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WHAT WILL DETERMINE FUTURE TROPOSPHERIC OZONE AND METHANE? CTM CALCULATIONS OF THE ROLES OF EMISSIONS AND CLIMATE CHANGE FOR THE PERIOD 1990-2030

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We used a set of realistic country-based emission scenarios for CH4, CO, NMVOC, and NOx and implemented them in two different global Chemistry Transport Models: TM3 and STOCHEM. The new emission scenarios, developed by the IIASA group, involve assumptions about country- and region-wide developments in the activities of energy and land-use sectors, as well as anticipated changes in the coming decades regarding technological developments and emissions factors. Two scenarios are considered: Business-as-usual (BAU) and Maximum Feasible Reduction (MFR). Several long-term integrations were performed to assess global, hemispheric and regional changes in CH4, CO, hydroxyl radical (oxidation capacity), O3 and radiative forcing related to these emission scenarios. First we will present an analysis of our ability to model present day atmospheric photochemistry by comparing modelled ozone with surface stations and balloon soundings. We then systematically analyze the roles of: - reductions in emissions of “classical” pollutants such NOx, CO, and NMVOC - reduction of methane emissions - influence of different models and model set-ups - influence of climate change. We will focus on consequences for air quality in the year 2020.