

Interactive comment on “Emissions of Carbon Tetrachloride (CCl₄) from Europe” by Francesco Graziosi et al.

P. J. Fraser (Referee)

paul.fraser@csiro.au

Received and published: 30 May 2016

Text suggestions

Line 40: near exclusively

Line 45: (Butler et al., 1999; Sturrock et al., 2002)

Line 53: sharp decrease in the large-scale emissive use of CCl₄

Line 63: emissive uses of CCl₄ are banned...in signatory countries

Line 67: no significant natural sources

Line 69: the industry sector (Simmonds et al., 1998; Fraser et al., 2014)

Line 77: define NH, SH

Line 78: shows that CCl₄ is still being emitted...

Line 96: ...to 0.12-0.18 Gg yr⁻¹, a decline of 5% yr⁻¹

Line 106: Emission estimates by Hu et al. were...

Line 110: please state the Xiao et al. European CCl₄ emissions in Gg (referred to later in the text)

Line 111: this study...did not derive regional variations that likely occur across Line 128: AGAGE and affiliated stations

Line 131: oceanic air masses and occasionally by air masses from over Ireland, UK and continental Europe

Line 154: 20-day back trajectories

Line 156: define ERA

Line 226: ...macro areas (acronyms given in Table 1)

Line 227: define SRR

Line 242: geo-referenced

Line 259: and/or chlor-alkali industry

Line 283: add 'Australian CCl₄ emissions are declining at 5% yr⁻¹ (Fraser et al., 2014)

Line 545: a priori (blue squares)

Comments

Line 136: CCl₄ is measured at MHD by GC-MS and GC-ECD - the latter data are preferred because there are inherent problems in AGAGE in measuring CCl₄ by GCMS. Do these problems exist for GC-MS at JFJ, and, if they do, do they impact on this analysis

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Line 165: a priori emissions. I suggest the following prior could be used - the Xiao et al. European emissions should be released according to the E-PRTR distribution of industrial emissions. Hu et al. (2016) showed conclusively the US emissions of CCl₄ (and presumably European emissions of CCl₄) are not significantly related to population distributions but are related to the distribution of chemical industrial activity. Why bias your prior in the likely wrong direction using largely (96%) population distributed emissions. This could lead to a significantly better a priori.

Line 260: this study and Hu et al. show that the CCl₄ emissions are coming from industrial chemical hot-spots and are not related to population distributions. Landfills and domestic bleach sources tend to follow population distributions and these studies therefore tend to down-play landfills and domestic bleach as significant sources although tentative, I think this important conclusion can be made.

3.2.4 Comparison with NAME: why not run the NAME inversion using all 3 observation sites not just MHD?

Line 270 - Figure 6 compares UK and NWEU emissions of CCl₄ with the latter significantly higher. At this point it would be instructive to compare the relative size of the chemical industries in these two regions - for example compare their chlor-alkali productions.

Line 284: per capita emissions. Since it has been shown that CCl₄ emission distributions do not follow population distributions, then something better than per capita emissions could be calculated as a reference indicator, such as CCl₄ emissions per unit of chemical production. I have done this for Hu et al USA emissions and Fraser et al. Australian emissions, as a function of chloro-alkali production - USA (0.39 kg CCl₄/tonne Cl and Australia (0.41 kg CCl₄/tonne/Cl). European Cl production numbers are available - it would be interesting to see what the European CCl₄/Cl emission factor is.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-326, 2016.