This repository contains the following files.

Electron impact cross-section dataset (Laporta et al. 2012; 2014) used to calculate the vibrational excitation of N2 molecules led by electron impact in our model. They are stored in an IDL save file named “n2ecs\_Laporta.sav”. The variables in the SAV file are:

EnergyGrid: Electron energy grid (in eV)

Number\_egrid: Number of electron energy grid

N2\_Vibecs: Electron impact cross-section for vibration transitions of N2 up to vibration level of 20 (in cm2)

Polynomial fit parameters for the rate coefficients for thermal electron excitation and for collisions with neutrals and ions. These parameters are stored as IDL SAV files. A sample program to construct the rate coefficients from these Polynomial parameters is provided.

Simulation outputs that are of main interest of the study. Outputs for each run are stored in sperate IDL SAV files. The model runs at a time resolution of 0.1s, but in the plot and the SAVE files, the outputs are averaged in every second (up to 900 sec). The variables in the SAV files are:

Altitude: Altitude grid (km)

TE00: Initial electron temperature profile (in K)

NE00: Initial electron density profile (in cm-3)

Ne\_runx: Electron density profile from Run x (in cm-3)

NNOi\_runx: NO+ density profile from Run x (in cm-3)

NOi\_runx: NO+ density profile from Run x (in cm-3)

NO2i\_runx: O2+ density profile from Run x (in cm-3)

NO1D\_runx: O(1D) density profile from Run x (in cm-3)

EnergyBin: Electron energy bin for flux (in eV)

Up\_eflux\_runx: Upward hemispherical electron flux from Run x (in /cm2/s/eV)

Down\_eflux\_runx: Downward hemispherical electron flux from Run x (in /cm2/s/eV)

n2v\_runx: N2(v) distribution from Run x (in cm-3)