

Description of SStoRM v2

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1 Introduction

SStorm stands for the Solar STOrm Radiation Model. SStoRM lets you create and analyze solar particle events (SPEs). Version 2 of SStoRM is different from version 1 because it can handle the simulation of a double event, or different events that happen over the same period of time. It is probably a good idea to understand how version 1 works before you start playing around with version 2. Most of the features common to both version 1 and 2 are only explained in the manual of version 1. So feel free to refer back to it.

2 Create the SPE

The SPEs that this program creates are the sum of two events. Each event has an energy spectrum and each event has a time evolution. You must specify the energy spectrum and time evolution of each event, as well as the duration of time after the first event starts before the second one does. Once you do this, SStoRM knows everything it needs and can then do the simulations.

2.1 The “Energy Spectrum” Tab

To create your SPE, you must first select the energy spectrum, or fluence, for both the first and second event. Selecting the fluence of your event is exactly the same as in the previous version of SStoRM except that you must define a curve for both events. Each curve and the sum of both curves is graphed in the window. The right column still shows the integral fluence of your event along with several others. But SStoRM calculates your integral fluence as the sum of the integral of both events summed together. It then compares the integral fluence of your event to that of all the historically recorded events shown in the graph. The results are presented to the right and can give you a rough sense of how bad your event is.

2.2 The “Time Evolution” Tab

Once you are happy with the fluence of your SPE, you can then define the flux, or time evolution, of your event. This is entirely the same as in version 1 except that you must define a curve for both events. One of the major differences in this version of SStoRM is that you have to specify the time delay between the beginning of the first and second event. This delay allows for one event to start, and then after a while for the second event to appear. You must enter the number of days after the first event happens before the second event happens. From the graph on the “Time Evolution” tab, it is clear how the time delay effects the shape of the event.

3 Analyze your SPE

3.1 The “Estimated Dose” Tab

The “Estimated Dose” tab works exactly the same as in the first version of SStoRM except that it calculates total radiation dose that an astronaut would receive from both events together.

3.2 The “Exercise” Tab

The “Exercise” tab works exactly the same as in the first version of SStoRM. SStoRM knows to take into account that there are 2 events that the astronaut must withstand.