

AMS Peer Training Module

Hazardous Weather – Winter Storms

Activity: Major Winter Snowstorm

1. 30 in. or more
 2. *no answer needed*
 3. heaviest snow accumulations occurred to the northwest of the track of the storm's center. This is where the cold air is located in a storm, supporting snow. Also, along the U.S. East Coast, air flow preceding the storm is directed toward the mountains, leading to rising air and orographic lifting creating precipitation – snow in the cold air.
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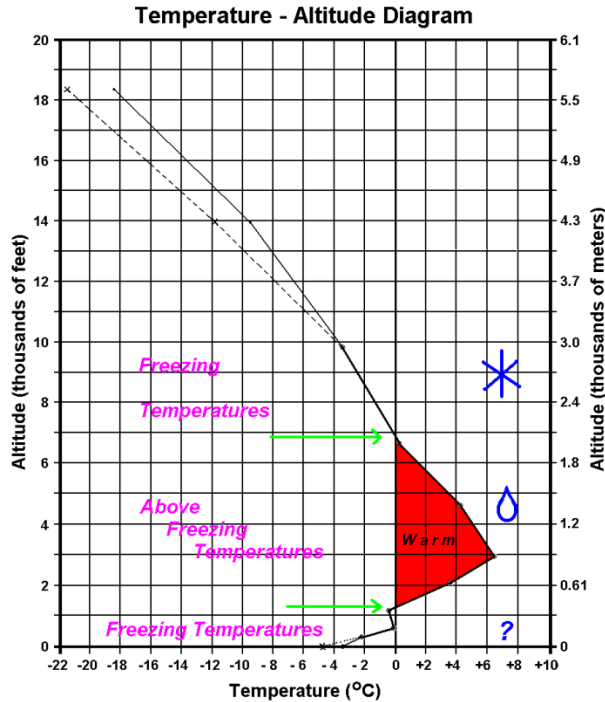
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Activity: Operation Ice Storm

1. Yes. The air was saturated at many levels, i.e. the dewpoint was equal to the temperature as noted in #2. Saturated air occurs above the ground in clouds.
2. Cloud levels noted in figure. The relatively great vertical extent of this saturation condition suggests time for growth of clouds and also precipitation.
3. See figure.
4. The relatively thick “Warm” layer would cause the snow to melt becoming rain.
5. About 1200 feet from ground to 0 °C point on profile.
6. Air advancing above a warm frontal surface sets the temperature pattern shown where clouds aloft in cold air form precipitation as snow. This falls through an above freezing layer which melts the precipitation becoming rain. This rain then falls through a thin below freezing layer just above the ground, chilling it below 0 °C (supercooled). Upon landing on surfaces (ground, power lines, structures) it freezes solid forming heavy layers of ice. Extended periods of this can cause devastating ice storms.

If the below freezing layer above the ground is thicker, the rain may have time to freeze forming ice pellets, also cause sleet, which does not coat surfaces and is not as great a hazard.



Real World Applications

Note: Stüve diagrams use pressures in millibars as the vertical dimension. For general equivalents, 1000 mb is near the ground, 850 mb is about 1500 meters (4900 ft) 700 mb is about 3000 m (10,000 ft).

1. Temperatures are equal to dewpoints from about 925 mb up to about 700 mb. This is a relatively thick layer denoting probable cloud conditions and possibly precipitation. Other surface weather reports would confirm these assumptions.
2. The profile shows saturated conditions (cloud) near the top which are below freezing (about 810 – 700 mb), then above freezing conditions (about 905 – 810 mb), finally below freezing temperatures from ground up to 905 mb. Snow would begin the fall, melting to rain and then freezing on contact (freezing rain).
3. “Warm” layer (approx.. 905 – 810 mb) would melt snow.
4. Surface temperature about 0 °C at bottom of cold air layer where rain would be supercooled and likely freezing on contact. See discussion below surface weather map segment.