

Interactive comment on “Atlantic CFC data in CARINA” by R. Steinfeldt et al.

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Response to referee #2 on 'Atlantic CFC data in CARINA' by Steinfeldt et al.

1) We acknowledge that the netcdf format is very useful especially for the storage of larger data sets as the complete CARINA data set. However, the decision for the csv format cannot be redone, as the data set in csv format is already online. We think about creating an additional netcdf version of the CARINA data set. Moreover, the CARINA database is searchable through WAVES, and this system can produce output in netcdf format (<http://cdiac3.ornl.gov/waves/>). The reason to remove flagged data from the product is simply that experience tells us that most users don't pay enough attention to flags, and use all data. All data are retained in the individual cruise files.

2) The alternative to a constant CFC increase would be to calculate an increase rate for each data point by the CFC age or the TTD method. This is time consuming and

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the result is not promising, as some errors remain due to uncertainties of the method (e.g. the unknown CFC saturation in surface waters which influences the age). The principal problem would also not be solved: In the subpolar north western Atlantic, the temporal variability of the CFC concentration due to circulation and water mass formation variability is comparable with the temporal CFC increase, at least for the period 1995-2004, where most of the CARINA data are collected. For the small concentrations in the tropics, the relative error of the CFC measurements is quite large, so an offset between cruises would remain even if the time correction would work perfectly. This discussion will be included into the manuscript. We will also provide a new version of Fig. 4 which includes the error range.

3) The decision for using the EXPCODES has been done for all CARINA papers. The 'real name' of the cruises as well as the cruise reports can be found on the CARINA website (http://cdiac.ornl.gov/oceans/CARINA/Carina_table.html). We will refer to this website in the manuscript. Page 32, line 13 'small' refers to the blank of the order of 0.01 pmol/kg. This will be specified in the manuscript.

Page 32, line 25 and Page 33, line 21 Table 1 (the cruise list) is modified, the cruises from the Arctic (4 cruises) and the non-CARINA 'reference' cruises (5 cruises) are now listed separately.

Page 34, line 1 The correct definition of the error function is $e = \text{rms}(F_i)$, the legend of figure 4 is corrected

Page 36, line 27 ff This whole paragraph is rephrased: The mean residuals for each cruise of the regression between the CFC saturations (CFC-12, CFC-113 and CCl4 towards CFC-11 as described in Fig. 7) are shown in Fig. 8. Here, the deviations and error bars are indeed an indicator for the quality at least of the CFC-11 and CFC-12 data. For the data flagged as good, the deviation of the observed CFC-12 saturation from the simple linear regression towards the CFC-11 saturation is not larger than 5% (after applying the adjustments given in table 2), and the standard deviation of the

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residuals is also of the order of 5% (Fig.8). This implies that the CFC-11 and CFC-12 surface data are consistent within 5%. For CFC-113 and CCl4, the decomposition of these tracers in warm waters leads to larger deviations from the simple linear regression.

Page 37, line 14 CFC-11/CFC-12 ratios is replaced with CFC-11/CFC-12 property-property plot

Fig.4 the typo is corrected

Fig.5 y-axis in Fig.5d, the y values are too large by 1, after subtraction the y-value is the offset as for the figures a-c and e.

Fig.5 and Fig.7 the same range of the y-axis will be used for all subfigures

Fig. 5 caption The caption is corrected: Mean value for all crossovers of each cruise (red) and offsets from the least square crossover analyses (blue) as suggested by the LSQ inversions for all CFC-components of the CARINA_ATL data set.. Vertical lines denote the error range (standard deviation for the mean values and statistical uncertainty for the offsets). Some cruises of the Arctic / Nordic Seas region and non-CARINA data are included to get an overlap between the regions and provide consistency towards other data sets. a: CFC-11, b: CFC-12, c: CFC-113, d: CCl4, e: CFC-11 - CFC12.

Fig. 9 The legend is corrected, indeed there is no figure 9a and 9b.

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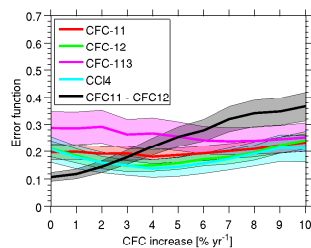


Figure 4

Fig. 1.

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