Stable isotopes in stratospheric carbon monoxide

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DOI:
10.33612/diss.195700524

Propositions

belonging to the dissertation

Stable isotopes in stratospheric carbon monoxide

by

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1. Routine measurements of trace gas mole fractions and stable isotopes of stratospheric air are possible at relatively low cost (Chapter 2).
2. Underestimation of the simulated carbon monoxide source from methane may be approximately balanced by overestimated transport term in models suffering from a cold bias (Chapter 3).
3. Stable isotope measurements of carbon monoxide can help identify contamination sources in the stratosphere (Chapter 4).
4. The total fractionation in atmospheric carbon monoxide due to removal by the hydroxyl radical is likely often underestimated (Chapter 4 & 5).
5. Photolysis of carbon dioxide leads to significant contribution to the total carbon monoxide in the middle and upper stratosphere, which can be identified by mole fraction and concurrent stable isotope analysis (Chapter 5).
6. The stratospheric carbon monoxide budget is too complicated for direct methane sink partitioning between the sink reactions of methane with the hydroxyl radical, excited oxygen radical, and the chlorine radical (Chapter 5).
7. Without the experimental quantification of the underlying fractionation processes, the interpretation of atmospheric observations of stable isotope composition remain hand waving and inconclusive, despite its potential.
8. Fast scientific progress is being made through collaborations (two heads are better than one). This is supported by open access publishing, free available data, and free and open source software. Science can learn from the success of the open source business model.
9. The "pressure to publish" encourages scientific misconduct rather than good quality research.
10. "I took month-long vacations in the stratosphere, and you know its really hard to hold your breath". (Growin' up – Bruce Springsteen 1973)