

## **EPP-produced NO and its 27-day solar cycles in production and mesospheric descent**

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Energetic particle precipitation (EPP) produces nitric oxide (NO) in the Mesosphere-Lower Thermosphere region (MLT), and during the polar winter, NO can reach down to stratospheric altitudes where it destroys ozone. Several case studies have shown a deficit in models' abilities to correctly represent the transport of NO from the lower thermosphere to the mesosphere and stratosphere, especially in connection with sudden stratospheric warmings.

We study by means of superposed epoch analyses, the general scenario of NO production due to energetic particles in the auroral region. NO observations are provided by the Solar Occultation For Ice Experiment (SOFIE) instrument onboard the Aeronomy of Ice in the Mesosphere (AIM) satellite. We focus on the downward transport from the lower thermosphere to mesosphere. The analysis clearly shows the effect of the 27 day solar cycle all the way down to 50 km during polar winter. Initially a rapid downward transport is noted during the first 10 days after EPP onset to an altitude of 82 km, which is then followed by a slower downward transport of approximately 1-1.2 km/day to lower mesospheric altitudes in the order of 30 days.