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INVESTIGATING THE IMPACT OF SOLAR PROTON EVENT ON RADIATION DOSE
ENHANCEMENT AT AVIATION ALTITUDE OVER SOUTH AFRICA.

Abstract

Space weather events have impact on technological systems, both ground based and space borne, and can also affects human health. In general solar proton events can enhance the radiation dose at aviation altitude which can have impact on human health. Analysis of the effects of solar proton events on radiation dose enhancement at aviation altitude is done for selected storm period between 2011 and 2017 that occurred during solar cycle 24. The radiation dose enhancement is calculated using the Model for Atmospheric Ionization Radiation Effects (MAIRE). The results of this paper are computed for the flight routes to and from Cape Town (33.9715 S, 18.6021 E) to Johannesburg (26.1367 S, 28.2411 E). The MAIRE model describes changes in the dosimetric quantities over short and long flights as a function of time, altitude, longitude, latitude, geomagnetic rigidity and the geomagnetic storm disturbance indicator such as Kp index. This paper will present the findings of the analysis done which include the magnitude of the impact of solar proton event on radiation dose enhancement at aviation altitude for a specific flight route. The impact will also be analysed in terms of different energies of solar proton events.