

Balloon-borne measurements of stratospheric radicals and their precursors: implications for the production and loss of ozone.

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Measurements from a September 1993 balloon flight from Ft. Sumner, N.M. (35° N) provide an opportunity to study the processes that affect ozone production and loss. In particular, the data allow determination of empirical rates for the NO_x , Cl_x and HO_x catalytic cycle contributions to ozone loss between 30 and 38 km and the Cl_x and HO_x contributions between 40 and 50 km. The empirical ozone loss rates calculated for each catalytic cycle are then compared to rates calculated using a constrained photochemical steady state model with the resulting agreement being good. A total loss rate for O_3 oxygen is calculated using the data and supplemented when necessary with values from the model and suggests an imbalance between O_3 production and loss of between 5 and 58% above 40 km. Examination of the nature of this ozone deficit suggests it could be indicative of a missing source of O_3 . The sensitivity of the calculated ozone deficit to rates of certain key reactions will also be presented.

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