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Atmos. Chem. Phys., 5, 1467-1472, 2005

www.atmos-chem-phys.net/5/1467/2005/

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Evidence for long-lived polar vortex air in the mid-latitude summer stratosphere from in situ laser diode CH₄ and H₂O measurements

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Abstract. A balloon borne diode laser spectrometer was launched in southern France in June 2000 to yield in situ stratospheric CH₄ and H₂O measurements. In the altitude region ranging from 20km to 25km, striking large spatial structures were observed in the vertical concentration profiles of both species. We suggest these patterns are due to the presence of long-lived remnants of the wintertime polar vortex in the mid-latitude summer stratosphere. To support this interpretation, a high resolution advection model for potential vorticity is used to investigate the evolution of the Arctic vortex after its breakdown phase in spring 2000.

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Citation: Durrý, G. and Hauchecorne, A.: Evidence for long-lived polar vortex air in the mid-latitude summer stratosphere from in situ laser diode CH₄ and H₂O measurements, Atmos. Chem. Phys., 5, 1467-1472, 2005. [Bibtex](#) [EndNote](#) [Reference Manager](#)

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