

ISS-IMAP observation of the mesospheric disturbances generated by tropical cyclones

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Troposphere was investigated to elucidate the vertical atmospheric coupling process using the global observational data from the International Space Station (ISS). The vertical coupling between the lower and the upper atmospheres has been revealed to be significant to control the dynamics and disturbances in the upper atmosphere by recent studies. The phenomena generated by the vertical coupling processes have been detected with various observational instruments, and studied with numerical simulations. TC, such as typhoon, hurricane and cyclone, is regarded as one of the intense sources in the Troposphere to affect the Mesosphere, the Thermosphere and the Ionosphere. There is a plenty of studies that reports the observation of the upper atmospheric disturbances associating with TC using ground-based instruments, such as HF doppler radars, IS radars, GNSS receiver arrays, and optical imagers. Because the ground-based observation cannot track the movement of TC, and TC is much active over the ocean, the observational opportunity is limited for the ground-based instruments. ISS-Ionosphere, Mesosphere, upper Atmosphere, and Plasmasphere (ISS-IMAP) mapping mission made a global observation of the airglow in the mesosphere and the ionosphere for three years. The data set of visible-light and infrared spectrum imager (VISI) of ISS-IMAP is idealistic to investigate the effect of TC on the Mesosphere and the Ionosphere. Mesospheric disturbances were detected by the airglow from the molecular oxygen in 762nm of wavelength, and the ionospheric disturbances were detected by the airglow from the atomic oxygen in 630nm of wavelength. In its three years observation, the number of TC that ISS-IMAP/VISI made the conjugate observation was 171. It was found that more than 20% of TC was associated with the mesospheric disturbances that seems to be generated by TC. The duration of these disturbances was one or two days in spite of the lifetime of TC is longer than a week. The relationship among TC, the mesospheric and the ionospheric disturbances will be discussed in the presentation.

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