

ISS-IMAP observation of the airglow and the ion resonant scattering in the Earth's upper atmosphere

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ISS-IMAP (Ionosphere, Mesosphere, upper Atmosphere, and Plasmasphere mapping) mission have observed the airglow and the ion resonant scattering in the Earth's upper atmosphere since 2012. The scientific goals of ISS-IMAP are to elucidate following two processes: 1) energy transport process by the structures whose horizontal scale is 50-500km in the Earth's upper atmosphere, 2) the effect of the structures and disturbances on the space-borne engineering system. ISS-IMAP was installed on the Exposure Facility of Japanese Experiment Module, Kibo, of the International Space Station in August 2012. It consists of two sets of imagers, VISI and EUVI. Visible-light and infrared spectrum imager (VISI) observes the Mesosphere and the Ionosphere. Extra ultraviolet imager (EUVI) observes the Ionosphere and the Plasmasphere. VISI observes the airglow in the Nadir direction. The airglow emissions were mainly observed by VISI was 730nm (OH, Alt. 85km), 762nm (O₂, Alt. 95km), and 630nm (O, Alt. 250km). Additional airglows, such as Sodium, were also observed. The global distributions of the airglow structures whose scale size is 50-500km in the nightside of the Mesosphere and the Ionosphere have been obtained by the VISI observation. EUVI measures the resonant scattering of 30.4nm [He⁺] and 83.4nm [O⁺]. Its field- of-view is 15 degrees, and points the limb of the Earth to observe the vertical distribution of the ions. The observational results including its conjugate observation with the ground-based instruments will be introduced in the presentation.

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