

# The Estimation of Wind Speed at High-Altitude by Using Remote Sensing with Infrasonic Waves

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The propagation mechanism of infrasound waves have a feasibility to be used as an indirect measurement of the Earth's atmosphere. When the location of the infrasound source is determined, the structure of local wind dynamics above the shadow zone region can be obtained.

In this session, we introduce the idea of determining the horizontal wind speed in the upper refraction layer based on infrasound waves observation. This study used series of events in the eruption of Mount Shinmoedake in Japan that occurred in March 2018. About 11 infrasound sensors spread across Shikoku prefecture, Japan have recorded significant fluctuations in air pressure due to the eruption. To calculate the wind speed at high-altitude, we utilized the apparent speed of the recorded signals based on radar beam steering algorithm. In order to validate the calculated wind speed up to the lower atmosphere, the wind profile obtained by Japan Meteorological Agency's radiosonde data is used.

As the results, the estimated wind speed by using infrasound observation is relatively close to the result of direct measurement of radiosonde. In addition, the wind speed at the middle and upper atmosphere is also obtained from the calculation. However, a further validation with the appropriate observations for the wind speed at the middle-upper atmosphere is needed.

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