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Mesospheric Gravity Waves Observed over the South Pole Station

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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, several studies have reported on the gravity wave characteristics in the MLT based on airglow imaging observations at various latitudes. It was found that, in particular, the horizontal propagation direction of the waves, which is a key parameter for understanding the direction of mean flow acceleration due to the waves, often shows clear variations depending on the season and/or location where the waves are observed because the directions are greatly controlled by the locations of the wave source and the atmospheric conditions in the propagation paths. However, little is known about such wave characteristics in the polar region owing to less observation. NIPR all-sky imager at the South Pole Station (90S, geomagnetic latitude -74.3) has started the observations of gravity waves through the Sodium airglow emission (589.3 nm, emission height about 90 km) in 2002 as well as imaging observations of aurora from 1997. This imager 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. Since the sodium emission is least susceptible to auroral contamination, gravity wave structures in the weak airglow can be detected even at the high latitudes. In the presentation, we will report initial results of the gravity wave statistics over the South Pole during the winter seasons of 2003 and 2004 (101 days).