The predominant periods of the atmospheric perturbations and geomagnetic oscillations

Mitsuru Matsumura[1]; Toshihiko Iyemori[2]; Yoshikazu Tanaka[3]; Masahito Nose[4]; Mitsuru Utsugi[5]; Naoto Oshiman[6]; Hiroyuki Shinagawa[7]; Yoko Odagi[8]

[1] Dept. of Geophysics, Kyoyo Univ.; [2] WDC for Geomag., Kyoto Univ.; [3] Aso Volcanological Laboratory Kyoto Univ.; [4] DACGSM, Kyoto Univ.; [5] Kyoto Univ.; [6] DPRI, Kyoto Univ.; [7] NICT; [8] WDC for Geomag, Kyoto

We have been observing atmospheric pressure perturbations since the summer in 2006. Observation sites are increasing, and now we are observing at Kyoto, Shigaraki, Aso, Phimai in Tailand and Iznik in Turkey. The resolution of barometric sensor is about 1.6Pa and the output signal is A/D converted with 490Hz and 0.4Pa resolution. One second averaged data are recorded and transferred through network.

It has been known that the infrasound causes the acoustic resonance between the lower atmosphere and the thermosphere. The main resonance periods theoretically reported are 190-200, 210-230 and 260-270 seconds.

We calculated the occurrence rate of power spectral peaks of pressure perturbations, and we found that the local maxima appeared at the three resonance periods theoretically expected. We found these maxima appeared more clearly in autumn. The occurrence rate of peaks at the local maxima is about 10%.

On the other hand, we also used the data of geomagnetic field to calculate the occurrence rate of spectral peaks, and we found the local maxima at the same three periods. The occurrence rate of peaks at the local maxima is about 10%, too. For the magnetic field oscillation, we found these maxima in every season.

From these facts, we believe that the geomagnetic oscillations are frequently caused not only through magnetospheric plasma processes but also by the acoustic resonance.