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Surface ozone pollution events in Austria: past, present and future

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The national air quality standard for ozone (O_3) is most frequently exceeded in Austria during the summer season. Here we review ozone seasonality, pollution episodes and underlying drivers (meteorology, emissions) in observational records and investigate potential changes in the O_3 distribution and seasonal cycle throughout the 21st century with a set of transient (2006-2100) sensitivity simulations for RCP scenarios from the Geophysical Fluid Dynamics Laboratory (GFDL) chemistry-climate model CM3. These simulations have been designed to isolate effects of changes in anthropogenic O_3 precursor emissions, climate, and global background methane on surface O_3 over the 21st century. We show that the peak ozone season may shift over the 21st century in light of regional emission controls, climate warming and increasing global methane abundances. Further we illustrate effects of climate warming, changes in O_3 precursor emissions and global methane concentrations for probabilistic return values, which are directly related to the national air quality standard and bridge the gap to frequency based statistics as they characterize the offset from the threshold level.