**Abstract**

Water vapor is a key element in the climatic system and plays a crucial role in controlling water vapor flux on climatological timescales. The measurement of water vapor is a challenging task. To this end, water vapor instruments must be robust, reliable, and accurately calibrated for use in different climate zones. The Network of Standardized Water Vapor Observations (NOAA) is an important network for calibrating such instruments. This study presents an investigation on the quality of water vapor measurements from different types of instruments. We compared the results from the different instruments and derived the following conclusions:

- The NOAA's Global Monitoring of Radiation (GMSR) and the Combined Aerosol and Tropical Ozone Monitoring (CARTOM) instruments showed consistent results.
- The radiosondes (RS) and the Clouds and the Earth's Radiant Energy System (CERES) instruments had some discrepancies.
- The satellite-based instruments (e.g., the Microwave Limb Sounder (MLS)) provided accurate results.
- The ground-based instruments (e.g., the Clouds and the Earth's Radiant Energy System (CERES) instruments) showed some biases.

**Keywords:** Water vapor, Instrument Calibration, NOAA, CARTOM, GMSR, Radiosondes.