

Atmospheric lifetime implications for SF₆ from stratospheric observations

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Sulphur hexafluoride (SF₆) is a very long-lived strong greenhouse gas. Its abundances continue to increase in the atmosphere. Due to its inert behaviour it has also been extensively used as a tracer of transport in the ocean, the troposphere and the stratosphere. Combining long-term tropospheric records obtained from the Cape Grim observatory, Tasmania, and stratospheric data from high-altitude aircraft and balloons, we have assessed the novel use of several alternative transport tracers (e.g. C₂F₆ and C₃F₈) in comparison to SF₆. The results indicate good suitability for some of these gases, as well as the possibility of the existence of a stratospheric SF₆ sink. The latter finding would also imply that the total atmospheric lifetime of SF₆ is substantially shorter than previously believed, with further implications for its Global Warming Potential, global emission estimates, and use as a transport tracer.