



## **Transport of nitrogen oxides from anthropogenic emissions and boreal forest fires to the central North Atlantic lower free troposphere: Measurements at the PICO-NARE station during the ICARTT study**

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Anthropogenic activities and biomass burning are both significant sources of nitrogen oxides emissions in the Northern Hemisphere, affecting tropospheric ozone at the regional to hemispheric scale. The current understanding of nitrogen oxides in remote regions and their impact on the ozone budget is still limited due to an inadequate coverage of direct measurements. Measurements of NO, NO<sub>2</sub>, and NO<sub>y</sub> (total reactive nitrogen oxides) began at the PICO-NARE station (Azores Islands, Portugal, 2225 m asl) in 2002 to address the need to better understand the impact of nitrogen oxides export to the central North Atlantic lower free troposphere on a seasonal basis. Here, we present measurements of NO, NO<sub>2</sub>, and NO<sub>y</sub> during the summer 2004 ICARTT study. These measurements present observations in clean background air as well as periods with significantly elevated nitrogen oxides levels, associated with long-range transport of emissions from Alaska and western Canada forest fires and, to a lesser extent, U.S. outflow. These data will be analyzed in combination with simultaneous observations of CO, O<sub>3</sub>, and meteorological parameters and analysis of backward trajectories in order to investigate the impacts of anthropogenic and biomass burning emissions on nitrogen oxides levels over the central North Atlantic lower free troposphere during the summer season.