

Global synchronization of lightning activity

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Day-to-day variation of global lightning activity is not well known since its quite difficult to investigate by optical detector onboard satellites such as OTD or LIS/TRMM because of the limited observation frequency at same local time and longitude. Here we examine the day-to-day lightning activity modulation based on ELF Schumann resonance measurement. It was reported by Sato et al. that the radiation power in ELF range shows clear enhancement at 27-day, the solar rotation period. They confirmed that this variation is not caused by the conditions of the ionosphere, which are strongly affected by solar UV, but by the lightning activity itself. We derived the longitudinal distributions of the lightning power on a daily basis, assuming that the same local time dependency of lightning activity in any places. It is found that variations in about 30-day period are synchronized at almost all local times without strong phase difference. There may exist two kinds of explanations for this fact: Firstly, atmospheric electric currents including lightning discharge are modulated by variations of atmospheric conductivity, which could be caused by such cosmic ray precipitation. Secondly, thunderstorm activity itself is modulated in the generation phase.