

Dewpoint and humidity measurements and trends at the summit of Mount Washington, New Hampshire, 1935-2004

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Abstract

Meteorological conditions have been recorded at the summit of Mount Washington, New Hampshire, (44°16'N, 71°18'W, 1914 m ASL) since November 1932. Use of consistent instrumentation allows analysis of humidity measurements as calculated from error-checked dry bulb temperature, wet bulb temperature, and pressure during the period 1935–2004. This paper presents seasonally and annually averaged dewpoint temperature, mixing ratio, and relative humidity means and trends, including clear-air and fog subsets and, beginning in 1939, day and night subsets. The majority of linear trends are negative over the full study period, although these decreases are not constant, with relatively large (small) values in the mid-1950s (late 1970s). Annual mean dewpoint (water vapor mixing ratio) over the 70-yr period has decreased by $0.06^{\circ}\text{C decade}^{-1}$ ($0.01 \text{ g kg}^{-1} \text{ decade}^{-1}$). During this period the annual frequency of fog increased by $0.5\% \text{ decade}^{-1}$. Dewpoint and mixing ratio trends, both generally decreasing, differ by season; they are smallest in spring and greatest in fall. Relative humidity has decreased most in winter. The clear-air subset shows significant decreases in both dewpoint and mixing ratio for all seasons except spring.

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