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The potential of stratospheric ozone changes to influence the abundance of sulfate aerosols in the troposphere

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Stratospheric ozone abundances are expected to change in the future due to regulations in the use of ozone-destroying CFCs and due to greenhouse gas increases, that can impact chemical processes in the stratosphere. Any change in stratospheric ozone has the potential to alter tropospheric chemistry, through modifications of short-wave radiation entering the troposphere. In particular, modifications of radiation can affect photolysis of ozone in the troposphere, and thus impact the production of hydroxyl radicals (OH). The latter are very important for the production of sulfate aerosols (SO_4) from sulfur dioxide (SO_2) emissions. In this work, we perform a set of sensitivity runs with the G-PUCCINI chemistry-climate model (GISS GCM with aerosol and gas chemistry) to investigate how the expected future changes in stratospheric ozone concentrations can alter the abundance of sulfate aerosols in the troposphere through modifications of photolysis. Additionally, we examine the possible effects of stratospheric ozone changes on methane lifetime and ozone formation in the troposphere.