

# 10/24-27 2007 Rain Event

The first widespread rain in almost two months began October 24 2007 and finally ended during the morning of October 27 2007. This event was highlighted in the following statement.

This storm brought an average of 3-4 inches of rainfall to the area. Locally higher amounts over 6 inches were observed with some reports in excess of 7 inches.

**THE FOLLOWING ARE OFFICIAL RAINFALL STORM TOTAL OBSERVATIONS TAKEN DURING THE STORM THAT AFFECTED OUR REGION.**

OFFICIAL ASOS SITE	STORM TOTAL RAINFALL (INCHES)
SALISBURY - (SBY)	1.84
ELIZABETH CITY - (ECG)	2.41
WAKEFIELD NWS OFFICE	3.17
RICHMOND - (RIC)	3.53
NEWPORT NEWS - (PHF)	4.53
NORFOLK - (ORF)	5.13

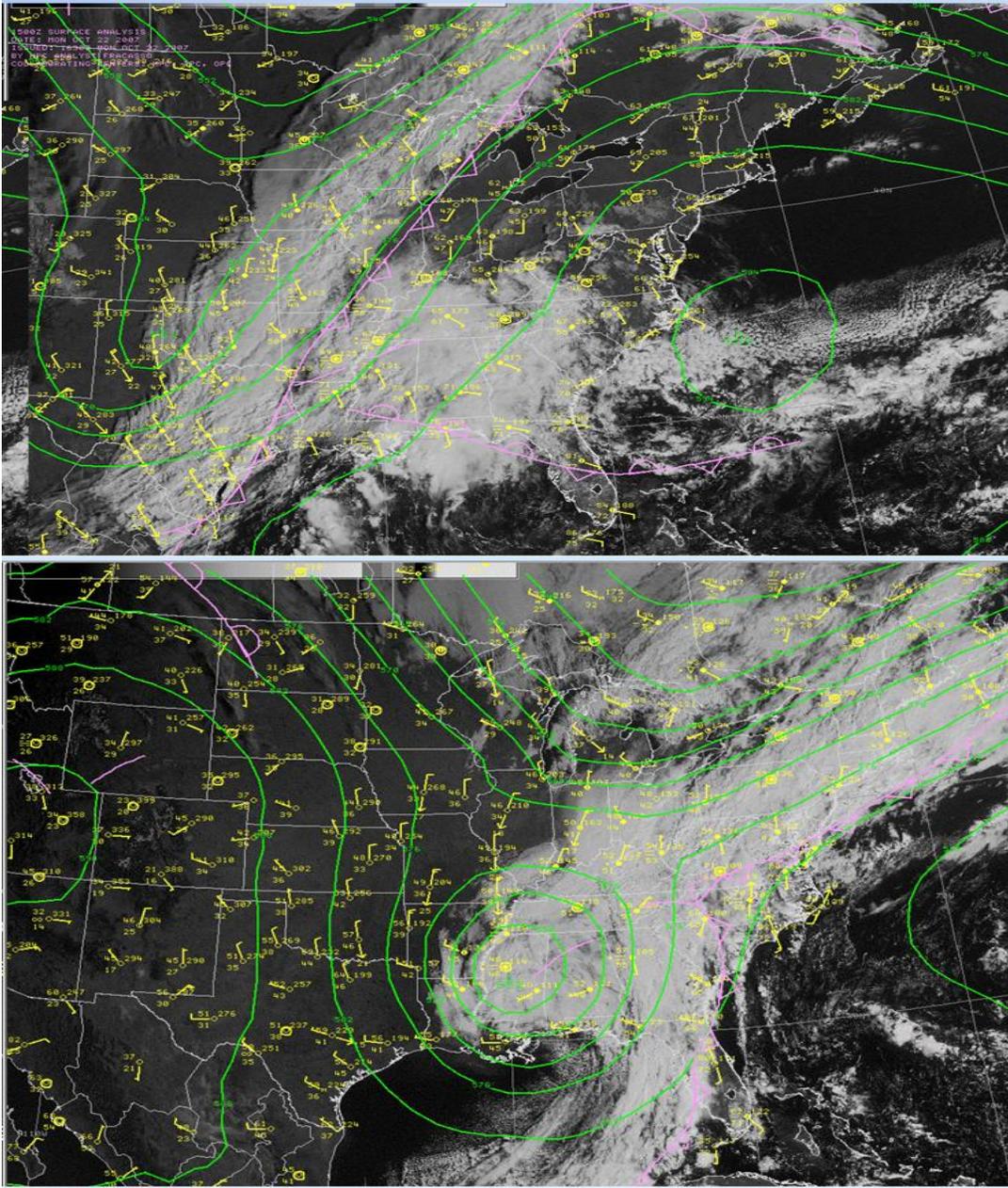
**SOME NOTABLE STORM TOTAL RAINFALL OBSERVATIONS (UNOFFICIAL) THAT WERE RECORDED BY A FEW OF OUR SPOTTERS.**

	STORM TOTAL RAINFALL (INCHES)
.NORTHUMBERLAND COUNTY...	
4MI N OF KILMARNOCK	7.80
.AMELIA COUNTY...	
PAINVILLE	7.40

## Various Aspects of the Storm

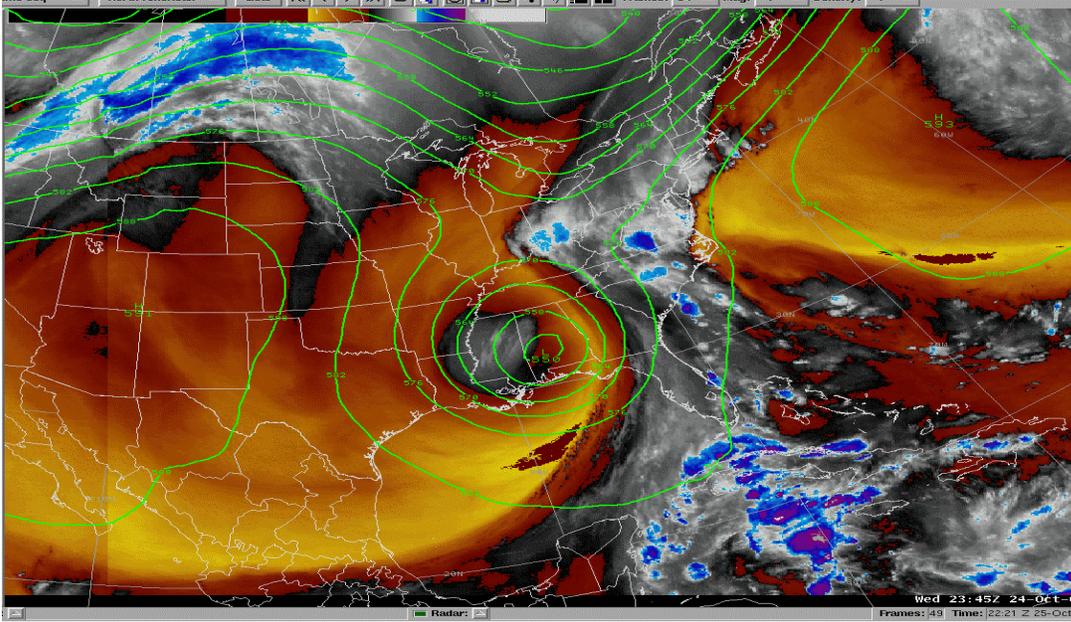
### Development and Evolution:

A strong trough of low pressure in the mid and upper levels of the atmosphere moved from the Rockies into the Plains on Monday October 22<sup>nd</sup>. Across the southeastern U.S., a strong ridge of high pressure was in place, allowing for more of the same: dry weather and well above normal temperatures (see Fig 1 top image) for the drought-stricken Carolinas and southern Virginia. Thankfully, changes were on the way as the Plains trough continued to deepen and amplify, eventually becoming cut off from the main flow across the northern tier of the United States and southern Canada (see Fig 1 bottom image). This proved to be a significant development for one main reason: it enabled the system to transport deep tropical moisture northward into the southeast and mid Atlantic states.



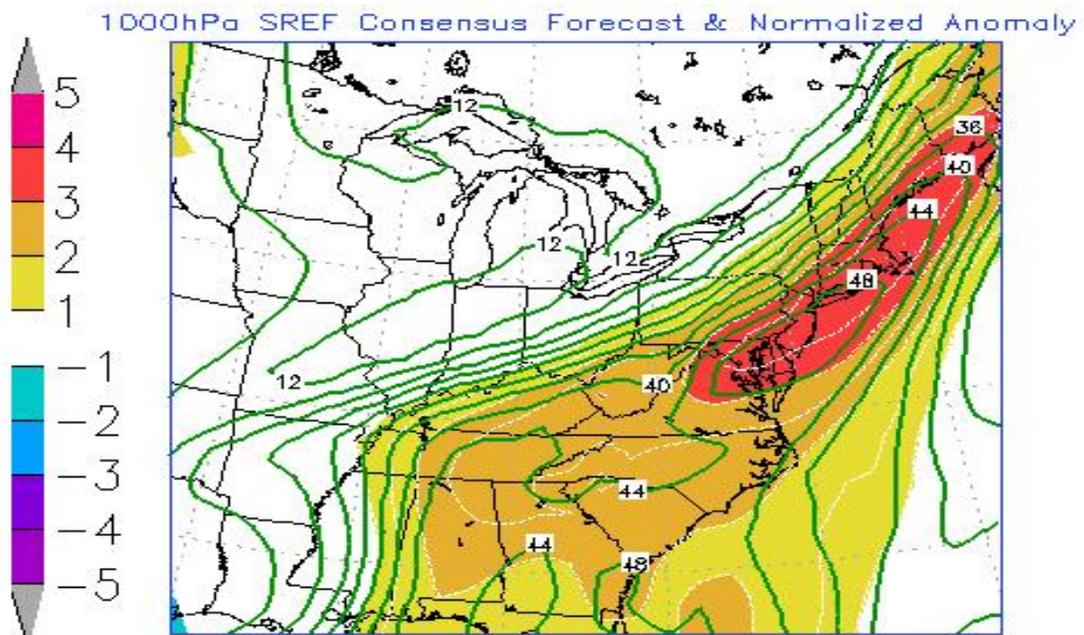
**Figure 1: The green contours are 500 mb heights. Top image shows the pattern on Monday October 22<sup>nd</sup>, bottom image is 2 days later Wednesday October 24<sup>th</sup>.**

The abundant moisture available to this storm is clearly evident in the water vapor image shown below (Figure 2). Note the long plume of moisture coming all the way from the Caribbean Sea. This plume continued through the duration of the storm; it finally weakened and moved off the Atlantic Coast by Friday night.



**Figure 2:** the darker colors and blue indicate the high moisture area. The contours are 500 mb heights.

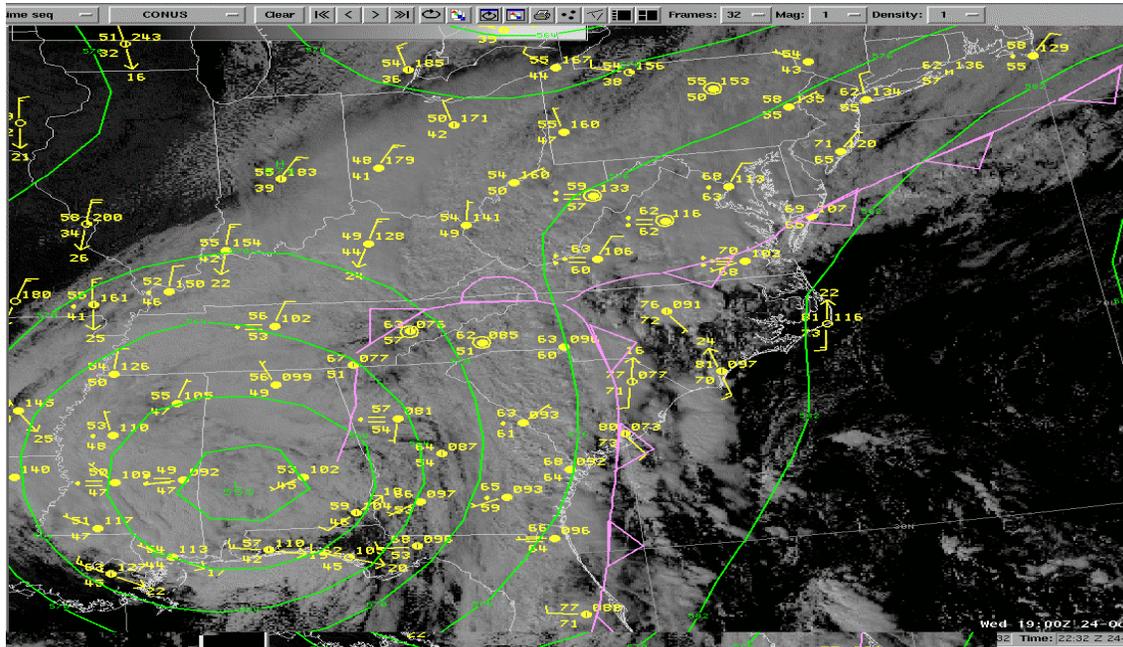
By Wednesday the 24<sup>th</sup>, precipitable water was in excess of 2.25 inches, a value that is approximately 3 standard deviations above the climatological normal (see Figure 3).



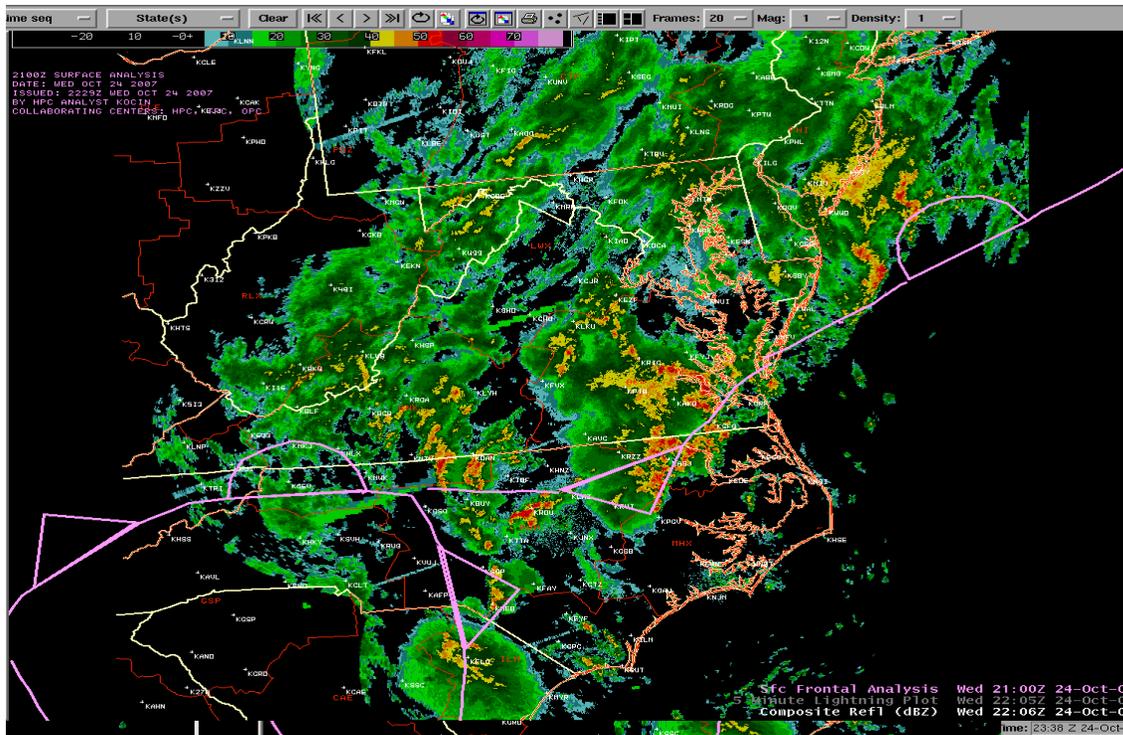
Consensus Forecast = Green Contour  
Departure from 24OCT normal (# Std Dev)=Shading, White Contour

**Fig 3:** Precipitable water at 1000 mb on Oct 24<sup>th</sup> (shading depicts standard deviation from climatology for the date).

The cold front depicted in Figure 4 slowly pushed just south of the area. This front provided a good overrunning surface where the moisture laden air was lifted over it causing the rain. The heaviest rain across the area occurred along and to the north of this frontal boundary. As the upper low slowly moved back to the west Thursday and Friday this front moved inland across southeastern Virginia and northeast North Carolina. The strong southerly flow aloft continued through the event producing the heavy rain.



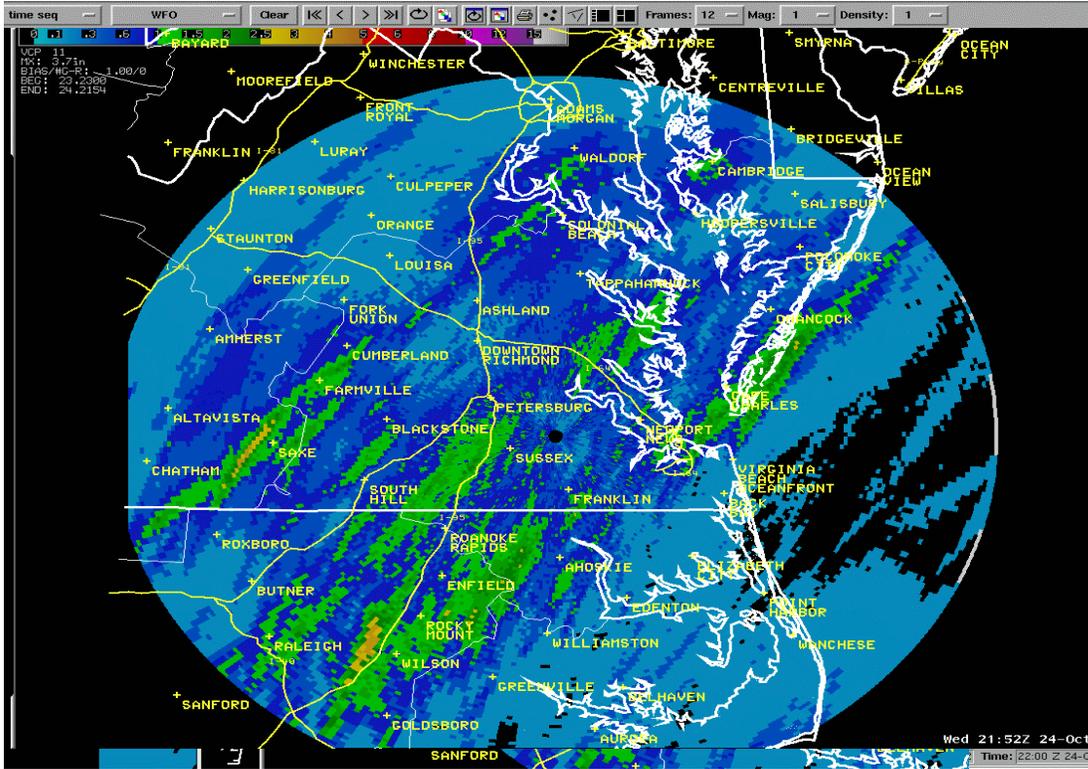
**Figure 4: Frontal boundaries in purple. Solid lines are 500 mb heights.**



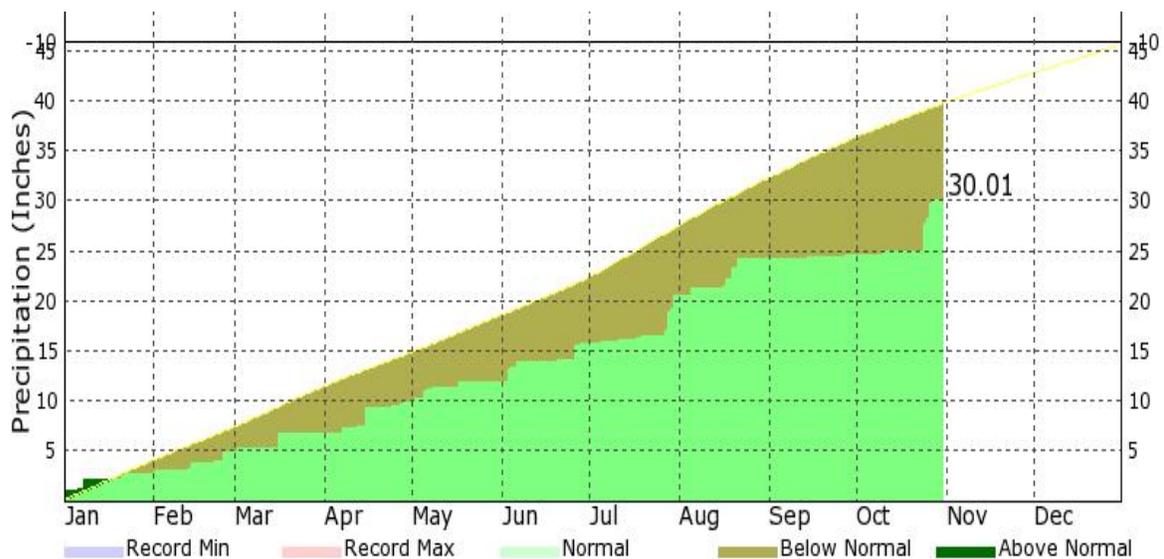
**Figure 5: Radar echoes are in green with the heaviest rain depicted by the orange and red areas.**

Notice in Figure 5 all the echoes to the north of the cold front while in the warm sector only isolated showers were occurring. Some very heavy rain was developing along the front in the orange areas with rainfall rates of 1 to 2 inches per hour.

In Figure 6 the total precipitation is depicted for early in the event. Notice the streaks of heavier precipitation which indicate some of the heavier rain showers. These streaks are oriented southwest to northeast which was the direction of storm motion.



**Figure 6: Radar derived rainfall estimates are shown here. The green to orange show the heaviest rainfalls. This image was taken Wednesday evening (after the 1<sup>st</sup> day of widespread rainfall associated with the storm).**



**Figure 7: Norfolk Precipitation for 2007 (note the jump late in October decreasing the annual deficit from roughly 14 inches before the event to about 10 inches after).**