

STUDIES ON THE OZONE DEPLETION HYPOTHESIS BY CHLOROFLUOROCARBONS :
TWO-DIMENSIONAL STRATOSPHERIC MODELLING AND IMPLICATIONS FOR
STRATOSPHERIC CHEMISTRY.

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A two-dimensional (2-D) model of the atmosphere including photochemistry as complete as that in advanced 1-D models, parameterized transport, diurnal effects and rayleigh scattering has been used to calculate present day altitude profiles of trace species mixing ratios.

The structure and content of the model will be described and a comparison of model results with atmospheric measurements will be presented.

In particular, while there had been some expectation that inclusion of latitudinal and seasonal effects would resolve certain major discrepancies for atmospheric chlorine species, the current profiles for 30 degrees latitude are qualitatively similar to 1-D model results and seasonal variations are relatively small. The principle discrepancies between 1-D model results and measurements including overstimulation by the model of ClO concentrations below 30 km and understimation of HCl above 30 km are still present in the 2-D model results.

The absence of change in HCl also imploies that over-estimation of HF/HCl ratio above 20 km remains a problem.

The implications for model validation and ozone depletion calculations, in the view of the effect of chlorofluorocarbons, will be discussed.