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## Discovering global-scale processes in the marine atmosphere

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Measurements in the remote unpolluted atmosphere have tremendous power to reveal processes that are happening on a global scale. In the marine atmosphere where nitrogen oxide (NO<sub>x</sub>) levels are very low, the photochemical loss rate of tropospheric ozone dominates over production, allowing loss processes to be sensitively explored. We showed that bromine and iodine emitted from open-ocean marine sources initiate important global-scale catalytic ozone-destroying cycles and found that the deposition of ozone and subsequent reactions at the sea surface are a substantial pathway for production of volatile iodine. Production of ozone in the remote atmosphere is predominantly regulated by the abundance of NO<sub>x</sub>, which also exerts substantial control over the hydroxyl radical (OH), the most important oxidant in the atmosphere. It is now emerging that NO<sub>x</sub> regeneration pathways, namely the photolysis of particulate nitrate, could provide the dominant source of NO<sub>x</sub> to the marine atmosphere. This has significant implications for our understanding of the chemistry of the remote troposphere. This presentation discusses advances made in understanding these important, predominantly natural, cycles and their impacts on the atmosphere.