

Solar Activity Dependence in the Aircraft Radiation Environment as Observed on CSA Flights in 2001 and 2005

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A new Atmospheric Ionizing Radiation (AIR) model is in development at the National Institute of Health of Italy (Istituto Superiore di Sanita' – ISS), in collaboration with the NASA Langley Research Center and the Bartol Research Institute of the University of Delaware, to compute particle spectra and dosimetric quantities all throughout the Earth's atmosphere for radiation dose evaluation of current aircrew member doses as well as in epidemiological studies targeted to atmospheric flight personnel such as civilian airlines crewmembers. The incoming particles are filtered with a new fully angular dependent geomagnetic cut-off rigidity model, as a function of latitude, longitude, arrival direction, altitude and time. The results of the new model are compared with the results obtained by other common transport codes (e.g. CARI, EPCARD). As preliminary validation of the particle transport technique, the flight route profile analysis, the epidemiological interface and the new angular dependent geomagnetic cut-off rigidity model, this model is being tested against particle data obtained in 2 observation campaigns with same Si based Liulin type instrument, one performed in 2002 and the other one performed in the year 2005, onboard aircraft of the CSA Czech Airlines. Data from various long haul flights have been used, and the solar modulation effects pointed out. Experimental results are compared with our and other models data.