



The contribution of ozone to future stratospheric temperature trends

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The projected recovery of ozone from the effects of ozone depleting substances this century will modulate the stratospheric cooling due to CO₂, thereby affecting the detection and attribution of stratospheric temperature trends. Here the impact of future ozone changes on stratospheric temperatures is quantified for three representative concentration pathways (RCPs) using simulations from the Fifth Coupled Model Intercomparison Project (CMIP5). For models with interactive chemistry, ozone trends offset ~50% of the global annual mean upper stratospheric cooling due to CO₂ for RCP4.5 and 20% for RCP8.5 between 2006–2015 and 2090–2099. For RCP2.6, ozone trends cause a net warming of the upper and lower stratosphere. The misspecification of ozone trends for RCP2.6/RCP4.5 in models that used the International Global Atmospheric Chemistry (IGAC)/Stratosphere-troposphere Processes and their Role in Climate (SPARC) Ozone Database causes anomalous warming (cooling) of the upper (lower) stratosphere compared to chemistry-climate models. The dependence of ozone chemistry on greenhouse gas concentrations should therefore be better represented in CMIP6.