Simultaneous Observation of the Atmospheric Gravity Waves by ISS-IMAP and All-sky Imagers

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The purpose of this study is to examine the spatial scale of the atmospheric gravity wave in the mesosphere and the lower thermosphere using the simultaneous observations of ISS-IMAP and a ground-based all-sky imager at Hawaii. The relationship between the wave structures of the mesospheric airglow and the tropospheric events have been discussed by previous studies. The limitation of the ground-based observation of the airglow is that it cannot distinguish spatial variations from temporal variations of the structures whose scale size is larger than its field-of-view. ISS-IMAP started the observation in October, 2012 to clarify the atmospheric gravity waves whose horizontal scale size is 50 km and longer. ISS flies around 400 km altitude, and its orbital inclination angle is 51.6 degrees. The spatial resolution of the VIsible-light and infrared Spectrum Imager (VISI) is from 10 km to 25 km. The simultaneous observation between ISS-IMAP/VISI and the Hawaii all-sky imager has started on March 14, 2013. The atmospheric gravity waves detected by 762nm observation of VISI were compared with the airglow structures in 557.7 nm observed by the ground-based all-sky imagers. The origin and the propagation mechanism of the atmospheric gravity waves were investigated. VISI frequently observed the wave packets whose scale size were 1,000-2,000 km. These wave packets were observed by the ground-based imager as a series of waves that continued for 5-6 hours. The characteristics of these wave packets of the atmospheric gravity waves are discussed in this presentation.