



Solar Energetic Particle Statistical and Physical Modelling: the SEPEM Project

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Many of the currently used standard models of the solar energetic particle environment were developed based on results published more than 15 years ago. Modern user requirements, as well as recent observational data and scientific advances mean that these standards are currently in need of review and updating. Incorporating recent scientific results and a complete set of well calibrated data the ESA Solar Energetic Particle Environment Modelling (SEPEM) project is working towards creating new engineering models and tools to address current and future needs. The objectives of the SEPEM project are to move beyond a model generating only mission integrated fluence statistics to include peak flux statistics, durations of high flux periods and other outputs suitable for single event upset (SEU) rate and radiation background calculations. Databases of ion species and their fluxes will also be integrated into tools for SEU and background calculation so that past events and future scenarios can be simulated. This study is also working to improve existing physics-based shock-acceleration models to predict the expected event-time profiles at non-Earth locations (near-Sun, Mercury, Venus, Mars,...) with a view to obtaining a new model of helio-radial dependence of events. One of the important outputs of SEPEM is the creation of a standard solar energetic particle dataset. A further output of SEPEM for the user community will be a user-friendly webserver with access to the models being developed under this project. Through the webserver the data will be easily accessible at various processing stages, as users might want to use the raw data or skip some data processing steps and apply their own processing.