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Oceanography and Atmospheric Sci. Atmospheric Physics

Innovative Development and Application of Models for Weakly Ionized Ionospheric Plasmas

Authors: [J. V. Eccles](#); [James Hingst](#); [Russell Armstrong](#); [MISSION RESEARCH CORP NASHUA NH](#)

Abstract: Artificial modifications of the ionosphere through chemical releases and ionospheric heating experiments are examined with models of chemistry and transport to advance understanding of ion chemistry of the upper atmosphere. The specific releases investigated were the SF6 released of the CRRES-at-Kwajalein rocket campaign and the CO2 releases of the Red Air I program. Both the SF6 and CO2 releases experienced freezing or clustering of the molecules. This must be accounted for in the composition and airglow observations. In addition, HF heating effects in the E and F region were examined through modeling of energy deposition and resulting chemistry. NO sub x production in a HF ionospheric heater beam is estimated and compared with natural sources of NO sub x. Global effects of HF operation are very small but the local effects can be large enough to permit observable modulation to this environment.

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