

Stratospheric Aerosol and Gas Experiment III installed on the International Space Station (SAGE III/ISS): On-orbit update

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In early March 2017 the Stratospheric Aerosol and Gas Experiment (SAGE) III was installed on the International Space Station (ISS), joining the family of space-based solar occultation instruments operated by NASA to investigate the Earth's upper atmosphere since the late 1970s. One of three identical instruments, the SAGE III/ISS mission was restarted in 2009 with a primary objective to monitor the vertical distribution of aerosol, ozone and other trace gases to enhance understanding of ozone recovery and climate change processes in the upper atmosphere. Here we discuss the mission architecture, its implementation, and data produced by SAGE III/ISS, including their expected accuracy and coverage. The 52-degree inclined orbit of the ISS is well-suited for solar occultation and provides near-global observations on a monthly basis with coverage of low and mid-latitudes similar to that of the SAGE II mission. The nominal science products include vertical profiles of ozone, nitrogen dioxide and water vapor, along with multi-wavelength aerosol extinction. Though in the visible portion of the spectrum the brightness of the Sun is a million times that of the full Moon, the SAGE III instrument is designed to cover this large dynamic range, performing lunar occultations on a routine basis to augment the solar products. The standard lunar products include ozone, nitrogen dioxide & nitrogen trioxide. Routine observations began in June 2017 and continue to the present. This has enabled observations of the significant perturbations of the stratosphere induced by the intense wildfires in North America during August 2017 and the subsequent evolution, as represented in the standard data products. Current status of the operational SAGE III/ISS will also be presented.

Key words: aerosol extinction, ozone, water vapor, nitrogen dioxide, stratosphere