

# **Ground-based imaging of waves in the mesosphere, thermosphere, and ionosphere**

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We have been operated seven all-sky CCD imagers in Japan (at 3 stations), Australia (1 station), Indonesia (1 station), and Canada (2 stations), as part of the Optical Mesosphere Thermosphere Imagers (OMTIs). The imagers can observe waves in the mesosphere and thermosphere/ionosphere through airglow emissions. Several statistical studies have been done to investigate propagation characteristics of the waves, such as small-scale (less than 100 km) gravity waves in the mesopause region, and medium- and large-scale traveling ionospheric disturbances in the thermosphere/ionosphere. In this presentation, we will review propagation characteristics of these waves observed by airglow imagers in the mid- and low-latitude stations in Japan, Australia, and Indonesia.