

Interactive comment on “Perfluorocarbons in the global atmosphere: tetrafluoromethane, hexafluoroethane, and octafluoropropane” by J. Mühle et al.

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Received and published: 22 May 2010

Please note that we provide our replies in bold after each comment from C. Bayliss (received and published: 12 April 2010).

Supplement Page 2, lines 21-22 This is not strictly the case – we use annually reported anode effect data to derive PFC emissions using technology specific (and in the case of facilities that have measured their PFC emissions, facility specific coefficients). These are IPCC Tier 2 and Tier 3 methodologies, not Tier 1 application of emission factors to technology production. We then use average (median) emission factors within technologies to estimate emissions from non reporting facilities (representing around 40%

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production, mainly high performing PFPB).

In earlier Anode Effect surveys IAI has published Tier 1 (technology specific) emissions factors for CF_4 and C_2F_6 separately, but we agree that in more recent surveys IAI reports/uses more accurate Tier 2 (technology specific) and, when available, Tier 3 (facility specific, confidential) coefficients for aggregated PFC ($\text{CF}_4 + \text{C}_2\text{F}_6$) $\text{CO}_2\text{-e}$ emissions. We have modified the section accordingly.

Supplement Page 2, lines 23-25 See J Marks comments (SC 1188) for suggested rewording.

We have reworded and expanded the section according to the explanations and insights of J. Marks and C. Bayliss.

Supplement Page 2, line 28 One can only assume constant Chinese EF as far back as mid 2000s, since when China has produced 100% of its aluminium using PFPB technology. Prior to this, the technology mix in China was more complex and without measurement/anode effect data, the best estimate would be to use global technology averages.

We thank the commentator and J. Marks for the insights and now only apply the correction for the higher Chinese PFPB emission factor from 2006 to 2008. This results in a reduction of Al production related CF_4 emissions estimated from the IAI reports of ~ 0.4 Gg/yr from 1999 to 2005 and a corresponding increase in the CF_4 emission gap. All calculations have been repeated with the new estimates and all numbers and figures in the manuscript have been updated accordingly. The conclusion remain unchanged.