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O_3 and Stratospheric H_2O Radiative Forcing Resulting From A Supersonic Jet Transport Emission Scenario

The tropospheric radiative forcing has been calculated for ozone and water vapor perturbations caused by a realistic High Speed Civil Transport aircraft emission scenario. Atmospheric profiles of water vapor and ozone were obtained using the LLNL 2-D chemical-radiative-transport model of the global troposphere and stratosphere. IR radiative forcing calculations were made with the LLNL correlated k-distribution radiative transfer. UV-Visible-Near IR radiative forcing calculations were made with the LLNL two stream solar radiation model. For the case of water vapor the IR and Near IR radiative forcing was determined at five different latitudes and then averaged using an appropriate latitudinal average to obtain the global average value and for ozone the radiative forcing was calculated for the globally averaged atmosphere. For both ozone and water vapor the radiative forcing was too small to be of major global warming consequence. Future studies will include the direct and indirect effects of aircraft soot and sulfate aerosol emissions on radiative forcing and ozone chemistry.

Allen S. Grossman and Douglas E. Kinnison
(510) 423-6371 and (510) 422-7975
allen@seneca.llnl.gov and kinnison1@llnl.gov
Atmospheric Research Division, L-262
Lawrence Livermore National Laboratory

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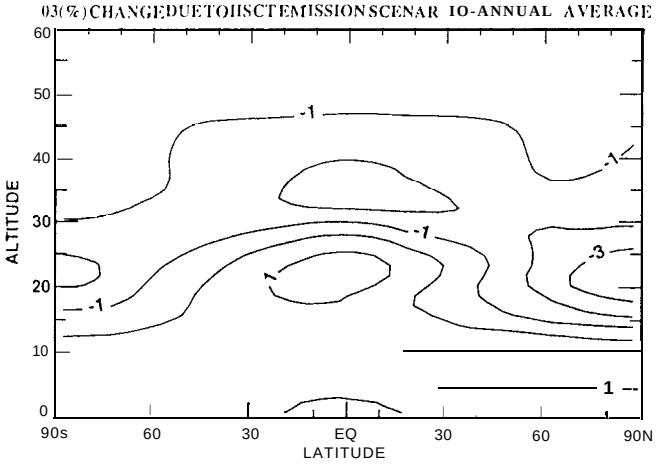
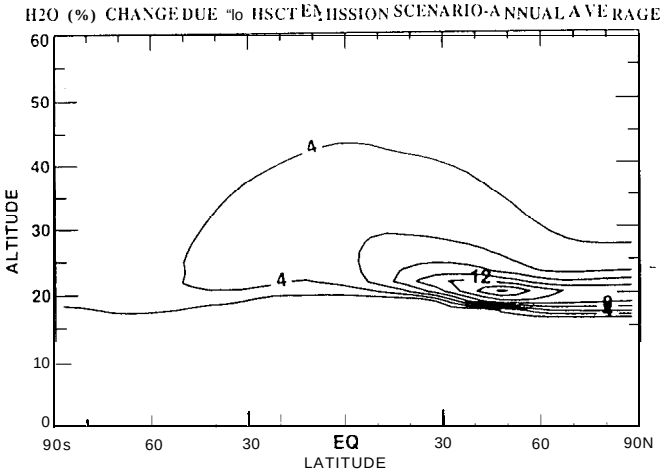


The annual and zonal average change in ozone mixing ratio due to the HSCT scenario as a function of latitude and altitude.



The annual and zonal average change in water vapor mixing ratio due to the HSCT scenario as a function of latitude and altitude.