



11/06/20

O_3 , H_2O and Aerosol Observations at Garmisch-Partenkirchen/Zugspitze 2007 – 2018

Thomas Trickl , Hannes Vogelmann (and many others)



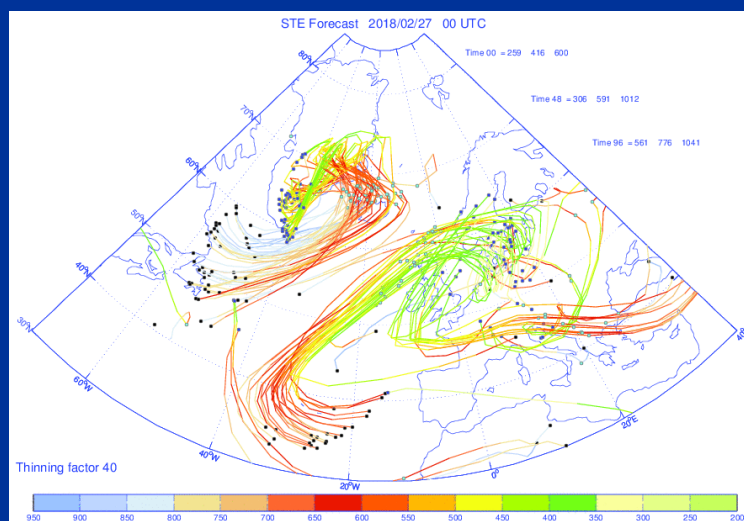
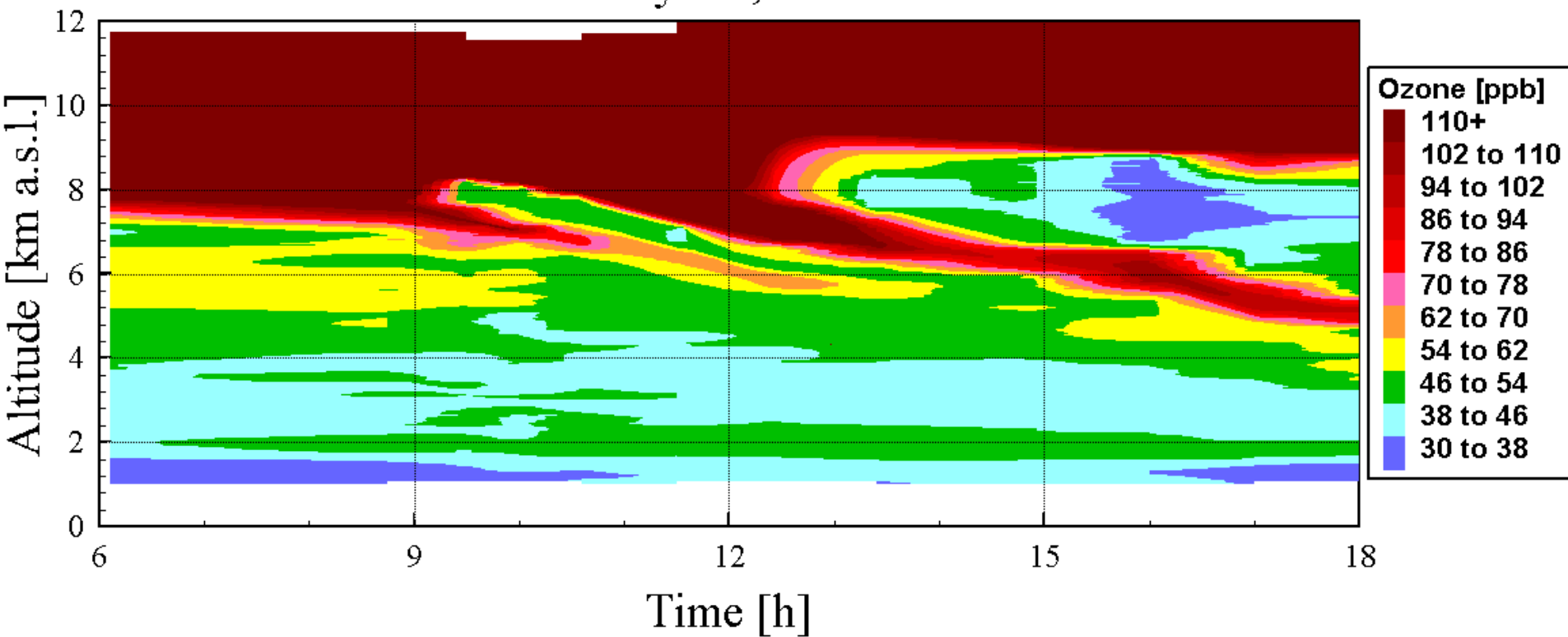
11/06/20

2007-2018	Routine measurements with ozone and water-vapour DIAL Aerosol retrieved from 313-nm channel with excellent S/N (operation of HSRL not funded).
As of May 1	2523 O ₃ and aerosol profiles; backscatter coefficients archived in EARLINET data base in near-real time.
2015	Fatal damage of Ti:sapphire laser of H ₂ O DIAL
2016-2017	Project for developing a new laser funded; first emission observed.

Results:

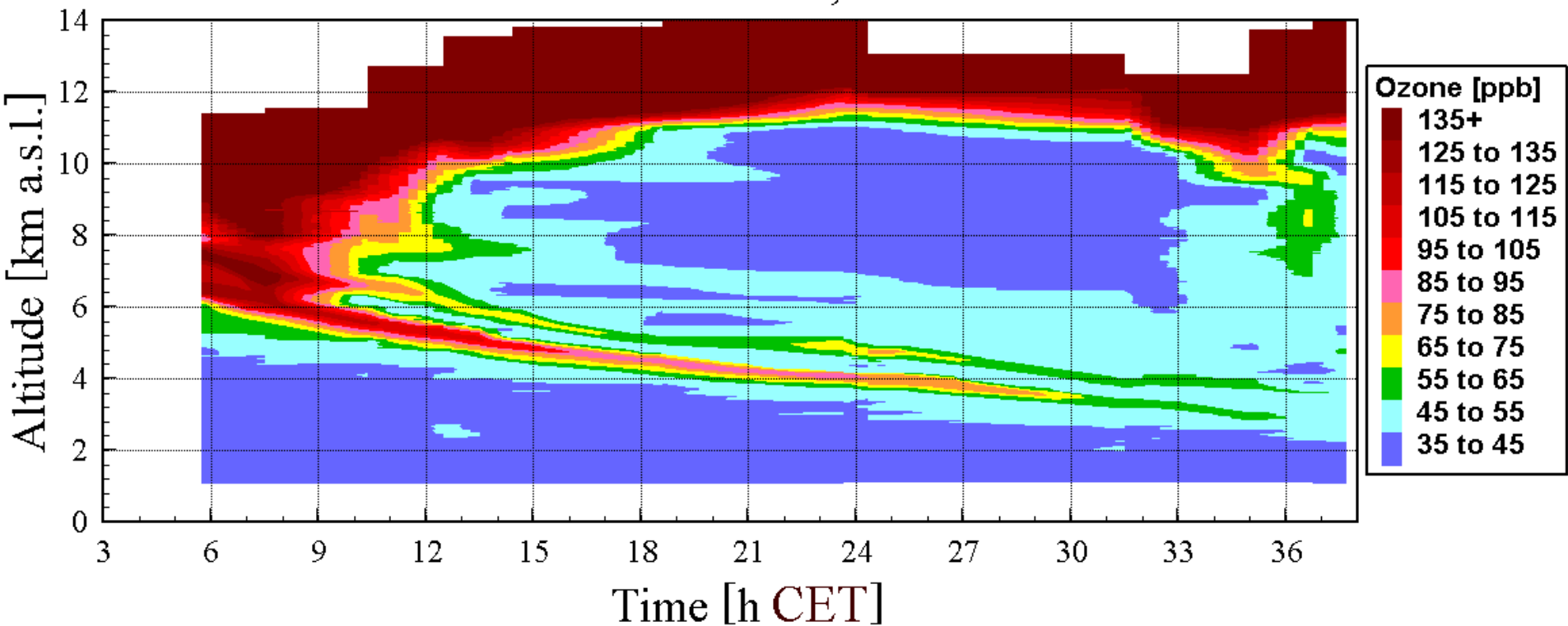
- Interesting structures mostly related to STT (the main topic here)
- Intercontinental transport of ozone resulted only occasionally in peaks
- Biomass burning and Saharan dust event co-exist with stratospheric intrusions
- Aerosol in intrusion layers after major volcanic eruptions
- STT climatology 2007 – 2016 (currently ACPD; for special issue on O₃ Symposium)

February 28, 2018

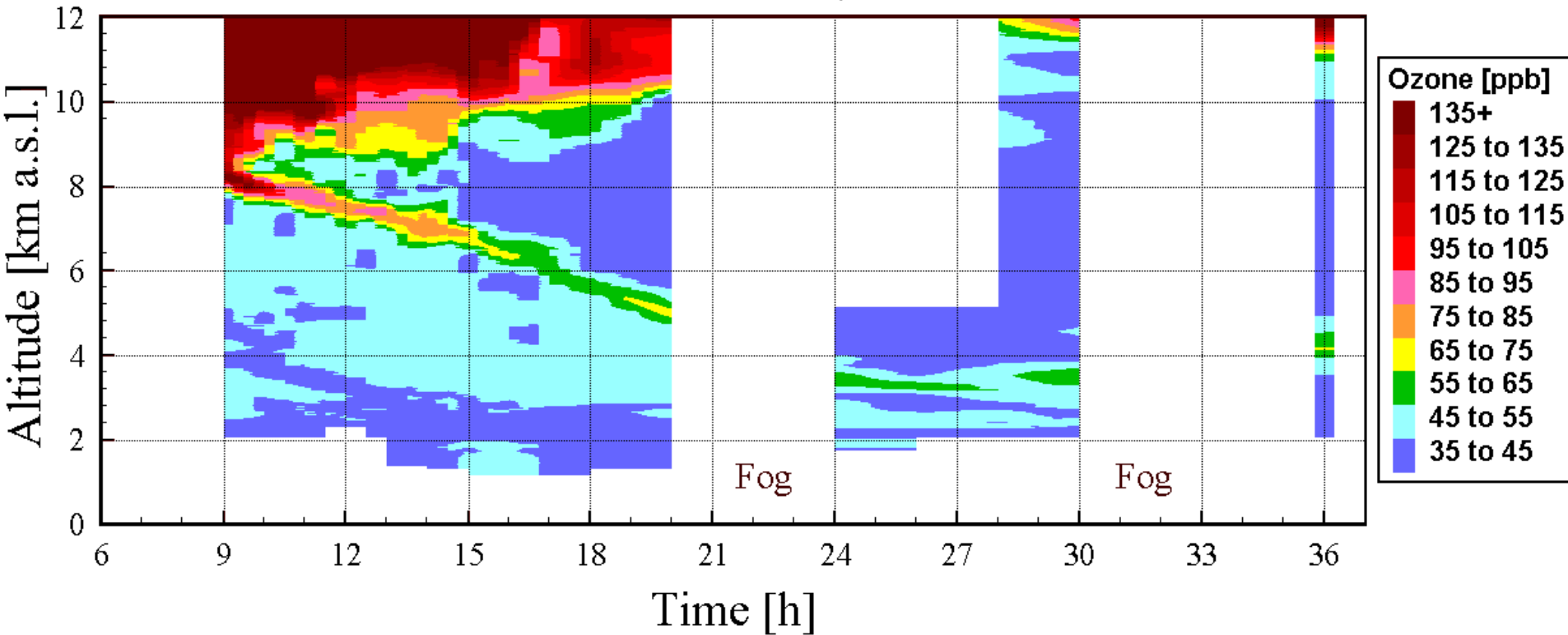


M. Sprenger,
ETH

December 30, 2013



December 26 to 27, 2008



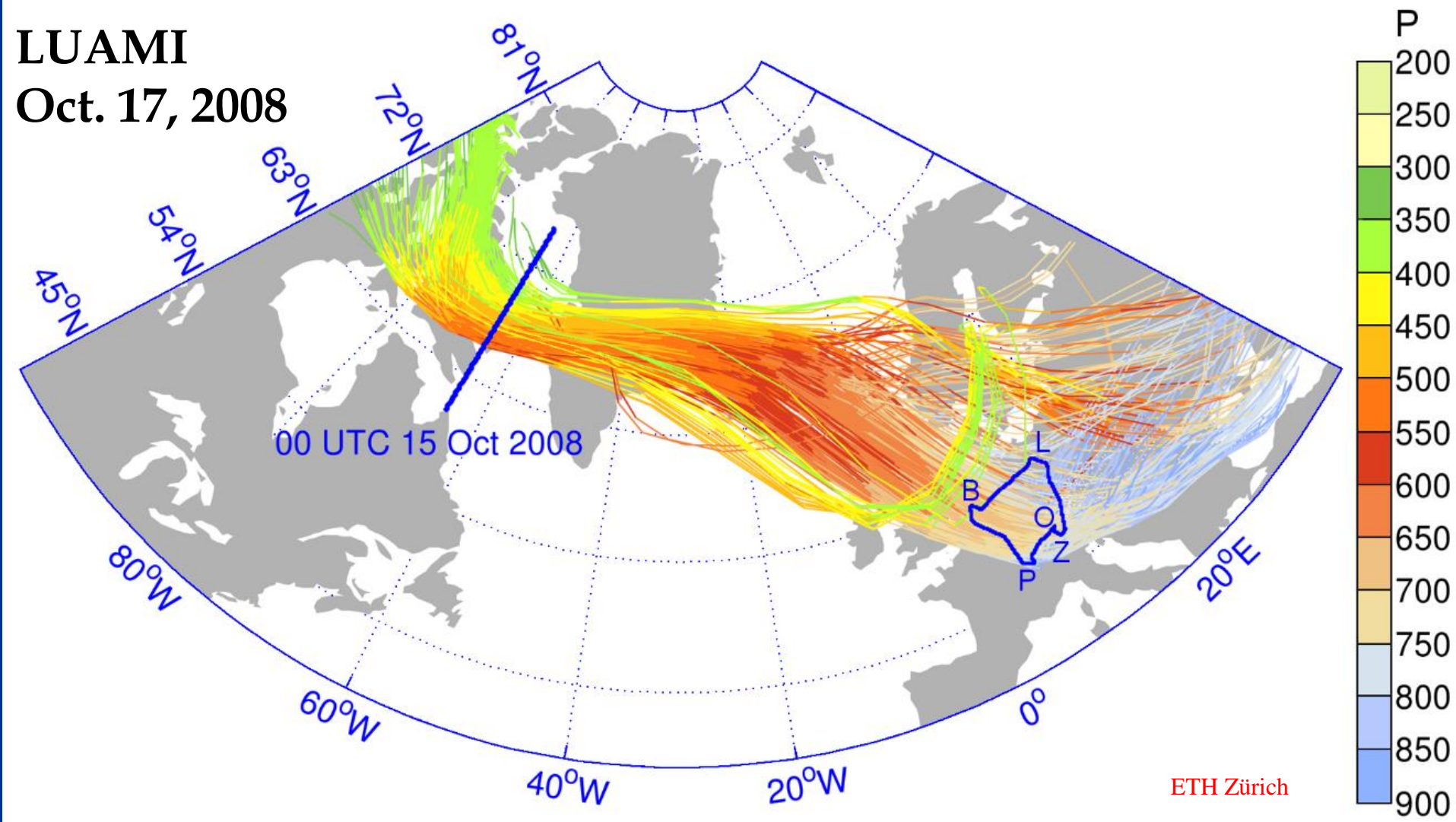
Trickl et al., ACP 2014:

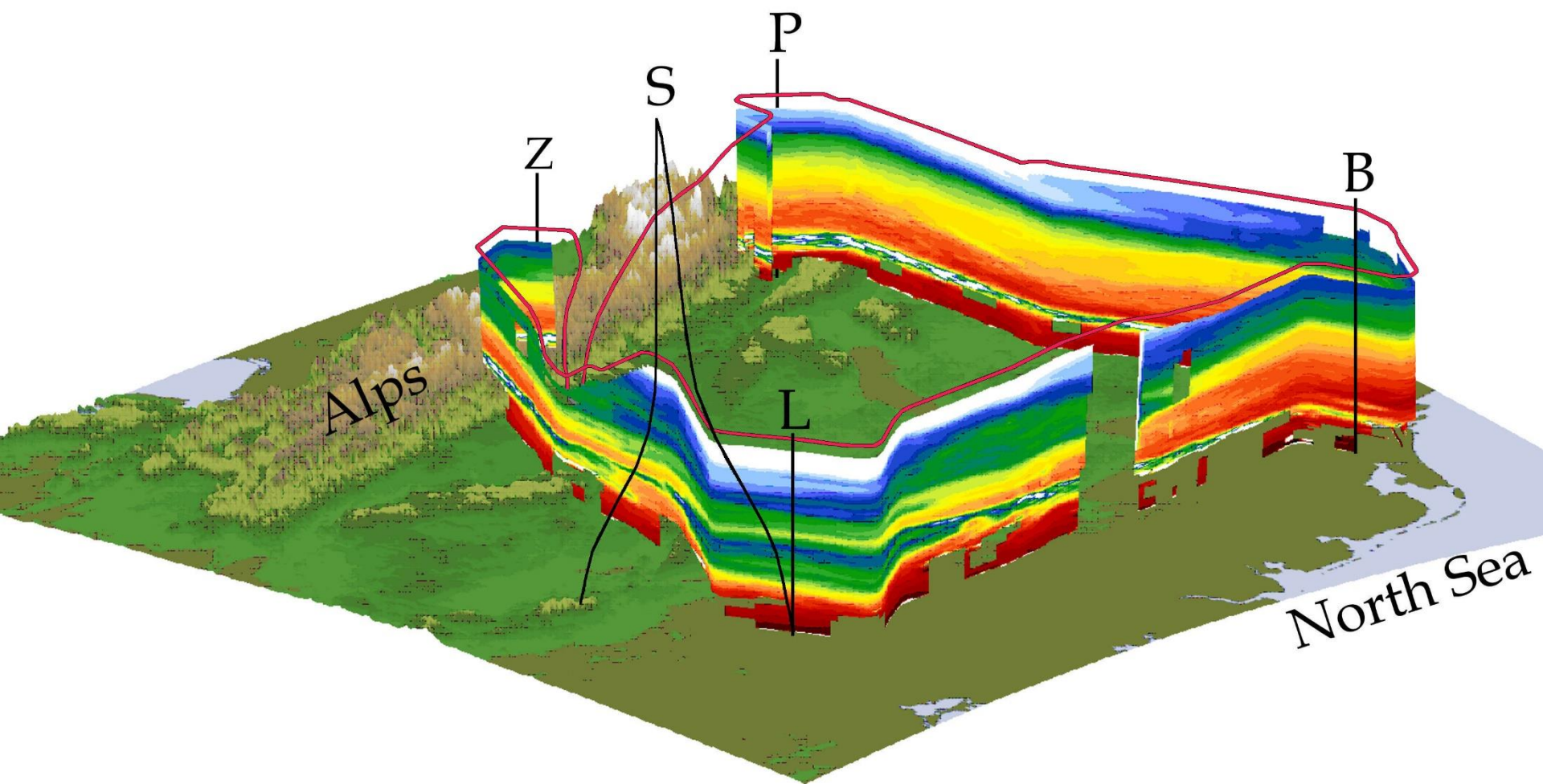
- 1 % RH in this very thin layer!
- width fully confirmed with FLEXPART

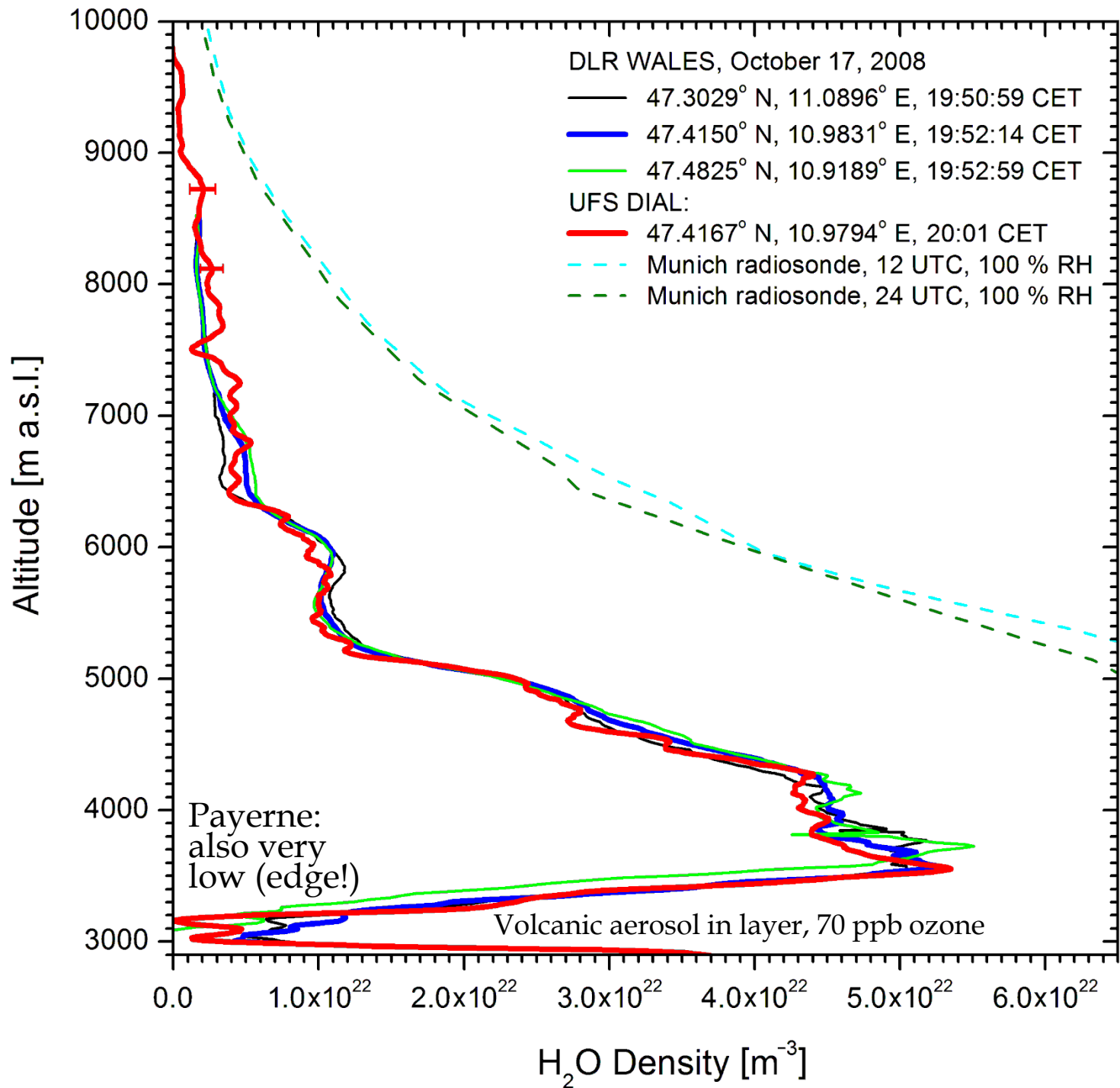


LUAMI

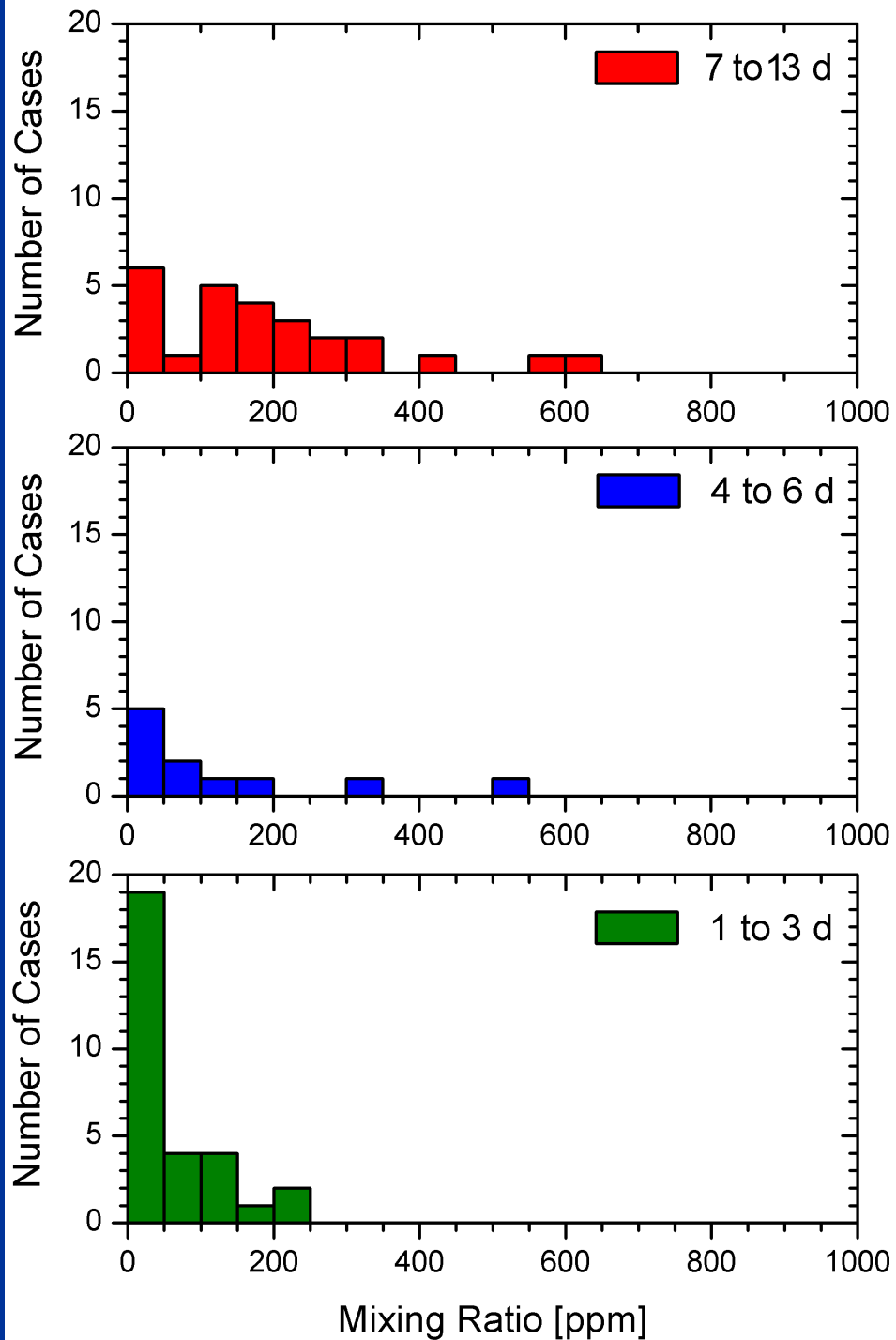
Oct. 17, 2008

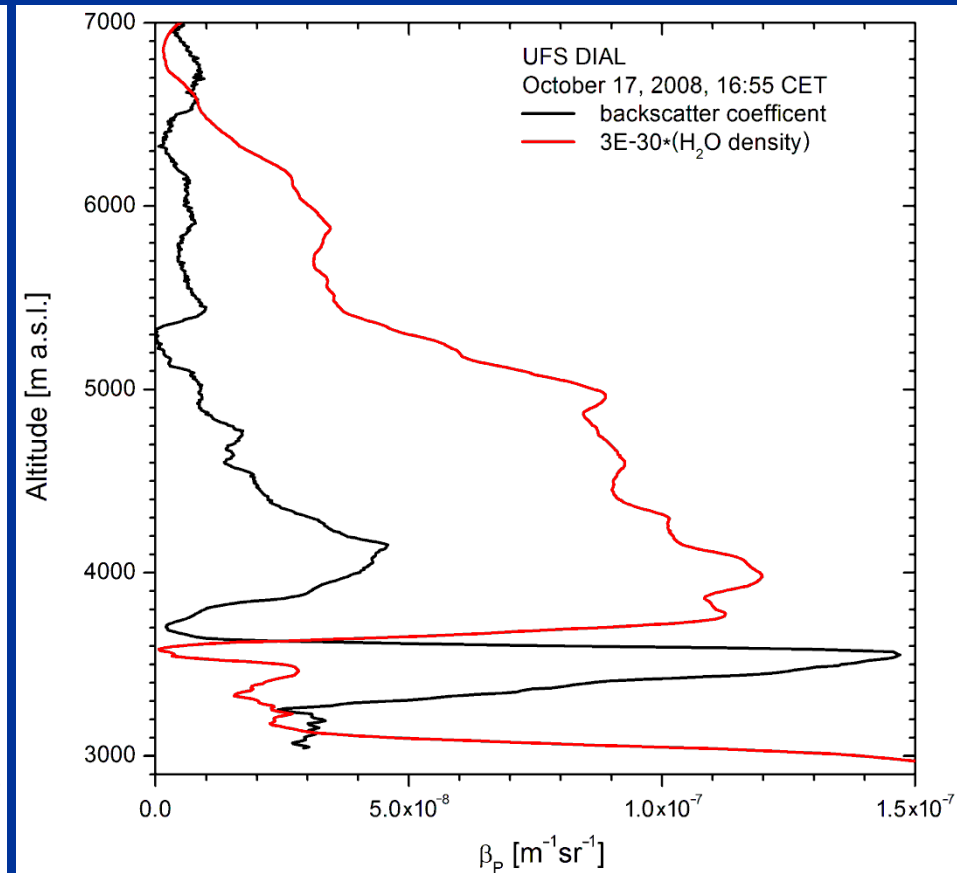
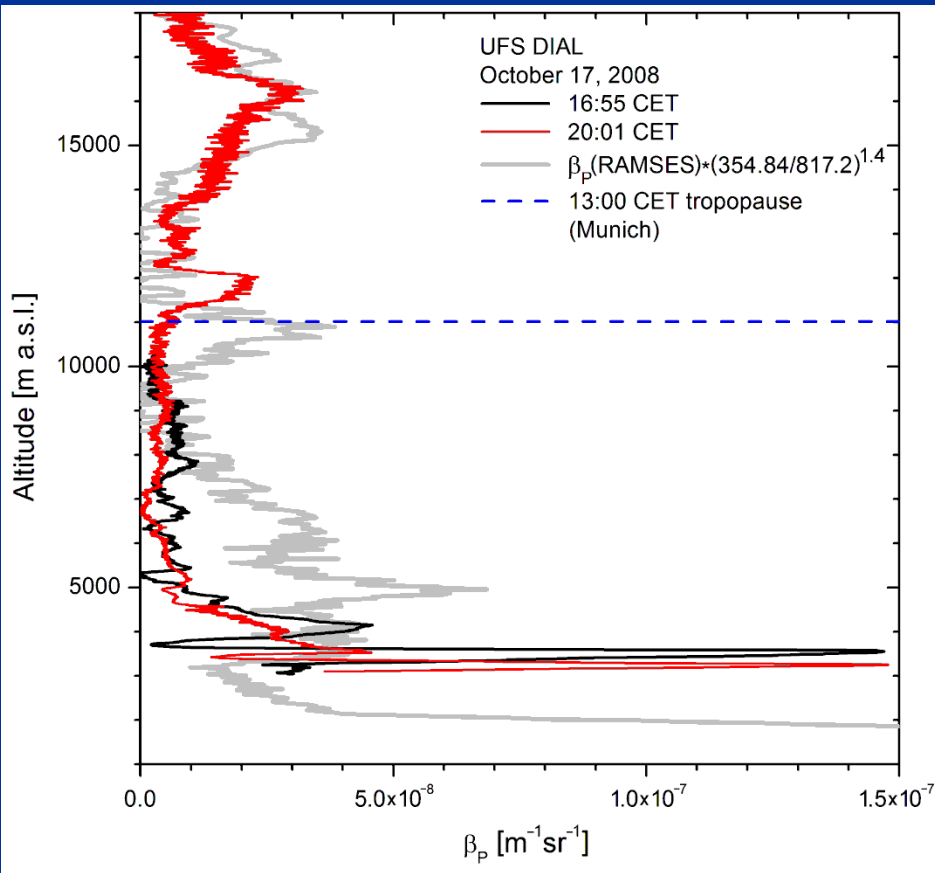






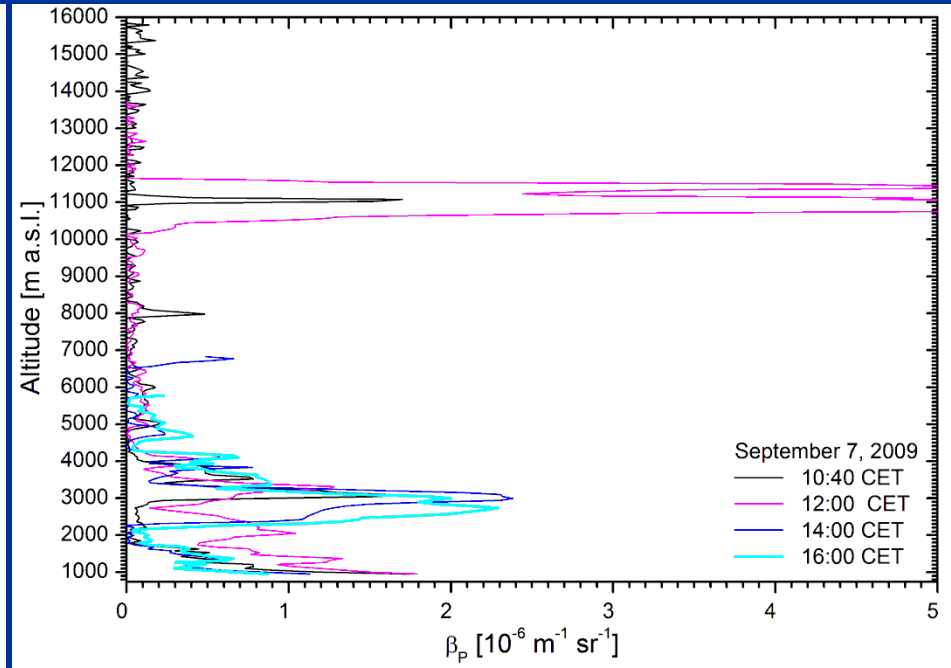
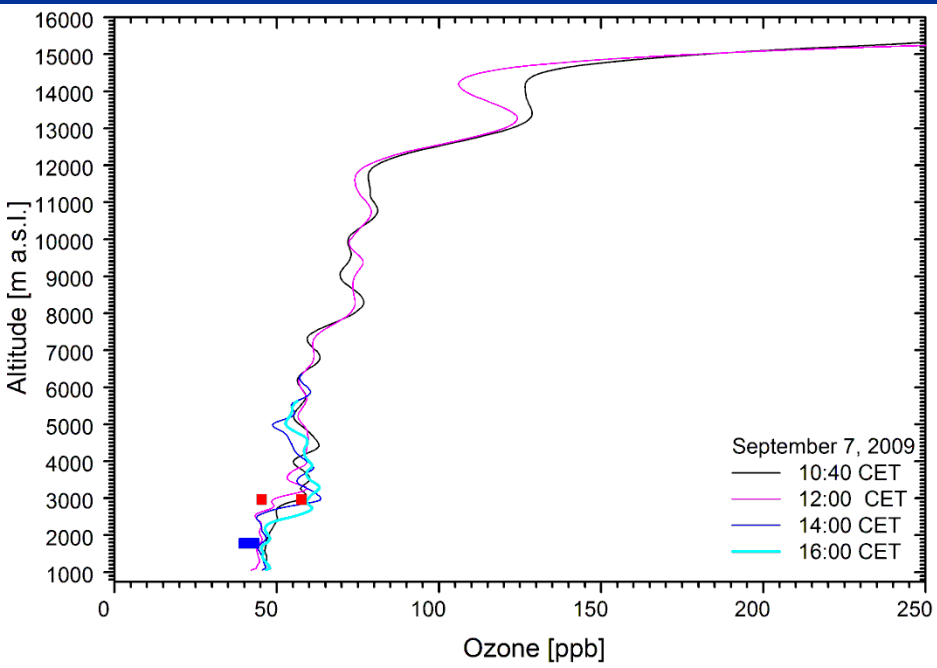
2004 – 2013



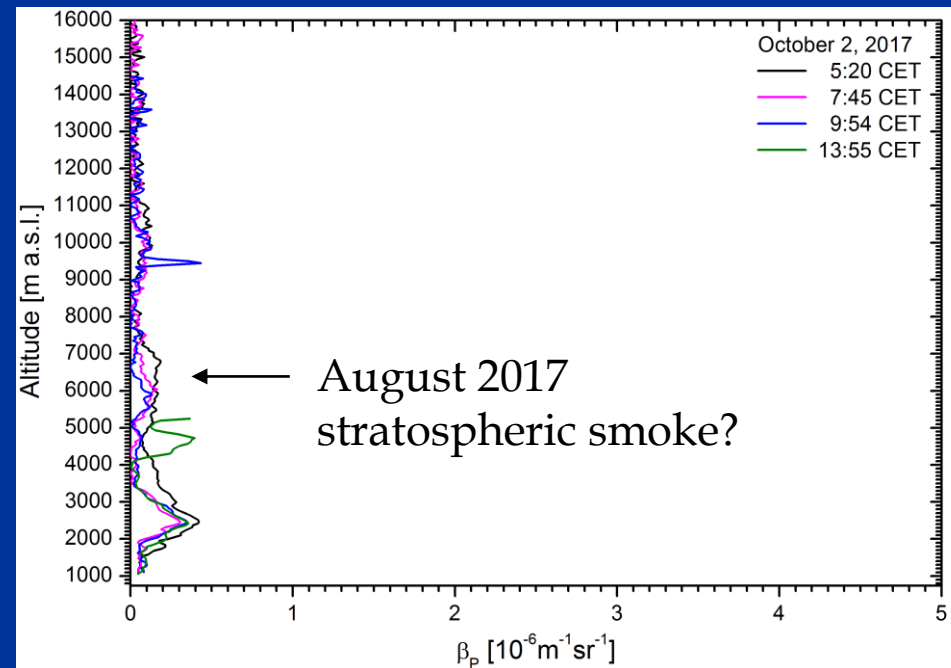
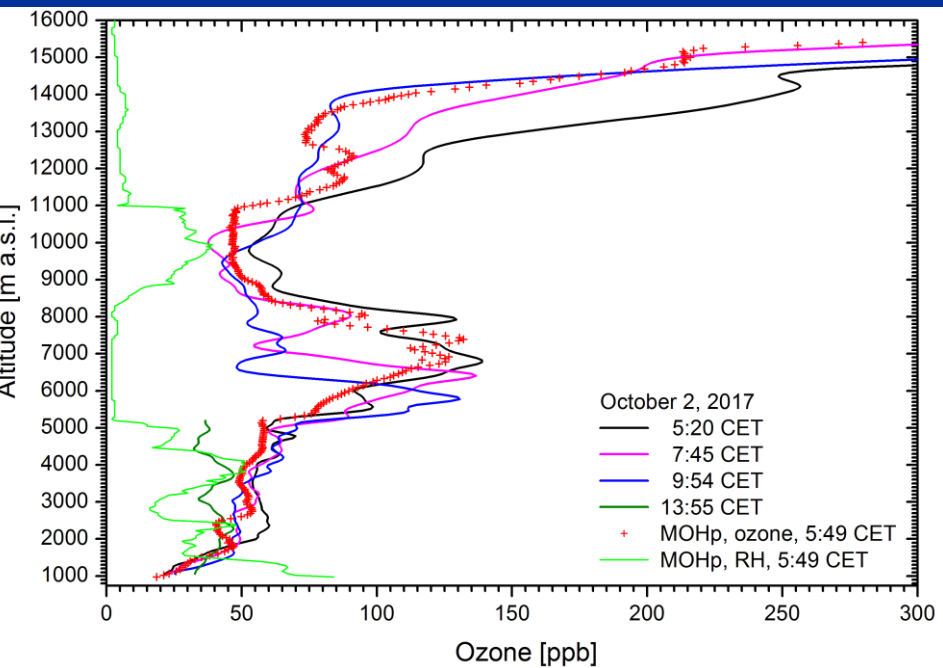


Trickl et al., ACP 2016

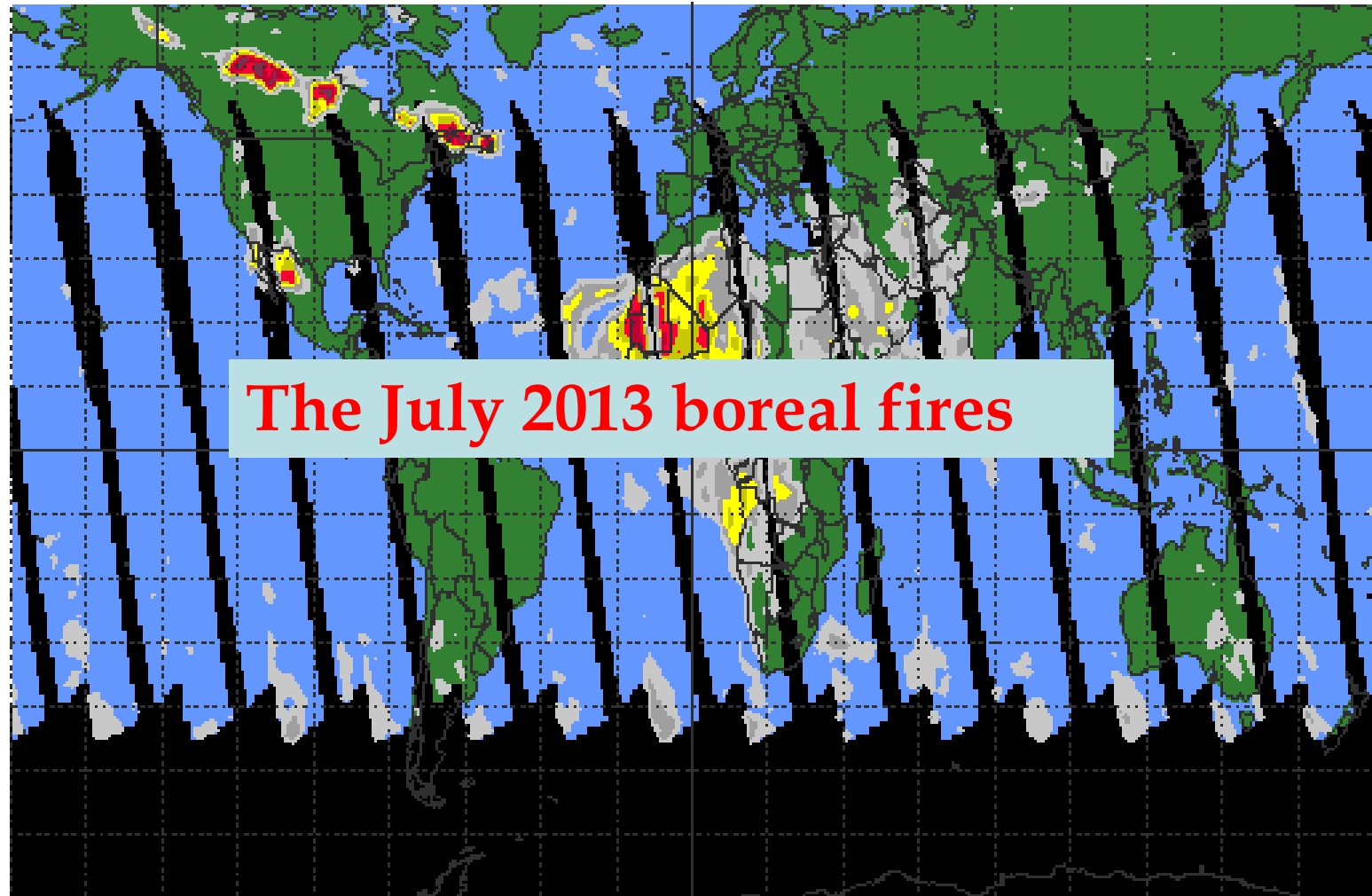
**Rising backscatter coefficients with growing altitude:
Cross section through UTLS in source region
transferred to Europe?**



Sarychev?



OMI Aerosol Index
on July 04, 2013

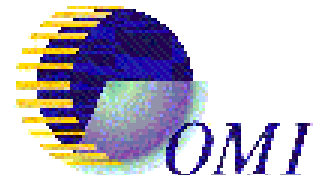
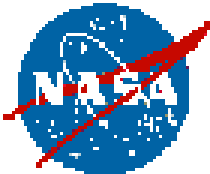


GSFC

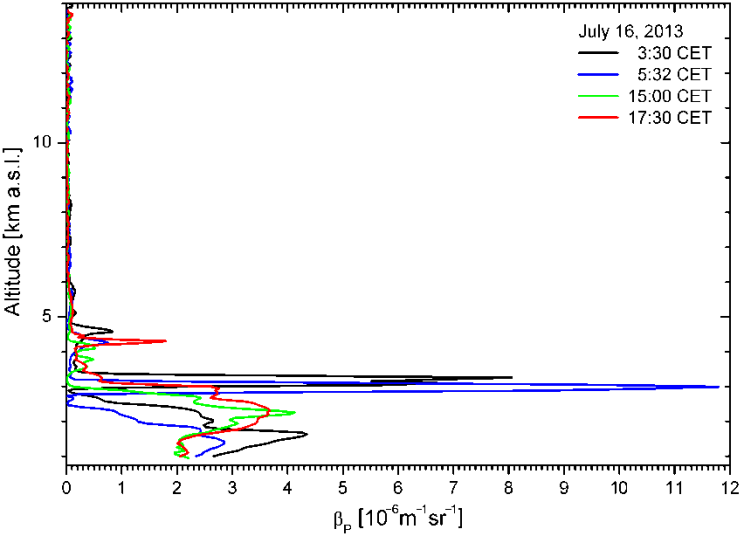
NIVR-FMI-NASA-KNMI



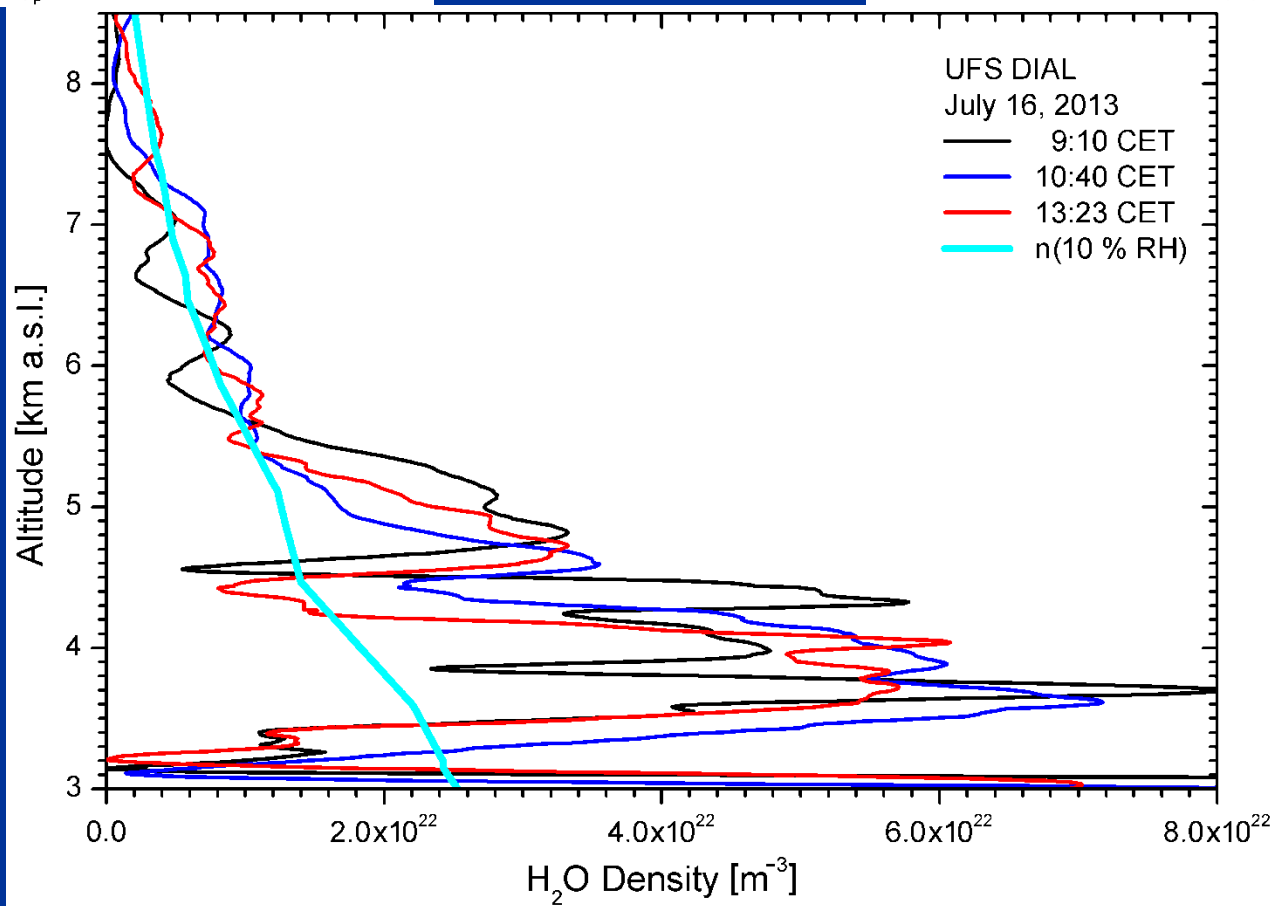
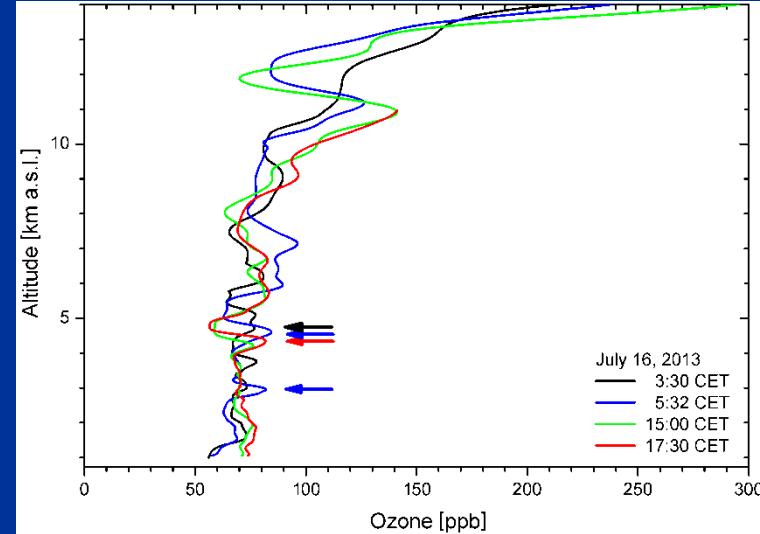
Aerosol Index



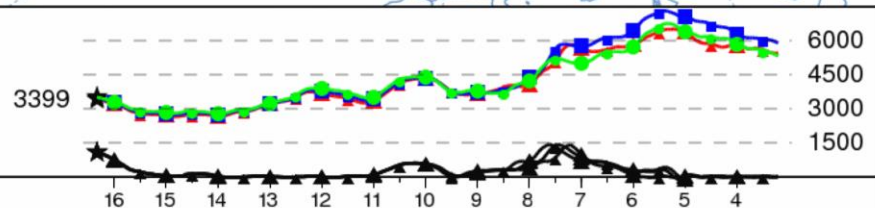
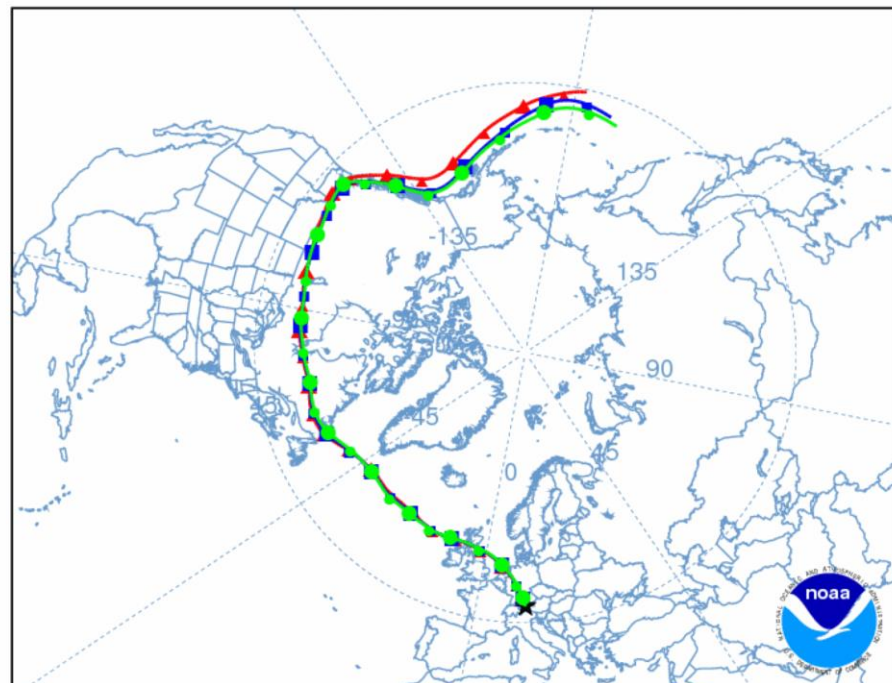




Trickl et al., ACP 2015



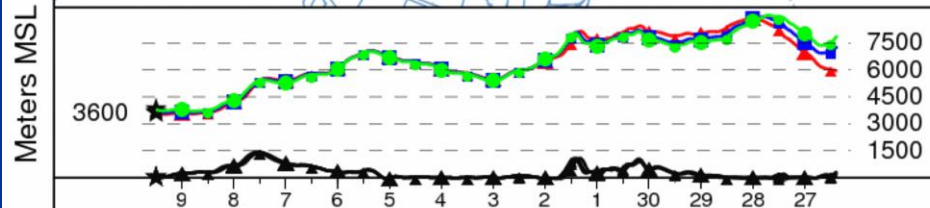
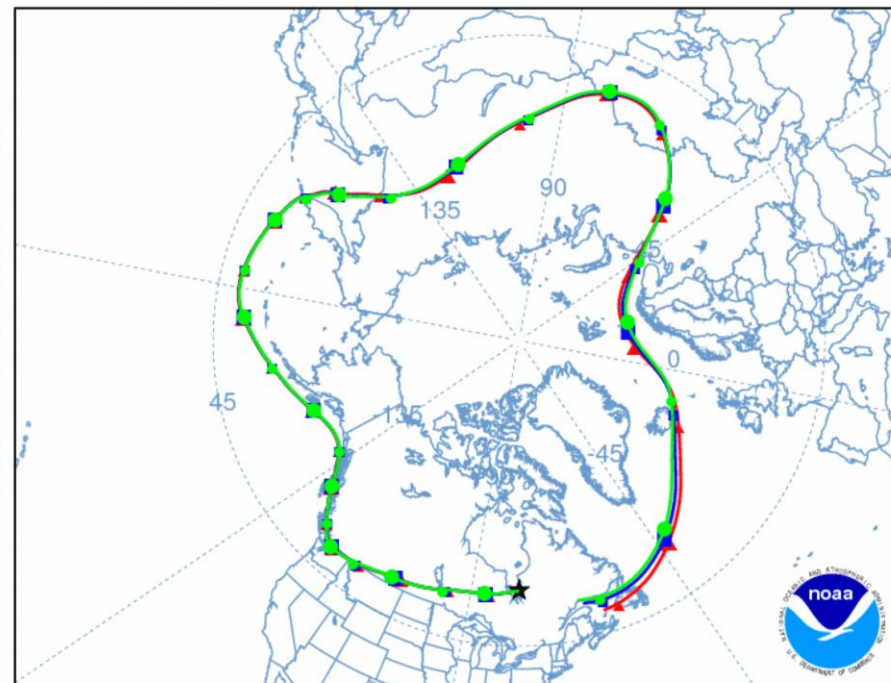
NOAA HYSPLIT MODEL
Backward trajectories ending at 0800 UTC 16 Jul 13
CDC1 Meteorological Data



Job ID: 160211 Job Start: Wed Aug 13 16:00:27 UTC 2014
Source 1 lat.: 47.477 lon.: 11.064 hghts: 3400, 3450, 3500 m AMSL

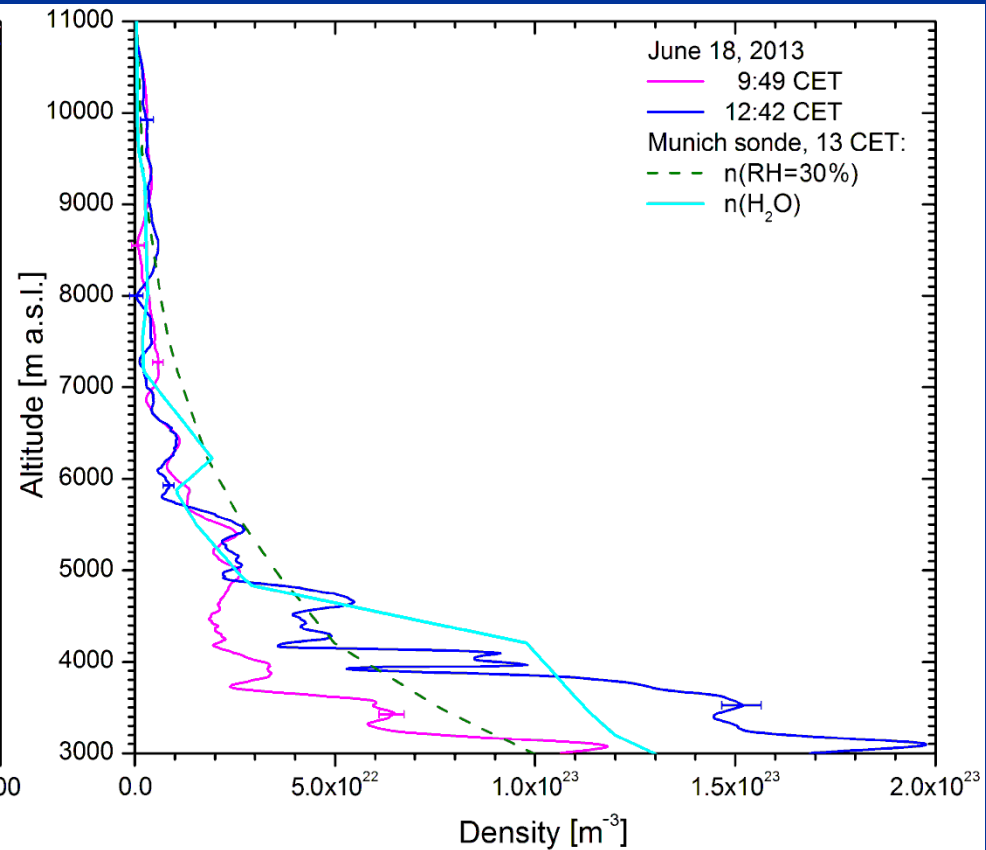
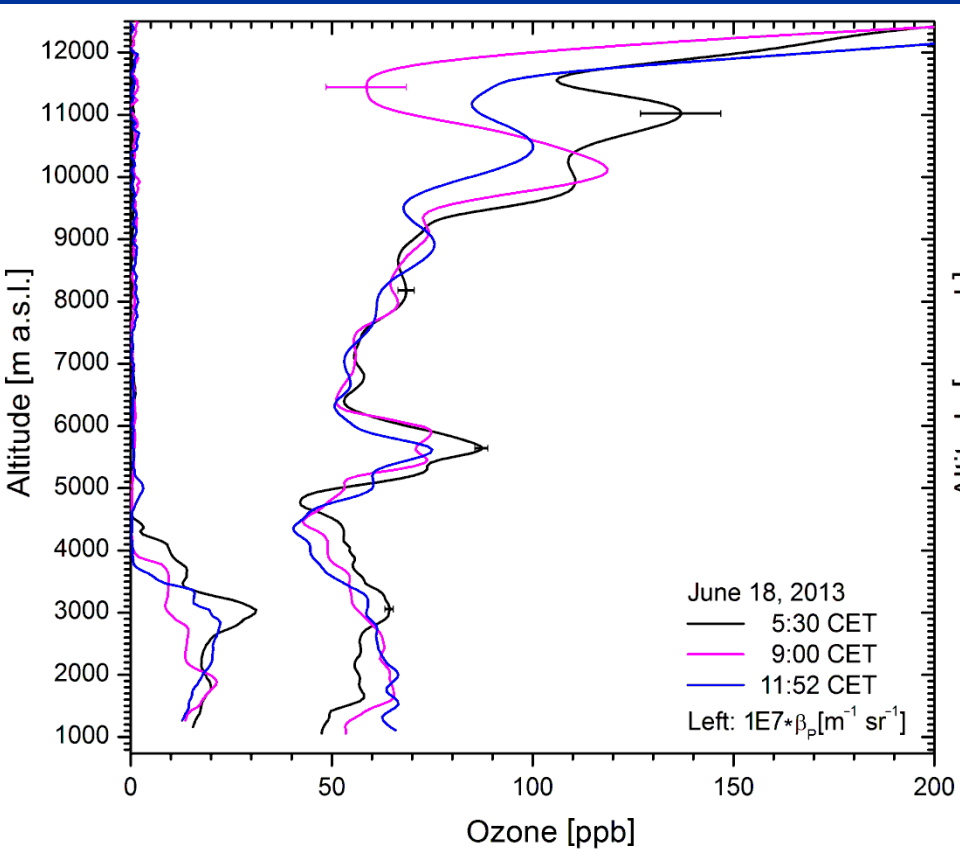
Trajectory Direction: Backward Duration: 315 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Jul 2013 - reanalysis

NOAA HYSPLIT MODEL
Backward trajectories ending at 1200 UTC 09 Jul 13
CDC1 Meteorological Data

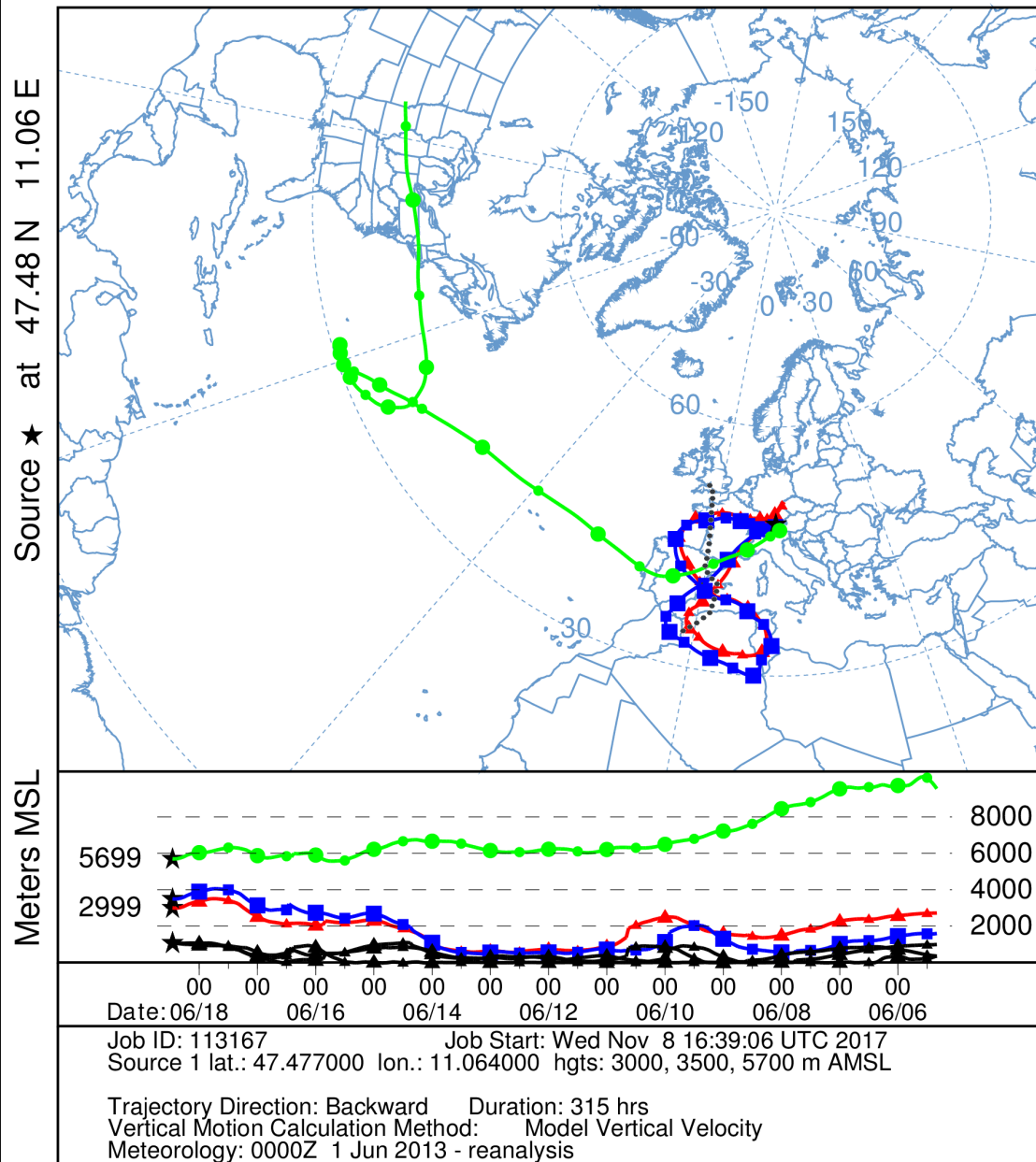


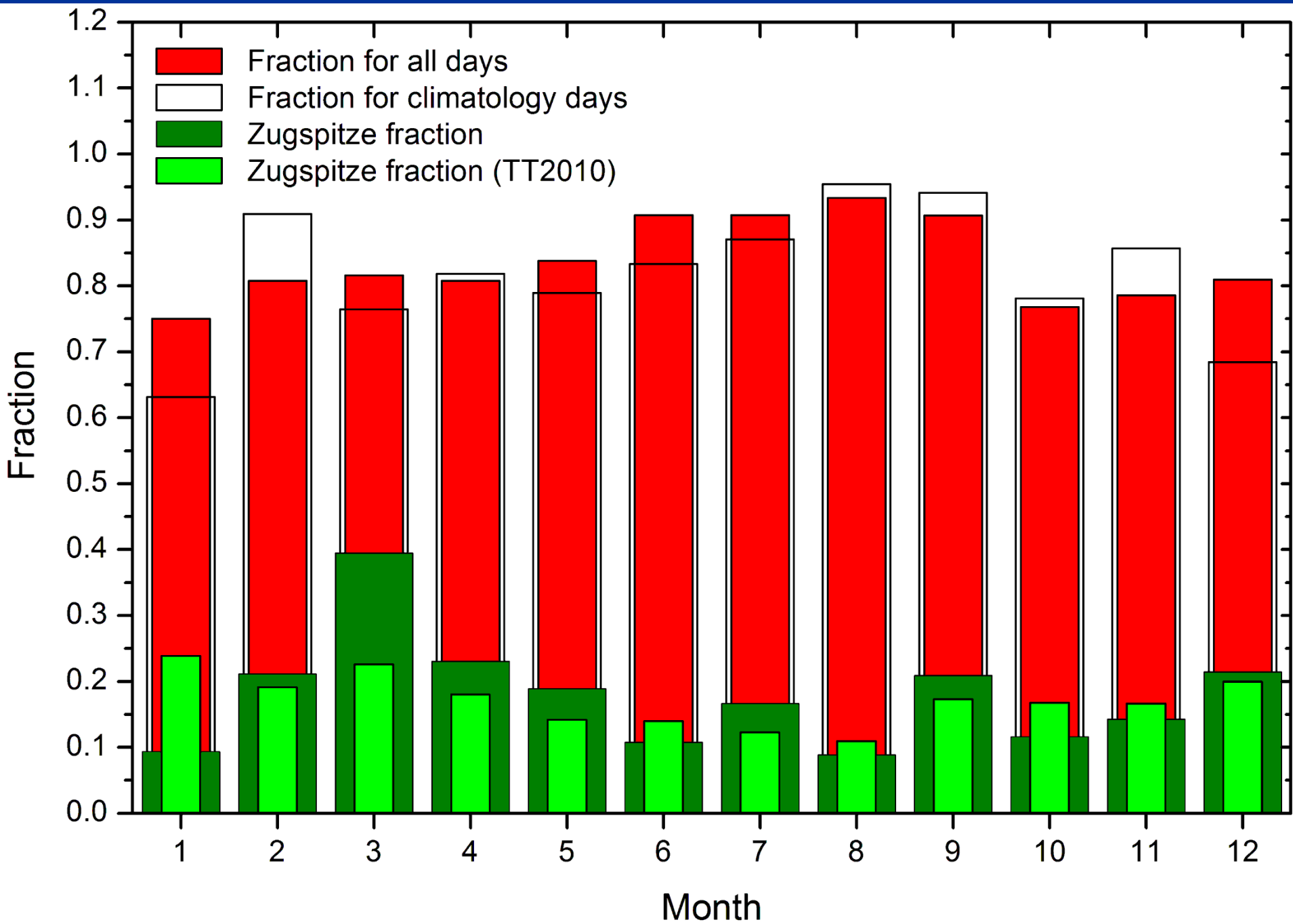
Job ID: 149747 Job Start: Wed Aug 13 14:08:13 UTC 2014
Source 1 lat.: 52.50 lon.: -79.2 hghts: 3600, 3700, 3800 m AMSL

Trajectory Direction: Backward Duration: 315 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Jul 2013 - reanalysis

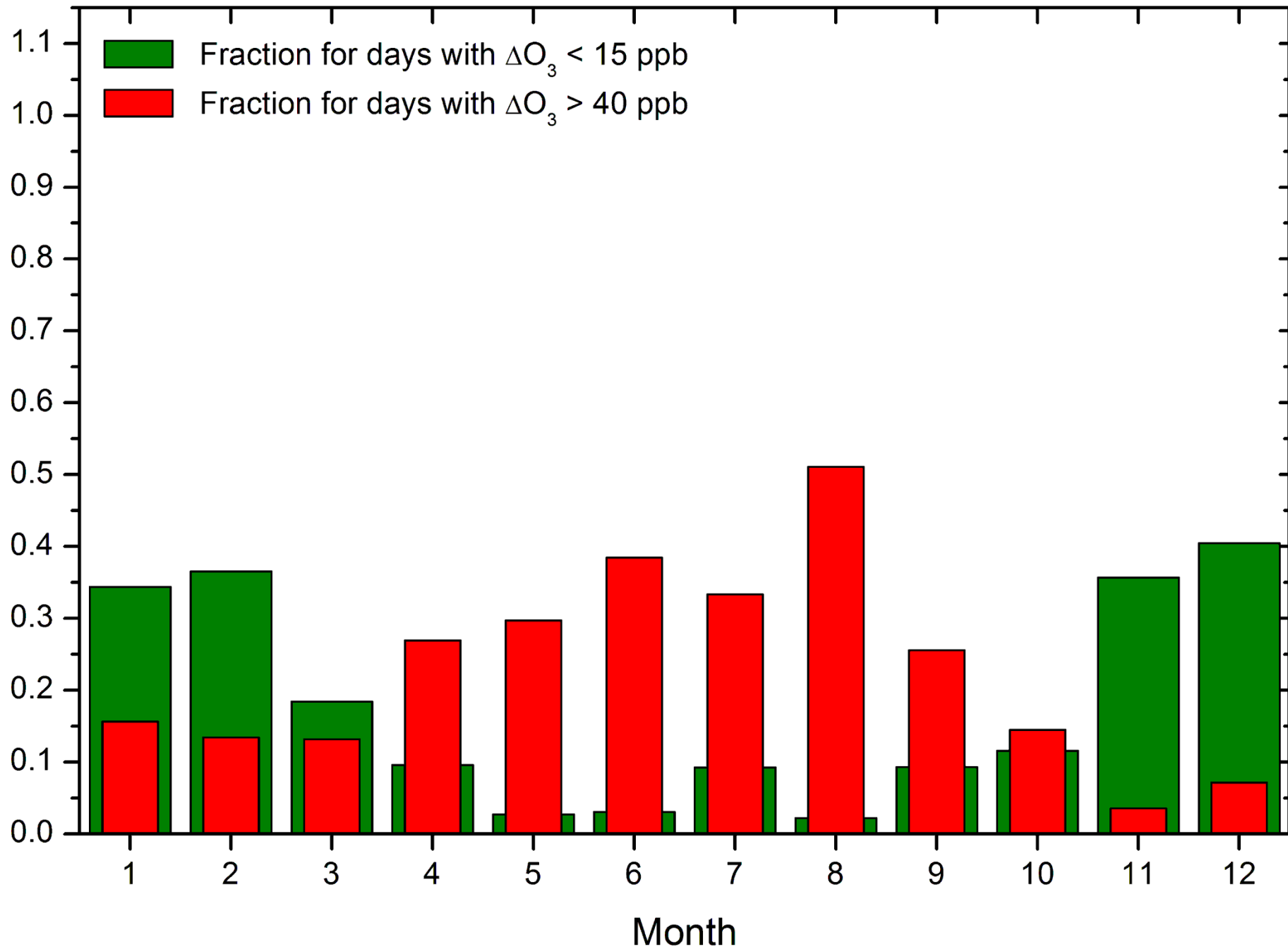


NOAA HYSPLIT MODEL
Backward trajectories ending at 1100 UTC 18 Jun 13
CDC1 Meteorological Data

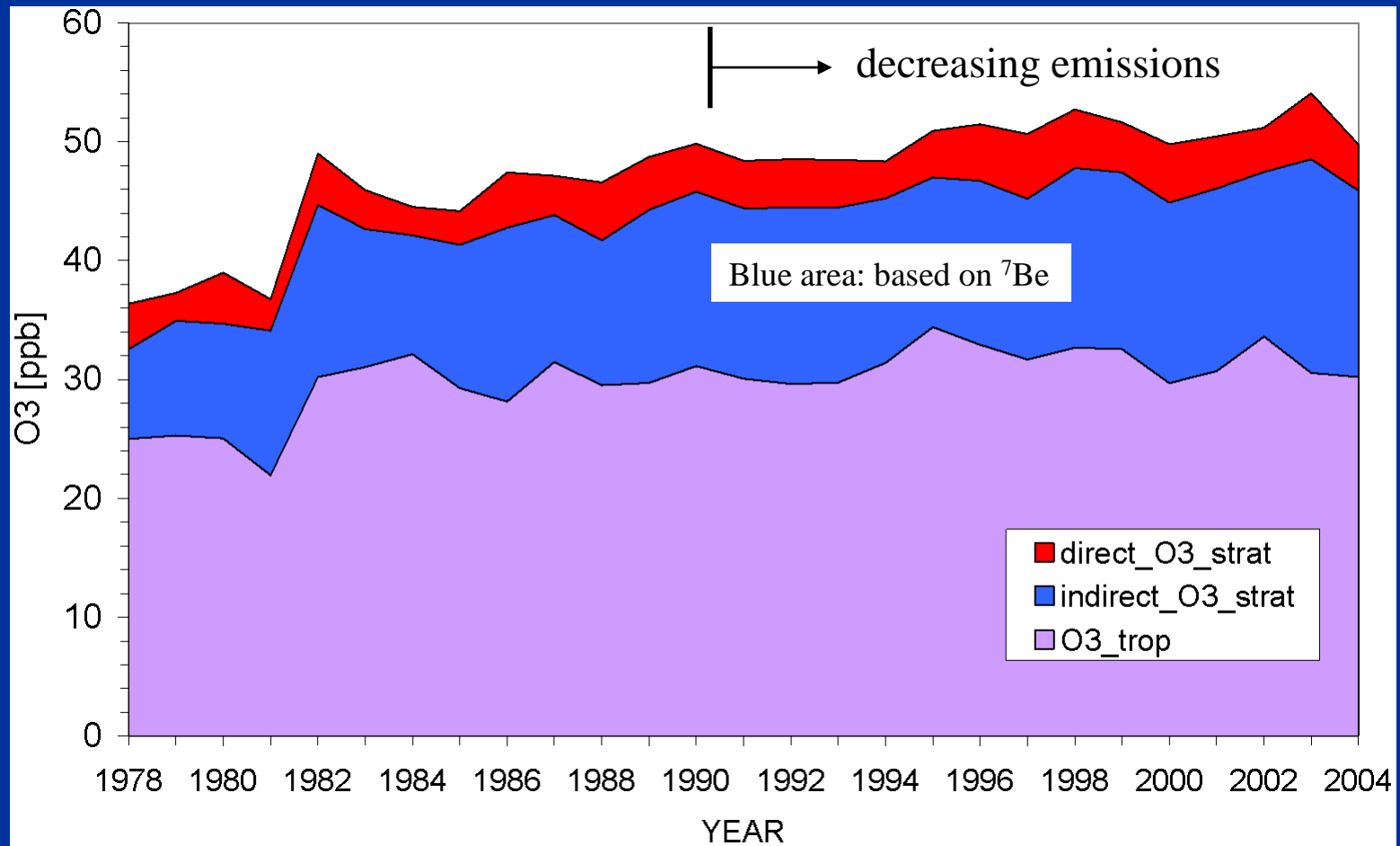




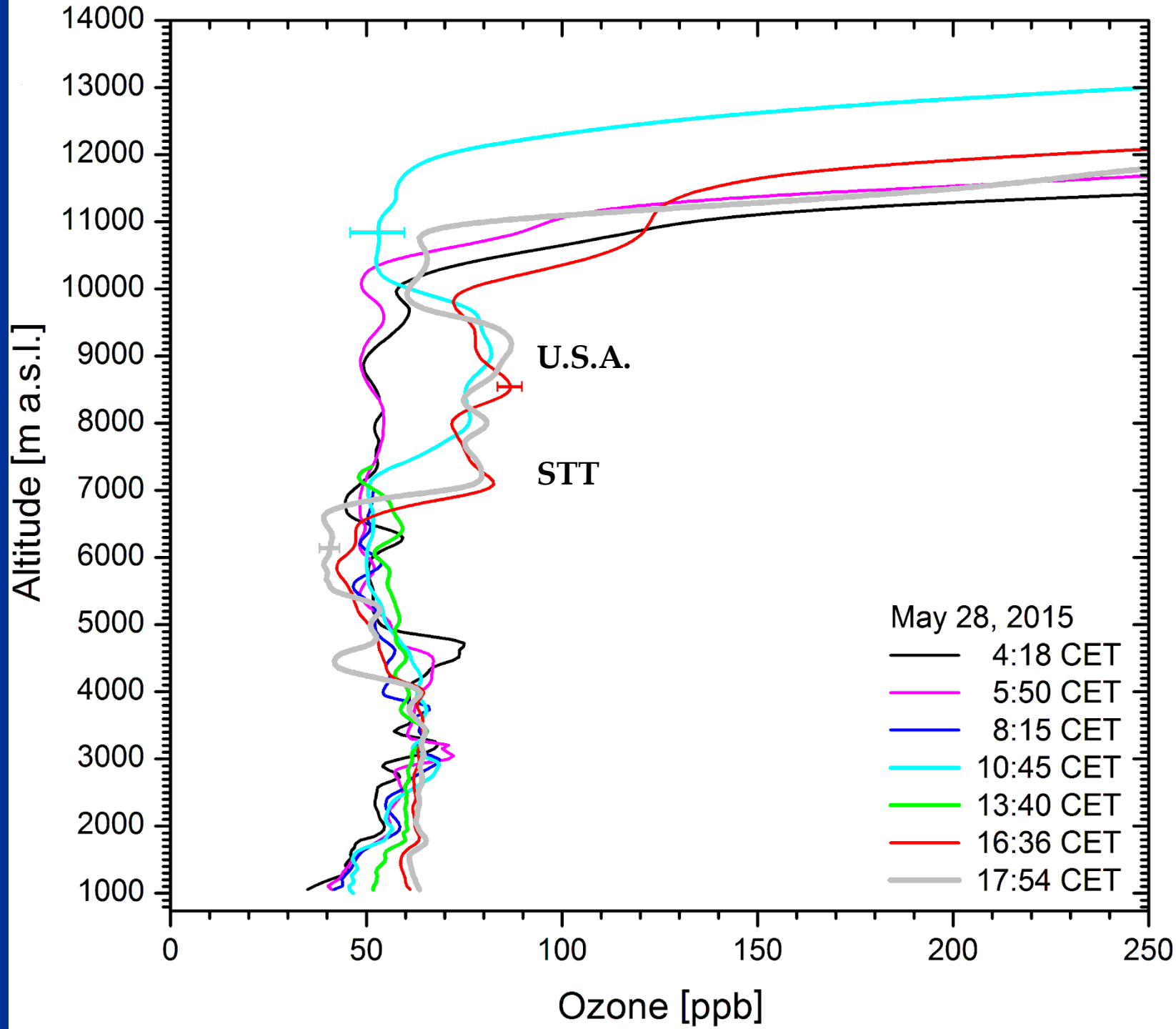
Fraction

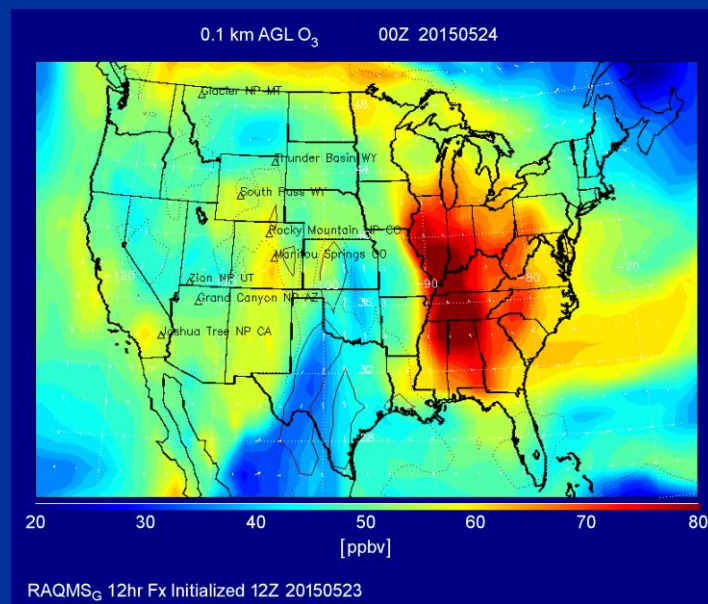


Zugspitze (H.-J. Kanter, H. E. Scheel; preliminary)

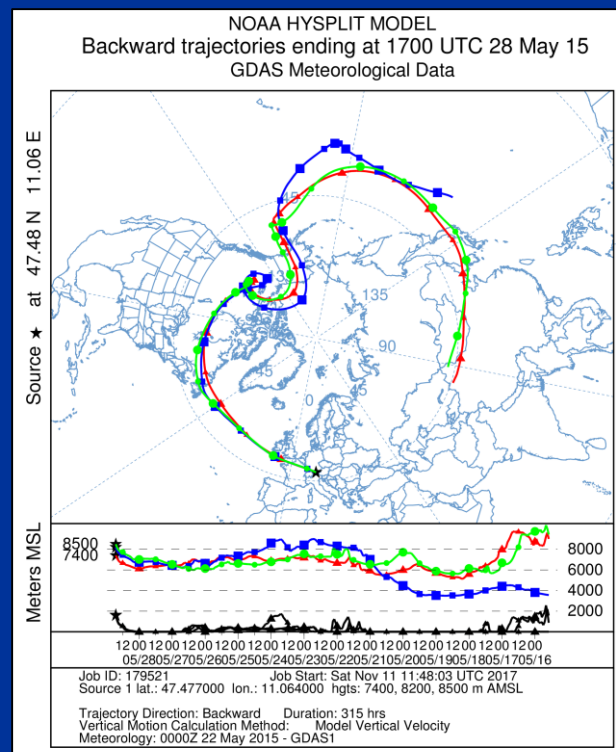
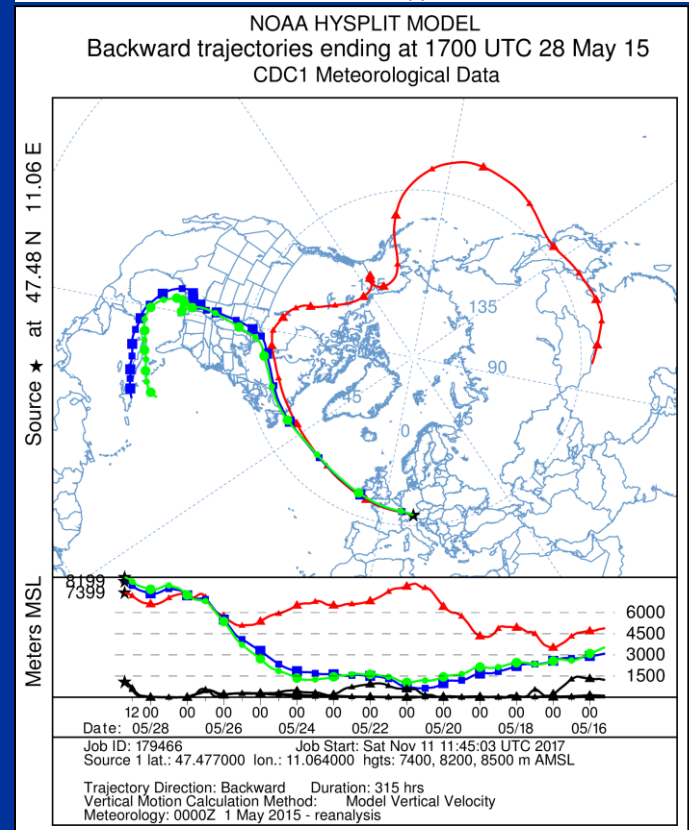


Roelofs and Lelieveld, 1997: **40 %** of tropospheric ozone is due to STT!





**B. Pierce
(NOAA)**





Thank you!