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Effect of Blue Jets on Stratospheric Ozone - a model study

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In the framework of the TARANIS space mission dedicated to the study of transient luminous events, a detailed ion–neutral chemistry model has been developed to simulate the impact of blue jet streamers on stratospheric chemistry. It is based on the MIPLASMO model (Microphysical and Photochemical Lagrangian Model of Ozone) widely used over the last 20 years to interpret balloon and satellite measurements associated with stratospheric ozone. In this study, instead of using a constant reduced electric field value during a streamer pulse time, we used a time-dependent reduced electric field coming from an explicit streamer model. The simulations are performed on day-time/night-time and their duration is two days. Among 117 species in the model, we put the focus on nitrogen, oxygen, chlorine and bromine species, and ozone perturbations. The model results indicate that the impact on both ions and neutral species volume mixing ratios considering a quasi-real streamer (i.e. using a time-varying electric field) is different from previous model studies considering streamer as a simple pulse. These differences will be analyzed in detail as a function of altitude. Validation exercise and preliminary results will be presented.