DETECTION OF ACOUSTIC RESONANCE EFFECTS ON THE GROUND AND IN THE IONOSPHERE AT THE TOTAL ECLIPSES

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The ground - lower atmosphere - thermosphere (ionosphere) coupling effects through acoustic resonance have been observed, for example, for the Mt. Pinatubo eruption in 1991 (Kanamori and Mori, 1992) and the great 2004 Sumatra earthquake (Iyemori et al., 2005). In the Mt. Pinatubo case, it was assumed that the acoustic wave (i.e., pressure variation) caused a very low frequency oscillation of the ground observed worldwide. However, a volcanic eruption or earthquake can also cause the ground oscillation directly. The ground oscillation may cause atmospheric oscillations but with a complicated causality. In the case of typhoons when the resonance effects have been detected, the ocean waves also make the situation complicated. When a total eclipse occurs, the rapid pressure variations, caused by the rapid decrease of temperature may also generate the acoustic resonance, however, in this case, the situation is expected to be simpler than for volcanic eruptions. This situation provides better conditions for quantitative modeling of the acoustic resonance effects. On July 22, 2009, a total eclipse will be observed along a band from China, Iwo Island, and through the Tokara Islands, south of Japan. We plan to make barometric, geomagnetic, GPS-TEC and HF Doppler observations at several points along the eclipse path. In this paper, we show some results of analysis of the data obtained from the total eclipses in the past and preliminary results of the observations from the July 22, 2009 event.

Acoustic resonance, ionosphere, total eclipse

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