

Anonymous Referee #2

The study deals with four global satellite data sets including up to four atmospheric species relevant for the monitoring of the Montreal protocol. For each species two or three of these data sets are compared. Although not directly mentioned the authors try to tackle systematic errors of each data set with the “statistic” of two/three different data sets to some degree. In the discussion they incorporate knowledge from earlier studies with these data sets and comparisons with additional measurements. The limitation of such an approach is well addressed. The result is presumably the best that can be done with the data situation and it is the first study of this kind. Therefore, I recommend publication with minor revisions.

We thank Referee 2 for his/her valuable comments. We have changed the manuscript according to the comments listed below.

Minor comments

Page 763/line 29: “as carried out in this study”, add “out”.

The text has been changed.

765/18: “are part of a larger project”, add “a”.

The text has been changed.

770/18-20: Please add a reference.

We have added the reference Eckert et al., MIPAS IMK/IAA CFC-11 (CCl₃F) and CFC-12 (CCl₂F₂) measurements: accuracy, precision and long-term stability, Atmos. Meas. Tech. Discuss., 8, 7573-7662, doi:10.5194/amtd-8-7573-2015, 2015.

771/4-5: I failed to recognize the unrealistically steep gradients below 70 hPa for HIRDLS. One sentence later, it seems that vertical gradients are meant and not gradients of the isopleths along the latitudes. However, both types of gradients seem to be comparable in size to the gradients visible in the MIPAS data set. May be these unrealistically steep gradients are only visible in monthly zonal means? Independent of the answer, since some discussion in this study deal with the knowledge of the monthly data I like to see altitude-latitude cross-sections of monthly zonal means for four months (c.f. figures 1, 5, 8, 10), e.g. for the months Febr., May, Aug., Nov., for all four species in the supplement in order to gain a better overview about the seasonal differences. I see no need for a detailed discussion. General references in the text would be sufficient.

The steep gradients exist for isopleths larger than 0.175 ppbv and are also detectable in the meridional profiles at 170 hPa (Figure 2a). We have removed the term ‘vertical’ from the following sentence to avoid confusion.

We have added monthly zonal evaluations of all gases for January, April, July and October to the supplementary material. In general, the monthly mean evaluations confirm the results of the annual mean comparisons.

776/6-8: For me the better agreement of HIRDLS with MIPAS or ACE-FTS is altitude dependent for the NH mid-latitudes.

We agree with this and have removed ‘NH mid-latitudes’ from the sentence.

776/14-17: Two sentences would be better: “: : for the high latitudes. In the southern high latitudes ACE-FTS detects larger CFC-12 : :”, since there are no ACE-FTS values in the northern high latitudes.

We have changed the text as suggested.