

## A Space Weather Index for the Radiation Field at Aviation Altitudes

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### Abstract

The additional dose contribution to the radiation exposure at aviation altitudes during Solar Particle Events (SPEs) has been a matter of concern for many years. After the Halloween storms in 2003 several airlines began to implement mitigation measures such as rerouting and lowering flight altitudes in response to alerts on the NOAA S-scale regarding solar radiation storms. These alerts are based on the integral proton flux above 10 MeV measured aboard the corresponding GOES-satellite which is operated outside the Earth's atmosphere in a geosynchronous orbit. This integral proton flux has, however, been proved to be an insufficient parameter to apply to the radiation field at aviation altitudes without an accompanying analysis of the shape of the energy spectrum. Consequently, false alarms and corresponding disproportionate reactions ensued. Since mitigating measures can be quite cost-intensive, there has been a demand for appropriate space weather information among responsible airline managers for about a decade. Against this background, we propose the introduction of a new Space Weather index D, based on dose rates at aviation altitudes produced by solar protons during solar radiation storms, as the relevant parameter for the assessment of corresponding radiation exposure (J. Space Weather Space Clim. 4 A13 (2014), DOI: <http://dx.doi.org/10.1051/swsc/2014010>).

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