

Detection of natural hazards with very low frequency acoustic wave, infrasound

*Yoshihiro Kakinami¹

1. National Institute of Technology, Tomakomai College

Very low frequency acoustic waves so-called infrasound are often observed accompanied with severe natural hazards. One of the most prominent events are detected after earthquakes. The infrasound is emitted by the ground/sea surface motion arising from the earthquake. The infrasound reaches at several hundred km altitude, then disturb ionospheric plasma through collision with neutral atmosphere. These disturbances are often detected in the data of GNSS total electron contents (TEC). Furthermore, TEC disturbance was also found over a huge thunderstorm. Since the infrasound propagates not only vertical direction but also horizontal direction, the ground-based infrasound sensors also detect tsunami signature after the large earthquake under the sea. Therefore, the infrasound from the huge thunderstorm showing TEC disturbance is possibly detectable. In fact, detection of concentrated heavy rain using the infrasound has been attempted and the results show the potential ability of the detection. In addition, it was found that the infrasound was emitted from snowslides. The observation suggests that the infrasound is also emitted from land slide. Therefore, the infrasound is useful tool to detect the land slide accompanying with the heavy rain. When array observations are arranged, the location of the event can be estimated using time delay of the signals. Therefore, the infrasound observation can contribute the nowcast system to detect the heavy rain. Since the sensors are easy to maintain and operate, they are easy to install in the developing countries. Philippines also has many earthquakes. The infrasound observation can also contribute to reduce tsunami disasters as well as thunderous.

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