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CURRENT AND FUTURE SURFACE OZONE LEVELS OVER EUROPE

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Climate change is one of the most important problems facing us today, and atmospheric chemistry controls the abundances and distributions of many of the radiatively important gases. Chemically active long-lived greenhouse gases have contributed about half of the radiative forcing of climate since the pre-industrial. Climate change itself affects atmospheric chemistry, for instance directly through changes in temperature and water vapour which affect the rates of chemical production and destruction processes. There are indirect effects too. The largest source of reactive hydrocarbons to the atmosphere comes from vegetation, but plants are expected to emit more hydrocarbons in a warmer climate. These increases may offset the decreases in anthropogenic emissions due to emission controls. A further impact is through increases in NOx from lightning. While lightning is not a significant source of NOx over industrial regions, it forms ozone over remote regions of the globe, thus contributing to the background concentrations of ozone. Due to the non-linear nature of the ozone regulations, small increases in the ozone background can cause large violations of the air quality standards. We have simulated the evolution of ground-level ozone over Europe under climate-change scenarios using a global chemistry transport model. We will present here the results of these experiments and the implications for our ability to meet air quality standards in the future.