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A statistical study on the AGW modulations in subionospheric VLF/LF propagation data

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Though there have been several papers suggesting the important role of atmospheric gravity waves (AGWs) in the generation mechanism of seismo-ionospheric perturbations, no reports have appeared on the statistical study of the AGW effect. Based on the data over nine years and for many propagation paths in and around Japan, this paper presents the first statistical result on the role of AGW in seismo-ionospheric effects. The conclusion by means of superimposed epoch analysis is that the AGW modulation (fluctuation) is rather enhanced about 10 days only for shallow (depth < 40km) earthquakes, but its significance level is just close to the conventional 2sigma (sigma: standard deviation) level. So that, we can conceive that the AGW channel is the most dominant hypothesis for seismo- ionospheric perturbations, but an alternative channel such as chemical (+ electric field) channel is also operative either simultaneously for an EQ or may be dominant for a small number of earthquakes.

Keywords: VLF/LF subionospheric propagation, earthquakes, seismo-ionospheric perturbation, AGW modulation