

GEOMAGNETIC ACTIVITY DEPENDENCE OF O⁺ IN TRANSIT FROM THE IONOSPHERE

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We discuss observations of O⁺ populations escaping from the ionosphere and their access to the plasma sheet and ring current. We review data establishing that a significant flux of O⁺ escapes the ionosphere during geomagnetically quiet intervals. We then estimate the relative magnitude of the O⁺ population in transit between the ionosphere, plasma sheet, and ring current during quiet intervals before geomagnetic storms. Our analysis suggests that dynamic reconfigurations of the magnetosphere during geomagnetic storms significantly alter the O⁺ transport paths. During these reconfigurations the in-transit O⁺ population and O⁺ in the flanks of the plasma sheet are captured on magnetic field lines leading to the ring current. The prompt appearance of this O⁺ population in the ring current could modify the evolution of the ring current in the storm growth phase.

Ionospheric outflow, plasma sheet, plasma transport, ring current

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