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Space Radiation exposure calculations during different solar and galactic cosmic ray activities

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The primary components of radiation in interplanetary space are galactic cosmic rays (GCR) and solar cosmic radiation (SCR). GCR originates from outside of our Solar System, while SCR consists of low energy solar wind particles that flow constantly from the Sun and the highly energetic solar particle events (SPEs) that originate from magnetically disturbed regions of the Sun, which sporadically emit bursts of energetic charged particles. Exposure to space radiation may place astronauts and aviation crews at significant risk for numerous biological effects resulting from exposure to radiation from a major SPE or combined SPE and GCR. Doses absorbed by tissues vary for different SPEs and model systems have been developed to calculate the radiation doses that could have been received by astronauts during previous SPEs. For this reason a new application DYASTIMA-R which constitutes a successor of the Dynamic Atmospheric Shower Tracking Interactive Model Application (DYASTIMA) is being developed. This new simulation tool will be used for the calculation of the equivalent dose during flights scenario in the lower or higher atmosphere, characterized by different altitudes, different geographic latitudes and different solar and galactic cosmic ray intensity. Results for the calculated energy deposition and equivalent dose are calculated during quiet and disturbed periods of the solar cycles 23 and 24, are presented.

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