Investigation of the long term variation of the Schumann resonance observed at Kawatabi, Miyagi 1998-2007

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Long term variation of the intensity of the Schumann resonance is investigated on the basis of magnetic field observation at Kawatabi, northwest of Miyagi Prefecture, during the period from December 10, 1998 to November 21, 2007. The magnetic field fluctuations in the range from 0.125 up to aboUT 40 Hz obtained by a fluxgate magnetometer with a sampling frequency of 128 MHz are Fourier transformed for every 8 sec. Hourly averages of the spectra show clear peaks at 7.9Hz, 14.3Hz, 20.7Hz, 27.0Hz, and 32.8Hz. The intensity of the fundamental to 5th modes of the Schumann resonance show seasonal variation as repeatedly reported by many authors. They also show universal time dependence, according as which of the major sources of the lightning activity in the world is in the area of the most intense lightning activity. In particular, there were prominent enhancements at 0 UT in the northern summer, associated with lightning activity originating from Northern America, and at 15 UT throughout the year, associated with lightning in the Africa, as reported by Fullekrug and Fraser-Smith (1997). There was another enhancement at around 8 UT, corresponding to the time when just west of Japan comes into the area of strong lightning activity. No enhancement was observed at 20 UT, which is said to be associated with Latin American lightning activity. Even after subtracting local lightning effects, no increase is observed associated with global warming.