MESOSCALE WEATHER OBSERVING NETWORK PROVIDES SOURCES OF DETAILED METEOROLOGICAL DATA FOR ALBANY, NY AND ENVIRONS

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1. INTRODUCTION

A weather-observing network started by the author and the local TV meteorologist, Bob Kovachick, in May 1978 records daily temperature and rainfall data for an area of 60 x 70 miles (4,200 square miles) centered around Albany, NY. The rainfall event of March 21-22, 1980 produced some amazing differences in precipitation totals over the area. The density of the network permits close inspection of the rainfall amounts for this event, and the variation due to terrain. Comparison of the network data with that published by the National Climatic Center reveals some interesting differences in the analysis of the rainfall pattern. A brief description of the meteorological events during this storm sheds some light on noted precipitation maxima and minima. It is believed that data from this mesoscale weather observation network could lead to some interesting discoveries about the local climate around Albany that may in the future be useful to the National Weather Service as well as to private meteorologists serving the community.

2. OBSERVING NETWORK

The author (at the time president of the local chapter of the American Meteorological Society - AMS) and the new TV-10 meteorologist made arrangements for a group of members of the Interior of Eastern New York Chapter of the AMS who were interested in keeping weather records to purchase inexpensive yet accurate maximum-minimum thermometers and rain gauges. The intent of the network, which was separate from those sub-

INTERIOR OF EASTERN NEW YORK CHAPTER OF THE AMERICAN METEOROLOGICAL SOCIETY
WEATHER OBSERVATION NETWORK

Location # 1

Drop in mail on the first day of next month — send to → Doc Taylor, 226 Lake Hill, Burnt Hills, N.Y. 12027

Month March 1980

Date	Weather	Min. Temp.	Max. Temp.	Aver. Temp.	Precip. Total	Snow Fall 7 A.M.	Snow on Grd. 7 A.M.	Date	Weather	Min. Temp.	Max. Temp.	Aver. Temp.	Precip. Total	Snow Fall 7A.M.	Snow on Grd. 7 A.M.
1	○	-3	15				T	17	⊕ ⚡R-	24	38				5.0
2	○	-3	18				T	18	⊕ R-	26	48		.12		2.0
3	○	-2	30				T	19	◍	29	46				T
4	◍	11	40				T	20	◍ -	26	58		.01		T
5	⊕ S--	26	38		.06	0.1	T	21	⊕ R+	38	49		2.75	1.0	
6	◍	23	32					22	⊗ S -	32	45		.36	1.0	1.0
7	⊕	24	44		.57	T	T	23	◍	30	49				T
8	⊕ R-	32	34		.51			24	○	30	52		.36		
9	⊕	30	37					25	⊕ R-	34	40		.06		
10	◍	19	47		.14	0.5		26	⊕	32	44		T		
11	⊕ S-	26	34		.04	0.7	0.4	27	◍	30	48				
12	◍ SW-	12	24				0.7	28	◍	26	57		.07		
13	◍	5	32		.84	8.5	T	29	⊕ R-	39	44		.91		
14	⊗ S-	23	34		.22	2.1	8.5	30	⊕	39	47				
15	⊕ SW-	26	30		T	T	9.0	31	⊕	30	44		.02		
16	○	2	37		.01		7.0		Average	23.1	39.8	31.5	7.05	13.9	
									Lowest Min. Date	-3 (1,2)					
									Highest Max. Date	58 (20)					

NOTES: Denote thunderstorm days with ⚡ in weather column.

Figure 1. Sample observer network data sheet.

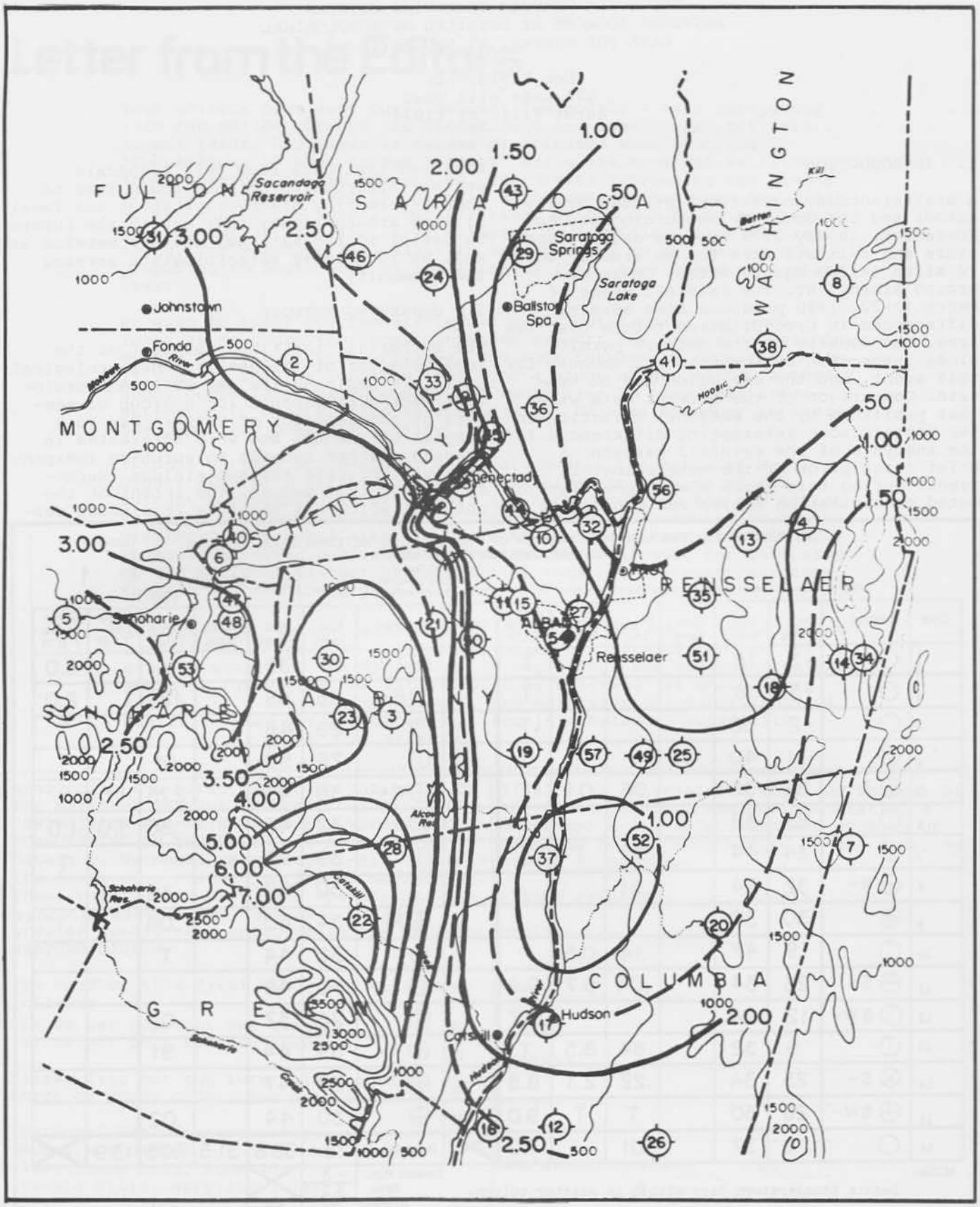

Figure 2. Precipitation Analysis, March 21-22, 1980.

station observers for the National Weather Service (NWS), was to collect weather data on a smaller scale, and hopefully learn more about the local climate. Some of these observers also provide real-time data for the TV-10 weather program similar to that done at station KSTP in Minneapolis/St. Paul, MN (2). The number of observers in the network grew the first year from about 30 to 45, and now stands at 57. Each observer takes daily observations of maximum and minimum temperatures and the 24-h precipitation total. Other data, such as snowfall and the number of thunderstorm days, are also recorded on the observer sheet (Figure 1). At the end of the month, the data sheets are mailed to the author, who in turn plots and analyzes the data. A copy of the analysis is sent to all observers as well as to the NWS at Albany, and to a local newspaper that publishes the map. The data is also being used by the State University at Albany for research in thunderstorm patterns around the area. The NWS has been given the phone numbers of many of the observers so that forecasters may have access to real-time data when needed. This might be especially useful in times of severe weather, when the lead forecaster might want to call an observer in a location where radar shows a heavy thunderstorm. In the last few months, awareness of the network has spread. One request for data from the network stemmed from the need by a local real-estate broker for data about recent rainfall in an area not covered by the NWS network.

3. SYNOPSIS OF THE MARCH 21-22 EVENT

24 hours before the onset of heavy rain in eastern New York, a low-pressure system was centered in western Tennessee. A sharpening and fairly fast-moving upper-air trough accompanied this system.

By 12Z on Friday the 21st, the primary system had moved to West Virginia, while a secondary storm showed signs of developing in Virginia, on the eastern side of the mountains. The upper-level trough was lifting out to the east and was in a negative-tilt position. Retarding the normal northeast movement of a storm in this position was a large, high-latitude blocking high-pressure system over Labrador and the North Atlantic Ocean between Labrador and Greenland. During the afternoon of the 21st, the heaviest rains commenced over the network.

During the night, the surface low-pressure system tracked from Virginia over Baltimore and New York City, then eastward to the south of Cape Cod. The upper-level trough closed off and moved eastward under the Canadian block. It is this latter feature that became important in the way precipitation was distributed over the network that night.

The heavy rains that fell on the Catskill Mountains (located in the southwest part of the network) resulted in the worst flooding situation since hurricanes Connie and Diane struck in 1955. Meanwhile, people in Washington County, 60 miles to the northeast, wondered what all the commotion was about, because all they received was less than a tenth inch of rain. Yet over the border in Vermont, some places, like Manchester, recorded about two inches of rain.

4. DISCUSSION OF RAINFALL ANALYSIS

Figure 2 is the analysis of the total rainfall for the storm. Elevation contours for

DATE / TIME	3/21/80 12Z	3/22/80 00Z	3/23/80 12Z	3/24/80 00Z
Height above surface in feet				
0	CALM	14014	32012	31012
1000	14520	15528	35513	32510
2000	14526	11547	04519	35509
3000	15530	10553	06028	02513
4000	16532	12550	07536	02020
5000	17033	12550	07538	02525
6000	18035	13080	09549	03031
7000	18035	—	10053	04531
8000	18027	—	11048	06033

Key - First 3 digits wind direction in degrees
Last 2 digits wind speed in knots

Figure 3. Winds Aloft Data for Albany, NY.

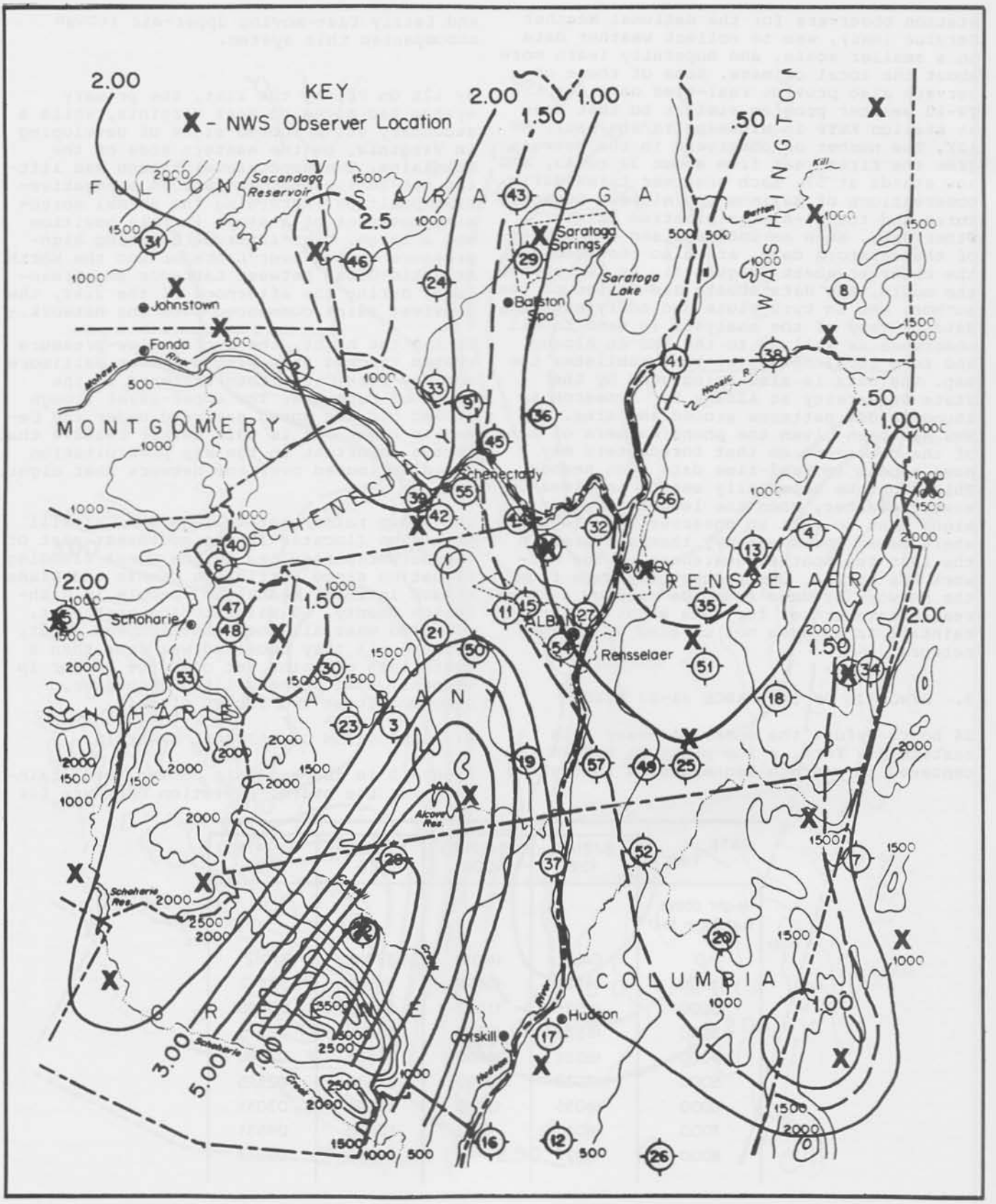

Figure 4. Precipitation Analysis from National Weather Service Data, March 21-22, 1980.