Imaging observations of atmospheric gravity waves using a near-infrared camera in Patagonia

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Atmospheric gravity waves significantly contribute to the wind/thermal structures in the mesosphere and lower thermosphere (MLT) through their vertical transport of horizontal momentum. It has been reported that the gravity wave momentum flux preferentially associated with the scale of the waves. Airglow imaging is a useful technique to observe two-dimensional structure of small-scale (<100 km) gravity waves in the MLT region and has been used to investigate global behaviour of the waves. In the Southern hemisphere, however, the observations of the MLT gravity waves are very limited compared to those in the Northern hemisphere.
The ANtarctic Gravity Wave Instrument Network (ANGIWN) project has started in 2011 to understand gravity waves over the Antarctic and the effects on general circulation. It is known that the southern Andes is a hot spot of gravity waves and would also contribute significantly to the dynamics in the upper atmosphere. We installed all-sky camera to monitor the MLT gravity waves in November 2017 at Rio Gallegos station (51.6S, 69.3W), Patagonia, Argentina, as an extension the ANGWIN network. The Patagonia camera has an InGaAs array sensor, which is sensitive to the near-infrared (900-1700 nm), and can image OH Meinel band airglow (height: ~85 km) without interference filter, obtaining an OH airglow image every 5 s with an exposure time of 2 s. The system is similar to the imagers of ANGWIN network at Davis, McMurdo, Halley, Syowa and the south-pole. We expect that the airglow imaging at this site would contribute to reveal the characteristic of gravity waves generated around the hot spot at Andes and Antarctic Peninsula.
In this presentation, we will report the design of the observation system and some initial results.

