

Interactive comment on “Airborne in-situ measurements of vertical, seasonal and latitudinal distributions of carbon dioxide over Europe” by C. Gurk et al.

C. Gurk et al.

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Reply to anonymous referee #3

We thank the referee for her/his comments, which we have taken into account in a revised version of our manuscript. In detail, we made the following changes to address the points raised by the referee:

Specific: As suggested we added a sentence to the abstract to describe new findings: Modelling studies support the interpretation that altitude gradients of CO₂ are likely due to stratosphere-troposphere-transport.

7316L19: According to the latest IPCC report we have changed the average rate of

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annual increase to 1.9 ppm/year.

7317L8: we added e.g. ahead of the list of citations.

7318: Ambient air samples were not dried in order to permit additional H₂O measurements, but the air inside the analyser exposed to cabin air has been dried. Corrections for water vapour effects on CO₂ mixing ratios (i.e. interference, pressure broadening and dilution) were made after the flights based on the H₂O reading of the monitor.

7321L24: We changed the statement to: in particular during April 2003.

7322L2-3: The tropopause height was determined from the 2 PVU surface. We modified the text by adding: (determined as the 2 PVU surface with 1 PVU = 10⁻⁶ m²s⁻¹Kkg⁻¹)

Contribution of Asian air masses: The discussion of long-range transport of Asian air masses in Fischer et al. was based on tagged CO tracers in the 3D-chemical transport model MATCH-MPIC. This is the only tracer in the model with a source specific characteristic, other tracers, in particular for CO₂, have not been calculated. Thus it is not possible to transfer the results obtained for Co to CO₂.

7323: The SPURT N₂O data indeed support the 2 PVU definition for the TP height, as do a large number of other tracers (CO, O₃, H₂O and NO_y). In general the chemical and the dynamical tropopause are in good agreement.

7324: A detailed description of the GLOBALVIEW data products and its use as a marine boundary layer reference value can be found in the paper by Masarie and Tans, that has been cited in the manuscript and on the GLOBALVIEW www-page. Indeed, the GLOBALVIEW products are derived from observations but contain no actual data. Nevertheless the products are based on observations within the marine boundary layer, that have been latitudinally and weekly averaged to produce a proxy for the background atmosphere.

We prefer not to add an additional figure with the locations of the refuelling locations.

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This has been already given in the paper by Fischer et al. that has been published in ACP and is freely accessible from the www.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 7315, 2008.

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