Relations between proton fluxes and D-region electron densities during solar proton events

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Abstract

The excess ionisation of the D region by solar protons is of continuing interest, both for the aeronomy of the high-latitude ionosphere and because of the effects of the polar cap absorption event on radio propagation. The paper will outline some recent studies,by various methods, which bear of the relationships between the proton spectra (as observed on satellites) and the resulting electron densities at various levels of the mesosphere. Values of the effective recombination coefficient are determined experimentally over a range of altitudes between 90 and 40 km, and are compared with those computed from some chemical models. It is shown that the square-law relationship between production rate and electron density is obeyed more closely than the models would indicate.