



Atmospheric response to local ozone perturbations

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The atmospheric response to middle-atmospheric ozone perturbations depends on their spatial and temporal characteristics, as well as on the sensitivity of the region affected by the perturbation. Global solar and anthropogenic ozone perturbations have earlier been shown to influence the atmosphere. However, also the impact of localized short term perturbations, such as solar proton events, auroras and transient luminous events, can become important when aggregated over many events.

In this study we adopt a systematic approach, investigating the response to ozone perturbations of different scales, with respect to their spatial and temporal characteristics. A 1D radiative-convective model is used for a first estimate of the changes in radiative heating rates caused by the ozone perturbation. A 3D middle-atmosphere model is then used to assess the dynamical response to perturbations at different latitudes. Finally, the perturbations are introduced in a general circulation model to evaluate the magnitude of the perturbation needed to significantly affect the low stratosphere and the troposphere. In order to estimate the impact of localized short term perturbations, further work will be dedicated to comparison of observed perturbations with these results.