

Validation of NASA Space Radiation Analysis Tools with ISS Radiation Environment Monitor (REM) Data

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A variety of computational tools and models are used by NASA to evaluate astronaut radiation exposure in support of vehicle design and mission planning efforts. These space radiation analysis tools include radiation environment models, transport codes, and vehicle shielding models. Measurements made with the Radiation Environment Monitor (REM) units currently onboard the International Space Station (ISS) provide an opportunity to perform end-to-end validation of these tools. NASA's Advanced Exploration Systems program supports an effort to perform this validation analysis. Under this project, ISS models have been updated to more accurately represent the shielding masses surrounding the REM units and comparisons between calculated results and measurement data have been completed. The calculated results accurately model the time dependence of the varying environment within the station but underestimate the total dose by approximately 25% at higher latitudes, where the environment is more like the free space environment, and by approximately 60% near the equator. In an effort to better understand this underestimation, the sensitivity of calculated results to a variety of model assumptions has been examined and will be presented.

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