Effects of acoustic waves generated in the lower atmospheres of the planets on the ionospheres.

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Although it has been suggested that lower atmospheric disturbances are likely to affect the ionosphere through acoustic waves, no clear evidence of the relationship between lower atmospheric phenomena and ionospheric variations has been found. However, extremely clear variations in the ionosphere and the magnetic field on the ground have been observed in the Sumatra earthquake occurred in December 2004, and clues to quantitative understanding have been obtained. Previous analyses of this event have indicated that the ionospheric and magnetic oscillations are driven by acoustic waves propagated from the lower atmosphere where acoustic waves are generated by the tsunami. Similar events have been observed during eruption of the Pinatubo volcano, and smaller ionospheric variations have also been found during other volcanic eruptions and typhoons. We will study the events using numerical simulation, and discuss whether or not such phenomena could occur in other planets like Venus and Mars.