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Improvements of operational retrieval algorithms for SMILES Level 2 products on ISAS/JAXA

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The Superconducting Submillimeter-wave Limb-Emission Sounder (SMILES), which was jointly developed by JAXA and NICT, had been launched and aboard the Japanese Experiment Module (JEM) of the International Space Station (ISS) in September, 2009. The SMILES carries 4K-cooled Superconductor-Insulator-Superconductor (SIS) mixers to demonstrate a sensitive instrument for sub-millimeter limb sounding. SMILES system noise temperature (Tsys) is less than 500K (random noise < 1 K). Since ISS has a non-sun-synchronous orbit, SMILES can observe diurnal variations of ClO, BrO, HO2 and mesospheric O3 etc.

Standard L2 products, which are defined as O3, HCl, ClO, HNO3, CH3CN, HOCl, HO2, BrO, O3-isotopes in the stratospheres, began to be released to RA PIs on January, 2010. The L2 data is currently 4~85km, with 3km interval (geometrical altitude) in HDF ver.5 file format similar to EOS-HDF including time, location etc. However, release data (ver. 005-06-0024) is a test version which is retrieved by prelaunch algorithms (Rodgers 1976. SMILES mission plan 2002. Takahashi et al., 2010. Imai et al., 2010.), and has some known issues. In this presentation, we will introduce our approach and results for the improvement of level 2 products.

References:
[1] Rodgers 1976, Retrieval of Atmospheric Temperature and Composition Remote Measurements of Thermal Radiation, Reviews of Geophysics and Space Physics, Vol. 14, p.609
[2] NASDA and CRL, 2002, SMILES mission plan, http://smiles.tksc.jaxa.jp/document/SMILES_MP_ver2.11.pdf
[3] Takahashi et al. 2010, Operational Retrieval Algorithms for JEM/SMILES Level 2 Data Processing System, Journal of Quantitative Spectroscopy and Radiative Transfer, vol. 111, issue 1, pp. 160-173
[4] Imai et al. 2010, Evaluation of the Voigt algorithms for the ISS/JEM/SMILES L2 data processing system, Advances in Space Research, vol. 45, pp.669--675