

## Capability study for atmospheric minor species with JEM/SMILES

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In this work, we clarified the capability of atmospheric minor species with the JEM/SMILES (Japanese Experiment Module / Superconducting Submillimeter-wave Limb Emission Sounder). The JEM/SMILES will be launched in 2009 and observe limb emission from atmospheric minor species in the stratosphere, such as O<sub>3</sub>, ClO, HCl, HNO<sub>3</sub>, HOCl, CH<sub>3</sub>CN, HO<sub>2</sub>, BrO, O<sub>3</sub> isotopes etc. The measurement bands are band A (624.3-625.5 GHz), band B (625.1-626.3 GHz), and band C (649.1-650.3 GHz) in the altitude range between 10 and 60 km and the nominal latitude coverage from 65N to 38S. The major feature is the high-sensitive observation with low system noise temperature approximately 700 K to carry 4 K cooled SIS mixer.

A level 2 data processing system (DPS-L2) for the SMILES, which converts emission spectra (Level 1B data) into vertical profiles of the atmospheric minor species concentrations in near-real time, is underdeveloped. Since the SMILES is the high sensitive sensor comparing with existing similar sensors, such as Aura/MLS and Odin/SMR, the development of the high accurate algorithm of the DPS-L2 is important to take advantage of the SMILES. Furthermore the processing speed is also important for the near-real time operational data processing.

The launch ready algorithm was developed and it was confirmed to meet these requirements. According to the algorithm, a preliminary error analysis on random and systematic errors are performed. It is clarified that the minimum precision of the retrieved vertical profile of ozone, HCl, and ClO is approximately 0.5%, 1%, and 3% at 30 km with 3 km height resolution, respectively, and that the systematic errors are kept at low level comparable with the retrieval precision.