

Interactive comment on “Technical Note: New trends in column-integrated atmospheric water vapor – Method to harmonize and match long-term records from the FTIR network to radiosonde characteristics” by R. Sussmann et al.

Anonymous Referee #2

Received and published: 21 August 2009

Technical note by Sussmann et al. describes retrieval of integrated water vapour using FTIR data. It is a good technical note and the data set would be useful once they apply their method to all available stations in the network.

Comments:

Title —

Trend in IWV is only a short section of the paper, so that cannot be title of the paper. The paper is mostly about getting IWV from FTIR measurements, so please change

C4086

the title to match with content of the paper. I would suggest something like: "Tech Note: A method to harmonize and match long-term records of integrated water vapour from the FTIR network to radiosonde characteristics"

Abstract —

P 13201, L1 - I do not think that the paper is about retrieving IWV trend, but retrieving IWV, so please correct it.

Introduction —

P 13201, starting L15: Is IWV the key climate variable? If one says water vapour is a key climate variable, that is more correct. Positive feedback of water vapour makes water vapor a key climate variable, but most of this feedback is originated from mid or upper troposphere where as IWV is dominated by water vapor in the lower troposphere. Also, getting IWV correct in climate models does not guarantee that the magnitude of water vapor feedback is correct. Again, IWV is not an input parameter for climate models. So, please correct these things in the first paragraph of introduction.

Another issue I have is to optimize retrievals based on radiosonde values. Radiosondes have know dry bias for cold and dry conditions where the two FTIR stations used in this study are located. How does this affect on the retrieved IWV? Have you tried to do a similar analysis for a station in different climate condition? (e.g., station close to mean sea level.)

What does harmonization scientifically mean? Is it homogenization? One might think that this is removing discrepancies between discussed data sets. Are there any changes to instrument measuring at a particular station which can introduce change points in the time series?

What does it mean by "complementing radiosonde data"? It is very well known that radiosondes have different kinds of biases and spurious changes over time, thus they are not reliable for climate trend analysis. Durre et al., 2009 look at trends in IWV

C4087

using radiosonde data (Note that they used only surface to 500 hPa IWV to avoid lower quality humidity at higher levels).

The argument for no trend at Jungfraujoch is not consistent with previous results. There are studies showing specific humidity increase even in the upper troposphere (e.g., Soden et al., 2005) so one should expect the same for 3.5 km. Is it possible to check how surface temperature is changing for this station and how IWV is co-varying with it?

Is temporal sampling poor for both stations during the first few years? Does it affect the trend analysis? It looks like the time series miss higher values during the first 5 or 6 years.

Wouldn't it be better to remove seasonal cycle before doing trend analysis?

Durre, I., C. N. Williams Jr., X. Yin, and R. S. Vose (2009), Radiosonde-based trends in precipitable water over the Northern Hemisphere: An update, *J. Geophys. Res.*, 114, D05112, doi:10.1029/2008JD010989.

Soden, B. J., D. L. Jackson, V. Ramaswamy, M. D. Schwarzkopf, and X. Huang, 2005: The radiative signature of upper tropospheric moistening. *Science*, 310(5749), 841-844.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 9, 13199, 2009.