

2007 New York State Science Olympiad - Basic Weather

Station 2

2-1 In the winter, natural snow, ice pellets and ice on the ground can melt, can be washed or be blown away, but on a day when the air temperatures are significantly below freezing and the relative humidity is low, the snow, ice pellets and ice can totally disappear naturally (not by shoveling, plowing or snow blowing) by _____ (provide the word or describe the process).

Answer the following questions (2-2 to 2-10) based on the data presented for the National Weather Service Oswego East station located just south of Lake Ontario in upstate New York.

STATION (City/Town/Village)		COUNTY		MONTH	DATE	WS FORM B-91 (12/00)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE																		
OSWEGO EAST		OSWEGO		FEB.	20	07	RECORD OF RIVER AND CLIMATOLOGICAL OBSERVATIONS																		
STATE		COUNTY		RIVER																					
N.Y.		OSWEGO																							
TIME (local) OF OBSERVATION		PRECIPITATION		STANDARD TIME IN USE																					
5-P.		5-P.		E																					
TYPE OF RIVER GAGE		ELEVATION OF RIVER (GAGE ZERO)		FLOOD STAGE		NORMAL POOL STAGE																			
		FL		FL		FL																			
DATE	TEMPERATURE F.		24-HR AMOUNTS		PRECIPITATION		WEATHER (Calendar Day)				RIVER STAGE		REMARKS (Special observations, etc.)												
	MAX.	MIN.	AT OBSN.	Rain, melted snow, etc. (line and frequency)	Snow, sleet, hail, (line and frequency)	At Obs. (line and frequency)	Draw a straight line (—) through hours precipitation was observed and a wavy line (---) through hours precipitation probably occurred unobserved		Mark "X" for all types occurring each day:					GAGE READING AT	TEMPERATURE										
							A.M.	NOON	P.M.	Fog	Ice Pellets	Glaze	Thunder	Hail	Overcast	Windy	Time of observation if different from above	CONDITION	GAGE READING AT	TEMPERATURE					
1	31	20	27	T	T	7																	LIGHT SNOW - TEMP ↑ CLEARING		
2	32	24	30	.11	1.0	7																	LIGHT SNOW - WET SNOW - HEAVY @ TIMES WINDY		
3	30	13	20	.10	3.5	10																	L.E. SNOW EARLY - COLD FRONT - SQUALL		
4	20	7	10	T	1.9	9																		MOSTLY SUNNY - COLD & WINDY - L.E. SNOW LATE	
5	16	4	16	.26	10.0	15						X	X											HEAVY L.E. SNOW - K. 8-90 WIND 57 MPH - 0 VISIBL	
6	18	10	14	.80	26.0	35																		HEAVY L.E. SNOW - WINDY - POOR VISIBILITY	
7	19	4	16	.45	10.4	40																		HEAVY L.E. SNOW - WINDY - POOR VISIBILITY	
8	23	14	18	.37	13.3	48																		HEAVY L.E. SNOW - WINDY - WHITE - CUTS EARLY	
9	24	12	24	.05	2.0	38																		L.E. SNOW - WINDY - BLOWING & DRIFTING	
10	24	18	22	.21	8.0	33						X												L.E. SNOW WINDY - HEAVY SNOW W/ F.R. - SQUALLS	
11	24	17	23	.04	1.7	28																		L.E. SNOW EARLY - CLEARING	
12	27	20	20	.04	1.5	26																		L.E. FLURRIES	
13	20	-1	8	0	0	24																		COLD - SNOW LATE	
14	10	5	10	.45	10.0	30																		STORM SNOW - COLD WINDY - BLOWING W/ RAIN	
15	16	6	16	.07	1.6	28																		L.E. SNOW - VERY WINDY - COLD - WHITE CUTS	
16	23	15	22	.03	1.0	28																		WINDY - BLOWING SNOW - L.E. SQUALLS	
17	28	15	26	0	0	26																		NOT AS COLD - LIGHT SNOW LATE	
18	26	17	17	.08	1.8	25																		L.E. SNOW EARLY - WINDY	
19	18	1	16	0	0	24																		COLD - CLEAR	
20	40	14	36	T	0	22																		TEMP ↑ OVER NIGHT - LIGHT RAIN	
21	37	25	32	.01	0	20																		MOSTLY CLEAR & COLD - TEMP ↑	
22	36	24	35	.22	2	19																		TEMP ↑ WET SNOW - RAIN - FOG	
23	35	16	20	.08	1.5	20																		SNOW EARLY - WINDY	
24	23	13	23	T	T	20																		FLURRIES - COLD	
25	27	11	27	0	0	20																		OVERCAST - SNOW LATE	
26	31	27	29	.03	3	20																		LIGHT WET SNOW	
27	30	26	26	.10	2.0	21																		FLURRIES	
28	29	17	25	0	0	19						X												HEAVY FOG ON EVERYTHING - FOG 0800	
29																									OBSCURING - 75% HUMIDITY DAY
30																									
31																									
717 394		SLM		3.50 9.59		CHECK BAR (For wire-weight) NORMAL CK. BAR		READING		DATE		OBSERVER		SUPERVISING OFFICE		STATION INDEX NO.								30-6314-9	
A. obstructed by rough ice.		E. ice gage below gage										WM. N. GREGWAY													
B. frozen, but open at gage.		F. shore ice.																							
C. upper surface of a smooth ice.		G. floating ice.																							
D. ice gage above gage.		H. pool stage.																							

- 2-2 What was the greatest amount of snow and/or ice pellets that fell in any 24-hour period?
- 2-3 What was the date and the greatest depth of the snow, ice pellets, and/or ice measured on the ground?
- 2-4 How many days did it take to reduce that greatest depth of snow, ice pellets, and/or ice on the ground to $\frac{1}{2}$ of the greatest depth?
- 2-5 What was the maximum air temperature recorded during this period in your answer to Question 2-4?
- 2-6 Explain the primary reason why this greatest depth was reduced in half.
- 2-7 On February 2, 2007, how much snow fell?
- 2-8 What was the water equivalency of the snow that fell on February 2?
- 2-9 A comparison of a fixed volume (for example, a cubic foot) of the snow that fell on February 2 with the same fixed volume of snow that fell on February 5 (Do not assume that you can pack snow into a fixed volume) shows that:
- A. Not enough information was provided in the Oswego East station data to compare the mass of snow in a fixed volume on both dates.
 - B. The February 2 and February 5 volumes would have the same mass.
 - C. The February 2 volume would have a greater mass than the February 5 volume.
 - D. The February 5 volume would have a greater mass than the February 2 volume.
- 2-10 Since only snow reached the ground in the lake effect snowstorm on February 5, what was the air temperature profile above the ground in the area affected by this storm?
- A. Air temperatures were above freezing within the first 1,000 meters above the ground and were below freezing above 1,000 meters.
 - B. Air temperatures were below freezing within the first 1,000 meters above the ground, were above freezing above 1,000 meters to 2,000 meters and were below freezing above 2,000 meters.
 - C. Air temperatures were below freezing within the first 1,000 meters above the ground and were also below freezing above 1,000 meters.

- D. Air temperatures were below freezing within the first 100 meters above the ground and were above freezing above 100 meters.

2-11 Only ice pellets reached the ground during the St. Valentines Day storm in certain areas of the New York City Metropolitan area. What was the air temperature profile above the ground in these areas?

- A. Air temperatures were above freezing within the first 1,000 meters above the ground, and were below freezing above 1,000 meters.
- B. Air temperatures were below freezing within the first 1,000 meters above the ground, above freezing above 1,000 meters to 2,000 meters and below freezing above 2,000 meters.
- C. Air temperatures were below freezing within the first 1,000 meters above the ground, and the air temperatures were also below freezing above 1,000 meters.
- D. Air temperatures were below freezing within the first 100 meters above the ground and were above freezing above 100 meters.