

EASTERN REGION TECHNICAL ATTACHMENT  
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Lightning Frequency and Cyclogenesis - Nov. 11, 1987 (Veteran's Day Storm)

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Editor's Note: Tracton (1973) found that the convective release of latent heat is an important source of energy for cyclogenesis. He states---

"Significant convection occurred in the center of storms generally only during the early stages of their life history. Latent heat released by convective showers in the vicinity of the Low center appeared to initiate development before such development would have occurred if only the larger scale baroclinic processes were operative. Convective activity not in the immediate vicinity of the Low center did not appear crucial either to the initiation of development or to the trend of continued development following the onset of cyclogenesis."

RECENTLY WE SOLICITED COMMENTS FROM THESE OTHER OFFICES ABOUT OUR LIGHTNING NARRATIVES. WSFO RALEIGH ASKED THAT WE CONTINUE TO TRANSMIT THEM DURING THE WINTER MONTHS. A FORECASTER THERE RECALLED THE GALE EXPERIMENT IN WHICH THEY DISCOVERED THAT LIGHTNING ACTIVITY OFFSHORE WAS OFTEN A TIP OFF TO CYCLOGENESIS ALONG THE COASTAL FRONT."

I TESTED THIS HYPOTHESIS ON THE VETERANS DAY STORM. BETWEEN 15Z AND 20Z LIGHTNING ACTIVITY OFF THE MID ATLANTIC COAST INCREASED EACH HOUR. IT PEAKED BETWEEN 19 AND 20Z AND ENDED ABRUPTLY AT 2334Z. THE GREATEST AMOUNT OF LIGHTNING OCCURRED WHEN THE STORM WAS ALMOST IN A STEADY STATE. CENTRAL PRESSURE ONLY CHANGED ABOUT 1MB DURING THIS TIME. IN CONTRAST NO LIGHTNING WAS OBSERVED DURING THE TIME THAT MAXIMUM INTENSIFICATION TOOK PLACE, BETWEEN 00Z AND 09Z THURSDAY.

IT IS INTERESTING TO NOTE THAT THE PEAK CAME AT A TIME WHEN THE LOW WAS IN CLOSE PROXIMITY TO THE WEST WALL OF THE GULF STREAM. AT THE SAME TIME INFARED SATELLITE IMAGERY SHOWED THE RAPID DEVELOPMENT OF A PRONOUNCED WEDGE SHAPED CLOUD PATTERN. CLOUD TOP TEMPERATURES JUST REACHED THE -60 DEGREE BLACK CONTOUR (MB CURVE) AT 20Z.

There is some suggestion in the data that it takes some time (about 5-8 hours) to loft the latent heat energy, released by convection, that will fuel the synoptic scale cyclogenetic process.

#### References

Tracton, M. Steven, "The Role of Cumulus Convection in the Development of Extratropical Cyclones", Monthly Weather Review, Vol. 101, No. 7, July 1973, pp. 573-593.

Scientific Services Division, ERH  
December 1, 1987

Attachments



	<u>Time</u> <u>GMT</u>	<u>Pressure</u> <u>(MB)</u>	<u>Δ P (MB)</u>	<u>CG</u> <u>Strikes</u>
/11/87	15	1006		
	16			11
	17			14
	18	1001	-5	36
	19			100
	20			133
	21	1000	-1	112
	22			60
	23			33
/12/87	00	997	-3	13
	03	987	-10	0
	06	982	-5	0
	09	976	-6	0
	12	979	+3	0

Veteran's Day Storm 11-12 Nov. 1987  
 Cloud to water (CG) lightning frequency vs. central  
 pressure and pressure change.