Characteristics of acoustic mode gravity waves on the ground and their effect in the ionosphere

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Short period waves from lower atmosphere generate small-scale field-aligned currents through ionospheric dynamo. The magnetic fluctuations with amplitude about 1 nT and spatial scale about 100 –200 km generated by the small-scale field-aligned currents were named as “magnetic ripples”. The most plausible source of the atmospheric waves is the cumulus convection. Although the global distribution and its local time or seasonal variation of the amplitude of magnetic ripples strongly suggest the cumulus convection as the main origin, we need to clarify what mode of atmospheric waves contributes to the magnetic ripples and what meteorological condition correspond them. For those purposes, we analyze ground based magnetic and micro-barometric variations. We try to make quantitative estimation of the contribution from both acoustic and internal mode of gravity waves, acoustic resonance, etc.

The followings are our tentative results:

・Averaged PSD (power spectral density) increases to longer period (at least to 30 minute).

・PSD of pressure has a bulge in a range of acoustic gravity mode waves (100 –400 sec)

・The amplitude of the bulge is highly variable around vertical resonance period.

・PSD is larger on dayside.

・Average location of PSD peaks show slight shift depending on the latitude and season.

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