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The global and regional oxidation capacity trends estimation using tropospheric hydroxyl radical burden

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The oxidation capacity of the atmosphere, which determines the self-cleaning ability of the air, may have been changed over the few latest decades, due to active emissions from human and natural ecosystems not only because of industrial activities but also because of temperature rise owing to climate change. To examine its tendency and severity in variabilities, we infer global and regional burden of hydroxyl radical (OH) trend using the growth rate of methane (CH4) to minimize the possible bias of traditional method using methyl chloroform (1,1,1-Trichloroethane, CH3CCl3) since its abundances have declined after the Montreal Protocol. The mass balance approaches among man-made emissions and losses of CH4 have been used and as a result, we found increasing trend of OH radical until 2000 by about 1.67 times. After that the OH trend leveled off until mid-2000s and then decrease down by about 1.2 times, in recent where the global burden of CH4 had been kept increase (from 1650 to 1870 ppb since 1983 to recent). Further analysis of CFC, HCFC and HFCs to verify the cause of inconsistency in OH and CH4 trend will be discussed.