FTS satellite observation mission for understanding chemical and dynamical processes in the upper atmosphere

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Tropospheric warming/stratospheric cooling due to increasing anthropogenic greenhouse gas concentrations in the atmosphere and the recovery of the stratospheric ozone layer are ongoing concerns for our changing climate. To understand the current climate and to predict future climate change, continuing observations of atmospheric trace gases and clouds are required on a global scale.
In this mission, we will use a mid-infrared Fourier-Transform Spectrometer (FTS) to perform solar occultation observations (2 to 13 μm, resolution 0.02 cm^{-1}). With this method, it is possible to observe a large number of atmospheric trace gases (including isotopes) and clouds with high vertical resolution (1.5 km) from the upper troposphere to the lower thermosphere (6-100 km).
This mission is expected to refine our understanding of the chemical processes in the stratosphere and elucidate new mechanisms, and to improve the accuracy of forecasting using numerical models based on information on water vapor and its isotope (HDO) in the upper troposphere . Furthermore, by reproducing the chemical processes in the stratosphere in detail, it is possible to improve the reproducibility of the dynamics of the stratosphere and thereby more realistically reproduce the effects of atmospheric changes in the middle atmosphere on the troposphere, and to better predict impacts of climate change. It is expected to contribute to society and government policies through improving the performance of climate models.

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