国際宇宙ステーションからの地球大気中ラジカル分子の分光観測

Spectroscopic observation of the radical species in the Earth's atmosphere from International Space Station

Y. Kasai1,2H. Sagawa1, T. O. Sato1,2, K. Kuribayashi1,2, D. Kreyling1, J. Urban3, D. Murtagh3, JEM/SMILES Mission team[1,3, 4,5,6]

[1]National Institute of Information and Communications Technology(NICT) , [2]Tokyo Institute of Technology , [3]Osaka Prefecture University , [4]Lule°a University of Technology , [5]Chalmers University of Technology , [6]Japan Aerospace Exploration Agency

A new generation of sub-millimeter-wave receivers employing sensitive SIS (Superconductor-Insulator- Superconductor) detector technology will provide new opportunities for precise passive spectroscopic remote sensing observation of minor constituents in atmosphere. Superconducting Submillimeter-Wave Limb-Emission Sounder (SMILES) performed the observation between 12 October 2009 and 211 April 2010 from the Japanese Experiment Module (JEM) on the International Space Station (ISS). SMILES is a collaboration project of National Institute of Information and Communications Technology (NICT) and Japan Aerospace Exploration Agency (JAXA).

Mission objectives of SMILES are:

i) Space demonstration of super-sensitive SIS mixer and 4-K mechanical cooler technology

ii) Super-sensitive global observation of atmospheric minor constituents with sub-millimeter-wave limb emission sounder

JEM/SMILES observed the atmospheric species such as O_3, $H^{35}Cl$, $H^{37}Cl$, ClO, HO_2, BrO, HOCl, HOBr, HNO_3, CH_3CN, Ozone isotope species, H_2O, and Ice Cloud with the precisions in a few to several tens percents. The altitude region of observation is from the upper troposphere to the mesopouse. I will present the current status of SMILES instrument, data processing and Scientific results.