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## Two-dimensional perspective on ozone depletion

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Quantitative estimates of the effect of increasing chlorine abundances on stratospheric ozone have largely been performed with one-dimensional models. Current one-dimensional models predict a rather small steady state ozone column reduction of about 4-6%. These small values result from a balance between large depletions in the upper stratosphere and increases in the lower stratosphere (the chemical "self-healing" effect), so that the total column change is a small difference between the two. It is however, well established that lower stratospheric ozone is largely dynamically (not chemically) dominated, particularly at middle and high latitudes in winter. In particular, the chemical self-healing is likely to be much less important at high latitudes than one-dimensional model projections indicate, leading to greater total ozone column changes there. Further, latitudinal variations in long-lived species such as  $\text{CH}_4$  are expected to produce latitudinal gradients in  $\text{ClO}$  and  $\text{HCl}$ , with associated effects on the ozone changes near 40 km. These and other two-dimensional variations in trace species related to ozone depletion projections will be explored.

Reference: Solomon, S., R. R. Garcia, and F. Stordal, J. Geophys. Res., 90, 12981-12989, 1985.