

Validation of the SAGE III on ISS science data products

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The Stratospheric Aerosol and Gas Experiment III (SAGE III) measures stratospheric ozone, aerosol, and water vapor along with other greenhouse species. Measurements from the SAGE series of instruments historically have relative differences of less than 20% when compared to comparable stratospheric measurements from both in-situ instruments and from satellites. Since the launch, installation, and science operation of the SAGE III on ISS instrument beginning in February through March 2017, a validation campaign has been established and executed to provide insight into the uncertainties and accuracy of the SAGE III/ISS science data products. After one year of operations, the SAGE III/ISS mission is actively utilizing in-situ profile measurements from balloon packages, consisting of a standard meteorological radiosonde, ozone-sonde and frost-point hygrometer, launched during SAGE III/ISS overpass opportunities. Some packages also include an aerosol-sonde. In addition, ground-based LIDAR measurements and aircraft-based measurements of ozone, water vapor, aerosol extinction and nitrogen dioxide will provide additional validation data for correlation with the SAGE III/ISS data products. This provides regional correlations of ozone, water vapor and aerosol extinction between the in-situ measurement data and the SAGE III/ISS profile products. Comparisons have also been performed with satellite measurements from the OSIRIS instrument providing very good correlations during the breakup of the Antarctic polar vortex. These validation comparisons have highlighted areas for improvements in the science data product algorithms while demonstrating that the SAGE data products have maintained a high level of accuracy for stratospheric measurements of ozone and aerosol. This paper will demonstrate the current validation effort and results for the primary products released by the SAGE III/ISS mission.

Key words: stratosphere, ozone, aerosol, validation, water vapor