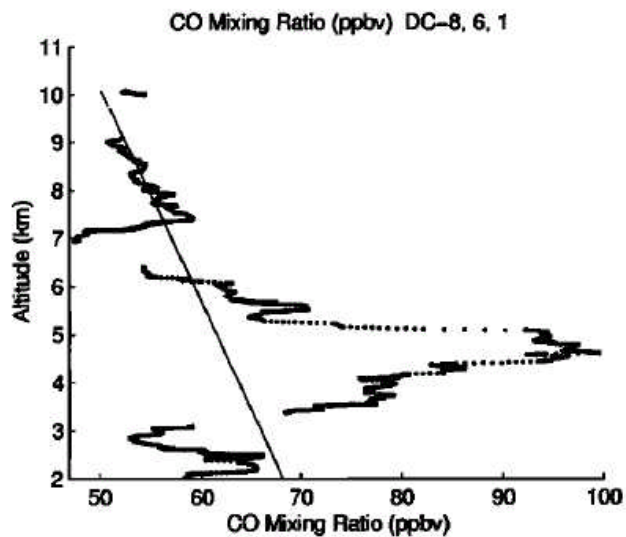
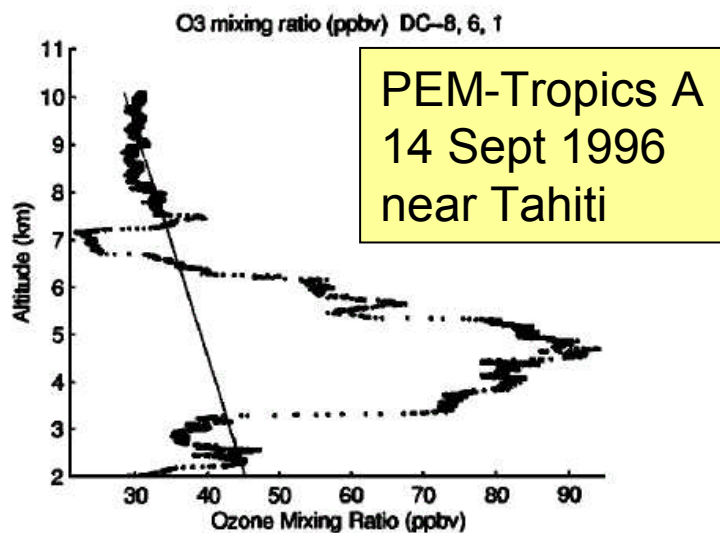


Long-range transport of biomass burning pollution

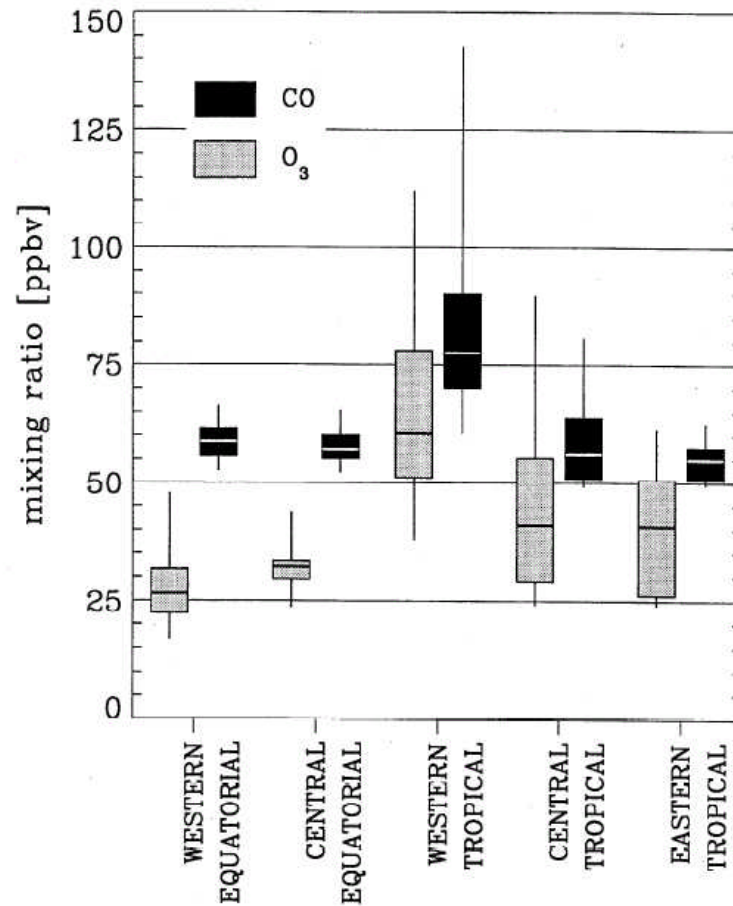
Martin Schultz

Forschungszentrum Jülich, Germany

Motivation

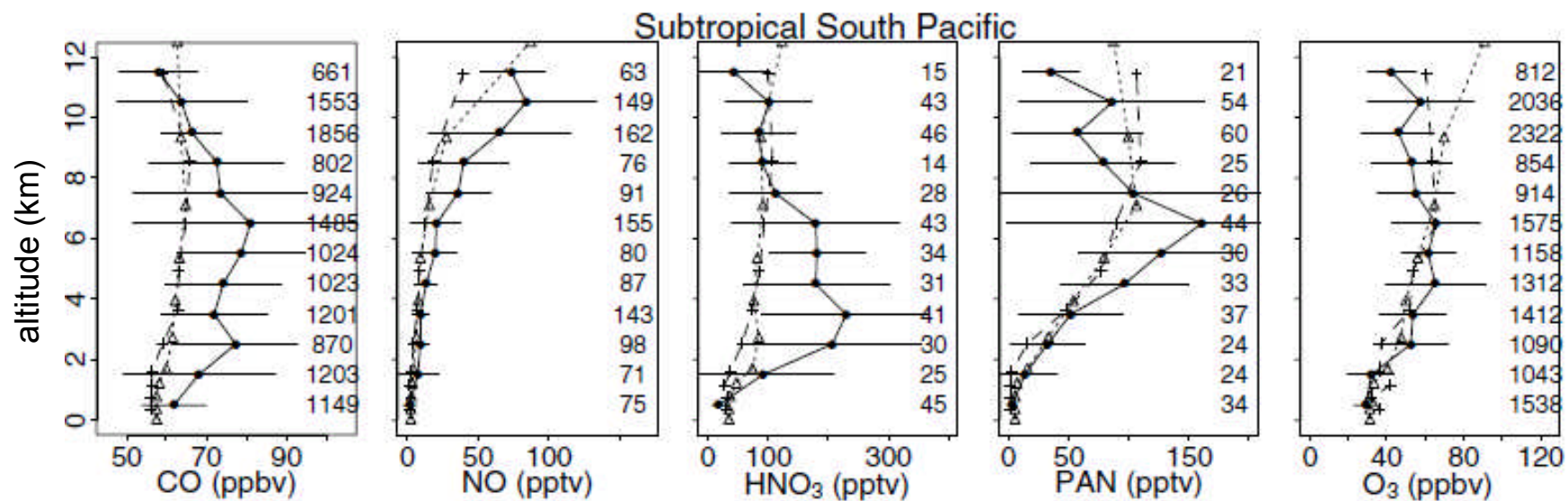


Stoller et al., 1999

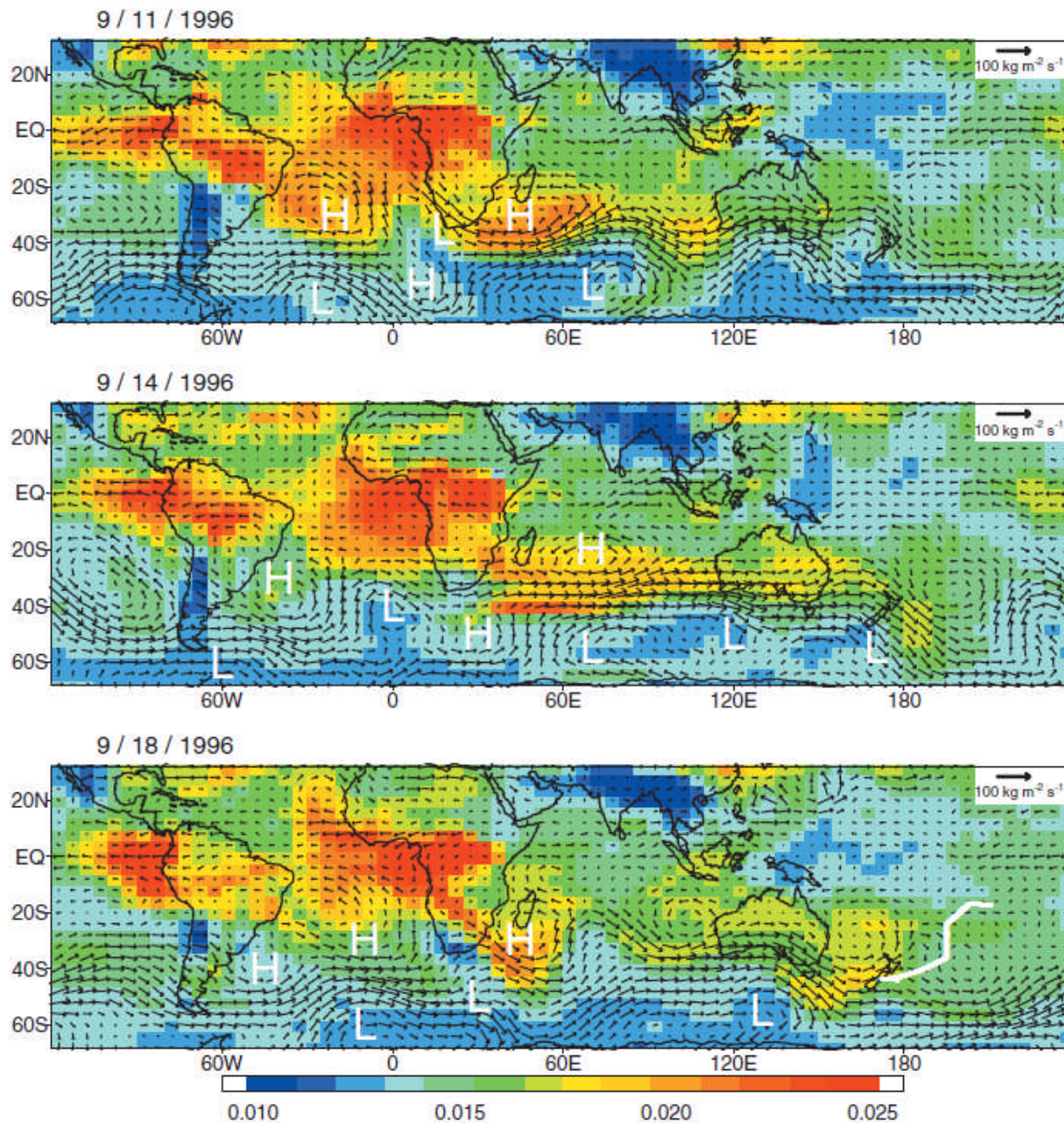


Schultz et al., 1999

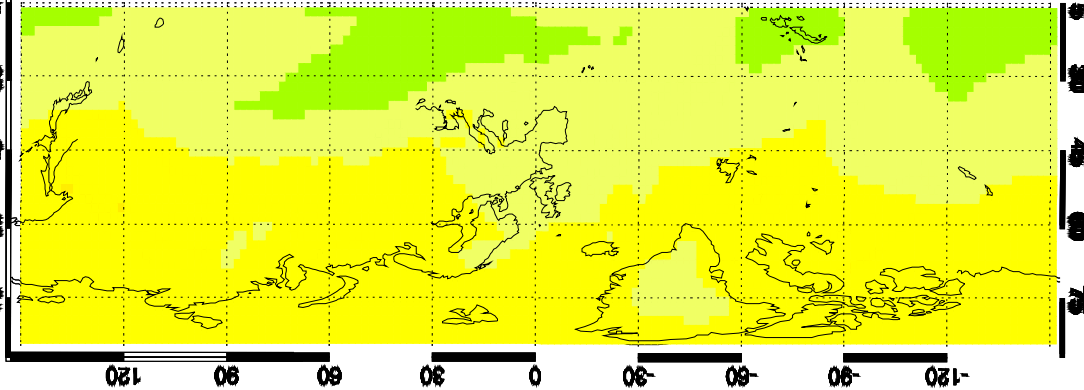
GEOS-Chem simulations of „the plume“



Staudt et al., 2002



Large impact of fire plumes in the UT over Asia & Canada identified in MOZAIIC data is not seen in MOZART-3



MOZAIIC CO
Summer 2003 (JJA)
UT (PV<2)

MOZART-3 CO
Summer 2003 (JJA)
350 mb level

MOZART-3 CO
Summer 2003 (JJA)
610 mb level

**Wrong LRT patterns
→ parametrisation of
injection height**

J.P. Cammas, A. Volz-Thomas
M. Schultz, O. Stein, K. Thomas

- MOPITT CO column
- △ GEOS-Chem BE
- △ GEOS-Chem Standard

Daily results averaged over the North Pacific

Siberia, Summer 2003

- POLDER AOT_{fine_865}
- △ GEOS-Chem BE
- △ GEOS-Chem Standard

- MODIS AOT_{fine_550}
- △ GEOS-Chem BE
- △ GEOS-Chem Standard

Set-up for the “Best Estimate”
(BE) simulation

Fire emissions are

- increased by a factor 3 in May
- prescribed on a daily-basis
- Injected up to 4.5 km in July and August

Siberian fire case study in GEMS

Siberian fire case study in GEMS

reanalysis 2

reanalysis 1

control run

Tracer signatures to trace-back emissions

Greenland firn/ice

fossil fuel combustion!

Biomass fires over Northern Canada in June-July 2004: Meso-scale modelling of convective events over Canada

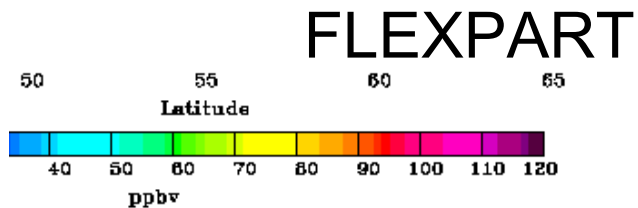
Height of convective clouds (km) from a model simulation with the Meso-NH model.

Mari, Cammas, 2007

Boundary layer tracer concentration (0-1) a few hours after initialisation in a zonal vertical cross-section. Other lines: 335K, 2 and 4 pvu, and 0°C.

Do pollution plumes in the free troposphere affect surface concentrations?

CONTRACE campaign: 19 Nov 2001, 12 UTC
meridional slice along 10°E



ECHAM5

Color scale not identical!

Conclusions

1. Long-range transport is frequent
2. Plumes clearly visible in FT in-situ data
3. Concerns about plume visibility in sat data (clouds)
4. Models seem to capture plumes qualitatively
IF injection height > 0 , fire data < 1 month
5. Data assimilation helps (in spite of 3.)
6. Vertical diffusion of plume unrealistic (PEM Tropics A case)
7. How much is exported, how much is imported into BL?
(scale issue?)