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Atmospheric Chemistry and Physics Discussions

Interactive comment on "How stratospheric are deep stratospheric intrusions?" *by* T. Trickl et al.

Anonymous Referee #2

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The paper presents a careful analysis of stratospheric-intrusion signatures primarily during 3 case-studies from 2008/2009, combining lidar, radiosonde and in-situ observations at high-altitude observatories in Europe. The authors are able to demonstrate convincingly that the observations are consistent with stratospheric intrusion in thin lays with little mixing after initial intrusion, and that the likely source is in the mixing layer immediately above the tropopause.

The study represents a valuable follow up on previous work based primarily on in-situ observations at the observatories , in particular highlighting problems with measurement of very low humidity at Zugspitze summit.

The authors are further able to argue that 20-year trends in CO in stratospheric intrusions at Zugspitze can have their source in increasing Asian pollution.

Altogether the questions addressed are important ones, the observations and analysis methods state-of-the art and the conclusions well argued.

Technical corrections :

p15841 , line 19 'formation to' –> ' formation of '

p 15483, line 1 It is not clear what is meant by 'insufficient trajectory results of or the absence of ' - maybe ' insufficient relevant trajectory results or the absence of ' ?

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 15463, 2014.