

2017-2018 Space Physics Seminar Series

The Supersoaker Experiment: Measuring the Upper Atmosphere's Response to Pure Water Vapor

The Earth's upper atmosphere is typically an extremely dry place, with water vapor mixing ratios measured in parts per million near 85 km altitude. The introduction of large quantities of water to the upper atmosphere can produce unexpected effects including the formation of polar mesospheric clouds (PMC), which have been implicated as indicators of long-term change in the upper atmosphere. Water vapor is a common exhaust product of liquid fueled launch vehicles and it has been shown that several different space shuttle launches led to bursts of PMC both in the Arctic and the Antarctic. To better understand how concentrated water vapor parcels lead to PMC formation, NASA supported a rocket experiment called Supersoaker. Supersoaker launched on 26 January 2018 from Poker Flat Research Range in Alaska and explosively released 200 kg of water vapor at 85 km altitude in a coordinated ground-based campaign to measure mesospheric clouds, temperature changes and wind changes in response to the water vapor release. Here we present results from that experiment for the first time. Model predictions will be compared to the observations and the implications to PMC formation will be discussed.

Thursday, March 29 at 4:00PM
725 Commonwealth Avenue
Room 502



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