

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

Anonymous Referee #1

Received and published: 2 September 2009

As an invited reviewer I found that this draft overall presents solid and valuable work, however in this initial stage there were issues with the presentation that need to be addressed.

My primary objection to this paper is section 3. During my first read through I was confused as to how the LSQ procedure could be in any way valid for CFCs. Halfway through the paper I learn (in section 4) that none of section 3 is relevant to the final data product. Although the authors expended a considerable amount of effort (and a few figures) on the LSQ procedure, in the end they do not use this approach because CFCs are transient tracers. I'd recommend that the authors dispense with section 3, and just start section 4 (re-numbered) with something like “the LSQ approach of Johnson et al 2001 was intended for steady state tracers. Due to the transient nature of the CFC signals, we instead resorted to known features of CFC saturation levels at the sea surface and CFC ratios in the ocean interior for our secondary quality control.”

C18

If the authors feel strongly that section 3 should remain, then it would seem worthwhile to discuss (I suspect they've tried this) a variant on LSQ where all of the CFC data are first corrected to a common date (a centered time). In practice, each sample's CFC values could be adjusted according to the time difference between the cruise and the mid-date of all the cruises, multiplied by the CFC's growth rate in the atmosphere evaluated at the apparent outcrop date (cruise date – CFC age) of the sample for each CFC.

Omitting section 3 would provide some more space for discussion/details that would improve the utility of the final carina CFC dataset. Examples of things that would be nice to have included are: 1) The “0” flag (p. 3) it would be very helpful if some distinction between calculated versus interpolated flags could be provided – As there are important differences. 2) In CFC dating, a 5% precision is a substantial error in waters outcropped after the mid 1980s. However, most of the data in this manuscript I suspect are accurate to much better than 5%. It would be helpful if the authors could provide some guidance into how the accuracy and precision depends on, for example, individual cruises or concentration ranges for each cfc. Incidentally at bottom of page 4 (line 88) the authors mean to report an accuracy (not precision) of 5% or better, right? Presuming the atmospheric history is on the same calibration scale, the accuracy is what's needed for estimating errors in CFC dates. 3) How do these data differ from those included in GLOBEC? Have the same corrections been applied there?

Interactive comment on Earth Syst. Sci. Data Discuss., 2, 27, 2009.

C19