

## Edits and errata to the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

### Disclaimer

This list is intended to cover all the edits and errata made to the report prior to publication. It includes corrections of errors identified after the adoption of and the Overview Chapter and the acceptance of the underlying report in accordance with the Annex 3 of Appendix A to the Principles Governing IPCC Work. It also includes edits made to ensure consistency between individual Chapters/Annexes/Appendices as well as full consistency of the Overview Chapter and the underlying report. The list might not be fully comprehensive and copy edits are generally not part of this list.

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NOTE on the advance version released on 14 June 2019

Technical corrections of editorial nature have been made to the document <Doc. 3b - Rev.3 - Accepted Report 2019 Refinement>. They are explained in this note:

- In Annex 1 (Mapping Tables) of Volume 1, addition of the figure "Decision Tree to choose a Good Practice method" in Chapter 4 has been reflected on page A1.9.
- In Chapter 4 of Volume 2, the final text proposed by the authors in the Contact Group and explained orally to the Panel on Sunday, 12 May, has been added in section 4.1.2.
- In Chapter 2 of Volume 4, "ALOS-2" has been moved to a different line in BOX 2.0D (New) Remote Sensing Technologies on page 2.20. This is not a new change, it had already been captured in the table of changes.
- In Chapter 5 of Volume 4, Table 5A.3.3 was not properly copied in Annex 5A.3 by editorial mistake. It is now correctly included.
- In Chapter 7 of Volume 4, Equations 7.10, 7.15, 7.16, 7.17 and 7.18 in Section 7.3.3 have been reformatted; these equations were revised and agreed upon during the Panel session. The changes are formatting of the equations to the correct style.
- In Chapter 7 of Volume 4, References have been updated in text citation and in reference list, to reflect changes made at IPCC-49.
- In Chapter 7 of Volume 4, Figure A4 has been updated to correctly reflect the discussion and agreement at IPCC-49.
- In Annex 2 of Volume 4, Mapping tables have been updated to reflect changes made and agreed at IPCC-49 in Chapter 2: Section 2.6 on Inter-Annual Variability (IAV) and Chapter 7: Flooded land.
- Chapter 2 and Chapter 3 of Volume 1 were missing by editorial mistake. It is now correctly included. No changes have been made in these chapters at the 49<sup>th</sup> Session of IPCC.
- The Glossary was missing by editorial mistake. It is now correctly included. Some small changes have been made to ensure consistency with the changes in the main chapters made at IPCC-49.

In addition, in accordance with the <Decision - IPCC-XLIX-9 - Adoption and Acceptance of 2019 refinement>, two footnotes have been added in Chapter 4 of Volume 2. (footnote 5 on page 4.48 and footnote 8 on page 4.64 in the final publication version)

Volume	Chapter	Section	Page	Start line number	End line number	Correction
<b>Overview</b>						
Overview	Overview	-	-	356	356	"microelectricalmechanical" be replaced with "microelectromechanical".
Overview	Overview	-	-	361	361	replace "ODS substitutes" with "substitutes for ozone depleting substances (ODS)".
Overview	Overview	-	-	365	365	"Microelectricalmechanical" be replaced with "Microelectromechanical".
Overview	Overview	-	-	420	422	"The methane conversion factor (MCF) for animal waste management systems are presented based on climatic regions, as opposed to annual temperatures and a simple calculation model for deriving the MCF based on monthly temperature regimes has been presented." should be "The <u>default</u> methane conversion factor (MCF) <u>values</u> for animal waste management systems are presented based on climatic regions, as opposed to annual temperatures, and a simple calculation model for deriving the MCF based on monthly temperature regimes has been presented."
<b>Glossary</b>						
Glossary	Glossary	-	G.4	-	-	[Canal] delete "accessed 10 Apr 18".
Glossary	Glossary	-	G.5	-	-	[Country-specific data] replace "emissions" with "emission factors".
Glossary	Glossary	-	G.8	-	-	[Flow rate] replace "cfs" with "ft <sup>3</sup> s <sup>-1</sup> ".
Glossary	Glossary	-	G.9	-	-	[Harvested wood products] replace "IPCC good practice guidance (2003, 2006)" with "Good Practice Guidance for Land Use, Land-Use Change and Forestry (2003) and the 2006 IPCC Guidelines".
Glossary	Glossary	-	G.9	-	-	[Harvested wood products] replace "refers" and "includes" with "refer" and "include".
Glossary	Glossary	-	G.10	-	-	[Large dams] replace "ICOLD" with "International Commission On Large Dams".
Glossary	Glossary	-	G.12	-	-	[Mode] replace "we usually encounter distributions with only one mode" by "distributions with only one mode are usually encountered".
Glossary	Glossary	-	G.16	-	-	[Surrogate data] add "so-" before "called".
<b>Volume 1</b>						

Volume	Chapter	Section	Page	Start line number	End line number	Correction
1	1	1.1	1.5	91	91	Footnote 1 "In the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement), additional methods are applied to the coastal wetlands, too, than the standard application of the Managed Land Proxy" to amend as follows: "In the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement), additional methods are applied to the coastal wetlands that do not follow the standard application of the Managed Land Proxy".
1	1	Authors	1.2	9	9	Comma after "Michael Gillenwater (USA)".
1	1	1.4.1.1	1.11	250	253	To remove underlines in notes [c] and [e] under the Table 1.2.
1	1	1.4.1.3	1.13	275	275	"QA/QC (see section 1.7.3)" to read as: "QA/QC (see Section 1.6.3)".
1	1	1.4.1.7	1.15	345	345	"...(as defined in Chapter 1.4 of the 2006 IPCC Guidelines)..." to read as: "... (as defined in Section 1.4 of the 2006 IPCC Guidelines).
1	1	1.4.2	1.16	362	362	"...highlights important data providers..." to read as: "...highlights importance of data providers..."
1	1	1.4.2	1.16	378	378	To add "derivation" after "country-specific emission factors".
1	1	1.4.2.1	1.16	385	385	Footnote 7 "Own construction based on the South Africa's 2nd Biennial Update Report" to read as: "Own construction based on the South Africa's 2nd Biennial Update Report"
1	2	Authors	2.2	-	-	"Veronika Ginzburg (Russia)" to read as: "Veronika Ginzburg (Russian Federation)"
1	2	2.1	2.7	-	-	Sentence "Advice related to selecting emission factors focuses on understanding and generating measured data as well as addressing where to find and when to use default factors." to amend as follows: "Advice related to selecting emission factors focuses on understanding of measured data as well as where to find and when to use default factors."
1	2	2.1	2.5	-	-	"In establishing routine, formalised, data collection use should be made of existing statistical organisations and official data wherever possible" to amend as follows: "In establishing routine, formalised, data collection use should be made of existing statistical organisations and other official data wherever possible".
1	2	2.1	2.5	-	-	"Data reporting and archiving are covered in section 1.4.1..." to read as: "Data reporting and archiving are covered in section 1.5 of the 2006 IPCC Guidelines..."
1	2	2.2.3	2.20	-	-	To delete "then" before "...multi-year averaging..."

Volume	Chapter	Section	Page	Start line number	End line number	Correction
1	2	2.2.4	2.26	-	-	"It is also good practice, as part of the measurement programme to include in the scope of a monitoring protocol how and other measurements are to be carried out, if the fuel/raw materials are not dry or there are contaminants that could adversely affect the measurement process, moisture." to amend as follows: "It is also good practice, as part of the measurement programme to include in the scope of a monitoring protocol how measurements are to be carried out, if the fuel/raw materials are not in dry weight or there are contaminants that could adversely affect the measurement process, or moisture content."
1	2	2.2.4	2.26	-	-	"...if the fuel/raw materials used are not dry, a moisture analysis will be required." to amend as follows: "...if the fuel/raw materials used are not in dry weight, a moisture analysis will be required."
1	2	2.3.3.1	2.37	-	-	"...it is possible to calculate the emissions which haven't been reported (e.g. the residual value can be demonstrated by the following calculation:" to split into two sentences: "...it is possible to calculate the emissions which haven't been reported. The residual value can be demonstrated by the following equation:"
1	2	2.2	2.10	-	-	Abbreviation "NSO" should be introduced in brackets after National Statistical Offices.
1	2	2.2	2.10	-	-	"involving them in scientific or statistical workshops on the inventory inputs and outputs;" to read as: "scientific or statistical workshops on the inventory inputs and outputs;"
1	2	2.2.1	2.15	-	-	"sectoral chapters 2-5" to read as: "chapters of Volumes 2-5".
1	2	2.2.4	2.22	-	-	In Table 2.1a "Industrial Processes" to read as "IPPU".
1	2	2.2.4	2.25	-	-	"The EFDB invites experts and researchers all over the world to populate the EFDB with their data." to read as: "Experts and researchers all over the world are invited to populate the EFDB with their data."
1	2	2.3.2.1	2.34	-	-	In Table 2.5 separate country-specific default emission factors by slash to read: "country-specific/default emission factors"
1	2	2.3.3.1	2.37	-	-	"...which haven't been reported (e.g. the residual value can be demonstrated by the following:" to split into two sentences to read: "...which haven't been reported. The residual value can be demonstrated by the following:"
1	2	2.1	2.5	-	-	"...as well as for generating new data by surveys or measurement campaigns." to read as: "...as well as generating new data by surveys or measurement campaigns."

Volume	Chapter	Section	Page	Start line number	End line number	Correction
1	2	2.1	2.7	-	-	"Advice related to selecting emission factors focuses on understanding and generating measured data as well as addressing where to find and when to use default factors." to read as: "Advice related to selecting emission factors focuses on understanding of measured data as well as where to find and when to use default factors."
1	3	3.2.3.1	3.28	-	-	In Column L of Table 3.2 brackets should be used both in numerator and denominator of equation.
1	3	3.2	3.13	-	-	"Uncertainty consideration will need to be an integral part of the data collection effort, including selection of data sources and choice of methods following the guidance in Chapter 2 of Volume 1 of the 2006 IPCC Guidelines" to read as: "Uncertainty consideration will need to be an integral part of the data collection effort, including selection of data sources and choice of methods following the guidance in Chapter 2 of Volume 1"
1	3	3.1.1a	3.6	-	-	"Chapter 1.1" to read as: "Section 1.1".
1	4	4.1.2	4.6	116	116	"Section 4.5" to read as: "Section 4.4". "Section 4.6" to read as: "Section 4.5".
1	4	4.2	4.6	129	131	To remove sentence: "This will be facilitated by an approach which is aggregated/disaggregated based on methodology and in particular uncertainties".
1	4	4.2	4.6	121	121	"additional good practice" to read as "good practice".
1	4	4.2	4.7	183	185	"Table 4.1 provides suggested aggregation levels with guidance on subdivisions that could be considered that relate to methods, data sources and assumptions for which estimation methods are provided in the sectoral volumes." to read as: "Table 4.1 provides suggested aggregation levels with subdivisions that relate to methods, data sources and assumptions based on guidance in the sectoral volumes".
1	4	4.5	4.26	420	420	Table 4.10, column H: "Cumulative sum of level assessment" to read as "Cumulative sum of trend assessment".
1	4	4.2	4.11	186	186	In Table 4.1 (2E): "HCFs" to read as "HFCs".
1	4	4.2	4.7	183	185	"Table 4.1 provides suggested aggregation levels with guidance on subdivisions that could be considered that relate to methods, data sources and assumptions for which estimation methods are provided in the sectoral volumes" to amend as follows: "Table 4.1 provides suggested aggregation levels with subdivisions that relate to methods, data sources and assumptions based on guidance in the sectoral volumes".
1	5	Authors	5.2	34	34	"Francesco Tubiello (Italy)" to read as: "Francesco Tubiello (USA and Italy)".

Volume	Chapter	Section	Page	Start line number	End line number	Correction
1	5	5.2.1	5.6	129	129	"In such cases, it is possible for the inventory compiler to apply the old EFs in one set of the time series and the latest EFs for other parts of the time series." to read as: "In such cases, it is possible for the inventory compiler to apply the EFs before changes in one set of the time series and the latest EFs for other parts of the time series."
1	5	5.2.2	5.7	189	189	"...emissions and removals from agricultural soils or forest ecosystem in low forest cover countries" to read as: "emissions from and removals by agricultural soils or forest ecosystem in low forest cover countries".
1	5	5.2.3	5.8	228	230	To remove sentence "This is particularly relevant to categories in which it is possible to implement direct sampling and measurement programs but that these new data may not be indicative of conditions in past years".
1	5	5.2.3	5.8	237	238	"In such cases, EFs should be applied from the year the changes took place (i.e. they cannot be applied prior to the year of change)" to amend as follows: "In such cases, new EFs should be applied from the year the changes took place (i.e. they cannot be applied prior to the year of change)".
1	5	5.3.3.3	5.1	432	432	In Box 5.2a "R2" to read as: "R <sup>2</sup> ".
1	6	Authors	6.2	23	25	"Shamil Maksyutov (Japan)" to read as: "Shamil Maksyutov (Japan and Russian Federation)"; "Francesco Tubiello (USA)" to read as "Francesco Tubiello (USA and Italy)".
1	6	6.10.2.5	6.18	699	699	To add the following footnote after "review": "http://www.nies.go.jp/soc/en/documents/guidebook/, last accessed 11/09/2018".
1	6	6.12.7	6.30	1080	1080	"parameterization" to read as: "parameterisation".
1	6	References	6.34	1270	1271	Reference "IG3IS. (2018) An Integrated Global Greenhouse Gas Information System (IG3IS) Science Implementation Plan. Geneva: WMO" to replace by: "DeCola P, Tarasova O, Brunner D, Maksyutov S, Manning A, Vogel F, Gurney K, et al. (2018) <i>An Integrated Global Greenhouse Gas Information System (IG<sup>3</sup>IS) Science Implementation Plan</i> . Geneva: WMO".

Volume	Chapter	Section	Page	Start line number	End line number	Correction
1	6	References	6.35	1323	1325	Reference "Matsunaga, T. & Maksyutov, S. (2018) A Guidebook On The Use Of Satellite Greenhouse Gases Observation Data For Verification Of Greenhouse Gases Emission Inventories. Tokyo: Satellite Observation Center, National Institute for Environmental Studies" to amend as: "Matsunaga T, Maksyutov S (2018) <i>A Guidebook on the Use of Satellite Greenhouse Gases Observation Data to Evaluate and Improve Greenhouse Gas Emission Inventories</i> . Japan: Satellite Observation Center, National Institute for Environmental Studies".
1	6	References	6.34	1269	1270	To add reference: "Hu H, Landgraf J, Detmers R, Borsdorff T, de Brugh J, Aben I, Butz A, et al. (2018) Toward Global Mapping of Methane With TROPOMI: First Results and Intersatellite Comparison to GOSAT. <i>Geophysical Research Letters</i> 45: 3682-3689".
1	6	References	6.33	1203	1204	To add reference: "Bergamaschi P, Corazza M, Karstens U, Athanassiadou M, Thompson R, Pison I, Manning A, et al. (2015) Top-down estimates of European CH <sub>4</sub> and N <sub>2</sub> O emissions based on four different inverse models. <i>Atmospheric Chemistry and Physics</i> 15: 715-736".
1	6	6.10.2.1	6.13	449	450	To delete "to be consistent with the IG3IS Science Implementation Plan approved by the 70th session of WMO Executive Council in June 2018".
1	6	6.10.2.3	6.15	581	581	"Favorable" to read as: "Favourable".
1	6	6.10.2.4	6.17	660	660	"strong emissions in surrounding oceans" to read as: "substantial emissions from surrounding oceans".
1	7	References	7.10	273	275	To relocate reference "EMEP/EEA 2016" from "References copied from the 2006 IPCC Guidelines" to "References newly cited in the 2019 Refinement" and amend as follows: "EEA (2016) <i>EMEP/EEA air pollutant emission inventory guidebook 2016</i> . Luxembourg: Publications Office of the European Union. ( <a href="https://www.eea.europa.eu/publications/emep-eea-guidebook-2016">https://www.eea.europa.eu/publications/emep-eea-guidebook-2016</a> )".
1	7	Annex	7.11	298	298	To insert the following Annex title: "Annex 7A.1 Practical examples for carbon emitted in gases other than CO <sub>2</sub> ".
1	7	7.2.1.5	7.50	129	129	In Footnote 3 "Box 7.1" to read as: "Box 7.2".
1	8	8.2.1	8.5	121	121	"wetland supplement" to read as: " <i>Wetlands Supplement</i> ".
1	8	8.2.1	8.5	124	124	"on reporting these categories and the sub-categories contained in the supplement" to read as: "on reporting of emissions and removals for these categories and the sub-categories contained in the <i>Wetlands Supplement</i> ".



Volume	Chapter	Section	Page	Start line number	End line number	Correction
1	8	8.2.1	8.5	117	120	"When reporting total national emissions and removals (Table A: Summary Table), for those countries that choose to implement the approach described in Section 7.3.3, Volume 4, it is good practice to report the total MLP emissions and removals, as well as the indicative estimates of the anthropogenic component of total emissions." to read as: "When reporting total national emissions and removals, for those countries that choose to implement the approach described in Section 7.3.3, Volume 4, it is good practice to report the total MLP emissions and removals, as well as the indicative estimates of the anthropogenic component of total emissions."
1	8	8.3	8.8	224	224	"missions" to read as "emissions".
1	8	8.5	8.33	Table 8.2	Table 8.2	"Biomass Burning in Forest Lands" to read as: "Biomass Burning in Forest Land"; "Biomass Burning in Croplands" to read as: "Biomass Burning in Cropland"; "Biomass Burning in Grasslands" to read as: "Biomass Burning in Grassland"; "Biomass Burning in All Other Land" to read as: Biomass Burning in All other lands". "Emissions from biomass burning that include N <sub>2</sub> O and CH <sub>4</sub> in forest lands" to read as: "Emissions from biomass burning that include N <sub>2</sub> O and CH <sub>4</sub> in forest land"; "Emissions from biomass burning that include N <sub>2</sub> O and CH <sub>4</sub> in croplands" to read as: "Emissions from biomass burning that include N <sub>2</sub> O and CH <sub>4</sub> in cropland"; "Emissions from biomass burning that include N <sub>2</sub> O and CH <sub>4</sub> in grasslands" to read as: "Emissions from biomass burning that include N <sub>2</sub> O and CH <sub>4</sub> in grassland". "Emissions from biomass burning that include N <sub>2</sub> O and CH <sub>4</sub> in settlements, and all other land" to read as: "Emissions from biomass burning that include N <sub>2</sub> O and CH <sub>4</sub> in settlements, wetlands and all other land". "Harvest Wood Products" to read as: "Harvested Wood Products".
1	8	Note under Table 8.2	8.4	254	254	Note "(1) Under the <i>2006 IPCC Guidelines</i> , emissions from the use of carbonates should be reported in the subcategories (industries) where they occur." to amend as follows: (1) Under the <i>2006 IPCC Guidelines</i> and its <i>2019 Refinement</i> , emissions from the use of carbonates should be reported in the subcategories (industries) where they occur".
1	8	Annex 8A.2	T.62	Table 6A	Table 6A	"AGRO CULTURE" to read as "AGRICULTURE".
1	8	Annex 8A.2	T.68	Table 6C	Table 6C	"AGRO CULTURE" to read as "AGRICULTURE".

Volume	Chapter	Section	Page	Start line number	End line number	Correction
1	8	Annex 8A.2	T.53	Table 3.8	Table 3.8	"From atmospheric deposition of N volatilized from managed soils from agricultural inputs of N (synthetic N fertilizers; organic N applied as fertilizer; urine and dung N deposited on pasture, range and paddock by grazing animals (2); N in crop residues (3); and N mineralization/immobilization associated with loss/gain of soil organic matter resulting from change of land use or management of mineral soils" to read as: "From atmospheric deposition of N volatilized from managed soils from agricultural inputs of N (synthetic N fertilizers; organic N applied as fertilizer; urine and dung N deposited on pasture, range and paddock by grazing animals (2))".
1	8	Annex 8A.2	T.30	Table 2.2	Table 2.2	"2B9f" and "2B10" to read as "2B9g" and "2B11" respectively.
1	8	Annex 8A.2	T.26	Table 2	Table 2	"specific PFC(s) produced" to read as: "specify PFC(s) produced".
1	8	Annex 8A.2	T.30	Table 2.2	Table 2.2	"specific PFC(s) produced" to read as: "specify PFC(s) produced".
1	Annex 1	Mapping Tables	A1.13	218	218	"inclusion of new F-gases under gases included in the 2019 Refinement" to read as: "new F-gases under gases included in the 2019 Refinement".
1	Annex 1	Mapping Tables	A1.9	136	136	"e.g. overall and interpolation methods" to read as: "e.g. overlap and interpolation methods".
1	Annex 1	Mapping Tables	A1.12	193	195	"new guidance" to read as "updated guidance"; "guidance on carbon content" to read as "data on carbon content".
1	Annex 1	Mapping Tables	A1.3	23	23	To delete "additional and".
1	Annex 1	Mapping Tables	A1.10	156	157	Equation 5.1 added (NR: "No refinement").
1	Annex 1	Mapping Tables	A1.10	158	159	Figures 5.1-5.3 added (NR: "No refinement").
1	Annex 1	Mapping Tables	A1.15	233	233	Box 8.1 added (U: "Updated").
<b>Volume 2</b>						
2	4	-	-	Table 4.2.4b (New)	Table 4.2.4b (New)	Note d. insert "Norwegian" before "VOC Industrial Cooperation"
2	4	-	-	Table 4.2.4b (New)	Table 4.2.4b (New)	Note e. insert "Norwegian" before "VOC Industrial Cooperation"

Volume	Chapter	Section	Page	Start line number	End line number	Correction
2	4	-	-	References	References	In reference list, "Norwegian" should be inserted before "VOC Industrial Cooperation"
2	Appendix 4A.3	-	-	Section 4.3		"Fischer-Tropsch process" should be consistently used in section 4.3
2	4	-	-	Table 4.3.6	Table 4.3.6	Delete uncertainty value for N <sub>2</sub> O
2	Appendix 4a.2	-	-	Page 4.151	Page 4.151	"biomass fuel transformation" should be "solid to solid fuel transformation"
2	4	-	-	Table 4.2.4G (NEW)	Table 4.2.4G (NEW)	Correct documentation for CH <sub>4</sub> <b>Edit footnote c:</b> Emission factors for CH <sub>4</sub> and CO <sub>2</sub> developed from data reported to the Australian National Greenhouse and Energy Reporting program (NGER) (Australian Government Clean Energy Regulator 2017), as applied in Australian National Inventory (Australian Government 2018). <b>The value for CH<sub>4</sub> is the average of emissions for the years 2014-2017, and the value for CO<sub>2</sub> is the average of emissions for the years 2016-17.</b>
2	4	-	-	Table 4.2.4H (new)	Table 4.2.4H (new)	For footnote c, change text to "Emission factors from IPCC 2006, Table 4.2.4."
2	4	-	-	Table 4.2.4H (new)	Table 4.2.4H (new)	Change 1st subcategory to "Without LDAR or with limited LDAR, or less than 50% of centrifugal compressors have dry seals"
2	4	-	-	Table 4.2.4H (new)	Table 4.2.4H (new)	Change 2nd subcategory to "Extensive LDAR, and around 50% or more of centrifugal compressors have dry seals"
2	4	-	-	Table 4.2.4J (NEW)	Table 4.2.4J (NEW)	For both rows of short term storage, include a + in front of the high end of each uncertainty range (e.g., -50% to +100%)
2	4	-	-	Table 4.2.4K(NEW)	Table 4.2.4K (NEW)	For Natural Gas vehicles row, include a + in front of the high end of each uncertainty range (e.g., -50% to +100%)
2	4	-	-	Table 4A.2.6 (new)	Table 4A.2.6 (new)	Change 1st subcategory to "Without LDAR or with limited LDAR, or less than 50% of centrifugal compressors have dry seals"
2	4	-	-	Table 4A.2.6 (new)	Table 4A.2.6 (new)	Change 2nd subcategory to "Extensive LDAR, and around 50% or more of centrifugal compressors have dry seals"
2	4	-	-	Page 4.14	Page 4.14	The equation number should be corrected from 4.1.X to 4.1.0

Volume	Chapter	Section	Page	Start line number	End line number	Correction
2	Annex 2 (Mapping)	-	-	Page A2.6	Page A2.6	Under "Equation", the bullet point should be included - "Equation 4.1.0: Example equation for estimating fugitive emissions from coal exploration was newly provided"
2	Annex 2	-	-	Page A2.6	Page A2.6	In the table for Equation, the following information should be inserted. Equation title:
2	4	-	-	Figure 4.3.2	Figure 4.3.2	In the figure, the fugitive dust emissions were removed, which are not relevant for this chapter on fugitive emissions of GHGs
<b>Volume 3</b>						
3	3	3.3.2.2	3.7	203	203	"by type of production <b>processes</b> " should be "by type of production <b>process</b> "
3	3	3.3.2.2	3.7	204	205	"The five production <b>processes</b> types" should be "The five production <b>process</b> types"
3	3	3.3.2.2	3.8	211	212	"include all <b>levess</b> of abatement such" should be "include all <b>levels</b> of abatement such"
3	3	3.10.2.2	3.23	764	765	follows:"
3	3	3.10.2.2	3.26	925	925	The reference "Schaffner et. al., 2018" was removed, referencing Annex 3A.1 which was
3	4	4.2.2.4	4.33	855	855	" <b>lingots</b> " should be "ingots"
		4.2.2.5	4.35	909	909	"to <b>cross-checked</b> the proper allocation" should be "to <b>cross-check</b> the proper allocation"
3	4	4.4.5.2	4.75	2333	2333	"tonn" should be "tonne"
3	4	4.4.2.3	4.43	1172	1172	"does not occur, or occurs at <b>level</b> so low, it is considered negligible" should be "does not occur, or occurs at <b>levels</b> so low, it is considered negligible"
3	4	4.4.2.3	4.44	1214	1214	"default emission factors by <b>aluminum</b> production" should be "default emission factors by <b>aluminium</b> production"
3	4	4.4.5.2	4.7	2159	2162	"discussion under Section <b>4.4.6.3</b> Choice of Emission Factors" should be "discussion under Section <b>4.4.5.3</b> Choice of Emission Factors" (two times)
3	4	References	4.97	3053	3053	Reference "Official Journal of European Union (2011a)" was corrected to "Official Journal of European Union (2011)", because the reference "Official Journal of European Union (2011b)" was removed. Consistent corrections were made to citations to lines 784-785, 793-794, 799-800, 3053
3	4	4.4.1	4.41	1072	1072	In section 4.4.1 "A small proportion of alumina (<6% in 2015) is produced from the Bayer-Sinter process or nepheline ore refining process using alternative technology" should be "<3% in 2015)". It is consistent with the correct figure in section 4.4.5 "In 2017, only around 3% of alumina was produced globally via the Bayer-sintering process and around

Volume	Chapter	Section	Page	Start line number	End line number	Correction
3	4	4.4.1	4.41	1085	1085	"has risen from <30% in 2006 to >60% in 2017" should be "has risen from <30% <b>of global production</b> in 2006 to >60% in 2017" .
3	4	4.4.2.3	4.53	1550	1550	"Lowest uncertainties will be obtained with the second and third options <b>proposed</b> below" should be "Lowest uncertainties will be obtained with the second and third options <b>presented</b> below"
3	6	6.2.1.1	6.8	214	214	Add footnote after "(CVD)" reading: "This chapter uses the term "thin-film deposition," which encompasses chemical vapour deposition as well as other thin film deposition techniques."
3	6	6.2.1.1	6.80	237	238	Table 6.2. Correct title of second column to "Gaseous Fluorinated Compounds and N2O"
3	6	6.2.1.1	6.90	277	277	"The Tier 2 methods are expected to be more accurate than the Tier 1 method because they rely on the actual consumption of individual gases and account for <del>abatement</del> " should be "The Tier 2 methods are expected to be more accurate than the Tier 1 method because they rely on the actual consumption of individual gases and account for <b>the use of emissions control technology.</b> "
3	6	6.2.1.1	6.1	304	304	"flowing to abated tools (see discussion..." should be "exhausted from <del>abated</del> tools which are connected to emission control systems (see discussion..."
3	6	6.2.1.1	6.1	315	315	"(2) in the case of abatement calculations,..." should be "(2) in the case of <del>abatement</del> <b>emissions control</b> calculations,..."
3	6	6.2.1.1	6.1	318	318	"...calculating effective destruction efficiencies (ai and ak) " should be "...calculating <b>the impacts of emissions control systems (D<sub>i</sub> and D<sub>k</sub>).</b> "
3	6	6.2.1.1	6.13	387	389	In the title of Table 6.3 " <del>C</del> ASEOUS" should be "Gaseous"
3	6	6.2.1.1	6.18	518	518	"remote clean" with "remote <b>plasma</b> clean"
3	6	6.2.1.1	6.19	541	543	"Thus, when using the Tier 2a method, the consumption of C3F8, NF3, and N2O should be apportioned between their different uses, as applicable to each reporting site" should be "Thus, when using the Tier 2a method, consumption of C3F8 <b>and</b> NF3 should be apportioned between <b>RPC and other processes, and consumption of N2O should be apportioned between TFD and "Other" N2O-using processes,</b> as applicable to each reporting site."
3	6	6.2.1.1	6.19	546	546	"...the Tier 2a method include the destruction and removal efficiency..." should be "the Tier 2a method include the destruction <del>and</del> removal efficiency..."

Volume	Chapter	Section	Page	Start line number	End line number	Correction
3	6	6.2.1.1	6.2	618	618	Here and everywhere "When NF3 is used in remote clean process" should be " <b>When NF3 is used in RPC processes.</b> " Similarly "NF3 used in remote clean process" should be "NF3 used in RPC processes." These phrases occur throughout the discussion of Equations 6.7 and 6.15, including in the definitions of the terms of the equations.
3	6	6.2.1.1	6.2	620	621	"Unless the emissions control equipment original equipment manufacturer (OEM)" should be "Unless the emissions control <b>system</b> manufacturer ( <b>referred to below as the “original equipment manufacturer” or “OEM”</b> )"
3	6	6.2.1.1	6.21	656	657	Equation 6.8, definition ai: "Estimate of the fraction of gas i emitted from process tools equipped with suitable emissions control technologies (site-specific fraction, as determined in Equation 6.10)." should be "Estimate of the fraction of gas i emitted from process tools equipped with suitable emissions control technologies (site-specific fraction, as determined in Equation 6.10 <b>or Equation 6.18, as applicable</b> )."
3	6	6.2.1.1	6.21	669	670	In the definition of ak, correct "as determined in Equation <b>6.10</b> " with "as determined in Equation <b>6.11 or Equation 6.19, as applicable.</b> "
3	6	6.2.1.1	6.21	676	677	"fraction of gas" should be "fractions of gas"
3	6	6.2.1.1	6.21	681	681	"remote plasma clean" should be " <b>RPC</b> " and "CVD" should be " <b>TFD</b> ". The same changes should be in all the following text of the document (but not preceding unless noted otherwise).
3	6	6.2.1.1	6.22	711	712	(e.g., c-C4F8 IST) should be (e.g., 711 c-C4F8 <b>ITC</b> )
3	6	6.2.1.1	6.25	809	809	"interlock process tools..." should be " <b>interlocked</b> process tools..."
3	6	6.2.1.1	6.27	941	943	Variable nu <sub>p</sub> , "Ratio of emissions control systems connected to tools running process type p and certified not to form CF4 within emissions control systems to the total number of emissions control systems running process type p in the facility (site-specific fraction)" should be "Ratio of emissions control systems connected to tools running process type p and certified not to form CF4 within emissions control systems to the total number of emissions control systems <b>connected to tools</b> running process type p in the facility (site-specific fraction)."
3	6	6.2.1.1	6.28	964	965	Corrected definition of ai,p: "Estimate of the fraction of by-product k emitted from process tools running process type p and equipped with suitable emissions control technologies (site-specific fraction <b>calculated using Equation 6.18</b> )."
3	6	6.2.1.1	6.28	979	980	Corrected definition of ak,p: "Estimate of the fraction of by-product k emitted from process tools running process type p and equipped with suitable emissions control technologies (site-specific fraction <b>calculated using Equation 6.19</b> )."

Volume	Chapter	Section	Page	Start line number	End line number	Correction
3	6	6.2.1.1	6.29	999	999	Correct Equation 6.18 in variable "na i,p" to be "n i,p,a" (moving "a" to a subscript). Correct the variable below the equation in definitions
3	6	6.2.1.1	6.29	1027	1027	Correct Equation 6.19 (and surrounding text), by (1) replacing the variable name "m" with "n," and (2) changing the variables representing the numbers of abated tools ("na") to "n" with an "a" subscript at the end.
3	6	6.2.1.1	6.3	1053	1053	"using interlock process tools..." should be "using interlocked process tools..."
3	6	6.2.1.1	6.33	1138	1138	"...different than the default DRE values for abatement systems installed on a certain subset of process tools..." should be "...different <del>than</del> <b>from</b> the default DRE values for <del>abatement emissions control</del> systems installed on a certain subset of process tools"
3	6	6.2.1.1	6.33	1178	1178	"emissions control equipment, emission factors that have been measured by the reporting facility" should be "emission factors or emissions control equipment <b>DREs</b> that have been measured by the reporting facility"
3	6	6.2.1.1	6.34	1202	1202	After "in-situ analysis", insert a period. Delete "while" and capitalize "In" to create a new sentence.
3	6	6.2.1.1	6.34	1207	1207	Delete "also".
3	6	6.2.1.1	6.34	1242	1242	Delete "consumption of each FC gas and N2O, as well as"
3	6	6.2.1.1	6.35	1244	1244	Correct "Measurements of" with "Measure"
3	6	6.2.1.1	6.35	1246	1246	Correct "Measurements of" with "Measure"
3	6	6.2.1.1	6.35	1269	1269	Replace "fluorinated greenhouse gas" with "FC gas"
3	6	6.2.1.1	6.35	1273	1273	Remove "Fluorinated" from the title of Equation 6.21.
3	6	6.2.1.1	6.36	1291	1291	In the title of Equation 6.22 and throughout the chapter (particularly the stack-testing section), replace "fluorinated GHG" with "FC".
3	6	6.2.1.1	6.37	1331	1331	Equation 6.23, insert "for input gas".
3	6	6.2.1.1	6.37	1338	1338	In the definition of "Activity <sub>i,f</sub> " and everywhere, correct "stack testing period" with " <b>sampling period</b> ".
3	6	6.2.1.1	6.37	1348	1349	Insert "FC" before "by-product k", and before "input gases i" in first sentence and before "input gas " in second sentence.
3	6	6.2.1.1	6.37	1350	1351	" an input gas i" should be " an <b>FC</b> input gas i"
3	6	6.2.1.1	6.37	1354	1354	Equation 6.24, "By-product specific emission factor" should be " <b>FC</b> by-product specific emission factor"
3	6	6.2.1.1	6.37	1359	1370	In all definitions of the terms of Equation 6.24, insert "FC" before any occurrence of "by-product" or "input gas i". (In the definition of ESKs, use "FC" to replace "fluorinated GHG.")
3	6	6.2.1.1	6.38	1377	1377	Insert "Input" before "Gas i" in the title of Equation 6.25.

Volume	Chapter	Section	Page	Start line number	End line number	Correction
3	6	6.2.1.1	6.38	1392	1392	Insert "FC" between "each" and "by-product".
3	6	6.2.1.1	6.38	1394	1394	Insert "FC" in the title of Equation 6.26 before "by-product k"
3	6	6.2.1.1	6.38	1398	1409	In all definitions of the terms of Equation 6.26, insert "FC" before any occurrence of "by-product" or "input gas i".
3	6	6.2.1.1	6.38	1405	1406	Correct the definition of $a_{k,f}$ for Equation 6.26 to read "Estimate of the fraction of <b>FC</b> by-product gas k emitted from process tools equipped with suitable emissions control technologies (site-specific fraction, as determined in Equation <b>6.110</b> ) for facility f."
3	6	6.2.1.1	6.38	1407	1407	Revise the definition of $d_k$ by inserting "FC by-product" before "gas k"
3	6	6.2.1.1	6.39	1425	1425	Correct "if suitable backup emissions control equipment or interlocking with the process tool is implemented for each emissions control equipment" to "if suitable backup emissions control equipment or interlocking with the process tool is implemented for each emissions control <b>system</b> "
3	6	6.2.1.1	6.39	1426	1426	"interlock process tools..." should be "interlocked process tools..."
3	6	6.2.1.2	6.39	1450	1451	Insert "and" after "(including PFPME)," and delete comma.
3	6	6.2.2.1	6.44	1585	1585	Correct "by-product of cleaning processes of TFD chamber" to "by-product of chamber cleaning processes"
3	6	6.2.2.1	6.45	1589	1606	In the footnotes to tables 6.7, 6.9, 6.10, and 6.11 that define "NA," correct "reporter" to "compiler". Do the same in footnote 1 to Figure 6.2 on page 6.32.
3	6	6.2.2.1	6.5	1609	1610	Table 6.14. Remove ellipses (...) in the column titles.
3	6	6.2.2.1	6.54	1677	1678	Figure 6.4. In the gray box to the top right, "Use default $AB_{NF3,CF4}$ & $AB_{F2,CF4}$ equipment OEM Emission Rate, or electronics Manufacturer" should be " <b>Use default factors <math>AB_{NF3,CF4}</math> &amp; <math>AB_{F2,CF4}</math> in Eq. 6.7 and 6.15.</b> " In diamond [4], "Table 6.12" should be "Table 6.17."
3	6	6.3.1	6.58	1796	1796	"abatement" should be "emissions control systems"
3	6	6.3.1	6.58	1826	1826	"probabilities of distribution functions (PDFs)" should be "probability distribution functions (PDFs)"
3	6	6.4.1	6.63	1927	1928	Delete fragment "Reporting and documentation" at the end of the paragraph.
3	6	6.4.2	6.64	1949	1950	Table 6.23, last row on page 64. Add "s" to "Number" and add "with" to obtain the following: "Numbers of EWC and TFD tools equipped <b>with</b> suitable emissions control technologies."
3	6	6.4.2	6.65	1949	1950	Table 6.23, 1st row on page 65. Add "s" to "number" in "Total number of EWC and TFD tools ."



Volume	Chapter	Section	Page	Start line number	End line number	Correction
3	6	References	6.66	1975	2195	<p>References added:</p> <p>Czerniak, Mike, "Mechanisms for PFC Formation in CVD Applications," SESH 2018 Symposium</p> <p>Gray, Fraser, and Afroza Banu, "Influence of CH<sub>4</sub>-F<sub>2</sub> mixing on CF<sub>4</sub> by-product formation in the combustive abatement of F<sub>2</sub>," Research Disclosure September 2018, 986-989.</p> <p>Li, Shou-Nan, Jung-Nan Hsu, Hui-Ya Shih, Shu-Jen Lin and Jen-Liang Hong (2002). "FTIR spectrometers measure scrubber abatement efficiencies." Solid State Technology. 45. 157-165.</p> <p>Semiconductor Industry Association (2012c). Response to EPA's Stack Test Question 1. March 7, 2012, URL <a href="https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0064">https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0064</a></p> <p>Semiconductor Industry Association (2012e) Questions for SIA on Abatement System DRE, Uptime, and Related Requirements, March 6, 2012, URL <a href="https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0073">https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0073</a></p> <p>Semiconductor Industry Association (2012f) Report to EPA on Etch Factor Proposal for Fab GHG Emissions Reporting, February 28, 2012, URL <a href="https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0074">https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0074</a></p> <p>Semiconductor Industry Association. Attachment A. Additional 2012 Etch Emissions Characterization Data, URL <a href="https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0095">https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0095</a></p> <p>U.S. Environmental Protection Agency, (2010) Draft Emission Factors for Refined Semiconductor Manufacturing Process Categories, Office of Air and Radiation. [EPA-HQ-OAR-2011-0028-0067] URL <a href="https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0067">https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0067</a></p> <p>U.S. Environmental Protection Agency, (2012c) Technical Support for Other Technical Issues Addressed in Revisions to Subpart I, Office of Air and Radiation, URL <a href="https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0084">https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0084</a></p>

Volume	Chapter	Section	Page	Start line number	End line number	Correction
3	6	References	6.67	1975	2195	<p>Delete the following references, which are not used in Chapter 6:</p> <p>Intel. (2016) Abating greenhouse gases at Intel Corporation. Technology and Operations Management, URL <a href="https://rctom.hbs.org/submission/abating-greenhouse-gases-at-intel-corporation/">https://rctom.hbs.org/submission/abating-greenhouse-gases-at-intel-corporation/</a></p> <p>Intel. (2015) Intel Global Climate Change Policy Statement. URL <a href="http://www.intel.com/content/dam/www/public/us/en/documents/corporate-information/environment-climate-change-policy-harper.pdf">http://www.intel.com/content/dam/www/public/us/en/documents/corporate-information/environment-climate-change-policy-harper.pdf</a></p> <p>Office of Sustainability, City of Austin. (2014) Industrial Process Advisory Group. URL <a href="https://austintexas.gov/sites/default/files/files/Sustainability/Climate/Industrial_TAG_Sept_17_update.pdf">https://austintexas.gov/sites/default/files/files/Sustainability/Climate/Industrial_TAG_Sept_17_update.pdf</a></p> <p>Ottinger, D., Averyt, M. &amp; Harris, D. (2015) US consumption and supplies of sulphur hexafluoride reported under the greenhouse gas reporting program.. Journal of Integrative Environmental Sciences, 12(5): 16.</p> <p>Semiconductor Industry Association. (2011) Petition for Reconsideration and Request for Stay Pending Reconsideration of Subpart I of the Final Rule for Mandatory Reporting of Greenhouse Gases, DOCKET NO. EPA-HQ-OAR-2009-0927, URL <a href="https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0070">https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0070</a></p> <p>Semiconductor Industry Association. (2015) Semiconductor industry concerns with inclusion of abatement requirement in product environmental standards. URL <a href="https://www.semiconductors.org/clientuploads/directory/DocumentSIA/Environment/Abatement%20in%20product%20standards%20nov%202015.pdf">https://www.semiconductors.org/clientuploads/directory/DocumentSIA/Environment/Abatement%20in%20product%20standards%20nov%202015.pdf</a></p> <p>World Semiconductor Council. (2011) Joint statement of the 15th meeting of the World Semiconductor Council. URL <a href="http://www.semiconductorcouncil.org/wp-content/uploads/2016/07/WSC_2011_Joint_Statement.pdf">http://www.semiconductorcouncil.org/wp-content/uploads/2016/07/WSC_2011_Joint_Statement.pdf</a></p> <p>World Semiconductor Council. (2016) Joint statement of the 20th meeting of the World Semiconductor Council. URL <a href="https://www.semiconductors.org/clientuploads/Trade%20and%20IP/20th%20WSC%20Joint%20Statement%20May%202016%20Seoul%20FINAL.pdf">https://www.semiconductors.org/clientuploads/Trade%20and%20IP/20th%20WSC%20Joint%20Statement%20May%202016%20Seoul%20FINAL.pdf</a></p>
3	6	References	6.69	2149	2149	<p>Delete reference listed as "US Environmental Protection Agency. (2012a) Report to EPA on Etch Factor Proposal for Fab GHG Emissions Reporting, February 28, 2012, URL <a href="https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0074">https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0028-0074</a>"</p>

Volume	Chapter	Section	Page	Start line number	End line number	Correction
3	7	7.1.2.1	7.12	325	326	Footnote b) was added to table 7.3A (NEW) to address rounding issues (applies to row with Commercial, Industrial and Transport Refrigeration): "Due to rounding, sums of individual items may not equal the totals".
3	7	7.5.2.1	7.26	743	743	"Additon" should be "Addition"
3	7	7.5.2.1	7.29	854	854	"where" should be "were"
3	7	7.5.2.3	7.34	1074	1074	"..will be probably..." should be "..will probably be.."
3	Annex 1	2B9	A1.3	21	21	"2B9 FLUORORCHEMICAL" should be "2B9 FLUORO-CHEMICAL"
3	Annex 1	2B9	A1.3	24	25	"2B9 FLUORORCHEMICAL PRODUCTION (UPDATED)", 2nd table, column labelled "B", there is a leftover footnote "3)" that has been deleted, and the callout here should also be deleted. The callout "3)" removed.
3	Annex 1	2C3	A1.14	96	97	Worksheets – 2C3, 13 of 14, column D: "-0.0972* B + 0.890" should be "-0.0972* B + 0.8905".
3	Annex 1	2C3	A1.14	99	100	Worksheets – 2C3, 14 of 14, column D: "-0.0981 * B2 + 0.381 * B + 0.341" should be "-0.0981 * B2 + 0.381 * B + 0.3413".
3	Annex 4	Annex 4	A4.2	11	11	"and general glossary in Volume 1 of the 2006 IPCC Guidelines" should be "and general glossary of the 2006 IPCC Guidelines".
3	Annex 5	-	-	-	-	Chapter titles were added
3	Annex 5	-	A5.19	210	211	Equation titles of equations 6.21, 6.22, 6.23, 6.24, 6.25, 6.26 were corrected accordingly to corrections implemented in the Chapter 6
<b>Volume 4</b>						
4	1	-	-	85	85	Added capitalised 1.INTRODUCTION in line with the 2006 IPCC Guidelines style guide.
4	1	-	-	98	98	Added 2019 Refinement.
4	1	-	-	115	115	Added Revised in italics in line with style guide
4	1	-	-	160	160	Abbreviated of inter-annual variability to read IAV in abbreviation
4	1	-	-	183	183	to read <del>nitrous oxide</del> (N2O) in abbreviation
4	1	-	-	459	459	to read <del>Managed Land Proxy</del> (MLP) in abbreviation
4	1	-	-	467	467	emissions and removals abbreviated to E/R
4	1	-	-	469	469	word have changed to read has
4	1	-	-	470	470	emissions and removals abbreviated to E/R
4	1	-	-	487	487	Methane changed to CH <sub>4</sub>
4	1	-	-	500	500	methane emission changed to read CH <sub>4</sub> emissions
4	1	-	-	511	511	remove comma with conjunction after wood products

Volume	Chapter	Section	Page	Start line number	End line number	Correction
4	1	-	-	98-99	98-99	Added Revised in italics in line with style guide
4	1	-	-	Figure 1.4		burning of biomass in forest lands/croplands/grasslands should be read as burning of biomass of forest land/cropland/grassland
4	1	-	-	Figure 1.4		burning of biomass in other land should be read as "burning of biomass of all other lands"
4	1	-	-	Table 1.2 Updated		Word Revised in Italics added in header and in table
4	2	-	-	189	189	bracket removed
4	2	-	-	200	200	legen completed,including adding unit
4	2	-	-	392	392	"REDD+" spelled out
4	2	-	-	394	394	"REDD+" replaced with "Redd-plus"
4	2	-	-	511	511	space added after "DBH"
4	2	-	-	524	528	"," and "." replaced with commas
4	2	-	-	529	529	Figure 2.2A to read Figure 2.2a
4	2	-	-	600	600	diameter at breast height to read (DBH)
4	2	-	-	611	611	Box 2.2 C to read Box 2.0c.
4	2	-	-	625	625	Box 2.0c.National GHGI inventories to read NGHGI
4	2	-	-	661	661	Box 2D (new) insert hyphen to read as ALOS-2
4	2	-	-	709	711	National GHGI inventories to read NGHGI
4	2	-	-	768	768	wording dead organic matter inserted before (DOM )
4	2	-	-	777	777	"Figure 2.4" replaced with "Figure 2.3"
4	2	-	-	868	868	add hyphen on noncommercial to read non-commercial
4	2	-	-	959	959	change buildup to build-up

Volume	Chapter	Section	Page	Start line number	End line number	Correction
4	2	-	-	1428	1429	<p>The posted version should have this sentence above equation 2.25A.</p> <p>The impact of biochar C amendments on mineral soils can also be estimated with a Tier 2 method for mineral soils using Equation 2.25A and adding this estimate to the result in Equation 2.25[1].</p> <p>There was also a footnote in the sentence with the biochar definition as it applies to this equation. See lines 1343 and 1344 in the final version that I sent you with the edits to biochar in Chapter 2 during the week at the plenary in Kyoto. Hopefully this sentence can be added since it provides the context for Equation 2.25A. Currently there is no sentence to introduce the equation in the advance version of Chapter 2 posted on the TSU web site. Footnote to read: <i>Biochar is a solid carbonised product from thermochemical conversion through pyrolysis (heating with limited air). The term biochar is used herein only to refer to materials that have been produced under process conditions in which relatively easily mineralisable organic materials are converted to more persistent forms by heating to above 350°C with limited air through a gasification or pyrolysis process. This guidance does not deal with pyrolytic organic materials that result from wild fires or open fires, and is only applicable for biochar added to mineral soils.</i></p>
4	2	-	-	1578	1578	added the acronym (NIR)
4	2	-	-	1622	1623	Rothamsted Carbon Model (RothC) spelled out as first occurrence
4	2	-	-	1669	1669	Rothamsted Carbon Model deleted since it is not the first occurrence
4	2	-	-	1758	1758	National GHGI inventories to read NGHGI
4	2	-	-	1807	1813	National GHGI inventories to read NGHGI
4	2	-	-	1976	1976	remove comma after carbon stock in "heterogeneity in the carbon stock, and"
4	2	-	-	2035	2035	Change analyze to analyse
4	2	-	-	2064	2064	Change analyze to analyse
4	2	-	-	2251	2251	National Inventory Report to be read NIR
4	2	-	-	2387	2387	wording "quality assurance/quality control" inserted
4	2	-	-	2518	2518	National GHGI inventories to read NGHGI
4	2	-	-	2573	2900	inter-annual variability to read IAV
4	2	-	-	2615	3010	National GHGI inventories to read NGHGI
4	2	-	-	2729	2867	deleted Manged Land Proxy
4	2	-	-	2753	2754	National Inventory Report to be read NIR

Volume	Chapter	Section	Page	Start line number	End line number	Correction
4	2	-	-	Box 2.0A		Allocation of Box 2.0A at the end of 2.2.2
4	2	-	-	Box 2.2 L		Net E/R plus non CO2 to read non-CO <sub>2</sub> with hyphen
4	2	-	-	Box 2.2E		National GHGI inventories to read NGHGI
4	2	-	-	Figure 2.1		add unchanged to Figure 2.1
4	2	-	-	Table 2.4 and Table 2.6		Table 2.4 , page 48-49 and Table 2.6 page 54 post harvest to read post-harvest
4	2	-	-	Table 2.6A		Table 2.6A step 5: -Change analyze to analyse
4	3	-	-	57	57	Move Box 3.1a (New) Examples of assigning ipcc land-use and land-use change categories from tables TOC to a separate heading, Boxes are meant to give information
4	3	-	-	411	411	analyze changed to analyse
4	3	-	-	619	619	deleted second occurrence of "used"
4	3	-	-	1296	1296	Radarsat capitalised to RADARSAT
4	3	-	-	1538	1538	analyze changed to analyse
4	4	-	-	101	101	add comma after forest soils
4	4	-	-	186	186	remove comma with conjunction after peer-reviewed
4	4	-	-	244	244	add comma after thus
4	4	-	-	443	443	remove comma with conjunction after bracket of word chapter 2
4	4	-	-	1441	1441	deleted "copied"
4	4	-	-	Table 4.4		second Tropical dry to be read Tropical Mountain.
4	4	-	-	Table 4.12		Page 4.53 Continential to read Continental
4	5	-	-			replace unitless with dimensionless
4	5	-	-	216	216	remove comma with conjunction after management system
4	5	-	-	307	307	add hyphen to read high-resolution
4	5	-	-	356	356	Table 5.4 first row under crop system Fallow- under description column, remove comma with conjunction after fallows
4	5	-	-	433	433	fertilisation spelled fertilization
4	5	-	-	466	466	to read ligno-cellulose with hyphen
4	5	-	-	622	623	corrected spelling to read dimensionless
4	5	-	-	829	829	Table 5.5 under description column, penultimate sentence to read includes
4	5	-	-	844	844	typo corrected leveling to read levelling
4	5	-	-	1203	1203	remove comma with conjunction after possible
4	5	-	-	1457	1457	corrected typo leveling to levelling
4	5	-	-	1700	1700	to read deep-water with hyphen
4	5	-	-	1847	1847	typo corrected understanding

Volume	Chapter	Section	Page	Start line number	End line number	Correction
4	5	-	-	3719	3720	Constant "a" to be read as two elements: "contant" and "a"; accrdingly the definition of constant is provided
4	5	-	-	Table 5.1	Table 5.2	added the following footnote to hedgerows "Biomass storage rates and tree density for hedgerows are presented per kilometer of hedgerows, not per hectare of agricultural field or per hectare of hedgerow"
4	5	-	-	Table 5.5a		soil C stock rrafted as SOC
4	5	-	-	Table 5.7		error during iteration of version control in refinement process, Replace Table 5.7 with original disturbance matrix in 2006GL
4	6	-	-	92	92	Food and Agriculture Organization inserted
4	6	-	-	175	175	leveling corrected to levelling
4	6	-	-	520	520	remove comma with conjunction after 3
4	7	-	-			removing squared brackets from units in equations legend
4	7	-	-	535	535	page 19 measurement based - include hyphen to read measurement-based
4	7	-	-	680	697	page 23 $EF_{CO_2\ age\leq 20, j}$ Change to $CO_2$
4	7	-	-	741	741	page 24 model based - include hyphen to read model-based
4	7	-	-	940	940	page 29 $F_{CO_2Anthrop}$ . Change to $CO_2$
4	7	-	-	950	950	page 29 $F_{CO_2Anthrop}$ . Change to $CO_2$
4	7	-	-	959	959	page 30 $EF_{CO_2\ age\leq 20, j}$ Change to $CO_2$
4	7	-	-	1833	1833	Reference corrected
4	8	-	-	456	456	doi referemce links removed
4	8	-	-	Table 8.1		Table references notation corrected to correspond with number in source column of table
4	8	-	-	Table 8.2		Table references notation corrected to correspond with number in source column of table
4	9	-	-	Cover Page		removal of capital R to read no refinement
4	10	-	-	740	742	Equation 10.10, equation text format used for the second equation, need to delete the first one
4	10	-	-	879	886	Equation 10.18a (Updated) equation title for estimation of dry mater intake for Heifers to read as equation title format
4	10	-	-	1476	1476	the current text "countries are mixing Tier 1 and Tier 2 methods and volatile solids are calculated through Equation 22A and are", should be "countries are mixing Tier 1 and Tier 2 methods and volatile solids are calculated through Equation <b>10.22A</b> and are"

Volume	Chapter	Section	Page	Start line number	End line number	Correction
4	10	-	-	1966	1966	the current text "P = productivity class, high or low, to be considered if using the Tier 1B approach" Should be read as "P = productivity class, high or low, to be considered if using the <b>Tier 1a</b> approach"
4	10	-	-	2071	2079	the current text "Nintake(T) = the annual N intake per head of animal of species/category T , kg N animal-1 day-1" Should be "Nintake(T) = the <b>daily</b> N intake per head of animal of species/category T , kg N animal-1 day-1"
4	10	-	-	2080	2080	In the legend to Equation 10.31A (new equation), quantity Nretention (T) is wrongly defined as the "fraction of daily N intake ...". This should be replaced by "amount of daily N intake by head of animal of species / category T....., kg N animal-1 day-1".
4	10	-	-	2105	2106	the current text "CP% = percent crude protein in dry matter for growth stage "i"", The text should be updated as "CP% = percent crude protein in dry matter for growth stage "i" <b>(Table 10A.1, Table 10A.2 and Table 10A.3 present default CP% values for all regions)</b>
4	10	-	-	2126	2127	the current text "Milk PR% = percent of protein in milk, calculated as $[1.9 + 0.4 \bullet \%Fat]$ , where %Fat is an input, assumed to be 4% (applicable to dairy cows only)." The following revision should be implemented "Milk PR% = percent of protein in milk, calculated as $[1.9 + 0.4 \bullet \%Fat]$ , where %Fat is an input, assumed to be 4% (applicable to dairy cows only), <b>or the values reported in Table 10A.1, Table 10A.2 and Table 10A.3 can be used.</b>
4	10	-	-	2199	2199	replacing "excretion" with "retention"
4	10	-	-	2207	2207	replacing "excretion" with "retention"; and adding "and broilers"
4	10	-	-	2204		DWG reads WG
4	10	-	-	2325	2328	Add the subfix (T,S)
4	10	-	-	2334	2335	redrafted as: "FRACTION OF MANAGED MANURE N LOST PRIOR TO APPLICATION TO MANAGED SOILS FOR THE PRODUCTION OF FEED, FUEL OR FOR CONSTRUCTION USES"
4	10	-	-	2338	2343	Add the subfix (T,S)
4	10	-	-	2344	2344	Add the subfix (S)
4	10	-	-	2345	2345	the current text "FracLossMS = total fraction of managed manure nitrogen for livestock category T that is lost in the manure management system S, %", should be as "FracLossMS = total fraction of managed manure nitrogen for livestock category T that is lost in the manure management system S"; %unit should be removed
4	10	-	-	2344	2348	redrafted as: "emission factor for direct N2O emissions from manure management system S; in this case considered dimensionless (see Table 10.21)"



Volume	Chapter	Section	Page	Start line number	End line number	Correction
4	10	-	-	2361	2361	Equation 10.34B - is referred as Equation 10.34C in the text on page 10.105, should be 10.34B.
4	10	-	-	2346	2350	the current text FracGASMS _ FracLEACHSMS _ FracN2MS = <b>amount</b> of managed manure nitrogen for livestock category T...", should be as "FracGASMS _ FracLEACHSMS _ FracN2MS = <b><u>fraction</u></b> of managed manure nitrogen for livestock category T ..."
4	10	-	-	2366	2371	consistently with the rprevious comment, "amount" to be replaced with "fraction". Reference to table 10.23 moved to RN2(N2O)
4	10	-	-	2392	2392	Equation 10.34B - is referred as Equation 10.34C in the text on page 10.105, should be 10.34B.
4	10	-	-	Table 10.19, footnote 4		the current text" 4 Values are taken from FAO GLEAM databases (FAO 2017). High and low estimates are simplified extracts from the model database and may be prone to refinement in the final draft. Means of high and low productivity systems are simple means and will be refined in the final order draft." . The second sentence should be removed. The updated text should be as "Values are taken from FAO GLEAM databases (FAO 2017). " ( page 10.93)
4	10	-	-	Table 10.14, footnote 7		Should be read as "Uncertainty is $\pm 30\%$ consistent with the 2006 <b>IPCC</b> guidelines", the current text "Uncertainty is $\pm 30\%$ consisten with the 2006 guidelines"
4	10	-	-	Table 10.18		Cell "Pasture/Range/Paddock", should be read as "Pasture/Range/Paddock ( <b>PRP</b> )" further, add the following footnote: "3 Comparative definitions with the EMEP/EEA Air Pollutant Emission Inventory 2016 Guidebook can be found in Annex Table 10A.10"
4	10	-	-	TOC		List of contents: Chapter 10: should be manure management in singular not plural, managements
4	11	-	-	44	44	retain the wording mineralise
4	11	-	-	157	157	retain the wording mineralisation
4	11	-	-	426	426	retain the wording mineralised
4	12	-	-	402	402	publically corrected to publicly
4	12	-	-	TOC		Remove subheadings pages after Annex 12.A
4	12	-	-	94	94	carbon dioxide written in full
4	12	-	-	95	96	Agriculture Forestry and Other Land Use written in full
4	12	-	-	357	358	FAO written in Full
4	12	-	-	433	433	6 -month and one year to read six-month and one-year
4	12	-	-	380	380	change unplanned to unplanned
4	12	-	-	572	572	First Order Decaty written as FOD

Volume	Chapter	Section	Page	Start line number	End line number	Correction
4	12	-	-	949	949	Estimate Service Life( now in acronym ESL
4	Annex 1	-	-	Table 10A.11		it is a new guidance so "NG" added
4	Annex 1	-	-	Table 10A.17		This table is a copy of table 10.17 and it is updated as table 10A.18
4	Annex 2	-	-	Equation 11.7A		to be read "R" i.e. removed
<b>Volume 5</b>						
5	Annex 1	-	-	152	152	Replace "abiogenic" with "non-biogenic"
5	6	-	-	548	549	Remove "Default CH <sub>4</sub> and N <sub>2</sub> O EFs related to discharge in non-aquatic environments are proposed".
5	6	-	-	758	758	Change "methane correction factor" to MCF
5	6	-	-	802	802	Remove "Methane correction factor" and remove bracket from MCF
5	6	-	-	575	576	Change "Treated wastewater treatment system" to "Wastewater treatment system"
5	6	-	-	575	576	Change "Onsite sludge treatment system" to "Sludge treatment system"
5	6	-	-	811	812	Change "Treated wastewater treatment system" to "Wastewater treatment system"
5	6	-	-	811	812	Change "Onsite sludge treatment system" to "Sludge treatment system"
5	6	-	-	811	812	Change the Comments field for "composting" and "incineration and open burning" to the wording used in Table 6.3.
5	6	-	-	164	164	Change "meters" to "metres".
5	6	-	-	283	283	Change "meters" to "metres".
5	6	-	-	145	145	Change "centralized" to "centralised".
5	6	-	-	166	145	Change "centralized" to "centralised".
5	6	-	-	173	145	Change "centralized" to "centralised".
5	6	-	-	591	591	Change "urbanization" to "urbanisation".
5	6	-	-	622	622	Change "urbanization" to "urbanisation".
5	6	-	-	643	643	Change "urbanization" to "urbanisation".
5	6	-	-	717	717	Change "urbanization" to "urbanisation".
5	6	-	-	624	624	Change "utilization" to "utilisation".
5	6	-	-	871	871	Change World Health Organization (WHO) to WHO.
5	6	-	-	Multiple		Make consistent between $K_{rem}$ vs $K_{rem}$ vs $K_{REM}$
5	6	-	-	Multiple		Make consistent between $S_{mass}$ and $S_{mass}$
5	6	-	-	1306	1307	Change font and font size to match rest of document.

Volume	Chapter	Section	Page	Start line number	End line number	Correction
5	6	-	-	503	503	Change ", See" to ". See" in various equations.
5	6	-	-	586	586	Change ", See" to ". See" in various equations.
5	6	-	-	643	643	Change ", See" to ". See" in footnote 4.
5	6	-	-	394	394	Change "(See" to "(see".
5	6	-	-	1037	1037	Change "(See" to "(see".
5	6	-	-	1135	1136	Remove "(EF)"
5	6	-	-	621	641	Moved to after Table 6.5