We would like to thank the reviewer for useful comments. In the following we answer the specific comments (included in “**boldface**” for clarity) and, whenever required, we describe the related changes implemented in the revised manuscript.

Anonymous Referee #1

GENERAL COMMENTS:

The paper describes the CCl4 VMRs as derived from the MIPAS instrument using the ESA V7 data set. This data set is validated against independent measurements and used to determine trends and lifetime of this trace gas, which are consistent with other recent estimates. The paper is very well written and its scope fits well into AMT. However, there are some questions that should be clarified before publication.

SPECIFIC COMMENTS

page 9, Figure 4: **The lowermost values at several latitude bands exhibit drastically increased VMRs (compared to values above and beside). Are these values typical for deep tropospheric VMRs or could, e.g., (undetected) thin clouds or stray light have affected the measurements? Would filtering these extreme values affect the trend analysis in a positive or negative way?**

The VMRs at lowermost pressure levels can be affected by the presence of thin clouds causing extreme values and more scattered monthly mean time series. Nevertheless the fit is able to manage these values. In these cases the quality of the fit is poor and the chi-squared is greater. Large chi-squared values imply large uncertainties on the trend and small significativity. Fig’s. 11 and 12 clearly show this effect: at lowermost pressure levels the uncertainty is larger and the significativity is smaller as compared to the values at higher altitudes.

page 12, line 21ff: **It is not fully clear what the discussed quantities of Fig. 6 and 7 are. I assume that the blue curves are simply the sum of the errors of the two**

individual instruments? Or was the precision as a random error summed in the square? This is rather elaborately described for the ACE-FTS instrument following this section but missing here. Further I do not fully understand the distinction between the standard deviation "sd" of the differences and the error bars on the mean. How was the standard deviation of the mean computed? By dividing the standard deviation of the differences by the square root of measurements? Or was a jackknife-like algorithm employed? Further, was the standard deviation of the differences computed with an assumed mean of zero? Otherwise, shouldn't those standard deviations be plotted relative to the mean instead of the zero line?

In the revised paper we included the following additional description in the caption of Fig. 7: "The plots show mean absolute and relative VMR differences of trajectory match collocations (red numbers) between both MIPAS sensors (red solid line) including standard deviation of the difference (red dotted lines) and standard error of the mean (plotted as error bars). Precision (blue dotted lines), systematic (blue dash-dotted lines) and total (blue dashed lines) mean combined errors calculated according to the error summation $(err_{MIPAS\text{-}E}^2 + err_{MIPAS\text{-}B}^2)^{0.5}$ are displayed, too. For further details on the error calculation, see Wetzel et al. (2013)."

The standard deviation of the differences is not computed with a zero mean but with the actual mean. Anyhow, it makes sense to plot it relative to the zero line such that it is directly comparable to the precision.

Caption Figure 8: Same as Figure 7 but for the OR part of the MIPAS mission.

We also added the following reference:

Wetzel, G., Oelhaf, H., Berthet, G., Bracher, A., Cornacchia, C., Feist, D. G., Fischer, H., Fix, A., Iarlori, M., Kleinert, A., Lengel, A., Milz, M., Mona, L., Müller, S. C., Ovarlez, J., Pappalardo, G., Piccolo, C., Raspollini, P., Renard, J.-B., Rizi, V., Rohs, S., Schiller, C., Stiller, G., Weber, M., and Zhang, G.: Validation of MIPAS-ENVISAT H_2O operational data collected between July 2002 and March 2004, Atmos. Chem. Phys., 13, 5791-5811, doi:10.5194/acp-13-5791-2013, 2013.

page 23, Table 3: **What are the pressure levels chosen for the MIPAS data? At -45 degree latitude, the significance of the data is reduced at 200 hPa and below. I am not sure that I can identify the box with a trend of 25 pptv and an error of only 5 pptv between -40 and -45. The values are difficult to determine using the continuous colour scale, but the lowest box in this grid seems to have a value of -15+-5.**

In Table 3 MIPAS trends are calculated at variable pressure levels (as explained in the text, page 21 lines 14-19). Therefore the trend values reported in table 3 are not directly comparable to those shown in Fig. 11.

MINOR REMARKS

page 8, line 6: **Space after "Sect." is missing.**

Done.

page 12, line 21ff: **How much of the difference can be attributed to the different level 2 algorithms (e.g. employed micro windows and spectral databases)?**

As written on page 12 line 9, CCl4 cross sections used by MIPAS-B are the same as the ones used by MIPAS/ESA version 7 retrievals. However, the selection of microwindows used for the retrievals of both sensors is different (as mentioned on page 12, line 7 and in Table 1). This might explain at least part of the differences where CCl4 amounts are low (above about 24 km). We added a corresponding sentence in the text.

page 17, line 17: **What is the reasoning behind the specific value of 1.6? Obviously one is looking for a grid point being "always" in the troposphere with a sufficient distance from the stratosphere as to not be influenced by its value (more than 1.5km distance?) but as high as possible as the significance drops with altitude. I would expect that for many latitude bands no significant value would be available.**

We guess the reviewer refers to page 21, line 17. As mentioned by the reviewer the major complication in this procedure is to find the 'correct' pressure level ("… in the troposphere with a sufficient distance from the stratosphere … but as high as possible as the significance drops with altitude. …"). As mentioned in the paper, we select this pressure level as follows: we identify the pressure at the tropopause and we choose the pressure-grid level closest to the tropopause pressure increased by 60%. The aim of this procedure is to include in the trend-calculation analysis only VMR values relating to a pressure level located about 3 km below the tropopause. Unfortunately, whenever the tropopause is very low (i.e. at high latitudes) the significance of the derived trend decreases, due to the same problems identified by the reviewer in the above comment referring to page 9, fig.4. This effect impacts the trend fit and consequently produces a large error of the trend at high latitudes, as evident from MIPAS trend errors reported in Table 3.

In the revised paper we have rephrased the sentence. "We multiply this pressure by 1.6 and find the nearest pressure level ($p_t(\lambda)$) in the fixed pressure grid defined in Sect. 5.1." → "We multiply this pressure by 1.6 and find the nearest pressure level (pt(λ)) in the fixed pressure grid defined in Sect. 5.1. Using this procedure the selected pressure level is located approximately 3 km below the tropopause pressure level".

page 17, line 28f: **What is the specific reasoning for including this specific set of oscillation periods and how significant are the determined factors Ci and Di?**

This set of oscillation periods has been previously used in several recent papers (Kellmann et al., 2012; Eckert et al., 2014; Haenel et al., 2015). As explained by Haenel et al. (2015): "The period of the first two sine and cosine functions is 12 and 6 months respectively, representing the seasonal and the semiannual cycle. The other six terms have period lengths of 3, 4, 8, 9, 18 and 24 months and describe deviations of the temporal variation from a pure sine or cosine wave. Fitting sine and cosine of the same period length accounts for a possible phase shift of the oscillation."

To avoid repetition we have added a reference to Haenel et al. (2015) near the description of the oscillation periods used in this work.

Haenel, F. J., Stiller, G. P., von Clarmann, T., Funke, B., Eckert, E., Glatthor, N., Grabowski, U., Kellmann, S., Kiefer, M., Linden, A., and Reddmann, T.: Reassessment of MIPAS age of air trends and variability, Atmos. Chem. Phys., 15, 13161-13176, doi:10.5194/acp-15-13161-2015, 2015.