

## Direction finding experiments of infrasonic and audible waves by multiple-sites arrayed sensors

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Infrasound and audible sound propagation in atmosphere is one of the open fields of the atmospheric science. These waves as well as atmospheric gravity waves that can propagate vertically up to the thermosphere is important in energy transportation way among ground, ocean, troposphere, stratosphere, mesosphere, and thermosphere. These waves can possibly be a seed of observable waves in thermosphere or ionosphere as many kinds of horizontal waves observed by optically or electromagnetically at each fixed altitude, suggesting these waves might be a key of atmospheric studies in vertical interactions. Many kinds of sources in naturally and artificially on ground, ocean, or troposphere like volcanic eruptions, earthquakes, tsunamis, artificial explosions, traffic of vehicles and planes can emit audible sound and infrasonic waves, however, examples of direction finding experiments by multiple-sites arrayed infrasound sensors in mesoscale region have been limited.

In order to observe and confirm source directions and coordinates of infrasonic waves from Sakurajima volcano and two sounding rocket launches from Uchinoura Space Center (USC), JAXA, we deployed 8 infrasound sensors as two 3-sensors arrays with triangles of about 50 m separations at Miyazaki University and Kinkowan High School and 2 independent sensors at Kagoshima National College of Technology and USC/JAXA from Dec. 16, 2011 to Jan. 16, 2012. During the experiment, the Sakurajima volcano was very active and many volcanic eruptions were reported by Japan Meteorological Agency with each maximum pressure value observed at nearest volcano observatory within 5 km from the source (vent position), whereas, JAXA's sounding rocket S-310-40 was launched from USC at 23:48 on Dec. 19, 2011, and S-520-26 rocket was at 5:51 on Jan. 12, 2012, respectively. Apparent infrasonic waves by Sakurajima eruptions were recorded by Chaparral Physics Model-2 and Model-2.5 sensors with Hakusan LS-8000WD and LS-8800 data loggers as well as SAYA A/D boards with PC at each site. We developed software for the direction finding. Based on the analyzing software, these infrasonic waves were successfully confirmed as the waves from Mt. Sakurajima by comparing between the vent position of Mt. Sakurajima and the results of direction findings. In this talk we will present a summary of direction finding experiments and the next step of multiple-sites arrayed observation of infrasound in Japan and Antarctic.

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