

in Planetary Seismology Using Infrasound Signatures on Venus

The planetary evolution and structure of Venus remain uncertain more than half a century after the first visit by a robotic spacecraft. To understand how Venus evolved it is necessary to detect potential signs of current seismic activity. Due to the adverse surface conditions on Venus, with extremely high temperature and pressure, it is infeasible in the near future to place seismometers on the surface for an extended period of time. JPL in collaboration with ISAE and Caltech Campus is in a process of developing an instrument to measure seismic activity on Venus by in-situ measurements of infrasonic waves in the atmosphere. The overall objective of this research is to demonstrate the feasibility of sensitive barometers to detect infrasonic signals from seismic and volcanic activity on Venus from a balloon platform. The seismic signals are known to couple about 60 times more efficiently into the atmosphere on Venus than on Earth, which might allow the detection of small regional quakes (magnitude ~ 3). We will report results on the first flight experiment that will focus on using the barometer instruments on a tethered helium-filled balloon. The experiments are intended to validate the two-barometer signal processing approach using a well-characterized point-source signal.

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