

Interactive comment on “1997–2007 CO trend at the high Alpine site Jungfraujoch: a comparison between NDIR surface in situ and FTIR remote sensing observations” by B. Dils et al.

Anonymous Referee #2

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Overall, this is a useful and potentially publishable paper addressing the comparability of two complementary measurements of CO at Jungfraujoch and the reasons for differing trends being derived from each instrument. The following comments are offered to potentially clarify and improve the work.

(1) The description of the humidity correction (section 4.2) needs some clarification. Is the variation of MeteoSwiss RH along the actual (generally slanted) pathway of the FTIR sounding used, or just the vertical variation above Jungfraujoch? How is the information in the averaging kernels applied?

(2) While the air mass measured by the FTIR is well defined, the air mass effectively

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measured by the NDIR is not (unless observational information on the boundary layer height above the Jungfraujoch is available). Some comment on this should be added to section 4.3.

(3) The text should be made clearer about whether the filtering methods used (sections 4.3–4.5) lead to simple rejection of anomalous (“polluted”) data, or replacement of this data by estimates of the “non-polluted” values.

(4) The term volume mixing ratio (vmr) is used throughout, but both of the optical instruments are presumably measuring mole fractions (which would equal vmr only for ideal gases).

(5) The calculation of back trajectories over 20 days (section 5) is pushing well beyond the synoptic (about 7 days) period over which these trajectories are generally considered reliable (due to the poor model simulation of fronts and convective events occurring during such back trajectories). The use of ensembles of back trajectories does not necessarily remove this problem. At the very least, the validity and accuracy of the trajectory procedures used needs to be discussed. The claim that Jungfraujoch data yield reliable emission estimates for Asia and Africa is particularly dubious.

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