

Continuous infrasound observation to monitor atmospheric phenomena related to activities of the Earth's crust

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Uncovering the dynamics of the multi-layered Earth, which consists of the solid Earth, the oceans, the atmosphere including the ionosphere, is likely to offer new insights in the Earth science. Recent improvements in the sensor technology and expanding geophysical observation networks enable us to detect observational evidence of physical interactions between any two successive layers. One of the typical phenomena related to the coupling between the solid Earth and the atmosphere is "seismoacoustic wave", which is an acoustic wave excited by a large earthquake. Nagao et al. (J. Geophys. Res., submitted) indicates, through data assimilation of the 2008 Iwate-Miyagi Nairiku Earthquake, that a joint analysis of seismograms and infrasound records could provide strong constraints on seismic mechanisms such as focal depth especially in the cases of shallow earthquakes. More infrasound observations would provide important information of activities of the Earth's crust although the number of infrasound observatories is insufficient at this moment.

In order to detect and clarify atmospheric phenomena related to activities of the Earth's crust, we have established an infrasound monitoring station at the Sugadaira Space Radio Observatory (36deg 31.389' N, 138deg 19.073' E) of the University of Electro-Communications. This station is located at appropriate distances from both the aftershock region of the 2011 Great East Japan Earthquake and the supposed area of the forthcoming Tokai-Tonankai-Nankai Earthquake. The joint observations of the atmosphere and the ionosphere could contribute to an establishment of tsunami early warning system, which detects precursive infrasound signals of tsunami.

Keywords: infrasound, seismoacoustic wave, Iwate-Miyagi Nairiku Earthquake, coupling between solid earth and atmosphere, ionosphere, tsunami