HASP Monthly Status Report - November 2014

Balloons over Volcanoes Team

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1 Synopsis

- Completed experiment design and scientific results portion of scientific report
- Created an automatic image analysis algorithm to quantify gondola motion
- Acquired additional ground infrasound data to support aerial analysis

2 Activity Summary

Daniel Bowman performed Hilbert and Fourier spectral analysis of infrasound and gravity waves detected during ascent and flight. Gravity waves were recognized in both pressure and elevation records from the balloon (Figure 1). Daniel has written the design and scientific analysis portion of the scientific report, and is awaiting instructions from HASP before completing the document. Patrick Gouge analyzed a subset of the video data for gondola motion, and we determined that this manual analysis was not accurate enough. Therefore, Jonathan Lees developed an automated image processing algorithm that shows promise. We have acquired acoustic records from a microphone array near Albuquerque, and will be examining these data to try and determine the propagation azimuth of a signal common to the balloon and ground stations.

3 Issues Encountered

Progress on the scientific report is on hold pending guidance from HASP.

4 Milestones Achieved

Determination of gravity wave spectra by direct observation in the stratosphere. Completion of most of the scientific report.

5 Team

The student team consists of Daniel C. Bowman and Patrick Gouge (University of North Carolina at Chapel Hill), Jacob F. Anderson (Boise State University), and Tierney Larson (Yale University). Jonathan M. Lees (UNC Chapel Hill) serves as Faculty Advisor. Paul Norman and Kyle Jones are outside advisors.

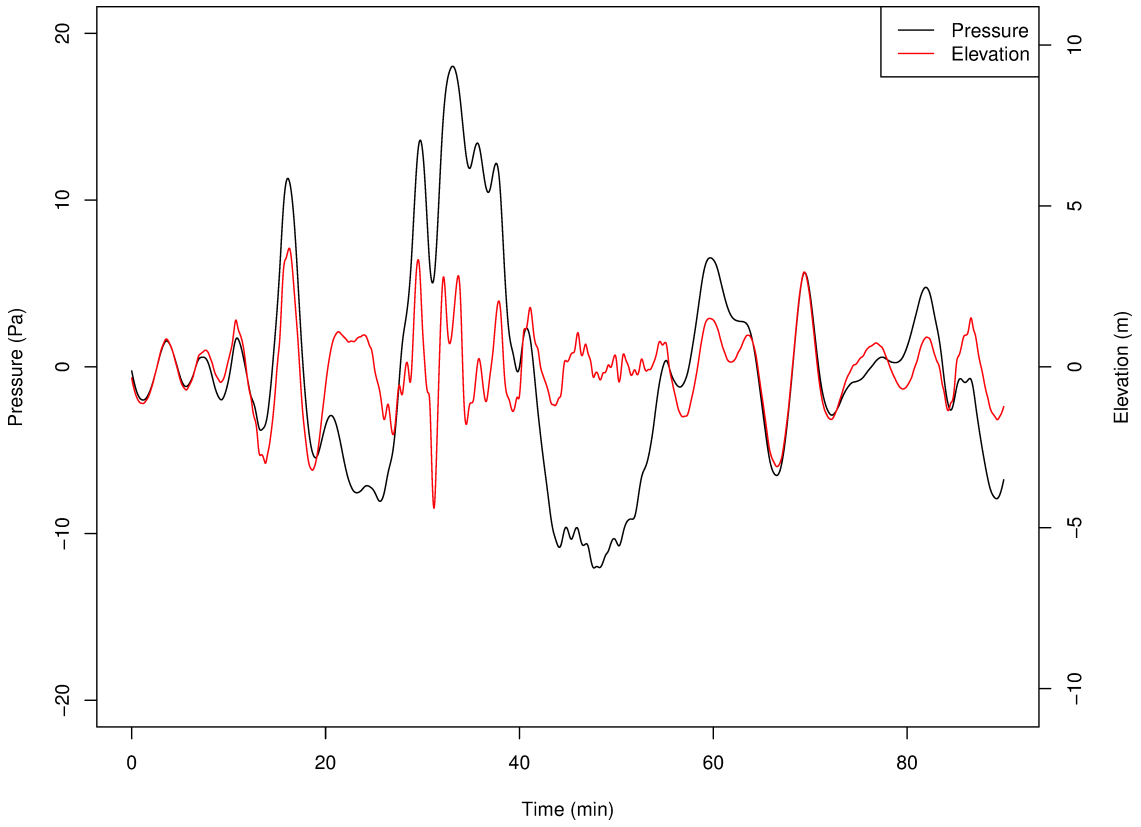

Figure 1: Gravity waves recorded during flight on pressure transducers and the gondola GPS. Gravity waves are long period pressure waves with gravity as the restoring force.