

Tomikawa, Y., I. Murata, M. Kohma, and K. Sato, 2024: Simultaneous observation of near-inertial frequency gravity waves by a long-duration balloon and the PANSY radar in the Antarctic. *J. Meteor. Soc. Japan*, **102**, <http://doi.org/10.2151/jmsj.2024-034>.

Plain Language Summary: In order to represent the realistic state of the atmosphere in the model, the momentum transport and deposit due to atmospheric gravity waves must be accurately represented. In this study, we showed that near-inertial frequency gravity waves (NIGWs) simultaneously observed by a long-duration balloon and a large atmospheric radar in the Antarctic lower stratosphere were not adequately represented even by the latest atmospheric reanalysis ERA5. This result implies the difficulty to explicitly represent the behavior of NIGWs even in the high-resolution simulation.

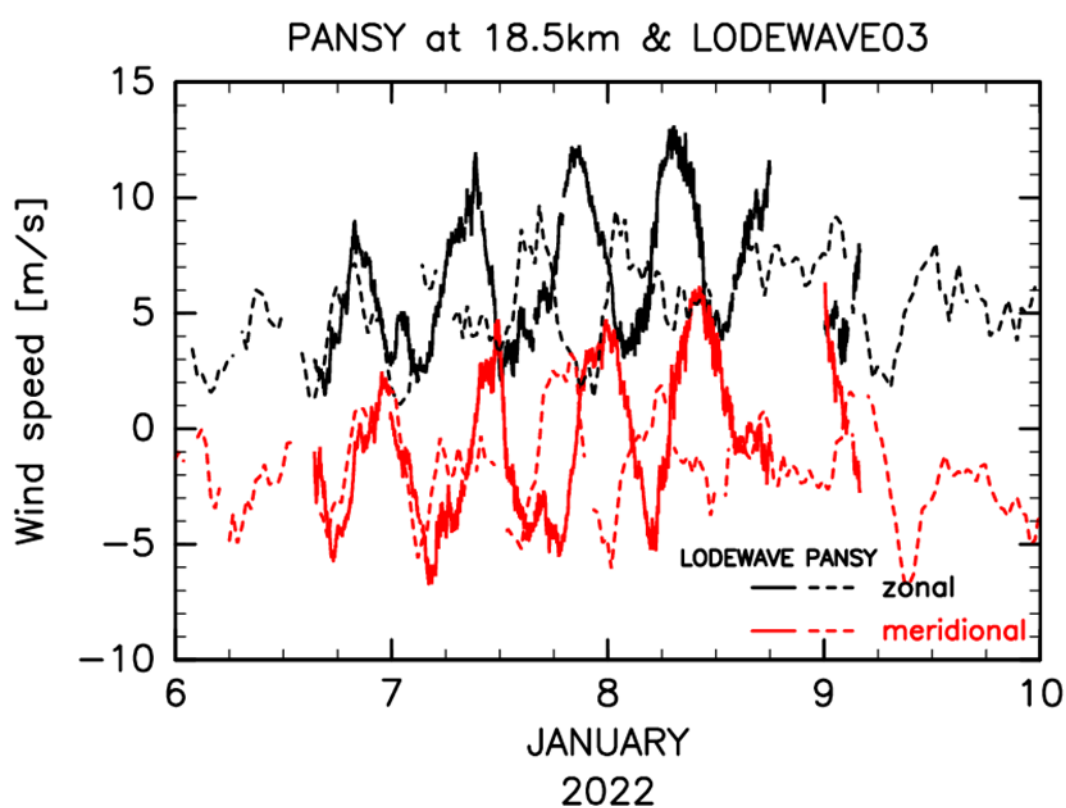


Figure 1. Time variations of zonal (black) and meridional (red) winds along trajectories of LODEWAVE 3 (solid) and from the PANSY radar at an altitude of 18.5 km (dashed).

- A long-duration balloon and the PANSY radar simultaneously observed near-inertial frequency gravity waves (NIGWs) in the Antarctic lower stratosphere, which had upward group velocities and vertical wavelengths less than 3 km.
- Although the NIGWs were partially represented in the latest reanalysis ERA5, their amplitudes were underestimated or not reproduced in the ERA5 data.
- The cause could be insufficient vertical resolution, or excessive diffusion, or misrepresentation of the NIGWs in the model.