Solar Particle Effects at Aircraft Altitudes

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Major solar particle events with hard spectra lead to ground level events and significantly enhanced fluxes at aircraft altitudes. These can make significant contributions to crew and passenger dose and greatly increase the rates of single event effects in avionics. Techniques have been developed to determine these increases based on space data from GOES and ground level neutron monitors. Validation has been made against five periods of enhanced fluxes observed on Concorde during 1989. Account must also be taken of the ambient geomagnetic conditions which can make a factor of two difference. Extrapolation is made to widely used subsonic flight routes and it is shown that for high latitude flights the conditions can be significantly more severe than on Concorde. The possibility of providing a real-time service to airlines is assessed.