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Lightning: An Indicator of Gravity Wave Generation

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Abstract

Study on sources of gravity waves in connection to lightning flash rates has been conducted for selected upper mesospheric gravity waves events observed at São Martinho da Serra (29.32°S, 53.87°W) in the southern part of Brazil. The selected cases were identified from 2017 to 2019. It was observed that [the time estimated to be] the corresponding time of excitation of the waves is coincident with the highest values of lightning flash rates as well as the coldest brightness temperature image that indicates the moment of overshoot. The result of the wave parameters showed that, the radiated wave spectrum could only be generated by strong convective activities. However, the Convective Available Potential Energy (CAPE) before and during the lightning activity reveals a very strong maximum updraft velocity of rising air column and the state of the atmosphere as well. The correlation between the lightning flash rates, the brightness temperature and the wave spectrum strongly suggests that lightning activity is an indicator for gravity wave generation.

Topic Areas

Lightning Interactions with the Upper Atmosphere

Submission Format

Oral