Mesospheric temperature derivation using ISS-IMAP VISI data

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Satellite observation data of the airglow spectrum is difficult to analyze because its wavelength resolution is inferior to ground observation data. In this research, we analyze data of the airglow emission in the mesosphere observed by the visible and near-infrared spectral imaging device (VISI), which is an observational instrument mounted on the International Space Station (ISS) for the ISS-IMAP mission from 2012 to 2015 to estimate the temperature of the mesospheric OH layer around 85 km. It is known that the relative existence distribution of rotational levels follows the Boltzmann distribution determined by OH rotational temperature when OH molecules make a transition between vibrational levels. This method has been applied for the ground-base OH airglow observation. In this research, we apply this method to observational data from VISI to obtain OH temperature in the wider area than that observation from the ground-base. We use the spectral mode data. The spectral mode data was focused on 6 region of interest (ROI) to observe the emission spectrum of airglow, and the observation data was recorded along with the spatial position information. Multi wavelength data of OH airglow near 828nm are processed to suppress the influence of salt-and-pepper noise derived from cosmic-ray and white noise derived from observation equipment. Thereafter, in order to compensate for the resolution in the wavelength direction of the spectrum diagram, we fit it with a Gaussian function and estimate temperature by linear regression, and derive the temperature and evaluate it.