



## **Effective lifetime of $\text{NO}_x$ produced by energetic particle precipitation in the winter hemisphere**

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Energetic particle precipitation (EPP) into the atmosphere impacts the chemical composition in the middle atmosphere. However, the EPP effects are not restrained to the area it is produced, but will be transported both horizontally and vertically by the background winds and waves. To address the aspect of horizontal transport we use the simple empirical horizontal wind model, HWM07, to trace the approximate trajectories the air parcels take around the polar region. We limit our focus to the winter hemisphere. We parameterize the  $\text{NO}_x$  production based on the energy deposition estimated from particle measurements on the NOAA Polar Orbiting Environmental Satellites (POES). We estimate the evolution of the EPP-produced  $\text{NO}_x$  taking into consideration sunlight exposure. The results give a rough estimate of the lifetime of  $\text{NO}_x$  produced during a precipitation event and its hemispherical distribution in the aftermath of an event compared to its local production.