**Atmospheric
Chemistry
and Physics
Discussions**

Interactive
Comment

Interactive comment on "Analysis of stratospheric NO$_2$ trends above Jungfraujoch using ground-based UV-visible, FTIR, and satellite nadir observations" *by* F. Hendrick et al.
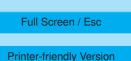
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Received and published: 29 June 2012

General comments:

The authors present a trend study of NO2. The study is based on consolidated long term data sets from ground-based measurements. Furthermore, satellite data from different sensors are merged after validation with ground-based data set from SAOZ. The derived trends are consistent among the various data sets. The trends are discussed in the context of trends of other species. This topic, quantification and understanding trends of atmospheric constituents is an important scientific issue. The subject is fully appropriate for publication in ACP. I recommend publication after minor revisions.

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Specific comments:

Chapter 2.1: While for FTIR and satellite data an error estimate is given, it is missing for SAOZ observations.

In Chapter 4.1 the formula by Weatherhead et al. 1998 is given which allows one to calculate the length of the data set needed to derive a statistically significant trend. Did you calculate this and how does this value compare to the time series used (see also comment to chapter 4.2).

Chapter 4.2: Maybe, you can add tB values as defined by formula (5) in Tab. 1 to show directly which trend is significant within the 95% confidence level.

To calculate tB sigmaB is used which presumably has been calculated according to formula 4 (Weatherhead et al., 1998). How did you estimate the autocorrelation of the data set? Did you use the same data set or an independent one (e.g. from model data)?

While trends derived from SAOZ and FTIR time series are significant on the 95% confidence level, the trend from satellite data is not. In other words, the period of the time series of satellite data is still too short for a significant (95% conf.) trend detection. Using formula 4 (Weatherhead et al., 1998) you might calculate the length of the data set needed to derive a statistically significant trend.

Typos/minor corrections:

p. 12362: considered => considered as

p. 12371:

- N2 Oof => N2O of

- N2 Otrends => N2O trends

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 12357, 2012.

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