Geomagnetic N+/O+ variation in the Ring Current Observed by the Arase (ERG) Satellite

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O+ and N+ are important ring current ions in magnetic storms and they can be a tracers of ion outflows from the deep ionosphere. Much Many researches haves been devoted to the escape of O+, but N+ has not been studied much, possibly because its mass per charge ratio is similar to that of O+ and separating the two is difficult.

We investigated the statistical properties of O+ and N+ in the ring current based on ion composition measurements (~10-180keV/q) by medium-energy particle experiments-ion mass analyzer (MEP-i) on board the Arase (Exploration of energization and Radiation in Geospace, ERG) satellite. By applying a fitting function to the TOF spectrum, we can separated N+ and O+ in the data obtained during geomagnetic storm on 16 July 2017. From the results of fitting we obtained the ratio of N+/O+. As a result the ratio of N+/O+ during geomagnetic storm and during geomagnetic quiet times is found to be about $0.2^{\circ}0.4$ and <0.2 respectively. In this presentation we will discuss ion outflow from the deep ionosphere.

Keywords: Arase (ERG) satellite, Ion outflow, Ionosphere, Nitrogen ion