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Sub-orbital demonstration of coincident aerosol and water vapour measurements with the Aerosol Limb Imager and the Spatial Heterodyne Observations of Water instrument

The High-altitude Aerosols Water Vapour and Clouds (HAWC) satellite mission is Canada's contribution to NASA's upcoming Atmosphere Observing System (AOS). HAWC will provide observations that will focus on aerosols, clouds, and water vapor in the Upper Troposphere and Lower Stratosphere (UTLS), with coverage extending into the middle stratosphere and lower altitudes at the poles. The mission comprises three instruments: the Aerosol Limb Imager (ALI), the Spatial Heterodyne Observations of Water (SHOW) instrument, and the Thin Ice Cloud in Far InfraRed Emissions (TICFIRE) instrument. Advancements in HAWC science and algorithm development are progressing through multiple initiatives, including sub-orbital testing of the instruments aboard NASA's ER-2 aircraft. The first of two planned measurement campaigns took place last fall and involved two extended flights carrying the ALI and SHOW instruments. These flights yielded extensive high-resolution, coincident observations of aerosol properties and water vapor. The campaign also featured coordinated underpasses of MLS, OMPS, JPSS-2, and SAGE, along with an EPCAPE overpass and co-located in-situ measurements using frost-point hygrometers and radiosondes launched from JPL's Table Mountain Observatory. This paper presents preliminary findings from the campaign, including insights into algorithm development, synergies between instruments, overall instrument performance, and key scientific objectives. Additionally, plans for the second measurement campaign, which will incorporate the TICFIRE instrument, will be outlined.

Topic

Current and past limb and occultation instruments: algorithms, products, validation

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