

Atmospheric oxidation capacity and global methane

The self-cleaning or oxidation capacity of the atmosphere is principally controlled by hydroxyl (OH) radicals in the troposphere. Hydroxyl has primary and secondary sources, the former through the photo-dissociation of ozone, the latter through OH recycling in radical reaction chains. We show that secondary OH sources are much larger than previously assumed. We also calculate substantially higher OH reactivity from volatile organic compound (VOC) oxidation compared to predecessor models. Further, we find that nighttime OH formation may be significant in the polluted subtropical boundary layer in summer. Globally, secondary exceeds primary OH formation, so that OH is buffered and not sensitive to perturbations by natural or anthropogenic emission changes, e.g., by VOCs including methane. The implications for methane variability and trends will be discussed.