ISS-IMAP搭載VISIによる大気光観測：開発の現状と観測シミュレーション(2)

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Visible airglow observation by VISI on ISS-IMAP: current status of development and simulation of airglow measurement (2)

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We have been conducting the ISS-IMAP mission which is a part of the Japanese Experiment Module (JEM) 2nd stage plan on the International Space Station (ISS). This will be launched in 2011 or 2012, and perform optical remote-sensing measurements in VIS-NIR and EUV ranges to clarify the energy and physical transfer processes in the boundary region between earth's atmosphere and space.

The visible imaging spectrometer instrument (VISI) on ISS-IMAP will make an imaging spectroscopic measurement of airglows. The targets of airglow emissions are O (630 nm, altitude 250 km), OH Meinel band (730 nm, altitude 87km), and O2 (0-0) atmospheric band (762 nm, altitude 95 km). We designed a bright (F/0.9), wide-angle (field-of-view 90 degrees) objective lens. To extract a background contamination, airglow spectra in 45 deg. forward and 45 deg. backward directions are obtained using the two slits. Each slit is faced almost perpendicular to the orbital plane, and it corresponds to ~550 km x 6 km mapping to an altitude of 100 km. The phase velocity of airglow wave structure is also estimated from the difference between forward and backward data. We will obtain a continuous slit-scanning image for each emission line from + 51 deg to -51 deg in geographic latitude by the successive exposure cycle with a time of 1 - several sec. From the simulation of airglow observation with a simple sine-curve airglow pattern including noises, we found that the wave structure in airglow can be determined for the three emissions. We are now making simulations using more realistic conditions assuming the height profile of airglows superposed on a cloud pattern background measured by a climate satellite. In this presentation, the current status of instrumental development, observation plan, and simulation of airglow observations will be reported.