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New measurements of McMurdo gravity wave parameters

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New measurements of McMurdo gravity wave parameters

A person wearing a bright red jacket and a black beanie is looking through binoculars. They are standing on a snowy and icy terrain, possibly a glacier or a frozen body of water. In the background, there is a large expanse of water with ice floes, and distant mountains under a blue sky with light clouds.

Jonathan Pugmire

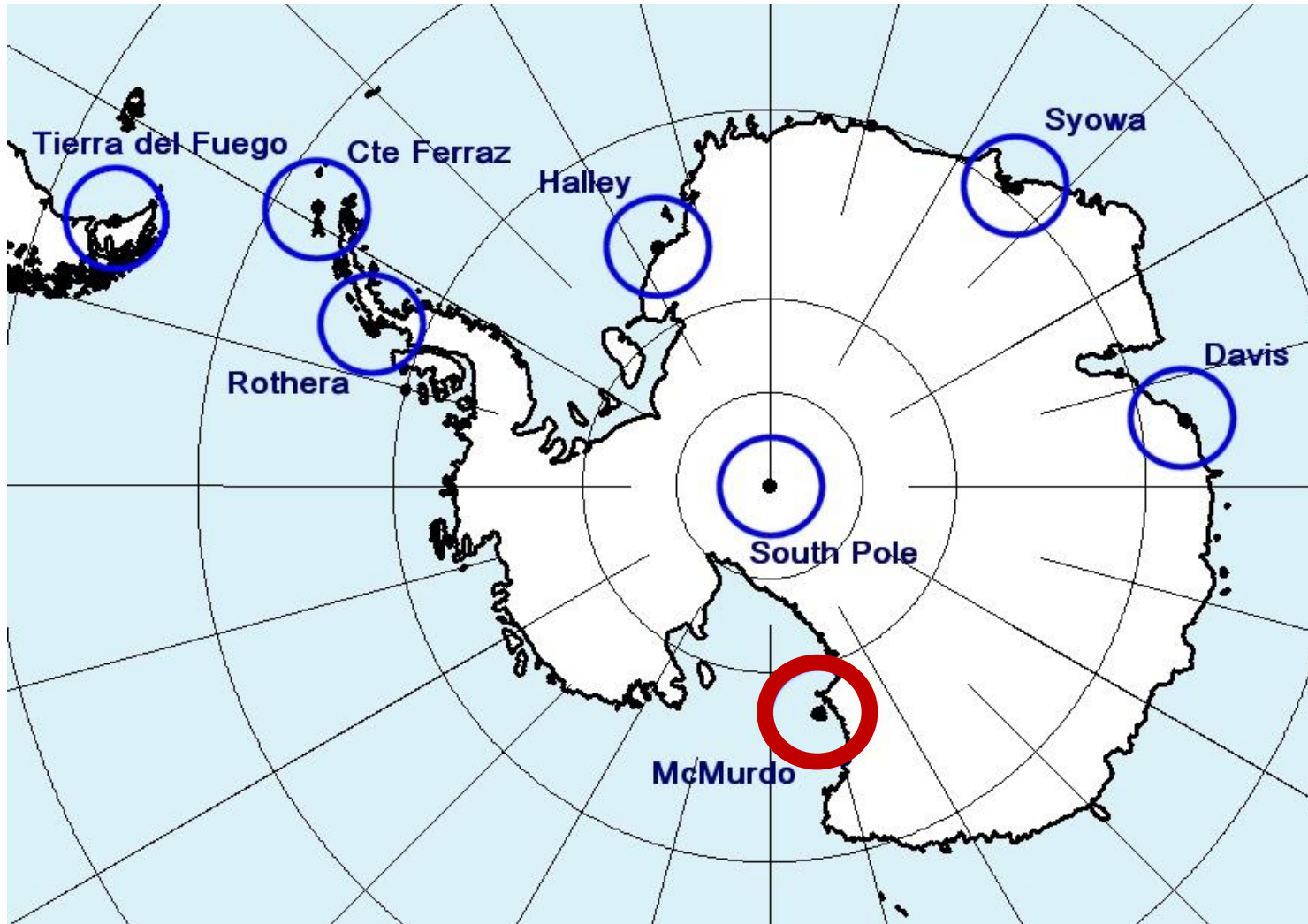
Mike Taylor, Dominique Pautet

Center for Atmospheric and Space Sciences

Utah State University

ANGWIN Workshop, Oct 2, 2014

ANTarctic Gravity Wave Imaging Network (ANGWIN)



Journey to McMurdo

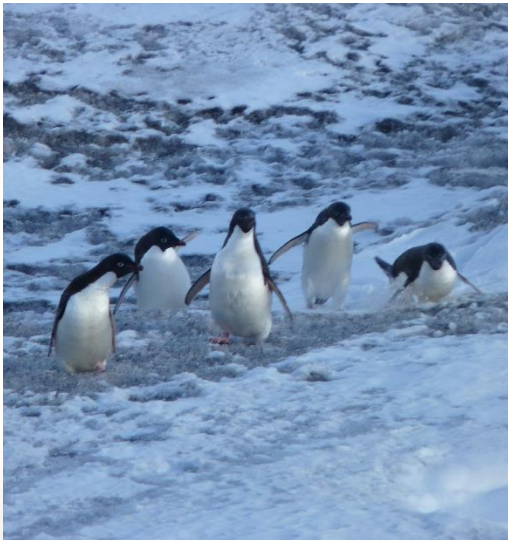








Wild Life





Scott's Hut



McMurdo Station (77°S, 166°E)

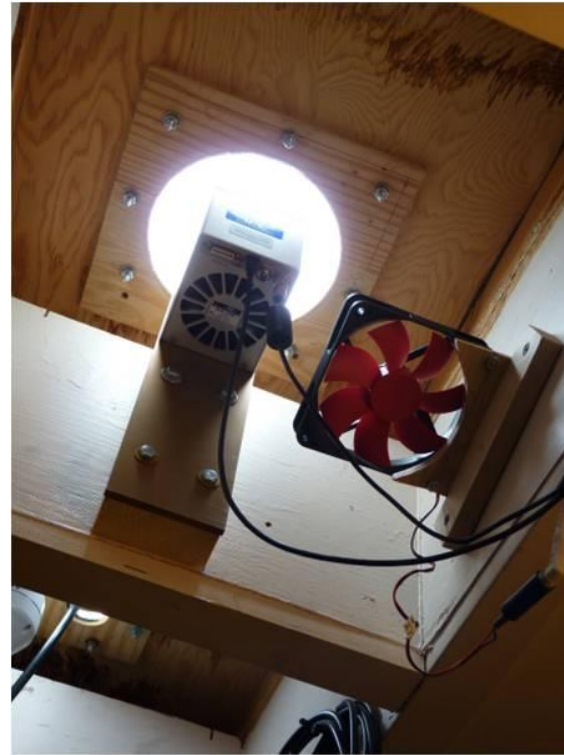


Arrival Heights

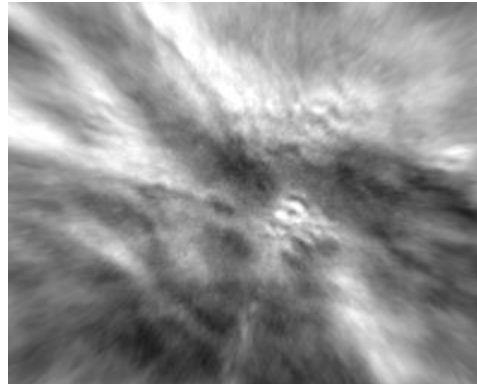
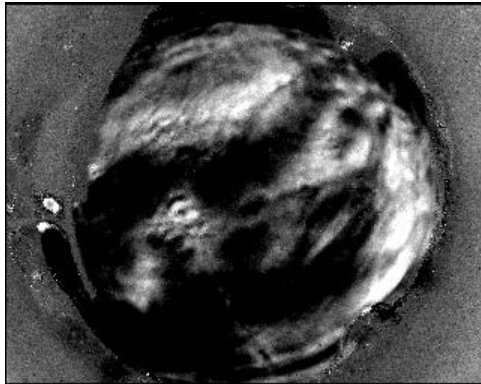
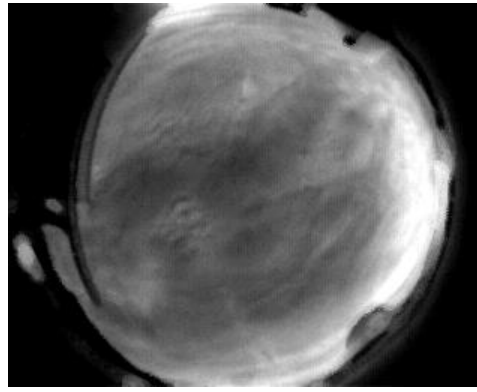
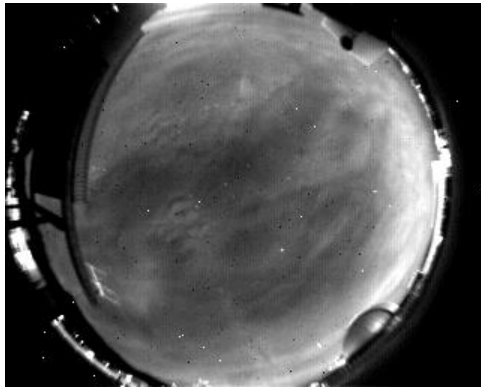


All-sky IR Imager

- Infrared (0.9-1.7 μm) cooled InGaAs camera.
- Records image every 10 s.
- 3 second exposure.



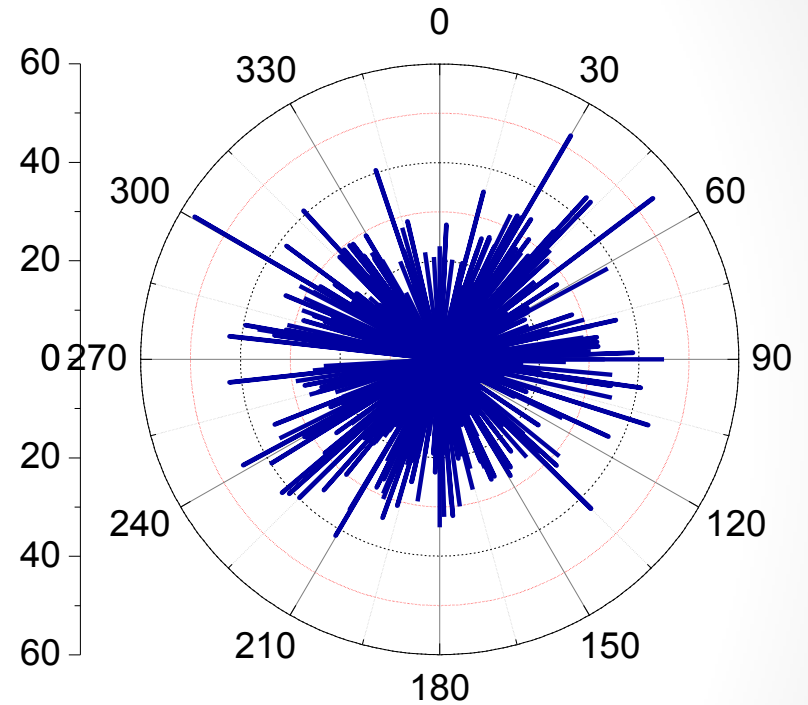
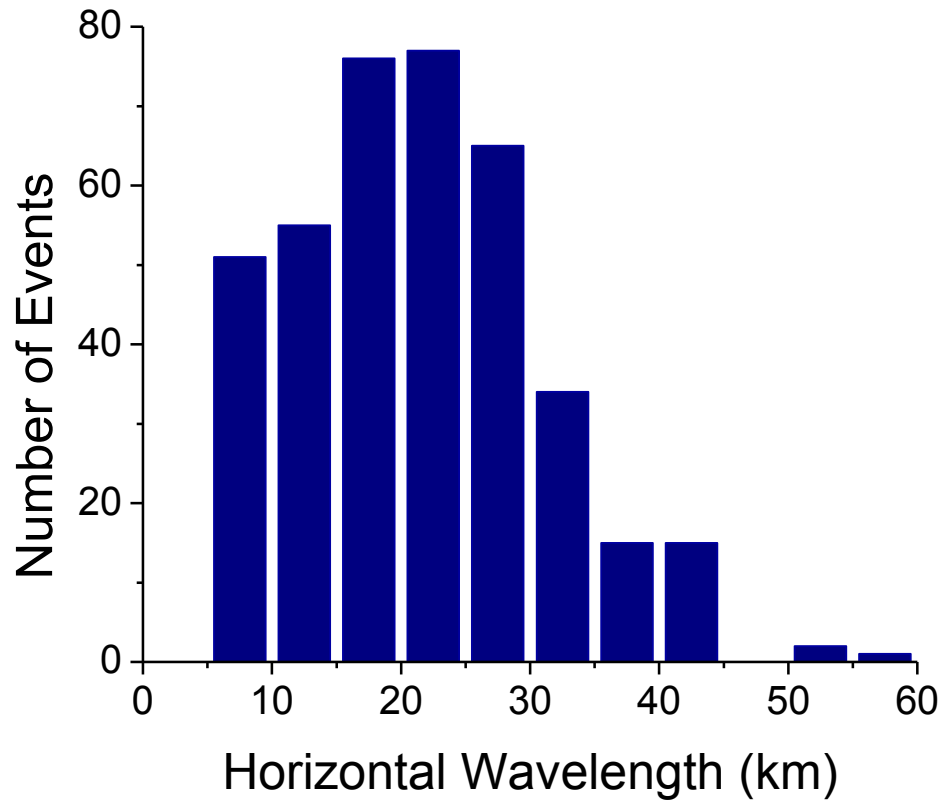
Data 2012



- ~60 nights of data
- ~400 wave events

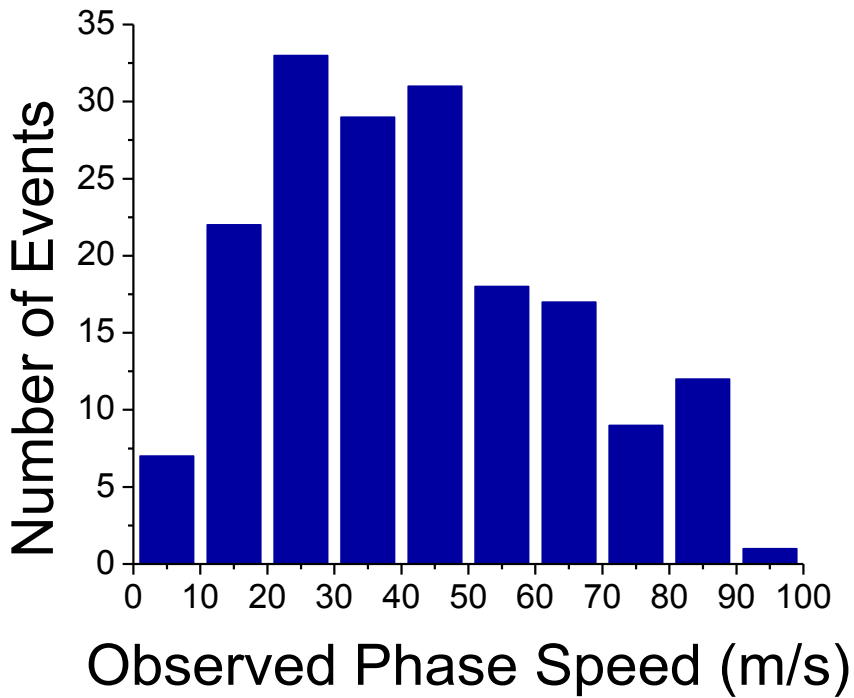
- Calibrated using star field
- Stars removed
- Flat Field
- Unwarped to 350 x 320 km
- FFT Analysis

Wavelength

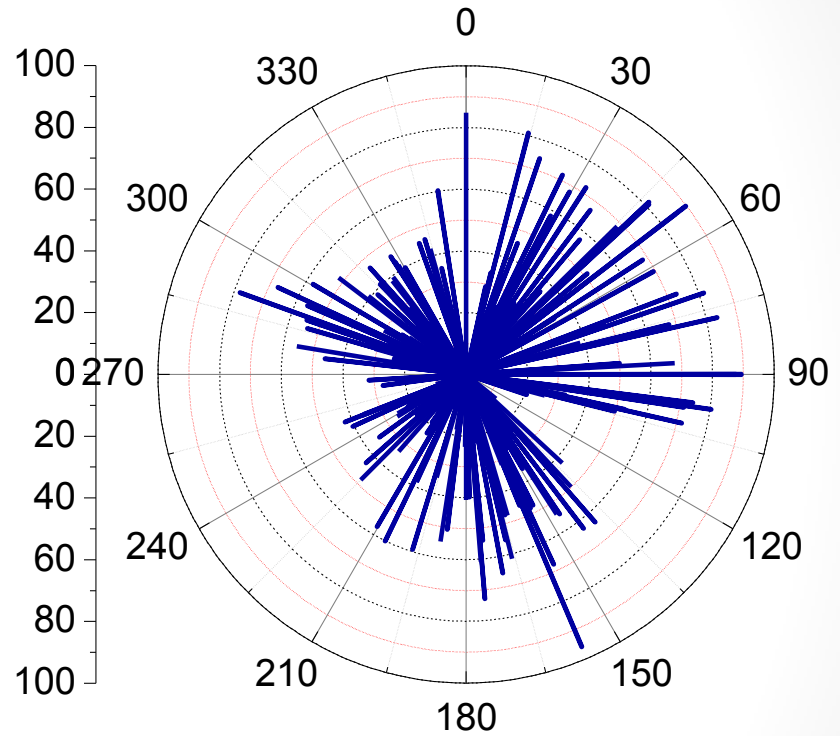


Average horizontal wavelength: 22 ± 10 km

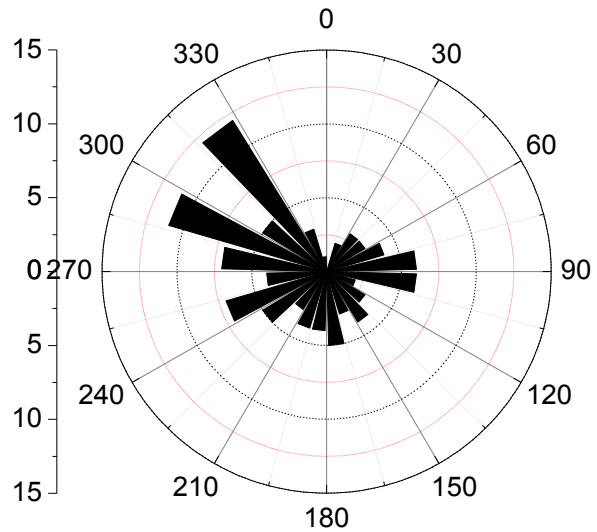
Horizontal Phase Speed



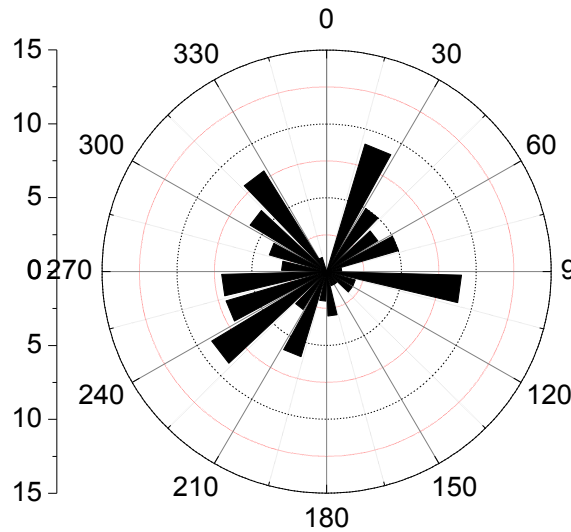
Average phase speed: 42 ± 23 m/s



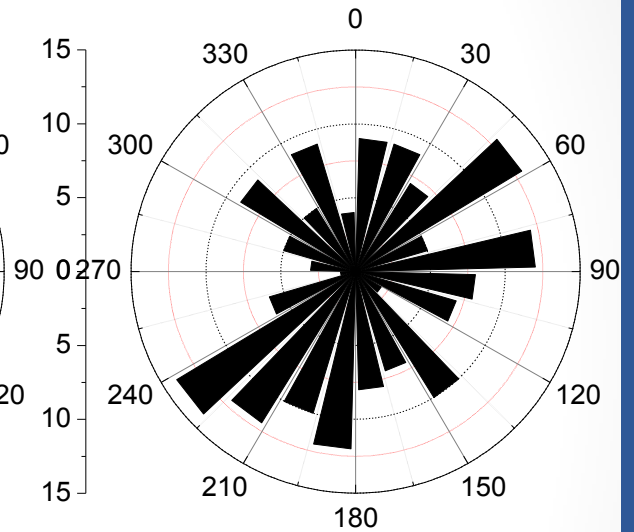
Direction of Propagation



March-May

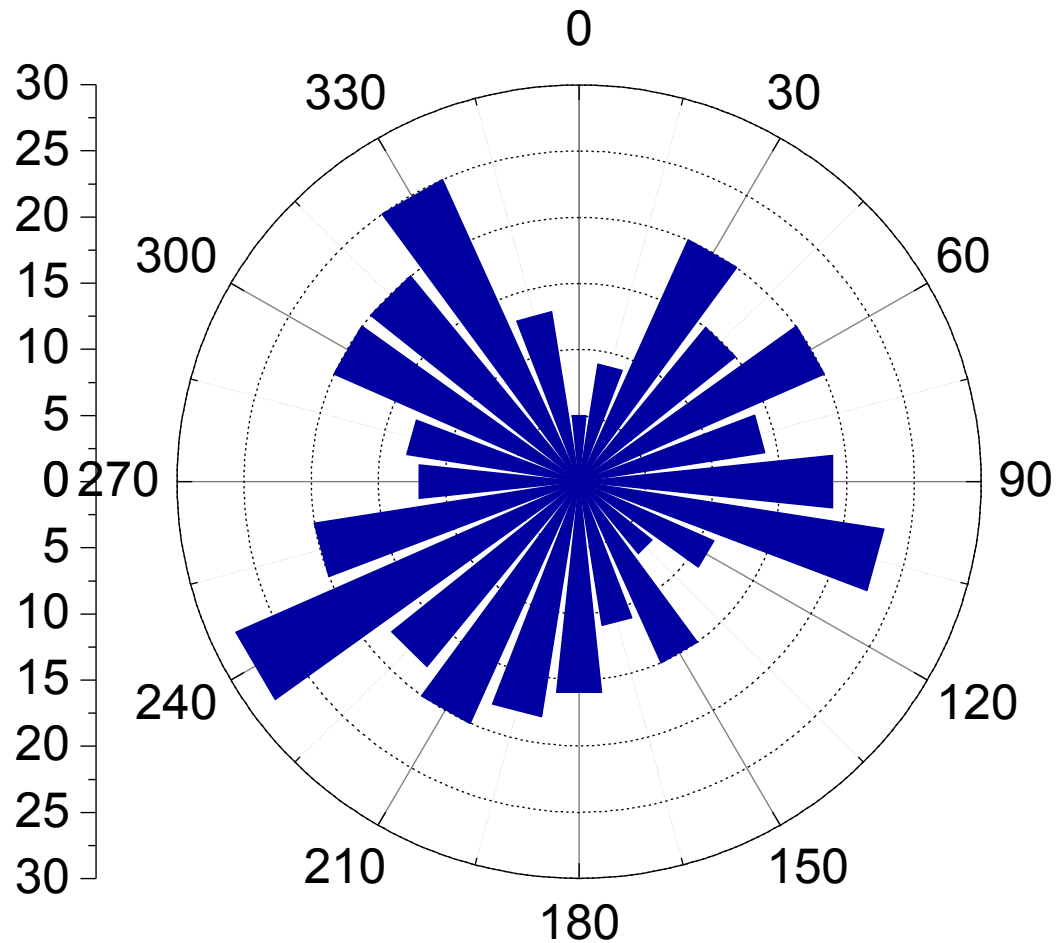


June-July



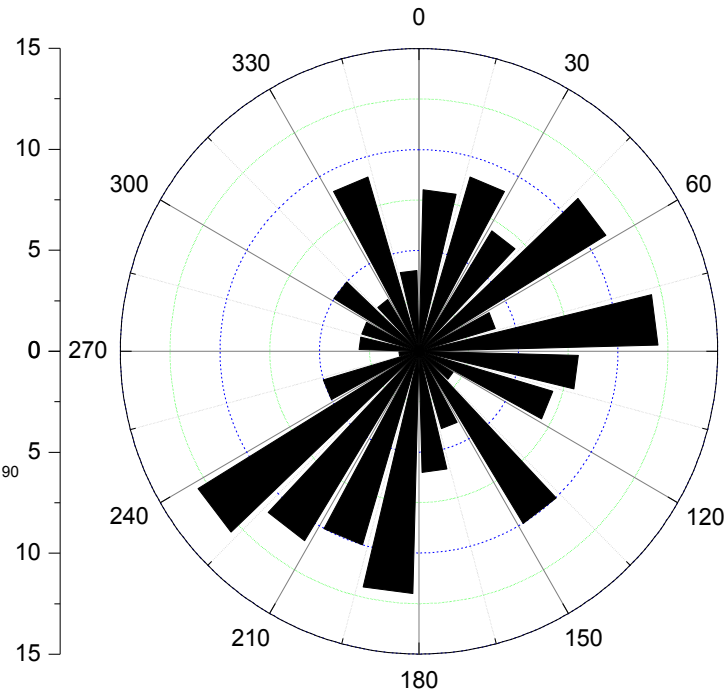
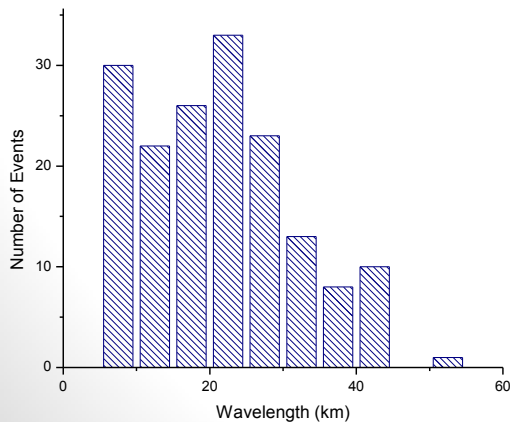
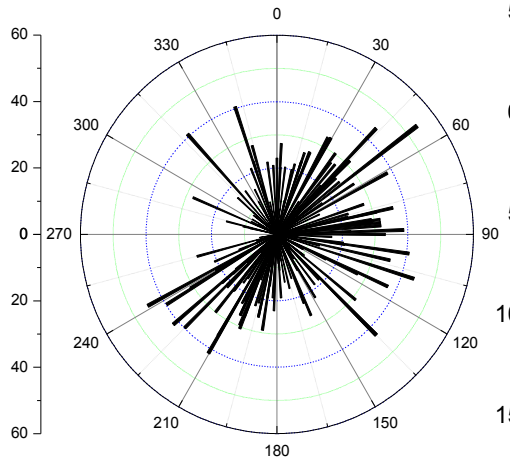
August-September

Direction of Propagation



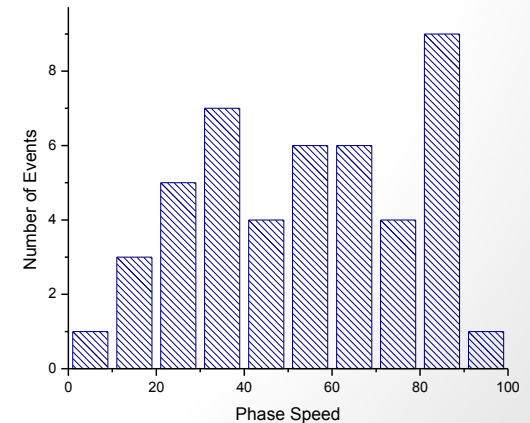
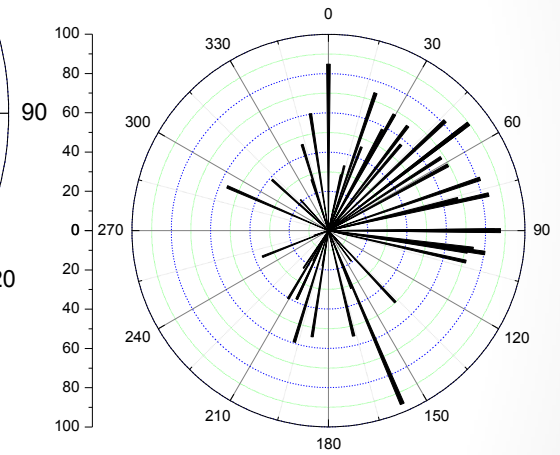
Days 216-230

22 ± 12 km
Wavelength



Direction of Propagation

56 ± 26 m/s
Phase Speed



Summary/Future Work

- Optical observations of gravity wave activity over McMurdo are a new and ongoing study. Initial results are promising although further data reduction and analysis is needed.
- Average wavelength is 22 ± 10 km.
- Average phase speed is 42 ± 23 m/s.
- Direction of Propagation has 3 dominant directions.
- Several weeks of clear nights with lots of wave activity.

Finish analyzing results from McMurdo 2012 Session.

- 23 Nights have University of Colorado Fe Lidar observations.
- Analyze medium scale gravity waves using keograms.
- See my AGU poster.

Analyze McMurdo 2013 Session.