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Climate-Driven in the Oxidation of the Atmosphere”

Abstract: The Earth's atmosphere is a highly oxidizing medium, resulting in the rapid oxidation of most reduced-trace gases important to human health and climate. The chemical reactivity of the atmosphere is governed by its oxidizing capacity, which is typically defined by global-mean concentrations of the hydroxyl radical (OH). How OH may have varied in the past is unknown, but is important for understanding the drivers of observed changes in the chemical composition of the Earth's atmosphere. I will present ice-core observations that suggest that the chemical reactivity of the polar atmosphere changes over major climate transitions, including rapid climate change events during the last glacial period. A hypothesis for the driver of these observed changes, which rests on changes in the large-scale circulation of the atmosphere, will be presented utilizing results from global chemistry-climate model simulations. This paleo perspective can inform estimates of potential future change in the oxidation capacity of the Earth's atmosphere.