



Turnaround in total ozone?

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The release of man-made CFCs into the atmosphere has led to a near-linear increase in stratospheric chlorine loading since the early 1970s but started to level off and even to decline after the mid-1990s in response to the ban of CFCs by the Montreal Protocol and its Amendments. We applied a method based on a hierarchy of multiple linear regression models combined with a parameter elimination procedure to test whether this has also a measurable effect on total ozone values observed by the global network of ground-based Dobson, Brewer and Filter instruments. In addition to explanatory variables describing the influence of the solar cycle, volcanic eruptions, and various modes of dynamical variability, each model version included a linear trend and a term describing the evolution of effective equivalent stratospheric chlorine (EESC). The models were run for every station separately and a parameter elimination procedure was employed to decide which of the two terms better describes the observed evolution. For a majority of extratropical stations in both the Northern and Southern Hemisphere, the EESC proxy is preferred over the linear trend term suggesting that the ozone layer is indeed showing first signs of recovery in response to the Montreal Protocol. To answer questions about the dependence between the results of individual stations we used spatial statistics which handle the correlation inside the results in respect to their geographical positions.