

Variation of Schumann resonance at Kuju station during solar flares

*Akihiro Ikeda¹, Teiji Uozumi², Akimasa Yoshikawa³, Akiko Fujimoto², Hiromasa Nozawa¹

1. Kagoshima National College of Technology, 2. ICSWSE, Kyushu Univ., 3. Department of Earth and Planetary Sciences, Kyushu Univ.

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 frequencies, which are about 8, 14, 21, and 26 Hz, appears in ground magnetic field variation. The diurnal variations of SR parameters reflect the properties of both global lightning activity and the state of the Earth-ionosphere cavity. Recently, it is revealed that SR is also controlled by the solar activities. In this study we focused on the SR during solar flares.

We examined the SR at Kuju, Japan (KUJ, M.Lat. = 23.4 degree, M. Lon. = 201.0 degree) by comparing solar X-ray and EUV flux. The data of X-ray and EUV flux were obtained by the GOES series of the satellites on a geostationary orbit and the SEM/SOHO at the Lagrangian point L1, respectively. Solar flare on 23 October 2003 was accompanied with the variation of SR parameters. The X-ray in 0.05-0.3 nm wave bands and EUV flux in 0.1-50 nm wave bands started to increase around 08:30 UT and reached the maximum value within about ten minutes. At the time, second mode of SR (SR2) frequencies in H (horizontal northward) and D (horizontal eastward) components also increased. The timing of peaks of SR2 frequencies coincided with EUV flux than X-ray. Since EUV contributes the most to ionization of Earth's ionosphere, the variation of the SR frequency seems to reflect the electron density in the ionospheric D-region during the solar flare.

Keywords: Schumann resonance, solar activity, solar flare