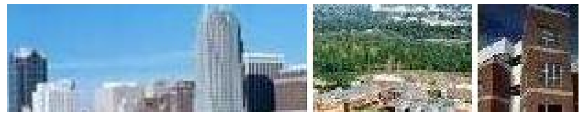
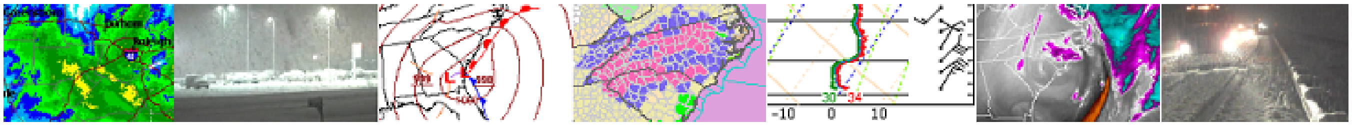
Event Summary
National Weather Service, Raleigh NC



March 2-3, 2010 Winter Storm

Note that this is a PDF version of the event summary and that some links, media or resources may not be avaiable in this format.



Event Headlines

...This was an impressive event with localized snow totals of 6 to 8 inches in Randolph and Chatham Counties...
...This was a late season winter storm that featured a deepening surface low which followed a preferred track for winter storms in central North Carolina...
...Uncertainty in the amount of forecast precipitation along with surface temperatures at or just above freezing, warmer soil temperatures then typically associated with accumulating snow, and the late season nature of the storm made snow accumulation forecasts very difficult...
...Mesoscale features including frontogentical forcing and the resultant bands of heavier snow along with local conditions played a critical role in the snow accumulations and the highly variable accumulations...
...Winter Storm Warnings were issued for 20 counties with 12 warnings verified and 3 missed events. The average lead time for all of the Winter Storm Warnings was 8.6 hours with all warnings preceded by advisories. Winter Weather Advisories were issued for 31 counties with 26 advisories verified. The average lead time for all of the Winter Weather Advisories was 17.7 hours...

Event Overview

An impressive southern stream vortex located over Mississippi, Alabama, and western Tennessee at 12 UTC on March 2 moved east across the Gulf Coast region. Meanwhile, a northern stream shortwave associated with a 50 kt jet max was dropping south across the northern plains. At the surface, a slowly intensifying area of low pressure was moving across the northeastern Gulf of Mexico and a modest area of high pressure (~ 1026 mb) extended from southern Ontario southwestward across the western Great Lakes and into the Northern Plains.

The high pressure system was expected to provide little support for wintry precipitation across central North Carolina given its modest strength, its ridge axis west of the Mississippi, and its lack of cold dry air given dew points which were generally in the teens.

By 18 UTC, the surface low was exiting the Georgia coast while a warm front was developing just offshore of the Southeast U.S. coast. The surface low reached the mouth of the Cape Fear River by 21 UTC and moved to near Cape Hatteras by 00 UTC. The surface low was deepening and followed a preferred track for a winter storms in central NC.

Multiple areas of precipitation developed and moved across the Carolinas during the event. An initial axis of precipitation extending northeast across the western Piedmont during the midday and early afternoon hours was associated with mid level frontogenesis. Another area of precipitation that moved across the southern and eastern Carolinas during the mid to late afternoon appeared to be forced by differential vorticity advection as a shortwave rotated across Georgia and South Carolina. In addition, a 150 kt jet at 300 HPa was moving across the northeast Gulf of Mexico producing a large area of divergence aloft and upward vertical motion across the southeast. Increasingly strong low level northeasterly flow provided moisture and aided in the development of a deformation band during the evening and overnight hours as a band of moderate to occasionally heavy snow pivoted across Randolph, Chatham, Lee, Harnett and Sampson Counties.

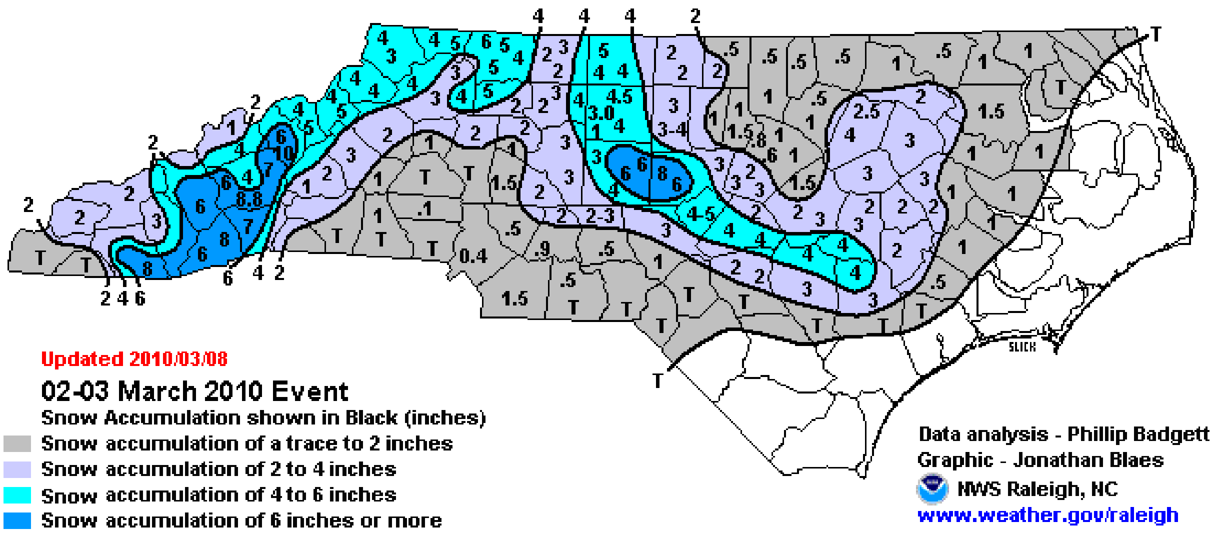
A relatively warm boundary layer with temperatures above freezing extended from the surface up to a few thousand feet when the precipitation commenced. The precipitation rates were impressive and were sufficient to diabatically cool the lower levels of the atmosphere via melting, which allowed precipitation to change from rain to snow. AMDAR soundings were effectively used to monitor the depth of the surface based above freezing layer at KRDU during the event.

The precipitation started off as all snow in the Triad with surface temperatures in the mid to upper 30s with temperatures quickly falling into the 33-36 range within an hour or two of precipitation onset. Further east in the Triangle area, the precipitation fell as a mix of rain and snow for much of the afternoon and early evening with surface temperatures falling into the 35-39 range within an hour or two of precipitation onset. The precipitation did not change over to mostly or all snow in the Triangle area until mid to late evening.

Determining snow accumulations in a spring snow event with a warm ground and ambient air temperatures at or just above freezing was difficult since some of the snow was melting as it hit the ground and observers had to estimate the snow fall. In addition, the snow that accumulated was also melting throughout its accumulated depth. The best information suggests that snow accumulations across central North Carolina were the greatest across Randolph and Chatham Counties where accumulations ranged from 6 to 8 inches. An arc of accumulations of 4 to 6 inches extended from the Virginia state line just west of Danville, across the Triad and into portions of the Sandhills and Southern Coastal plain. Lesser amounts of snow, generally on the order of an inch or two fell across the Northeast Piedmont and Triangle area. Mesoscale features including frontogentical forcing and the resultant bands of heavier snow along with local conditions played a critical role in the snow accumulations and the highly variable accumulations.

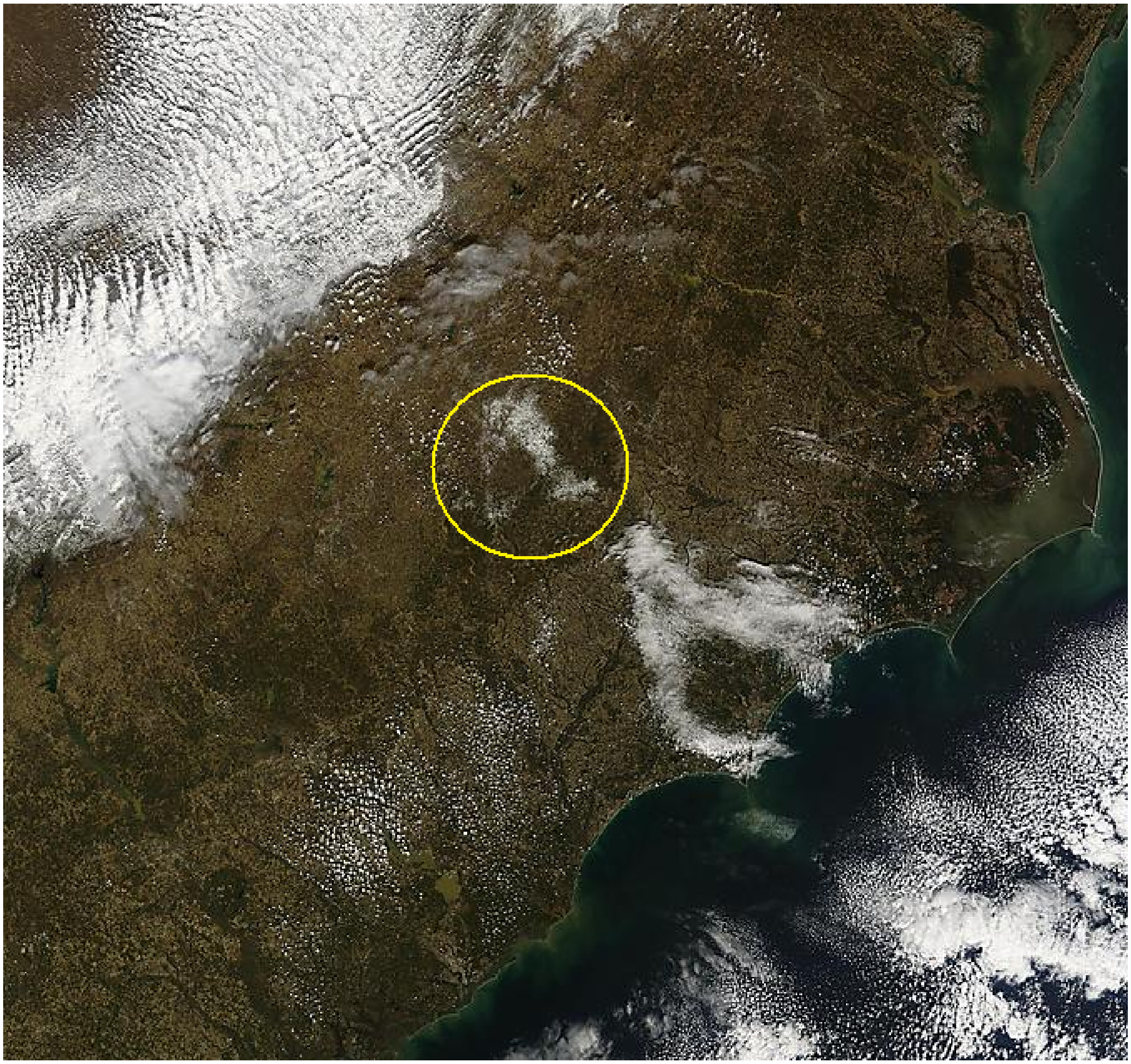
Determining the snow to liquid ratios for this event was extremely difficult given the large uncertainty in the snow accumulations and the mix of rain and snow that fell. Snow to liquid ratios computed from snow accumulations and liquid equivalents during periods of accumulating snow produced ratios of around 13:1 at KGSO and approximately 5:1 at KRDU.

Snow Accumulation Map



MODIS Terra Satellite Image Showing Snow Cover on 2010/03/04

The localized area of the heaviest snow can be seen in the MODIS Terra Satellite image from 04 March, almost two days after the snow started falling.

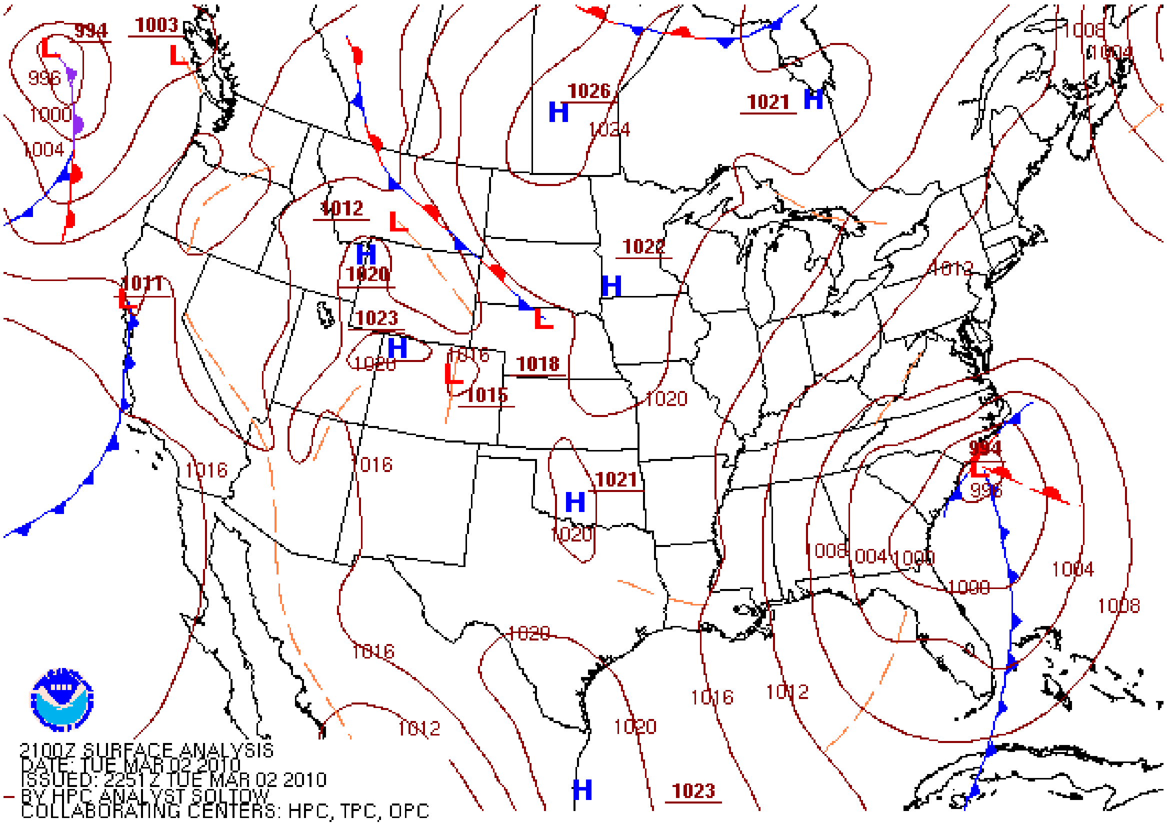


Surface Analysis

A **Java Loop** of surface analysis imagery from 00 UTC March 01 through 21 UTC March 03, 2010 shows the surface low developing across the western Gulf of Mexico at 12 UTC on March 01 with a 1035 MB area of high pressure centered over Ontario. By 12 UTC on March 02, the surface low had deepened to 1000 MB and was located over northern Florida while the area of high pressure had weakened to around 1025 MB and was located just slightly southeastward from its location 24 hours earlier. The surface low deepened slowly during the afternoon and evening of March 02 as it moved northeastward along the Southeast coast.

At 00 UTC on March 03, the surface low was located near Cape Hatteras with a pressure of 996 mb. By 12 UTC, the pressure had fallen to 984 MB (a drop of 12 MB in 12 hours) and at 00 UTC on March 4, the pressure had fallen to 982 MB or a drop of 14 MB in 24 hours. While the pressure fall of 14 MB in 24 hours is impressive, it does not meet the generally accepted definition of a "Meteorogical bomb" as defined by Sanders and Gyakum (1980). This definition is the formation of an "extratropical area of low pressure in which the central barometric pressure drops at least 24 millibars in 24 hours. It must be noted that the 24 MB requirement is true for storms that are north of 60 degrees latitude. Sanders and Gyakum set the pressure fall needed to reach bomb status at 23 millibars in 24 hours at 55 degrees and 19 millibars in 24 hours at 45 degrees (map of the western Atlantic with lines of latitude and longitude).

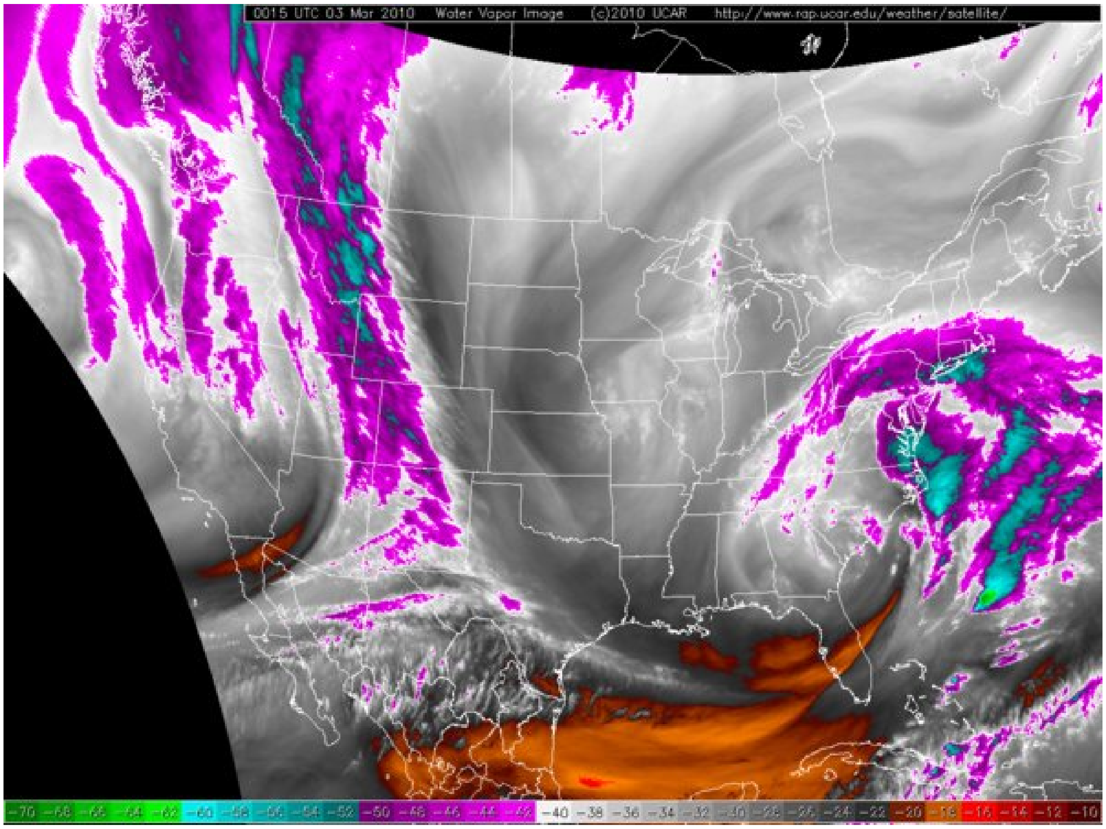
While a strong flow of cold air into the region was lacking and the area of high pressure to the north and west of the storm system was relatively weak and not in a favored location, the track of the developing storm system and its deepening nature was consistent with a classic winter storm scenario for central North Carolina.



Satellite Imagery

The water vapor animation available at the link below shows the evolution of the winter storm across the southern U.S. As one storm system exits New England, the storm system of interest moves from Texas early on 01 March into the Deep South early on 02 March. A large plume of deep moisture extends into central North Carolina early on 02 March before drying aloft spreads across North Carolina late in the day. Deep moisture is again visible across the eastern Carolinas late in the loop as a second deformation band develops and then pushes offshore.

A **Java Loop** of water vapor imagery from 0615 UTC 01 March through 1215 UTC 03 March, 2010 is available.

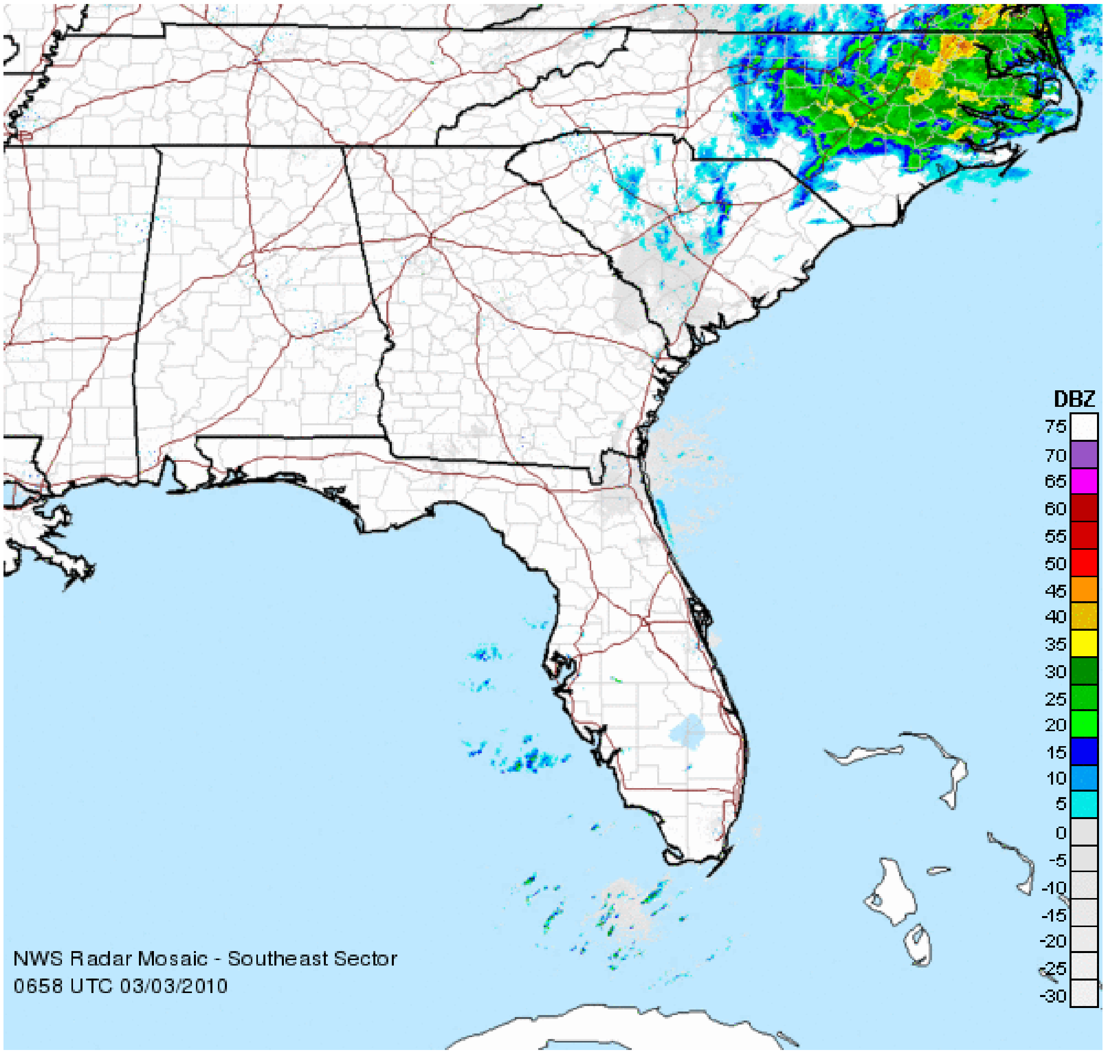


Southeast Regional Radar Imagery

The hourly regional radar loop available at the link below shows the multiple areas of precipitation that moved across the region during the event. Early in the loop, a broad band of precipitation moved rapidly east across Florida, Georgia, and South Carolina and then offshore by around midday on 02 March. Light precipitation, mainly in the form of snow, spread into the western Piedmont of North Carolina during the late morning hours and persisted into the mid afternoon hours. Some of this precipitation was heavy with both Greensboro and Winston-Salem reporting heavy snow for a time. Another area of precipitation developed and spread northeast across the Coastal Plain of North Carolina during the afternoon with high reflectivities. Some of this precipitation also fell as moderate to heavy wet snow. Finally, a band of occasionally heavy snow associated with an area of deformation developed late in the evening in the Haw River Basin and pivoted across central North Carolina after midnight, dumping snow at rates of 2 inches per hour in Randolph, Chatham and Lee Counties. This area of snow lifted northeast exiting central North Carolina before daybreak.

The regional reflectivity image below from 0658 UTC on 03 March shows the band of precipitation across central North Carolina that produced heavy snow. Spotters in Randolph, Chatham and Lee Counties reported hourly snow accumulation rates of 1 to 2 inches per hour around this time. At 130 AM on 03 March, a spotter in Sanford, NC reported very heavy snow and snowfall rates of around 2 inches per hour along with a great photo.

A **Java Loop** of Southeast regional radar imagery from 0558 UTC on 02 March through 1148 on 03 March, 2010 is available.

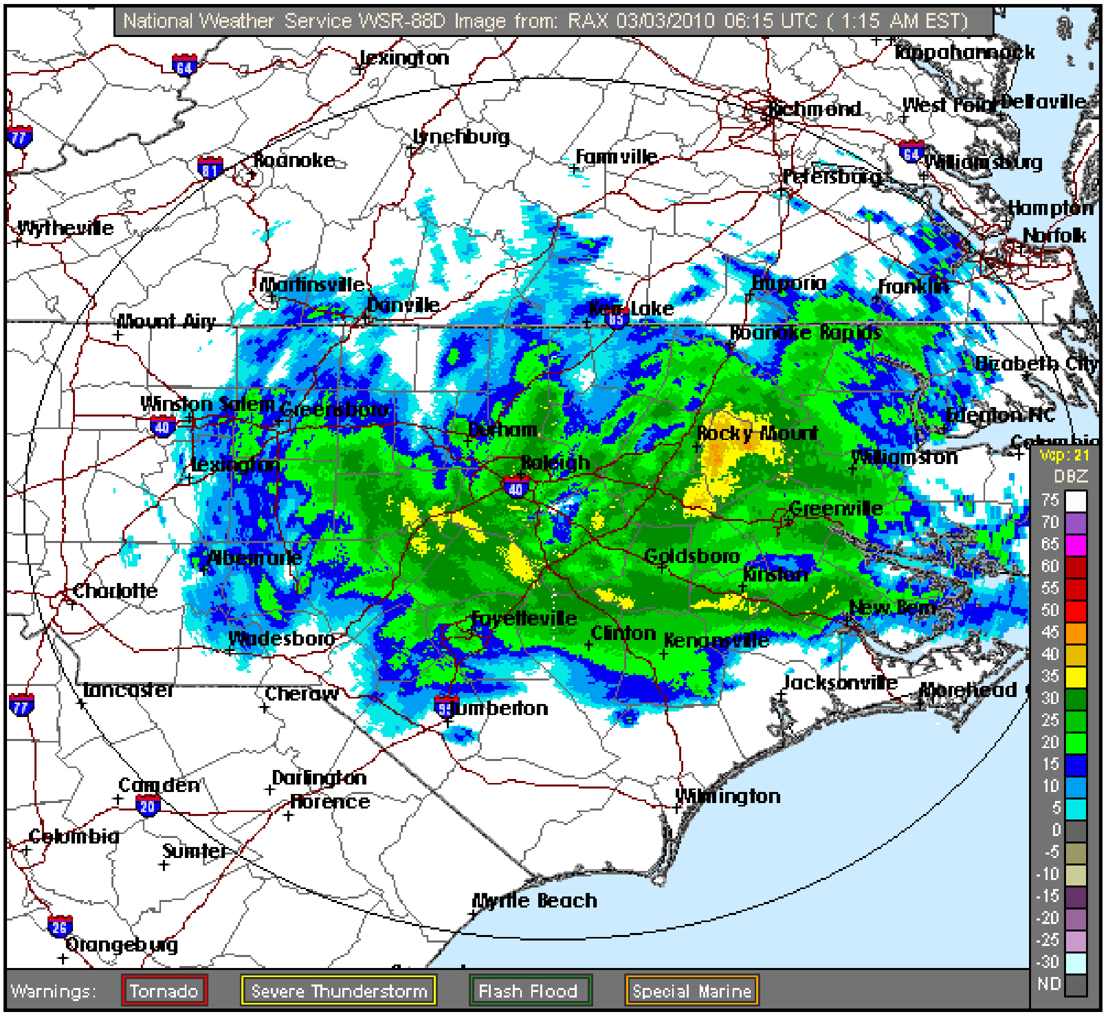


KRAX Radar Loops

A Java Loop overview of the entire event with images from every hour between 1203 UTC on 02 March through 0958 UTC on 03 March 2010 is available **here**. Note - this loop includes 23 frames

A Java Loop overview of the entire event with images from every 15 minutes between 1402 UTC on 02 March through 0958 UTC on 03 March, 2010 is available **here**. Note - this loop includes 81 frames

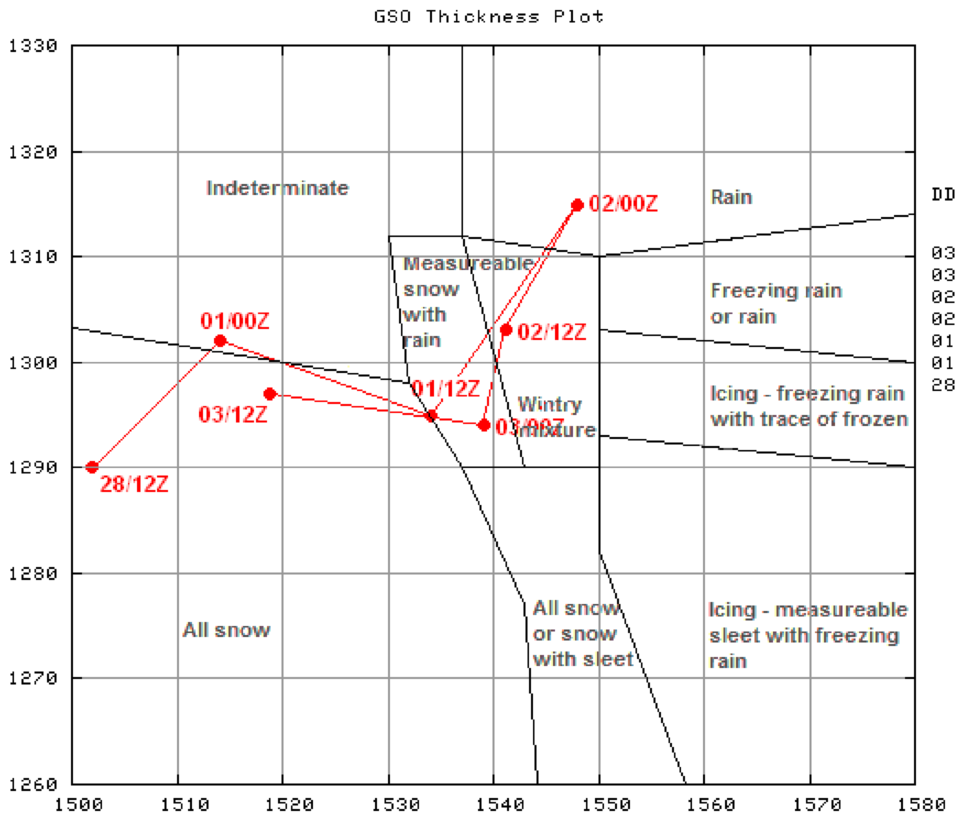
The KRAX reflectivity image below is from 0615 UTC on 03 March, 2010 as a band of heavy snow falls across a portion of central North Carolina.



TRENDís Predominant P-type Nomogram

The nomogram to the right shows the distribution of precipitation (p-type) TREND's as a function of partial thickness values. Close examination of precipitation events over the past 30 years accounts for the boundaries on the nomogram separating the various p-type areas. Mid level thickness values increase from left to right along the x axis. Low level thickness values increase from bottom to top along the y-axis.

The nomogram to the right displays the observed thickness values from the 12 hourly RAOB's at KGSO from 12 UTC on 02/28 through 12 UTC on 03/03. The partial thickness trace on the nomogram suggested the precipitation in the Triad would begin as a "wintry mixture" during the morning hours on 03/02. As noted in the Predominate P-Type TRENDs Nomogram Visualizer, the "wintry mixture" portion of the nomogram states that secondary p-type factors can become the primary players for controlling precipitation types. These factors include evaporation, melting, and the latent heat of freezing. The trace of observed soundings at 00 UTC on 03/03 moves into the "measurable snow with rain category" in which the vertical temperature profile typically features surface based melting layers of varying degrees. The observed sounding trace then moves into the all snow category during the overnight/early morning hours on March 3 as the mid level thickness values drop in excess of 40 meters during the overnight and early morning hours.



DD	HH	850-700	1000-850
03	12	1519	1297
03	00	1539	1294
02	12	1541	1303
02	00	1548	1315
01	12	1534	1295
01	00	1514	1302
28	12	1502	1290

Observations for GREENSBORO PIEDMONT, NC (GSO)

STN	TIME	PMSL	ALTM	TMP	DEW	RH	DIR	SPD	GUS	VIS	CLOUDS			Weather	MIN	MAX	P01	PCP	SNO
	DD/HHMM	hPa	inHg	F	F	%	deg	kt	kt	mile					F	F	in	in	in
GSO	03/1754	1005.8	29.69	40	28	62	310	5		10.0	OVC024				31	40			
GSO	03/1654	1005.7	29.69	39	29	67	320	5		10.0	OVC050								
GSO	03/1554	1005.4	29.68	37	29	72	310	6		10.0	OVC055								
GSO	03/1454	1004.9	29.67	36	29	75	310	6		10.0	OVC055								
GSO	03/1354	1004.5	29.65	35	28	75	320	6		10.0	OVC050								
GSO	03/1254	1003.9	29.63	33	28	82	310	8		10.0	SCT050	SCT095							
GSO	03/1154	1003.5	29.62	31	28	89	310	7		8.0	BKN120				31	34		0.00	2
GSO	03/1054	1003.0	29.60	34	30	85	330	7		10.0	SCT038	SCT100	OVC120				0.00		
GSO	03/0954	1003.0	29.60	34	31	88	330	7		7.0	SCT040	OVC090		S-			0.00		
GSO	03/0854	1003.0	29.60	34	30	85	350	7		5.0	SCT040	SCT048	OVC095	S-F			0.00	0.00	
GSO	03/0754	1003.3	29.61	34	30	85	360	8		6.0	BKN040	OVC055		S-F			0.00		
GSO	03/0654	1003.6	29.62	34	29	82	360	11	15	4.0	OVC027			S-			0.00		
GSO	03/0554	1003.8	29.63	33	30	88	10	9	14	5.0	SCT009	BKN036	OVC070	S-F	33	33	0.01	0.02	2
GSO	03/0454	1003.6	29.62	33	30	88	10	6	14	4.0	SCT006	BKN009	OVC060	S-F			0.00		
GSO	03/0354	1003.5	29.62	33	30	88	10	6	18	3.0	BKN010	OVC039		S-F			0.00		
GSO	03/0254	1002.9	29.60	33	30	88	10	8	18	1.5	BKN006	OVC012		S-F			0.00	0.01	
GSO	03/0154	1002.7	29.60	33	30	88	20	12	19	2.0	BKN005	OVC011		S-F			0.00		
GSO	03/0054	1003.2	29.62	33	30	88	30	10	20	4.0	BKN006	OVC013		S-F			0.01		
GSO	02/2354	1003.8	29.63	33	30	88	30	11	19	1.8	BKN006	OVC011		S-F	33	34	0.02	0.19	2
GSO	02/2254	1004.0	29.64	33	30	88	20	12	19	1.0	BKN005	OVC009		S-F			0.02		
GSO	02/2154	1004.6	29.65	33	30	88	30	12	17	0.8	BKN004	OVC010		S-F			0.03		
GSO	02/2054	1005.5	29.68	33	30	88	40	10		1.0	BKN005	OVC010		S-F			0.03	0.12	
GSO	02/1954	1006.6	29.71	33	30	88	30	11	16	0.2	OVC003			S+F			0.07		
GSO	02/1854	1007.7	29.75	33	31	92	30	7		0.8	OVC006			S-F			0.02		
GSO	02/1754	1009.0	29.79	34	31	88	60	9		0.8	BKN006	OVC015		S-F	33	39	0.01	0.01	
GSO	02/1654	1009.3	29.80	39	24	55	50	9		10.0	OVC035								
GSO	02/1554	1009.2	29.79	39	23	52	60	17	21	10.0	OVC035								
GSO	02/1454	1011.3	29.86	39	24	55	60	12		10.0	FEW055								
GSO	02/1354	1012.8	29.90	38	24	57	70	10		10.0	OVC100								
GSO	02/1254	1012.3	29.89	37	25	61	50	9		10.0	OVC110								
GSO	02/1154	1013.0	29.91	36	25	64	60	5		10.0	BKN110				35	38			
GSO	02/1054	1013.3	29.92	36	24	62	30	6		10.0	OVC120								
GSO	02/0954	1013.5	29.93	36	24	62	20	4		10.0	CLR								
GSO	02/0854	1013.8	29.93	36	24	62	20	4		10.0	CLR								
GSO	02/0754	1013.6	29.93	37	24	59	30	4		10.0	CLR								
GSO	02/0654	1013.2	29.92	37	24	59	40	7		10.0	CLR								
GSO	02/0554	1015.0	29.97	37	24	59	10	3		10.0	CLR				37	46			

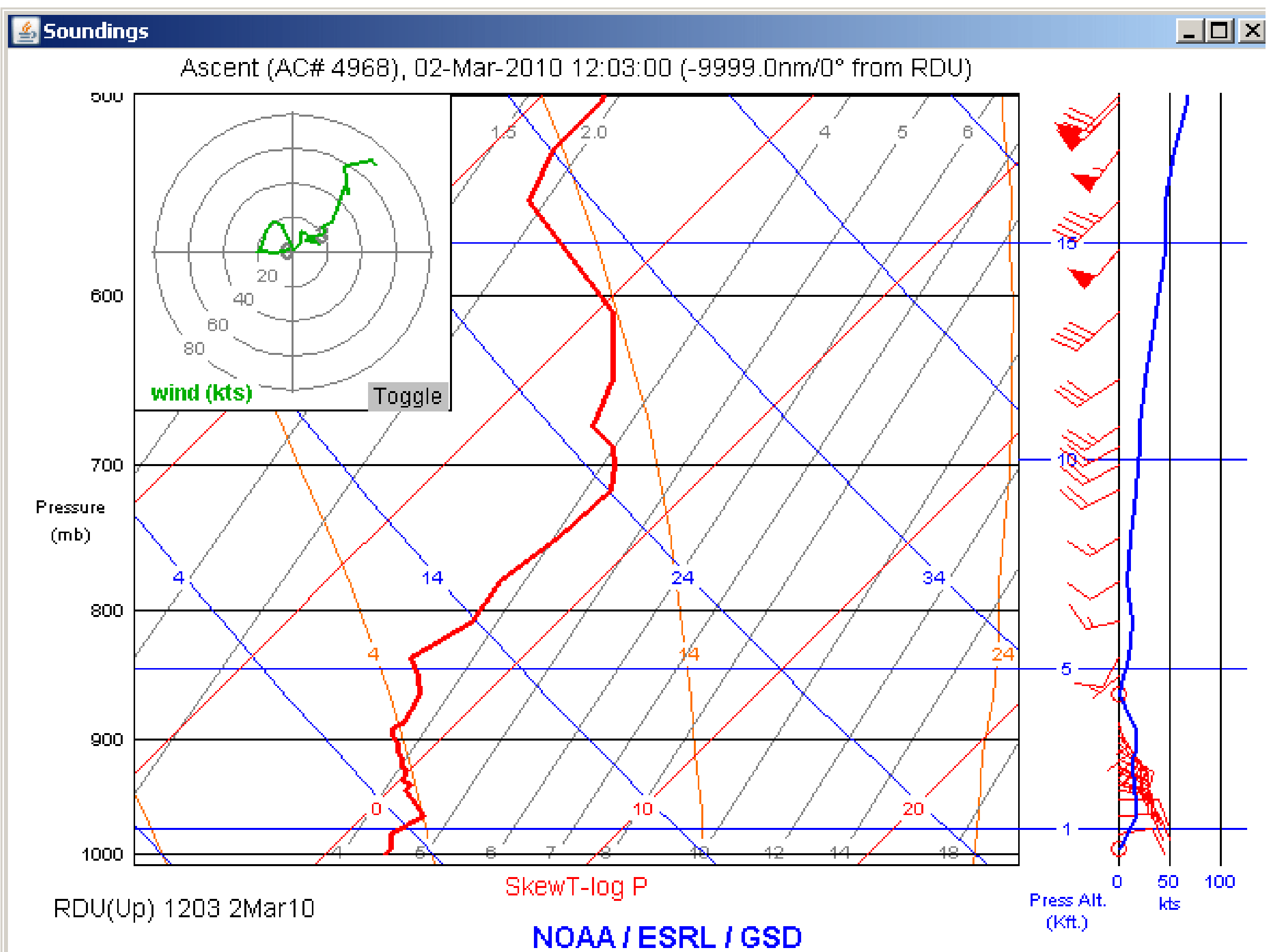
AMDAR Aircraft Soundings

AMDAR is an acronym for **Aircraft Meteorological DAat and Reporting** (AMDAR) which is an international effort within the World Meteorological Organization to coordinate the collection of environmental observations from commercial aircraft. In the United States, we often refer to the **Meteorological Data Collection and Reporting System** (MDCRS) which is a private/public partnership facilitating the collection of atmospheric measurements from commercial aircraft to improve aviation safety.

AMDAR Aircraft Soundings are very useful for short term forecasting situations where conditions are changing rapidly and in particular for aviation forecasting. Regarding winter weather events, AMDAR data can provide forecasters with the height of the freezing level, the presence of elevated warm layers, indications of thermal advection and dry layers. All of these are necessary for accurate precipitation type forecasts. The availability of this upper air data at times and locations where RAOB data may be lacking is invaluable.

The image below contains a loop of AMDAR soundings at Raleigh-Durham International Airport (KRDU) during the event from 1203 UTC on 03/02 through 0405 UTC on 03/03. During the 24 hour period from 1200 UTC on 03/02 through 1200 UTC on 03/03 there were a total of 23 AMDAR soundings available via NOAA/GSD for KRDU. The AMDAR soundings at KRDU clearly show the moderation of temperatures near the surface during the morning of 03/02 and then a slow drop in temperatures for much of the afternoon before a more dramatic drop in boundary layer temperatures during the evening. In addition, the thermal profile suggest melting snow aloft led to the development of a near freezing layer as shown in the soundings from 2137 UTC 03/02 and 2339 UTC 03/02.

A **Java Loop** of AMDAR soundings at KRDU from 1203 UTC on 02 March through 0405 UTC on 03 March, 2010 that can be stopped, controlled and zoomed is available. A few selected AMDAR soundings for KRDU during the time in which melting snow aloft allowed the temperature of the thermal profile to fall to near or just below freezing and remain isothermal are shown below. A list of the observations from KRDU shows the surface temperatures were in the lower 40s as of 18Z and then fell into the mid 30s just as the precipitation began. Note that snow began to mix in with the rain at KRDU by 21 UTC and again at 00 UTC with all of the precipitation changing and falling in frozen form (snow/ice pellets) by around 0300 UTC.
2137 UTC 03/02 | 2339 UTC 03/02 | 0002 UTC 03/03 | 0031 UTC 03/03 | 0306 UTC 03/03 | 0335 UTC 03/03.



The Micro Rain Radar

The NWS Raleigh has used Micro Rain Radar data during the past few winter seasons in a collaborative effort between the NWS Raleigh and Dr. Sandra Yuter of the Cloud and Precipitation Processes and Patterns Group (CPPPG) at NC State and with the Renaissance Computing Institute (RENCI) from Chapel Hill, NC.

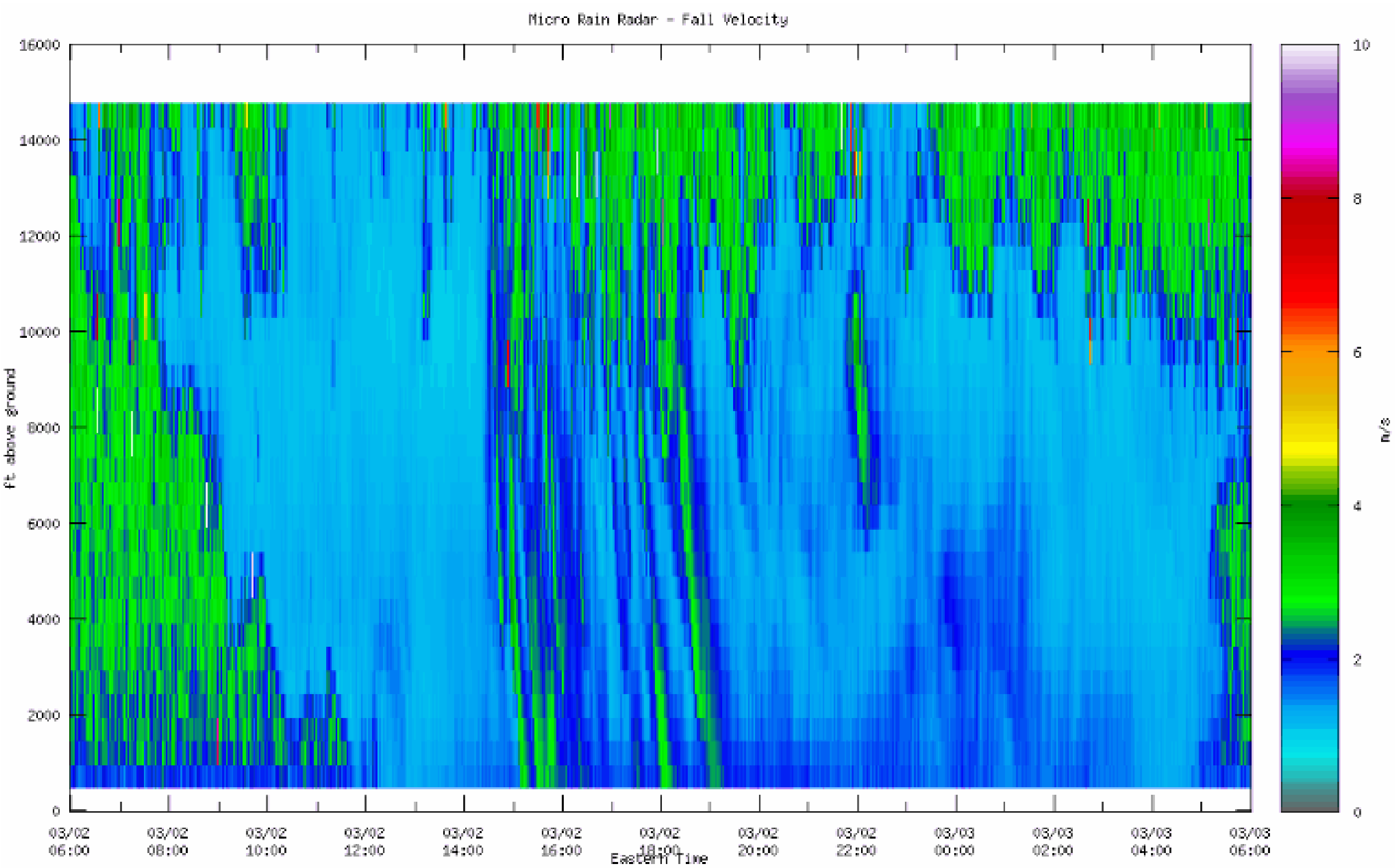
The Micro Rain Radar (MRR) is a vertically-pointing Ku-band radar. The output from the MRR can be processed to provide the user with a vertical view of reflectivity and Doppler velocity. The high temporal and vertical spatial resolution of the MRR along with its unique data makes it an interesting tool to view the characteristics and type of precipitation during winter storms.

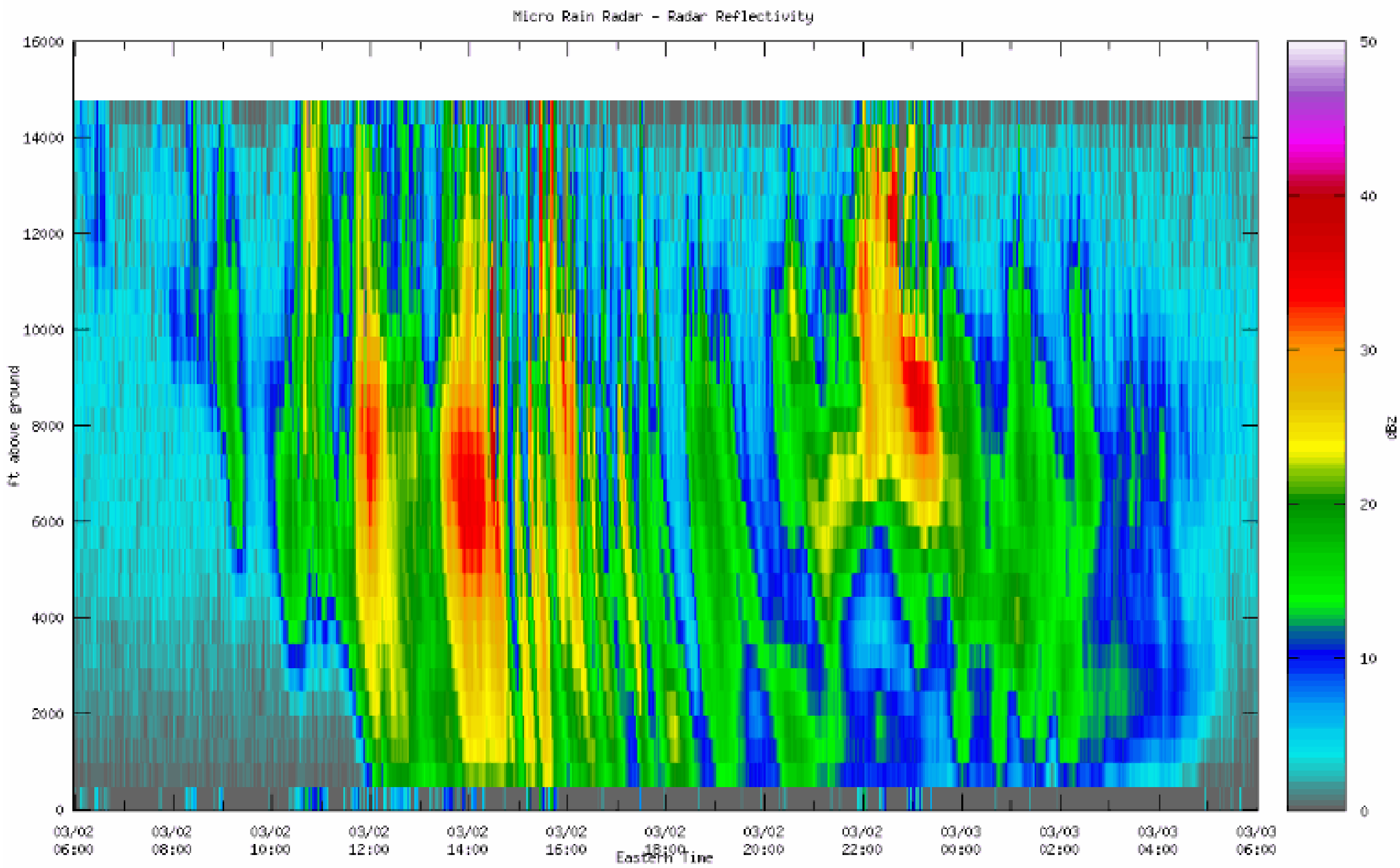
Both the reflectivity and the Doppler velocity datasets are displayed with a vertical axis depicting height in thousands of feet and a horizontal axis depicting time. The reflectivity data can be used to determine precipitation intensity and potential bright banding. The velocity data can be used to determine precipitation type based on the fall velocity of the hydrometeor. Snowflakes have a much slower fall velocity than sleet or rain (including freezing rain). The location where a slower fall speed changes into a faster one can be inferred as the melting layer. The melting layer is typically associated with an increased in reflectivity as well.

During this event, there was a MRR unit in the NWS Raleigh forecast area. This MRR unit, operated by the Renaissance Computing Institute (RENCI) was located in Greensboro, NC around 5 miles east of the Piedmont Triad International Airport (KGSO).

The data from the MRR unit in Greensboro shows the arrival of the precipitation as virga between 1000 AM and 1200 PM EST. The initial development of precipitation aloft can be seen in the vertical reflectivity plot at around 900 AM EST with a drop in the lowest reflectivity height noted between 1030 AM and 1200 PM EST. A similar trend is even easier to visualize in the Doppler velocities which show the height of the virga dropping throughout the morning. The KGSO METAR reports that the snow began at 1702 UTC or 102 PM EST. In fact, the snow began with a surface temperature of 3.9 degrees C or 39 degrees but temperatures quickly fell to 33 degrees within two hours of the onset of precipitation. Despite the varied precipitation intensities as noted with the reflectivity values aloft exceeding 30 dBZ at times, the precipitation fell as all snow during the afternoon. An AMDAR aircraft sounding for KGSO valid at 1812 UTC shows that much of the profile is several degrees C below freezing with a very shallow surface based layer with temperatures near or just above freezing. The slow Doppler velocities during the afternoon, generally less then 2 m/s, is consistent with snow. In fact, the visibility at KGSO was less than a mile for nearly all of the afternoon in mainly light snow.

The steadier snow became lighter and more showery during the late afternoon and early evening which can be seen in the KRAX reflectivity imagery, as well as the vertical reflectivity, and the Doppler velocity plots.





Hourly 4 inch (0.1m) Soil Temperatures

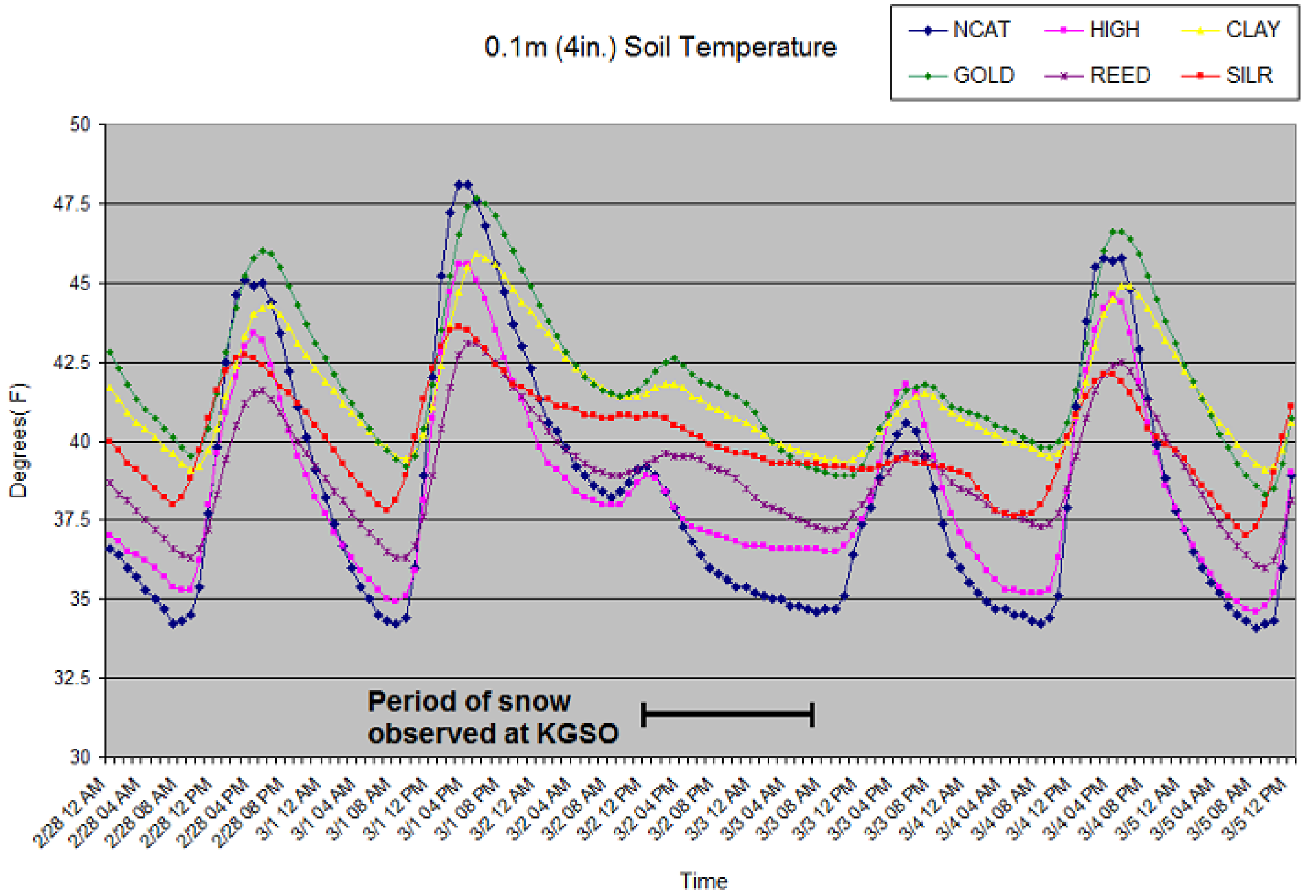
The image below (click on it to enlarge) shows the hourly 4 inch soil temperatures at 6 locations across central North Carolina from midnight on February 28 through midnight on March 6, 2010.

First note that this winter storm was preceded by a few mild days with temperatures reaching the 40s to lower 50s on 02/28 and in the lower and mid 50s on 03/01. During this warm period the 0.1m (4 inch) soil temperatures reached the lower to mid 40s during the late afternoon hours. The amount of diurnal and spatial variability in the data is also interesting with some location experiencing diurnal spreads of more then 10 degrees.

Note the limited diurnal recovery on 03/02 given the expansive cloud deck which results in soil temperatures in the upper 30s to lower 40s just before the precipitation arrives. Once the precipitation begins during the midday and afternoon hours on 03/02, the soil temperatures begin a gradual drop through the evening and overnight hours.

Past experience has shown that when max soil temperatures during the day preceding a snow fall are in the lower 40s or colder and given modest snow rates with surface temperatures at or near freezing, the snow can be expected to accumulate. While soil temperatures were a little warmer then these guidelines, the heavy snow rates in the Triad during the afternoon and overnight across Randolph, Chatham, and Lee Counties allowed the snow to accumulate fairly quickly.

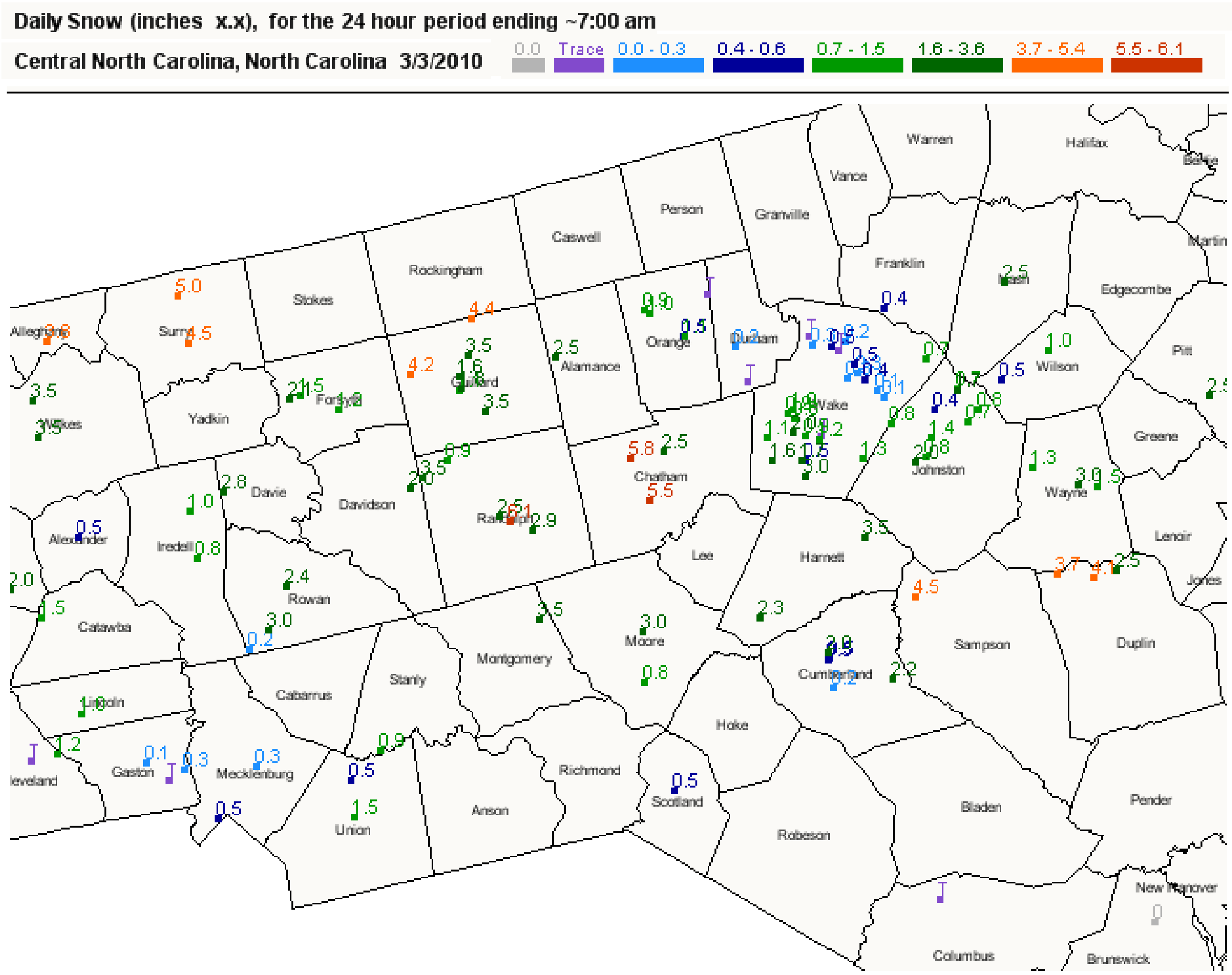
NCAT - NC A&T State University Research Farm, Greensboro NC
HIGH - UNCG Lindale Farm Station, High Point, NC
CLAY - Central Crops Research Station, Clayton, NC
GOLD - Cherry Research Station, Goldsboro, NC
REED - Reedy Creek Field Laboratory, Raleigh, NC
SILR - Siler City Airport, Siler City, NC



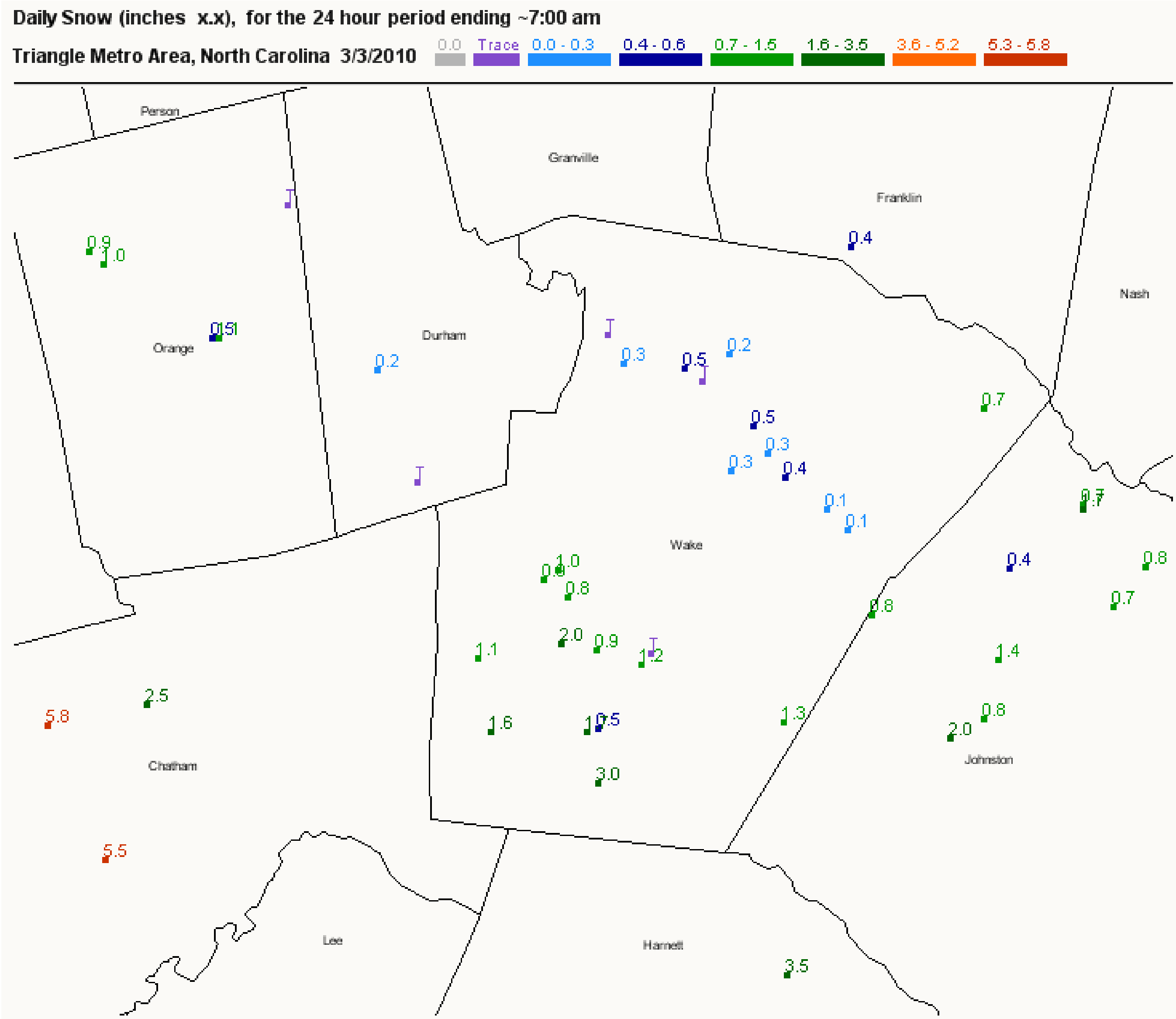
CoCoRaHS Observer Network

CoCoRaHS is a grassroots volunteer network of weather observers working together to measure and map precipitation (rain, hail and snow) in their local communities. By using low-cost measurement tools, stressing training and education, and utilizing an interactive web-site, CoCoRaHS aims to provide the highest quality data for natural resource, education and research applications. The only requirements to join are an enthusiasm for watching and reporting weather conditions and a desire to learn more about how weather can effect and impact our lives. North Carolina joined the CoCoRaHS network in 2007. For more information, visit the CoCoRaHS web site at www.cocorahs.org.

Central North Carolina Snow Accumulation Totals Ending at 7AM on 03/03



Triangle Area Snow Accumulation Totals Ending at 7AM on 03/03



Archived Text Data from the Winter Storm

Select the desired product along with the date and click "Get Archive Data."
Date and time should be selected based on issuance time in GMT (Greenwich Mean Time which equals EST time + 5 hours).

Product ID information for the most frequently used products...

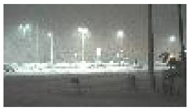
RDUAFDRAH - Area Forecast Discussion
RDUAFMRAH - Area Forecast Matrices
RDUHWORAH - Hazardous Weather Outlook
RDUNOWRAH - Short Term Forecast
RDUPFMRAH - Point Forecast Matrices
RDUPNSRAH - Public Information Statements (snow/ice reports among other items.)
RDUWRKDRT - Soil Temperature Data from the NC State Climate Office
RDUWSWRAH - Winter Storm Watch/Warning/Advisory
RDUZFPRAH - Zone Forecast Products

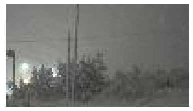
* Scroll down for list | from | March | 03 | 2010

Get Archive Data

Select Photos and Videos of the Winter Storm

Selected Photos
Photos courtesy of Jeremy Gilchrist.
(Click on the image to enlarge the photo)





Select Videos
Videos courtesy of Jeremy Gilchrist.
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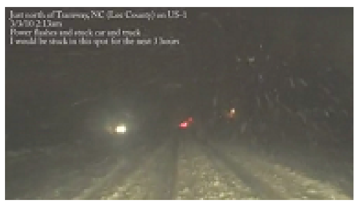

Final Thoughts and Lessons Learned

Three to four days in advance of the event, HPC expressed higher than normal confidence in the ECMWF model, which depicted a coastal surface low just off the Carolina coast. The GFS forecast a surface low crossing the upper Florida peninsula and continuing just north of due east into the open Atlantic. HPC noted a higher than normal clustering of ECMWF ensemble members as reason for confidence. The Canadian relatively quickly joined the ECMWF, while the GFS only gradually adjusted its low track westward. A very similar scenario occurred earlier in the season in the Carolinas which boosted local confidence in HPC and the ECMWF.

Early model and HPC preferences of a climatologically preferred storm track for winter weather for portions of central NC was noted. It also became increasingly evident three to five days prior to the potential event that the storm would likely have to produce its own cold air to generate wintry precipitation since there would not be a strong cold high pressure system in a favorable location to support and sustain wintery precipitation in central NC. However, the favored surface low track from the Gulf of Mexico northeast, close to the SC/NC coast along with the deepening nature of the storm suggested a potential winter storm. This potential was also enhanced by the potential for the mid/upper level low to track very close to central or eastern NC, giving credence to the capability of the storm producing its own cold air.

On February 20th, an email was sent to various users including broadcasters highlighting the anticipated pattern change and potential for a late season winter storm. The hazardous weather outlook mentioned the potential for late season storm in the 400 AM EST February 26th issuance which corresponded to a 4 day lead time.

Uncertainty in the amount of forecast precipitation along with surface temperatures at or just above freezing, warmer soil temperatures then typically associated with accumulating snow, and the late season nature of the storm made snow accumulation forecasts very difficult. Mesoscale features including frontogentical forcing and the resultant bands of heavier snow along with local conditions played a critical role in the snow accumulations and the highly variable accumulations. In the future, highlighting broader regions in Watches, Warnings, and advisories should be considered.

The predominate precipitation type nomogram performed fairly well despite the late season and warm/wet nature of the storm.

The nighttime snowfall along with the periods of moderate and even heavy snow allowed the snow to accumulate more readily then anticipated.

Determining snow accumulations in a spring snow event with a warm ground and ambient air temperatures above freezing is difficult since the snow will be melting throughout its accumulated depth. The snow and rain mix also made determining snow ratios nearly impossible.

Attention to forecast hourly surface temperatures which were expected to remain near or above freezing, along with precipitation amounts and timing allowed the NC DOT to save money by not pre-treating the roads.

Situational awareness displays were on, focused on television stations in Greensboro initially as the snow arrived quickly and intensely. Webcams were very useful, showing reduced visibilities and snow accumulation on grass and roads as bands of snow moved through certain areas.

AMDAR soundings were effectively used to monitor the depth of the surface based above freezing layer at KRDU.

NWS Chat provided a mechanism to obtain a great deal of observations from several TV stations. Some of the AFD release times were beyond the 300 PM deadline and impacted some media users. NWSChat was used to notify users of the delayed AFD while providing some important details about advisories and accumulations.

Numerous briefings were provided to local emergency managers and decision makers during the event via the new NWS Raleigh Briefing Web Page and via other online conferencing software. The ability to share information with users who may be at home or away from the office was invaluable.

An updated reflectivity color curve used in AWIPS for 8 bit data was received very well by the forecast staff.

References

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