Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

PEM06-22 Room:312 Time:May 1 10:30-10:45

Coordinated observation of space-borne imaging by ISS-IMAP and ground-based measurement by radars and GPS

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ISS-IMAP mission is a space-borne mission to investigate the mesoscale structures in the ionosphere, the mesosphere, and the plasmasphere by imaging observations of instruments on International Space Station. It consists of two imaging instruments. Visible-light and infrared spectrum imager (VISI) observes the airglow in the MTI region. Extra ultraviolet imager (EUVI) observes the resonant scattering from ions in the ionosphere and the plasmasphere. The objective of this mission is to clarify the upper atmospheric structures whose horizontal scale is 50-500km, and the effect of the structures on the space-borne systems in the low- and mid-latitude regions. VISI observes the airglow of 730nm (OH, Alt. 85km), 762nm (O2, Alt 95km), 630nm(O, Alt.250km) in the Nadir direction to investigate the mesoscale structures in the mesosphere and the ionosphere. The coordinated observations of ISS-IMAP with ground-based measurements have been carried out. The MU radar and Equatorial Atmosphere Radar (EAR) observe the ionosphric density structures and field-aligned irregularities while ISS-IMAP observe the large and mesoscale ionospheric structures with the 630nm airglow, and the atmospheric gravity waves in the mesosphere with the 762nm airglow. The two-dimensional distribution of total electron contents derived with the ground-base GPS receiver array is also compared with the ionospheric and mesospheric structures observed by ISS-IMAP. The results of the ISS-IMAP mission by VISI and EUVI, and its coordinated observations with the ground-based instruments will be introduced in the presentation.

Keywords: Ionosphere, Airglow, Atmospheric Gravity Wave, Plasma Bubble, Radar, GPS