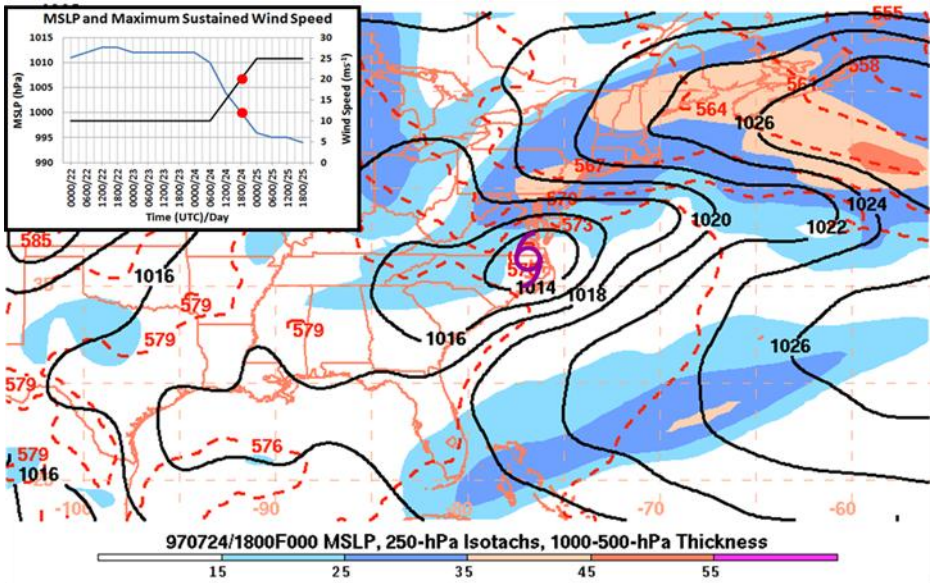

Figure 1. 250-hPa wind speed (shaded, m s^{-1}), 1000–500-hPa thickness (dashed red, dam), and MSLP (solid black, hPa) for 18 UTC 24 1997. Purple TC symbol corresponds with the position of TC Danny at 18 UTC 24 1997. Graph of mean sea-level pressure (MSLP) (blue line) and sustained wind speed (black line) changing with time (top left). Red dots showing the corresponding MSLP and wind speed of TC Danny at 18 UTC 24 July 1997.

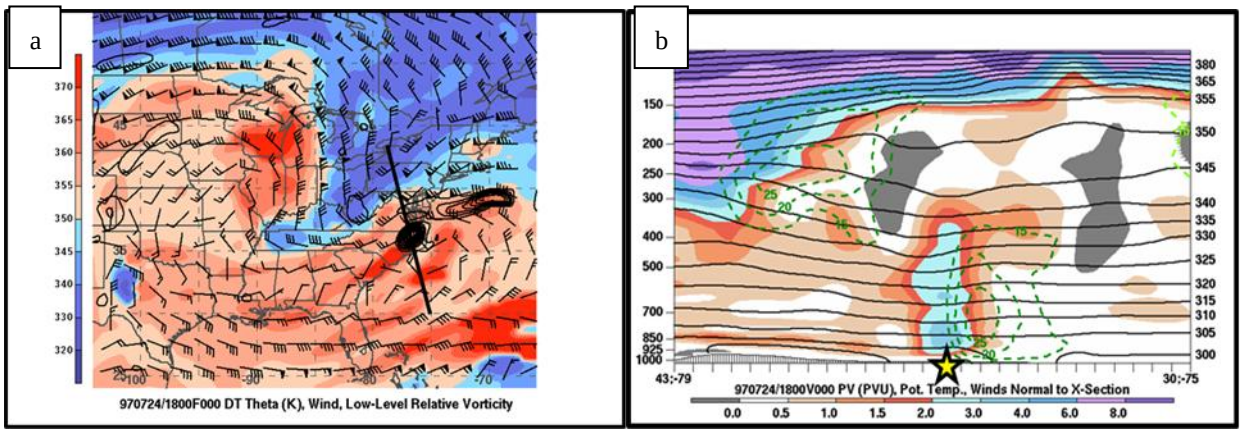

Figure 2. a) Potential temperature (shaded every 5 K) on the 2 PVU surface, winds (barbs in kt), and 925–850-hPa layer-averaged relative vorticity (solid black every 0.5 × 10^{-4} s^{-1}) for 18 UTC 24 July 1997. b) N-S cross section (black line in part a) displaying PV (shaded every 1 PVU), θ (solid black, every 5 K), and the wind component normal to the cross section (dotted green every 5 m s^{-1}) for 18 UTC 24 July. Yellow star corresponds with the position of TC Danny.

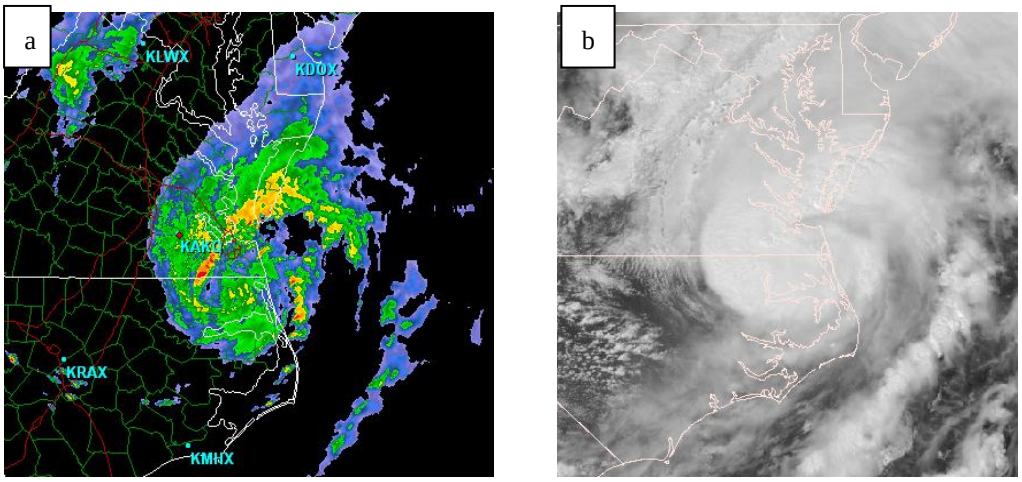

Figure 3. a) KAKQ Base Reflectivity from 1814 UTC 24 July 1997. b) GOES-8 Visible Image from 1815 UTC 24 July 1997.

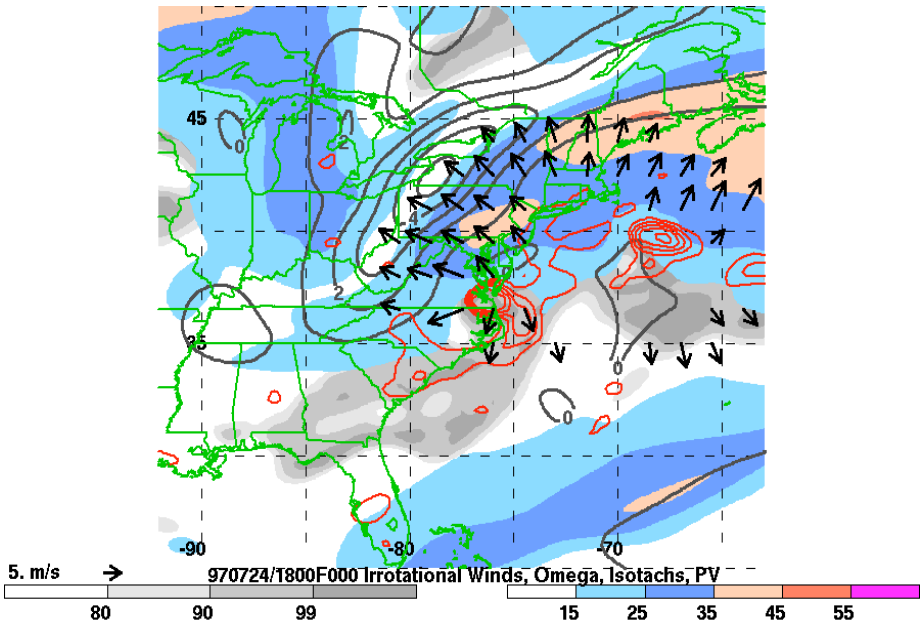

Figure 4. 250-hPa wind speed (color shading in kt), 250-hPa potential vorticity (solid gray every 1 PVU), 250-hPa relative humidity (gray shading in %), 600–400-hPa layer-averaged ω (red every 4×10^{-3} hPa s^{-1}, negative values only), 300–200 hPa layer-averaged irrotational wind (arrows, m s^{-1}) for 18 UTC 24 July 1997.

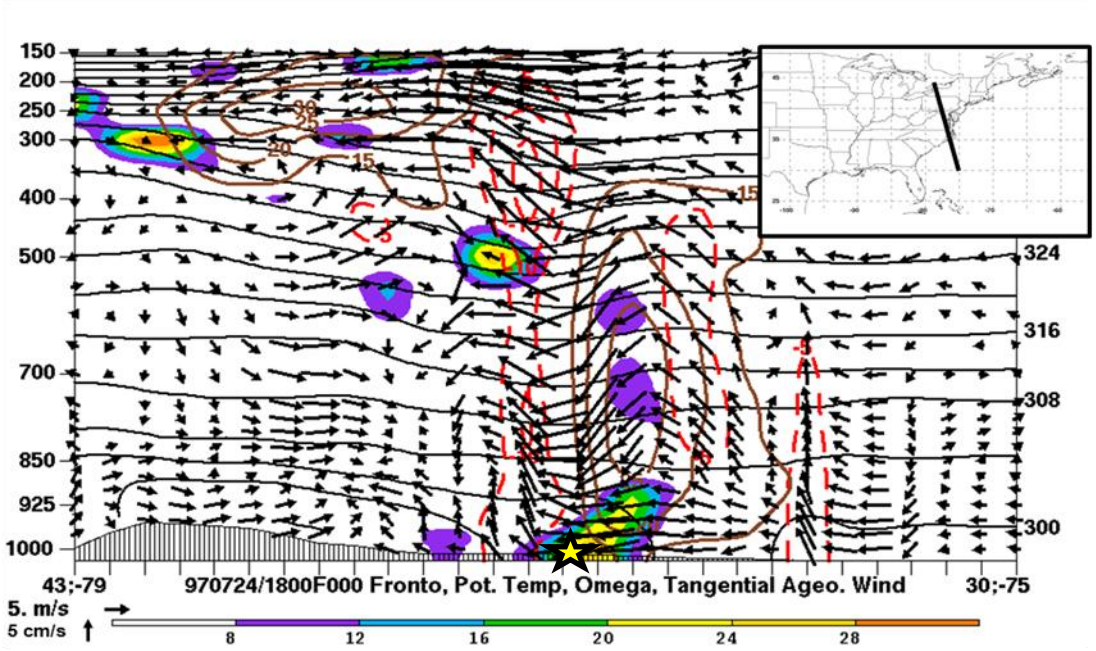

Figure 5. N-S cross section of frontogenesis (shaded in K (100 km)$^{-1}$ (3 h)$^{-1}$), θ (solid black every 5 K), ω (dotted red every 5 × 10^{-3} hPa s^{-1}, negative values only), wind component normal to the cross section (solid brown, m s^{-1}), and the ageostrophic wind component tangential to the cross section (arrows, m s^{-1}) for 18 UTC 24 July 1997. Location of the cross section is found in the corresponding map in the top right. Yellow star corresponds with the position of TC Danny.

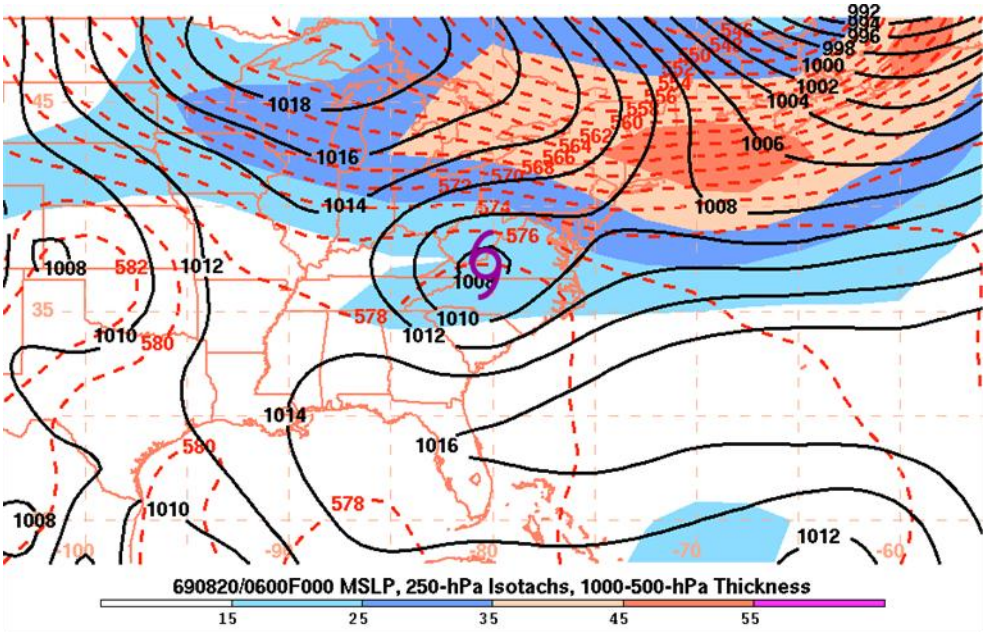

Figure 6. 250-hPa wind speed (shaded, m s^{-1}), 1000–500-hPa thickness (dashed red, dam), and MSLP (solid black, hPa) for 6 UTC 20 August 1969.

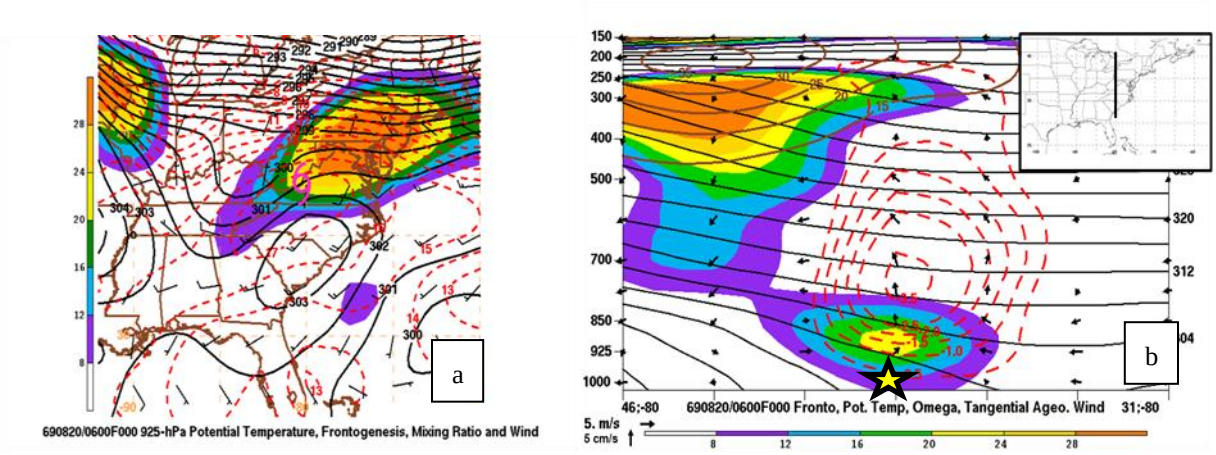

Figure 7. a) 925-hPa frontogenesis (shaded in K (100 km)$^{-1}$ (3 h)$^{-1}$), θ (solid black every 1 K), mixing ratio (solid red every 1 g kg^{-1}), and winds (barbs, m s^{-1}) for 6 UTC 20 August 1969. b) Frontogenesis (shaded in K (100 km)$^{-1}$ (3 h)$^{-1}$), θ (solid black every 5 K), ω (dotted red every 0.5 × 10^{-3} hPa s^{-1}, negative values only), wind component normal to the cross section (solid brown, m s^{-1}), and the ageostrophic wind component tangential to the cross section (m s^{-1}) for 6 UTC 20 August 1969. Location of the cross section is found in the corresponding map in the top right. Yellow star corresponds with the position of TC Danny.

SECTION 2: Cumulative CSTAR Project Publications

a) Theses completed:

Groenert, D., 2002: Large-scale circulation anomaly indices in relation to cool-season precipitation events in the Northeastern United States. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 144 pp.

Novak, D., 2002: A climatological and composite study of cold season banded precipitation in the Northeast United States. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 182 pp.

Smith, B. A., 2003: Cutoff cyclones: A global and regional climatology and two case studies. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 165 pp.

DeLuca, D., 2004: The distribution of precipitation over the northeast accompanying landfalling and transitioning tropical cyclones. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 178 pp.

Fracasso, A., 2004: Case studies of cold season 500 hPa cutoff cyclone precipitation distribution. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 121 pp.

Najuch, J. S., 2004: Case studies of warm season cutoff cyclone precipitation distribution. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 108 pp.

Archambault, H., 2005: Cool-season regime transition and its impact on precipitation in the northeastern United States. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 163 pp.

Wasula, A. C., 2005: A comprehensive study of cool season tornadoes in the southeast United States. Ph.D. Dissertation, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 222 pp.

Wagner, K. R., 2006: Cool-season moderate precipitation events in the Northeastern United States. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 134 pp.

Greenstein, M. D., 2006: Mesoscale structure of precipitation regions in northeast winter storms. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 128 pp.

Cote, M. R., 2007: Predecessor rain events in advance of tropical cyclones. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 200 pp.

Klein, J. R., 2007: Mesoscale precipitation structures accompanying landfalling and transitioning tropical cyclones in the Northeast United States. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 155 pp.

Wilson, P. H., 2008: Warm-season lake-/sea-breeze severe weather in the Northeast. Master of Science Thesis, Department of Earth and Atmospheric Sciences, University at Albany/SUNY, Albany, NY, 115 pp.

Scalora, M. A., 2009: Forecasting distributions of warm-season precipitation associated with 500-hPa cutoff cyclones. Master of Science Thesis, Department of Atmospheric and Environmental Sciences, University at Albany/SUNY, Albany, NY, 186 pp.

Asuma, J. V., 2010: Cool-season high wind events in the Northeast U.S. Master of Science Thesis, Department of Atmospheric and Environmental Sciences, University at Albany/SUNY, Albany, NY, 117 pp.

Moore, B. J., 2010: Synoptic-scale environments and dynamical mechanisms associated with predecessor rain events ahead of tropical cyclones. Master of Science Thesis, Department of Atmospheric and Environmental Sciences, University at Albany/SUNY, Albany, NY, 150 pp.

Payer, M. D., 2010: Forecasting precipitation distributions associated with cool-season 500-hPa cutoff cyclones in the Northeastern United States. Master of Science Thesis, Department of Atmospheric and Environmental Sciences, University at Albany/SUNY, Albany, NY, 130 pp.

b) Preprints:

Groenert, D., L. F. Bosart, D. Keyser, and R. H. Grumm, 2002: Large-scale circulation anomaly indices in relation to cool-season precipitation events in the northeastern United States. Preprints, 19th Conference on Weather Analysis and Forecasting, American Meteorological Society, 12-16 August 2002, San Antonio, TX, pp 168–171.

Grumm, R. H., N. W. Junker, R. Hart, and L. F. Bosart, 2002: Can possible heavy rainfall events be identified by comparing various parameters to the climatological norms? Preprints, 19th Conference on Weather Analysis and Forecasting, American Meteorological Society, 12-16 August 2002, San Antonio, TX, pp 160–163.

Junker, N. W., R. Hart, R. H. Grumm, and L. F. Bosart, 2002: Establishing a 10 Year climatology of 101.6 mm (4 inch) rainfall days, Part I. Preprints, 19th Conference on Weather Analysis and Forecasting, American Meteorological Society, 12-16 August 2002, San Antonio, TX, pp 156–159.

Novak, D. R., and R. S. Horwood, 2002: Analysis of mesoscale banded features in the 5–6 February 2001 New England snowstorm. Preprints, 19th Conference on Weather Analysis and Forecasting, American Meteorological Society, 12-16 August 2002, San Antonio, TX, pp J103–J105.

Novak, D. R., L. F. Bosart, D. Keyser, and J. S. Waldstreicher, 2002: A climatological and composite study of cold season banded precipitation in the northeast United States. Preprints, 19th Conference on Weather Analysis and Forecasting, American Meteorological Society, 12-16 August 2002, San Antonio, TX, pp 164–167.

Novak, M. J., L. F. Bosart, D. Keyser, T. A. Wasula, and K. D. LaPenta, 2002: Climatology of warm season 500 hPa cutoff cyclones and a case study diagnosis of 14-17 July 2000. Preprints, 19th Conference on Weather Analysis and Forecasting, American Meteorological Society, 12-16 August 2002, San Antonio, TX, pp 68–71.

Smith, B. A., L. F. Bosart, D. Keyser, and D. St. Jean, 2002: A global 500 hPa cutoff cyclone climatology: 1953-1999. Preprints, 19th Conference on Weather Analysis and Forecasting, American Meteorological Society, 12-16 August 2002, San Antonio, TX, pp 74–77.

Wasula, A. C., L. F. Bosart, R. Schneider, S. J. Weiss, and R. H. Johns, 2003: Mesoscale aspects of the rapid intensification of a tornadic squall line across central Florida: 22-23 February 1998. Preprint CD-ROM, 10th Conference on Mesoscale Processes, American Meteorological Society, 23-27 June 2003, Portland, OR.

Bosart, L. F., W. Drag, and A. C. Wasula, 2003: The unusually intense coastal front passage of 17-18 April 2002 in eastern New England. Preprints, Fifth Conference on Coastal Atmospheric and Oceanic Prediction and Processes, American Meteorological Society, 6-12 August 2003, Seattle, WA, pp 169–174.

Novak, D. R., J. S. Waldstreicher, L. F. Bosart, and D. Keyser, 2003: An observational study of cold season mesoscale band formation in the Northeast United States. Preprints, 31st Conference on Radar Meteorology, American Meteorological Society, 6-12 August 2003, Seattle, WA, pp 969–972.

Archambault, H. M., L. F. Bosart, D. Keyser, and R. Grumm, 2004: Large scale regime transition and its relationship to significant cool season precipitation events in the Northeast. Preprint CD-ROM, 20th Conference on Weather Analysis and Forecasting, 11-15 January 2004, Seattle, WA.

DeLuca, D. P., L. F. Bosart, D. Keyser, and D. R. Vallee, 2004: The distribution of precipitation over the Northeast accompanying landfalling and transitioning tropical cyclones. Preprint CD-ROM, 20th Conference on Weather Analysis and Forecasting, 11-15 January 2004, Seattle, WA.

Fracasso, A. R., 2004: Cold season 500 hPa cutoff cyclone precipitation distribution and a case study. Preprint CD-ROM, 20th Conference on Weather Analysis and Forecasting, 11-15 January 2004, Seattle, WA.

Junker, N. W., R. H. Grumm, R. Hart, and L. F. Bosart, 2004: A climatological study of 100 mm or greater days in northern California. Preprint CD-ROM, 20th Conference on Weather Analysis and Forecasting, 11-15 January 2004, Seattle, WA.

Najuch, J. S., L. F. Bosart, D. Keyser, T. Wasula, and K. D. LaPenta, 2004: Case studies of warm season cutoff cyclone precipitation distribution. Preprint CD-ROM, 20th Conference on Weather Analysis and Forecasting, 11-15 January 2004, Seattle, WA.

Novak, D. R., J. S. Waldstreicher, L. F. Bosart, and D. Keyser, 2004: A forecast strategy for anticipating cold season mesoscale band formation within developing extratropical cyclones. Preprint CD-ROM, 20th Conference on Weather Analysis and Forecasting, 11-15 January 2004, Seattle, WA.

St. Jean, D. P., P. A. Sisson, L. F. Bosart, D. Keyser, and B. Smith, 2004: Characteristics of upslope snowfall events in Northern New York State and Northern Vermont: Diagnostics and model simulations of several Northwest-flow cases. Preprint CD-ROM, 20th Conference on Weather Analysis and Forecasting, 11-15 January 2004, Seattle, WA.

Wasula, T. A., A. C. Wasula, and L. F. Bosart, 2004: A multi-scale analysis of the end of the millennium snowstorm. Preprint CD-ROM, 20th Conference on Weather Analysis and Forecasting, 11-15 January 2004, Seattle, WA.

Wasula, A. C., L. F. Bosart, R Schneider, S. J. Weiss, and R. H. Johns, 2004: Cool season tornadoes in the southeast United States: A climatological and case study perspective. Preprint CD-ROM, 20th Conference on Weather Analysis and Forecasting, 11-15 January 2004, Seattle, WA.

Bosart, L. F., K. LaPenta, A. Seimon, M. Dickinson, and T. J. Galarneau, Jr., 2004: Terrain-influenced tornadogenesis in the northeastern United States. Preprint CD-ROM, 11th Conference on Mountain Meteorology, 21-25 June 2004, Bartlett, NH.

Sisson, P. A., D. St. Jean, E. Evenson, W. E. Murray, S. F. Hogan, L. F. Bosart, D. Keyser, and B. Smith, 2004: Applying local research to National Weather Service operations: Forecasting heavy mountain snowfalls in Vermont and Northern New York. Preprint CD-ROM, 11th Conference on Mountain Meteorology, 21-25 June 2004, Bartlett, NH.

Bosart, L. F., K. D. LaPenta, A. Seimon, and M. J. Dickinson, 2004: Terrain-influenced tornadogenesis in the northeastern United States: An examination of the 29 May 1995 Great Barrington, Massachusetts, Tornado. Preprint CD-ROM, 22nd Conference on Severe Local Storms, 4-8 October 2004, Hyannis, MA.

LaPenta, K. D., L. F. Bosart, T. J. Galarneau, Jr., and M. J. Dickinson, 2004: A multiscale examination of the 31 May 1998 Mechanicville, New York, Tornado. Preprint CD-ROM, 22nd Conference on Severe Local Storms, 4-8 October 2004, Hyannis, MA.

Novak, D., and A. Aiyyer, 2004: The 2004 April fool's New England flooding event: Analysis of three heavy precipitation episodes associated with a slow moving cutoff cyclone. Preprint CD-ROM, 22nd Conference on Severe Local Storms, 4-8 October 2004, Hyannis, MA.

Seimon A., and L. F. Bosart, 2004: An observationally based hypothesis for significant tornadogenesis in mountain environments. Preprint CD-ROM, 22nd Conference on Severe Local Storms, 4-8 October 2004, Hyannis, MA.

Wasula, A. C., L. F. Bosart, R Schneider, S. J. Weiss, R. H. Johns, G. S. Manikin, and P. Welch, 2004: The structure and climatology of boundary layer winds in the southeast United States and its relationship to nocturnal tornado episodes. Preprint CD-ROM, 22nd Conference on Severe Local Storms, 4-8 October 2004, Hyannis, MA.

Archambault, H. M., D. Keyser, L. F. Bosart, and A. Aiyyer, 2004: Cool-season regime transition and its impact on precipitation in the northeast United States. Preprint, The First THORPEX International Science Symposium, 6-10 December, Montréal, Québec, Canada.

Wasula, T. A., P. H. Wilson, L. F. Bosart, D. Keyser, and R. L. Tracey, 2008: A comparison of two lake breeze severe events with a threat checklist application. Preprint CD-ROM, 24th Conference on Severe Local Storms, 27-31 October 2008, Savannah, GA.

Wasula, T. A., N. A. Stuart, and A. C. Wasula, 2008: The 17 February 2006 severe weather and high wind event across Eastern New York and New England. Preprint CD-ROM, 24th Conference on Severe Local Storms, 27-31 October 2008, Savannah, GA.

c) Co-PI and/or student presentations:

Bosart, L. F., 2001: Scientific and operational lessons from the 25 Jan '00 and 30 Dec '00 snowstorms. Oral presentation at the 26th Annual Northeastern Storm Conference, 9-11 March 2001, Saratoga Springs, NY.

Bosart, L. F., 2001: An overview of derechos and their environments. Oral presentation at the CSTAR Conference and Albany Weather Forecasting Office Spring Meeting, 25-26 April 2001, Albany, NY.

Bosart, L. F., 2001: Death by 1000 Cuts? Oral presentation at the Third Northeast Regional Operational Workshop, 6-7 November 2001, Albany, NY.

Groenert, D., L. F. Bosart, D. Keyser, and R. Grumm, 2001: Large-scale circulation anomaly indices in relation to cool-season precipitation events in the northeastern United States. Oral presentation at the Third Northeast Regional Operational Workshop, 6-7 November 2001, Albany, NY.

Novak, D., L. F. Bosart, D. Keyser, and J. Waldstreicher, 2001: A climatology of cold season banded precipitation in the northeast United States. Oral presentation at the Third Northeast Regional Operational Workshop, 6-7 November 2001, Albany, NY.

Smith, B. A., L. F. Bosart, D. Keyser, and D. St. Jean, 2001: A climatology of 500 hPa cutoff cyclones. Oral presentation at the Third Northeast Regional Operational Workshop, 6-7 November 2001, Albany, NY.

Bosart, L. F., 2002: Dynamic tropopause and PV maps: A user's guide. Oral presentation at the 27th Annual Northeastern Storm Conference, 8-10 March 2002, Saratoga Springs, NY.

Groenert, D., L. F. Bosart, and D. Keyser, 2002: Large-scale circulation anomaly indices in relation to cool-season precipitation events in the northeastern United States. Oral presentation at the 27th Annual Northeastern Storm Conference, 8-10 March 2002, Saratoga Springs, NY.

Novak, D., L. F. Bosart, D. Keyser, and J. Waldstreicher 2002: A climatological and composite study of cold season banded precipitation in the northeast United States. Oral presentation at the 27th Annual Northeastern Storm Conference, 8-10 March 2002, Saratoga Springs, NY.

Bosart, L. F., 2002: Mesoscale boundaries, organized deep convection and forecast derailments. Oral presentation at the Northeast Regional Operational Workshop, 5 November 2002, Albany, NY.

Novak, D., J. Waldstreicher, L. F. Bosart, and D. Keyser, 2002: Anticipating mesoscale band formation in winter storms. Oral presentation at the Northeast Regional Operational Workshop, 5 November 2002, Albany, NY.

Novak, M. J., L. F. Bosart, D. Keyser, T. A. Wasula, and K. D. LaPenta, 2002: A climatology of warm season 500 hPa cutoff cyclones and case study. Oral presentation at the Northeast Regional Operational Workshop, 5 November 2002, Albany, NY.

Smith, B. A., L. F. Bosart, D. Keyser, and D. St. Jean, 2002: Cutoff cyclones: A global and regional climatology (1948–2001) and two case studies. Oral presentation at the Northeast Regional Operational Workshop, 5 November 2002, Albany, NY.

Atallah, E. H., and L. F. Bosart, 2003: Tropical cyclone extratropical transition evolutions: Forecast vs. observed. Oral presentation at the 28th Annual Northeastern Storm Conference, 7-9 March 2003, Saratoga Springs, NY.

Atallah, E. H., A. Aiyyer, and L. F. Bosart, 2003: Teleconnections, 1000-500 hPa thickness and storm tracks in the Northern Hemisphere. Oral presentation at the 28th Annual Northeastern Storm Conference, 7-9 March 2003, Saratoga Springs, NY.

Brewster, J., and M. Evans, 2003: Forecasting the Christmas Day 2002 Snowstorm using modernized National Weather Service tools, training and technology. Oral presentation at the 28th Annual Northeastern Storm Conference, 7-9 March 2003, Saratoga Springs, NY.

Bosart, L. F., and M. J. Dickinson, 2003: The double transition of Hurricane Michael (2000): Baroclinic to tropical to baroclinic. Oral presentation at the 28th Annual Northeastern Storm Conference, 7-9 March 2003, Saratoga Springs, NY.

Novak, M. J., A. Aiyyer, L. F. Bosart, D. Keyser, T. A. Wasula, and K. D. LaPenta, 2003: Climatology of warm season 500 hPa cutoff cyclones and case study diagnosis of 14–17 July 2000. Oral presentation at the 28th Annual Northeastern Storm Conference, 7-9 March 2003, Saratoga Springs, NY.

Smith, B. A., L. F. Bosart, D. Keyser, and D. St. Jean, 2003: Cutoff cyclones: A global and regional climatology (1948–2001) and two case studies. Oral presentation at the 28th Annual Northeastern Storm Conference, 7-9 March 2003, Saratoga Springs, NY.

Archambault, H. M., 2003: Large-scale regime transition and its relationship to significant cool season precipitation events in the Northeast. Oral presentation at the NWS/UAlbany/NCSU CSTAR Workshop, 9-10 July 2003, Silver Spring, MD.

DeLuca, D. P., L. F. Bosart, D. Keyser, and D. Vallee, 2003: The distribution of precipitation over the Northeast accompanying landfalling and transitioning tropical cyclones. Oral presentation at the NWS/UAlbany/NCSU CSTAR Workshop, 9-10 July 2003, Silver Spring, MD.

Fracasso, A., A. Aiyyer, L. F. Bosart, D. Keyser, and M. Evans, 2003: Case studies of cold season cutoff cyclone precipitation distribution. Oral presentation at the NWS/UAlbany/NCSU CSTAR Workshop, 9-10 July 2003, Silver Spring, MD.

Najuch, J. S., A. Aiyyer, L. F. Bosart, D. Keyser, T. A. Wasula, and K. D. LaPenta, 2003: Case studies of warm season cutoff cyclone precipitation distribution. Oral presentation at the NWS/UAlbany/NCSU CSTAR Workshop, 9-10 July 2003, Silver Spring, MD.

Novak, M. J., A. Aiyyer, L. F. Bosart, D. Keyser, T. A. Wasula, and K. D. LaPenta, 2003: Climatology of warm season 500 hPa cutoff cyclones and case study. Oral presentation at the NWS/UAlbany/NCSU CSTAR Workshop, 9-10 July 2003, Silver Spring, MD.

Novak, D., J. Waldstreicher, L. F. Bosart, and D. Keyser, 2003: Anticipating mesoscale band formation in Winter storms using radar and model guidance. Invited speaker at the 28th Annual National Weather Association Meeting, 18-23 October 2003, Jacksonville, FL.

Archambault, H. M., L. F. Bosart, D. Keyser, and R. Grumm, 2003: Large-scale regime transition and its relationship to significant cool season precipitation events in the Northeast. Oral presentation at the Northeast Regional Operational Workshop, Albany, NY, 4-5 November 2003.

Bosart, L. F., W. Drag, and A. C. Wasula, 2003: The unusually intense coastal front passage of 17-18 April 2002 in Eastern New England. Oral presentation at the Northeast Regional Operational Workshop, Albany, NY, 4-5 November 2003.

DeLuca, D. P., L. F. Bosart, D. Keyser, and D. R. Vallee, 2003: The distribution of precipitation over the northeast accompanying landfalling and transitioning tropical cyclones. Oral presentation at the Northeast Regional Operational Workshop, Albany, NY, 4-5 November 2003.

Fracasso, A., L. F. Bosart, D. Keyser, and M. Evans, 2003: Cold season 500 hPa cutoff cyclone precipitation distribution and a case study. Oral presentation at the Northeast Regional Operational Workshop, Albany, NY, 4-5 November 2003.

LaPenta, K. D., 2003: The Eastern New York and Western New England F2 Tornado of 21 July. Oral presentation at the Northeast Regional Operational Workshop, Albany, NY, 4-5 November 2003.

Najuch, J. S., L. F. Bosart, D. Keyser, T. A. Wasula, and K. D. LaPenta, 2003: Case studies of warm season cutoff cyclone precipitation distribution. Oral presentation at the Northeast Regional Operational Workshop, Albany, NY, 4-5 November 2003.

Waldstreicher, J. S., 2003: Assessing the impact of collaborative research projects on NWS Warning performance. Oral presentation at the Northeast Regional Operational Workshop, Albany, NY, 4-5 November 2003.

Wasula, A. C., L. F. Bosart, R. Schneider, S. Weiss, and R. Johns, 2003: A study of cool season tornadoes in the Southeast United States. Oral presentation at the Northeast Regional Operational Workshop, Albany, NY, 4-5 November 2003.

Archambault, H. M., L. F. Bosart, and D. Keyser, 2004: Large-scale regime transition and its relationship to significant precipitation events in the Northeast. Oral presentation 29th Annual Northeastern Storm Conference, 12-14 March 2004, Saratoga Springs, NY.

Bosart, L. F., 2004: Coastal fronts, cold air damming, and fronts adjacent to higher terrain. Oral presentation 29th Annual Northeastern Storm Conference, 12-14 March 2004, Saratoga Springs, NY.

Cannon, J., 2004: Environmental flow regimes and heavy rainfall distribution associated with tropical cyclones in the northeast United States. Oral presentation 29th Annual Northeastern Storm Conference, 12-14 March 2004, Saratoga Springs, NY.

DeLuca, D. P., L. F. Bosart, D. Keyser, and D. R. Vallee, 2004: The distribution of precipitation over the Northeast accompanying landfalling and transitioning tropical cyclones. Oral presentation 29th Annual Northeastern Storm Conference, 12-14 March 2004, Saratoga Springs, NY.

Fracasso, A., L. F. Bosart, D. Keyser, and M. Evans, 2004: Cold season 500 hPa cutoff cyclone precipitation distribution and a case study. Oral presentation 29th Annual Northeastern Storm Conference, 12-14 March 2004, Saratoga Springs, NY.

Najuch, J. S., L. F. Bosart, D. Keyser, T. A. Wasula, and K. D. LaPenta, 2004: Case studies of warm season cutoff cyclone precipitation distribution. Oral presentation 29th Annual Northeastern Storm Conference, 12-14 March 2004, Saratoga Springs, NY.

Sisson, P. A., D. St. Jean, E. Evenson, W. E. Murray, S. F. Hogan, L. F. Bosart, D. Keyser, and B. Smith, 2004: Application of local research results to National Weather Service Operational Forecast Challenges – A success story forecasting heavy mountain snowfalls in Vermont and Northern New York. Oral presentation 29th Annual Northeastern Storm Conference, 12-14 March 2004, Saratoga Springs, NY.

Bosart, L. F., K. D. LaPenta, A. Seimon, and M. J. Dickinson, 2004: Terrain-influenced tornadogenesis in the northeastern United States: An examination of the 29 May 1995 Great Barrington, Massachusetts, Tornado. Oral presentation, 22nd Conference on Severe Local Storms, 4-8 October 2004, Hyannis, MA.

LaPenta, K. D., L. F. Bosart, T. J. Galarneau Jr., and M. J. Dickinson, 2004: A multiscale examination of the 31 May 1998 Mechanicville, New York, Tornado. Oral presentation, 22nd Conference on Severe Local Storms, 4-8 October 2004, Hyannis, MA.

Seimon A., and L. F. Bosart, 2004: An observationally based hypothesis for significant tornadogenesis in mountain environments. Oral presentation, 22nd Conference on Severe Local Storms, 4-8 October 2004, Hyannis, MA.

Wasula, A. C., L. F. Bosart, R Schneider, S. J. Weiss, R. H. Johns, G. S. Manikin, and P. Welch, 2004: The structure and climatology of boundary layer winds in the southeast United States and its relationship to nocturnal tornado episodes. Oral presentation, 22nd Conference on Severe Local Storms, 4-8 October 2004, Hyannis, MA.

Archambault, H. M., L. F. Bosart, D. Keyser, A. Aiyyer, and R. Grumm, 2004: Cool-season regime transition and its impact on precipitation in the northeast. Oral presentation at the Sixth Northeast Regional Operational Workshop (NROW), 2-3 November 2004, Albany, NY.

Bosart, L. F., 2004: A long-lived intense continental-scale front: 28 February-4 March 1972. Oral presentation at the Sixth Northeast Regional Operational Workshop (NROW), 2-3 November 2004, Albany, NY.

Fracasso, A., L. F. Bosart, and D. Keyser, 2004: Cool season 500 hPa cutoff cyclones: Precipitation distribution and a case study. Oral presentation at the Sixth Northeast Regional Operational Workshop (NROW), 2-3 November 2004, Albany, NY.

Novak, D., B. Colle, and D. Keyser, 2004: High-resolution simulations of the 25 December 2002 banded snowstorm using Eta, MM5, and WRF. Oral presentation at the Sixth Northeast Regional Operational Workshop (NROW), 2-3 November 2004, Albany, NY.

Runyon, S. C., and L. F. Bosart, 2004: A statistical and synoptic climatological analysis of U.S. heat waves. Oral presentation at the Sixth Northeast Regional Operational Workshop (NROW), 2-3 November 2004, Albany, NY.

Wagner, K., L. F. Bosart, and D. Keyser, 2004: Cyclogenesis and upper-level jet streaks and their influence on the low-level Jet. Oral presentation at the Sixth Northeast Regional Operational Workshop (NROW), 2-3 November 2004, Albany, NY.

Wasula, A. C., L. F. Bosart, R. S. Schneider, S. Weiss, R. H. Johns, G. S. Manikin, and P. Welsh, 2004: The structure and climatology of boundary layer winds in the southeast United States and its relationship to nocturnal tornado episodes. Oral presentation at the Sixth Northeast Regional Operational Workshop (NROW), 2-3 November 2004, Albany, NY.

Bosart, L. F., W. Drag, and A. Wasula, 2004: Backdoor and sidedoor cold fronts: A continual forecast challenge. Invited presenter, 5th Southern New England Weather Conference, 6 November 2004, Brookline, MA.

Archambault, H. M., L. F. Bosart, D. Keyser, A. Aiyyer, and R. Grumm, 2005: Cool-season regime transition and its impact on precipitation in the northeast. Oral presentation at the 30th Annual Northeastern Storm Conference, 18-20 March 2005, Burlington, VT.

Runyon, S. C., and L. F. Bosart, 2005: A statistical analysis and synoptic climatology of heat waves over the United States. Oral presentation at the 30th Annual Northeastern Storm Conference, 18-20 March 2005, Burlington, VT.

Wagner, K., L. F. Bosart, and D. Keyser, 2005: Moderate precipitation events in the Northeastern United States. Oral presentation at the 30th Annual Northeastern Storm Conference, 18-20 March 2005, Burlington, VT.

Archambault, H. M., L. F. Bosart, D. Keyser, A. Aiyyer and R. H. Grumm, 2005: Cool-season regime transition and its impact on precipitation in the Northeast. Oral presentation, 21st Conference on Weather Analysis and Forecasting/17th Conference on Numerical Weather Prediction, American Meteorological Society, 1-5 August 2005, Washington, DC.

Greenstein, M. D., L. F. Bosart, D. Keyser, and D. J. Nicosia, 2005: Examining the role of mesoscale features in the structure and evolution of precipitation regions in northeast winter storms. Poster presentation, 21st Conference on Weather Analysis and Forecasting/17th Conference on Numerical Weather Prediction, American Meteorological Society, 1-5 August 2005, Washington, DC.

Junker, N., R. Grumm, R. Hart, L. F. Bosart, K. M. Bell and F. J. Pereira, 2005: Forecasting extreme wintertime precipitation events in northern California. Oral presentation, 21st Conference on Weather Analysis and Forecasting/17th Conference on Numerical Weather Prediction, American Meteorological Society, 1-5 August 2005, Washington, DC.

Novak, D. R., B. A. Colle, and D. Keyser, 2005: High-resolution modeling of the 25 December 2002 Northeast U.S. banded snowstorm. Oral presentation, 21st Conference on Weather Analysis and Forecasting/17th Conference on Numerical Weather Prediction, American Meteorological Society, 1-5 August 2005, Washington, DC.

Runyon, S. C., and L. F. Bosart, 2005: A Statistical analysis and synoptic climatology of heat waves over the United States. Oral presentation, 21st Conference on Weather Analysis and Forecasting/17th Conference on Numerical Weather Prediction, American Meteorological Society, 1-5 August 2005, Washington, DC.

Wagner, K. R., L. F. Bosart, D. Keyser, and M. S. Evans, 2005: Cool-season moderate precipitation events in the Northeastern United States. Poster presentation, 21st Conference on Weather Analysis and Forecasting/17th Conference on Numerical Weather Prediction, American Meteorological Society, 1-5 August 2005, Washington, DC.

Archambault, H., L. F. Bosart, D. Keyser and R. Grumm, 2005: Cool-season regime transition and its impact on precipitation in the Northeast. Poster presentation, NOAA 30th Annual Climate Diagnostics and Prediction Workshop, 24-28 October 2005, University Park, PA.

Archambault, H., L. F. Bosart, D. Keyser and R. Grumm, 2005: Cool-season regime transition and its impact on precipitation in the Northeastern United States. Oral presentation, The 6th Southern New England Weather Conference, 5 November 2005, Brookline, MA.

Archambault, H., L. F. Bosart, D. Keyser and R. Grumm, 2005: Cool-season regime transition and its impact on precipitation in the Northeast. Oral presentation at the Seventh Northeast Regional Operational Workshop (NROW), 1-2 November 2005, Albany, NY.

Novak, D., B. Colle, and D. Keyser, 2005: An investigation of model-simulated band placement and evolution in the 25 December 2002 Northeast U.S. Banded Snowstorm. Oral presentation at the Seventh Northeast Regional Operational Workshop (NROW), 1-2 November 2005, Albany, NY.

Greenstein, M. D., L. F. Bosart, D. Keyser, and D. J. Nicosia, 2005: Examining the role of mesoscale features in the structure and evolution of precipitation regions in northeast winter storms. Oral presentation at the Seventh Northeast Regional Operational Workshop (NROW), 1-2 November 2005, Albany, NY.

Wagner, K., L. F. Bosart, D. Keyser, and M. S. Evans, 2005: Cool-season moderate precipitation events in the Northeastern United States. Oral presentation at the Seventh Northeast Regional Operational Workshop (NROW), 1-2 November 2005, Albany, NY.

Runyon, S. C., and L. F. Bosart, 2005: A statistical analysis and synoptic climatology of heat waves over the Northeast United States. Oral presentation at the Seventh Northeast Regional Operational Workshop (NROW), 1-2 November 2005, Albany, NY.

Wasula, A. C., 2005: A multiscale snalysis of the 23-24 November 2004 Southeast United States tornado outbreak. Oral presentation at the Seventh Northeast Regional Operational Workshop (NROW), 1-2 November 2005, Albany, NY.

Archambault, H., L. F. Bosart, D. Keyser, A. Aiyyer, and R. Grumm, 2006: Cool-season regime transition and its impact on precipitation in the Northeast. Oral presentation 31st Annual Northeastern Storm Conference, 10-12 March 2006, Saratoga Springs, NY.

Bosart, L. F., 2006: The small-scale New England coastal bomb of 9 December 2005: A near-miss Hurricane Zeta? Oral presentation 31st Annual Northeastern Storm Conference, 10-12 March 2006, Saratoga Springs, NY.

Greenstein, M. D., L. F. Bosart, D. Keyser, and D. J. Nicosia, 2006: Mesoscale structure of precipitation regions in northeast winter storms. Oral presentation 31st Annual Northeastern Storm Conference, 10-12 March 2006, Saratoga Springs, NY.

Wagner, K., L. F. Bosart, and D. Keyser, 2006: Cool-season moderate precipitation events in the Northeastern United States. Oral presentation 31st Annual Northeastern Storm Conference, 10-12 March 2006, Saratoga Springs, NY.

Wasula, A. C., 2006: The diurnal variation of synoptic scale structure of cool season tornado episodes in the Southeast United States. Oral presentation 31st Annual Northeastern Storm Conference, 10-12 March 2006, Saratoga Springs, NY.

Wasula, T. A., 2006: The Thanksgiving 2004 severe weather event across upstate New York and New England. Oral presentation 31st Annual Northeastern Storm Conference, 10-12 March 2006, Saratoga Springs, NY.

Bosart, L. F. (with contributions from A. Wasula, W. Drag, and K. Meier), 2006: Strong surface fronts over sloping terrain and coastal plains. Oral presentation, St. Louis (LSX) National Weather Service Forecast Office, 15 March 2006, St. Louis, MO.

Bosart, L. F, 2006: Modern weather forecasting: A scientific and operational perspective. Guest speaker, Eastern Region MIC Conference, 28 March 2006, Raleigh, NC.

Archambault, H. M., D. Keyser, and L. F. Bosart, 2006: Cool-season regime transition and its impact on northeast precipitation. Seminar (presented by D. Keyser), Program in Atmospheres, Oceans, and Climate, Massachusetts Institute of Technology, 8 May 2006, Cambridge, MA.

Archambault, H. M., D. Keyser, and L. F. Bosart, 2006: Cool-season regime transition and its impact on major northeast precipitation events. Oral presentation, Second Annual Eastern US Weather Conference, 8 July 2006, Baltimore, MD.

Archambault, H. M., D. Keyser, L. F. Bosart, and A. Aiyyer, 2006: Cool-season regime transition and its impact on Northeast precipitation. Seminar (presented by H. Archambault), NCEP/Climate Prediction Center, 6 September 2006, Camp Springs, MD.

Grumm, R., and L. F. Bosart, 2006: Model jumpiness and the need for ensembles. Oral presentation, 31st Annual Meeting, National Weather Association, 14-19 October 2006, Cleveland, OH.

Cote, M. R., L. F. Bosart, D. Keyser, and M. L. Jurewicz, Sr., 2006: Heavy rainfall events preceding the arrival of tropical cyclones. Oral presentation at the Eighth Northeast Regional Operational Workshop (NROW), 1-2 November 2006, Albany, NY.

Wilson, P., L. F. Bosart, D. Keyser, and T. Wasula, 2006: Warm-season lake-/sea-breeze severe weather in the Northeast. Oral presentation at the Eighth Northeast Regional Operational Workshop (NROW), 1-2 November 2006, Albany, NY.

Klein, J. R., L. F. Bosart, D. Keyser, and D. Vallee, 2006: Mesoscale precipitation structures accompanying landfalling and transitioning tropical cyclones in the northeast United States. Oral presentation at the Eighth Northeast Regional Operational Workshop (NROW), 1-2 November 2006, Albany, NY.

Cote, M. R., L. F. Bosart, D. Keyser, and M. L. Jurewicz, Sr., 2007: Heavy rainfall events preceding the arrival of tropical cyclones. Oral presentation, 32nd Annual Northeastern Storm Conference, 9-11 March 2007, Springfield, MA.

Klein, J. R., L. F. Bosart, D. Keyser, and D. Vallee, 2007: Mesoscale precipitation structures accompanying landfalling and transitioning tropical cyclones in the Northeast United States. Oral presentation, 32nd Annual Northeastern Storm Conference, 9-11 March 2007, Springfield, MA.

Wilson, P., L. F. Bosart, D. Keyser, and T. A. Wasula, 2007: Warm-season lake-/sea-breeze severe weather in the Northeast. Oral presentation, 32nd Annual Northeastern Storm Conference, 9-11 March 2007, Springfield, MA.

Cote, M. R., L. F. Bosart, D. Keyser, and M. L. Jurewicz, Sr., 2007: Heavy rainfall events preceding the arrival of tropical cyclones. Oral presentation, National Weather Service Spring Workshop, Binghamton, NY, 27 March 2007, Binghamton, NY.

Klein, J. R., L. F. Bosart, D. Keyser and D. Vallee, 2007: Mesoscale precipitation structures accompanying landfalling and transitioning tropical cyclones in the Northeast United States. Oral presentation, 22nd Conference on Weather Analysis and Forecasting/18th Conference on Numerical Weather Prediction, American Meteorological Society, 25-29 June 2007 Park City, UT.

Cote, M. R., L. F. Bosart, D. Keyser, and M. L. Jurewicz Sr., 2007: Heavy rainfall events preceding the arrival of Tropical Cyclones. Oral presentation, 22nd Conference on Weather Analysis and Forecasting/18th Conference on Numerical Weather Prediction, American Meteorological Society, 25-29 June 2007 Park City, UT.

Wilson, P., L. F. Bosart, D. Keyser, and T. Wasula, 2007: Warm-season lake-/sea-breeze severe Weather in the Northeast. Oral presentation, 22nd Conference on Weather Analysis and Forecasting/18th Conference on Numerical Weather Prediction, American Meteorological Society, 25-29 June 2007 Park City, UT.

Cote, M. R., L. F. Bosart, D. Keyser, and M. L. Jurewicz, 2007: Predecessor rain events in tropical cyclones. Oral presentation, 12th Conf. on Mesoscale Processes, American Meteorological Society, 9 August 2007, Waterville Valley, NH.

Klein, J. R., L. F. Bosart, D. Keyser, and D. Vallee, 2007: Mesoscale precipitation structures accompanying landfalling and transitioning tropical cyclones in the Northeast United States. Oral presentation, 12th Conf. on Mesoscale Processes, American Meteorological Society, 9 August 2007, Waterville Valley, NH.

Wilson, P. H., L. F. Bosart, D. Keyser, and T. A. Wasula, 2007: Warm-season lake-/sea-breeze severe weather in the Northeast. Oral presentation at the 32nd Annual National Weather Association Meeting, 13-18 October 2007, Reno, NV.

Bosart, L. F., D. Keyser, S. Weiss, R. Schneider, M. Cote, D. DeLuca, T. Fracasso, J. Klein, and A. C. Wasula, 2007: Lessons learned from CSTAR/COMET-sponsored research on convective storms and heavy rains. Invited speaker at the 32nd Annual National Weather Association Meeting, 13-18 October 2007, Reno, NV.

Wilson, P., L. F. Bosart, D. Keyser, and T. Wasula, 2007: Warm-season lake-/sea-breeze severe weather in the Northeast. Oral presentation at the Ninth Northeast Regional Operational Workshop (NROW), 7-8 November 2007, Albany, NY.

Cote, M. R., L. F. Bosart, D. Keyser, and M. L. Jurewicz, Sr., 2007: Predecessor rain events in tropical cyclones. Oral presentation at the Ninth Northeast Regional Operational Workshop (NROW), 7-8 November 2007, Albany, NY.

Bosart, L. F., D. Keyser, M. R. Cote, J. Klein, and D. DeLuca, 2007: CSTAR tropical cyclone-related research at the University at Albany/SUNY. Invited presentation at the National Centers for Environmental Prediction, 5 December 2007, Washington, DC.

Bosart, L. F., K. Corbosiero, M. R. Cote, and T. J. Galarneau, Jr., 2008: Mesoscale structures within transient synoptic-scale systems: Science and forecast challenges. Invited presentation at the First US-China Symposium on Meteorology: Mesoscale Meteorology and Data Assimilation, 27 February 2008, National Weather Center, Norman, OK.

Bosart, L. F., T. J. Galarneau, Jr., and A. C. Wasula, 2008: Modern weather forecasting: Where do we stand and where do we need to go? Invited presentation, 33rd Annual Northeastern Storm Conference, 14-16 March 2008, Springfield, MA.

Augustyniak, M., and L. F. Bosart, 2008: Flow channeling in the Mohawk and Hudson Valleys: A multiscale case study of surface flow convergence. Oral presentation, 33rd Annual Northeastern Storm Conference, 14-16 March 2008, Springfield, MA.

Bosart, L. F., T. J. Galarneau, Jr., and A. C. Wasula, 2008: Modern weather forecasting: Where do we stand and where do we need to go? Invited presentation, 12th Annual Russell L. DeSouza Banquet, Department of Earth Sciences, Millersville University, 16 April 2008, Millersville, PA.

Cote, M. R., L. F. Bosart, and D. Keyser, 2008: Predecessor rain events in tropical cyclones. Oral presentation, 28th Conference on Hurricanes and Tropical Meteorology, American Meteorological Society, 27 April - 2 May 2008, Orlando, FL.

Bosart, L. F., and K. Meier, 2008: Front-mountain interactions in the long-lived, intense surface front of 28 February through 4 March 1972 over the United States. Oral Presentation, 13th Conference on Mountain Meteorology, American Meteorological Society, 11-15 August 2008, Whistler, Canada.

Bosart, L. F., M. Cote, T. J. Galarneau, Jr., and A. Srock, 2008: Troublesome precipitation events: A challenge for models and humans alike. Invited seminar, Earth System Research Laboratory, ESRL/PSD Seminar Series, 5 June 2008, Boulder, CO.

Bosart, L. F., J. C. Cordeira, and T. J. Galarneau, Jr., 2008: Modern weather forecasting: A status report and scientific opportunities." Invited seminar at GERT Joint Program in Applied Mathematics and Earth and Environmental Sciences, Columbia University, 9 October 2008, New York, NY.

Keyser, D., H. M. Archambault, and L. F. Bosart, 2008: Relationships between large-scale regime transitions and major cool-season precipitation events in the Northeast U.S. Oral presentation at the 14th Cyclone Workshop, 21-26 September 2008, Hôtel Mont Gabriel, Sainte-Adèle, Quebec, Canada.

Wasula, T. A., P. H. Wilson, L. F. Bosart, D. Keyser, and R. L. Tracey, 2008: A comparison of two lake breeze severe events with a threat checklist application. Poster presentation at the American Meteorological Society 24th Conference on Severe Local Storms, American Meteorological Society, 27-31 October 2008, Savannah, GA.

Wasula, T. A., N. A. Stuart, and A. C. Wasula, 2008: The 17 February 2006 severe weather and high wind event across Eastern New York and New England. Oral presentation at the 24th Conference on Severe Local Storms, American Meteorological Society, 27-31 October 2008, Savannah, GA.

Galarneau, T. J. Jr., and D. Keyser, 2008: Use of the nondivergent wind for diagnosing banded precipitation systems. Oral presentation at the Tenth Northeast Regional Operational Workshop (NROW), 5-6 November 2008, Albany, NY.

Scalora, M. A., L. F. Bosart, D. Keyser, N. A. Stuart, and T. A. Wasula, 2008: A diagnostic analysis of a difficult-to-forecast cutoff cyclone from the 2008 warm season. Oral presentation at the Tenth Northeast Regional Operational Workshop (NROW), 5-6 November 2008, Albany, NY.

Bosart, L. F., 2008: The "spin" on the active part of the 2008 North Atlantic hurricane season: Large-scale storm interations and mesoscale forecast challenges posed by inland flooding. Oral presentation (invited) at the NOAA/AOML/HRD, 15 December 2008, Miami, FL.

Bosart, L. F., 2009: Just how good are weather forecasts these days: Challenges and opportunities. Oral presentation (invited) at the AMS Southeastern Coastal and Atmospheric Processes Symposium (SeCAPS), 27-28 February 2009, Mobile, AL.

Bosart, L. F., T. J. Galarneau, Jr., and J. M. Cordeira, 2009: Storm-storm and storm-environment interations during the 2008 North Atlantic hurricane season. Oral presentation at the 34th Annual Northeastern Storm Conference, 6-8 March 2009, Springfield, MA.

Scalora, M. A., L. F. Bosart, and D. Keyser, 2009: An analysis of a high impact 500-hPa cutoff cyclone from the 2008 warm season. Oral presentation at the 34th Annual Northeastern Storm Conference, 6-8 March 2009, Springfield, MA.

Bosart, L. F., H. M. Archambault, T. J. Galarneau, Jr., and J. M. Cordeira: 2009: Modern weather forecasting: Scientific opportunities and operational challenges. The Robert D. Cess lecture (invited), 1 April 2009, University at Stony Brook, SUNY, Stony Brook, NY.

Galarneau, T. J., Jr., L. F. Bosart, D. Keyser, and R. S. Schumacher, 2009: A review of recent UAlbany CSTAR research on warm-season precipitation systems including predecessor rain events ahead of tropical cyclones. Oral presentation at the 1st NOAA Testbed USWRP Workshop, 28-29 April 2009, Boulder, CO.

Asuma, J. V., L. F. Bosart, and D. Keyser, 2009: Cool-season severe weather in the northeast U.S. Poster presentation at the 23rd Conference on Weather Analysis and Forecasting/19th Conference on Numerical Weather Prediction, 1-5 June 2009, Omaha, NE.

Bosart, L. F., H. Archambault, and J. M. Cordeira, 2009: Linked extreme weather events: Severe cold and record-breaking rains in Mexico and disruptive wildfires in California in late October 2007. Oral presentation at the 23rd Conference on Weather Analysis and Forecasting/19th Conference on Numerical Weather Prediction, 1-5 June 2009, Omaha, NE.

Galarneau, T. J., Jr., L. F. Bosart, and R. S. Schumacher, 2009: The life-cycle of tropical storm Erin (2007): Genesis, postlandfall reintensification, and widespread heavy rain. Oral presentation at the 23rd Conference on Weather Analysis and Forecasting/19th Conference on Numerical Weather Prediction, 1-5 June 2009, Omaha, NE.

Moore, B. J., L. F. Bosart, and D. Keyser, 2009: A predecessor rain event over the Upper Midwest associated with Tropical Cyclone Rita (2005). Poster presentation at the 23rd Conference on Weather Analysis and Forecasting/19th Conference on Numerical Weather Prediction, 1-5 June 2009, Omaha, NE.

Scalora, M. A., L. F. Bosart, and D. Keyser, 2009: An analysis of a high impact 500-hPa cutoff cyclone from the 2008 warm season. Oral presentation at the 23rd Conference on Weather Analysis and Forecasting/19th Conference on Numerical Weather Prediction, 1-5 June 2009, Omaha, NE.

Bosart, L. F., and T. J. Galarneau, Jr., 2009: An overview of predecessor heavy rain events associated with landfalling tropical cyclones. Oral presentation at the Conference on the Inland Impacts of Tropical Cyclones, 10-12 June 2009, Atlanta, GA.

Jurewicz, M. L. Sr., M. Cote, L. F. Bosart, and D. Keyser, 2009: A study of predecessor rainfall events (PRE) in advance of tropical cyclones. Oral presentation at the Conference on the Inland Impacts of Tropical Cyclones, 10-12 June 2009, Atlanta, GA.

Moore, B. J., L. F. Bosart, and D. Keyser, 2009: A comparison of significant predecessor rain events associated with Tropical Cyclone Rita (2005) and Tropical Cyclone Erin (2007). Oral presentation at the Conference on the Inland Impacts of Tropical Cyclones, 10-12 June 2009, Atlanta, GA.

Bosart, L. F., 2009: An overview of predecessor heavy rain events associated with landfalling tropical cyclones. Invited seminar, Department of Atmospheric and Oceanic Sciences, University of Wisconsin at Madison, 21 September 2009, Madison, WI.

Asuma, J. V., L. F. Bosart, D. Keyser, J. S. Quinlan, T. A. Wasula, H. W. Johnson, and K. S. Lipton, 2009: Cool-season high wind events in the northeast. Oral presentation at the Northeast Regional Operational Workshop XI (NROW), 4-5 November 2009, Albany, NY.

Bosart, L. F., T. J. Galarneau, Jr., J. M. Cordeira, and B. J. Moore, 2009: Predecessor rain events ahead of TC Ike and TC Lowell on 11-14 September 2008. Oral presentation at the Northeast Regional Operational Workshop XI (NROW), 4-5 November 2009, Albany, NY.

Moore, B. J., L. F. Bosart, D. Keyser, M. L. Jurewicz, Sr., 2009: Synoptic environments associated with predecessor rain events in advance of landfalling tropical cyclones. Oral presentation at the Northeast Regional Operational Workshop XI (NROW), 4-5 November 2009, Albany, NY.

Payer, M., L. F. Bosart, D. Keyser, N. A. Stuart, and T. A. Wasula, 2009: Analysis of precipitation distributions associated with two cool-season cutoff cyclones. Oral presentation at the Northeast Regional Operational Workshop XI (NROW), 4-5 November 2009, Albany, NY.

Bosart, L. F., H. M. Archambault, and J. M. Cordeira, 2010: Upstream North Pacific "mischief" and downstream extreme weather during December 2009 and January 2010. Oral presentation at the 35th Annual Northeastern Storm Conference, 5-7 March 2010, Saratoga Springs, NY.

Moore, B., L. F. Bosart, D. Keyser and M. L. Jurewicz, Sr., 2010: Mechanisms for the development of predecessor rain events in advance of landfalling tropical cyclones. Oral presentation at the 35th Annual Northeastern Storm Conference, 5-7 March 2010, Saratoga Springs, NY.

Asuma, J. V., L. F. Bosart, D. Keyser, J. S. Quinlan, T. A. Wasula, H. W. Johnson, and K. S. Lipton, 2010: Cool-season high wind events in the Northeast. Oral presentation at the 35th Annual Northeastern Storm Conference, 5-7 March 2010, Saratoga Springs, NY.

Payer, M., L. F. Bosart, D. Keyser, N. A. Stuart, and T. A. Wasula, 2010: Analysis of the precipitation distribution associated with the 1-4 January 2010 hPa cutoff cyclone. Oral presentation at the 35th Annual Northeastern Storm Conference, 5-7 March 2010, Saratoga Springs, NY.

Payer, M., D. Keyser, N. A. Stuart, and T. A. Wasula, 2010: Analysis of the precipitation distribution associated with the 1–4 January 2010 500 hPa cutoff cyclone. Oral presentation at the 35th Annual Northeastern Storm Conference, 5-7 March 2010, Saratoga Springs, NY.

Moore, B. J., L. F. Bosart, D. Keyser, and M. L. Jurewicz, 2010: Mechanisms for predecessor rain events ahead of tropical cyclones. Invited presentation at the 2nd NOAA Testbed USWRP Workshop, 4-5 May 2010, Boulder, CO.

Moore, B. J., L. F. Bosart, D. Keyser, and M. L. Jurewicz, 2010: Mechanisms for predecessor rain events in advance of tropical cyclones. Oral presentation at the NOAA/NWS Eastern Region Flash Flood Conference, 2-4 June 2010, Wilkes-Barre, PA.

Payer, M., L. F. Bosart, D. Keyser, N. A. Stuart, and T. A. Wasula, 2010: Forecasting heavy precipitation associated with cool-season 500-hPa cutoff cyclones in the Northeast. Oral presentation at the NOAA/NWS Eastern Region Flash Flood Conference, 2-4 June 2010, Wilkes-Barre, PA.

Wasula, T. A., N. A. Stuart, M. A. Scalora, L. F. Bosart, and D. Keyser, 2010: An application of a cutoff low forecaster pattern recognition model in the 30 June – 2 July 2009 significant event for the Northeast. Poster presentation at the American Meteorological Society 25th Conference on Severe Local Storms, 11-15 October 2010, Denver, CO.

Moore, B. J., L. F. Bosart, D. Keyser, and M. L. Jurweicz, Sr., 2010: Synoptic-scale environments and dynamical processes associated with predecessor rain events ahead of tropical cyclones. Oral presentation at Cooperative Institute for Research in the Environmental Sciences, University of Colorado, Boulder, CO, 25 October 2010.

Moore, B. J., L. F. Bosart, D. Keyser, and M. L. Jurewicz, Sr., 2010: Synoptic and mesoscale process associated with predecessor rain events ahead of tropical cyclones. Oral presentation at The Twelfth Northeast Regional Operational Workshop (NROW) 3-5 November 2010, Albany, NY.

Moore, B. J., L. F. Bosart, D. Keyser, and M. L. Jurewicz, Sr. 2011: Synoptic-scale environments and dynamical mechanisms associated with predecessor rain events ahead of tropical cyclones. Oral presentation at the 24th American Meteorological Society Weather Analysis and Forecasting Conference at the 91st American Meteorological Society Annual Meeting, 23-27 January 2011, Seattle, WA.

Bosart, L. F., 2011: Briefing on Winter Wonderland: Extremes, hazards, and blackouts – What gives? Invited oral presentation at the briefing sponsored by the University Corporation for Atmospheric Research, the American Geophysical Union, and The Weather Coalition, 2 March 2011 at the Senate Office Building, Capitol Hill, DC.

Bosart, L. F., 2011: Modern weather forecasting: a personal perspective. Invited keynote speaker at the 2nd Great Lakes Atmospheric Science Symposium (GLASS), 16 April 2011, SUNY-Oswego, Oswego, NY.

Potter, M., L. F. Bosart, and D. Keyser 2011. A multiscale analysis of the inland reintensification of Tropical Cyclone Danny (1997) within an equatorward jet-entrance region. Oral presentation at the American Meteorological Society 14th Conference on Mesoscale Processes, 1–4 August 2011, Los Angeles, CA.

Castellano, C. M., L. F. Bosart, D. Keyser, and J. Quinlan 2011: Climatological aspects of freezing rain in the eastern United States. Poster presentation at the American Meteorological Society, 14th Conference on Mesoscale Processes, 1–4 August 2011, Los Angeles, CA.

Thompson, D. B., L. F. Bosart, D. Wasula, T. A. Wasula, and M. Kramar 2011: Characteristics and climatology of Appalachian lee troughs. Poster presentation at the American Meteorological Society, 14th Conference on Mesoscale Processes, 1–4 August 2011, Los Angeles, CA.

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d) CSTAR/COMET related refereed publications:

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Bosart, L. F., A. C. Wasula, W. H. Drag, and K. W. Meier, 2008: Strong surface fronts over sloping terrain and coastal plains. *Fred Sanders Monograph*, L. F. Bosart and H. B. Bluestein, Eds., *Meteor. Monogr.*, **33,** No. 55, Amer. Meteor. Soc., 35–85.

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Galarneau, T. J., Jr., L. F. Bosart, and R. S. Schumacher, 2010: Predecessor rain events ahead of tropical cyclones. *Mon Wea. Rev.*, **138**, 3272-3297.

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SECTION 3: Report by Warren R. Snyder (NWS Perspective)

CSTAR: 1 May 2011 – 31 October 2011

National Weather Service Perspective

Warren R. Snyder, Science & Operations Officer

Science & Operations Officer

WFO Albany, New York

The CSTAR IV project "***The Cooperative Research with the National Weather Service on Cool and Warm-Season Precipitation Forecasting over the Northeastern United States***" is fully engaged, with most projects up and running. The level of interaction between the graduate students and NWS Focal Points and has been excellent.

Graduate students Chris Castellano ("Ice *Storms and Freezing Precipitation"*) and Dan Thompson (*Deep Convection, Severe Weather, and Appalachian Lee Troughs)* have worked on their projects for over a year. These projects have completed literature review, identified cases and data sets, and presented some findings. A freezing rain climatology has been completed for the Eastern United States. Dan Thompson has focused his initial work on the Appalachian Lee Troughs focus of his project. He has stratified the data into northern and southern groupings, and is well on the way to developing the climatology of events.

In addition UAlbany has leveraged an NCEP/UCAR project with student Matthew Potter into a CSTAR project on the topic of re-intensification of Tropical Cyclones over land as a result of jet streak interactions. The initial research applied to TS Danny and a comparison to Hurricane Camille's (1969) evolution over land. Other TCs that redeveloped over land will be investigated.

Matthew is affiliated with the *"Mesoscale Precipitation Substructures Associated with Convective Systems that Cause Flash Floods"* project. Joe Villani has completed preliminary work on other focuses of this project. Joe completed the development of Flash Flood Potential Index values for all the river basins and sub-basins in the ALY CWA. Further work on this focus of the project will have to wait another year, to fund a graduate student.

Graduate student Jaymes Kenyon has identified his project as the "*Mesoscale Substructure in Winter Storms."* He is still identifying his primary focus. Initial exploratory work was focused on Gravity Waves, but he is likely to shift his focus to a further investigation of Mesoscale Banding with a focus on improving predictability of where and when bands occur.

Several of the Collaborative projects have moved along nicely. The Inland Extent of Lake Effect Snow Bands has been completed. AWIPS applications have been developed and are being tested/verified at ALY and BGM. The "Development of Warning Thresholds for One Inch or Greater Hail in the Albany New York County Warning Area" has been published as ER Tech Attachment 2011-05 in August 2011. Brian Frugis has begun work on laying the ground work

for the Major Focus Project "Using 8bit Products and Dual Pol WSR88D data sets" to improve tornado warnings, and updating the V/R Shear Criteria from the work sets originally developed by Lapenta et al.

The comparison of WFO ALY and ER office TAF performance versus MOS study was completed with UAlbany undergraduate Interns contributing significantly to this work. UAlbany Interns have participated in, or are participating in other projects to: Transfer AWIP procedures to AWIPS II, El Nino/La Nina Impacts in Northeast, Accuracy of ALB Contractor Obs with respect to Thunderstorms, Southern Mohawk Convergence Zones, Verification Studies, Hydrology Verification, and others.

One completed CSTAR project "Warm Season Cut Off Lows" has been developed into Articulate Teletraining and is in review at SSD. Another completed CSTAR project will be developed soon. The Articulate software required an upgrade when NWS went to office 2010. ER SSD purchased this upgrade and it will be used to convert the current and develop future teletraining.

The Fall CSTAR meeting was hosted at the NWS office in Albany, New York, November 4, 2011. The meeting was attended by NWS staff members, the three CSTAR Principal Investigators, and the CSTAR graduate students. Project reports and plans were presented

CSTAR continues to provide a large payback to the NWS for the modest amounts expended.
This grant's projects continue to build on CSTAR's legacy of completing operationally focused research, engaging the academic community at a high level, providing the NWS with top quality applicants, and enabling the involvement of dozens of operational meteorologists in applied research and conferences from numerous offices. CSTAR resources in the NWS Collaborative and Associate Projects of this grant also raise the level and sophistication of involvement by UAlbany undergraduates in support of the CSTAR and NWS research.

SECTION 4: NWS Semi-Annual Reports

(a) Semi-annual Report

CSTAR IV Research (1 May 2011 – 31 October 2011)

Focal Point Leader(s): Thomas A. Wasula, NOAA/ NWS Albany, NY
Matt Kramar, NOAA/NWS Sterling, VA
Contributors: Brian Frugis, NWS Albany, NY
Nelson Vaz, NWS New York, NY
Mike Evans and Mike Jurewicz, NWS Binghamton, NY
Joe Dellicarpini, NOAA/NWS Taunton, MA
Mike Ekster, NOAA/NWS Gray, ME
Dr. Lance Bosart and Dr. Daniel Keyser, SUNYA at Albany
Warren Snyder, NOAA/NWS Albany, NY

Research Focus: ***Deep Convection, Severe Weather, and Appalachian Lee Troughs***

a. Understanding the role of Appalachian lee troughs in the organization of convection and its severity. Develop methodologies and conceptual models to identify and forecast regionally, specific significant events.
b. Utilize new 8bit products and Dual Polarization (Dual Pol) WSR88D datasets after the April 2012 installation, in the development of warning criteria for 1 inch hail, and update V/R shear criteria developed by LaPenta et al. in identifying tornadic thunderstorms.

I. Project Activities and Work Done

- Dan Thompson, SUNYA Master's CSTAR student, gave a presentation at the May 6, 2011 mid-year CSTAR meeting. It was on the progress so far on this Appalachian Lee Trough (ALT) work, which involved defining the trough in a domain, and building a climatology from 2000-09. Tom was not able to attend the morning meeting, since he had finished a midnight shift.

- Tom e-mailed Dan several potential pre-frontal trough cases from the 2011 warm season. Most notably, the June 1, 2011, and June 8-9, 2011 were applicable cases in the Northeast sent to Dan.

- Dan met with Tom on July 20th to discuss his research progress. He went over some summary PowerPoints on the progress of his research. He also reviewed his poster that he gave at the 14th AMS Mesoscale Processes Conference in Los Angeles 1-4, August 2011. The poster was titled "Characteristics and Climatology of Appalachian Lee Troughs". A few of the key findings were: Appalachian Lee Troughs (ALTs) 1.) Exhibit four distinct low-level mesoscale features: wind component orthogonal to and downslope of mountains, thickness ridge, thermal

vorticity minimum, and geostrophic relative vorticity maximum (mainly warm-core and shallow to 700 hPa), 2.) Tend to form between 1800-0000 UTC tied to the diurnal cycle, 3.) Are much more likely in June, July, and August, than in May or September and 4.) Category 2 with no Prefrontal Trough is the most common.

- Several e-mails were exchanged from May to October between Tom, Dan, Matt, Lance and Dan on how to proceed on the storm reports with ALT's. There is definitely a population bias (a correction was attempted on Alicia Wasula's Northeast refereed severe weather work), but it didn't work too well. Storm reports were counted closest to the 1800 UTC and 0000 UTC time frame. Large and small severe events are being composited to see how to determine very active vs. less active ALT severe events. The objective tracking method is not working well in the Northeast. Pre-frontal troughs (PFT's) may have to be tracked subjectively by looking through HPC hand analyses since 2000. Northeast PFT's are more cold core, and do not show up well in the 0.5° Climate Forecast System Reanalysis 6-hr data.

- Dan went has summary PowerPoints on his progress and results from June, July and Sept/OCT on his student web-site. The web-site is:
http://www.atmos.albany.edu/student/dthompso/docs.html

- A SUNYA undergraduate student, Brian Castellano, helped put together a tornado climatology spread sheet database for states in the Upper Mid-Atlantic Region and Northeast from 1981-2010 for Tom Wasula and Brian Frugis during this summer. This database will be used over the next few years to develop improved tornado warning guidance in the Northeast. The Binghamton WFO had a Hollings Scholar, Tim Humphrey, working on a tornado project this summer. He will be giving a talk on his research at NROW XIII entitled "A Study of Convective Modes Associated with Tornadoes in Central New York and Northeast Pennsylvania". Brian Frugis will also be giving a talk at the conference on a tornado case study this past September and outline the reason for updating the ALY tornado warning guidance. His talk will be "The 4 September 2011 Tornado in Eastern New York: An Example for Updating Tornado Warning Strategies".

- Mike Evans from BGM, Joe Dellicarpini from BOX and Tom Wasula will be giving case study talks involving severe weather associated with pre-frontal troughs at NROW XIII. Mike's talk will be "The April 28, 2011 Early-morning Tornado and Flash Flood Event in Central New York and Northeast Pennsylvania". Joe's talk will discuss "The Massachusetts Tornado Outbreak of June 1, 2011", and Tom's will be "The June 1, 2011 Hail Monster Event across Eastern New York and Western New England". These talks will be listed in the next CSTAR report (since they are in November). Matt Kramar from LWX will be giving a couple of severe weather talks at NROW XIII too, one which is titled "Applying Conceptual Models for Non-mesocyclonic Tornadoes in QLCS's to NWS Damage Surveys"

- Brian Frugis (lead author) and Tom completed an Eastern Region tech attachment on "Developing Warning Criteria for One Inch or Greater Hail in the Albany New York County Warning Area". The article was completed in late August and is sited below.

- Tom and Neil continue to work on deliverables for past CSTAR projects. A teletraining session is under review by Eastern Region SSD on Matt Scalora's, M.S. thesis entitled "Forecasting Distributions of Warm-Season Precipitation and Severe Weather Associated with 500-hPa Cutoff Cyclones". Tom and Neil also have a draft for a potential paper, which is being revised at this time, and hopefully will make further progress next year. Work will begin on Melissa Payer's Cool Season Cutoff Low results for a teletraining session in 2012.

II. Presentations on CSTAR IV Related Research (NOV 2010 – OCT 2011)

Frugis, B. J., 2010. Use of the Albany Hail Study to Predict Large Hail During the 21 July 2010 Severe Weather, Albany, NY, November 3-5, 2010.

Kramar, M. R., 2010. A "Survey" of Tornadoes and their Environments in the WFO Sterling, VA Forecast Area", 12th Northeast Operational Workshop, Albany, NY, November 3-5, 2010.

Wasula, T.A., 2010. The May 26-27, 2010 Eastern New York and Western New England Significant Severe Weather Event, 12th Northeast Operational Workshop, Albany, NY November 3-5, 2010.

III. Publications on CSTAR IV Related Research (MAY 2011 – OCT 2011)

Frugis, B.J., T. A. Wasula, 2011. Development of Warning Thresholds for One Inch or Greater Hail in the Albany New York County Warning Area, *Eastern Region Tech Attachment*, **No 2011-05**, National Weather Service, NOAA, Department of Commerce, 24 pp., Bohemia, NY.

(b) **Semi-annual Report**

CSTAR IV Research (1 May 2011 – 31 October 2011)

Focal Point Leader: John S. Quinlan, NWS Albany, NY

NWS Contributor: Kevin Lipton, NWS Albany, NY

NWS Contributor: Paul Sisson, NWS Burlington, VT

NWS Contributor: Todd Lerichos, NWS Caribou, ME

NWS Contributor: Robert LaPlante, NWS Cleveland, OH

NWS Contributor: Mike Cempa, NWS Gray, ME

NWS Contributor: David Glenn, NWS Gray, ME

NWS Contributor: Stacie Hanes, NWS Gray, ME

NWS Contributor: Dan St. Jean, NWS Gray, ME

NWS Contributor: Hayden Frank, NWS Taunton, MA

Dr. Lance Bosart, University at Albany

Dr. Daniel Keyser, University at Albany

Warren Snyder, NWS Albany, NY

Research Focus*: Ice Storms and Freezing Precipitation* - Understanding the environments that produce Ice Storms, development of forecast climatologies and methodologies to forecast and identify significant Ice Storm events. Across the Northeast United States and Southeastern Canada these events have the greatest potential to cause societal disruption, massive damage to utility grids, and economic disruption. The Northeast United States has the greatest frequency of these events in the nation.

I. Project Activities and Work Done

- John attended the annual Spring CSTAR meeting, which was May 6, 2011. This project was discussed, in terms of the initial research that Christopher Castellano would be doing towards creating a long term climatology of freezing rain for the eastern United States. John mentioned the work that has been done at the Cold Regions Research and Engineering Laboratory (CRREL) in Hanover, NH on Significant Ice Storms and their Ice Storm GIS page: http://cmep.crrel.usace.army.mil/ice. This site should be able to help with the identification of the major ice storms which have impacted the study area. In addition, John mentioned that research presented at the Ice Storm Workshop held at the Hubbard Brook Experimental Forest in New Hampshire on April 12, 2011 supported the different Ice Storm Warning criteria that currently exist in the eastern United States (greater than or equal to 0.50" for New York and all of New England as well as a small portion of northeast Pennsylvania and northern New Jersey, and greater than or equal to 0.25" for the remainder of the eastern United States). Different species of trees have different vulnerability ratings to ice storms and generally those tree species found farther south can withstand less ice accretion. It was also decided at the meeting that the CRREL Ice Storm GIS Page and Storm

Data would be used to determine the Ice Storm events to study once the long term climatology of freezing rain events for the eastern United States was completed.

- John, Kevin and Stacie created Excel spreadsheets of potential Ice Storm events to be included in the study for the Albany, NY and Gray, ME County Warning Areas. It was apparent early on what a daunting task it would be to identify all of the Ice Storm events across the northeastern United States as few measurements of ice accretion exist for most freezing rain events and even the descriptions of Ice Storm events in Storm Data do not always list damage that occurred from the weight of the ice, but rather descriptive terms such as heavy ice accretion or significant ice accretion are often used.

- John met with Chris several times over the summer. More meetings were not possible due to numerous significant and record breaking weather events as well as summer leave. The first of these meetings took place on August 10, 2011 during which Chris presented his 35 year (1975-2010) climatology of freezing rain/freezing drizzle occurrence which was completed earlier in the summer. John and Chris also formulated a plan to extract as many cases Ice Storm events as possible from Storm Data using Ice Storm Identification guidelines which focused on how the event was listed in Storm Data, any mention of actual ice accretion, any listing of damage as well as description of the ice accretion (significant or heavy). For this meeting as well as subsequent meetings it has been a major point of discussion as to what actually defines an ice storm and the societal impact of freezing rain events in general. Additional meetings between John and Chris were held on August 22nd (Kevin was also present) and on September 20th. At both of these meetings it became apparent that just identifying the events was a tall order as well as the magnitude of the events in terms of impact and geographic extent. It was decided that an additional meeting with Lance and Dan was needed.

- John and Kevin met with Chris, Lance and Dan on October 5, 2011. This meeting was primarily to discuss how best to identify the Ice Storm events to be studied in terms of ice accretion, societal impact and geographic extent. It was agreed upon that events which produced ice accretion reaching the Ice Storm Warning thresholds (0.25" south and 0.50" north) as well as those events which produced damage would be considered Ice Storm events. In addition it was agreed upon that those events producing lesser ice accretion and little if any damage should be studied since they have a great societal impact with respect to transportation (hazardous travel conditions). These lesser events would be mainly those events which produce a Trace to 0.25" of ice accretion. The geographic extent (spatial characteristics) of ice storms would best be handled by looking at the events on a CWA basis and then grouping those events into several categories (Localized, Regional and Synoptic-scale). In doing this the smaller scale events which are likely tied to mesoscale features are not excluded, and the synoptic-scale features of the larger events likely not dampened. The next phase of the project will focus on identifying significant freezing rain events based on duration, ice accretion/damage, spatial characteristics, and thermal structure. Also, providing forecasters with greater situational awareness of synoptic-scale and mesoscale processes that modulate the evolution of freezing rain events.

II. Presentations on CSTAR IV Related Research (MAY 2011 – OCT 2011)

Castellano, C. M., L. F. Bosart and D. Keyser, 2011. Climatological aspects of freezing rain events in the eastern United States, 14th AMS Conference on Mesoscale Processes, Los Angeles, CA, August 1-4, 2011.

********************Presentations Prior to May 2011***********************************

Quinlan, J.S., K.S. Lipton, 2011. A 16 Year Climatology of Ice Storms in WFO Albany's County Warning Area and a Comparison of Two Recent Events, ISE Workshop, Hubbard Brook Experimental Forest, NH, April 12, 2011.

Lipton, K.S., J.S. Quinlan, 2010. A 16 Year Climatology of Ice Storms in WFO Albany's County Warning Area and a Comparison of Two Recent Events, 12th Northeast Operational Workshop, Albany, NY, November 3-5, 2010.

Lipton, K.S., J.S. Quinlan, 2010. A 16 Year Climatology of Ice Storms in WFO Albany's County Warning Area and a Comparison of Two Recent Events, 3rd Tri-State Weather Conference, Danbury, CT, October 9, 2010.

Quinlan, J.S., K.S. Lipton, 2010. A 16 Year Climatology of Ice Storms in WFO Albany's County Warning Area and a Comparison of Two Recent Events, HPC Visiting Forecaster Program Presentation, Camp Springs, MD, September 23, 2010.

Quinlan, J.S., K.S. Lipton, 2010. A 16 Year Climatology of Ice Storms in WFO Albany's County Warning Area and a Comparison of Two Recent Events, 67th Eastern Snow Conference, Hancock, MA, June 8-10, 2010.

Lipton, K.S., J.S. Quinlan, 2010. A 16 Year Climatology of Ice Storms in WFO Albany's County Warning Area and a Comparison of Two Recent Events, 35th Northeastern Storm Conference, Saratoga Springs, NY, March 5-7, 2010.

(c) Status of "Snyder Proposal" Projects

Department of Commerce
NOAA, National Weather Service
251 Fuller Rd. Suite B-300
Albany, NY 12203-3640

November 8, 2011

MEMORANDUM FOR: Lance F. Bosart

FROM: Warren R. Snyder
SOO, WFO, Albany, NY
(W/Input from Project Focal Points)

SUBJECT: Status of Collaborative and Associate Projects in CSTAR IV

1. Overview

a. Actual project descriptions are in CSTAR Proposal.

2. Collaborating Projects

a. ***ALY Decision Support Services Project (DSS)*** **-** A study assessing DSS provided to New York State Office of Emergency Management (OEM). Provided support via the following approaches, telephone or NAWAS Briefing, live web briefing/in house briefing, webinar, live virtual briefing, or in person at OEM Emergency Operations Center. The level of briefing is contingent on the situation. Study will assess techniques and technologies used, and the effectiveness of the project on OEM's operations. Develop best practices. Project lead completed ICS training, and briefings have been supplied for several events, however staffing limited the ability to be onsite for Irene and Lee. With the installation of audio equipment NWS operations area, it is hoped that this video technology with be supplemented with a purchase of a web-cam and associated software will increase the number of briefings.

i) Lead – Brian Montgomery (ALY)

b. ***Integrating Social Science Into Operations*** – Initial contact Dr. Tom Stewart, Director, Center for Policy Research and Research Professor has retired. This project has been shelved.

i) Lead – Neil Stuart (ALY)
ii) Team – Raymond O'Keefe (ALY), Steve DiRienzo (ALY)

c. **Establishing Criteria for Warning on 1 Inch Hail** –

i) Project is completed. Comprehensive study of several seasons of hail events over the ALY CWA, testing numerous criteria. These included height of 50, 55, 60 and 65 dBZ, Echo Top (ET), height of the 50 dBZ above the -20° C

isotherm, Gridded VIL and Storm Echo Top, VIL Density, and others. Study was very successful at identifying criteria with high correlations. These were tested during the 2010 convective season. Results have been presented at NROW XI, NROW XII, ER Radar and Severe Weather Workshop, and 3rd Tri State Weather Conference. Project results published as ER Tech attachment 2011-05.

a) Lead – Brian Frugis (ALY)
b) Participants –Rihaan Gangat (ALY STEP) & Tom Wasula

d. ***Applications of Mesoscale Modeling*** –

i) WRF Ensemble ran over the winter of 2010-11 providing data to Great Lakes Offices. Local HiRes (regional) WRF at ALY ran through April 18, 2011. Reconfiguration of RIT job schedulers at UAlbany has shut down the production of this WRF during the late spring. RIT staff developed scripts to work around this issue. The WRF runs resumed in June. While reliability has increased considerably, 10-15% of runs still fail. WFO Albany is running a new local WRF on a cluster of computers in the WFO built from excessed AWIPS components. It covers the CWA and has been running since mid March to support the Enhanced Short Term Forecast Initiative and Warn on Forecast concepts. A methodology for outputting gib2 data was developed and shared across the NWS. While functional, there remain bugs with the Composite reflectivity output and storage of all hours in AWIPS. Data has been used in numerous events by office staff.

ii) Leads – Warren Snyder (ALY), Mike Evans (BGM), Mark McKinley(ZOB),

iii) PI - David Knight

iv) Team – Vasil Koleci, Todd Lerichos (CAR-e), Dan Leins (CLE) , Scott Reynolds (ZBW)

e. ***Improvement of Ceiling & Visibility Forecasts for TAFs***–

i) One project which has been completed involved determining the utility of statistical guidance (MOS) in enhancing TAF (Terminal Aerodrome Forecast) accuracy. Deborah Lucia (NWS-SUNY Albany STEP 2010-2011) developed a database containing 0-6 hour IFR (Instrument Flight Rule) POD (Probability of Detection) and FAR (False Alarm Ratio) of office TAFs, MAV MOS, MET MOS, and LAV MOS at KGFL, KALB, and KPOU in order to determine if MOS products were useful in improving office forecast accuracy. This data used was for the period January 2007-September 2010. These statistics were also expanded to include TAFs within all of NWS Eastern Region, to investigate if MOS had additional strengths in other geographical areas. The results of this project were presented by Deborah at the NWS Spring Workshop in May 2011, with the end results indicating that none of the MOS added much value to TAFs in Eastern Region. The MET MOS did indicate better POD than the other MOS, but also exhibited a much higher FAR. One possible reason for this might be due to the fact that the MET MOS uses the NAM, which tends to exhibit a moist bias in the lowest levels of the

atmosphere, therefore indicating IFR conditions (either fog or low clouds) too often, resulting in a slightly higher POD, but also high FAR. The results of this project are intended to be written into an Eastern Region Technical Attachment.

ii) A second project currently underway is investigating the utility of the crossover temperature technique, as described in Baker et. al 2002. Hannah Attard (NWS-SUNY STEP 2011-2012) and I will be developing a database of 'radiational fog events' (i.e. events with clear skies, light to calm wind, and little or no moisture advection) at our three TAF sites (KGFL, KALB, and KPOU). Once completed, we will then determine the crossover temperature from the previous day, and examine if fog and/or low stratus could have been predicted using this technique. In addition , we intend to develop tables for radiational fog events, including the following information: the temperature at which fog formed on these days, the minimum temperatures during fog events, the minimum visibility during fog 'events,' snow depth (for ALB only) during fog events, last occurrence of measurable precipitation prior to a 'radiational fog event,' and the general wind characteristic for 3 hours prior to a 'radiational fog event.' This study will closely emulate Western Region Technical Attachment Lite 08-20 (referenced below). Hannah will then present the results at either the Northeast Storms Conference, or the NWS spring workshop in May 2012. The results are also intended to be written into an Eastern Region Technical Attachment.

iii) REFERENCES

a) Baker, R., J. Cramer, and J. Peters, 2002: Radiation Fog: UPS Airlines Conceptual Models and Forecast Methods, Preprints, *10th Conference on Aviation, Range, an Aerospace Meteorology*, Portland, OR, Amer. Meteor. Soc., 5.11

b) Whitworth Jr., L.J., and C. Collins, 2008: Assessing Applicability of the UPS Airlines Radiation Fog Forecasting Method for the J.C. Harris Regional Airport in Elko, NV. Western Region Technical Attachment Lite No. 08-20.

iv) Lead – Kevin Lipton (ALY)

v) Team - Hugh Johnson (ALY), Jeff Tongue (OKX), Mike Evans (BGM), Todd Lericos (CAR), John Roessner (UAlbany STEP Student), Debra Lucia (ALY)

f. ***Understand the Modulation of the Climate of the Northeast United States by Hudson's Bay (Canada).*** – Work has not begun on this project.

i) Lead – Warren Snyder (ALY)

g. **Understanding Inland Extent of Lake Effect Snow Bands**. Initial Project is complete. Forecast procedures developed from research results were integrated into operations on an experimental basis during the 2010-2011 winter season at the Albany and Binghamton WFOs. Forecast procedures included identified favorable patterns for a multi-lake connection, and included a forecast application on NWS AWIPS which outputs the inland extent of lake effect snow bands in miles, based on

the equation that was derived from the most strongly correlated parameters. Verification of the performance of the AWIPS program was conducted for the 2010-2011 winter season. These verification results were presented at the Great Lakes Operational Meteorology Conference in March 2011. Results indicate the program performed well with single snow bands in a west or west-southwest flow regime, but tended to underestimate the inland extent with narrow multi-bands in a northwest flow regime. Additional research is required for these multi-band cases.

i) Leads – Joe Villani and Mike Jurewicz.

h. ***Expanding Operational Use of Known Methods for Forecasting River Ice Formation, Snow Melt and Ice Break up.*** – Work has not begun on this project

i) Lead – Steve DiRienzo (ALY)

ii) Team – Greg Hanson (SSH, BTV) , Mark Turner (CAR), Dan St. Jean (GYX-datasets only), Thomas Econopoly (NERFC), Michael Schaffner (BGM)

iii) **Northeast Convective Flash Flood Events –** Completed. A comprehensive Flash Flood database for convective flash flood events which occurred in the Albany forecast area during the warm seasons of 2003-2010 was developed. Overall, 39 convective flash flood events have been analyzed with full documentation, including a spreadsheet with various computed parameters. Final results were presented at the Eastern Region Flash Flood Workshop in Wilkes-Barre, PA in June 2010.

iv) **Development of a Flash Flood Potential Index (FFPI) Completed.** (falls under hydrologic component of Major Foci project #4, *Mesoscale Precipitation Substructures associated with Convective Systems and Land-falling Tropical Systems that cause Flash Floods, prerequisite project)*: This index assesses the role of soil type, slope, forest canopy, and urbanization across the NWS Albany HSA. Utilizing ArcMap GIS software and high resolution maps such as Slope (derived from the Digital Elevation Model), Land Use/Cover, Forest Density, and Soil Type Classification, an FFPI that combines these physiographic elements has been developed. The data sets have been gathered from various sources. Once obtained, each data set was projected to the same scale, re-sampled into a static FFPI index, and eventually combined. All four elements have been completed and a final FFPI map has been created. Also, the index has been averaged over each aggregate flash flood basin so it can be utilized in combination with the Flash Flood Monitoring Program (FFPM) during operations. Two undergraduate students (Gabriel Susca-Lopata and Jason Keefer) from the University of Albany assisted with this project.

v) Leads – Joe Villani and Mike Jurewicz.

1. **Associate Projects**

a. ***Integration of Research Into Operations*** –

i. CSTAR webpage maintenance items included adding thesis material and articulate presentations.

ii. Articulate presentations Warm Season Cutoff Lows is in review at SSD. They are planned for the two completed CSTAR III Projects.

iii. WFO Albany Senior Forecaster Neil Stuart creates post mortem pages based on past events related to CSTAR projects.
iv. Encourage use of forums in AMS journals for fast publication of short articles on CSTAR projects.
v. Project Participants
    1. Lead – Vasil Koleci (ALY)
    2. Team - Neil Stuart (ALY), Tom Wasula (ALY), Michael Jurewicz (BGM), Mike Evans (BGM), Josh Korotky (PIT)

b. ***Hudson-Mohawk Convergence Events*** –
    i. Cases continued to be reviewed by UAlbany Interns adding to the preliminary findings identified in previous report.
    ii. Leads – Hugh W. Johnson IV (ALY) and Kim McMahon (ALY)

c. ***UAlbany Interns Increased Involvement in CSTAR*** – Since the summer of 2010 Nineteen Interns have been or were actively involved in supporting Local Research and CSTAR projects, as well as six SCEP/STEP NWS employees who are UAlbany Students.

SECTION 5: Computer and Technology Transfer Issues (David Knight)

The results described herein would not have been possible without appropriate computing infrastructure. Students are exposed to NWS facilities and software, and NWS staff has access to capabilities not available in the local office. Both groups benefit from this interaction and sharing of facilities. Several Sun workstations and PCs are available for use by CSTAR participants. Approximately 300 GB of disk space on the UAlbany Department of Atmospheric and Environmental Sciences (DAES) Sun servers is dedicated to storing CSTAR related data and software. This disk space is available on all DAES workstations and provides a central location where both UAlbany and NWS personnel can store, process, and exchange large datasets. Each CSTAR student has a PC laptop, which enables them to take familiar computers with them when visiting NWS staff, and provides them ready access to the DAES UNIX machines. Email lists created on the DAES computers at the beginning of the project continue to be useful conduits for exchange of scientific ideas, results, and information between CSTAR participants. There are email lists for all the CSTAR participants, as well as focused lists for those involved in specific projects. Albany WFO staff took the lead in maintaining content for the CSTAR webpage at http://cstar.cestm.albany.edu. The web page provides an additional mechanism for exchanging information and ideas. The WFO all runs a CSTAR forum and discussion group at http://infolist.nws.noaa.gov/read/?forum=cstar_ne. The DAES web server (http://www.atmos.albany.edu) and ftp server (ftp://ftp.atmos.albany.edu) are being used to facilitate exchange of large datasets between CSTAR collaborators. The DAES computing resources are available for CSTAR related research including a Sun server (with 8 CPUs and 16GB RAM), a Linux server (with 16 CPUs and 32GB RAM) and two large network attached disk storage arrays (36 TB total usable space). While CSTAR funds were not used for this, and the machines were not bought specifically for CSTAR use, they nonetheless directly benefit the CSTAR research by providing much faster servers for computation and storage space for commonly used datasets.

In addition to DAES, and NWS computing facilities, the formal CSTAR collaborative grant effort has allowed access to University Research Information Technology (RIT) services. In particular, Warren Snyder (SOO Albany WFO) is using the RIT 96 CPU Linux cluster for Weather Research and Forecasting (WRF) model simulations. This computing facility allows him to perform computations not possible at the local office. The facility will be used to generate additional members for the collaborative ensemble, and to generate higher resolution runs for research purposes. So far this facility has been made available at no cost to the CSTAR project.

SECTION 6: Selected Documentation of CSTAR Project Activities:

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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Sat. 5/14/11
To: bosart@atmos.albany.edu
Date: Sat, 14 May 2011 15:48:21 +0000 (UTC)
Cc: keyser@atmos.albany.edu

Saturday 14 May 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR warm-season cutoff low research is cited by Tom Wasula in the fourth paragraph of the long-term section of this morning's AFD issued
by NWS ALY.

Dan

FXUS61 KALY 141438
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
1038 AM EDT SAT MAY 14 2011

.SYNOPSIS...
A FRONTAL BOUNDARY WAS STALLED ACROSS THE GREAT LAKES AND NORTHERNNEW YORK STATE THIS MORNING. THIS BOUNDARY WILL SLOWLY SHIFTSOUTHWARD AS DISTURBANCES MOVE ALONG IT AND IT WILL SERVE AS AFOCUS FOR RAINFALL. UNSETTLED WEATHER IS EXPECTED MUCH OF THECOMING WEEK AS A LOW PRESSURE SYSTEM LINGERS OVER THE EASTERNUNITED STATES.

&&

.LONG TERM /SUNDAY NIGHT THROUGH FRIDAY/...
THE DETERMINISTIC AND ENSEMBLE GUIDANCE ARE IN PRETTY GOOD AGREEMENT THAT A WET AND UNSETTLED PERIOD IS SETTING UP FOR NEXT WEEK. A CUTOFF LOW NEAR THE OHIO VALLEY WILL DOMINATE THE SENSIBLE WEATHER WITH ONE SURGE OF MOISTURE IMPACTING THE REGION SUNDAY NIGHT INTO MONDAY...WITH AN AREA OF UPPER LEVEL DIFFLUENCE OVER NY AND NEW ENGLAND ASSOCIATED WITH AN ANOMALOUS PLUME OF PWAT AIR 1 TO 3 STANDARD DEVIATIONS ABOVE NORMAL. PWAT VALUES WILL BE BTWN 1-1.5 INCHES. A QUASI-STATIONARY FRONTAL BOUNDARY WILL BE NEAR THE NY-CANADIAN BORDER. A SHORT-WAVE MOVING ALONG THE ERN FLANK OF THE CUTOFF WILL HELP ENHANCE THE RAINFALL. WE WENT WITH CATEGORICAL VALUES FOR PERIODS OF MODERATE TO OCCASIONALLY HVY RAINFALL INTO MONDAY MORNING.

MONDAY...THE LOW LEVEL BAROCLINIC ZONE DRIFTS NORTH OF THE REGION AND THE PLUME OF HIGHER PWAT AIR SHIFTS EASTWARD...AS A DRY SLOT MAY SLIDE OVER THE REGION DURING THE DAY. WE LOWERED THE POPS TO CHANCE VALUES WITH SCT SHOWERS AND PERHAPS AN ISOLATED THUNDERSTORM...AS THE GFS HAS SBCAPE VALUES AT AROUND 500 J/KG OR LESS. THE GFSMOS MAX TEMPS WERE MUCH WARMER THAN THE MET GUIDANCE. FOR EXAMPLE...THE MET GUIDANCE HAS A HIGH OF 59F FOR KALB WITH THE MAV PROJECTING A HIGH OF 73F. WE WENT A CATEGORY COOLER THAN THE WARMER MAV GUIDANCE. WE WENT WITH 60S OVER MUCH OF THE FCST AREA /EXCEPT A FEW L70S OVER THE MID HUDSON VALLEY/ WITH SOME U50S OF THE MTNS.

MONDAY NIGHT INTO TUESDAY...THE CUTOFF HANGS ON OVER THE OH VALLEY...AND A SHORT-WAVE IN THE SOUTHEAST FLOW APPROACHES THE REGION. THE H850 LOW LEVEL JET INCREASES FROM THE SOUTHEAST AT 30-40 KTS. SHOWERS WILL BE LIKELY ACCORDING THE GFS/ECMWF/GEFS WITH PERHAPS SOME SCT THUNDERSTORMS WITH MODEST INSTABILITY...AND SHOWALTER VALUES IN THE 0 TO -2C RANGE. SOME HEAVIER RAINFALL TALLIES MAY BE POSSIBLE ALONG THE E/SE SLOPES OF THE CATSKILLS...LITCHFIELD HILLS...BERKS...AND ERN DACKS.

TUESDAY NIGHT INTO FRIDAY...NOT MUCH CHANGE WITH THE FCST THROUGH THE MID WEEK...AS WEAK IMPULSES ROTATE AROUND THE CUTOFF. CSTAR RESEARCH HAS SHOWN THAT CUTOFFS CAN BE TROUBLE. IT IS TRICKY TO TIME CONVECTION CHANCES IN DAY 5-7 OF THE FCST BASED ON THE INSTABILITY FORECASTS FROM THE MEDIUM RANGE GUIDANCE. WE PLACED CHANCES OF SHOWERS AND THUNDERSTORMS ON WED...AND WENT WITH ISOLD THUNDER ON THU. PWAT VALUES DO RISE BACK TO 1 TO 2 STANDARD DEVIATIONS ABOVE NORMAL BY WED. SOME HEAVY DOWNPOURS OF RAINFALL WILL BE POSSIBLE. AS THE RAIN TOTALS INCREASE...WE WILL HAVE TO MONITOR FOR ANY HYDRO ISSUES DUE SATURATED SOILS BY THE MIDDLE TO LATTER PORTION OF THE WEEK. THE GFS IS FASTER THAN THE ECMWF BRINGING THE CUTOFF LOW OVER NY AND NEW ENGLAND BY FRI...WHILE THE ECMWF DRAGS IT FURTHER SOUTH OVER THE MID ATLANTIC REGION. NONETHELESS...CHANCES OF SHOWERS WERE CONTINUED ON FRI.

OVERALL...PCPN LOOKS ABOVE NORMAL...AND TEMPS NEAR NORMAL DUE TO MILDER MIN TEMPS...DESPITE COOLER MAX TEMPS.

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SYNOPSIS...RCK
LONG TERM...WASULA
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Sat. 5/14/11
To: bosart@atmos.albany.edu
Date: Sat, 14 May 2011 21:48:16 +0000 (UTC)
Cc: keyser@atmos.albany.edu

Saturday 14 May 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR warm-season cutoff low research is cited in the second paragraph of the short-term section of this afternoon's AFD issued by NWS ALY.

Dan

FXUS61 KALY 142052
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
451 PM EDT SAT MAY 14 2011

.SYNOPSIS...
A RATHER UNSETTLED PERIOD OF WEATHER IS EXPECTED OVER THE NEXT SEVERAL DAYS. AN UPPER LEVEL LOW WILL SLOWLY TRACK TOWARD THE MIDDLE ATLANTIC REGION. IN ADDITION...A FRONTAL BOUNDARY WILL SLOWLY MIGRATE ACROSS THE REGION THAT WILL ASSIST WITH THE FOCUS OF SHOWERS AND PERHAPS A PERIOD OF HEAVY RAINFALL. SOME IMPROVEMENTS ARE POSSIBLE TOWARD THE END OF THE WEEK.

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.SHORT TERM /6 AM SUNDAY MORNING THROUGH MONDAY NIGHT/...A RATHER SOGGY PERIOD AS THE AFOREMENTIONED UPPER LOWS BECOME SOMEWHAT CONSOLIDATED OVER THE OHIO VALLEY AND THE SURFACE FRONTAL FEATURE WILL WAVER OVER THE REGION. THIS PLACES A RATHER LOW CONFIDENCE PLACEMENT WHERE THE MODERATE-HEAVY RAINFALL AXIS WILL OCCUR AND THE CHANCES FOR EMBEDDED CONVECTION. AT THIS TIME...IT SEEMS THE RAINFALL AXIS WILL OCCUR JUST NORTH OF I90 THROUGH SUNDAY THEN MIGRATE/WEAKEN TO OUR WEST INTO EARLY NEXT WEEK. PWATS STANDARD DEVIATIONS ARE PROGGED TO CLIMB AROUND +2 ACROSS THE REGION AS WE WILL WATCH CLOSELY WHERE THIS FRONTAL BOUNDARY AND RAIN BAND/S/ SETUP. MEANWHILE...SEVERE WEATHER POTENTIAL LOOKS RATHER LOW AS SOUTHEAST FLOW OFF THE ATLANTIC OCEAN SHOULD KEEP THE MARINE LAYER IN PLACE. THE BEST CHANCE FOR THUNDER LOOKS TO BE ON MONDAY AFTERNOON AS WE WILL FIND OURSELVES WITHIN A ELEVATED WARM SECTOR. AS FOR TEMPERATURES...MOS GUIDANCE VARIES GREATLY WITH THE NAM MOS ON THE COLDEST SIDE OF THE GUIDANCE ENVELOPE. WHILE THE GFS MOS IS QUITE WARM...COORDINATION WITH NEIGHBORING OFFICES WAS TO APPLY A 2:1 RATIO FAVORING THE GFS MOS AND BLENDING WITH LOCAL GFS BIAS CORRECTED 2M TEMPS.

AS CSTAR RESEARCH HAS REVEALED...THESE UPPER LOWS ARE VERY PROBLEMATIC AND WE WILL GET A BETTER HANDLE WHERE THESE BANDS WILL SET UP AS WE GET CLOSER TO THE POTENTIAL EVENT/S.

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SYNOPSIS...BGM
SHORT TERM...BGM

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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Sun. 5/15/11
To: bosart@atmos.albany.edu
Date: Sun, 15 May 2011 13:58:33 +0000 (UTC)
Cc: keyser@atmos.albany.edu

Sunday 15 May 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR cutoff low research is cited by Tom Wasula in the next-to-last paragraph of the long-term section of this morning's AFD issued by NWS
ALY.

Dan

FXUS61 KALY 151133
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
733 AM EDT SUN MAY 15 2011

.SYNOPSIS...
UNSETTLED WEATHER IS EXPECTED FOR MUCH OF THE WEEK AS A LOW PRESSURE SYSTEM REMAINS OVER THE EASTERN UNITED STATES.

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.LONG TERM /TUESDAY NIGHT THROUGH SATURDAY/...
THE EXTENDED FCST CONTINUES TO FEATURE A BROAD CUTOFF LOW CENTERED NEAR THE MID ATLANTIC REGION TUESDAY NIGHT. THIS CUTOFF WILL KEEP THE WX UNSETTLED INTO THE LATTER PORTIONS OF THE WEEK WITH CHANCES OF SHOWERS AND THUNDERSTORMS INTO FRI.

TUESDAY NIGHT INTO WEDNESDAY....THE CUTOFF BECOMES NEGATIVELY TILTED IN THE LONGWAVE TROUGH WITH SFC LOW PRESSURE MEANDERING NORTHWARD OVER VA/MD. AN INVERTED SFC TROUGH EXTENDING N/NE WILL FOCUS PERIODS OF RAINFALL WITH ISOLD-SCT THUNDERSTORMS. THE LATEST GLOBAL ENSEMBLES INDICATE PWAT ANOMALIES OF 1 TO 2 STANDARD DEVIATIONS ABOVE NORMAL. MODEST AMOUNTS OF INSTABILITY ARE PROGGED BY THE GFS. A E/SE LLJ OF 30-40 KTS WILL TEND TO ENHANCE THE RAINFALL ALONG THE E/SE SLOPES OF THE CATSKILLS AND HELDERBERGS. GFS/ECMWF/CMC GEM/ENSEMBLES ALL HINT AT A SLUG OF MOISTURE IMPACTING THE REGION...EXACT AMOUNTS AND LOCATIONS STILL VARY. OVERALL...WE CONTINUED WITH LIKELY POPS...AND COOL TEMPS IN THE 60S...WITH A LITTLE MORE SUNSHINE IN THE NRN ZONES...WHERE SOME L70S ARE POSSIBLE.

WED NIGHT INTO FRI...THE CUTOFF SWINGS N/NE TOWARDS THE VIRGINIAS WITH SPOKES OF SHORT-WAVE ENERGY CONTINUING TO IMPACT THE FCST AREA. ANY CONVECTION LOOKS TO BE DIURNALLY TIMED WITH THE AMOUNT OF SOLAR HEATING DETERMINING ANY STRONG TO SEVERE CONVECTIVE POTENTIAL. IT SHOULD BE NOTED THE LATEST RUN OF THE GFS HAS TOTAL TOTALS IN THE L50S...BEST SFC COMPUTED LIFTED INDICES BTWN -2C TO -6C...WITH SBCAPE VALUES EXCEEDING 1000 J/KG OVER A LARGE PORTION OF THE FCST AREA ON THU. THESE CONVECTIVE PARAMETERS WOULD INDICATE A THREAT FOR SOME STRONGER STORMS. BY FRI...THE COLD POOL ALOFT MOVES OVERHEAD AS THE GFS/ECMWF HAS THE CUTOFF DRIFTING EAST OF NJ. WE LOWERED THE POPS TO LOW CHC VALUES FOR SCT SHOWERS AND TSRAS. TEMPS MAY REBOUND A BIT BASED ON THE LATEST GMOS VALUES WITH HIGHS IN THE 70-75F RANGE IN THE VALLEYS...AND 60S OVER THE MTNS.

FRI NIGHT INTO SATURDAY...THE GFS IS FASTER SHIFTING THE CUTOFF EAST OF THE REGION WITH SOME MID LEVEL RIDGING BUILDING IN FROM THE ERN GREAT LAKES REGION/SE CANADA. THE ECMWF IS SLOWER...WITH AN ONSHORE FLOW OF SHOWERS. LOCAL CSTAR WARM AND COOL SEASON RESEARCH HAS SHOWN THESE FEATURES TO BE PESKY AND TROUBLESOME DUE TO THEIR SLOW MOVEMENT. WE KEPT A SLIGHT TO LOW CHC OF SHOWERS IN THE GRIDDED FCST. MIN AND MAX TEMPS WILL CONTINUE AT SEASONAL LEVELS FOR MID-LATE MAY.

OVERALL...PCPN LOOKS ABOVE NORMAL...AND TEMPS NEAR NORMAL IN THE LONG TERM.

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SYNOPSIS...IAA
LONG TERM...WASULA
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Sun. 5/15/11
To: bosart@atmos.albany.edu
Date: Sun, 15 May 2011 21:05:56 +0000 (UTC)
Cc: keyser@atmos.albany.edu
Sunday 15 May 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR cutoff low research is cited in the second paragraph of the
long-term section of this afternoon's AFD issued by NWS ALY.

Dan

FXUS61 KALY 152026
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY

425 PM EDT SUN MAY 15 2011

.SYNOPSIS...
UNSETTLED WEATHER IS EXPECTED FOR MUCH OF THE WEEK AS A LOWPRESSURE SYSTEM REMAINS OVER THE EASTERN UNITED STATES.

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.LONG TERM /WEDNESDAY THROUGH SUNDAY/...
BOTH THE EUROPEAN AND GFS ARE IN PRETTY GOOD AGREEMENT THROUGH THIS PERIOD. BOTH FORECAST THE UPPER AIR LOW TO BE OVER THE SE OHIO VALLEY ON WEDNESDAY...VERY SLOWLY MOVING LIFTING NORTHEASTWARD INTO SE PA BY FRIDAY AND FINALLY OFF THE EASTERN SEABOARD OF NEW JERSEY BY LATE SATURDAY.

ON WEDNESDAY THE UPPER AIR TROUGH STILL LOOKS SOMEWHAT NEGATIVELY TILTED. FURTHER MORE OUR AREA WILL BE UNDER THE RR ENTRANCE REGION OF THE UPPER LEVEL JET. AT THE SAME TIME...THE H850 SE FLOW APPROACHING 50KTS PULLING IN PWAT AIR OF ABOUT 1.25 INCHES...UP TO TWO STANDARDS ABOVE NORMAL...RIGHT INTO OUR REGION. RAIN COULD BE ESPECIALLY HEAVY ACROSS THE CATSKILLS AND LITCHFIELD COUNTY. INSTABILITY OFF THE GFS WAS VERY MARGINAL SO WE ONLY KEPT SLIGHT CHANCES OF THUNDERSTORMS FOR THAT DATE. CSTAR STUDIES INVOLVING COLD AND WARM SEASON CUTOFFS INDICATE THIS TYPE OF SETUP COULD SPELL TROUBLE WITH THE POTENTIAL FOR FLOODING...ESPECIALLY IN THE CATSKILLS. FOR NOW...WILL ONLY MENTION POTENTIAL IN OUR HAZARDOUS WEATHER OUTLOOK.

THERE ARE INDICATIONS SOME MID LEVEL DRIER AIR MIGHT BE PULLED IN FROM THE SOUTHEAST ON THURSDAY AS THE LOW MOVES VERY SLOWLY TOWARD PA. THIS MIGHT SERVE TO ALLOW FOR SOME BREAKS IN THE CLOUDS WHICH WOULD ONLY INCREASE THE THUNDERSTORM THREAT BY AFTERNOON. EXPECT OVERALL SHOWER COVERAGE TO NOT BE AS WIDESPREAD AS WEDNESDAY...BUT ANY THUNDERSTORMS COULD CONTAIN TORRENTIAL DOWNPOURS DURING THE AFTERNOON.

MORE OF THE SAME FRIDAY...EXCEPT THE COLUMN MIGHT SATURATE A BIT MORE. MEANWHILE...THE LOW LEVEL AND UPPER LEVEL JET LOOK TO WEAKEN SO THE OVERALL FORCING WILL CONTINUE TO WEAKEN. THEREFORE...WE LOWER POPS TO 40 BUT STILL THE CHANCE OF MAINLY AFTERNOON THUNDERSTORMS (DUE TO MAXIMUM HEATING).

BY SATURDAY...THE UPPER AIR LOW WILL STILL BE CLOSE ENOUGH TO BRING COLD TEMPERATURES ALOFT AND RESULTANT INSTABILITY. AT THIS POINT...INSTABILITY WILL BE THE ONLY DRIVING FORCE TRIGGERING ANY SHOWERS AND AFTERNOON THUNDERSTORMS WHICH SHOULD CONTINUE TO DECREASE IN COVERAGE...SO POPS ONLY 20% (SLIGHT IN THE MORNING)...30% IN THE AFTERNOON DUE TO MORE INSTABILITY THROUGH DIURNAL HEATING.

ESSENTIALLY...OUR WEATHER WILL REMAINED UNSETTLED THROUGH SATURDAY. EVEN ON SUNDAY...WHILE THE UPPER AIR LOW IS OFFSHORE...THERE COULD BE ENOUGH MOISTURE TO SPAWN AN ISOLATED SHOWER...ESPECIALLY OVER THE HIGHER TERRAIN. FOR NOW...JUST WENT 20% EVERYWHERE FOR THE AFTERNOON.

THERE WILL LITTLE DIURNAL RANGE IN TEMPERATURES DUE THE EXTENSIVE CLOUD THROUGHOUT MOST OF THE PERIOD...GENERALLY AROUND 60 FOR DAYTIME HIGHS AND OVERNIGHTS IN THE 50S.

OVERALL...PCPN LOOKS WELL ABOVE NORMAL...AND TEMPS NEAR NORMAL IN THE LONG TERM.

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SYNOPSIS...IAA
LONG TERM...HWJIV
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Mon. 5/16/11
To: bosart@atmos.albany.edu
Date: Mon, 16 May 2011 13:25:49 +0000 (UTC)
Cc: keyser@atmos.albany.edu

Monday 16 May 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR cutoff low research is cited by Tom Wasula in the second paragraph of the short-term section of this morning's AFD issued by
NWS ALY.

Dan

FXUS61 KALY 161059
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
658 AM EDT MON MAY 16 2011

.SYNOPSIS...
A BROAD...SLOW MOVING...UPPER LEVEL LOW WILL MOVE NEAR THE MID ATLANTIC REGION TODAY INTO TUESDAY KEEPING THE WEATHER UNSETTLED THROUGH MUCH OF THE WEEK WITH SHOWERS AND ISOLATED THUNDERSTORMS. TEMPERATURES WILL BE COOLER THAN NORMAL IN THE DAMP AIR MASS INTO THE MID WEEK.

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.SHORT TERM /6 PM THIS EVENING THROUGH WEDNESDAY/...
TONIGHT...THE COLD FRONT SLOWLY LIFTS BACK NORTHWARD AS A WARM FRONT...AS THE CUTOFF...AND ITS ASSOCIATED SFC REFLECTION MOVES OVER THE CAROLINAS. AN E/SE ONSHORE FETCH OF MOISTURE ADVECTS IN ATLANTIC MOISTURE...AS QG LIFT IS

FOCUSED NORTH AND WEST OF THE BOUNDARY. THE GFS/NAM/ECMWF ALL SHOW A VORT MAX INCREASING THE SHOWERS ESPECIALLY TOWARDS...AND AFTER MIDNIGHT. WE INCREASED THE POPS TO CATEGORICAL VALUES FROM THE NRN CATSKILLS...AND HUDSON VALLEY EASTWARD. WE DID NOT GO QUITE AS COOL AS THE METMOS MINS HERE...AND WENT ONLY SLIGHTLY COOLER THAN THE MAVMOS MINS WITH LOWS IN THE U40S TO L50S IN THE VALLEYS...AND MID TO U40S OVER THE MTNS.

TUESDAY INTO WEDNESDAY...THE BEAT GOES ON WITH THE DAMP AND DREARY WEATHER. THIS CUTOFF IS NOT IN A CLASSIC POSITION BASED ON THE CSTAR CUTOFF LOW RESEARCH FOR SEVERE WX INTO THE MID WEEK...AS IT WOBBLES WESTWARD FROM THE MID ATLANTIC REGION TO THE OHIO VALLEY. IT WILL DEFINITELY BE A RAIN PRODUCER...BUT PINPOINTING ANY POTENTIAL FLOOD ISSUES IS STILL VERY NEBULOUS. A PERSISTENT FETCH OF MOISTURE FROM THE ATLANTIC CONTINUES ON TUESDAY WITH SOME OROGRAPHIC ENHANCEMENT OF THE RAINFALL ON THE E/SE SLOPES OF THE CATSKILLS...AND ADIRONDACKS. WE TRIED TO ACCOUNT FOR SOME DOWNSLOPING OVER THE CAPITAL DISTRICT...UPPER HUDSON REGION...AND WEST OF THE GREEN MTNS WITH ONLY LIKELY POPS COMPARED TO CATEGORICAL VALUES ON TUESDAY.

THE ECMWF AND CMC GGEM CONTINUE TO DUMP AN ADDITIONAL 2 TO 4 INCHES OF RAINFALL SOUTH OF THE CAPITAL REGION TUESDAY NIGHT INTO WEDNESDAY...AS A POTENT VORT MAX SPIRALS AROUND THE STACKED LOW...WHEN IT BECOMES NEGATIVELY TILTED. THE SOUTHEAST H850 FLOW STRENGTHENS TO 30-40 KTS. THE GEFS HAVE PWATS RISING BACK TO 1 TO 2 STANDARD DEVIATIONS ABOVE NORMAL. THE GFS AND NAM DON/T SHOW THIS HVY RAINFALL MAX OVER THE SRN ZONES. THERE IS A BIT MORE INSTABILITY ON THE GFS...WITH SBCAPES OF AROUND 500 J/KG...SO WE INCLUDED ISOLD THUNDERSTORMS EVERYWHERE ON WED. THERE MAYBE BE A FEW BREAKS OF SUNSHINE TO HELP DESTABILIZE THE ATMOSPHERE MORE SO THIS DAY WITH HIGHS GENERALLY IN THE MID AND U60S IN THE VALLEYS...AND U50S TO L60S OVER THE MTNS. CONFIDENCE STILL REMAINS LOW FOR ANY HYDRO FLAGS AT THIS TIME. WE WILL HIGHLIGHT HVY RAINFALL IN THE HWO WITH FLOOD ADVISORY POTENTIAL ISSUES FOR POOR DRAINAGE AND PONDING ON ROADWAYS.

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SYNOPSIS...WASULA
SHORT TERM...WASULA
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Th. 5/26/11
To: bosart@atmos.albany.edu
Date: Thu, 26 May 2011 22:56:29 +0000 (UTC)
Cc: keyser@atmos.albany.edu

Thursday 26 May 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR warm-season cutoff low research is cited by Tom Wasula in the second paragraph of the near-term section and in the second paragraph of the short-term section of this morning's AFD issued by NWS ALY.

Dan

FXUS61 KALY 260851
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
451 AM EDT THU MAY 26 2011

.SYNOPSIS...
AN AREA OF LOW PRESSURE...AND A WARM FRONT WILL MOVE NORTHWARD TOWARDS THE SAINT LAWRENCE VALLEY TODAY. THIS BOUNDARY WILL BECOME NEARLY STATIONARY OVER NORTHERN NEW YORK...AND NORTHERN NEW ENGLAND TONIGHT INTO FRIDAY WITH ABOVE NORMAL TEMPERATURES AND HIGH HUMIDITY LEVELS. SEVERAL DISTURBANCES MOVING ALONG THIS BOUNDARY WILL PRODUCE SHOWERS...AND SCATTERED STRONG TO POTENTIALLY SEVERE THUNDERSTORMS INTO SATURDAY.

&&

.NEAR TERM /UNTIL 6 PM THIS EVENING/...
AS OF 4 AM EDT...NY AND NEW ENGLAND WILL BE ENTERING AN ACTIVE WEATHER REGIME OVER THE NEXT FEW DAYS...AS A WARM FRONT CONTINUES TO SLOWLY LIFT NORTH THIS MORNING. AN MCS THAT PRODUCED SOME WIND DAMAGE OVER W-CNTRL NY AND PA CONTINUES TO DECAY IN THE MORE STABLE AIR MASS OVER ERN NY. A FEW RUMBLES OF THUNDER WILL PERSIST OVER THE SRN DACKS...BUT THE 3-KM HRRR REF PRODUCT CONTINUES TO SHOW THIS WEAKENING TREND.

THE WARM FRONT WILL ACT AS A FOCUS TODAY...AS IT SLOWLY MOVES N/NE TOWARDS THE ST LAWRENCE RIVER VALLEY. THE WATER VAPOR LOOP THIS MORNING DEPICTS A CLOSED LOW OVER MISSOURI WITH THE LONGWAVE TROUGH POSITIVELY TILTED. IN THE CSTAR WARM SEASON CLOSED LOW RESEARCH WITH SUNYA...THIS PATTERN WOULD FIT INTO A POSITIVELY TILTED TYPE-A CONCEPTUAL MODEL WITH REGIONS OF STRATIFORM AND CONVECTIVE RAINFALL...WITH SOME SEVERE WEATHER WITH MOSTLY WIND DAMAGE REPORTS. TYPICALLY...PORTIONS OF UPSTATE NY AND SE CANADA ARE NEAR THE RIGHT REAR QUADRANT OF AN H250 JET STREAK. PWATS USUALLY INCREASE IN EXCESS OF 1.50 INCHES IN THE WARM SECTOR. IF THE CLOSED LOW TAKES ON A MORE NEUTRAL TILT...THEN SOME MORE ROBUST SEVERE WEATHER IS POSSIBLE BASED ON THE CSTAR RESEARCH.

ANOTHER SHORT-WAVE IS LINING UP OVER LOWER MICHIGAN AND OHIO THISMORNING. SOME MID AND UPPER LEVEL DRYING IS OCCURRING IN THE WATER VAPOR LOOP OVER W-CNTRL PA AND NY. WE BELIEVE THIS CLEARING WILL GET TO THE ALY FCST AREA BY THE AFTERNOON FOR DESTABILIZATION OF THE ATMOSPHERE FOR THE THREAT OF STRONG TO SEVERE THUNDERSTORMS. THE SHORT-WAVE...AND THE FRONT WILL ACT AS THE FOCUSING LIFTING MECHANISMS. WE ARE FAIRLY CERTAIN THE NAM IS OUT TO LUNCH WITH SFC DEWPTS POOLING INTO THE U60S TO

L70S OVER PORTIONS OF THE FCST AREA. THIS WOULD YIELD SBCAPES OF 2000-3500 J/KG. WE CAN NOT FIND DEWPTS THIS HIGH EVEN CLOSE TO REGION. FOR INSTABILITY...WE BELIEVE THE GFS IS CLOSER TO REALITY WITH SFC DEWPTS IN THE LOWER TO MID60S WITH SBCAPES OF 1000-2000 J/KG GENERALLY OVER THE REGION

THERE WILL BE A STRENGTHENING H850 LLJ OF 30-40 KTS WITH 0-6 KM BULK SHEAR VALUES OF 35-50 KTS BY THE PM. THE BEST DEEP SHEAR IS NORTHWEST OF THE CAPITAL REGION THIS AFTERNOON. PWATS WILL BE RISING TO 1 TO 1.50 INCHES. THESE VALUES ARE 1 TO 3 STANDARD DEVIATIONS ABOVE NORMAL BASED ON THE GEFS. THE MID LEVEL LAPSE RATES WILL BE STEEP OVER THE FCST AREA...GENERALLY 6.5-7 C/KM. IN THE FAST SW FLOW...SOME DEEP ORGANIZED CONVECTION IS POSSIBLE. WET BULB ZERO HEIGHTS IN THE WARM SECTOR WILL BE HIGH IN THE 11-13 KFT AGL RANGE. WE COULD GET A FEW DISCRETE SUPERCELLS...CAPABLE OR LARGE HAIL...DAMAGING WINDS...AND PERHAPS AN ISOLD TORNADO IF THE SFC FLOW BACKS SOME /MODEL HODOGRAPHS AND SOUNDINGS HINT AT THIS POSSIBILITY/. HOWEVER...A BETTER LOW-LEVEL CAP MAY BE IN PLACE SOUTH AND EAST OF KALB. WE BELIEVE...AN MCS MAY FORM AS THE MAIN THREAT IN THE LATE PM INTO THE EARLY EVENING WITH PRIMARILY A WIND DAMAGE...AND HAIL THREAT WITH THE TALLER UPDRAFTS. WE KEPT THE ENHANCED WORDING IN THE GRIDS AND ZONES THAT SOME MAY BE SEVERE...AND THERE GOOD BE TORRENTIAL DOWNPOURS WITH THE ANOMALOUS PWAT AIR IN PLAY.

WARM AND MUGGY CONDITIONS WILL MOVE INTO THE REGION WITH HIGHS IN THE LOWER TO MID 80S IN THE VALLEYS...AND M70S TO L80S OVER THE MTNS.

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.SHORT TERM /6 PM THIS EVENING THROUGH SATURDAY NIGHT/...
TONIGHT...THAT POSSIBLE MCS RACES NORTHEAST OF THE REGION WITH WARM FRONT BECOMING STATIONARY JUST SOUTH OF THE ST LAWRENCE RIVERVALLEY. THE BEST CHC OF STRONG TO POSSIBLY SEVERE THUNDERSTORMS WOULD BE PRIOR TO MIDNIGHT. THE NAM IS SLIGHTLY FURTHER SOUTH THAN THE GFS WITH THE PLACEMENT OF THE BOUNDARY...LOCATIONS FROM THECAPITAL REGION...MOHAWK VALLEY NORTHWARD WOULD HAVE THE GREATEST THREAT OF SHOWERS AND THUNDERSTORMS. WE ARE LEANER CLOSER TO THE GFS. IT WILL BE A HUMID NIGHT...FEELING LIKE SUMMER...WITH LOWS GENERALLY IN THE LOWER TO MID 60S. SOME U50S ARE POSSIBLE OVER THE SRN DACKS.

FRIDAY...THIS MAY BE THE DAY WHEN THE SEVERE THREAT IS MORE EXPANSIVE AND WIDESPREAD OVER THE REGION. MOST OF THE REGION WILL BE ENTRENCHED IS A VERY HUMID AIR MASS. THE H500 CLOSED LOW TAKES ON A MORE NEUTRAL TILT OVER THE ERN GREAT LAKES REGION. THE MID LEVEL LAPSE RATES WILL BE IN THE 6.5-7C/KM RANGE WITH SBCAPES OF 1000-3000 J/KG ON THE GFS AND NAM. THE CSTAR CLOSED LOW RESEARCH WOULD HAVE THIS CLASSIFIED AS A NEUTRAL TILT - TYPE A: WHERE A FEW DOZEN SEVERE REPORTS CAN OCCUR OVER THE NORTHEAST WITH HAIL THE DOMINATE THREAT. 0-6 KM BULK SHEAR BY THE PM WILL BE IN THE 35-45 KT RANGE...SOME MULTICELLULAR CLUSTERS WITH SOME ISOLD SUPERCELLS WOULD BE POSSIBLE. WE AGREE WITH THE SPC ASSESSMENT IN DAY 2. ALSO...SOME HVY RAIN IS LIKELY WITH PWATS STILL RUNNING 1 TO 3 STANDARD DEVIATIONS ABOVE NORMAL. SOME ANY TRAINING ECHOES MAY YIELD SOME ISOLD FLASH FLOODING...ESPECIALLY NORTH AND WEST OF ALBANY. ENHANCED WORDING WAS USED IN THE ZONES AND

GRIDS AGAIN. HIGHS WILL BE SULTRY WITH LOWER TO MID 80S IN THE VALLEYS...AND U70S TO L80S IN THE MTNS.

FRIDAY NIGHT INTO SATURDAY NIGHT...THE PLACEMENT OF THE FRONT WILL DEPEND ON THE COVERAGE OF THE SHOWERS AND THUNDERSTORMS ON SATURDAY. THE UPPER LEVEL LOW OPENS AND MOVES NORTHEAST TOWARDS JAMES BAY. THE W/SW FLOW CONTINUES ALOFT. ANOTHER SHORT-WAVE APPROACHES THE W-CNTRL GREAT LAKES REGION. WITH THE BOUNDARY HANGING AROUND A CONDITIONAL THREAT FOR SHOWERS AND THUNDERSTORMS PERSISTS. WE KEPT A CHANCE IN EVERYWHERE ON SATURDAY WITH TEMPERATURES REMAINING ABOVE NORMAL. THE FRONT MAY ZIP NORTH LATE SAT INTO SAT NIGHT...AND WITH AN UPPER RIDGE BUILDING IN FROM THE DEEP SOUTHEAST. THIS WOULD HAVE THE FCST AREA INTO A HOTTER AIR MASS FOR THE NEXT TWO THIRDS OF THE MEMORIAL DAY WEEKEND.

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SYNOPSIS...WASULA
NEAR TERM...WASULA
SHORT TERM...WASULA
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Mon. 6/13/11
To: bosart@atmos.albany.edu
Date: Mon, 13 Jun 2011 14:58:04 +0000 (UTC)
Cc: keyser@atmos.albany.edu

Monday 13 June 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR cutoff low research is cited by Tom Wasula in the second paragraph of the long-term section of yesterday afternoon's AFD issued by NWS ALY.

Dan

FXUS61 KALY 122002
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
402 PM EDT SUN JUN 12 2011

.SYNOPSIS...
AN OCCLUDED FRONT WILL SLOWLY MOVE EAST ACROSS THE AREA EARLY THIS EVENING. AN UPPER LEVEL LOW WILL MOVE OVER THE REGION MONDAY AND TUESDAY RESULTING IN MOSTLY CLOUDY SKIES...BELOW NORMAL TEMPERATURES AND SCATTERED SHOWERS. HIGH PRESSURE WILL BUILD IN MID WEEK WITH DRIER AND MORE SEASONABLE TEMPERATURES.

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.LONG TERM /WEDNESDAY NIGHT THROUGH SUNDAY/...
THE EXTENDED OPENS WITH A CUTOFF LOW MOVING EAST OF CAPE COD WITH SOME MID AND UPPER LEVEL RIDGING BRIEFLY OVER NY AND NEW ENGLAND.UPSTREAM OF THE RIDGING...YET ANOTHER H500 CLOSED LOW WILL BE APPROACHING FROM THE UPPER MIDWEST AND THE W-CNTRL GREAT LAKES REGION. MOST OF THE WED NIGHT TO THU TIME FRAME SHOULD BE DRY WITH PERHAPS SOME ISOLATED SHOWERS MOVING IN FROM THE W/SW. THE ECMWF IS DRIER THAN THE GFS. THE SFC HIGH SLOWLY MOVES EASTWARD OFF THE DELMARVA REGION THU AFTERNOON ACCORDING TO THE HPC GUIDANCE WITH TEMPS A SHADE ABOVE NORMAL FOR MID JUNE.

THU NIGHT INTO FRI...THE SFC HIGH RETREATS EASTWARD WITH SOME THERMALS ADVECTION AHEAD OF A WARM FRONT...AND A TRIPLE POINT EVOLVING OVER THE OHIO VALLEY. THE BEST QG LIFT AHEAD OF THE WARM OR OCCLUDED FRONT WILL BE FROM THE CAPITAL REGION SOUTHWARD THU NIGHT. THERE IS A BETTER CHANCE OF SHOWERS AND THUNDERSTORMS ON FRIDAY WITH THE JET STREAK ON THE E/SE SIDE OF THE CLOSED LOW...AND THE COLD POOL MOVING OVERHEAD. THE GFS IS NOT FORECASTING MUCH INSTABILITY AT THIS POINT...BUT THE CLOSED LOW IS IN A FAVORABLE POSITION ON THE ECWMF FOR SOME POTENTIALLY ACTIVE WEATHER BASED ON CSTAR CLOSED LOW RESEARCH...IF SOME SUBSTANTIAL SFC BASED HEATING OCCURS.

FRIDAY NIGHT INTO SATURDAY...THE MEDIUM RANGE GUIDANCE INDICATES THE CLOSED LOW OPENS UP...AND THE UPPER TROUGH MOVES EASTWARD WITH AN ISOLD THREAT OF A SHOWER TO OPEN THE WEEKEND. H850 TEMPS REMAIN SEASONABLE IN THE 10 TO 12C RANGE.

SATURDAY NIGHT INTO SUNDAY...THE ECMWF/GFS SHOWS SOME WEAK RIDGING IN THE WAKE OF UPPER TROUGH PASSAGE. SFC HIGH PRESSURE WILL BE RIDGING S/SE FROM JAMES BAY. ANOTHER DISTURBANCE IN THE ZONAL FLOW UPSTREAM OVER THE GREAT LAKES REGION...AND THE UPPER MIDWEST MAY ENCROACH LATE IN THE WEEKEND. FOR NOW...WE HAVE GONE DRY ON FATHERS DAY WITH TEMPS RANGING FROM THE U70S TO M80S IN THE VALLEYS...AND MID AND U70S OVER THE MTNS.

OVERALL...TEMPS WILL BE SLIGHTLY ABOVE NORMAL WITH PCPN AROUND NORMAL DEPENDING ON THE CLOSED LOW LATE IN THE WEEK.

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SYNOPSIS...IAA
LONG TERM...WASULA
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Mon. 7/18/11
To: bosart@atmos.albany.edu
Date: Mon, 18 Jul 2011 15:02:49 +0000 (UTC)
Cc: keyser@atmos.albany.edu

Monday 18 July 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

COMET/CSTAR studies of severe convection in the ALY forecast area occurring under northwesterly flow regimes are cited by Tom Wasula in the sixth paragraph of the short-term section of this past Saturday morning's AFD issued by NWS ALY.

Dan

FXUS61 KALY 160811
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
411 AM EDT SAT JUL 16 2011

.SYNOPSIS...
HIGH PRESSURE WILL DOMINATE THE WEATHER THIS WEEKEND OVER NEW YORK AND NEW ENGLAND. THE HIGH WILL MOVE OFF THE MID ATLANTIC COAST THIS AFTERNOON...AND HUMIDITY LEVELS WILL INCREASE SUNDAY INTO MONDAY. A COLD FRONT WILL MOVE ACROSS THE REGION ON MONDAY WITH A CHANCE OF SHOWERS AND SOME STRONG THUNDERSTORMS.

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.SHORT TERM /6 PM THIS EVENING THROUGH MONDAY NIGHT/...
SATURDAY NIGHT...THE SFC HIGH DRIFTS FURTHER OFF THE MID ATLANTIC COAST AND MERGES WITH THE BERMUDA HIGH. THE SKIES WILL AGAIN BE MOSTLY CLEAR/CLEAR WITH LIGHT TO CALM WINDS. NEAR IDEAL RADIATIONAL COOLING WILL OCCUR ONCE AGAIN WITH LOWS A LITTLE BIT WARMER THAN THE PREVIOUS FEW NIGHTS...AS SFC DEWPTS WILL SLOWLY BE TICKING UPWARD. LOWS WILL RANGE FROM U50S TO L60S FROM THE MOHAWK VALLEY/CAPITAL REGION SOUTH AND EAST...TO LOWER TO MID 50S NORTH AND WEST. SOME PATCHY RADIATIONAL FOG IS POSSIBLE IN THE MAJOR RIVER VALLEYS SUCH AS THE MOHAWK...HUDSON...AND CT. WE PLACED PATCHY FOG IN FOR LOCATIONS UNDER 1000 FT AGL BTWN 09Z-12Z.

SUNDAY...HUMIDITY LEVELS WILL SLIGHTLY INCREASE DURING THE DAY...AS A HOT SOUTHWESTERLY FLOW SETS UP OVER THE REGION. H850 TEMPS RISE TO 17-19C...AND LOCAL CLIMO STUDIES SHOW THAT A SFC- BOUNDARY LAYER SW FLOW OFF THE HELDERBERGS...AND ERN CATSKILLS CAN CAUSE TEMPS TO SPIKE A BIT OVER THE CAPITAL REGION...AND MID HUDSON VALLEY. WE WENT A LITTLE ABOVE THE GUIDANCE HERE WITH SOME LOWER 90S IN THE CAPITAL REGION...AND THE MOHAWK AND HUDSON RIVER VALLEYS. EXPECT MID AND U80S TO PREVAIL OVER THE HILLS AND MTNS. SOME OF THE HIGH PEAKS IN THE SRN GREENS/SRN DACKS WILL STILL BE IN THE U70S OR L80S. THE MODEL SOUNDINGS SHOW A STRONG MID LEVEL CAP IN THE H700-H600 LAYER. THIS SHOULD INHIBIT CONVECTION SOME. WE DID INCLUDE A SLIGHT CHC OF A SHOWER OR STORM OVER THE SRN GREENS...SRN DACKS...AND WEST

OF THE HUDSON RIVER VALLEY FOR DIFFERENTIAL HEATING/AIR MASS STYLE ISOLD TSRAS. ALL AND ALL...IT SHOULD BE A HOT SUMMER AFTERNOON.

SUNDAY NIGHT...THE AIR MASS STARTS TO GET VERY WARM AND UNCOMFORTABLE IN TERMS OF HUMIDITY LEVELS. A THERMAL TROUGH/WEAK WARM FRONT DRIFTS THROUGH WITH AN INCREASE OF LOW LEVEL MOISTURE. MIN TEMPS WILL GENERALLY BE IN THE 60-65F RANGE OVER THE MTNS...AND M60S TO L70S OVER THE VALLEYS. THERE IS A SLIGHT OR LOW CHANCE OF A SHOWER OR THUNDERSTORM MAINLY NORTH OF THE CAPITAL REGION...AS PREFRONTAL TROUGH ENCROACHES THE REGION. THE MORE ACTIVE PERIOD LOOKS LIKE MONDAY IN TERMS OF STRONG TO SEVERE CONVECTION.

MONDAY-MONDAY NIGHT...THERE ARE SOME TIMING DIFFERENCES BTWN THE NAM/GFS/ECMWF WITH THE PASSAGE OF A PREFRONTAL TROUGH AND A SFC COLD FRONT DESCENDING S/SE FROM THE ST LAWRENCE RIVER VALLEY DURING THE DAY. THE 00Z NAM IS FAST DEVELOPING A BAND/BANDS OF SHOWERS AND THUNDERSTORMS...WHICH WOULD MUTE THE STRONG TO SEVERE POTENTIAL OVER THE NRN HLF OF THE FCST AREA.

THE GFS AND TO AN EXTENT THE ECMWF ARE SLOWER...SO THERE IS A LARGE AMOUNT OF SFC OR MLCAPE AROUND /1000-3000 J/KG/ WITH PLENTY OF LOW-LEVEL MOISTURE /SFC DEWPTS IN THE M60S TO L70S/. THE LOW AND MID LEVEL HEIGHT FALLS ARE IMPRESSIVE WITH MID LEVEL LAPSE RATES STEEPENING TO ABOUT 7C/KM. THERE ARE SOME HINTS IN THE GFS OF A PRONOUNCED ELEVATED MIXED LAYER IN THE NW FLOW. THE 0-6 KM DEEP SHEAR IS GENERALLY 25-40 KTS. THE GFS WOULD HAVE A LARGE CHUNK OF THE FCST AREA NEAR THE LEFT FRONT QUAD OF AN H300 JET STREAK. IMPRESSIVE THETA-E LAPSE RATES ARE FORECASTED IN THE 1000-500 HPA LAYER TOO.

NW FLOW EVENTS ARE CHARACTERIZED BY DAMAGING WINDS AND LARGE HAIL BASED
ON PAST COMET/CSTAR STUDIES FOR THE ALY FCST AREA. DEEP ORGANIZED MULTICELL LINES OR CLUSTERS WILL BE POSSIBLE. WE DID NOT ADD ENHANCED WORDING TO THE ZONES/GRIDS YET...BUT WE WILL EMPHASIZE THE POTENTIAL SEVERE THREAT IN THE HWO. NAM LOOKS LIKE AN OUTLIER...AND THE DAY 3 FROM SPC AGREES WITH OUR THINKING THAT SOME SEVERE POTENTIAL EXISTS FOR MOST OF THE FCST AREA. SOME HVY DOWNPOURS ARE LIKELY WITH PWATS IN THE 1.50-2.0 INCH RANGE OVER THE FCST AREA.

WE KEPT POPS AT HIGH CHC VALUES FOR THE SHOWERS AND STORMS...AND WENT WITH A GFSMOS MAX TEMP SCENARIO WITH HIGHS IN THE MID 80S TOLOW 90S IN THE VALLEYS...AND U70S TO L80S OVER THE MTNS.

THE SHOWERS AND THUNDERSTORMS END FAIRLY QUICKLY FROM THE NW TO SE OVER THE FCST AREA PRIOR TO 06Z. DRIER AIR FILTERS IN FROM THE NORTH AND WEST WITH SFC HIGH PRESSURE RIDGING IN SOUTH OF JAMES BAY. LOWS WILL GENERALLY BE IN THE 60S.

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SYNOPSIS...WASULA

SHORT TERM...WASULA
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Mon. 7/18/11
To: bosart@atmos.albany.edu
Date: Mon, 18 Jul 2011 15:12:59 +0000 (UTC)
Cc: keyser@atmos.albany.edu
Monday 18 July 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

COMET/CSTAR studies of severe convection in the ALY forecast area occurring under northwesterly flow regimes are cited by Tom Wasula in the second paragraph of the short-term section of yesterday morning's AFD issued by NWS ALY.

Dan

FXUS61 KALY 170820
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
420 AM EDT SUN JUL 17 2011

.SYNOPSIS...
THE BERMUDA HIGH WILL BRING HOT AND INCREASINGLY HUMID CONDITIONS ACROSS THE REGION TODAY INTO TONIGHT. A COLD FRONT WILL BRING SHOWERS AND POTENTIALLY SOME STRONG THUNDERSTORMS TO MUCH OF EASTERN NEW YORK AND WESTERN NEW ENGLAND ON MONDAY. HIGH PRESSURE WILL RIDGE IN FROM ONTARIO WITH DRIER WEATHER MONDAY NIGHT THROUGH TUESDAY.

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.SHORT TERM /6 PM THIS EVENING THROUGH TUESDAY/...
TONIGHT...THE QUIET STRETCH OF WEATHER WILL END...AS THE NW FLOW ALOFT WILL GET ACTIVE. THE SHORT RANGE GUIDANCE ISN/T IN COMPLETE AGREEMENT...BUT THE FIRST OF POSSIBLY TWO MCS/S MAY IMPACT THE NORTHEAST AHEAD OF A COLD FRONT SLOWLY DESCENDING SOUTH AND EAST FROM SOUTHEAST CANADA. THE FIRST MCS LOOKS LIKE IT WILL MISS MOST OF THE ALY FCST AREA. IT APPEARS IS WILL IMPACT NRN NEW ENGLAND AND PERHAPS PORTIONS OF NRN NY. WE PLACED A CHC OF SHOWERS IN AFTER MIDNIGHT...WITH A SLIGHT CHC OF THUNDERSTORMS NORTH OF THE MOHAWK VALLEY AND CAPITAL REGION...AS THE INSTABILITY LOOKS LIMITED INITIALLY. THE FCST AREA WILL BE GETTING INTO A HUMID AIR MASS WITH SFC DEWPTS INCREASING INTO THE MID TO U60S. LOWS WILL BE WARMER THAN THE PAST SEVERAL NIGHTS WITH MID AND U60S IN THE VALLEYS...AND LOWER TO MID 60S OVER THE MTNS.

MONDAY...A SEVERE WEATHER THREATS EXISTS...BUT THERE ARE SOME ISSUES BASED ON THE SHORT-RANGE GUIDANCE THAT MAY COMPLICATE MATTERS NORTH OF THE

CAPITAL REGION. THE NAM FIRES UP THE SECOND MCS QUICKLY EAST OF LAKE ONTARIO IN THE MORNING...AND DUMPS COPIOUS AMOUNTS OF RAINFALL OVER THE HSA /ON THE ORDER OF 1-3 INCHES/. THE BEST HEATING AND INSTABILITY THAT WOULD BE REALIZED WOULD BE FROM THE CAPITAL REGION SOUTHWARD. THE GFS /WHICH IS THE MODEL FAVORED HERE/ HAS A SHORT-WAVE AHEAD OF THE MAIN COLD FRONT FIRING CLUSTERS OR BANDS OF SHOWERS AND THUNDERSTORMS IN THE AFTERNOON. THE GFS SBCAPES ARE IN THE 1000-2000 J/KG RANGE WITH MID LEVEL LAPSE RATES STEEPENING TO 6.5-7C/KM. THE BEST LIFTED INDICES ARE BTWN -4C AND -7C. THE NAM LAPSE RATES ARE MICH WEAKER. THERE ARE SOME SIGNS OF AN ELEVATED MIXED LAPYER /EML/ UPSTREAM OVER THE UPPER MIDWEST/PLAINS...WE JUST ARE NOT SURE HOW THE EML WILL IMPACT THE ENTIRE AREA AT THIS TIME WITH POTENTIAL CONVECTIVE DEBRIS/ONGOING CONVECTION. THE BULK SHEAR VALUES IN THE 0-6KM LAYER ARE 30-40 KTS. THE LEFT FRONT QUADRANT OF A STRONG MID/UPPER JET STREAK WILL MOVE OVER PORTIONS OF UPSTATE NY/NEW ENGLAND IN THE PM...WHICH SHOULD ENHANCE THE CONVECTIVE POTENTIAL. NW FLOW SVR EVENTS ARE DOMINATED BY HAIL AND WIND DAMAGE BASED ON PAST LOCAL COMET/CSTAR STUDIES. THE CONVECTIVE MODE LOOKS TO BE DOMINATED BY MULTICELL CLUSTERS AND LINES.

FINALLY...A QUICK LOOK AT THE LATEST SPC SREF REVEALED HIGH PROBS /GREATER THAN 70%/ OF SBCAPE OR MLCAPE EXCEEDING 1000 J/KG. THE PROBS LOWER TO CHC VALUES AT THE 2000 J/KG THRESHOLD. OUR THINKING IS THAT AN OUTFLOW BOUNDARY WILL LIKELY COME OFF THE FIRST MCS THAT WILL MISS MOST OF THE REGION...BUT THIS BOUNDARY WILL INTERACT WITH THE NEXT SHORT-WAVE APPROACHING FROM THE WEST FOR A PERIOD OF STRONG TO SEVERE THUNDERSTORMS. OUR CONFIDENCE IS THE WEAKEST NORTH OF THE MOHAWK VALLEY...CAPITAL REGION...AND SRN VT...AND STRONGEST FROM THESE AREAS SOUTH. WE HAVE OPTED TO GO WITH ENHANCED WORDING IN THE GRIDS/ZONES THAT SOME THUNDERSTORMS MAY BE SEVERE IN THE AFTERNOON/EARLY EVENING AT ALL LOCATIONS. WE ALSO INCLUDED THE HVY RAIN THREAT WITH PWATS RISING TO 1.5-2.0 INCHES IN THE MUGGY AIR MASS. THESE PWATS ARE 1 TO 2 STANDARD DEVIATIONS ABOVE NORMAL BASED ON THE GLOBAL ENSEMBLES. THE SPC DAY 2 GRAPHIC SEEMS TO BE IN LINE WITH OUR THINKING. WE DIDN/T BUY INTO THE METMOS/NAM GUIDANCE...AND WE WENT CLOSE TO THE GFSMOS MAX TEMPS FOR MON...WITH HIGHS IN THE MID 80S TO L90S FROM THE CAPITAL REGION SOUTH AND EAST...AND U70S TO M80S NORTH AND WEST.

MONDAY NIGHT...THE CONVECTION DIMINISHES BY MIDNIGHT OVER THE SRN ZONES...AS HIGH PRESSURE WILL BE RIDGING IN FROM SOUTH OF JAMES BAY. WE KEPT SOME STRONG/SVR STORMS IN THE FCST SOUTH OF ALBANY WITH THE HVY RAINFALL PRIOR TO 04Z. THE COLD AIR ADVECTION IS NOT STRONG WITH THE FRONTAL PASSAGE. MIN TEMPS WILL GENERALLY BE IN THE 60S WITH SOME 50S OVER THE SRN DACKS.

TUESDAY...THE SFC HIGH BUILDS IN OVER NY WITH LOTS OF SUBSIDENCE. THE SKIES WILL BE MOSTLY SUNNY OVER MOST OF THE REGION WITH A BRIEF BREAK IN THE HUMIDITY LEVELS...BEFORE THE MID TO LATE WEEK HEAT COMES IN. WE ARE EXPECTING THE DEWPTS TO FALL INTO THE 50S OVER MOST OF THE CWA BY THE AFTERNOON. HIGHS WILL RANGE FROM THE LOWER TO U80S IN THE VALLEYS...AND M70S TO L80S OVER THE MTNS.

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SYNOPSIS...WASULA
SHORT TERM...WASULA
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From: Dan Keyser <keyser@atmos.albany.edu>
To: bosart@atmos.albany.edu
Date: Thu, 21 Jul 2011 14:39:56 +0000 (UTC)
Cc: keyser@atmos.albany.edu

Thursday 21 July 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR research on the role of lake-breeze boundaries in initiating convection in the Northeast is cited by Joe Villani in the fourth paragraph of the near-term section of this morning's AFD issued by NWS ALY.

Dan

FXUS61 KALY 210819
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
419 AM EDT THU JUL 21 2011

.SYNOPSIS...
A BERMUDA HIGH PRESSURE SYSTEM WILL DOMINATE OUR WEATHER WITH A SOUTHWEST FLOW OF HOT AND HUMID AIR FROM THE MIDWEST. THIS PATTERN WILL RESULT IN OPPRESSIVE HEAT AND HUMIDITY THROUGH FRIDAY. A FRONTAL PASSAGE ON SATURDAY SHOULD BRING SLIGHTLY COOLER AND LESS HUMID WEATHER...WITH EVEN COOLER AND MORE SEASONABLE TEMPERATURES IN STORE FOR SUNDAY.

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.NEAR TERM /THROUGH TONIGHT/...
...HOT AND HUMID CONDITIONS WILL AFFECT THE REGION TODAY...

AS OF 415 AM...EXCESSIVE HEAT WARNING AND/OR HEAT ADVISORIES REMAIN IN EFFECT FOR MOST OF THE AREA FOR TODAY. THE ONLY CHANGE TO CURRENT HEADLINES WAS TO UPGRADE EASTERN DUTCHESS COUNTY TO A WARNING. OTHERWISE...THE REST OF THE HEADLINES REMAIN AS THEY WERE ISSUED.

STILL WATCHING AN MCS TRACK GENERALLY EASTWARD ACROSS THE ONTARIO/QUEBEC BORDER JUST NORTH OF GEORGIAN BAY. THE POSITION OF THIS SYSTEM LINES UP WELL WITH THE SURFACE CYCLONE CENTER...WHICH HAS DEEPENED TO 994MB AT THIS TIME. MID-UPPER TROPOSPHERIC FLOW IS WEST-EAST IN VICINITY OF THE MCS NOW...ALTHOUGH THE TRAJECTORY BECOME MORE WNW-ESE ACROSS

NORTHERN NEW ENGLAND. GOOD AGREEMENT WITH MODEL GUIDANCE REGARDING THIS FEATURE...SO AM EXPECTING THE MCS TO REMAIN NORTH OF OUR AREA THIS MORNING...ALTHOUGH SOME HIGH LEVEL DEBRIS CLOUDS COULD MOVE ACROSS THE AREA.

THE MAIN STORY THIS AFTERNOON WILL BE THE OPPRESSIVE HEAT AND HUMIDITY THAT WILL GRIP THE REGION. 850MB TEMPS ARE FORECAST TO REACH +22C TO +24C THIS AFTERNOON. INCREASING SOUTHWEST FLOW ALOFT WITH 30-35 KT WINDS AT 850MB WILL ALLOW FOR COMPRESSIONAL WARMING EAST OF THE CATSKILLS WHICH WILL HELP BOOST TEMPS INTO THE MID TO PERHAPS UPPER 90S IN THE MID HUDSON VALLEY. MID 90S ARE EXPECTED FOR THE CAPITAL REGION AND UPPER HUDSON VALLEY AND OTHER VALLEY LOCATIONS. ELSEWHERE LOWER 90S SHOULD OCCUR EXCEPT FOR MOUNTAINOUS AREAS.

THE POTENTIAL FOR CONVECTION IS SOMEWHAT LOW FOR TODAY DUE TO THE WARM MID LEVEL TEMPS AND FORECAST SOUNDING SHOWING MULTIPLE INVERSIONS BETWEEN 850-700MB. HOWEVER...MLCAPE VALUES WILL BUILD TO AROUND 1500-2500 K/JG AS DEWPOINTS RISE INTO THE LOWER 70S. MID LEVEL LAPSE RATES COULD STEEPEN TO AROUND 6-6.5C/KM BETWEEN 850-500MB. SO...IF ANY UPDRAFTS CAN BREAK THROUGH THE LOW-MID LEVEL INVERSIONS THERE IS A LOW PROBABILITY OF SEVERE STORMS...ESPECIALLY GIVEN THE DEEP LAYER 0-6KM SHEAR OF 30-35 KT WHICH COULD ORGANIZE ANY CELLS INTO BOWING SEGMENTS OR CLUSTERS. THE MAIN QUESTION IS THE TRIGGER TO INITIATE STORMS. IN THESE TYPES OF SETUPS WITH A HOT AND HUMID AIR MASS IN PLACE AND LOTS OF CAPE...CSTAR RESEARCH HAS SHOWN LAKE BREEZE BOUNDARIES CAN INITIATE CONVECTION BUT DOES NOT HAPPEN EVERY TIME. THIS IS SOMETHING TO KEEP IN MIND AS A POTENTIAL TRIGGER. ALSO WHILE SUBTLE...DIFFERENTIAL HEATING DUE TO THE TERRAIN COULD ALLOW FOR ENOUGH LIFT. SO...WILL MENTION ISOLATED THUNDER TODAY BUT ANY STORMS THAT FORM HAVE THE POTENTIAL TO QUICKLY BECOME SEVERE WITH STRONG GUSTY WINDS THE MAIN THREAT. DOWNPOURS WILL ALSO BE LIKELY WITH HIGH PWATS AROUND 1.75 INCHES.

ANY CONVECTION THAT DOES DEVELOP SHOULD TEND TO DIMINISH AFTER SUNSET AND DAYTIME HEATING IS LOST SINCE THEY WILL NOT BE TIED TO ANY SYNOPTICALLY DRIVEN SYSTEM. IT WILL BE A MUGGY NIGHT WITH MINS ONLY IN THE LOWER TO PERHAPS MID 70S IN VALLEY LOCATIONS.

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SYNOPSIS...JPV
NEAR TERM...JPV
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Fri. 7/29/11
To: bosart@atmos.albany.edu
Date: Fri, 29 Jul 2011 14:50:49 +0000 (UTC)

Friday 29 July 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR warm-season cutoff low research is mentioned in the seventh paragraph of the near-term section of this morning's AFD issued by NWS
ALY.

Dan

FXUS61 KALY 290840
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
430 AM EDT FRI JUL 29 2011

.SYNOPSIS...
A HUMID AIR MASS WILL BE IN PLACE TODAY AS A COLD FRONT AND DISTURBANCE MOVES ACROSS THE REGION LATER TODAY. THESE WILL COMBINED TO PRODUCE SHOWERS AND SCATTERED THUNDERSTORMS. SOME OF THE THUNDERSTORMS COULD CONTAIN HEAVY RAINFALL AND GUSTY WINDS. HIGH PRESSURE WILL BUILD INTO THE GREAT LAKES REGION FOR THE WEEKEND. A WEAK COLD FRONT WILL MOVE INTO NEW YORK AND NEW ENGLAND MONDAY.

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.NEAR TERM /THROUGH TONIGHT/...
AS OF 400 AM...FOLLOWING AN IMPRESSIVE CELL WORKING WORKING TOWARD BUFFALO...THE BEGINNINGS OF A MCS BREWING OVER MICHIGAN. BUFFALO HAS ALREADY ISSUED A SEVERE THUNDERSTORM ON THIS WARNING. THE STRONGER CELL IS SPLITTING AND HEADING ESE.

OUR ENTIRE COUNTY WARNING REMAINED FREE OF SHOWERS OR THUNDERSTORMS.

A SEVERE THUNDERSTORM WATCH HAS ACTUALLY BEEN ISSUED BUFFALO`S REGION OF RESPONSIBILITY (WESTERN NEW YORK STATE).

THE MCS COMPLEX LOOKS TO INITIALLY MOVE ESE BASED ON THE H850-700 THETA E RIDGE ORIENTATION. HOWEVER...A THE NOSE OF A H850 LOW LEVEL JET INCREASES ACROSS THE REGION...THE ATMOSPHERE ALOFT COULD RAPIDLY DESTABILIZE AFTER SUNRISE...INITIALLY TO THE NORTHWEST. THE THETA E RIDGE WILL BUILD NORTHEAST ACROSS THE REGION.

MORE SHOWERS AND THUNDERSTORMS WILL LIKELY POP UP THROUGHOUT THE DAY ACROSS THE REGION. PWAT VALUES LOOK TO INCREASE TO WELL OVER 2.00 INCHES...SO THERE WILL A LOT OF MOISTURE LOADING AVAILABLE IN THE CLOUDS TO PRODUCE HEAVY RAINFALL. ALSO...THE BULK SHEAR WILL INCREASE MARKEDLY...TO ABOUT 40KTS.

THE STORM PREDICTION CENTER (SPC) HAS PLACED MOST OUR REGION IN SLIGHT RISK FOR SEVERE THUNDERSTORMS TODAY. THE WILD CARD IN ALL OF THIS IS HOW MUCH HEATING (SUNSHINE) WILL WE RECEIVE? MOST GUIDANCE SUGGEST LIMITED

SUNSHINE AT BEST...AS UPSTREAM OBS SUPPORT MORE CLOUDS THAN SUNSHINE. HOWEVER...IT WOULD NOT TAKE MUCH HEATING TO PRODUCE HEFTY SBCAPES OVER 1000 J/KG. IF THIS WERE TO HAPPEN...THE THREAT OF SEVERE THUNDERSTORMS WOULD INCREASE QUITE A BIT AS THERE WOULD PLENTY OF ENERGY FOR TALL THUNDER TO COMMENCE AND ANY LARGE CELLS COULD BECOME ORGANIZED INTO MULTI-CELL STRUCTURES CAPABLE OF PRODUCING DAMAGING WINDS. THERE COULD EVEN A SUPER CELL OR TWO. FOR NOW...WILL FOLLOW SPC`S LEAD AND CONTINUE WITH "THUNDERSTORMS MIGHT CONTAIN GUSTY WINDS AND HEAVY RAINFALL"

CORFIDI VECTORS INDICATED THE CELLS OR CLUSTER OF THUNDERSTORMS SHOULD BE PROGRESSIVE AND NOT TEND TO BACKBUILD. TRAINING CELLS IS ALWAYS A POSSIBILITY BUT EITHER WAY...CONFIDENCE WAS TOO LOW TO ISSUE A FLASH FLOOD WATCH WITH THIS PACKAGE. SEE MORE ABOUT HYDROLOGY CONCERNS IN OUR HYDROLOGY SECTION OF THE AREA FORECAST DISCUSSION (AFD). ALSO...THE SYNOPTIC SETUP (DERIVED FROM CSTAR RESEARCH) IS NOT IDEAL FOR FLASH FLOODING. THERE IS NO CUTOFF LOW TO OUR NORTHWEST OVER SOUTHERN CANADA...BUT AN OPEN WAVE MOVING QUITE QUICKLY.

WITH THE ANTICIPATED CLOUD COVER MUCH OF THE DAY...LEANED A LITTLE MORE WITH THE LOWER MAV NOS BUT IT WILL BE QUITE HUMID WITH DEWPOINTS CREEPING INTO THE 70S.

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SYNOPSIS...HWJIV
NEAR TERM...HWJIV
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Th. 8/11/11
To: bosart@atmos.albany.edu
Date: Thu, 11 Aug 2011 20:58:37 +0000 (UTC)

Thursday 11 August 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR warm-season cutoff low research is mentioned in the second paragraph of the long-term section of this afternoon's AFD issued by
NWS ALY.

Dan

FXUS61 KALY 112003
AFDALY
AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
403 PM EDT THU AUG 11 2011

.SYNOPSIS...
A RELATIVELY COOL AND DRY AIR MASS WILL PERSIST THROUGH FRIDAY...AS HIGH PRESSURE DRIFTS ACROSS THE REGION. AS THE HIGH MOVES OFF THE COAST ON SATURDAY...WARMTH AND HUMIDITY LEVELS WILL BEGIN TO INCREASE. A DEVELOPING CUT OFF LOW PRESSURE SYSTEM MAY BRING A SOAKING RAINFALL FOR THE LAST HALF OF THE WEEKEND INTO EARLY NEXT
WEEK.

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.LONG TERM /SUNDAY THROUGH THURSDAY/...
SHORT WAVE...SEEN IN THE H2O VAPOR LOOP OVER THE BIG SKY COUNTRY OF MONTANA...WILL BECOME OUR MAIN WEATHER PLAYER FOR THE START OF THIS EXTENDED PERIOD. ALL GLOBAL MODELS SUGGEST A RATHER DEEP ANOMALOUS TROUGH DEVELOPING OVER THE EASTERN U.S. ON SUNDAY. PWAT ANOMALY OVER THE CWFA FROM THE GEFS POINT TOWARD 1-2 STANDARD DEVIATIONS ABOVE NORMAL AND 850MB V-COMPONENT WIND MAGNITUDES 3-4 STANDARD DEVIATIONS ABOVE NORMAL. QPF FROM VARIOUS MODELS ALL SUGGEST 1-2 INCHES OF RAIN WITH LOCALLY HIGHER AMOUNTS INTO THE TERRAIN. WHERE THE HIGHEST RAINFALL OCCURS...ALONG WITH THE CHANCE OF EMBEDDED CONVECTION...REMAINS TO BE SEEN. AT THIS TIME...WE WILL PLACE LIKELY POPS AND CONTINUE TO HIGHLIGHT IN THE HWO.

SUN NT INTO MON...THE MAIN SURGE OF MOISTURE IS EXPECTED TO LIFT NORTH OF THE REGION. THIS PLACES US WITHIN EITHER A DRY SLOT OR DEFORMATION AXIS AS THIS UPPER TROUGH SLOWLY MIGRATES EASTWARD. AS SUGGESTED BY CSTAR RESEARCH...THESE UPPER LOWS CAN PLAY HAVOC OVER THE REGION AND WE WILL KEEP POPS IN THE FORECAST AT THIS TIME.

TUE-THU...HIGH PRESSURE WILL BUILD INTO THE REGION WITH DRIER AND MORE TRANQUIL CONDITIONS. THERE IS A HINT OF A FRONTAL BOUNDARY APPROACHING ON THURSDAY FROM CENTRAL CANADA THAT HPC AND THE LATEST HIRES-ECMWF SUGGEST. AT THIS TIME...DUE TO LOW CONFIDENCE...WE WILL PLACE ONLY SLIGHT CHANCE FOR PRECIP.

TEMPERATURES THROUGH THE PERIOD SHOULD AVERAGE NEAR TO SLIGHTLY BELOW NORMAL WITH PRECIPITATION ABOVE NORMAL.

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SYNOPSIS...JPV
LONG TERM...BGM
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Mon. 8/15/11
To: bosart@atmos.albany.edu
Date: Mon, 15 Aug 2011 15:03:39 +0000 (UTC)

Monday 15 August 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR warm-season cutoff low research is cited in the second paragraph of the near-term section of yesterday afternoon's AFD issued by NWS ALY.

Dan

FXUS61 KALY 142031
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
431 PM EDT SUN AUG 14 2011

.SYNOPSIS...
A COMPLEX LOW PRESSURE SYSTEM WILL AFFECT THE REGION BRINGING HEAVY RAINFALL TO THE AREA. THE SYSTEM WILL DEPART THE REGION BY MID WEEK WITH FAIR WEATHER RETURNING.

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.NEAR TERM /THROUGH MONDAY/...
...FLOOD WATCH ISSUED FOR THE HUDSON RIVER VALLEY EASTWARD AND FOR THE ADJACENT WESTERN NEW ENGLAND THROUGH MONDAY...

MODELS CONTINUE TO INDICATE HEAVY RAINFALL ACROSS THE FORECAST AREA TONIGHT INTO MONDAY. HOWEVER HOW MUCH AND WHERE THE IT FALLS STILL IS NOT CLEAR. MODEL GUIDANCE AND WATER VAPOR SUGGESTS AN UPPER LOW WILL CLOSE OFF FOR A TIME THIS EVENING BUT WILL OPEN WITH THE TROUGH REMAINING POSITIVELY TILTED. WITH POSITION OF UPPER LOW CSTAR WARM SEASON CLOSE OFF LOW RESEARCH SHOWS HEAVY RAINFALL WOULD OCCUR ACROSS THE FORECAST AREA.

THE MODELS DO NOT PLACE THE HEAVIEST RAINFALL IN THE SAME PLACE...HOWEVER THEY DO INDICATE WIDESPREAD 1 TO 3 INCHES WITH HIGHER AMOUNTS EXPECTED. THE NAM IS NOT PICKING UP ON THE CONVECTION ACROSS WESTERN INTO CENTRAL NEW YORK...WHERE THE GFS INDICATES SOME CONVECTION ACROSS THAT AREA. CONVECTION HAS FIRED UP IN THE UNSTABLE AIRMASS AHEAD OF THE FRONTAL BOUNDARY ACROSS THE EASTERN GREAT LAKES AND NORTHERN NEW YORK. MODEL GUIDANCE INDICATES COVERAGE OF PRECIPITATION WILL INCREASE FROM THE NORTH...WEST AND SOUTH AND DEVELOP ACROSS THE AREA. HPC HAS PLACED EAST CENTRAL NEW YORK GENERALLY THE HUDSON RIVER VALLEY EASTWARD AND WESTERN NEW ENGLAND IN THE SLIGHT RISK AREA FOR EXCESSIVE RAINFALL...POTENTIAL TO EXCEEDFLASH FLOOD GUIDANCE. WATER VAPOR SHOWS A PLUME OF DEEP SUBTROPICAL MOISTURE ALONG THE EAST COAST AHEAD OF THE DEEPENING TROUGH. THIS MOISTURE FEED WILL CONTINUE AS THE LOW LEVEL JET MOVES INTO THE REGION AS THE SURFACE LOW CONTINUES TO DEVELOP ALONG THE MID ATLANTIC REGION/DELMARVA TONIGHT. LOCALLY HIGHER RAINFALL TOTALS ARE EXPECTED WITH EMBEDDED CONVECTION. HAVE USED HPC AND THE NORTHEAST

RIVER FORECAST CENTER GUIDANCE FOR QPF. HAVE ISSUED A FLOOD WATCH FOR THE HUDSON RIVER VALLEY EASTWARD AND FOR THE ADJACENT WESTERN NEW ENGLAND THROUGH MONDAY.

PRECIPITATION WILL MONDAY CONTINUE AS THE SURFACE LOW PASSES JUST SOUTH OF LONG ISLAND AND THE UPPER TROUGH APPROACHES PROVIDES LARGE SCALE ASCENT.

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SYNOPSIS...IAA
NEAR TERM...IAA
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From: Dan Keyser <keyser@atmos.albany.edu>
To: bosart@atmos.albany.edu
Date: Thu, 18 Aug 2011 21:31:48 +0000 (UTC)

Thursday 18 August 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

A local CSTAR study on forecasting large hail is cited in the first paragraph of the near-term section of this afternoon's AFD issued by NWS ALY.

Dan

FXUS61 KALY 182021
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
421 PM EDT THU AUG 18 2011

.SYNOPSIS...
A WEAK DISTURBANCE WILL PRODUCE ISOLATED TO SCATTERED SHOWERS AND THUNDERSTORMS TONIGHT. A WEAK COLD FRONT WILL BRING A CHANCE OF SHOWERS AND THUNDERSTORMS AGAIN TOMORROW. AN UPPER LEVEL DISTURBANCE AND ANOTHER COLD FRONT WILL CONTINUE TO BRING ISOLATED TO SCATTERED SHOWERS AND THUNDERSTORMS DURING THE WEEKEND.

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.NEAR TERM /UNTIL 6 AM FRIDAY MORNING/...
AS OF 400 PM EDT...SOME LOOSELY ORGANIZED OR PULSE THUNDERSTORMS HAVE DEVELOPED AHEAD OF A SFC TROUGH PASSING ACROSS THE CAPITAL REGION...ERN CATSKILLS...MID HUDSON VALLEY...AND INTO WRN NEW ENGLAND. SOME THE 50 DBZ REFLECTIVITY CORES ARE GETTING TO AROUND 30-32 KFT AGL. ACCORDING TO THE LOCAL CSTAR LARGE HAIL STUDY REF VALUES GETTING TO ABOUT 30 KFT AGL MAY

YIELD SOME QUARTER SIZE HAIL. NO SEVERE REPORTS AS OF YET...AND THESE THUNDERSTORMS CONTINUE TO PULSE UP AND DOWN WITH WEAK DEEP LAYER SHEAR OF 15-25 KTS...BUT AN ABUNDANCE OF INSTABILITY /SPC PAGE HAS MLCAPES OF 1000-2000 J/KG/. SOME MARGINAL HAIL MAY BE POSSIBLE...AS WELL AS SOME BURSTS OF HEAVY RAIN /1-2 INCHES IN AN HOUR/ DUE TO THE SLOW MOVEMENT OF THE THUNDERSTORMS 10-20 KTS. PWATS ARE CURRENTLY IN 1-1.33 INCH RANGE WHICH IS ONLY SLIGHTLY ABOVE NORMAL.

WE WILL MONITOR FOR ANY POOR DRAINAGE FLOODING ON LOW LYING AREAS. THE GREATEST THREAT FOR THE SHOWERS AND THUNDERSTORMS WILL CONTINUE TO BE FROM THE CAPITAL REGION SOUTH AND EAST PRIOR TO MIDNIGHT...WITH ISOLD SHOWERS AND THUNDERSTORMS NORTH AND WEST. THE CONVECTION SHOULD DIMINISH WITH THE LOSS OF THE DIURNAL HEATING AND WANING INSTABILITY.

WE ALSO PLACED SOME PATCHY FOG IN THE VALLEYS OVERNIGHT...AND INCREASED THE PATCHY FOG FROM THE HUDSON RIVER VALLEY INTO WRN NEW ENGLAND TOWARDS DAYBREAK WITH THE INCREASING LOW LEVEL MOISTURE AND/OR WET GROUND FROM THE ISOLD-SCT SHOWERS AND THUNDERSTORMS.

WE WENT WITH THE MILDER/WARMER MINS FROM THE NAM MOS WITH LOWS IN THE LOWER TO MID 60S ACROSS THE REGION...EXCEPT SOME MID AND U50S OVER THE SRN GREENS...SRN DACKS...AND ERN CATSKILLS.

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SYNOPSIS...WASULA
NEAR TERM...WASULA
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From: Dan Keyser <keyser@atmos.albany.edu>
To: bosart@atmos.albany.edu
Date: Wed, 24 Aug 2011 14:52:08 +0000 (UTC)

Wednesday 24 August 2011

Lance,

The possibility that a predecessor rain event will affect eastern New York and western New England during the upcoming weekend is mentioned in the fourth paragraph of the long-term section of yesterday afternoon's AFD issued by NWS ALY.

Dan

FXUS61 KALY 232016
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
416 PM EDT TUE AUG 23 2011

.SYNOPSIS...

HIGH PRESSURE WILL GRADUALLY SLIDE OFF THE EASTERN SEABOARD LATE TONIGHT INTO WEDNESDAY MORNING. A DEVELOPING SOUTHERLY FLOW WILL BRING WARMER AND BREEZY CONDITIONS TO THE REGION FOR WEDNESDAY. UNSETTLED WEATHER WILL RETURN FOR THURSDAY WITH SHOWERS AND THUNDERSTORMS EXPECTED AHEAD OF A COLD FRONT ADVANCING EASTWARD ACROSS THE REGION. FAIR WEATHER SHOULD RETURN ON FRIDAY AS HIGH PRESSURE BUILDS BACK IN.

&&

.LONG TERM /FRIDAY NIGHT THROUGH TUESDAY/...-
POPULATED MAINLY WITH HPC.

THE FORECAST STARTS TRANQUIL ENOUGH ON FRIDAY WITH HIGH PRESSURE STILL IN CONTROL. THE AIR MASS LOOKS SEASONABLE WITH COMFORTABLE HUMIDITY LEVELS AND DRY CONDITION.

AFTER THAT...ALL BETS ARE OFF. HIGH PRESSURE WEAKENS AND SLIPS OFF SHORE. HURRICANE IRENE LOOKS TO TRACK SOMEWHERE UP ALONG OR JUST OFF THE EASTERN SEABOARD. IT COULD BE A POWERFUL HURRICANE AS IT TRACKS NORTHWARD FROM THE CAROLINAS TO COASTAL NEW ENGLAND.

ON SATURDAY INTO SATURDAY NIGHT...WE MIGHT HAVE TO DEAL WITH PRE-RAINFALL EVENT (PRE)...WHICH IS AN AREA OF RAIN THAT OCCASIONALLY FORMS WELL AHEAD OF MAIN TROPICAL CENTER. AT THAT TIME...THE STORM WILL STILL BE TO OUR SOUTH AND EAST.

BOTH MODELS DO NOT DEPICT A LOT OF RAIN WITH ANY PRE IN OUR REGION...BUT WE FELT IT WAS WARRANTED TO PLACE A CHANCE IN THE GRIDS...ESPECIALLY DURING THE AFTERNOON INTO THE EVENING.

THE MAIN EVENT LOOKS TO BE ON SUNDAY INTO SUNDAY EVENING AS IRENE EITHER PASSES OVERHEAD...OR TO OUR EAST. EITHER WAY...IT IS A GOOD BET AT THE VERY LEAST...WE WILL GET A SOAKING RAIN FROM THE STORM. WENT WITH LIKELY POPS ON SATURDAY (DAY6) WHICH WE RARELY DO...BUT THIS CASE WARRANTS IT.

THE EXACT TRACK IS STILL NOT CERTAIN AND DEPENDS A LOT ON THE INTERACTION OF A SHORT WAVE TROUGH IN THE JETSTREAM TO THE NORTH.

AS THEY SAY IN SHOW BIZ..."STAY TUNED".

THE STORM LOOKS TO PAST TO OUR NORTHEAST ON MONDAY...ALLOWING FOR DRIER AIR TO MOVE BACK.

ANOTHER WEAKER DISTURBANCE IN THE NORTHERN JETSTREAM MIGHT BRING A FEW SHOWERS ON TUESDAY. FOR NOW...JUST WENT WITH SLIGHT SHOWERS ON
THAT DAY.

TEMPERATURES WILL BE IN THE MID 70S TO LOWER 80S ON FRIDAY...ONLY IN THE 70S ON SATURDAY ON SUNDAY DUE TO MORE CLOUDS AND ANTICIPATED SHOWERS/RAIN...AND STAYING IN THE 70S ON MONDAY DUE TO A COOLER CANADIAN AIR MASS MOVING IN. LOWS WILL GENERALLY BE IN THE 60S.

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SYNOPSIS...JPV
LONG TERM...HWJIV
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Wed. 8/24/11
To: bosart@atmos.albany.edu
Date: Wed, 24 Aug 2011 15:06:25 +0000 (UTC)

Wednesday 24 August 2011

Lance,

CSTAR research on PREs (predecessor rain events) is cited in the second paragraph and the possibility that a PRE will affect eastern New York and western New England during the upcoming weekend is mentioned in the third paragraph of the long-term section of this morning's AFD issued by NWS ALY.

Dan

FXUS61 KALY 240827
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
427 AM EDT WED AUG 24 2011

.SYNOPSIS...
HIGH PRESSURE WILL SLIDE OFF THE EASTERN SEABOARD THIS MORNING. A DEVELOPING SOUTHERLY FLOW WILL BRING WARMER AND BREEZY CONDITIONS TO THE REGION TODAY. UNSETTLED WEATHER WILL RETURN FOR THURSDAY WITH SHOWERS AND THUNDERSTORMS EXPECTED AHEAD OF A COLD FRONT ADVANCING EASTWARD ACROSS THE REGION. FAIR WEATHER SHOULD RETURN ON FRIDAY AS HIGH PRESSURE BUILDS BACK IN.

&&

.LONG TERM /SATURDAY THROUGH TUESDAY/...
...MAIN EMPHASIS WILL BE THE POTENTIAL IMPACT FROM HURRICANE IRENE...
THE MAIN THREAT WINDOW FROM THE IMPACTS OF HURRICANE IRENE WILL BE THIS WEEKEND FOR THE LOCAL REGION. A WEALTH OF ENVIRONMENTAL DATA FROM THE NOAA HIGH ALTITUDE JET AND HURRICANE HUNTER AIRCRAFTS HAVE BEEN INGESTED IN THE GLOBAL MODEL DATASETS THIS MORNING. THIS HAS RESULTED IN NARROWING THE WINDOW OF THE EVENTUAL TRACK AND TIMING OF THIS TROPICAL SYSTEM. HOWEVER...RAINFALL DISTRIBUTION ALONG WITH RECENT CSTAR RESEARCH OF A POTENTIAL "PRE" MAY BRING ABOUT LARGE SWINGS OF RAINFALL LOCATION AND AMOUNTS /WHICH COULD BE SEVERAL INCHES OF RAIN/. FOR THE LATEST INFORMATION ON THE OFFICIAL TRACK ON IRENE...PLEASE REFER TO THE NATIONAL HURRICANE CENTER.

CLOUDS ASSOCIATED WITH IRENE ARE EXPECTED TO OVERSPREAD THE REGION FROM SOUTH TO NORTH DURING SATURDAY WITH THAT POTENTIAL "PRE" DEVELOPMENT EITHER ALONG OR EAST OF THE HUDSON RIVER LATE IN THE DAY WHERE CURRENT GUIDANCE SUGGESTS THE CONFLUENCE WILL BE MAXIMIZED. THEN RAIN ALONG WITH INCREASING WINDS ARE EXPECTED SATURDAY NIGHT INTO SUNDAY. AS SUGGESTED BY THE PREVIOUS FORECAST...WE WILL CONTINUE WITH THE LIKELY POPS ON SUNDAY. THE MAIN QUESTION TO THIS FORECAST WITH THE APPROACH OF IRENE WILL BE THE SHORT WAVE TROUGH THAT IS CURRENTLY APPROACHING THE BRITISH COLUMBIA COAST. THE TIMING OF THIS FEATURE WILL BE KEY TO THE EVENTUAL TRACK OF IRENE AND ITS DURATION ACROSS THE REGION.

ONCE IRENE LEAVES THE PICTURE...MAINLY DRY AND SEASONABLE CONDITIONS RETURN FOR THE EARLY START OF NEXT WEEK.

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SYNOPSIS...KL/JPV
LONG TERM...BGM
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Wed. 8/24/11
To: bosart@atmos.albany.edu
Date: Wed, 24 Aug 2011 21:28:15 +0000 (UTC)

Wednesday 24 August 2011

Lance,

It is stated in the fourth paragraph of the long-term section of this afternoon's AFD issued by NWS ALY that conditions are not considered favorable for the occurrence of a PRE over the ALY CWA during the upcoming weekend.

Dan

FXUS61 KALY 241921
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
321 PM EDT WED AUG 24 2011

.SYNOPSIS...
A STORM LIFTING TOWARD JAMES BAY WILL DRAG A WARM FRONT ACROSS THE REGION THIS EVENING AND A COLD FRONT THURSDAY. HIGH PRESSURE WILL BUILD EAST FROM THE GREAT LAKES TO START THE WEEKEND. HURRICANE IRENE WILL TRACK OFF THE ATLANTIC SEABOARD FROM THE VIRGINIA CAPES LATE SATURDAY TO THE NEW ENGLAND COAST SUNDAY NIGHT.

&&

LONG TERM /SUNDAY THROUGH WEDNESDAY/...
MAIN EMPHASIS WILL BE THE POTENTIAL IMPACT FROM HURRICANE IRENE...

NHC TRACK AND GFS FAIRLY CLOSE. POPULATED WITH HPC GRIDS AND MADE MINOR TWEEKS USING GMOS. WINDS POPULATED WITH TCM TOOL DURING IMPACT PERIOD FM IRENE.

CURRENT NHC FCST KEEPS IRENE IN CLOSE TO COAST ~150 MILES OFF NJ SUN MORNING...MVNG NE MAKING LANDFALL IN SE NEW ENG AND MOVING INTO MAINE SUNDAY NIGHT.

THIS TRACK WILL RESULT IN SHARP GRADIENTS OF WINDS AN QPF ACROSS THE FCA SUN INTO MONDAY. CURRENT TRACK AND THINKING WILL BRING RAIN INTO SE SAT NIGHT AND INTO MOST OF FCA SUNDAY. AMOUNTS WILL VARY GREATLY FM A FEW TENTHS ALONG THE WESTERN PERIPHERY OF FCA TO POSSIBLY 5 PLUS INCHES IN THE EAST. THE GENERAL JET STRUCTURE DOESN'T APPEAR TO BE FAVORABLE FOR A CSTAR "PRE" WITH THIS STORM OVER FCA AS A COUPLED JET PATTERN IS LACKING ATTM.

GIVEN THE SHARP GRADIENTS OF WINDS AND RAINFALL AND THE RANGE OF TRACKS POSSIBLE THERE COULD BE SIGNIFICANT RAINFALL AND WINDS PARTICULARLY IN THE EAST AREAS...OR IF FURTHER SHIFTING TO THE EAST OCCURS WITH THE HURRICANE TRACK THE RESULT WOULD BE MINIMAL IMPACTS OR SOMETHING AKIN TO A PASSING NOR EASTER IN MARCH WITHOUT THE SNOW.

IF THERE'S A TYPICAL ERROR IN THE TRACK FORECASTS OF MODEL SUITE ITS THESE SYSTEMS DEPART SOONER THAN LATER. ALL MODELS END EFFECTS OF IRENE SUN NIGHT AS IT RACES INTO INTO THE MARITIMES AND BCMS EXTRATROPICAL.

IN ITS WAKE A SOMEWHAT COOLER SFC HIGH DROPS INTO THE GRTLKS RGN IN WNW 500HPA FLOW. MONDAY A 500HPA A SHORT WAVE PASSES THROUGH BUT GIVEN SUBSIDENCE IN THE WAKE OF IRENE IT WOULD PROBABLY DO NO MORE THAN INCR CLOUDS. THE EFP ENDS WITH FAIR WX WITH A BUILDING RIDGE AT 500HPA AND THE LARGE GRTLKS SFC HIGH SLIDING OFFSHORE.

TEMPS WILL START THE PERIOD BLO NORMALS RISING TO NR OR ABV THEM BY THE END. AFT MON MORNING WINDS WILL BE LT AND VRBL.

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SYNOPSIS...SNYDER
LONG TERM...SNYDER
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Th. 8/25/11
To: bosart@atmos.albany.edu
Date: Thu, 25 Aug 2011 14:18:33 +0000 (UTC)

Thursday 25 August 2011

Lance,

CSTAR research on PREs is emphasized in the third paragraph of the long-term section of this morning's AFD issued by NWS ALY.

Dan

FXUS61 KALY 250833
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
433 AM EDT THU AUG 25 2011

.SYNOPSIS...
A LOW PRESSURE SYSTEM LIFTING TOWARD JAMES BAY WILL DRAG A COLD FRONT ACROSS THE REGION THIS AFTERNOON AND EVENING...PRECEDED AND ACCOMPANIED BY SHOWERS AND THUNDERSTORMS. HIGH PRESSURE WILL BUILD EAST FROM THE GREAT LAKES LATE TONIGHT INTO FRIDAY...PROVIDING FAIR WEATHER AND SEASONABLY WARM TEMPERATURES. DEPENDING ON THE EXACT TRACK OF IRENE...CLOUDS AND RAIN MAY SPREAD NORTHWARD INTO THE REGION BY LATE SATURDAY.

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.LONG TERM /SATURDAY NIGHT THROUGH WEDNESDAY/...
...ALL EYES ARE ON HURRICANE IRENE AND ITS POTENTIAL IMPACTS...

OVER 1/2 OF THE COUNTRY IS PARTICIPATING WITH SPECIAL UPPER AIR SOUNDINGS ALONG WITH NOAA AIRCRAFT AND HURRICANE HUNTERS TO BETTER ASCERTAIN THE TROPOSPHERE WITH THE APPROACH OF HURRICANE IRENE. LATEST GLOBAL MODELS ALONG WITH THE GFDL/HWRF ARE INCORPORATING THIS WEALTH OF INFORMATION WITH THE 00Z TRACK GUIDANCE TRENDING WEST. PLEASE REFER TO THE LATEST OFFICIAL FORECAST FROM THE NATIONAL HURRICANE CENTER.

THE IMPACTS FROM IRENE WILL BE FELT THIS WEEKEND ALONG WITH THE POTENTIAL OF "PRE" DEVELOPMENT OVER THE CWFA. AS UPPER JET DEVELOPS TO OUR NORTH ALONG WITH INCREASED CONFLUENCE IN THE MID LEVELS...POINTS TO A POTENTIAL "PRE" RAINFALL EVENT SATURDAY NIGHT. THIS IS GOOD AGREEMENT WITH THE CSTAR RESEARCH ALONG WITH COLLABORATION WITH NEIGHBORING OFFICES AND HPC. THEN RAINFALL DIRECTLY ASSOCIATED WITH IRENE IS EXPECTED OVERNIGHT SATURDAY INTO SUNDAY. ISOLATED RAINFALL AMOUNTS UP TO 10 INCHES ARE POSSIBLE...ESPECIALLY WHERE THE "PRE" DEVELOPS ALONG WITH FAVORABLE UPSLOPE CONDITIONS FOR PORTIONS OF THE CATSKILLS...NW CT...BERKS...SOUTHERN GREENS AND THE DACKS. CHANCES ARE INCREASING THAT A FLOOD WATCH HEADLINES MAY BE NEEDED FOR THE REGION.

WIND FORECASTS WILL BE A CHALLENGE AS THE COMBINATION OF A FURTHER WEST TRACK COULD POSE A THREAT FOR DAMAGING WIND GUSTS...ESPECIALLY WITH FUNNELING WITHIN THE HUDSON RIVER VALLEY. AT THIS TIME...WE WILL FOLLOW GUIDANCE FROM NHC/TPC WITH THE TCM WIND TOOL.

IRENE QUICKLY DEPARTS LATE SUNDAY NIGHT INTO CANADA WITH SOME LINGERING EFFECTS NORTH OF ALBANY POSSIBLE EARLY MONDAY MORNING. THEREAFTER...RATHER TRANQUIL AND SEASONABLE CONDITIONS FOR THE FIRST HALF OF NEXT WEEK WITH HIGH PRESSURE IN CONTROL.

PER NHC/TPC...USERS ARE ONCE AGAIN REMINDED NOT TO FOCUS ON SPECIFIC FORECAST POINTS BUT THE ENVELOPE CONE SINCE TRACK ERRORS ARE LARGE AT THESE LONGER TERM FORECASTS.

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SYNOPSIS...KL
LONG TERM...BGM
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Th. 8/25/11
To: bosart@atmos.albany.edu

Thursday 25 August 2011

Lance,

It is stated in the second paragraph of the short-term section of this afternoon's AFD issued by NWS ALY that conditions are not considered favorable at this time for the occurrence of a PRE over the ALY CWA this coming Saturday but that this assessment is subject to change.

Dan

FXUS61 KALY 252002
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
402 PM EDT THU AUG 25 2011

.SYNOPSIS...
A COLD FRONT WILL MOVE ACROSS THE REGION THIS AFTERNOON AND EVENING...ACCOMPANIED BY SHOWERS AND THUNDERSTORMS. HIGH PRESSURE WILL BUILD EASTWARD ROM THE GREAT LAKES INTO OUR REGION LATE TONIGHT INTO FRIDAY...PROVIDING FAIR WEATHER AND SEASONABLY WARM TEMPERATURES. DEPENDING ON THE EXACT TRACK OF IRENE...CLOUDS AND RAIN MAY SPREAD NORTHWARD INTO THE REGION BY LATE SATURDAY OR SATURDAY NIGHT. IT APPEARS IRENE WILL IMPACT THE REGION FROM LATE SATURDAY NIGHT INTO SUNDAY NIGHT WITH THE POTENTIAL FOR HEAVY RAINFALL AND STRONG WINDS.

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.SHORT TERM /FRIDAY NIGHT THROUGH SATURDAY NIGHT/...
AS OF 400 PM...QUIET WEATHER SHOULD PERSIST THROUGH FRIDAY NIGHT WITH WEAK HIGH PRESSURE REMAINING ACROSS THE AREA. HOWEVER...HURRICANE IRENE WILL BE

OMINOUSLY TRACKING NORTHWARD TO A POSITION JUST SOUTH OF THE OUTER BANKS OF NORTH CAROLINA BY 8 AM SATURDAY.

IT APPEARS SATURDAY WILL BE MAINLY DRY ACROSS THE AREA...AS RAINFALL DIRECTLY ASSOCIATED WITH IRENE WILL REMAIN WELL SOUTH. HOWEVER...UPPER LEVEL DIVERGENCE WILL BE INCREASING AS AN UPPER LEVEL JET DEVELOPS OVER THE THE REGION. THE MAIN AREA OF DIVERGENCE MAY SET UP TO OUR SOUTH...BUT WILL AT LEAST MENTION LOW CHANCE POPS FOR THE SOUTHEAST 2/3 OF THE AREA LATE IN THE DAY FOR ANY POTENTIAL SHOWERS THAT MAY POP UP. THE OVERALL POSITION OF THE UPPER JET DOES NOT APPEAR TO FAVOR DEVELOPMENT OF A PRE...OR PREDECESSOR RAIN EVENT IN OUR AREA BUT THIS COULD CHANGE. HIGH LEVEL CLOUDS WILL BE INCREASING FROM THE SOUTH AHEAD OF IRENE...AN WILL FILTER AND/OR DIM THE SUNSHINE SATURDAY AFTERNOON.

DIRECT RAINFALL FROM IRENE COULD BEGIN AS EARLY AS SHORTLY AFTER MIDNIGHT SATURDAY NIGHT ACROSS SOUTHERN AREAS. MODERATE TO POTENTIALLY HEAVY RAIN COULD COMMENCE BY SUNRISE SUNDAY MAINLY FROM ALBANY SOUTHWARD. THE EXACT TRACK AND TIMING OF RAINFALL ARRIVING FROM IRENE IS STILL NOT CERTAIN. PLEASE REFER TO REFER TO STATEMENTS ISSUED BY THE THE NATIONAL HURRICANE CENTER HTTP:/WWW.NHC.NOAA.GOV FOR UPDATES REGARDING HURRICANE IRENE.

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SYNOPSIS...JPV
SHORT TERM...JPV
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Fri. 8/26/11
To: bosart@atmos.albany.edu
Date: Fri, 26 Aug 2011 14:51:37 +0000 (UTC)

Friday 26 August 2011

Lance,
It is stated in the second paragraph of the short-term section of this morning's AFD issued by NWS ALY that conditions are not considered conducive to the occurrence of a PRE over the ALY CWA tomorrow in advance of Hurricane Irene.

Dan

FXUS61 KALY 260727
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
327 AM EDT FRI AUG 26 2011

.SYNOPSIS...

HIGH PRESSURE WILL BUILD FROM THE GREAT LAKES INTO NEW YORK AND NEW ENGLAND TODAY...SLIDING OFFSHORE SATURDAY MORNING. HURRICANE IRENE WILL MOVE UP THE MID ATLANTIC COAST SATURDAY NIGHT AND INTO NEW ENGLAND SUNDAY. MASSIVE HIGH PRESSURE WILL BUILD FROM THE MIDWEST TO THE EASTERN SEABOARD AND CONTROL OUR WEATHER MUCH OF THE NEW WEEK.

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.SHORT TERM /SATURDAY THROUGH SUNDAY NIGHT/...
THE MAJOR FEATURE IN THIS PERIOD WILL BE HURRICANE IRENE. THE OVERNIGHT GFS/NAM MODEL SUITE CONTINUES THE TREND OF ACCELERATING THIS STORM NORTHWARD. NHC TRACK BRINGS EYE INTO BERKSHIRE COUNTY BY SUNDAY EVENING...THEN RACES IT INTO QUEBEC AS IT UNDERGOES EXTRATROPICAL TRANSITION OVERNIGHT SUNDAY. THE NEW ECMWF IS IN PERFECT AGREEMENT WITH NHC ANS SO WILL IMPLEMENT NHC FCST WITH ECMWF IN GRIDS.

THIS TIMING IS SEVERAL HOURS FASTER THAN PVS FCSTS IN ARRIVAL OF IMPACTS IN FCA. SATURDAY SFC HIGH IS BEING DISPLACED OFFSHORE. MOST OF AREA WILL GET ONE MORE DRY DAY SATURDAY WITH NORTHERN AREAS REMAINING FAIR. HWVR CLOUDS WILL SLOWLY SPREAD N INTO FCA FM SE TO NW SAT...REACHING ALB BY AFTN AND ALL AREAS DURING THE EVENING. SAT AFTN GFS SUGGEST FIRST OUTER RAIN BAND REACHES SE AREAS. JET DYNAMICS DO NOT SUGGEST A PRE OVER OUR AREA..BUT MUCH FURTHER EAST IF AT ALL.

LATE SATURDAY NIGHT HEAVY RAINS...AND WINDS WILL OVERSPREAD REGION. SUNDAY WILL SEE FULL IMPACTS OF SYSTEM WITH 30-50MPH WINDS HEAVY RAINS WIDESPREAD. CONSERVATIVE QPF ON ORDER OF 4-7 INCHES WITH HIGHER AMOUNTS IN TRRN LIKELY. HAVE POSTED FLOOD WATCH.

OF PARTICULAR CONCERN WILL BE ENHANCED WINDS ON HIR TRRN AND N/S VALLYS WHERE CHANNELING WILL INCREASE THEM FURTHER...PARTICULARLY IN LK GEORGE/HUDSON/HOUSITONIC/SACADAGA/AND CONNECTICUT VLYS.

STRONG WINDS WILL BE EAST...VEERING TO NORTHEAST THEN NORTH THEN NORTHWEST AS IRENE`S MOVES UP COAST. RAINS END ACROSS THE REGION LATE SUNDAY NIGHT AND WINDS DIMINISH TWRD MORNING.

TROPICAL WATCHES / HIGH WIND WATCHES WILL BE CONSIDERED AFTER 5AM UPDATE FM NHC. PLEASE REFER TO STATEMENTS ISSUED BY THE THE NATIONAL HURRICANE CENTER HTTP:/WWW.NHC.NOAA.GOV FOR UPDATES REGARDING HURRICANE IRENE.

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SYNOPSIS...SNYDER
SHORT TERM...SNYDER
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Tues. 9/6/11
To: bosart@atmos.albany.edu
Date: Tue, 6 Sep 2011 22:37:51 +0000 (UTC)

Cc: keyser@atmos.albany.edu

Tuesday 6 September 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR warm-season cutoff low research is cited in the first paragraph of the near-term section of this afternoon's AFD issued by NWS ALY

Dan

FXUS61 KALY 062024
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
424 PM EDT TUE SEP 6 2011

.SYNOPSIS...
A FRONTAL BOUNDARY TO THE SOUTH OF THE REGION WILL RETURN NORTHWARD...ALLOWING A STEADY RAIN TO REDEVELOP FROM SOUTH TO NORTH TONIGHT. LOCALLY HEAVY RAIN WILL BE POSSIBLE...ESPECIALLY ACROSS WESTERN PORTIONS OF THE REGION THROUGH WEDNESDAY. THE RAIN WILL TAPER TO SHOWERS FOR WEDNESDAY NIGHT AND THURSDAY BEFORE DRIER WEATHER RETURNS FOR THE WEEKEND.

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.NEAR TERM /UNTIL 6 AM WEDNESDAY MORNING/...
AT THE SURFACE...A STALLED FRONTAL BOUNDARY SITUATED ALONG THE MIDATLANTIC COAST WILL BEGIN TO SHIFT NORTHWARD TONIGHT. STRONGISENTROPIC LIFT WILL MOVE INTO THE REGION...AIDED BY 850 HPA V WINDANOMALIES OF 2-4 STD ABOVE NORMAL /BASED OFF THE 12 UTC GEFS/. IN ADDITION...THE REGION WILL BE IN THE RIGHT REAR QUAD /ENTRANCE REGION/ OF 130 KT 250 HPA JET STREAK SITUATED OVER ATLANTIC CANADA. ALL THESE FACTORS WILL HELP PRODUCE A STEADY HEAVY RAINFALL DEVELOPING FROM SOUTH TO NORTH ACROSS THE REGION OVERNIGHT. WHILE FLASH FLOODING CANNOT BE TOTALLY RULED OUT...THE POSITION OF THE 500 HPA CUTOFF LOW OVER THE DEEP SOUTH APPEARS TO BE TOO FAR SOUTH FOR WIDESPREAD FLASH FLOODING BASED OFF LOCAL CSTAR RESEARCH. IT ALSO DOESN/T APPEAR THAT THERE WILL BE MUCH CONVECTION AT ALL EITHER...AS THE NATURE OF THE RAINFALL WILL BE A HEAVY STRATIFORM RAINFALL. STILL...THIS PERIOD OF STEADY RAINFALL WILL STILL LEAD TO SHARP RISES ON STREAMS AND RIVERS...AND A FLOOD WATCH IS IN EFFECT. PLEASE SEE THE HYDRO SECTION FOR MORE INFORMATION REGARDING EXPECTED RAINFALL AMOUNTS AND THE HYDROLOGIC IMPACT ACROSS OUR AREA. THE HEAVIEST RAINFALL LOOKS TO OCCUR FOR AREA WEST OF THE HUDSON VALLEY...AS WELL AS IN AREAS OF HIGHER TERRAIN.

WITH THE CLOUD COVER AND PRECIP...TEMPS WON/T DROP OFF MUCH TONIGHT...WITH GENERALLY MID TO UPPER 50S IN MOST AREAS.

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SYNOPSIS...FRUGIS
NEAR TERM...FRUGIS
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Re: Fwd: [Tropical-storms] Lee plus Katia causing huge rain event in PA/NY: Th. 9/8/11
To: bosart@atmos.albany.edu (Lance Bosart)
Date: Thu, 8 Sep 2011 14:51:27 +0000 (UTC)

Thursday 8 September 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

The cited text in your message concerning CSTAR PRE research conducted by Ben Moore appeared in the near-term section of yesterday afternoon's AFD issued by NWS BGM, which is appended below Jeff Masters' post to the tropical storms listserv.

Dan

cc: Ben Moore

Hi Dan,

From Jeff Masters as posted to the tropical storms listserv. He shows an excerpt from a WFO BGM AFD from 4:00 pm EDT 7 Sep about "a 'jet in ridge' (anticyclonic jet curvature) pre (predecessor rain event)". It might be worth checking the BGM AFD for the complete text for perspective purposes. Another good example of how our collective research on PREs is spreading throughout the scientific and operational communities and is working its way into the private sector. More fodder on technology transfer for our upcoming Nov 2011 CSTAR 6-month report.

Lance

cc: Ben

Begin forwarded message:

From: Jeff Masters <jmasters@wunderground.com>
Date: 8 September, 2011 02:12:52 GMT+00:00
To: tropical-storms@tstorms.org
Subject: [Tropical-storms] Lee plus Katia causing huge rain event in PA/NY

Binghamton, NY has gotten 5.65" of rain today so far, with more on the way:

http://www.wunderground.com/history/airport/KBGM/2011/09/07/DailyHistory.html

This breaks their former record just set last September: 4.68" on 9/30-Oct. 1, 2010. Records go back to 1890 for precipitation.

The Susquehanna River at Binghamton is forecast to crest at its highest height on record in multiple locations tomorrow:

http://water.weather.gov/ahps2/hydrograph.php?wfo=bgm&gage=bngn6&view=1,1,1,1,1,1,1,1%22

Stream gauge data goes back to at least 1846.

From the NWS discussion in Binghamton:

4 PM update... bad combo of ingredients in place to continue very heavy rainfall this evening. Closed upper low continues to spin over the Ohio Valley...with a deep srly fetch along the Eastern Seaboard...only adding to the moisture in place from the remains of TS Lee. As an additive factor...water vapor loops show tropopause moisture from distant Hurricane Katia...getting steered all the way into the +ra area...from the middle-atl into NY/PA. This synoptic pattern resembles the major flood event from June 2006...and also matches the large-scale pattern for a "jet in ridge" (anticyclonic jet curvature) pre (predecessor rain event).

Jeff Masters (jmasters@wunderground.com)
Director of Meteorology
Weather Underground, Inc.
300 N Fifth Ave #240
Ann Arbor, MI 48104
734-994-8824 (voice)
blog: http://www.wunderground.com/blog/JeffMasters/article.html

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FXUS61 KBGM 072030
AFDBGM

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE BINGHAMTON NY
430 PM EDT WED SEP 7 2011

.SYNOPSIS...
HEAVY RAIN WILL CONTINUE OVERNIGHT...WITH MAJOR FLOODING PERSISTING THROUGH AT LEAST THURSDAY. ALTHOUGH THE STEADIEST RAIN SHOULD TAPER OFF BY THURSDAY AFTERNOON...THE CHANCE OF SHOWERS OR THUNDERSTORMS WILL LINGER THROUGH WEEK`S END.

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.NEAR TERM /UNTIL 6 AM THURSDAY MORNING/...
4 PM UPDATE... BAD COMBO OF INGREDIENTS IN PLACE TO CONTINUE VERY HVY RAINFALL THIS EVE. CLOSED UPPER LOW CONTINUES TO SPIN OVER THE OH VLY...WITH A DEEP SRLY FETCH ALG THE ERN SEABOARD...ONLY ADDING TO THE MOISTURE IN PLACE FROM THE REMAINS OF TS LEE. AS AN ADDITIVE FACTOR...WATER VAPOR LOOPS SHOW TROP MOIST FROM DISTANT HURRICANE KATIA...GETTING STEERED ALL THE WAY INTO THE +RA AREA...FROM THE MID-ATL INTO NY/PA. THIS SYNOPTIC PATTERN RESEMBLES THE MAJOR FLOOD EVENT FROM JUNE 2006...AND ALSO MATCHES THE LRG-SCALE PATTERN FOR A "JET IN RIDGE" (ANTICYCLONIC JET CURVATURE) PRE (PREDECESSOR RAIN EVENT).

BOTTOM LN...SIG MOIST FEED/+RA BAND CURRENTLY IN PLACE...IS NOT LIKELY TO SHOW MUCH WEAKENING/MOVEMENT...TIL AT LEAST 06-09Z. ANOTHER 2-4"+ IS LIKELY WITHIN THIS BAND. FLASH FLOODING/RIVER FLOODING WILL BE MAJOR...WITH IMPACTS LASTING WELL PAST THIS PD...AND THROUGH THE COMING DAYS.

UPDATED AS OF 12 NOON... MAJOR EVENT UNFOLDING ATTM...WITH BAND OF +RA FEEDING UP THE I-81 CORRIDOR. CURRENT RADAR/SATELLITE IMAGES AND MODEL PROGS SHOW LITTLE HOPE OF ANY RELIEF FOR THE NEXT 3-6 HRS...AT LEAST...WITH LONG FETCH OF MOISTURE FROM THE GOMEX...AND ALSO KATIA WELL OFFSHORE...COMBINING WITH EXISTING MOIST PLUME FROM THE REMNANTS OF LEE. WE ADJUSTED OUR QPF AXIS A BIT TO THE E...AND ALSO UPPED THE MAGNITUDE...TO BETTER MATCH RADAR TRENDS...AND GROUND TRUTH RAIN SPOTTER REPORTS.

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SYNOPSIS...MLJ
NEAR TERM...MLJ
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From: Dan Keyser <keyser@atmos.albany.edu>
Subject: Input for next CSTAR 6-month report: Mon. 9/19/11
To: bosart@atmos.albany.edu
Date: Mon, 19 Sep 2011 22:34:04 +0000 (UTC)
Monday 19 September 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR cutoff low research is cited by Tom Wasula in the second paragraph of the long-term section of this afternoon's AFD issued by NWS ALY.

Dan

FXUS61 KALY 192113
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
512 PM EDT MON SEP 19 2011

.SYNOPSIS...
A WEAK COLD FRONT WILL MOVE ACROSS THE REGION LATE TONIGHT AND TUESDAY. AN AREA OF HIGH PRESSURE WILL BUILD IN FOR TUESDAY NIGHT AND WEDNESDAY...BUT IT WILL BE QUICKLY FOLLOWED BY LOW PRESSURE MOVING IN FOR WEDNESDAY NIGHT AND THURSDAY.

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.LONG TERM /THURSDAY THROUGH SUNDAY/...
THE MEDIUM RANGE GUIDANCE AND HPC ARE BOTH IN PRETTY GOOD AGREEMENT THAT THE LONG TERM WILL BE UNSETTLED OVER NY AND NEW ENGLAND. A POSITIVELY-TILTED UPPER LEVEL TROUGH NEAR THE UPPER MIDWEST AND THE UPPER MS RIVER VALLEY BEGINS TO CLOSE OFF WITH A COLD FRONT SLOWLY APPROACHING ERN NY AND NEW ENGLAND. THE GFS/ECMWF/CAN GGEM CUTS THE LOW OFF OVER THE CNTRL GREAT LAKES REGION/MIDWEST THU NIGHT INTO FRIDAY. THIS CUT-OFF...AND ITS ASSOCIATED DISTURBANCES ROTATING AROUND IT...WILL BRING A CHANCE OF SHOWERS TO THE FCST AREA INTO THE WEEKEND. THE SFC COLD FRONT STALLS OUT NEAR THE SRN NEW ENGLAND AND NJ SEABOARDS. THERE IS THE POTENTIAL FOR A SFC WAVE DEVELOPING ALONG THE BOUNDARY TAPPING SOME ATLANTIC MOISTURE. THE LATEST 12Z GLOBAL ENSEMBLES STILL SHOW PWAT ANOMALIES 1 TO 2 STANDARD DEVIATIONS ABOVE NORMAL FOR MOST OF THE FCST AREA LATE THU THRU FRI. WE KEPT THE TREND FOR LIKELY POPS OVER THE SRN TWO THIRDS OF THE FCST AREA FRI PM. THE QPF IS STILL VARIABLE ON THE GUIDANCE...BUT SOME LOCATIONS COULD GET MORE THAN AN INCH DURING THIS TIME FRAME. THE GFS INDICATES SOME MODEST INSTABILITY THU INTO FRI...SO WE INCLUDED A SLIGHT CHC OF THUNDERSTORMS BOTH AFTERNOONS OVER MOST OF THE REGION.

CSTAR RESEARCH HAS SHOWN HOW PROBLEMATIC CUTOFF LOWS CAN BE IN THE NORTHEAST IN TERMS OF FORECASTING THE HVY RAINFALL. WE WILL CONTINUE THE MENTION OF LOCALLY HVY RAINFALL IN THE HWO LATE IN THE WEEK AT THIS TIME. THE CUTOFF CONTINUES TO SIT AND SPIN OVER THE GREAT LAKES REGION DURING THE WEEKEND WITH A DEEP MOIST S/SW FLOW IMPACTING THE REGION. WE CONTINUED A CHC OF SHOWERS EACH DAY...THOUGH THEIR SHOULD BE BREAKS IN THE PCPN. THE SHOWERS ON THE WEEKEND MAY BE MORE SCATTERED AND CELLULAR WITH THE MID LEVEL COLD POOL ENCROACHING THE REGION.

THERE ARE SOME INDICATIONS THAT BY MONDAY THAT THE CUTOFF BEGINS TO LOSE ITS GRIP ON THE NORTHEAST...AND RETROGRADES SOUTHWARD WITH PERHAPS A BRIEF DRY STRETCH LATE SUNDAY INTO MONDAY.

OVERALL...TEMPS SHOULD RUN NORMAL TO SLIGHTLY ABOVE NORMAL WITH PCPN ABOVE NORMAL IN THE EXTENDED DUE TO THE PESKY CUTOFF.

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SYNOPSIS...GJM
LONG TERM...WASULA
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Subject: Input for next CSTAR 6-month report: Mon. 10/31/11

To: bosart@atmos.albany.edu
Date: Mon, 31 Oct 2011 15:16:09 +0000 (UTC)
Cc: keyser@atmos.albany.edu

Monday 31 October 2011

Lance,

For possible incorporation into the next six-month CSTAR report.

CSTAR research on mesoscale banding in cool-season northeast U.S. cyclones is cited in the second paragraph of the near-term section of this past Saturday afternoon's AFD issued by NWS ALY.

Dan

FXUS61 KALY 292044
AFDALY

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE ALBANY NY
444 PM EDT SAT OCT 29 2011

.SYNOPSIS...
LOW PRESSURE OFF THE MID ATLANTIC COAST WILL CONTINUE TO STRENGTHEN AND MOVE NORTHEASTWARD TONIGHT...PASSING JUST SOUTHEAST OF CAPE COD AFTER MIDNIGHT. THE LOW WILL THEN CONTINUE TO HEAD OFF TO THE NORTHEAST SUNDAY AND HIGH PRESSURE WILL BEGIN TO BUILD IN. THE HIGH SHOULD DOMINATE OUR WEATHER INTO EARLY NEXT WEEK.

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.NEAR TERM /UNTIL 6 PM THIS EVENING/...
AS OF 4 PM EDT...HISTORIC OCTOBER SNOWSTORM CONTINUES TO IMPACT PORTIONS OF THE ALY FCST AREA THIS AFTERNOON. LOW PRESSURE CONTINUES TO GO THROUGH RAPID CYCLOGENESIS OFF THE DELMARVA COAST. THE MSAS INDICATES PRESSURE FALLS OF 6-8 HPA/3 HRS OVER THE 40N/70W BENCHMARK. THE INTENSIFYING AND DEEPENING STORM WILL PASS SOUTH AND EAST OF LONG ISLAND EARLY THIS EVENING...AND REMAIN SE OF NANTUCKET AROUND MIDNIGHT...AND THEN SWING E/NE OF CAPE COD INTO THE GULF OF MAINE BY DAYBREAK SUNDAY.

PER CSTAR COOL SEASON RESEARCH...SEVERAL MESOSCALE BANDS HAVE DEVELOPED SOUTH OF THE CAPITAL REGION OVER LONG ISLAND...SRN NY...SRN NEW ENGLAND...NRN NJ...AND NE PA...IN THE NW QUADRANT OF THE BOMBING CYCLONE...AND ASSOCIATED VERY STRONG 850-700 HPA FRONTOGENESIS. SNOWFALL RATES OF 2"/HR HAVE COME IN FROM PORTIONS OF ERN ULSTER...SRN DUTCHESS...AND LITCHFIELD CTY CT ! SOME REPORTS OF 4-5 INCHES ARE ALREADY REPORTED FROM LITCHFIELD COUNTY...WITH TREE LIMBS DOWN...AND POWER OUTAGES. THE HEAVY WET SNOW WILL CONTINUE THERE...AND WE BELIEVE SOME ISOLD RUMBLES OF THUNDER MAY OCCUR IN THE ERN ULSTER...DUTCHESS AND LITCHFIELD CTY WITHIN THESE INTENSE MESOSCALE SNOW BANDS /CONDITIONAL MOIST SYMMETRIC INSTABILITY/. SNOW TO LIQUID RATIOS OF 6-8:1 ARE LIKELY IN THESE AREAS.

NUMEROUS POWER OUTAGES ARE LIKELY SOUTH AND EAST OF THE CAPITAL REGION DUE TO LEAVES BEING ON THE TREES...AND THE WEIGHT OF THE WET SNOW ON THEM. THE IMPACT IN THESE AREAS COULD BE SIMILAR TO WHAT HAPPENED ON OCT 4 1987 IN THE GREATER CAPITAL REGION.

THERE IS AN IMPRESSIVE LOW-LEVEL -U COMPONENT WIND ANOMALY OF 3 TO 5 STANDARD DEVIATIONS ABOVE NORMAL ACCORDING TO THE GEFS SOUTH AND EAST OF THE CAPITAL REGION. THESE EASTERLY ANOMALOUS WINDS ARE ADVECTING IN TREMENDOUS AMOUNTS OF ATLANTIC MOISTURE. THE STRONG QG LIFT GENERATED BY THE DIFFERENTIAL THERMAL ADVECTION WITH THE BOMBING CYCLONE HAS REACHED THE CAPITAL REGION AT 3 PM. THE SNOW CONTINUES TO BLOSSOM WITH THE COLUMN COOLING QUICKLY OVER THE CAPITAL REGION. ANY MIX WITH RAIN WILL BE QUICK WITH THE DYNAMICAL COOLING KICKING IN. THE H850 TEMPS ARE WELL BELOW FREEZING AT -4C TO -7C. CRITICAL PARTIAL THICKNESSES SUPPORT MAINLY SNOW EVERYWHERE.

IN TERMS OF THE SNOWFALL DISTRIBUTION...WE HAVE FOLLOWED CLOSE TO AN HPC/ECMWF BLEND OF QPF. THIS WAS SUPPORTED BY OUR NERFC. WE ARE EXPECTING 8 TO 16 INCHES IN THE MID HUDSON VALLEY /SOUTH OF HUDSON NY/...THE ERN CATSKILLS...SRN BERKS...CNTRL-SRN TACONICS...AND SRN LITCHFIELD CTY. THERE COULD BE SOME AMOUNTS EXCEEDING 15 INCHES IN THE LITCHFIELD HILLS. FURTHER NORTH...EXPECT 6-12 INCHES OVER SRN VT...THE NRN BERKSHIRES...NRN TACONICS...AND COLUMBIA CTY. THE GREATER CAPITAL REGION/SCHOHARIE VALLEY WILL RECEIVE 4 TO 8 INCHES...WITH THE LOWER TALLIES NORTH AND WEST OF THE IMMEDIATE TRI CITIES. WE LOWERED SE WARREN AND NRN WASHINGTON TO ADVISORIES DUE TO THE DROP IN THE QPF TO ONLY TWO TENTHS TO A THIRD OF AN INCH WITH THE MAJORITY OF THE GUIDANCE. EXPECT...2 TO 6 INCHES IN THE LAKE GEORGE REGION...AND THE CNTRL MOHAWK VALLEY. THE WRN MOHAWK VALLEY...AND THE SRN DACKS REGION WILL RECEIVE A COATING TO A FEW INCHES. THE WINTER STORM WARNINGS WILL STAY UP EVERYWHERE ELSE WITH THE WIDESPREAD SOCIETAL IMPACT OF THIS EARLY AND RARE OCTOBER STORM.

THE SNOW WILL BEGIN TO TAPER BTWN MIDNIGHT AND 3 AM...AS WE GET STUCK IN THE DEFORMATION ZONE OF THE SYSTEM. THERE ARE SOME HINTS OF SOME MOHAWK HUDSON CONVERGENCE EFFECT OR UPSLOPE SNOWFALL FOR THE CAPITAL DISTRICT...TACONICS...AND SRN VT AFTER MIDNIGHT. WE WILL HAVE TO SEE IF THIS MATERIALIZES. WE KEPT THE POPS UP AT LIKELY VALUES OR GREATER FROM THE HUDSON RIVER VALLEY EAST UNTIL ABOUT 09Z. THE OTHER ISSUE WILL BE THE BLUSTERY WINDS OVERNIGHT. THE STRONGEST N/NW WINDS WILL BE IN THE 15 TO 25 MPH RANGE BE SOUTH AND EAST OF THE CAPITAL REGION WITH SOME GUSTS IN THE 30-40 MPH RANGE OVER THE ERN CATSKILLS...SRN TACONICS...AND LITCHFIELD HILLS. THIS COULD CAUSE ADDITIONAL POWER OUTAGES. THE LIGHTER SNOW AMOUNTS MAY KEEP ANY POWER OUTAGES IN THE IMMEDIATE CAPITAL TO ISOLATED TO SCATTERED. TEMPS OVERNIGHT WILL GENERALLY BE IN THE 20S.

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SYNOPSIS...IAA
NEAR TERM...WASULA