

Forecast of solar radiation storms by on-line NM one-minute data, 1. Automatically search of great FEP event beginning

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Abstract. It is well known that in periods of great FEP fluxes of energetic particles can be so big that memory of computers and other electronics in space may be destroyed, satellites and spacecrafts became dead: according to NOAA Space Weather Scales are dangerous Solar Radiation Storms S5-extreme (flux level of particles with energy > 10 MeV more than 10^5), S4-severe (flux more than 10^4) and S3-strong (flux more than 10^3). In these periods is necessary to switch off some part of electronics for few hours to protect computer memories. These periods are also dangerous for astronauts on space-ships, and passengers and crew in commercial jets (especially during S5 storms). The problem is how to forecast exactly these dangerous phenomena. We show that exact forecast can be made by using high-energy particles (few GeV/nucleon and higher) which transportation from the Sun is characterized by much bigger diffusion coefficient than for small and middle energy particles. Therefore high energy

particles came from the Sun much more early (8-20 minutes after acceleration and escaping into solar wind) than main part of smaller energy particles caused dangerous situation for electronics (about 30-60 minutes later). We describe here principles and experience of automatically working of program "FEP-Search". The positive result which shows the exact beginning of FEP event on the Emilio Segre' Observatory (2025 m above sea level, $R_c = 10.8$ GV), is determined now automatically by simultaneously increasing on 2.5 St. Dev. in two sections of neutron supermonitor. The next 1-min data the program "FEP-Search" uses for checking that the observed increase reflects the beginning of real great FEP or not. If yes, automatically starts to work on line the programs "FEP-Research".

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