AN ORBITING CM AND MM-WAVE OCCULTATION SYSTEM FOR PROFILING WATER, OZONE, TEMPERATURE, GEOPOTENTIAL AND CLOUDS

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Our quest toward a deeper understanding of weather and climate and a significantly improved skill in predicting their future behavior depends critically on our knowledge of the present structure of atmospheric water and its variations. We present a concept for a satellite–to-satellite occultation system operating at cm and mm wavelengths to profile atmospheric water, ozone and other constituents such as water isotopes as well as temperature, the geopotential of atmospheric pressure surfaces and clouds. We will provide an overview of the observing system and summarize its expected performance. Our analysis indicates that such a system will yield dramatically higher vertical resolution, precision and absolute accuracy than present and planned passive radiometric systems in both clear and cloudy air. It will provide important complementary observations for weather applications and is particularly well suited for climate because of its self-calibrating nature. We will discuss our current instrument and retrieval system development effort as well as concepts for a proof of concept mission and an eventual constellation of microsatellites carrying these instruments focused on the hydrological cycle and monitoring of climate.