

5.062 Injection of iodine to the stratosphere and implications for future ozone depletion.

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Abstract:

There are still many uncertainties about the influence of iodine chemistry in the stratosphere, as the real amount of reactive iodine injected to this layer from the troposphere and the partitioning of iodine species are still unknown. In this work we report a new estimation of the injection of iodine into the stratosphere based on recently published (Saiz-Lopez et al., 2015) aircraft observations in the tropical tropopause layer (TORERO campaign) and a 3D global chemistry-climate model (CAM-Chem) that includes the most recent knowledge about iodine photochemistry. The results indicate that significant levels of total reactive iodine (0.25-0.7 pptv), between 2 and 5 times larger than the accepted upper limits, could be injected into the stratosphere via tropical convective outflow. At these iodine levels, modelled iodine catalytic cycles account for up to 30% of the contemporary ozone loss in the tropical lower stratosphere and can exert a stratospheric ozone depletion potential equivalent or even larger than that of very short-lived (VSL) bromocarbons. Therefore, in this presentation, we discuss the impact of iodine and VSL sources and chemistry on historical and future evolution of the stratospheric ozone layer.

Saiz-Lopez, A., S. Baidar, C. A. Cuevas, T. K. Koenig, R. P. Fernandez, B. Dix, D. E. Kinnison, J.-F. Lamarque, X. Rodriguez-Lloveras, T. L. Campos, et al. (2015), Injection of iodine to the stratosphere, *Geophys. Res. Lett.*, 42, 6852–6859, doi:10.1002/2015GL064796.