A CLIMATE SCENARIO FOR THE 21-ST CENTURY INCLUDING OZONE PHOTOCHEMISTRY

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Stratospheric cooling is a direct consequence of greenhouse gas increase has been less thoroughly investigated than the well-know tropospheric war ing. Ozone photochemistry in particular is sensitive to temperature and co be affected by the expected stratospheric cooling. In order to study this pr lem a climate scenario for the period 1950-2100 has been performed with th Arpege-Climat atmospheric GCM coupled by means of the OASIS coupler (de- veloped at CERFACS, Toulouse) to the OPA-8.0 ocean model (developed at LODYC, IPSL, Paris) and a sea-ice model (GELATO). The original features of this simulation are the rather high spatial resolution of the AGCM (T with linear grid), the detailed representation of the stratospheric circ (45 levels) with inclusion of the transport of ozone and a simple parameter tion of its photochemistry based on a linear relaxation to values computed b bidimensional detailed photochemical model MOBIDIC. For the computation of the infrared radiative forcing (Morcrette's parameterization), beside which is computed interactively, the other main greenhouse gases (CO2, CH4 N2O) are specified according to their observed evolution until present, and cording to scenario SRES-B2 of IPCC during the 21-st century, and accordin to the Montreal Protocol for CFCs. The direct and indirect effect of an! t pogenic sulfate aerosols is taken into account according to the parameteriz of Boucher and Lohman (1995), and their evolution is specified according t scenarios provided by J. Penner. For comparison a control simulation has be performed keeping the greenhouse gas concentrations and aerosols at their 1 values. The control simulation shows a very small surface warming trend duri the 150 years of the simulation, while the scenario gives a larger global su warming reaching about 3 K for 2100, and a stratospheric cooling up to -12 K at the equatorial stratopause. The tropospheric and stratospheric respons the enhanced greenhouse effect simulated in this scenario, and the feedbac on ozone concentration will be described in more detail in the presentatio