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Mapping the Oxidizing Capacity of the Global Remote Troposphere

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Observations from the NASA Atmospheric Tomography Mission (ATom) have elucidated a strong relationship between the production of hydroxyl radical (OH), the primary oxidant of the troposphere, and formaldehyde (HCHO), a major product of the oxidation of methane and other hydrocarbons. We present a proxy for global over-ocean OH based on this principle, using remote observations of HCHO from the Ozone Monitoring Instrument (OMI). Analysis of summer and wintertime remote OH from this proxy suggest a near-constant mean concentration of $1.03 \pm 0.25 \times 10^6 \text{ cm}^{-3}$ and a Northern Hemisphere to Southern Hemisphere over-ocean OH ratio of 0.89 ± 0.06 averaged over both seasons (1 σ uncertainties). We also share ongoing efforts to expand on this approach by refining the scaling factors that relate OH production to HCHO as a function of CO, NO_x, and VOCs, with the goal of extending the proxy over land as well as across the OMI record.

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