

Plasma perturbations HF-induced in the topside ionosphere

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Abstract

©2016. American Geophysical Union. All Rights Reserved. Three plasma perturbations induced by SURA HF (high-frequency) heating have been selected and analyzed in detail with the DEMETER satellite observing data by instruments of Langmuir probe and ion analyzer. Some common features are revealed, such as (1) electron density and electron temperature both increased during the heating period; (2) both O⁺ density and ion temperature also increased generally, while H⁺ varied negatively with O⁺ density; (3) the ions were accelerated in upward and northward directions, resulting from the thermal pressure gradient, which also caused the variations in ULF (ultralow-frequency) electric field due to (Formula presented.) effects; and (4) the simulation results verify the electron density and temperature enhancement at the topside ionosphere due to the ohmic heating process and thermal self-focusing instability over the heating region, which is consistent with the observing phenomena by the DEMETER satellite.

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Keywords

DEMETER satellite, ion velocity, ionospheric heating, plasma perturbations, thermal wave