

RING CURRENT: AN ADDITIONAL HEAT SOURCE FOR THE NEUTRAL UPPER-ATMOSPHERE

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In this paper it is demonstrated that the precipitation of the ring current ions represents a second heat source for the neutral upper-atmosphere. Its energy comes from the solar corpuscular heating and acts around equatorial latitudes. The ring current is heating the neutral atmosphere in addition to the auroral heat source. Contrary to this latter, however, the ring current acts not only in the main phase, but also during the recovery phase of a geomagnetic storm. The additional density increases connected to the ring current precipitation have only a two hours delay with respect to the dD_{st}/dt . As the D_{st} characterizing the intensity of the ring current is proportional to the dD_{st}/dt , we have modeled the density increase using D_{st} as an index in an improved empirical model (ddMSIS). The model takes into account the height and local solar time dependence of this additional density increase as well.

ring current, density of the neutral upper-atmosphere

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