

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Radiation Effects and Risks in Human Space Missions (4)

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MODELS OF THE MOON RADIATION ENVIRONMENT AND A COMPARISON WITH THE
RADOM EXPERIMENT DATA COLLECTED ONBOARD THE CHANDRAYAN-1 MISSION

Abstract

Radiation environmental models have been developed in the framework of the RADOM investigation that is onboard the CHANDRAYAN-1 mission by the Indian Space Agency ISRO. Models for the Moon radiation environment already developed have been used to be compared with the data coming from the RADOM experiment: models of Galactic Cosmic Rays (GCR) and Solar Particle Events (SPE) primary particles impinging on the lunar surface, transported through the subsurface layers, with backscattering taken into account, and interacting with some described targets. The lunar surface and subsurface has been modeled as regolith and bedrock, with structure and composition taken from the results of the instruments of the Luna, Ranger, Lunar Surveyor and Apollo missions, as well as from groundbased measurements. In order to perform the comparison with the RADOM spacecraft data, the models have been set to a 100 km altitude circular orbit, to the actual mission time frame (both punctual and averaged data), and to the actual environmental shielding inside the spacecraft. As a preliminary comparison, RADOM data at 100 km altitude around the Moon give a mean flux for GCR of 2.29 particles/cm²*sec. If for the comparison the above model is used, rescaled for CHANDRAYAN-1 orbital conditions and timeframe, with a shielding pattern of 0.45 g/cm² on the 2 solid angle before the detector and more shielding on the other 2 solid angle at the back side of the detector, a value for GCR of 2.55 particles/cm²*sec is this way obtained. Further examples of comparisons between models and RADOM data will be hereby shown.