ドイツとノルウェーでの大気光観測キャンペーン

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Airglow imaging observations in Germany and Norway

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Atmospheric gravity waves significantly contribute to the wind/thermal balances in the mesosphere and lower thermosphere (MLT) through their vertical transport of horizontal momentum. To date, quite a few studies have reported on horizontal characteristics of the MLT gravity waves, such as wavelength, phase speed, and propagation direction, based on airglow imaging observations at various latitudes. A part of gravity waves propagating upward in the MLT region are considered to penetrate into the thermosphere/ionosphere and transport energy and momentum from lower atmosphere. It is also considered that such waves can trigger various ionospheric irregularities. However, the observational evidence on characteristics of gravity waves propagating from lower atmosphere to MLT is very limited. An all-sky imager of National Institute of Polar Research was operated at Kühlungsborn, Germany (54N, 12E) in September 2010 and at ALOMAR observatory, Norway (69N, 16E) between October 2010 and April 2011. This imager (named as Mesospheric/Ionospheric Dynamics OpticaL Imager: MIDOLI) has five interference filters on a rotating wheel, a fish-eye lens with a 180-degree field of view (Nikkor 6 mm F1.4), and a cooled CCD camera with 512x512 pixels. In order to investigate the propagation of gravity waves from the lower to the upper atmospheres, we have carried out simultaneous observations with the imager, and lidars (RMR and K lidar of IAP at Kühlungsborn, RMR lidar of IAP and a Na lidar of CoRA at ALOMAR); the imager observes horizontal structure of the gravity waves in the MLT and lidars offer the signatures of vertical propagation in 30-85 km (RMR lidar) , and 80-105 km (K and Na lidars) altitude ranges.

In the presentation, we will report the summary of these observation campaigns and initial results of coordinated observations with the imager and lidars on 26 November 2010.