

The effect of excited neutral molecular nitrogen estimated in a coupled ion-neutral chemistry model

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Certain processes, such as auroral electron precipitation at high latitudes and transient luminous events (TLEs) at low and middle latitudes, cause excitation of molecular nitrogen and oxygen in the atmosphere. Reactions of excited-state nitrogen and oxygen are potential sources of odd nitrogen and studies indicate that they are important sources of NO in the auroral ionosphere.

In this study we estimate the role of TLEs at mid-latitudes as a similar source of NO. We parameterise reactions of excited nitrogen in addition to those excited states of oxygen which are already included in the coupled ion-neutral Sodankylä Ion Chemistry (SIC) model. Existing data from optical observations are used to estimate the production of excited nitrogen.