

Variation of Schumann resonance parameters at Kuju

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The Schumann resonance (SR) is the global resonance of electromagnetic waves generated by global lightning activity. The resonance is formed by the Earth-ionosphere cavity and the specific resonance frequency appears in ground magnetic field variation. Thus, the SR reflects both global lightning activity and ionospheric conditions and varies considerably with location. In this study, we focused on the variation of the SR parameters at Kuju, Japan (KUU; M.Lat. = 23.4 degree, M. Lon. = 201.0 degree).

The ground magnetic field variation in the extremely low frequency (ELF) range has been measured by an induction magnetometer at KUU since 2003. The observation is a part of activities by International Center for Space Weather Science and Education Kyushu University.

The first mode of the Schumann resonance (SR1) around 8 Hz can be seen at KUU. The SR1 in H (horizontal northward component) shows daily variations with maximum peak around 15 UT throughout the entire period. In the case of D (horizontal eastward component), the SR1 shows its maximum peak around 8 UT.

The three major regions of thunderstorm activity (tropical Asia, Africa and America) affect amplitude of SR. The maximum peak times of the SR1 in H and D are coincident with the enhancement of thunderstorm activity in Africa and Asia, respectively. This can be explained by the geographical location.