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NO_x and NO_y in the Tropical Marine Boundary Layer

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Nitrogen oxides (NO_x=NO+NO_2) and their reservoir species (NO_y) play a central role in determining the chemistry of the troposphere. Although their concentrations are low (1-100 ppt) in regions such as the remote marine boundary layer, they have a profound impact on ozone production and the oxidizing capacity. There are very few observations of NO_x and NO_y in remote oceanic regions due to the technical challenges of measuring such low concentrations, and thus our understanding of this background chemistry is incomplete. Here we present long term measurements of NO_x (2006-2015) and more recent measurements of speciated NO_y (total peroxyacetyl nitrates, PANs; alkyl nitrates, ANs; nitric acid; and aerosol analogues) made at the Cape Verde Atmospheric Observatory (CVAO; 16° 51' N, 24° 52' W) located in the tropical Atlantic Ocean. We identify potential interferences in the NO_2 and NO_y measurements and methods to eliminate them. Diurnal and seasonal cycles are interpreted using a box model. We find a complex chemistry with interactions between organic and inorganic chemistry, between the aerosol and gas phase, and between the very local and large scales.