

Vertical acoustic resonance excited by passing Lamb waves

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The power spectral densities of the micro-barometric, geomagnetic, and GPS-TEC fluctuations at the Phimai station in Thailand showed the sharp peaks of power spectral densities at around 220 and 270 seconds after the passage of the Lamb wave that was generated in association with the Hunga-Tonga submarine volcanic eruption on January 15, 2022 and orbited the Earth. The sharp spectral peaks were presumed to be caused by a vertical acoustic resonance. Lamb waves are basically sound waves that propagate horizontally in the atmosphere, but vertical acoustic resonance is a phenomenon caused by sound waves that propagate in the vertical direction. In this report, we show that the peaks in the power spectral density of geomagnetic and TEC fluctuations close to the theoretically predicted vertical acoustic resonance periods are also observed at other locations than at Phimai immediately after (or around) the estimated passage of the Lamb wave. The relation with the amplitude enhancement of magnetic ripples observed by the Swarm satellites is also discussed.

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