## ~1 Month Variation in Lightning Activity and Cloud Amount

YUKIHIRO TAKAHASHI<sup>1</sup>, HIROKO MIYAHARA<sup>2</sup>, MITSUTERU SATO<sup>1</sup>, HONG PENG<sup>3</sup>, NAOYA HOSHINO<sup>4</sup>, KAZUYO SAKANOI<sup>5</sup> <sup>1</sup>Dept. Cosmosciences, Hokkaido University <sup>2</sup>Institute for Cosmic Ray Research, The University of Tokyo <sup>3</sup>Dept. of Complexity Science and Engineering, The University of Tokyo <sup>4</sup> Dept. Geophysics, Tohoku University <sup>5</sup> Komazawa University

Lightning phenomenon is an excellent proxy of atmospheric convection, whose global activity can easily be monitored with very simple observation system. From the standpoint of the relationship between the effect of solar activity to the earth's climate, lightning activity measured with the ELF receivers in the frequency range f 1-100 Hz and the outgoing longwave Radiation (OLR), an indicator of cloud amount, are examined for their periodicity in the periodic range of about one month. The ELF Schumann resonance (SR) power shows about 27-day periodicity in solar maximum years and it becomes elongated toward solar minimum. On the other hand, OLR shows same kind of 27-day periodicity in solar maximum years, but only in the Western Pacific Warm Pool area. Both the spectra of SR and OLR have a peak around 35-day in solar minimum years. The average spectrum of OLR in solar maximum years also shows an enhancement in the range of 50-60 days corresponding to the main MJO period. Long-term variations in the tropospheric phenomena, including the 11-year cycle, are generally investigated from monthly or yearly averaged data, but the present results suggest an alternative possibility: shortperiod variations could modulate longer periodic phenomena. It is also found that the day-to-day SR power variations at different UT, which nearly represent activities of lightning at different longitude, are synchronized for about one-month periodicity. The key to understand the mechanism of the 27-day periodicity in OLR will be obtained by detailed analysis about the relationship between OLR and thunderstorm activity.