

Answers to 'SEPs and their impacts' Quiz

1. SEPs are a source of space radiation. Name another source.

Galactic Cosmic Rays or South Atlantic Anomaly Region (inner proton belt) via CRAND - COSMIC Ray Albedo Neutron Decay process.

2. What physical quantity do we monitor for SEPs, and what are the units? (for STEREO A, B, and GOES)? what does 'pfu' mean?

for GOES

the integral flux of > 10 MeV proton flux or >100 MeV proton flux

for STEREO A, B

the 13-100 MeV proton flux

pfu = particle flux unit

1pfu = 1/cm²/sec/steradian

3. What does the term "magnetic connectivity" refer to, and why is it important for SEPs?

Magnetic connectivity refers to how an object in space (spacecraft or a planet) is magnetically connected to the source region of the sun (tracing the magnetic field line back to the surface of the sun). It allows for a quick assessment of potential radiation risk for the object.

4. How can we forecast SEP events in the near Earth environment?

- observing/monitoring solar signatures/eruptions
- flare/CME modeling
- ReLEASE model of SEP

OPTIONAL homework

1. What are SEPs potential impacts? (name a few)

- a. radiation hazards for humans in space and airline passengers and operations
- b. radiation hazards for satellites via single event effects

2. What contributes to SEP enhancement?

CME (and flare). All SEP events exceeding our defined threshold involve CMEs. Flares are believed to be important to such as providing seed populations.

Note: The following part of homework requires internet connection.

Please use the following link to answer questions 4-6.

<http://ccmc.gsfc.nasa.gov/support/ILWS/layout-sep-homework.php> (with internet)

<http://10.0.1.5/support/ILWS/layout-sep-homework.php>

(on local temp school network)

Examine details of the layout, for example, each product and why they need to be here.

3. Were there significant flares on March 7, 2012?

The first one is the X5.4 class flare peaked at 00:24UT and the second is X1.3 class flare peaked at 01:14UT.

4. Were there accompanying CMEs

Yes, two accompanying CMEs associated with the X-class flares

5. When did the GOES >10 MeV proton flux started to exceed the threshold 10 pfu?

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