

Periodic changes of global lightning activities deduced from spectral power variations of Schumann resonance bands

Mitsuteru Sato[1], Hiroshi Fukunishi[2]

[1] Dept. of Geophysics, Tohoku Univ, [2] Department of Geophysics, Tohoku Univ.

In order to identify the relationship between global lightning activities and spectral power variations of Schumann resonance (SR) bands, we have analyzed ELF magnetic field waveform data in the frequency range of 1-100 Hz obtained at Syowa station (69.0S, 39.6E) in Antarctica and Onagawa observatory (38.4N, 141.5E) in Japan. It is found that the spectral power variations at both Syowa and Onagawa show a clear spectral peak at about 27 days. Cross spectral analysis has been made between the variation of the SR power and each of the variations of F10.7 index, cosmic ray flux, sunspot number, relativistic electron and ion fluxes observed by the GOES-8 satellite, Kp index, and Dst index. Though all these parameters have a distinct spectral peak around 27-32 days, coherence between the variations of the SR power and those of other parameters are less than 0.3 in all cases. Possible sources of the 27-day modulation in global lightning activities will be discussed.