

Coupling process among the mesosphere, thermosphere and ionosphere elucidated by the ISS-IMAP mission

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ISS-IMAP (Ionosphere, Mesosphere, upper Atmosphere, and Plasmasphere mapping) mission was installed on the Exposed Facility of Japanese Experiment Module of the International Space Station, EF of ISS-JEM, and consisted of two sets of imagers to observe the structures in the Mesosphere, Thermosphere and Ionosphere (MTI) region. Visible-light and infrared spectrum imager (VISI) of ISS-IMAP observed the airglow of 730nm (OH, Alt. 85km), 762nm (O₂, Alt. 95km), and 630nm (O, Alt. 250km) in the MTI region, and Extra ultraviolet imager (EUVI) observed the resonant scattering of 30.4nm (He⁺) and 83.4nm (O⁺) from ion in the Ionosphere and Plasmasphere. ISS-IMAP was operated from 2012 to 2015. VISI elucidated global distributions of the airglow structures whose scale size is 50-500km in the nighttime. The wavy structures that are interpreted to be generated by atmospheric wave were frequently observed. Some of them showed clear relationship with tropospheric phenomena as its source. EUVI elucidated global distributions of He ion. Its seasonal distribution indicates the thermospheric wind dominates the ion distribution of the topside ionosphere and the plasmasphere. Coupling processes among the MTI region and the lower atmosphere will be discussed in the presentation.

Keywords: Ionosphere, Thermosphere, airglow