MVOBS

MOUNT WASHINGTON O B S E R V A T O R Y

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What is MWO?

- A private, nonprofit, member-supported institution with a mission to advance understanding of the natural systems that create Earth's weather and climate.
 - Weather Operations
 - Research & Product Testing
 - Education
- Funding: Membership, Sponsors, Donations, Program Fees, Grants & Contracts



MWO History



- Established 1932
- April 12, 1934: 231 MPH
- Buildings:
 - Stage Office (1932-1937)
 - "Old House" (1937-1980)
 - Sherman Adams Building (1980-Present)



MWO Norms & Means

- Annual average wind speed: 35 MPH
- Annual average temperature: 27.3 F
- Annual average snowfall: 281.2"
- Annual average liquid equivalent precipitation: <u>96.87</u>"
- Annual average days with fog: 220/365 (approximately 60%)



Information from internal data records

MWO Extremes

- Maximum Instantaneous Wind Speed: 231 MPH (April 1934)
- Maximum Air Temperature: <u>72 F</u> (Aug 1975, June 2003)
- Minimum Air Temperature: <u>-47 F</u> (Jan 1934)
- Maximum Seasonal Snowfall Total: 566.4" (1968-69)
- Maximum Annual Liquid Equivalent: 130.14" (1969)



Information from internal data records

- Topography
- Frequency of Storms
- Venturi Effect







- Prevailing Winds W-NW
- 100+ MPH recorded from all directions





30 year climatological average track of surface low pressure systems. Tracks represented in this figure are those that existed for two or more days and tracked across the Eastern United States (2330 tracks classified).



Tropopause



MOUNT WASHINGTON OBSERVATORY

The Life & Work of a MWO Observer



- Observation
- Forecasting
- Education
- Research



"Typical" Work Week



- 8 Days On/ 6 Days Off
- Wednesday Shift Change
- Two Shifts of Three Observers Each
 - Two on Day Shift (0500-1700)
 - One on Night Shift (1700-0500)
 - Seasonal Intern on each shift



What Goes Into an Ob?



- Temperature/ DP/ RH
 - Sling Psychrometer
- Wind speed and Direction
 - Anemometer
- Air Pressure
 - Barometer
- Precipitation
 - Precipitation Can



Thermometers



Anemometers



Wind Data



Barometers



Precipitation



Human Senses



- Visibility
- Sky conditions
- Verifying readings
- Determining Precipitation Types



Snow Board



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Significant Clouds



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Varying Visibility



Precipitation Nearby



Maintenance



Maintenance

Mount Washington Observatory

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What is the Value of MWO Observations?

- Production of Model Output Statistics (MOS) for Forecasting
- Constant Upper-Level Atmospheric Data
 - Wind Speed, Lapse Rates, Moisture
 - Used in mixed precipitation events, fire weather forecasts
- Mountain hydrology data for runoff and spring flooding
- Unparalleled climate data for mountain/complex terrain investigation
- Data helps determine aircraft icing and turbulence
- Recreational and operational forecast information



The Higher Summits Forecast

- Produced twice daily
- 48-hour forecast window
- Peaks >4,000ft in the White Mountains
- Users:
 - Backcountry community (hiking, climbing skiing)
 - Mountain operations (MWAR, The Cog, MWSP)
 - SAR, aviation, etc.

HIGHER SUMMITS FORECAST

Mountain weather is subject to rapid changes and extreme conditions. This outlook is just one tool to help you plan a safe trip. Always travel with adequate clothing, shelter, food and water, and make your own assessment of weather conditions.

▲ WIND CHILL WARNING IN EFFECT THROUGH 10 PM EST WEDNESDAY... HIGH WIND WARNING IN EFFECT THROUGH 12AM EST WEDNESDAY ▲

Tuesday

Monday Night

Mostly in the clouds under mostly cloudy skies with a chance of snow showers. Possible snow accumulation of 1-3 inches. Windy! Temperature (°F): Around 0 falling to around 20 below Winds: W shifting NW 105-125 mph with gusts up to 165 mph, decreasing to 95-115 mph with gusts up to 140 mph Wind Chill (°F): Falling to 75 below to 85 below	In and out of the clouds becoming in the clear under clearing skies. Windy! Temperature (°F): Around 20 below Winds: NW 95-115 with gusts up to 135 mph, decreasing to 80- mph with gusts up to 115 mph Wind Chill (°F): 75 below to 85 below
Tuesday Night Mostly in the clear under partly cloudy skies. Windy! Temperature (°F): Around 25 below Winds: NW 80-100 mph with gusts up to 115 mph, decreasing to 70-90 mph with gusts up to 110 mph Wind Chill (°F): 70 below to 80 below	Wednesday In the clear under increasingly cloudy skies. Temperature (°F): Around 20 below rising to arr Winds: NW shifting W 60-80 mph, decreasing gusts up to 100 mph early Wind Chill (°F): 70 below to 80 below below



Research & Product Testing



Research & Product Testing



Current Projects



- Long-term Visibility Analysis
- MWO Regional Mesonet Technical Paper
- FAA Anemometer Testing
- Next Generation Pitot Anemometer



Educational Programs



- Distance Learning
- Science in the Mountains
- WeatherX Curriculum
- Extreme Mount Washington Museum

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Hard copies of the following:



Questions?

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Day in the Life







Transportation



High Winds





De-Icing





Living Quarters



Climate Change on Mount Washington



MOUNT WASHINGTON OBSERVATORY

Climate Change & Wx on Mount Washington

- Warming expected
- Shorter winter season
- Shallower snow depths
- More melt out events
- More intense large precip events
- Similar to Northeast US Region
- Unknowns remain



(Kelsey et al. in prep) (USGCRP 2018)