

Referee Robbie Andrew

Referee Andrew is recognized as a high level expert and he is a well informed and diligent reviewer. His comments on our paper are incredibly valuable and have caused us to rethink many statements, to correct several mis-statements, and to make other text more precise and clearer. His thoroughness is much appreciated. In the following we summarize how we have responded to his comments. In most cases we have responded exactly, or nearly exactly, as he suggests. In other cases we have rewritten a short section of text to incorporate his suggestions. In a number of cases we feel that his suggestions represent personal preferences and so long as our statement is factually correct we have stayed with our own preferences and we indicate “no action”. Occasionally we feel his ideas are adequately dealt with in the cited references and do not need reiteration or expansion in this short paper, and we again note simply “no action”. In total we are very aware that the comments of Referee Andrew have led us to a paper that is more accurate and clearer and we are grateful.

Line 18: Since we use the global assumption for non-energy uses for country level totals (0.01 for gases, 0.8% for solids), these industrial processes are not necessarily included in the calculations, see Marland and Rotty 1984, pg. 243 and 249. This was an error in personal communication and we have reiterated it in other places as well.

Line 41: done. Non-energy uses is the term used by the UN, and we are trying to be more consistent with that language.

Line 44-45: done

Line 49: done

line 53: done

line 58: Although Marland disagrees, Gilfillan agrees that economic sectors is imprecise, and have tried to correct this with “sectors of human activity” as a middle ground.

lines 65-66: done

lines 70-72: no action. See comments from line 18. (1% gases, 0.8% solids) (Marland and Rotty 1984).

line 76: done

line 80: done

line 91: done

line 94: deleted

lines 95-96: done

line 109: done

line 151: done

lines 151-152: done

lines: 154-155: added "The IEA does include some non-energy uses from iron and steel manufacture."

line 156: added "and recently provides separate emissions estimates from flaring emissions not within their main CO₂ database."

line 169: done

line 171: done

line 187: done

line 202: done

line 205: done

line 206: done

line 212: no action on this particular phrasing. We apologize for our errors in personal communication, but hopefully we have clarified them in this discussion. The global percentages are used as an assumption of nonenergy uses for solids and gases for country level totals.

lines 213-214: done

lines 281-21: no action

line 231: done

line 239: done

line 243: done

Line 245 and line 249: done

Line 282: sentence has been corrected. "NE_i are explicitly subtracted out for liquids based on the UN energy statistics codes, and we use the global assumptions (section 2.2.1) for the amount of solid and gaseous fuels that are used in for non-energy purposes, 0.8% and 1% respectively."

Line 284: no action

Line 288: the sentence is correct, natural gas is oxidized in the production of fertilizer

Line 299-300: standard rather than probabilistic.

Line 311-312: sentence corrected

Line 315: Sources have been added from Andrew 2018, 2019

Line 317: done

line 318-319: sources added.

line 328: Sources have been added.

lines 336-338: the text is correct as written, Marland in developing his method only used data from NIR/CRFs as far as UNFCCC no action

line 319: done.

line 352: the Andrew paper is cited twice in this page of text and in the data file, we think that this is excessive detail for this discussion.

Line 359: no action

Line 362: Added "Fossil"

Line 363: this is not a simple citation. Considering the context we think this is appropriate, no action

Line 366: done

Line 380: We used all emissions in CDIAC, not just combustion of fossil fuels. We will take your suggestion for future Kaya decompositions.

Line 381: no action

line 385: done

line 388: done

line 409: yes, the citation was misplaced. The sentence has been corrected.

Line 410: done

Line 410-1: done

Line 424-5: done

Line 433: done

Line 462-3: the usage is clear in the context

Line 463: A previously unknown but very timely reference has been inserted. (Thanks Referee Andrew!)

Line 477: appropriate references are cited, no action

Line 480-1: appropriate references are cited, no action

Line 488: we believe that an appropriate level of interpretation is provided in the near-by text, no action

Lines 507-508: no action

Line 517: done

Lines 527-8: sentence deleted

Line 549: done

Line 550: done

Line 545: text has been rephrased

Line 545: text has been rephrased

“one last minor comment”: no action expected or provided