**Earth System
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Interactive comment on "Atlantic CFC data in CARINA" *by* R. Steinfeldt et al.

Anonymous Referee #2

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Steinfeldt et al. present an excellent dataset which is clearly appropriate for publication in essdd. Observations of transient tracers such as CFCs have been widely used to study oceanic circulation and mixing. In order to find a new method for controlling the quality of CFC data the authors have examined CFC data from several cruises and years. In the first part they adapted a crossover based least square method for the adjustment of the transient data and showed that this approach yield unrealistic high correction factors. Thus, they felt back to rather classical method to derive corrections factors for CFC-11 and CFC-12 based on their ratios and surface saturations.

Major Comments

1) I do not think that the CSV-format is an adequate choice for such a large dataset. It is inefficient and contains no meta-information. Although, this regards not only the CFC-data but the entire CARINA-dataset, I recommend using the netcdf-format which

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could easily contain all meta-information mentioned in Section 2 (and maybe more). In addition the necdf-format could include both corrected and uncorrected data.

2) Even if the crossover analysis does not result in realistic correction factors, the method should be discussed in more detail, e.g.

- Why a constant CFC increase is assumed (Page 33, line 25) albeit the atmospheric increase is far from being constant (Fig 3)?

- What is the uncertainty of the error function (or Fi) in dependence of the assumed CFC-increase rate (Fig. 4)?

- Are the minima in Fig. 4 significant? Please add standard deviations in Fig. 4.

Additional issues that should be addressed:

1) A table of flags used for the CFC data in CARINA, i.e. what is a "poor" flag.

2) Why have the "poor" data removed from the CARINA data product? In my opinion a dataset should include all data that is the good and the poor.

3) Cruises are named either by an arbitrary cruise number or the EXPOCODE. Although the latter is an "official" standard it would desirable to mention the "real name" and cite the cruise reports of the specific expeditions

Minor comments:

Page 32 line 13: specify "(small) additional offset"

Page 32 line 25: how many cruises (crossovers) are from the CARINA Arctic/Nordic Seas

Page 33 line 21: how many "reference cruises" are included

Page 34 line 1: There is an inconsistency in the definition of the error function in the text and Fig. 4 e=rms(Fi) vs. e=sum(Fî2)

Page 36 line 27 ff: A precisions of 5% does not imply (necessarily) a small error. Thus there is no contradiction of small precision (CFC-11 and CFC-12) and large error range (CFC-113 and CCl4). This needs to be rewritten.

Page 37 line14: no CFC-11/CFC-12 ratios are shown in Fig. 9!

Fig. 4 x-axis: CFC increase

Fig. 5: y-axis: "Relative" Offset(5d) or offset (a-c and e)?

Fig. 5 and Fig.7: similar y-axes would be nice for a better comparability.

Fig. 5 Caption: Is really the standard deviation shown? It seems to be the relative offset and the statistical uncertainty.

Fig. 5 Caption: What is "Vertical lines denote the error range (the statistical uncertainty of the mean or the standard deviation)?

Fig. 9 Caption: ... Oceanic CFC concentrations are converted to the atmospheric mixing ration not to ppt which is only (a kind of) an unit. Fig. 9 consists of 38 pictures, which are the mentioned figures 9a and 9b.

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