

R010-01

Zoom meeting B : 11/3 AM2 (10:45-12:30)

10:45-11:00

Extreme space weather: A statistical study

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Statistical distributions are investigated for substorms, sudden commencements (SCs), and magnetic storms to identify the possible amplitude of 100-year event from a limited data set of less than 100 years. It is found that majorities of events essentially follow the log-normal distribution, as expected from the random output from a complex system. However, it is uncertain that rare events follow the log-normal distributions, and the possible excess from the log-normal distribution may rather follow the power-law distributions. The amplitudes of 100-year (1000-year) events estimated from both the log-normal and power-law distributions for magnetic storms, substorms, and SCs are 750 nT (1100 nT) ranging 5000 nT (6200 nT), and 230 nT (450 nT), respectively. The mechanisms to cause the statistical distributions are discussed, consulting the other space weather phenomena such as solar flares, coronal mass ejections, and solar protons.