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Upper Air Measurement Improvements

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Balloon-borne radiosondes designed to measure upper atmosphere temperature, relative humidity, and ozone are utilized by the Upper Air Instrumentation Research Project (UAIRP) at NASA's Wallops Island for satellite instrument calibration and validation. NASA is continually interested in new developments or improvement of existing instruments as they are integrated into the measurement system. Although radiosondes have been around for many decades they necessarily undergo periodic change and new and/or improved sensors are always needed. The UAIRP seeks to refine and improve upper-air measurement systems. The UAIRP conducts atmospheric soundings to serve the needs of satellite validation and climate-change research programs. Measurements are made on-site at the Wallops Flight Facility and in the field for observational campaigns. The facilities at Wallops Island are used to support instrumentation research, provide traceable standards, calibrations, and characterizations, and to obtain temperature, ozone, and water vapor measurements. Instruments currently in use or being tested at Wallops Island are the: Accurate Temperature Measurement (ATM) radiosonde used to provide accurate temperature soundings and to quantify temperature errors in other sounding systems including satellite validation; Automated Digital Calibration Bench was recently implemented for calibration and preparation of the ECC ozonesonde; and, chilled mirror radiosondes (a.k.a. Snow White) for improved relative humidity measurement. These instruments are well characterized and their impact on upper air data quality are discussed. The presentation also will include examples of data quality improvement.