| **#** | **Chapter** | **Comment Type** | **Figure/ Table Number** | **Start Page** | **End Page** | **Start Line** | **End Line** | **Comment** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | Whole Document |  |  |  |  |  | The units of emissions in particular need to be consistent and consistently labeled. It is often unclear whether emissions are stated in mass of the specific compound or in mass of CO2 equivalent. |
| 2 |  | Whole Document |  |  |  |  |  | The organization of SOCCR-2 provides a challenge to the reader to understand the contributions from the various terrestrial carbon pools (soils, above ground live biomass, dead woody debris) in different regions of North America to the overall carbon budget of North America. The discussion of the amounts of carbon present in these pools and the processes controlling the exchange of carbon between pools are divided between the various chapters, which in some cases discuss specific biomes that involve multiple pools (e.g., forests, grasslands, wetlands, agriculture, etc), a specific pool that involves multiple regions and biomes (e.g., soils), and a specific region that cross-cuts biomes and pools. As a result, there is a tremendous amount of overlap between chapters, with no discussion in the report of (a) where the different components of the carbon budget are discussed; and (b) what levels of overlap are present in the different chapters. A few examples illustrate this confusion. First, what is the difference in the forest areas discussed in Chapters 9 and 11? Soil carbon is discussed in six separate chapters: how much overlap is there between the information on soil carbon pools and fluxes discussed in these chapters?  How do the carbon pools and fluxes discussed in Chapters 11 and 13 differ, as the majority of inland wetlands in North America are located in areas with permafrost? In summary, there is a great deal of overlap between the information presented in different chapters that goes unexplained to the reader.  Related to the overlap between chapters, I found the description of the terrestrial carbon pools presented on page 4, lines 20 to 21 to be confusing. The terrestrial biosphere includes both live vegetation and dead organic matter, much of it stored is soils. Soils, in turn, contain areas with thawed soils and frozen soils (permafrost). Thus, permafrost itself does not store carbon, it is the soils in areas with permafrost that are frozen that contain a large reservoir of carbon. There are actually four processes responsible for regulating carbon fluxes between terrestrial and land ecosystems and the atmosphere: photosynthesis, respiration (autotrophic and heterotrophic), and combustion from fire. Since SOCCR-1, there has been a great deal of research devoted towards producing estimates of direct emissions from biomass burning during human caused and natural fires in natural and human impacted landscapes (in addition to emissions from burning of biomass for heating and cooking). Thus, there are now estimates of fluxes from combustion during biomass burning in terrestrial ecosystems and it is no longer necessary to provide a combined estimate for total respiration and fire â€“ one can now present an estimate of combustion emissions in Figure 1.1. Based on the GFED-4 data base (http://www.globalfiredata.org/data.html), for the period of 2002-2011, combustion emissions were 2.1 +/- 0.3 Gt C/yr, or 25% of emissions from the burning of fossil fuels. Following this line of thought, Line 26 on page 4 is not correct. There are four natural processes that regulate carbon exchange between the land and the atmosphere â€“ photosynthesis, respiration (autotrophic and heterotrophic), and combustion. In lines 29-30, it is overly simplistic to say that fire and other disturbance represent accelerated forms of respiration processes, because these disturbances actually influence all three of the natural processes that regulate land/atmosphere carbon exchange. Given the amount of research that has gone on by CCIWG agencies on the impacts of disturbance on terrestrial carbon cycling since SOCCR (especially the numerous studies based on the use of satellite and airborne remote sensing data), I think this report could present a more nuanced discussion of the impacts of disturbance, especially fire, which is a major source of annual GHG emissions on an annual basis. Finally, on page 211, Lines 18-26. As with elsewhere in this report, this paragraph does not accurately portray the three processes that regulate carbon fluxes between the land and atmosphere. While it correctly identifies photosynthesis and respiration as two processes responsible for carbon fluxes, it does not identify combustion of biomass as a key process. Instead, they use the generic term disturbance, which in fact is an important control on ecosystem processes (mortality, redistribution of biomass, initiating of secondary succession, creation of a large dead woody debris pool) that control respiration and photosynthesis, as well as represent a direct flux of C to the atmosphere (combustion). Note that the research that produced the GFED-4 data bases provides fluxes from fires for the NA region for the period of 2004-2013 (107 Tg +/- 23 Tg C/yr for the period of 2004-2013), which could be discussed in this chapter. Not only do we now have estimates of C fluxes from fires, but we also know their temporal and spatial distribution from the analyses of satellite remote sensing data. Finally, throughout the entire report, the authors should adopt a single protocol for referring to masses of carbon and areas. A number of different units are used, which is confusing. |
| 3 |  | Whole Document |  |  |  |  |  | Units for reported values vary considerably among chapters and should be standardized |
| 4 |  | Whole Document |  |  |  |  |  | We are strong proponents of systemic analysis. However, the authors of Chapter 5 are not at liberty to arbitrarily choose to rewrite UNFCCC accounting standards to their own choosing, particularly when the selectiveness is being performed to promote specific policy positions (e.g., p. 118 paragraphs 1-3). This is absolutely forbidden in assessment work. How can the authors be unaware of this? SOCCR2's overall leads simply must do a better job of instructing the authors of this report regarding their responsibilities. Under no circumstances may scientific assessment work be used for advocacy or to make policy recommendations, which is done all over this chapter. We will not allow the credibility of the National assessment effort to be undercut by such inappropriate content. If the next draft contains similar advocacy, this report will not be published. |
| 5 |  | Whole Document |  |  |  |  |  | Chapter 5, page 119 lines 1-14. This is only one example of overt advocacy in the agriculture chapter. Automatic fail for any scientific assessment. I realize that this is an early draft. But if the next draft contains anything even remotely like this, this report will be dead. SOCCR2's overall report leads need to engage thoroughly, and yesterday. Advocacy should never have been in any draft, authors should not be under the impression that this is allowable, and rejection of the report due to this type of content will affect authors well beyond this chapter. |
| 6 |  | Whole Document |  |  |  |  |  | SOCCR2 Report Leads: This comment is inspired by Chapter 5, but has implications across the document. Energy inputs, to give only one example from the chapter, are not typically included in any standard (e.g., UNFCCC) agricultural emissions inventory framework. Chapter 5 authors have elected to invent a new standard, subject to no review whatsoever, and antithetical to the well-reviewed and tested standard accounting procedures of the UNFCCC. To base analysis on a new standard requires a great deal of additional, and absent, explanation. Beyond a rationale and a technical validation, which themselves have not been provided and require a great deal of additional work currently not in the literature, if SOCCR2 leads choose to proceed in this way, then SOCCR2 leads must create an overall inventory for the report as a whole that fully accounts for the double-accounting that has occurred here across the chapters, which each take a different approach. Right now, energy and transportation are accounted for in multiple chapters (that is, their own chapters, as well as Chapter 5 on Agriculture). The energy used to create agricultural inputs, for example, is already accounted for elsewhere in SOCCR2. The authors must choose: Either eliminate double accounting, use editorial techniques to avoid overt double-accounting (e.g. a separate section or a text box for food system elements outside of the agricultural accounting system), or revert to accepted UNFCCC standards. There is no optoin #4 where authors invent their own accounting framework. |
| 7 |  | Whole Document |  |  |  |  |  | SOCCR2 Overall Leads: Your report's authors need to know that advocacy is inappropriate in a scientific assessment analysis. There are many instances of it in Chapter 5 - it is unclear that the report's leads have even read it. The Chapter is also very poorly organized - unreadably so, to the point that it appeared that you were asking the reviewers of this early draft to do that editorial work on behalf of the authors, which was too much to ask. I have put this comment in the "whole document" section of the response in order to be clear about one thing: As SOCCR2's leads, you have not done your jobs with the author teams. We understand that this is an early draft. However, you must engage in a meaningful way prior to issuing the next internal draft, including providing standards (e.g., GHG accounting standards such as those provided by the UNFCCC so this report is not overcounting emissions), guidance (e.g., no policy advice. not overt, not veiled, not anything - they have gone off the deep end, here), editing the document itself prior to distribution of the draft, and consistency across the document (e.g., why is there a discussion of grasslands in both the ag and the grasslands chapter, and why aren't they consistent?). As overall leads, these are your responsibilities. You have abused my time with this draft that should never have been distributed. If the next version has advoacy language in it, I must presume that you are not taking the assessment process seriously and as a consequence, there will be no third reading. The report will cease to progress at that point. The violations of assessment policy in this draft really are that serious. Please pay attention to your report. It should never have gone forward so early in the process without internal review. Lead the report, if you are going to. |
| 8 |  | Whole Document |  |  |  |  |  | In Section "About this Report" Page 3, beginning on line 8: â€œU.S. and North American carbon cycle processes,â€ Confusing as US is part of North America and we treat Canada and Mexico separately in some cases. If we mean North America with emphasis on US then letâ€™s say that. We do say that later (p.7, line 23.); we just need to be consistent. â€œThe status of and emerging opportunities for improving 15 measurements, observations, and projections of stocks and fluxes in the carbon cycle, including 16 uncertainty identification, are part of the Report.â€ Do we focus mostly on uncertainty in the end, or can we talk about risk management here (instead of or in addition to)? |
| 9 |  | Whole Document |  |  |  |  |  | "the members of the CCIWG, including NOAA, NASA, DOE, USDA, USGS, NIST, EPA, and NSF, and 8 the CCIWG-led U.S. Carbon Cycle Science Program" Add USAID |
| 10 |  | Whole Document |  |  |  |  |  | Page 8 Line 31 "an ecosystemâ€™s 31 vulnerability to changes to the carbon cycle may be affected by the history of land-use change, natural 32 climate variability, landscape-scale heterogeneity, anthropogenic effects, and more." Hard to understand |
| 11 |  | Whole Document |  |  |  |  |  | Throughout, I would delete phrases such as â€œare thoughtâ€ or "is thought" or â€œare estimatedâ€ or â€œis believed.â€ Those words add no understanding. Every assertion we make in any realm of analysis includes this implicit understanding. We just need to cite the underlying evidence. Readers can then draw their own conclusions about whether they agree. There is a tendency to over-qualify many statements, which makes it seem like they are "only opinions" when in fact there is a great deal of evidence behind the conclusions. |
| 12 |  | Whole Document |  |  |  |  |  | An example of a difference between chapters: Chapter 2, page 40, lines 1-2: "influenced with unprecedented release of 2 carbon-containing greenhouse gases (GHG; such as CO2 and CH4) into the atmosphere" Very different connotation from much of chapter 1. This is much stronger language and probably more appropriate. |
| 13 |  | Whole Document |  |  |  |  |  | There are many comparisons with China, some of them very specific to particular years. I doubt this is a useful frame. In fact, given the way the US and China coordinated on their announcements of contributions to the Paris Agreement, it seems like contrasting with China could be counter-productive. I do think providing global context makes a lot of sense -- but I think there are better ways to do that than comparing always with one single country. The year that China surpassed the US in emissions really does not matter. What matters is that their are several major emitters on different economic development trajectories that also need to be part of the global solution to managing the carbon budget. Those include China, India, Indonesia, several others. |
| 14 |  | Whole Document |  |  |  |  |  | From chapter 2 (below) -- need something like this in chapter 1: "the global-scale emissions uncertainty has been increasing with time, driven by the increasing proportion of emissions from developing countries" Nice. Observations of role of developing vs industrialized countries. With that, would be helpful to distinguish countries that are least developed from ones that are on a strong economic development trajectory like China, Brazil, and India. |
| 15 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Whole Page |  | 19 |  |  |  | Section 1.2 There is inconsistency in how CO2 and CH4 amount units are written. Page 20 line 8 says "315 billion tons (gigatons [Gt])" while Page 20 line 21 says "600 PgC". Page 20 line 33 says "110 PgC/yr" with reference to CO2 while Page 21 line 27 says "150-200 Tg CH4 yr-1". |
| 16 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Whole Chapter |  |  |  |  |  | There is a lack of discussion of the role of natural terrestrial disturbances on the carbon cycle, both pulse disturbances (such as fire, insects, storm damage), as well as press disturbances (long-term drought, permafrost warming). Much research has taken place since SOCCR-1 which could be highlighted in SOCCR-2. While the important role of disturbance is presented in other chapters of this report, their importance is not reviewed in Chapter 1. |
| 17 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Whole Chapter |  |  |  |  |  | Overall, the chapter is unfinished and dependent on previous SOCCR and Carbon Cycle Science Plan language that needs a significant update. |
| 18 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Whole Chapter |  |  |  |  |  | You might consider including a sidebar that explains the differences in amounts (e.g., Gigatonnes, Pg, ppm for the basic reader |
| 19 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Whole Chapter |  |  |  |  |  | The chapter lacks citations for traceability to reported values (example page 22 lines 12-14) |
| 20 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Whole Chapter |  |  |  |  |  | There is an opportunity to link to other chapters in the text. Maybe this will be worked out in the next draft. |
| 21 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Whole Chapter |  |  |  |  |  | This whole chapter takes a much more conservative approach than I would have expected or advised. A number of specific examples below but I urge the authors to be up-front in their observations of the severity of the problem and the current trends. An example on page 25, line 21 â€œif the climate warms significantlyâ€¦â€ It is a virtual certainty that it will, even though we donâ€™t know exactly how long, how fast, or to what extreme. Writing â€œIfâ€¦.â€suggests that it might or might not â€“ that we really donâ€™t know â€“ which is not what anyone of the authors actually would say the evidence tells us, right? |
| 22 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 19 | 19 | 36 | 36 | I'm guessing that "very causing" was supposed to be "very likely causing" |
| 23 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 20 | 20 | 19 | 25 | A table would be helpful to show these differences and relationships |
| 24 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 20 | 20 | 1 | 2 | "The primary cause of the recent increase in atmospheric CO2, human 1 activities, is confirmed beyond a reasonable doubt (IPCC 2013)." This is a remarkably conservative statement (â€œbeyond reasonable doubtâ€). Seriously? The evidence base is much, much stronger than that. How about â€œas certain as scientific evidence provides in any case of which we are aware in the history of civilization.â€ IPCC needs to use language acceptable to all the participating governments; SOCCR-2 is not bound by that constraint. |
| 25 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 20 | 20 | 7 | 7 | "human actions have received a large subsidy" I understand what you mean but it could be misconstrued to mean the opposite of what you intend |
| 26 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 21 | 21 | 17 | 18 | This sentence seems to be tacked on. Maybe include a figure as well as reporting the current ppm value |
| 27 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 21 | 21 | 19 | 25 | Be sure to mention the current concentration (ppb) of methane in the atmosphere |
| 28 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 21 | 21 | 10 | 10 | â€œGlobally, between 0 and 4 PgC/yr are thought to be taken up by the biosphere.â€ I would delete phrases such as â€œare thoughtâ€ or â€œare estimatedâ€ or â€œis believed.â€ Those words add no understanding. Every assertion we make in any realm of analysis includes this implicit understanding. We just need to cite the evidence that underlies these estimates and understanding. Readers can then draw their own conclusions about whether they agree. |
| 29 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 22 | 22 | 12 | 14 | "Out of the 9.8 GtC emitted as CO2 globally in 2014, 15% are estimated to have been emitted by the US, 12 while China emitted roughly twice this amount at 27%. Since the last SOCCR report, China has replaced 13 the US as the worldâ€™s top emitter of CO2." Nice global context â€“ but message is a off base. The issue is not who is the top emitter â€“ it is that all major emitters need to contribute as much as possible if we are to avoid catastrophic consequences. So instead of talking about who is emitting more, talk about the total emissions from major emitters and trends that point in a positive direction or that need to change to achieve certain objectives. |
| 30 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 22 | 22 | 20 | 24 | "reforestation of formerly agricultural land can 22 cause increased carbon uptake over time." But there are limits to C storage from land restoration and reforestation, and there are risks of reversals. Land-based sequestration is not really equivalent to fossil fuel emissions for these reasons. That difference should at least be hinted at here (and discussed more in-depth elsewhere in the report, with a cross-reference here). |
| 31 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 22 | 22 | 25 | 29 | "Future increases in population could increase emissions from agriculture and waste as demand for more food production risesâ€¦" Add â€œalthough, such increases could be countered if food waste (estimated at 40%) can be reduced and if diets in developing countries do not mimic ruminant-heavy patterns in the United States. (Hall et al. 2009; UN...or FAO)â€ |
| 32 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 23 | 23 | 16 | 16 | "last 800 kyr" is not clear - most people donâ€™t think in terms of kiloyears. |
| 33 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 23 | 23 | 32 | 32 | I recommend that "has risen over 1.5Â°" is edited to "has risen over 1.5Â°C". |
| 34 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 23 | 23 | 14 | 14 | Clarify the NOAA 2004 CH4 standard scale. |
| 35 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 23 | 23 | 21 | 21 | "28 times" Why not use more current GWP for methane? |
| 36 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 23 | 23 | 31 | 31 | "Relative to the pre-industrial era, anthropogenic forcing is now about 2.9 W/m2" 2.9 W/m2 greater? Clarify |
| 37 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 24 | 24 | 12 | 15 | Clarify what you mean by help limit rates of climate change. |
| 38 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 24 | 24 | 1 | 3 | "which form their 1 skeletons or shells out of calcium carbonate. This, in turn, is likely to have significant economic 2 consequences for the fishing and tourism industries (Fabry et al., 2008).â€ (Michalak et al. 2011).  Written in the future-tense. Isnâ€™t this already a problem for these sectors of the economy? |
| 39 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 25 | 25 | 31 | 31 | This section needs to address the dynamic interactions of human activities and the carbon cycle - it needs to be more than just emission reductions, but also needs to note understanding of reduction levels and how changes in climate may alter the necessary reduction levels and therefore the reduction strategies. As the document noted earlier, there is considerable uncertainty about feedbacks and the rate of natural carbon uptake; these will affect the level of anthropogenic reductions needed to avoid the worst case impacts of climate change. |
| 40 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 25 | 25 | 32 | 32 | Change "catastrophic" to "the most severe impacts of" |
| 41 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 25 | 25 | 1 | 2 | "Increased atmospheric CO2 may also lead to a fertilization effect that may lead to increased carbon 1 storage in the terrestrial biosphere, although the size of this effect is highly uncertain." Isnâ€™t it also considered likely to be a much less pronounced feedback than it was 10 years ago? If so, make that clear. Consider the balance of positive and negative feedbacks that Field et al. 2007 laid out. This might be a good place for a summary sentence citing that work. |
| 42 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 25 | 25 | 13 | 14 | "If the Arctic continues to warm, it seems possible that some of the Arctic 13 permafrost carbon will thaw and become mobilized to the atmosphere" Another example of surprisingly conservative wording. â€œseems possibleâ€¦â€ We observe permafrost thaw in many places, and we know that the carbon locked up in permafrost is labile when it thaws. And â€œIf the Arctic continues to warm?â€ We know it will. The question is how fast and for how long. |
| 43 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 25 | 25 | 27 | 27 | â€œThe empirical literature on CO2 and nitrogen deposition is mixed,â€ But there is a definite trend and thatâ€™s not reflected here |
| 44 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Text Region |  | 26 | 27 | 1 | 25 | Take a look at the section on pp.326-27 and see if the tone is what you want. You could read it to mean that we really donâ€™t have much confidence in any of our estimates. I'd suggest adding your own best expert judgment to complement the very thorough description of data sources and uncertainties. |
| 45 | Chapter 1: What is the C cycle, and why care/the C cycle in a global context | Figure | 1 | 30 |  |  |  | Figure 1 Really â€“ no flux at all from permafrost? Shouldnâ€™t we at least show a range of what is likely to be happening today? |
| 46 | Chapter 2: North American C budget past, present, and future | Text Region |  | 40 | 40 | 1 | 2 | "influenced with unprecedented release of 2 carbon-containing greenhouse gases (GHG; such as CO2 and CH4) into the atmosphere" Very different connotation from much of chapter 1. This is much stronger and probably more appropriate. |
| 47 | Chapter 2: North American C budget past, present, and future | Text Region |  | 40 | 40 | 6 | 7 | CH4 GWP cited as 25. 1) This is lower than current best estimates; 2) it is inconsistent with GWP for CH4 used in Ch 1. Need to check for consistency between ch 1 and ch 2 generally. Probably true for other chapters as well. |
| 48 | Chapter 2: North American C budget past, present, and future | Text Region |  | 40 | 40 | 16 | 17 | "the spatial patterns of carbon-containing GHG emissions are not sufficiently 16 characterized to inform local to regional carbon management decisions: Seems overstated. There are many local and regional management decisions that we can make based on understanding of which processes influence the C cycle in different ways, for example. |
| 49 | Chapter 2: North American C budget past, present, and future | Text Region |  | 41 | 41 | 1 | 41 | No mention of arctic permafrost, or land use change in the introdcution |
| 50 | Chapter 2: North American C budget past, present, and future | Text Region |  | 41 | 41 | 17 | 19 | â€œOf the three North American countries, the United 17 States contributed 85% of that total and ca. 2003 was the worldâ€™s largest emitter in absolute terms, though 18 was since passed by China in 2006.â€ I don't think this is the best framing -- using China as the comparison. What is the point of doing that? Illustrating how North America relates to the global context makes a lot of sense, but why is it important that China passed North America in a particular year? Makes it seem like it is a race among countries rather than a race for the planet to solve the problem. I could see a more general statement showing about how patterns seen in the U.S., for example, in the past, are playing themselves out now in other parts of the world (India, China, maybe other places too) -- but focusing on one country (China) seems like a mistake. |
| 51 | Chapter 2: North American C budget past, present, and future | Text Region |  | 41 | 41 | 23 | 23 | â€œConsidering the residual in the atmospheric carbon budgetâ€ Need to avoid this jargon. Residual. |
| 52 | Chapter 2: North American C budget past, present, and future | Text Region |  | 42 | 42 | 29 | 32 | missing paragraphs or sentences |
| 53 | Chapter 2: North American C budget past, present, and future | Text Region |  | 42 | 42 | 22 | 24 | "Additional factorsâ€”including woody encroachment, wetlands, and inland watersâ€”are accounted for in the overall estimate of a 505 MtC/yr continental sink in year 2003, but these estimates (120, 23, and 25 MtC/yr, respectively) are considered highly uncertain (within 50 to 100% of the estimate)." Can you say if the direction of these factors is considered uncertain or only the magnitude. |
| 54 | Chapter 2: North American C budget past, present, and future | Text Region |  | 43 | 43 | 1 | 25 | Nice job |
| 55 | Chapter 2: North American C budget past, present, and future | Text Region |  | 43 | 46 | 25 | 14 | Section 2.3 - Tough to track the line of reasoning throughout |
| 56 | Chapter 2: North American C budget past, present, and future | Whole Page |  | 43 |  |  |  | Lines 23-25,27-30 Needs to be updated |
| 57 | Chapter 2: North American C budget past, present, and future | Whole Page |  | 45 |  |  |  | Lines 20-21, 27-29 Needs to be updated |
| 58 | Chapter 2: North American C budget past, present, and future | Text Region |  | 39 | 39 | 25 | 33 | Key findings need to be updated |
| 59 | Chapter 2: North American C budget past, present, and future | Text Region |  | 40 | 40 | 6 | 7 | "There is greater inerest" instead of "there is greater concern"? The senetnce in the text can be improved |
| 60 | Chapter 2: North American C budget past, present, and future | Text Region |  | 44 | 44 | 11 | 16 | "According to more recent data for 2013 (Boden et al., 2015; the U.S. emitted 11 approximately 1.4 billion tons of carbon from fossil fuel burning, cement production and gas flaring â€“ accounting for 18% of the global total and ranking second among all nations behind the 2.8 billion tons of carbon emitted by China that year (Table 2.2)." Another comparison with China; throughout could find a better framing, e.g. with several other rapidly developing nations. I'm concerned about the possible message that this is a race between the US and China (or North America and China), or that given China's trends there is no need to manage anything in North America. We've certainly seen that kind of rhetoric and argument before. |
| 61 | Chapter 2: North American C budget past, present, and future | Text Region |  | 44 | 44 | 19 | 20 | "the global-scale emissions uncertainty has been increasing with time, driven by the increasing proportion of emissions from developing countries" Nice. Need something like this in chapter 1 â€“ observations of role of developing vs industrialized countries. With that, would be helpful to distinguish countries that are least developed from ones that hare on a strong economic development trajectory like China, Brazil, and India. |
| 62 | Chapter 2: North American C budget past, present, and future | Text Region |  | 45 | 45 | 17 | 18 | "the combined fossil fuel emissions from the three countries have switched to a negative trajectory of -0.7% per year for the 10-year period from 18 2004 â€“ 2013 (Figure 2.3)." Jargon. Could be read to mean that emissions are going down. I think what you mean is that the rate of increase is becoming less rapid â€“ but that emissions are still increasing over time. Try to use less jargon, and where you do need jargon guard against this type of misunderstanding. |
| 63 | Chapter 2: North American C budget past, present, and future | Text Region |  | 46 | 46 | 30 | 31 | "the boreal region of the 30 state has been a carbon source, losing 5.1 TgC per year as the result of increased fire activity in recent decades. " Nice to see this. Fire probably needs to be highlighted earlier. This is the first time Iâ€™ve seen it. |
| 64 | Chapter 2: North American C budget past, present, and future | Text Region |  | 47 | 47 | 1 | 6 | "Temperate forests in south and southeast coastal Alaska store 1,557 TgC in all major carbon 1 pools, distributed in live and dead tree biomass (1,018 TgC) and soil organic carbon (539). If managed with the current management plan (with forest harvesting) and assuming no climate change, the forest carbon could increase by 1 percent by the end of the century. Forest carbon could increase by 8 and 27 percent under the scenarios of climate change with or without harvesting, respectively." Does this account for potential increases in fire or changes in precipitation? It makes it sound like itâ€™s not plausible for this landscape to become a C source instead of a C sink. Is that correct? If so, say that explicitly. If not, not, make the bottom line clear. |
| 65 | Chapter 2: North American C budget past, present, and future | Text Region |  | 47 | 47 | 24 | 38 | â€œLand use change reported 32,42.86 Gg CO2e for 2013, representing 32 4.9% of total emissions.â€ â€œLand use change emission details (most important): Transformation to grasslands = 64.2% (28,877.56 Gg CO2 e); Transformation to agriculture = 9.8% (4,425.85 Gg de CO2 e); Forest fires = 21.4% (9,614.08 Gg de CO2 37 e).â€ First section heading that includes Mexico, I think. Certainly the first that includes a paragraph explicitly about Mexico How to reconcile this with some of information /assertions in agriculture chapter? (I will see if I can help with this.) No citations â€“ need those. |
| 66 | Chapter 2: North American C budget past, present, and future | Table | 2.1 | 56 |  |  |  | This is great. In which categories does it capture land use change? Particularly interested for potential contrast between Mexico (a developing country) and US and Canada. Is there a way to pull out that category? Or is that land-based source/sink not captured in this table? Looking further, I think you capture at least some of this in Table 2.2, but the understanding is buried in footnotes. Maybe you could make the land use change aspect more apparent in the title or structure of the table? And I am still unsure whether there are large aspects of land use change that the two tables together do not capture. |
| 67 | Chapter 2: North American C budget past, present, and future | Figure | 2.1 | 52 |  |  |  | Is it possible to find a map like this of land use change? Particularly to highlight the importance of land use change in a developing country context â€“ true in Mexico but in many other parts of the world as well. |
| 68 | Chapter 2: North American C budget past, present, and future | Figure | 2.3 | 54 |  |  |  | I am not sure the inset (o the right) is useful. It makes it look like there is very good news, because of the way the y-axis is constrained to a narrow band. The data shown in that figure on the right is as evident in the one on the left; itâ€™s not hard to see. Just donâ€™t think it merits a call-out figure. The point that does stand out is that the drop in N. Am emissions really occurred mainly in one year, which also suggests that the linear trendline shown is a bit misleading. The question the plot raises is: What happened in that year (2008-09)? |
| 69 | Chapter 3: Energy Systems | Whole Page |  | 59 |  |  |  | section 3.0.1 "including, inter alia,"--?? |
| 70 | Chapter 3: Energy Systems | Whole Page |  | 59 |  |  |  | section 3.0.5 how does this entire paragraph fir in to the desciptions with the section--seems an afterthought |
| 71 | Chapter 3: Energy Systems | Whole Page |  | 62 |  |  |  | section 3.2 paragraph starting line 33--is this necessary--the reiteration of previous two paragrapghs? |
| 72 | Chapter 3: Energy Systems | Whole Page |  | 66 |  |  |  | section 3.4 When discussing the 5, changes--the follow on paragraphs could use a table. |
| 73 | Chapter 3: Energy Systems | Whole Page |  | 72 |  |  |  | section 3.4.6 line 23--sentence that starts with "For example,"--makes no sense to me. Please rework this. |
| 74 | Chapter 3: Energy Systems | Whole Page |  | 79 |  |  |  | section 3.9 Comments on the sentence: "Key challenges in coming decades include upgrading of energy infrastructure while avoiding lock-in of 16 carbon-intensive technologies", there was no discussion on infrastructural options-(a more distributed/local, etc) that are viable when compared to the current carbon-intensive infrastructral system. |
| 75 | Chapter 3: Energy Systems | Whole Chapter |  |  |  |  |  | I very much appreciated the excellent discussion of policy in a few different contexts. One area not mentioned is commitments by industry -- and also by municipalities -- to reduce carbon footprints -- hence reduce emissions from transportation (e.g., trucking by Walmart but there are many such commitments). That might belong in other chapters and possibly cross-referenced here. |
| 76 | Chapter 3: Energy Systems | Text Region |  | 59 | 60 | 14 | 32 | The key findings are in general too long and too detailed. They need to be tightened up considerably to convey the key message and avoid too much detail. Key finding 5 is appropriate. |
| 77 | Chapter 3: Energy Systems | Text Region |  | 59 | 59 | 20 | 30 | Key finding 2 should also mention the increased leakage of methane that has been attributed to increased natural gas production. |
| 78 | Chapter 3: Energy Systems | Text Region |  | 63 | 63 | 18 | 18 | This is an opportunity to put Mexico in particular into the global context of developing countries. Any idea about Mexico GDP relative to all developing countries maybe with a few examples (e.g., Brazil, Vietnam, Malawi, Honduras)? |
| 79 | Chapter 3: Energy Systems | Text Region |  | 63 | 63 | 39 | 39 | Worth pointing out the recent energy auction in Mexico, at which Renewables won the day â€“ and for large amounts of power generation â€“ because they had the lowest cost. https://cleantechnica.com/2016/04/05/mexicos-first-power-auction-awards-1720-megawatts-of-wind-solar/ https://cleantechnica.com/2016/09/29/solar-dominates-mexicos-second-renewable-energy-auction/ |
| 80 | Chapter 3: Energy Systems | Text Region |  | 64 | 64 | 8 | 8 | I've noted in other chapters the multiple comparisons with China (and relative dearth of other comparisons). I'm not sure that is a useful comparison, particularly so often. Can we find another way to convey global context without always comparing the US to China? |
| 81 | Chapter 3: Energy Systems | Text Region |  | 65 | 65 | 4 | 6 | As noted above, need to mention Mexicoâ€™s recent energy auction and how renewable beat out fossil sources, suggesting what future trajectories could look like. (Could also be explained on page 69 but worth at least a parenthetical phrase here.) https://cleantechnica.com/2016/04/05/mexicos-first-power-auction-awards-1720-megawatts-of-wind-solar/ https://cleantechnica.com/2016/09/29/solar-dominates-mexicos-second-renewable-energy-auction/ |
| 82 | Chapter 3: Energy Systems | Text Region |  | 68 | 68 | 5 | 5 | These are not unconventional fuels, but are fuels from unconventional resources. It is appropriate to use the term "unconventional natural gas," but there is nothing inherently different about the gas, only about the resource from which it was extracted. |
| 83 | Chapter 3: Energy Systems | Text Region |  | 71 | 72 | 13 | 17 | Both biofuels and natural gas demonstrate the need to address emissions from a life cycle perspective. This is implied in the discussion of carbon neutrality of bioenergy and the note on fugitive methane emissions. The need to consider emissions across a fuel's life cycle needs to be addressed explicitly and in some detail in the chapter. |
| 84 | Chapter 3: Energy Systems | Text Region |  | 71 | 71 | 20 | 27 | Nice historical perspective. Any idea what the current situation is in Mexico? Surely biomass plays a key role in parts of Mexico still (and possibly in the country as a whole?), as it does even more strongly in many other developing countries. This is an opportunity to make that connection and put biomass-for-energy in a global context. |
| 85 | Chapter 3: Energy Systems | Text Region |  | 71 | 71 | 30 | 32 | "This energy is not tracked in the official national energy balance although the industrial use of biomass is tracked in a supplementary table (see below)." Very interesting and relevant. Should it also be included / cross-referenced in the policy/management section (if it isn't already)? |
| 86 | Chapter 3: Energy Systems | Text Region |  | 71 | 71 | 39 | 40 | "which most IPCC scenarios indicate will be necessary for keeping warming below 2 degrees C (IPCC 39 WGIII 2014, pg. 443, 447)." I would also reference 1.5 degrees given its explicit call-out in the Paris Agreement and the strong support USG has had for that agreement. |
| 87 | Chapter 3: Energy Systems | Text Region |  | 72 | 72 | 16 | 17 | This point needs to be expanded considerably and should cite from among the numerous papers that have been published in recent years. |
| 88 | Chapter 3: Energy Systems | Text Region |  | 72 | 72 | 3 | 8 | The appropriate citation for this quote is Khanna, M. et al., "SAB Review of EPA's Accounting Framework for Biogenic CO2 Emissions From Stationary Sources (September 2011)," U.S. Environmental Protection Agency Science Advisory Board, Biogenic Carbon Emissions Panel, EPA-SAB-12-011, September 28, 2012.  The report and the full list of authors can be provided if needed. |
| 89 | Chapter 3: Energy Systems | Text Region |  | 72 | 72 | 1 | 15 | Reporting on how the status of the science on biomass and emission has changed since SOCCR 1 is great, but for a reader itâ€™s not entirely clear how â€“ in a broad conceptual way â€“ bioenergy might not be C-neutral. If there is a straight-forward way to explain this â€“ even by illustration, not comprehensively â€“ in a few sentences, that would be a helpful addition. Possibly tangential -- but worth including someplace -- bioenergy plays a very different role in a rural context, where many households rely on it. This is true in many developing countries (and I assume Mexico but need to check) for fuel wood. And where energy supply in urban centers is uneven/unreliable, charcoal demand in urban centers can drive deforestation. Consider whether these points have been adequately conveyed and, if not, whether it is useful to include them. |
| 90 | Chapter 3: Energy Systems | Text Region |  | 72 | 72 | 16 | 17 | I'm very glad to see this -- was expecting elaboration. If that occurs elsewhere, maybe cross-reference here. |
| 91 | Chapter 3: Energy Systems | Text Region |  | 72 | 72 | 18 | 27 | Glad to see the section on feedbacks. It refers to demand and supply but seems to address mainly demand. For bioenergy and hydro, at least, there are clear feedbacks to supply, e.g., increased disease pressure on forests and forest vulnerability to fire could mean less wood availability for bioenergy. I expect this is covered in the forest chapter so perhaps a cross-reference here with just a sentence to outline the general issue/direction? |
| 92 | Chapter 3: Energy Systems | Text Region |  | 73 | 73 | 8 | 12 | (also relevant to p. 76 lines 9-11) "Typically, the Kaya Identity is used to help explain shifts in GHG emissions. The formula includes population change, changes in GDP per capita, changes in energy per GDP (energy intensity) and changes in carbon per energy input (carbon intensity). These factors are crucial in influencing the energy system, but there are also other factors, such as policies, awareness and social conditions that affect the adoption of technologies." The organization is very good, and I appreciate the note that the Kaya Identity does not explain all of the shifts in emissions, but Iâ€™m concerned that the role of policy is vastly understated. Subsidies in a whole variety of forms drive the mix of energy sources. In particular, there is a lot of discussion of subsidies for renewable without a parallel, simultaneous explanation of the many subsidies that fossil fuels have received. Making that more transparent would be very helpful. There is a sentence about this later (p.76) but it is very general. Specifics like those presented for building codes would be a great addition. |
| 93 | Chapter 3: Energy Systems | Text Region |  | 74 | 74 | 11 | 29 | It's great to have examples of current building codes and guidelines and how much they can reduce GHG emissions.  What can sometimes get lost in this type of discussion is the limits that interventions in one sector can have relative to trends that drive emissions more broadly. So...if we could achieve the the reductions in energy demand from buildings described here, what trajectories then drive emissions into the future? (A common example in the development context is that working on renewables and energy efficiency only gets you so far if you are still buildling coal-fired power plants.) Can you identify both the opportunity -- as you've done -- and also the limits of what we can achieve vis-a-vis carbon emission reductions compared to business-as-usual through, in this case, reduced building-centered energy demand? |
| 94 | Chapter 3: Energy Systems | Text Region |  | 75 | 75 | 5 | 10 | Would be worth a sentence or two generally describing the regulatory and management structure that does (or doesn't) influence fracking, compared to structure in place for other types of natural resource extraction and energy generation. |
| 95 | Chapter 3: Energy Systems | Text Region |  | 75 | 75 | 21 | 23 | "The present pace of progress, however, falls short of that needed in order to achieve the pace and scale of CCS deployment necessary to achieve a 2 Â°C pathway (IEA 2015)." True -- but isnâ€™t this a vast understatement? Do we even have confidence this technology will work at scale? Do we have confidence it will work well at the 22 plants? How many plants would be needed? Eventually, it would need to be incorporated into all fossil fuel based power plants. How many are there now in North America? Suggest stating the magnitude of the gap between need and deployment (and perhaps development) much more starkly. |
| 96 | Chapter 3: Energy Systems | Text Region |  | 76 | 76 | 19 | 25 | Very nice synthesis of INDC commitments from N. Am countries. A wording suggestion. Instead of "describes" and "envisions," e.g., use "commits" or "sets targets." The INDCs are supposed to set forth national-level commitments, not only ideas or visions or possibilities. |
| 97 | Chapter 3: Energy Systems | Text Region |  | 76 | 77 | 26 | 12 | "While the INDCs reflect commitments, the political activities to facilitate these goals have been developing over the past decade." Great point. Really important. For years, USAID has been supporting capacity for planning and implementating low emissions development in about 25 developing countries including Mexico. Nice detail on US and Canada. Same is true for Mexico. (You have a link and note you will discuss.) You can find additional relevant information here: http://www.climateactiontracker.org/countries/mexico.html (might also be useful for filling in Mexico-specific information in other parts of this chapter) A few specific points from that source: "Mexicoâ€™s progress in policy planning and institution building over recent years has been remarkable, including the April 2012 adoption of the General Law on Climate Change (LGCC in Spanish), one of the worldâ€™s first climate lawsâ€”and the first in a developing country. Under this law, Mexico aims to reduce its emissions by 50% from 2000 levels by 2050. The NDC proposal is consistent with this objective." "[Mexico's] Energy Transition Law, which includes a clean energy target: 25% of electricity generation by 2018, 30% by 2021, and 35% by 2024.... the way in which this law is implemented will be crucial for Mexicoâ€™s emissions pathway." "Mexico is currently undergoing a process that further details what the NDC means at the sectoral level. Within its NDC, Mexico proposes to unconditionally reduce its emissions of greenhouse gases (GHGs) and black carbon (BC) combined by 25% below business as usual (BAU) in 2030. Mexico's BAU is a scenario of emissions projections based on economic growth in the absence of climate change policies, from 2013." |
| 98 | Chapter 3: Energy Systems | Text Region |  | 77 | 77 | 14 | 14 | If specific state examples are going to be included here, California's GHG reduction efforts need to be on the list, and ideally, described. They are among the most advanced and the most ambitious. |
| 99 | Chapter 3: Energy Systems | Text Region |  | 77 | 78 | 22 | 31 | Do the recent energy auctions in Mexico (see previous comments) suggest that: (1) trends towards lower emissions will continue there; and (2) a similar pattern might emerge elsewhere in the absence of subsidies (direct and indirect) for fossil fuels? |
| 100 | Chapter 3: Energy Systems | Text Region |  | 78 | 78 | 7 | 7 | EIA or IEA? If both organizations are used, it may be appropriate to drop the acronyms and use the full names to avoid confusion. |
| 101 | Chapter 3: Energy Systems | Text Region |  | 79 | 79 | 1 | 20 | Much of this section is focused on issues that were not addressed in the chapter and are focused on policy implementation and effectiveness. The second paragraph in particular is entirely policy-related and should be removed or substantially revised. There was no discussion that I could find within the body of the chapter leading into this discussion. Similarly, the discussion of achieving the Paris objectives is focused on policy, logistics, and administration, which are questionable in the context of the chapter and the report. There are numerous gaps that are not addressed here that need to be. The issue of life cycle emissions was noted in a previous comment. Fugitive emissions in energy production is another issue that needs work. Questions about long-term behavior of shale gas reservoirs and the implications for reliance on natural gas, impacts of large-scale production of biomass resources on vegetative carbon uptake, and behavioral responses to a substantially changed energy system, such as how people might change travel patterns as vehicle types change, need further work. The chapter could also address influences that are often considered to be exogenous to the energy system, such as the increasing emphasis on on-line shopping and home delivery vs. in-store shopping and personal vehicle use, or the potential for autonomous vehicles. In general, this section needs considerable work. |
| 102 | Chapter 4: Urban | Whole Chapter |  |  |  |  |  | This chapter could benefit from significant focusing. It currently has 9 key findings, many of which seem to be less than crucial. Key finding 3, for instance, lists 7 "dominant societal drivers" of urban CO2 and implies there are more. There are certainly numerous societal drivers, but that is well known. Listing them all makes it impossible to determine which, if any, are truly dominant. The fact that per capita urban CO2 (CO2 equivalent? - should be explicit) emissions are essentially the same as rural per capita emissions strongly points to population as the dominant driver. The fact that there are significantly more opportunities for substantial emission reductions in urban areas, even with higher populations, is lost in the numerous and detailed key findings. The dominance of urban emissions also makes it clear that meeting any emission reduction goals will require substantial urban emission reductions, which would seem to be a key message that needs to be conveyed. The chapter does a good job of noting that many urban areas are taking actions that will reduce emissions. However, the key finding on policies focuses strongly on taxes, credits, and other financial mechanisms but ignore the critical importance of transportation, zoning, and building code policies. These are covered in one of the key messages and in the body of the chapter, but separating them from the policy discussion obscures the fact that some of the most beneficial approaches to GHG emission reductions are not explicitly carbon policies, especially at a local level. The governance discussion does not seem to add much to the discussion, especially given the statements that note there is little or no evidence that integrated governance has a significant effect. This seems to say that integrated, multi-level governance seems like a good idea, but it's not possible to say that it really is. While it is appropriate to note how effectiveness can be improved through coordination, access to datta or expertise, and measures that are additive rather than in conflict, those points are not clearly articulated. With the previous point about the importance of non-climate policies above, perhaps the discussion of multi-level integration would be more effective if it discussed those areas in which cities have the lead (building codes, transportation, zoning, etc.) and those areas in which state, national, or international policies are more effective (efficiency standards, technology R&D, energy system policies, etc.), and how the different areas of responsibility can be most effectively coordinated. |
| 103 | Chapter 4: Urban | Whole Chapter |  |  |  |  |  | You may have addressed this and I may have missed it -- or just forgotten by the time I got to the end of the chapter. When I read this sentence: "There are at least two important differences in the policy contexts of cities in the U.S., Canada and Mexico." I wondered: Are cities projected to grow at similar rates in the three countries? We read about the increasing number of mega-cities in developing countries. If you talk about it early in the chapter, I'd suggest cross-referencing here. If you don't, I'd suggest including it -- either to show how Mexico illustrates trends in other developing countries OR to say how a key difference between all of North America (including Mexico) and many developing countries is the emergency of megacities elsewhere (with implications for the C cycle, of course). |
| 104 | Chapter 4: Urban | Whole Chapter |  |  |  |  |  | Sometimes this chapter takes an approach that is just a little bit more academic than you might want. One example from p.94: "While there has been considerable research on the factors that drive cities to address climate change and the general approaches they develop, there has been much less work examining their progress and implementation." This sentence leads a whole section called "Policy Assessment." I think what this means is that if you really want to do a rigorous assessment of the influence policies have had, we have a long way to go. But many readers will skim the chapter and will look at this and think "Oh, maybe urban policies really haven't accomplished much." Is that the message you want to send? In other parts of the chapter, you discuss many different efforts within and among cities that suggest they are accomplishing a great deal. So I would suggest reading over the chapter and modifying places that focus on uncertainty to couch them in a more general context, using your best expert judgment. In the case above, this might look like: "Urban-centered initiatives to manage climate risk and reduce carbon emissions have provided critical leadership and accomplished a great deal, but more targeted evaluation research to attribute specific emission reductions to specific policies would enhance our ability to design and and implement effective policies in the future." |
| 105 | Chapter 4: Urban | Text Region |  | 91 | 91 | 17 | 26 | Great points, clearly written. Many people are aware of the urban-centered climate risk management efforts in the U.S. and possibly in Canada. At least in the U.S., many fewer, I suspect, are familiar with those in Mexico and in developing countries in general. It might be useful to include even a sentence or two adding a bit of detail about how widespread these efforts have been in Mexico, or how ambitious (and/or successful) they have been. |
| 106 | Chapter 4: Urban | Text Region |  | 91 | 91 | 4 | 5 | "In sum, global Projections remain uncertain, particularly because of uncertainty associated with transitions from urban to rural and vice versa in some contexts." This chapter is very impressive in many ways. This sentence, though, misses the mark entirely. We don't convey any useful information to anyone simply by saying that our summary is "it's uncertain." It would be better to omit the sentence entirely, but I suspect there is some information from the preceding section that you believe is actionable and should be highlighted. |
| 107 | Chapter 4: Urban | Text Region |  | 91 | 91 | 7 | 9 | "North American cities have generally recorded amongst the highest per capita carbon emissions when compared to global cities (Dodman, 2009; Kennedy et al 2009; Sovacool & Brown, 2010; Hoornweg et al., 2011)." Does this include Mexican cities? If so, is the general conclusion still driven by U.S. (or U.S. and Canada)? Just suggest you be careful to avoid attributing high per-capita emissions to North America broadly. |
| 108 | Chapter 4: Urban | Text Region |  | 92 | 92 | 5 | 23 | "Local climate change mitigation policy has also been promoted and expanded by municipal networks such as the C40 Cities Climate Leadership Group, ICLEI-Cities for Climate Protection, and the U.S. Conference of Mayors Climate Protection Agreement (Gore and Robinson, 2009; Kern and Bulkeley, 7 2009)." Really appreciate the specific examples of municipal organizations. "However, the impact of such network membership on local implementation or 12 broader scale policy change has yet to be demonstrated (Krause 2012; Gore 2010)." Does this sentence send the message you intend? Could easily be read to suggest that they have limited impact, if any. "One role such 13 networks may more clearly play is in helping to generate norms and standards by which cities act." But then this sentence says that they are very likely playing a very important role, with high impact, especially over longer time frames and when considering the links with other institutions. I'd suggest focusing on the likely positive impact, with an appropriate adjective to qualify statements. |
| 109 | Chapter 4: Urban | Text Region |  | 94 | 94 | 35 | 35 | Suggest rephrasing this sentence to avoid "should be" or similar - this can be read to imply that such values are policy or regulatory limits, as opposed to the intended meaning that such values are the maximum levels at which the life cycle emissions for natural gas are below those for the respective source types using other fuels. |
| 110 | Chapter 4: Urban | Text Region |  | 94 | 95 | 27 | 8 | I very much appreciate this section including the citations. Is there also work demonstrating potential for reducing leakage? Any estimates of what it would take to achieve that kind of leak reduction? I am pretty sure I have seen studies that quantify the amount of leakage (as percent of total flux) that you need to achieve in order to reach certain objectives. If any of this type of material could be included, it would be a helpful contribution. |
| 111 | Chapter 4: Urban | Table | 4.1 | 114 |  |  |  | There seems to be only one example from Mexico. That imbalance in information should be highlighted in the text that references this table, and perhaps in the chapter overall depending upon how it influences your more general points. |
| 112 | Chapter 4: Urban | Whole Chapter |  |  |  |  |  | please use metric units throughout (ie no miles or square miles) |
| 113 | Chapter 4: Urban | Whole Chapter |  |  |  |  |  | last name: Sch„fer (in author list) |
| 114 | Chapter 4: Urban | Text Region |  |  |  |  |  | in section 4.6 caution to not have any policy recommendation or subscription such as incentivizing local governments and the like |
| 115 | Chapter 5: Agriculture | Whole Page |  | 119 |  |  |  | Literature review is fine, but some kind of synthesis of the information would be welcome. Has the tendency to read as a list of loosely related facts with little bearing or consideration. |
| 116 | Chapter 5: Agriculture | Whole Page |  | 125 |  |  |  | OK, so we finally get to hear about crops. But it was never properly introduced to begin with. Again, this reflects severe organizational issues with the chapter. |
| 117 | Chapter 5: Agriculture | Whole Chapter |  |  |  |  |  | The chapter would be better organized by beginning with sources and sinks rather than drivers. Opening with food consumption moves the implicit focus from the carbon cycle to policy options. Section 5.2.2 largely focuses on food waste and loss, yet indicates (per the title) that it will address food policies. There is no discussion of policy here, and it is questionable whether there should be. While it is appropriate to note how policy requirements can affect food production and potentially loss, such a discussion needs to be careful to avoid explicit or implicit judgment about policy. Section 5.2.4 has "Social Drivers" as the first factor in the section title. There does not appear to be any discussion of social drivers in the subsequent section, although there is a brief discussion of the 1996 Farm Bill, which would seem to be appropriate for section 5.2.2. In general, the chapter needs to be reorganized and, in some cases, the sections need to be retitled. |
| 118 | Chapter 5: Agriculture | Whole Chapter |  |  |  |  |  | This chapter was not ready for internal review. The authors need to sit down with a blank page and start again to deal with the fatal organizational issues, to begin. It will be far easier to start over with an outline than to try and hammer this into the pretense of order, or to try and convince your readers that there is some kind of order. Crops alone appear to be discussed separately in at least eight different places! Some of the pieces here can be included as-is under a new organizational structure. Others need to be reevaluated entirely. I have never written a review as harsh as this one - I have never had to, and I do apologize. But there is no way to follow this, as written. Numerous comments are provided below, but the work needed is so extensive, that this list cannot be considered comprehensive. |
| 119 | Chapter 5: Agriculture | Whole Chapter |  |  |  |  |  | As written, due to organizational issues the thesis of the entire chapter appears to be that "meat is bad." That is a wholly inadequate assessment of the carbon cycle in agricultural systems - why on earth did you start here? Furthermore, as written, this is advocacy, which violates the most basic tenents of assessment work. Currently, this chapter does not meet the most basic requirements of assessment. The SOCCR2 leads should not have sent it out for consideration at this stage, should have provided guidance regarding the nature of assessments and the exclusion of recommendations, and should have edited the report to exclude such baseline violations prior to distribution. |
| 120 | Chapter 5: Agriculture | Whole Chapter |  |  |  |  |  | Very little in this chapter appears to be substantiated within the scientific literature. This may be a result of inadequate citations, or the authors may be winging it entirely - the reader cannot know. Whole paragraphs blend into one another without a single citation. As such, this chapter cannot be considered science. Every sentence should have a citation. |
| 121 | Chapter 5: Agriculture | Whole Chapter |  |  |  |  |  | The vast number of typos, grammatical errors, and undefined acronyms alone are enough to send this chapter back to the authors without further input. This chapter was not ready for preliminary consideration. |
| 122 | Chapter 5: Agriculture | Whole Chapter |  |  |  |  |  | There is no organizing principle for this chapter. Random thoughts just follow one after another. We urge the report leads to impose organization upon the chapter. |
| 123 | Chapter 5: Agriculture | Whole Chapter |  |  |  |  |  | Too many basic English composition problems with this chapter. Where is the organization? Why are random thoughts interjected into otherwise relatively cohesive paragraphs? Why are random facts listed sequentially with no theme to them? Why to section titles have nothing to do with content? Where are the leads and the editors? Reviewers should not be expected to do this work on behalf of the authors. |
| 124 | Chapter 5: Agriculture | Whole Chapter |  |  |  |  |  | N2O is included in discussions independent of it's influence on carbon cycling. This is a Carbon report. No justification is ever provided. If there is cause, please provide. |
| 125 | Chapter 5: Agriculture | Whole Chapter |  |  |  |  |  | This comment is inspired by Chapter 5, but has implications across the document. Energy inputs, to give only one example from the chapter, are not typically included in any standard (e.g., UNFCCC) agricultural emissions inventory framework. Chapter 5 authors have elected to invent a new standard, subject to no review whatsoever, and antithetical to the well-reviewed and tested standard accounting procedures of the UNFCCC. To base analysis on a new standard requires a great deal of additional, and absent, explanation. Beyond a rationale and a technical validation, which themselves have not been provided and require a great deal of additional work currently not in the literature, if SOCCR2 leads choose to proceed in this way, then SOCCR2 leads must create an overall inventory for the report as a whole that fully accounts for the double-accounting that has occurred here across the chapters, which each take a different approach. Right now, energy and transportation are accounted for in multiple chapters (that is, their own chapters, as well as Chapter 5 on Agriculture). The energy used to create agricultural inputs, for example, is already accounted for elsewhere in SOCCR2. The authors must choose: Either eliminate double accounting, use editorial techniques to avoid overt double-accounting (e.g. a separate section or a text box for food system elements outside of the agricultural accounting system), or revert to accepted UNFCCC standards. There is no optoin #4 where authors invent their own accounting framework. |
| 126 | Chapter 5: Agriculture | Whole Chapter |  |  |  |  |  | 10 pages into the chapter, crops have not yet been mentioned. Whatever the organizational basis was for this chapter, it does not function. It needs to be redone |
| 127 | Chapter 5: Agriculture | Text Region |  | 115 | 115 | 18 | 19 | Energy inputs, to give only one example from the chapter, are not typically included in the agricultural emissions inventory according to accepted UNFCCC standards. These authors have elected to invent a new, non-reviewed standard to apply as they choose in this chapter. To do so requires a great deal of additional explanation. Beyond a rationale, if the authors wish to do it this way, you will need to create an overall inventory for the report that fully accounts for the double-accounting that has occurred here across the chapters, which each take a different approach. That is, if you're taking emissions "out" of the energy chapter, that needs to be documented somewhere to avoid double counting. The energy used to create agricultural inputs, for example, is already accounted for elsewhere in SOCCR2. You can't have it both ways. Another alternative would be to isolate the non agricultural emissions in another section - say a section or text box on food system emissions. The third option is to adhere to the widely accepted scientific standards that already apply to emissions accounting. But no, you cannot invent your own system, then apply it inconsistently. |
| 128 | Chapter 5: Agriculture | Text Region |  | 116 | 116 | 29 | 30 | page 116 and 118; Lines 29-30, 7-8 These two sentences appear to contradict each other regarding dairy vs beef |
| 129 | Chapter 5: Agriculture | Text Region |  | 116 | 116 | 2 | 2 | Define "agricultural land." Authors seem to be including pastoral land. However, there is a separate chapter on grasslands, with which this chapter is not consistent - another problem, in itself. |
| 130 | Chapter 5: Agriculture | Text Region |  | 116 | 116 | 10 | 10 | Be careful when discussing rates. Given the intended audience, it would be easy to misinterpret this 104% reduction number (to give but one example) incorrectly. An improved explanation throughout the chapter is called for when presenting this type of information. |
| 131 | Chapter 5: Agriculture | Text Region |  | 116 | 116 | 12 | 12 | One of far too many examples in the chapter where a citation is mandatory and not provided. |
| 132 | Chapter 5: Agriculture | Text Region |  | 116 | 116 | 15 | 16 | "Combined with forestsÂ…" Why? Why are you suddenly changing the underlying metrics? Particuarly when there is a separate discussion of forests in the report. |
| 133 | Chapter 5: Agriculture | Text Region |  | 116 | 116 | 17 | 23 | Why are you again providing a basic introduction to agriculture? Shouldn't that have happened in the previous paragraph? It sort of did. Sort of. This is one of far too many examples of poor organization for the chapter. The authors appear confused, themselves. Start again. Outline, and redistribute the matieral that can still fit. Rewrite what needs to be rewritten. And add what is missing. |
| 134 | Chapter 5: Agriculture | Text Region |  | 116 | 116 | 25 | 25 | Is this your main theme for the chapter? Precious little background is provided, yet choose to make the "meat is bad" argument first thing in the chapter, making it effectively its foundation? The chapter has no basis for any such discussion so far, much less to make it the chapter's thesis and theme. |
| 135 | Chapter 5: Agriculture | Text Region |  | 116 | 116 | 26 | 27 | Yes. So do lots of other kinds of agriculture. Section (mislabeled) start off with an out-of-context half-truth? This is a standard technique of the advocacy world, but highly inappropriate in the world of scientific assessment. In fact, it means automatic rejection. I should not have read on, and I will not on the next draft. If the author team wishes to be taken seriously, much better care needs to be taken, and sufficient oversight needs to be provided to inexperienced members, so you do not discredit yourselves, this report, and the scientific assessment process wholesale. |
| 136 | Chapter 5: Agriculture | Text Region |  | 116 | 116 | 29 | 29 | "in terms of GHG," As opposed toÂ…? What other terms are under consideration? Also, first of many instances where acronyms have not been defined. Standard style guidelines generally dictate definition at first use in each chapter of a report of this type. If you are using another style guide, you must state which somewhere in the document - I have found no consistent formatting throughout, which leads to a number of issues. |
| 137 | Chapter 5: Agriculture | Text Region |  | 116 | 117 | 34 | 2 | This appears to be a litany of unrelated facts. If there is a point to this paragraph, it should be made. |
| 138 | Chapter 5: Agriculture | Text Region |  | 116 | 116 | 24 | 24 | This section seems to involve trends and be a piece of advocacy. It is not related to historical context (the title of the section), and should be deleted or moved (and rewritten per other comments) to a more appropriate location within the document. |
| 139 | Chapter 5: Agriculture | Text Region |  | 116 | 117 | 25 | 2 | This section reads very much like advocacy. If leads cannot refocus to be assessment-appropriate analysis, it must be deleted. In the next draft, if there are any recommendations at all, that will be the end of our read of the document. It will not be reconsidered on another go-around, and it will not go forward. Pay attention to this requirement. Your hard work may go nowhere if not. |
| 140 | Chapter 5: Agriculture | Text Region |  | 117 | 118 | 3 | 14 | This section is about food waste, and as such, is inappropriately titled. Retitle section to reflect the material it contains. This section, in contrast to the previous section, does contain some historical context (per the title) but is still unfocused and contains far too much extraneous material to follow. Another demonstration of the need for ground-up reorganization of the chapter. |
| 141 | Chapter 5: Agriculture | Text Region |  | 117 | 117 | 6 | 6 | "planetary warming" is not the accepted terminology. |
| 142 | Chapter 5: Agriculture | Text Region |  | 117 | 118 | 7 | 14 | I am a strong proponent of systemic analysis. However, the authors of Chapter 5 are not at liberty to arbitrarily choose to rewrite UNFCCC accounting standards to their own choosing, particularly when the selectiveness is being performed to promote specific policy positions (e.g., p. 118 paragraphs 1-2, among far too many other instances in the chapter). This is absolutely forbidden in assessment work. How can the authors be unaware of this? SOCCR2 overall report leads must do a better job of instructing the authors of this report regarding their responsibilities. |
| 143 | Chapter 5: Agriculture | Text Region |  | 117 | 117 | 10 | 12 | "However, food production is only one part of the picture," Yes. One part of the picture that has still not yet been discussed, another organizational concern contributing to the unreadability of this chapter. Where is the "historical context" which this section is supposed to fall under? |
| 144 | Chapter 5: Agriculture | Text Region |  | 117 | 117 | 17 | 17 | Which of these are included in this analysis? Why are some features of the food system listed but not discussed? What is the basis for this particular conceptualization for the food system, which appears incomplete and is not supported with a citation? |
| 145 | Chapter 5: Agriculture | Text Region |  | 117 | 117 | 3 | 40 | Section is highly selective. Justify these selections, or perform the analytical work necessary to properly support it. Alternatively, delete. |
| 146 | Chapter 5: Agriculture | Text Region |  | 118 | 118 | 1 | 14 | Overt advocacy. Automatic fail for any scientific assessment. I realize that this is an early draft. But if the next draft contains anything even remotely like this, this report will be dead. Fix this. It should never have been in any draft. |
| 147 | Chapter 5: Agriculture | Text Region |  | 118 | 118 | 23 | 24 | "the adoption ofÂ…" Random thought interjecting the paragraph? What is the relevance in this context? Perhaps the authors intended it for elsewhere? As written, this is a non-sequitir that currently does not belong here. Delete. |
| 148 | Chapter 5: Agriculture | Text Region |  | 118 | 118 | 34 | 36 | "emissionsÂ…have..been...incentivizedÂ…" What does this mean? Emissions have never, in any context, been explicitly incentivized. Again, this appears to be an argument in support of some kind of incoherent policy position. And the statement is uncited, which is the only thing about it that makes sense, since it is unsupportable. Delete. |
| 149 | Chapter 5: Agriculture | Text Region |  | 118 | 118 | 36 | 36 | Overt advocacy. Again. This is epidemic in the chapter. How are the authors unaware of the prohibition on policy advice? |
| 150 | Chapter 5: Agriculture | Text Region |  | 118 | 119 | 30 | 2 | An argument is presented that people need food. Then an argument is presented that less food should be grown, with nary a blink. In what way is food production suddenly optional? |
| 151 | Chapter 5: Agriculture | Text Region |  | 119 | 119 | 18 | 18 | "Gross primary production (GPP) and Reâ€¦" what is Re, respiration? |
| 152 | Chapter 5: Agriculture | Text Region |  | 119 | 119 | 3 | 9 | This argument contradicts the previous paragraph rather directly. Why are the concepts divorced? And why are citations so far and few between, here? |
| 153 | Chapter 5: Agriculture | Text Region |  | 119 | 119 | 1 | 2 | The energy used to create agricultural inputs are outside the UNFCCC accounting practices for agriculture. Recommend using editorial organization to separate out discussion of the food system (to one place, please, not eight - a section or a text box), so that industrial plant emissions are not being attributed to farmers, as is being done here. Alternatively, you may impose upon the overall report leads to do a new accounting for the overall report (which uses inconsistent methods, so it will be difficult) to ensure consistency and remove double-counting of emissions from the overall document. Or use standard accounting methods, only. Do not invent your own, that is not defensible. |
| 154 | Chapter 5: Agriculture | Text Region |  | 119 | 119 | 11 | 33 | There is a separate chapter on grasslands. Why is there a section here on the same subject matter with no recognition or explanation? Consistency between this section and that chapter is unclear, as well. |
| 155 | Chapter 5: Agriculture | Text Region |  | 119 | 119 | 11 | 33 | Too many undefined acronyms. Even if an acronym glossary is intended for the overall report, each should be introduced upon first use in each chapter. |
| 156 | Chapter 5: Agriculture | Text Region |  | 119 | 119 | 22 | 23 | What is a low-fertility carbon source? Some piece of an explanation appears to have gone missing in this section. |
| 157 | Chapter 5: Agriculture | Text Region |  | 120 | 120 | 9 | 10 | USDA supports CRP participation. However, this is written as a policy recommendation, which are not allowed within a scientific assessment. Soil carbon would increase under those practices, with or without formalized enrollment. Mentioning CRP is not a problem, but tie the soil carbon changes to the practices rather than the enrollment itself. |
| 158 | Chapter 5: Agriculture | Text Region |  | 120 | 120 | 19 | 19 | Use of "significant" is too vague. Suggest rephrasing to "The livestock sector represents a source of CO2, CH4, and N2O emissions throughout the production process." |
| 159 | Chapter 5: Agriculture | Text Region |  | 121 | 121 | 8 | 9 | Estimation methods exist for manure handling systems. Uncertainty exists, but it is not necessarily the case that uncertainty is any greater for this source than any other within the sector. Cite and provide additional explanation. |
| 160 | Chapter 5: Agriculture | Text Region |  | 121 | 121 | 12 | 12 | Delete first sentence of paragraph. There may be contexts in which it would be appropriate. However, because of the advocacy agenda previously presented in the report, it cannot be included. Also, use of "significant" is again too vague for assessment work. Throughout the chapter, authors state facts, refute non-facts, but may not advocate. |
| 161 | Chapter 5: Agriculture | Text Region |  | 121 | 121 | 20 | 25 | Again, as commented upon previously, standards already exist for emissions accounting. Attributing packaging, for example, to an operation, as is done in this section, is not appropriate. This haphazard, selective, nonrigorous, and untested methodology means that there is double accounting going on throughout the report. Either a) pull non-farm food system material together into one part of the chapter (a section or a text box), or b) the report's overall leads, with the assistance of this chapters contributors, will have to do a full non-standard accounting in the introductory chapters to the report to avoid the kind of misunderstanding that this new unreviewed accounting method leads to, or c) use the UNFCCC reporting standards throughout the chapter. The way it is done here currently, however, is not appropriate. |
| 162 | Chapter 5: Agriculture | Text Region |  | 122 | 122 | 26 | 26 | "The way manure is handled,â€¦" delete comma |
| 163 | Chapter 5: Agriculture | Text Region |  | 122 | 123 | 9 | 17 | Section has far too little support from the scientific literature. Just about every sentence requires a citation in an assessment. Gives the appearance that this is all just someone's opinion. |
| 164 | Chapter 5: Agriculture | Text Region |  | 123 | 124 | 19 | 3 | This is the chapter's first discussion of "crops," and it's one paragraph that is actually about land use conversions. The animal agriculture sections were well done. What happened to crops? How can their exclusion from a discussion of north american agriculture be justified? |
| 165 | Chapter 5: Agriculture | Text Region |  | 123 | 123 | 18 | 18 | Section 5.4 is mislabeled (as are many others). The title of the section and its content are unrelated. This section does not cover the topics of indicators, trends, or feedbacks. Retitle, reorganize, rewrite. |
| 166 | Chapter 5: Agriculture | Text Region |  | 124 | 124 | 12 | 12 | What does "an indirect effect on enteric CH4 emissions" refer to, exactly? Explanation that follows a bit later ("the effect on enteric emissions is through increased or decreased feed intake.") In what way is that "indirect?" |
| 167 | Chapter 5: Agriculture | Text Region |  | 124 | 124 | 20 | 20 | Why has the discussion suddenly been limited to the NE US? |
| 168 | Chapter 5: Agriculture | Text Region |  | 126 | 126 | 5 | 39 | Discussion of N2O appears outsized and out of scope. A better rationalization is required for its inclusion. Otherwise, delete, and include N2O only as it relates to C cycling. |
| 169 | Chapter 5: Agriculture | Text Region |  | 127 | 127 | 12 | 13 | "each method has its own advantages and drawbacks." So? Does that matter? If so, then the reader needs to know why. If not, then delete section. |
| 170 | Chapter 5: Agriculture | Text Region |  | 128 | 132 | 14 | 34 | Literature review is the basis for analysis. But it is the basis, not the purpose. Absent any higher-level interpretation, this entire section is wasted space. |
| 171 | Chapter 5: Agriculture | Text Region |  | 131 | 131 | 39 | 40 | awkward sentence |
| 172 | Chapter 5: Agriculture | Text Region |  | 131 | 131 | 38 | 38 | "reside" should probably be "residue' |
| 173 | Chapter 5: Agriculture | Text Region |  | 132 | 132 | 24 | 24 | "slightly can" or "can slightly"? |
| 174 | Chapter 5: Agriculture | Text Region |  | 132 | 132 | 22 | 22 | "no fertilized" should be "unfertilized" or "nonfertilized" |
| 175 | Chapter 5: Agriculture | Text Region |  | 132 | 133 | 35 | 25 | What an odd place to begin to consider context, two pages from the end of the chapter. Then again, half of the section is not about the "North American and Global Context" (the title of the section) at all. Again, the authors must revisit the organization. Chapter lacks coherence, structure. |
| 176 | Chapter 5: Agriculture | Text Region |  | 133 | 133 | 38 | 40 | awkward sentence |
| 177 | Chapter 5: Agriculture | Text Region |  | 133 | 133 | 36 | 36 | remove comma after "easement programs)," |
| 178 | Chapter 5: Agriculture | Text Region |  | 133 | 133 | 30 | 31 | incomplete sentence |
| 179 | Chapter 5: Agriculture | Text Region |  | 133 | 133 | 15 | 15 | incomplete sentence |
| 180 | Chapter 5: Agriculture | Text Region |  | 133 | 134 | 26 | 2 | And now we're back to talking about livestock again? |
| 181 | Chapter 5: Agriculture | Text Region |  | 134 | 134 | 1 | 2 | awkward sentence |
| 182 | Chapter 5: Agriculture | Text Region |  | 134 | 135 | 3 | 2 | And now it's crops again. Except the last paragraph was about cropped areas, too, and is mistitled. |
| 183 | Chapter 5: Agriculture | Text Region |  | 135 | 137 | 36 | 20 | Livestock again. |
| 184 | Chapter 5: Agriculture | Text Region |  | 137 | 137 | 22 | 36 | So all inventory uncertainties are strictly related to livestock? Seems a rather incomplete discussion. |
| 185 | Chapter 5: Agriculture | Text Region |  | 137 | 138 | 37 | 14 | Farmscale modeling efforts can be very helpful in helping operations to manage their emissions. But what happened to the food system discussion from earlier in the draft? What to retailer's refrigeration emissions have to do with what happens on the farm? The chapter has lost its own thread, which, to be honest, as a reader, I did, too. |
| 186 | Chapter 5: Agriculture | Table | 5.3 | 124 |  |  |  | Several blank cells; number of significant digits should be consistent throughout |
| 187 | Chapter 6: Societal drivers of emissions | Whole Chapter |  |  |  |  |  | This chapter is of considerable concern with regard to the need to remain - and be perceived as - policy neutral. For instance, the key finding, "Feasibility of Steering Transformative Change" implies a policy approach ("steering change" - steered by whom?) even if much of the text of this key finding addresses the need for flexibility. The fact that carbon is deeply embedded in societal activities is crucial, but the discussion needs to be explicit that any discussion of carbon embeddedness and response is necessarily founded upon some core assumptions of social and personal values. This is an exceptionally difficult issue to address; I see little in the chapter text that is clearly out of place. However, there are instances that imply desired responses or assumed values. It may not be possible to present a meaningful discussion of this topic that are free from such implications or assumptions, but it would be good for the authors to be explicit about the difficulties. The issues addressed in the chapter are crucial - the usual assumption taken by energy system modelers is that changing the energy system will be transparent to end users. Pointing out that such changes are inherently social and not "simply" technological or economic is vitally important. But for that message to be heard and not dismissed, great care is needed with phrasing throughout the discussion. As an example, the phrase "socially desirable directions" (p. 165, l. 14) may be more effectively communicated as "directions determined by society as desirable." The former phrasing can be interpreted as "socially desirable" by those making decisions for everyone else, even if the phrase is understood as implying the latter by those in the field. Care is also needed when discussing the impacts of changes to the carbon cycle. Key finding 3 may be true, but the scope of this report is focused on the carbon cycle and not on the impacts of carbon cycle imbalances. Where the impacts of such imbalances feeds back into the carbon cycle, it is appropriate to include discussion of those impacts, but with the focus on how they may act to mitigate or worsen the imbalances. |
| 188 | Chapter 6: Societal drivers of emissions | Text Region |  | 153 | 154 | 1 | 11 | This section could be condensed considerably.  On a related point, this section can read as a defense of social sciences, which I do not think you need, any more than we need a defense of the biological or geological science. I'd suggest going straight to the contribution you want to make to understanding the state of the carbon cycle in North America, rather than spending effort on the context that surrounds that contribution. |
| 189 | Chapter 6: Societal drivers of emissions | Text Region |  | 156 | 156 | 31 | 35 | What about a company like Opower? Through their clients they serve around 60 million people, which sounds to me like "broad influence on programs and projects." |
| 190 | Chapter 6: Societal drivers of emissions | Text Region |  | 159 | 159 | 8 | 12 | Again, the Opower example seems to not be "limited in scope." |
| 191 | Chapter 6: Societal drivers of emissions | Text Region |  | 161 | 161 | 27 | 32 | In three sentences, the authors use "very different" four times. |
| 192 | Chapter 7: Tribal Lands | Whole Page |  | 190 |  |  |  | Need to work on the supporting evidence section and identify work that supports the key findings. I suspect that some fraction of the supporting evidence will be in government reports, moreso than the refereed literature, given the subject matter. |
| 193 | Chapter 7: Tribal Lands | Whole Chapter |  |  |  |  |  | Given that specifics for sectoral carbon budgets will be covered in other chapters, this chapter does a nice job of focusing on the legal and societal differences for tribal lands with respect to carbon. Chapter organization and content seems appropriate. As a final exercise, consider whether there are any other pressing items or issues associated with tribal lands and carbon that should be included in section 7.3, 7.4, or 7.5. You may want to reach out to Mariel Murray at US Forest Service. She worked at FS and OMB on tribal relations and indian affairs as it relates to carbon and climate. She may know of some interesting issues and/or supporting evidence that could be useful for this chapter. |
| 194 | Chapter 7: Tribal Lands | Whole Chapter |  |  |  |  |  | I don't see any references to Ejidos in Mexico. Do you not consider them tribal lands? Changes in land use by Ejidos drive deforestation (hence carbon emissions) in Mexico, so they are directly relevant to SOCCR-2. Seems like that should be a major focus in this chapter. If you disagree, maybe at least the chapter needs to include text explaining what you include and exclude and why. (Let me know if you need help identifying sources for expertise on Ejidos and I will see if I can help. I do not have that expertise myself but might be able to help find someone(s). |
| 195 | Chapter 7: Tribal Lands | Text Region |  | 183 | 184 | 33 | 21 | At first glance I wonder where Mexico fits into this description, as it seems absent. What would be the key communities/populations in Mexico to consider? |
| 196 | Chapter 7: Tribal Lands | Text Region |  | 183 | 185 | 33 | 17 | I appreciate all your work so far and how challenging it is to pull these chapters together. One major problem that I think we need to address if at all possible -- I don't see a single reference to Mexico in this section that establishes context. Similar issue for the remainder of the chapter, but it jumps out here. |
| 197 | Chapter 7: Tribal Lands | Text Region |  | 188 | 188 | 32 | 32 | Should "are" be changed to "were"? Does the CCX still run a carbon credit trading operation? I thought that ended around 2010. Please check and confirm. |
| 198 | Chapter 8: Atmosphere | Whole Page |  | 197 |  |  |  | line 39, in reference to figure 8.3 it would be more illuminating to have each plot normalized by itself. Its not clear to me they have the same patterns as staed in the text. |
| 199 | Chapter 8: Atmosphere | Whole Page |  | 198 |  |  |  | All of this page would benefit from a table for the numbers. |
| 200 | Chapter 8: Atmosphere | Whole Page |  | 199 |  |  |  | 8.4 "Positive feedbacks between net ecosystem CO2 release and 2 climate are potentially very significant and represent a first-order uncertainty in climate projection.." Will need more than just one citation for such a statement. |
| 201 | Chapter 8: Atmosphere | Whole Page |  | 199 |  |  |  | 8.4 "Thus, it is reasonable to expect that improving flux accuracy and resolution through higher data density and transport model resolution should allow for closer examination of the carbon-climate relationship." What specificly are you talking about here? Im referring to the carbon-climate relationship--what is it exactly, or what do you postulate it to be? |
| 202 | Chapter 8: Atmosphere | Whole Page |  | 200 |  |  |  | Section 8.7.1 I think that this section on Future Atmospheric Measurement Strategies would be more effective if all of the potential measurement approach discussions included a clear (and quantitative, if possible) statement of potential impacts such as approach 2 (14CO2 measurements) lists: "atmospherically-based determination of U.S. fossil fuel CO2 emissions to within 5%," |
| 203 | Chapter 8: Atmosphere | Whole Page |  | 200 |  |  |  | line 33, what would the affect be of a minima set of NEON, sites? Or is it any additional data is good data? |
| 204 | Chapter 8: Atmosphere | Whole Chapter |  |  |  |  |  | Key References for comments provided for this chapter:  â€¢ [Basu et al.(2013)Basu, Guerlet, Butz, Houweling, Hasekamp, Aben, Krummel, Steele, Langenfelds, Torn, Biraud, Stephens, Andrews, an Basu, S., S. Guerlet, A. Butz, S. Houweling, O. Hasekamp, I. Aben, P. Krummel, P. Steele, R. Langenfelds, M. Torn, S. Biraud, B. Stephens, A. Andrews, and D. Worthy (2013), Global CO2 fluxes estimated from GOSAT retrievals of total column CO2, Atmos. Chem. Phys., 13(17), 8695â€“8717, doi:10.5194/acp-13-8695-2013. â€¢ [Basu et al.(2014)Basu, Krol, Butz, Clerbaux, Sawa, Machida, Matsueda, Frankenberg, Hasekamp, and Aben] Basu, S., M. Krol, A. Butz, C. Clerbaux, Y. Sawa, T. Machida, H. Matsueda, C. Frankenberg, O. P. Hasekamp, and I. Aben (2014), The seasonal variation of the co2 flux over tropical asia estimated from gosat, contrail and iasi, Geophysical Research Letters, p. 2013GL059105, doi:10.1002/2013GL059105. â€¢ [Deng et al.(2014)Inferring regional sources and sinks of atmospheric CO2 from GOSAT XCO2 data, Atmos. Chem. Phys., 14(7), 3703â€“3727, doi:10.5194/acp-14-3703-2014. â€¢ [Deng et al.(2016)Deng, Jones, Oâ€™Dell, Nassar, and Parazoo] Deng, F., D. B. A. Jones, C. W. Oâ€™Dell, R. Nassar, and N. C. Parazoo (2016), Combining GOSAT XCO2 observations over land and ocean to improve regional CO2 flux estimates, Journal of Geophysical Research: Atmospheres, 121 (4), 1896â€“1913, doi:10.1002/2015JD024157. â€¢ [Guerlet et al.(2013)Guerlet, Basu, Butz, Krol, Hahne, Houweling, Hasekamp, and Aben] Guerlet, S., S. Basu, A. Butz, M. Krol, P. Hahne, S. Houweling, O. P. Hasekamp, and I. Aben (2013), Reduced carbon uptake during the 2010 Northern Hemisphere summer from GOSAT, Geophysical Research Letters, pp. 1â€“6, doi:10.1002/grl.50402. â€¢ [Kort et al.(2012)Kort, Frankenberg, Miller, and Oda] Kort, E. A., C. Frankenberg, C. E. Miller, and T. Oda (2012), Space-based observations of megacity carbon dioxide, Geophys. Res. Lett., 39(17), L17,806, doi:10.1029/2012GL052738. â€¢ [Liu et al.(2016)Liu, Bowman, and Lee] Liu, J., K. W. Bowman, and M. Lee (2016), Comparison between the Local Ensemble Transform Kalman Filter (LETKF) and 4D-Var in atmospheric CO2 flux inversion with the Goddard Earth Observing System-Chem model and the observation impact diagnostics from the LETKF, Journal of Geophysical Research: Atmospheres, doi:10.1002/2016JD025100. â€¢ [Nassar et al.(2011)et al., Inverse modeling of CO2 sources and sinks using satellite observations of CO2 from TES and surface flask measurements, Atmos. Chem. Phys., 11(12), 6029â€“6047, doi:10.5194/acp-11-6029-2011. â€¢ [Parazoo et al.(2013)Parazoo, Bowman, Frankenberg, Lee, Fisher, Worden, Jones, Berry, James Collatz, Baker, Jung, Liu, Osterman, O Parazoo, N. C., K. Bowman, C. Frankenberg, J.-E. Lee, J. B. Fisher, J. Worden, D. B. A. Jones, J. Berry, G. James Collatz, I. T. Baker, M. Jung, J. Liu, G. Osterman, C. Oâ€™Dell, A. Sparks, A. Butz, S. Guerlet, Y. Yoshida, H. Chen, and C. Gerbig (2013), Interpreting Seasonal Changes in the Carbon Balance of Southern Amazonia Using Measurements of XCO2 and Chlorophyll Fluorescence from GOSAT, Geophysical Research Letters, doi:10.1002/grl.50452 |
| 205 | Chapter 8: Atmosphere | Whole Chapter |  |  |  |  |  | REFERENCES ADDED: Basu, S., M. Krol, A. Butz, C. Clerbaux, Y. Sawa, T. Machida, H. Matsueda, C. Frankenberg, O. P. Hasekamp, and I. Aben (2014), The seasonal variation of the CO2 flux over Tropical Asia estimated from GOSAT, CONTRAIL, and IASI, Geophys. Res. Lett., 41, 1809â€“1815, doi:10.1002/2013GL059105.  Chevallier, F., Palmer, P. I., Feng, L., Boesch, H., O'Dell, C. W., and Bousquet, P.: Towards robust and consistent regional CO2 flux estimates from in situ and space-borne measurements of atmospheric CO2, Geophys. Res. Lett., 41, 1065-1070, doi:10.1002/2013GL058772, 2014.  Detmers, R. G., O. Hasekamp, I. Aben, S. Houweling, T. T. van Leeuwen, A. Butz, J. Landgraf, P. KÃ¶hler, L. Guanter, and B. Poulter (2015), Anomalous carbon uptake in Australia as seen by GOSAT, Geophys. Res. Lett., 42, 8177-8184, doi:10.1002/2015GL065161. Deng, F., D. B. A. Jones, C. W. Oâ€™Dell, R. Nassar, and N. C. 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G., Strong, K., Mendonca, J., Kivi, R., Heikkinen, P., Iraci, L., Podolske, J., Hillyard, P. W., Kawakami, S., Dubey, M. K., Parker, H. A., Sepulveda, E., Rodriguez, O. E. G., Te, Y., Jeseck, P., Gunson, M. R., Crisp, D., and Eldering, A.: Comparisons of the Orbiting Carbon Observatory-2 (OCO-2) XCO2 measurements with TCCON, Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-227, in review, 2016. |
| 206 | Chapter 8: Atmosphere | Text Region |  | 194 | 194 | 29 | 29 | (key findings) â€œSimilar analyses of CH4 data show some variability and trends in neither the temperate nor boreal regionsâ€ . This is a confusing statement. If the authors are trying to suggest that no recent trend has been observed in temperate North American methane fluxes the literature is not conclusive on this point (this also seems inconsistent with statements on page 198). |
| 207 | Chapter 8: Atmosphere | Text Region |  | 194 | 194 | 21 | 26 | Changes to the wording in Key Finding #3: However, to date there is no inverse-modeling system capable of addressing national-scale emissions. |
| 208 | Chapter 8: Atmosphere | Text Region |  | 194 | 194 | 20 | 20 | correct "platfsorms" to "platforms" |
| 209 | Chapter 8: Atmosphere | Text Region |  | 194 | 194 | 22 | 25 | These last three sentences of the paragraph should be combined into one. |
| 210 | Chapter 8: Atmosphere | Text Region |  | 194 | 194 | 27 | 28 | recommend replacing "highly variable" with "high". |
| 211 | Chapter 8: Atmosphere | Text Region |  | 196 | 196 | 23 | 27 | â€œNew remote sensing approaches such as the Total Column Carbon Observing Network Fourier Transform Spectrometers (TCCON FTSs), and first-generation near-InfraRed space-based spectrometers aboard the GOSAT and OCO-2 satellites (in addition to existing thermal space-based sensors like AIRS and TES) are providing information that some modeling systems are attempting to assimilate.â€ This does not capture the state of the science very completely. A more accurate statement would be: â€œAssimilation models are using satellite data to better partition fluxes globally, and provide unique information in regions poorly constrained by the in situ network. Remote sensing approaches such as the Total Column Carbon Observing Network Fourier Transform Spectrometers (TCCON FTSs) and infrared (e.g., TES and AIRS) and near-Infrared (e.g., GOSAT and OCO-2) satellites are providing new information on natural and anthropogenic carbon fluxes both through assimilation in carbon cycle data assimilation systems, (e.g., Basu et al 2013, 2014; Liu et al, 2016; Deng et al 2016, Nassar et al., 2016) and data alone (e.g. Kort et al, 2012). Citations below. |
| 212 | Chapter 8: Atmosphere | Text Region |  | 196 | 196 | 37 | 37 | (regional studies). Missing the Calnex campaign which was a major study spanning an important region and key sectors e.g., Ryerson et al 2013, Gentner et al 2013, others. |
| 213 | Chapter 8: Atmosphere | Text Region |  | 196 | 196 | 19 | 31 | Applied changes to the text. Revised text follows:  Platforms and measurement techniques for observing greenhouse gas distributions have grown and diversified. In 2007, the North American CO2 and CH4 network mainly consisted of weekly surface flask-air sampling at a handful of sites, continuous observations at several observatories and tall towers and a few regular light aircraft profiling sites (Figure 8.2). We now have sustained records from many more towers and light aircraft flights. New remote sensing approaches such as the Total Column Carbon Observing Network Fourier Transform Spectrometers (TCCON FTSs), and first-generation near-InfraRed space-based spectrometers aboard the GOSAT and OCO-2 satellites (in addition to existing thermal space-based sensors like AIRS, TES, and ACE) are providing information that modeling systems are assimilating to provide initial flux estimates from satellite or satellite plus in situ senors. The satellite-based global observations fill important gaps in the existing surface based networks, which are heavily weighted to measurements in North America and Europe with few stations in South America, Africa, and parts of Asia. Measurements like those from OCO-2 provide the spatial resolution needed to resolve CO2 emission sources on the scales as fine as 1 degree by one degree (Hakkarainen et al., 2016). Carbon monoxide retrievals from MOPITT and IASI and nitrogen dioxide (NO2) retrievals from OMI provide important ancillary evidence of fossil fuel combustion and wildfire emissions (Heymann et al., 2016; Hakkarainen et al., 2016). Solar-induced fluorescence (SIF) measured from space is emerging as an important marker of terrestrial gross primary production (Joiner et al., 2011; Frankenberg et al., 2011). New in situ measurements have been enabled by better availability of laser spectroscopic analyzers requiring less-frequent calibration, many of which measure both CH4 and CO2. Recent work shows that vertical information can be retrieved from near infrared measurements like GOSAT and OCO-2 (Kulawik et al., 2016b), and future measurements from active sensors, such as the proposed Active Sensing of CO2 Emissions over Nights, Days, and Seasons (ASCENDS) mission will provide additional constraints on carbon dioxide, including measurements at night . |
| 214 | Chapter 8: Atmosphere | Text Region |  | 197 | 197 | 12 | 16 | (urban and oil & gas studies). No mention of major findings regarding long-tail (super-emitter) distribution of CH4 fluxes in the oil & gas sectors. In general the current references are very limited and neglect the broader body of work. Other key O&G refs include Zavala-Araiza et al., 2015, 2016; Lyon et al 2016, Jackson et al 2014, Brandt et al., 2014; Allen et al., 2014; Mitchell et al., 2015; Lamb et al., 2015; Zimmerle et al., 2015. Some other key urban carbon references include Pataki, Bowling, and Ehleringer 2003; Djuricin et al., 2010; Turnbull et al., 2015; Cambaliza et al., 2015; Kort et al., 2012; Wunch et al 2009; Wong et al 2016 [see Chapter 4 for full urban bibliography] |
| 215 | Chapter 8: Atmosphere | Text Region |  | 197 | 197 | 23 | 26 | â€œWith the OCO-2 and GOSAT programs, e.g., the strategy is to use TCCON as a preliminary link, and then link (not calibrate) TCCON to the CO2 calibration scale using aircraft and AirCore (Wunch et al., 2011). This strategy has proven difficult and renders difficult the application of satellite CO2 and CH4 observations to source/sink quantification.â€ The last sentence is rather subjective. A more accurate representation would be â€œ With the OCO-2 and GOSAT programs, the strategy is to determine the linear scale factor between TCCON and the satellite data, and then link TCCON to the CO2 calibration scale using aircraft and AirCore (Wunch et al., 2011). This strategy has been largely successful, although tropical latitudes are thinly sampled by the TCCON network. The TCCON transfer standard has been shown to be stable and robust and provides a path to link measurements made on orbit to the primary reference standards showing a linear calibration over ten or more sites on four continents over a 12-year period, and over a range of CO2 concentrations from 365 to 400 ppmv (for reference, Wunch et al 2010, 2011, 2016). The current precision for satellite co2 and ch4 observations allows the quantification of large sources and sinks (a few petagram C per year), while the quantification of smaller sources and sinks has not yet been achieved.â€ |
| 216 | Chapter 8: Atmosphere | Text Region |  | 197 | 197 | 8 | 9 | Have made some changes/ additions to the text, here, as follows:  â€¦ understand carbon cycle processes on large scales. The Atmospheric Tomography Mission (ATom) mission is collecting similar data across all seasons during 2016-2018. The Atmospheric Carbon and Transport-America (ACT-America) program, designed to explore the structure of greenhouse gas distributions within synoptic weather systems using a variety of aircraft observations, is also currently underway. The new NASA CARbon Atmospheric Flux Experiment (CARAFE) airborne payload designed for direct validation of regional carbon flux estimates has recently been deployed to collect airborne eddy covariance measurements for CO2 and CH4 (Wolfe et al. 2015). |
| 217 | Chapter 8: Atmosphere | Text Region |  | 197 | 197 | 15 | 16 | ... Texas (Karion et al., 2015), Sacramento (Ryoo et al., 2016) and other locations (Peischl et al., 2016; Johnson et al., 2016; Leifer et al., 2016). |
| 218 | Chapter 8: Atmosphere | Text Region |  | 197 | 197 | 17 | 31 | Changes / edits to the text as follows:  As the community expands and engages in research in new regions and environments, new challenges are emerging. Data availability remains an issue, with some observations being proprietary and others not generally released to the general community in a timely manner. Compatibility between networks is also a concern, although one that can be rectified by careful attention to calibration and participation in laboratory and field intercomparison activities. Establishing compatibility between well-calibrated in situ networks and remote sensing observations is much more difficult. To calibrate remote-sensed column estimates, in situ measurements are needed over the entire column. In situ aircraft-based measurements cover up to about 85% of the column air mass, whereas balloon-borne sensors such as AirCore can cover 99% of the column air mass (Karion et al., 2010), decreasing the uncertainty of the stratospheric component of the measured column. The strategy for validation of satellite observations has relied heavily on the use of TCCON as a transfer standard. TCCON observations are first validated against aircraft in situ measurements (e.g. Wunch et al., 2011), or more recently AirCore. Estimates of the column-averaged dry air mole fraction, XCO2, derived from satellite observations from GOSAT and OCO-2 are then validated against observations from TCCON. This strategy benefits from the large volume of satellite data that are regularly collected in the vicinity of the 21 TCCON stations at latitudes spanning Eureka, Canada (80 N) to Lauder, New Zealand (45 S). These TCCON measurements are augmented by the less frequent satellite/aircraft or satellite/AirCore matches. Using this strategy, satellite observations of CO2 from GOSAT and OCO-2 have reduced regional-scale biases in XCO2 to values on the order of 0.3-0.5 ppm (Wunch et al., 2016; Kulawik et al., 2016a). However, even these small biases make the use of these data in global inversions challenging. Time series of AirCore measurements are being established at Sodankyla, Finland, the Southern Great Plains ARM site in Oklahoma, and in Boulder, Colorado . (strike lines 23-29; continue with Inverse models such as CarbonTrackerâ€¦ ) |
| 219 | Chapter 8: Atmosphere | Text Region |  | 197 | 197 | 38 | 38 | The annual fluxes from these inversions for temperate North America (viz. Gurney et al., 2002) are depicted in Figure 8.3. Previous intercomparisons of inverse models using in situ data such as Baker et al. (2006) show differences in long-term mean flux estimates arising from differences in model transport (Stephens et al., 2007) and sparse in situ observations over the tropics. An intercomparison of inversions with measurements from GOSAT satellite data, in contrast, found agreement at large scales, but divergence in flux estimates at sub-continental scales (Houweling et al., 2015). Additional findings from GOSAT include increased carbon uptake in Australia in some years (Detmers et al., 2015), a larger sink in eastern Europe than expected from bottom-up estimates (Feng et al., 2016; Reuter et al., 2014), and interannual variations in tropical emissions (Basu et al., 2014; Deng et al., 2016). Other work has focused on diagnosing and mitigating model transport error, which affects both in situ and satellite-based flux estimates (Liu et al., 2015; Chevallier et al., 2014; Jiang et al., 2013). |
| 220 | Chapter 8: Atmosphere | Text Region |  | 197 | 197 | 39 | 41 | While different inversions from Baker et al. (2006) tended to manifest different long-term mean flux estimates, the patterns of interannual variability agreed well. There is some indication of coherence of interannual variations in the present collection of models, but with one significant disagreement (mainly from the Jena CarboScope model). Averaging across the inversions, ... |
| 221 | Chapter 8: Atmosphere | Text Region |  | 199 | 199 | 15 | 17 | There are already a number of existing regulatory and voluntary mitigation programs, carbon pricing systems, etc in place in North America across different sectors and governance levels (independent of international agreements). |
| 222 | Chapter 8: Atmosphere | Text Region |  | 199 | 199 | 17 | 19 | â€œâ€œBottom-upâ€ methods based on economic, agricultural and forest inventories currently provide much of the basis for these calculations, but these methods may be highly uncertain and susceptible to systematic reporting errors.â€ This seems like a rather sweeping statement that can be equally applied to "top-down" estimation methods (many of which are incapable of resolving key sectors and in some cases currently carry larger uncertainties than bottom-up methods). The fact is that the relative skill of top-down and bottom-up methods varies strongly by region and sector. |
| 223 | Chapter 8: Atmosphere | Text Region |  | 200 | 200 | 38 | 39 | The measurements cited here are useful for evaluating transport models and assessing uncertainties but do not necessarily translate to improved transport simulations. The latter may require other atmospheric or land surface observations and attention to model parameterization. |
| 224 | Chapter 8: Atmosphere | Text Region |  | 201 | 201 | 4 | 4 | recommend replacing "SF6" with "sulfur hexaflouride (SF6)" |
| 225 | Chapter 9: Forests | Whole Page |  | 219 |  |  |  | Check these numbers. I can't find the 480 Tg CO2 figure in the biannual report and it is considerably different from the table 9.2 in this report (even though it cites another source). Also, note the 7.3$ in the sentence below. In a reference scenario developed for the 2016 U.S. Biennial Report (USDA-OCE 2016), the 39 2015 estimate of forestsÂ’ net sequestration is 480 Tg CO2e yr-1, which offsets 7.3$ of carbon emissions from transportation and energy sources. |
| 226 | Chapter 9: Forests | Whole Chapter |  |  |  |  |  | The SOD of Chapter 9 â€œForestsâ€ is missing many recent crucial findings from forest carbon cycle changes in the western United States that have resulted from unprecedented climate warming, extreme drought, pest and pathogen attacks, and an increasingly long season for wildfires. Here are some highlights and references that should be added to Chapter 9 for the next draft: Cansler and McKenzie (2014) analyzed remotely sensed burn severity data from forest fires in the northern Cascade Range of Washington and reported significant positive relationships between climate and forest fire size, and between fire size and the proportion of high burn severity. Both summer temperatures and winter precipitation amounts were significantly correlated with fire size. Harvey et al. (2015), in a study of nearly 700 forest fires in the Northern Rocky Mountain region since 1984, reported that landscape patterns of stand-replacing fire were strongly controlled by fire size and the proportion of stand-replacing forest area to total fire area, which were, in turn, controlled mainly by climate. The proportion of stand replacing fire increased from 0.22 to 0.27 over the period of 1984 to 2010. Annual moisture deficit, a function of both temperature and precipitation, was highlighted as a prime controller of increasing forest fire size in the Northern Rocky Mountain region. Lombardo et al. (2009) identified a shift to more severe fires since the late nineteenth century in Douglas-fir stands of the Los Padres National Forest, and also noted a shift to predominantly widespread, landscape-scale fires compared to previous, more even mixtures of relatively large and small fires.  Molinari et al. (2015) reported that wildfire size and severity has recently been growing in southern California.  Dolanc et al. (2013) resampled historical vegetation plots originally sampled from 1929 to 1934 in the subalpine forest zone of the Sierra Nevada Mountain Range and found a net increase in tree stem density of 30%, including a 63% increase in small tree classes (10- to 30-cm diameter). Six of eight tree species showed statistically significant increases in small tree density, including species with distributions at both the upper and lower boundaries of the subalpine zone, regardless of slope or aspect variations. Increases in small tree density were partially offset by a 20% decrease in large tree density. Millar et al. (2012) reported that whitebark pine (Pinus albicaulis) plots just east of Yosemite National Park (NP) have experienced significant (50â€“80%) increases in mortality from 2007 to 2010 and were extensively infested by mountain pine beetles. Potter (2016) used satellite remote sensing to map the wide-spread mortality of forests due to drought in the Sierra Nevada region of California since 2011, mainly along southwestern margins of Yosemite National Park (NP), Kings Canyon NP, Sequoia NP, and Sierra and Sequoia National Forest boundaries. The patterns of tree die-back matched aerial surveys by the US Forest Service on 4 million acres of forested land and found that about 20 percent of forest stands had detectable mortality, totaling more than 10 million newly dead trees between 2013 and 2015. Literature Cited Cansler, C. A. and D. McKenzie, 2014, Climate, ï¬re size, and biophysical setting control ï¬re severity and spatial pattern in the northern Cascade Range, USA, Ecological Applications, 24(5): 1037-56. DOLANC, C.R., J.H. THORNE, AND H.D. SAFFORD. 2013. Widespread shifts in the demographic structure of subalpine forests in the Sierra Nevada, California, 1934 to 2007. Global Ecol. Biogeogr. 22:264 â€“276. Harvey . B. J., D. C. Donato . M. G. Turner, 2015, Drivers and trends in landscape patterns of stand-replacing fire in forests of the US Northern Rocky Mountains (1984â€“2010), Landscape Ecol DOI 10.1007/s10980-016-0408-4 Lombardo, K. J., T. W. Swetnam, C. H. Baisan, and M. I. Borchert, 2009, Using big cone Douglas-fir fire scars and tree rings to reconstruct interior chaparral fire history: Fire Ecology, 5: 35-56. MILLAR, C.I., R.D. WESTFALL, D.L. DELANY, M.J. BOKACH, A.L. FLINT, AND L.E. FLINT. 2012. Forest mortality in high-elevation whitebark pine (Pinus albicaulis) forests of eastern California, USA; influence of environmental context, bark beetles, climatic water deficit, and warming. Can. J. For. Res. 42:749 â€“765. Molinari, N., S. Sawyer, and H. Safford, 2015, A summary of current trends and probable future trends in climate and climate-driven processes in the Los Padres National Forest and neighboring lands, USDA Forest Service, Pacific Southwest Region, Report fseprd497638, Available online at www.fs.usda.gov/Internet/FSE\_DOCUMENTS/fseprd497638.pdf Potter, C. S., 2016, Landsat image analysis of tree mortality in the southern Sierra Nevada region of California during the 2013-2015 drought, Journal of Earth Science & Climatic Change, 7: 342. |
| 227 | Chapter 9: Forests | Whole Chapter |  |  |  |  |  | Need to include definititions of forest and woodlands up front and explain where trees in developed and ag lands are covered. |
| 228 | Chapter 9: Forests | Whole Chapter |  |  |  |  |  | Temperate forests are discussed in terms of carbon sequestration but more could be said about the distribution of the sinks in terms of whether they are rainforests (very high) or dry ponderosa pine forests. Ponderosa pine is extensive throughout the west and as a forest type their contribution might be high, given their geographic extent, in spite of being in drier settings. Informing the reader of the sequestration potential, or by using actual rates, of the various forest types across regions of North America would be worthwhile. |
| 229 | Chapter 9: Forests | Whole Chapter |  |  |  |  |  | Gaps and Outlook section: These sections are dominated by cabon discussions at the very fine scales (e.g. 30 meter pixel level) but the disturbance section (9.4.5) discusses how the extent, severity, and frequency of natural disturbances have increased in recent decades with the western regions of Canada and the U.S. experiencing substantial die-offs recently from wildfire, insect outbreak, and drought disturbances. Shouldn't there be a discussion on the need for landscape management strategies that lowers the probability of these large-scale disturbances to occur? The Natural Disturbance section states the these events have led to widespread tree mortality, with fire and insects alone affecting up to 9% of the live tree carbon stocks in the western U.S. forests but there isn't any discussion in the Gaps section for a need to develop landscape strategies, especially in the West, to mitigate these disturbances. Public-private partnerships have taken root and are increasing the likelihood of success across private and public lands. The public is aware that these disturbances are not restricted one cateogory of land ownership and as federal agencies, we believe that public involvement in landscape strategies are the wave of the future. This report could help these inititives by advocating research that could inform these inititatives as to the best science to keep carbon on the land while also balancing other benefits. |
| 230 | Chapter 9: Forests | Whole Chapter |  |  |  |  |  | Great to see references to data from SEMARNAT. There are some other chapters that reference carbon stocks related to land use in Mexico, and there seem to be some inconsistencies. Given that this chapter is citing SEMARNAT data, the writing team might be particularly well-positioned to help figure out what data sources are most appropriate for this effort, and to help ensure consistency across the whole report. |
| 231 | Chapter 9: Forests | Text Region |  | 209 | 209 | 35 | 38 | The finding: "However, carbon releases from the associated decay of harvested wood products offset a substantial portion (about half) of the net carbon sink in North American forestsÂ” seems to be mixing apples and oranges. Better to have separate finding about net flux in wood products pools rather than comparing WP decay to forest flux. As is, this implies that wood products are a contributor to GCC emissions. |
| 232 | Chapter 9: Forests | Text Region |  | 210 | 210 | 24 | 25 | much of the woodland increase from 2005 to 2015 for US is the result of measuring an area, west TX and west OK that had not been measured before and thus difficult to back cast to create real trend which was an increase but much lower; |
| 233 | Chapter 9: Forests | Text Region |  | 211 | 211 | 5 | 8 | "National assessments of forest land area as well as carbon dynamics have been conducted in the past in Canada, Mexico, and the U.S. however the motivation for these reports as well as the methods and data sources used in them differ substantially between countries." Great context. It's also an opportunity to note that Mexico is ahead of many developing countries in this regard -- that we should not take the existence of forest assessments for granted and that having those assessments is a critical foundation for planning and management, including for carbon. |
| 234 | Chapter 9: Forests | Text Region |  | 212 | 212 | 5 | 20 | This is the section on urban trees. The urban chapter also has a section on urban forestry. I am not sure they are contradictory but they do emphasize different points. Worth taking a look at each other's sections to decide how to handle this - perhaps treat it in one place and cross-reference (for space considerations) - but making sure all parties agree that what goes in at the end is technically accurate. |
| 235 | Chapter 9: Forests | Text Region |  | 213 |  | 9 |  | Consider replacing the word 'overwhelms' with exceeds, or something more scientific. |
| 236 | Chapter 9: Forests | Text Region |  | 213 | 214 | 37 | 4 | I'm very glad to see this information and discussion.  A very helpful addition would be additional description of what is driving land use change, where it still occurs, and what kinds of policies/management decisions/institutions are influencing (or could influence) that trajectory. |
| 237 | Chapter 9: Forests | Text Region |  | 216 | 216 | 29 | 29 | The following sentence may not be accurate: "Half of Canada's forests and allÂ…." It is highly unlikely that "nearly all of the conterminous US are considered managed land if forests in areas like Nature Reserve and Wilderness Area (as defined by IUCN have significant acreages. In these areas, no managemetn is allowed (i.e., no wood production or recreation services). |
| 238 | Chapter 9: Forests | Text Region |  | 216 | 216 | 30 | 31 | change "...wood product, paper, and recreation services, with carbon sequestration a secondary goal" to "Â… wood products, water, and recreation services, with carbon sequestration a secondary outcome". Please note that paper is a wood product; water is often an important component of management, and sequestration is not generally stated as a goal, but has been a consistent outcome of forest management. |
| 239 | Chapter 9: Forests | Text Region |  | 216 | 216 | 40 | 40 | Delete "or establishment of preserves,". One thing we have learned from preservation types of management is that the carbon is often lost to undesired wildfires and insect/disease related mortality. In addition, "preserves" can result in significant leakage and offsite impacts that are not accounted for by the local accounting practices often used. |
| 240 | Chapter 9: Forests | Text Region |  | 216 | 216 | 6 | 19 | The statement "U.S. deforestation occurs at a rate of about 0.12% per year, or 355,000 ha yr-1 (Masek et al. 2011, US National Resources Inventory), but this is more than offset by forest gain from reforestation and afforestation.", should not include an off-set by reforestation. By definition, reforestation is the re-establishment through management activities on land that had recent tree cover. Only afforestation can off-set deforestation since it is the forest establishment on land that has long been without forest. |
| 241 | Chapter 9: Forests | Text Region |  | 216 | 216 | 17 | 27 | It would be helpful to place both of the following statements on the same time interval. "The net effect is a gain of forest land area in the U.S. at about 0.21% per year, or 430,000 ha 19 yr-1 (EPA 2011; Smith et al. 2009), largely converted from grasslands and croplands (US EPA 2016). 20 This rate is somewhat larger than the 2.9 million ha of forest gain from 2005 to 2014 reported in the U.S. 21 EPA 2016." The first sentence is on a per year basis while the second sentence is over a period. |
| 242 | Chapter 9: Forests | Text Region |  | 217 | 217 | 1 | 2 | change "avoid substantial reductions in belowground C stocks typical of traditional timber management" to "minimize impacts to belowground C stocks associated with some management activities". There is a substantial body of literature, including life cycle assessment studies, that shows that "traditional timber management" does not result in "substantial reductions in belowground C stocks" which the authors appear to have ignored. |
| 243 | Chapter 9: Forests | Text Region |  | 217 | 217 | 4 | 4 | delete "or shifting harvested wood away from combustion". There is a substantial body of literature that shows that while wood combustion for energy results in co2 emissions, there is a significant mid- to long-term emissions reduction benefit when compared to fossil fuels. one citation: Miner, R. A., Abt, R. C., Bowyer, J. L., Buford, M. A., Malmsheimer, R. W., OÂ’Laughlin, J., Oneil, E. E., et al. (2014). Forest Carbon Accounting Considerations in US Bioenergy Policy. Journal of Forestry, 112(16), 591-606. Retrieved from http://www.ingentaconnect.com/content/saf/jof/2014/00000112/00000006/art... |
| 244 | Chapter 9: Forests | Text Region |  | 217 | 217 | 8 | 9 | change "but tend toward expectations of reduced forest carbon sequestration" to "and differ by forest system and location". Some forest types are expected to have increases and some decreases and it is forest type and location dependent. |
| 245 | Chapter 9: Forests | Text Region |  | 220 | 220 | 26 | 36 | This section ignores a very real outcome of maximizing carbon storage in vegetation on a site or in a landscape -- the loss of that carbon through undesired wildfire, and/or insect and disease infestation and mortality. This section needs to acknowledge that very real outcome of the "maximize" strategy in many forest types and landscapes. Cramming carbon on an acre and praying it stays there is not necessarily a useful path forward. The next paragraph clarifies that fact, but this paragraph should set that up. |
| 246 | Chapter 9: Forests | Text Region |  | 222 | 222 | 1 | 3 | Change "In the near future forest carbon management will likely occur as a co-benefit to the many other forest uses and values, but in some cases people may decide to maintain lower carbon stocks as a side effect of pursuing other values, such as wildlife habitat." to "In the future, forest carbon management will likely occur as a co-benefit to the many other forest uses and values. Owners and managers may decide to maintain lower carbon stocks as a side effect of pursuing other values, such as wildlife habitat." The suggested changes are more technically correct. |
| 247 | Chapter 9: Forests | Text Region |  | 222 | 222 | 10 | 12 | change "People may nonetheless choose to use these treatments to influence stand density, stand composition, and wildfire risk." to "Given that carbon is only one among many services of interest, owners and managers may choose to use treatments that reduce carbon on sites and across landscapes to meet ownership and management objectives through influencing stand density and stand composition, and reducing wildfire risk." The change makes it clear that carbon is not the only thing of interest/importance to land owners and managers. |
| 248 | Chapter 9: Forests | Table | Table 9.1 | 210 |  |  |  | much of the woodland increase from 2005 to 2015 for US is the result of measuring an area, west TX and west OK that had not been measured before and thus difficult to back cast to create real trend which was an increase but much lower; |
| 249 | Chapter 9: Forests | 9.1 | Table | 212 |  |  |  | The footnotes at the bottom of the table are not referenced in the table |
| 250 | Chapter 9: Forests | 9.1 | Table | 212 |  |  |  | Footnote 18: It is an incomplete definition and lacks the in situ height as published in EPA 430-R-16-002 |
| 251 | Chapter 9: Forests |  | Text Region | 216 | 6 | 216 | 19 | The statement "U.S. deforestation occurs at a rate of about 0.12% per year, or 355,000 ha yr-1 (Masek et al. 2011, US National Resources Inventory), but this is more than offset by forest gain from reforestation and afforestation.", should not include an off-set by reforestation. By definition, reforestation is the re-establishment through management activities on land that had recent tree cover. Only afforestation can off-set deforestation since it is the forest establishment on land that has long been without forest. |
| 252 | Chapter 9: Forests |  | Text Region | 216 | 17 | 216 | 27 | It would be helpful to place both of the following statements on the same time interval. "The net effect is a gain of forest land area in the U.S. at about 0.21% per year, or 430,000 ha 19 yr-1 (EPA 2011; Smith et al. 2009), largely converted from grasslands and croplands (US EPA 2016). 20 This rate is somewhat larger than the 2.9 million ha of forest gain from 2005 to 2014 reported in the U.S. 21 EPA 2016." The first sentence is on a per year basis while the second sentence is over a period. |
| 253 | Chapter 9: Forests |  | Whole Page | 219 | 40 | 220 | 3 | Check these numbers. I can't find the 480 Tg CO2 figure in the biannual report and it is considerably different from the table 9.2 in this report (even though it cites another source). Also, note the 7.3$ in the sentence below. In a reference scenario developed for the 2016 U.S. Biennial Report (USDA-OCE 2016), the 39 2015 estimate of forests’ net sequestration is 480 Tg CO2e yr-1, which offsets 7.3$ of carbon emissions from transportation and energy sources. |
| 254 | Chapter 9: Forests |  | Whole Chapter | 222 | 31 | 224 | 21 | Gaps and Outlook section: These sections are dominated by cabon discussions at the very fine scales (e.g. 30 meter pixel level) but the disturbance section (9.4.5) discusses how the extent, severity, and frequency of natural disturbances have increased in recent decades with the western regions of Canada and the U.S. experiencing substantial die-offs recently from wildfire, insect outbreak, and drought disturbances. Shouldn't there be a discussion on the need for landscape management strategies that lowers the probability of these large-scale disturbances to occur? The Natural Disturbance section states the these events have led to widespread tree mortality, with fire and insects alone affecting up to 9% of the live tree carbon stocks in the western U.S. forests but there isn't any discussion in the Gaps section for a need to develop landscape strategies, especially in the West, to mitigate these disturbances. Public-private partnerships have taken root and are increasing the likelihood of success across private and public lands. The public is aware that these disturbances are not restricted one cateogory of land ownership and as federal agencies, we believe that public involvement in landscape strategies are the wave of the future. This report could help these inititives by advocating research that could inform these inititatives as to the best science to keep carbon on the land while also balancing other benefits. |
| 255 | Chapter 9: Forests | Whole Chapter |  |  |  |  |  | make units consistent throughout chapter - Tg C for example |
| 256 | Chapter 9: Forests | Table | 9.2 |  |  |  |  | the table is incomplete and thus misleading. Since CA and MX do not have an inventory, it would suggest USA is a huge C sink, when CA and MX could be as well. Carbon stock for CA or MX ? |
| 257 | Chapter 9: Forests | Whole Chapter |  |  |  |  |  | the overall sink strength numbers are not matching up - if it is 240 for forest and 27 for urban, how does it amount to 280? Please be consistent in the reporting. |
| 258 | Chapter 9: Forests | Whole Chapter |  |  |  |  |  | The SOD of Chapter 9 “Forests” is missing many recent crucial findings from forest carbon cycle changes in the western United States that have resulted from unprecedented climate warming, extreme drought, pest and pathogen attacks, and an increasingly long season for wildfires.  Here are some highlights and references that should be added to Chapter 9 for the next draft: |
| 259 | Chapter 10: Grasslands | Whole Page |  | 247 |  |  |  | include area of grasslands in North America to put C discussion in context |
| 260 | Chapter 10: Grasslands | Whole Page |  | 257 |  |  |  | Section 10.5, Global, North American and Regional Context, needs to be expanded/written. |
| 261 | Chapter 10: Grasslands | Whole Page |  | 258 |  |  |  | Section 10.6, Societal Drivers and Impacts and Carbon Management, text needs to be expanded/written. |
| 262 | Chapter 10: Grasslands | Whole Page |  | 258 |  |  |  | Section 10.7, Synthesis, Knowledge Gaps and Outlook, needs to be written. |
| 263 | Chapter 10: Grasslands | Whole Page |  | 259 |  |  |  | Need to complete the "Supporting Evidence" section by adding text. |
| 264 | Chapter 10: Grasslands | Whole Page |  | 265 |  |  |  | Figure 10.1 header needs to include atrributable source. |
| 265 | Chapter 10: Grasslands | Whole Page |  | 268 |  |  |  | Figure 10.4 header needs to include an attributable source. |
| 266 | Chapter 10: Grasslands | Whole Chapter |  |  |  |  |  | Key findings are discussed in detail beginning on page 253. On page 259 supporting evidence for each key finding is outlined but not completed. Details for key findings in the two sections may be redundant and consideration of how to eliminate that redundancy should occur. It may be the information from page 259 on could be incorporated in the key findings material presented beginning on page 253. Past research on adding nitrogen to meadows reveals that below ground growth of the root systems is the observable reaction of the system and above ground response is not easily demonstrated. Perhaps this type of response could be mentioned in terms of the inputs (CO2 or nitrogen) so the reader will understand expected above ground versus below ground response in grasslands. There is a discussion of warming temperature and soil moisture content both promoting growth. A simple graph showing a line for increase in temperature intersecting with a line of decreasing soil moisture might drive home the point that as temperature is favorable for growth (longer growing season) soil moisture is necessary for that growth and there is a point where increased temperature is not beneficial because soil moisture loss increases and becomes limiting. |
| 267 | Chapter 10: Grasslands | Text Region |  | 249 | 249 | 5 | 5 | Change "USA" to "U.S" to be consistent with the rest of the document. |
| 268 | Chapter 10: Grasslands | Text Region |  | 249 | 249 | 27 | 28 | Sentence structure is a little awkward. Also, define "MIROC." |
| 269 | Chapter 10: Grasslands | Text Region |  | 249 | 249 | 33 | 33 | The word "form" should be "from." |
| 270 | Chapter 10: Grasslands | Text Region |  | 249 | 249 | 32 | 35 | A source for this table should be provided in this table header so that if the table is extracted from the text for some other purpose at some future date, the source for the data in the table will be known. |
| 271 | Chapter 10: Grasslands | Text Region |  | 250 | 250 | 22 | 22 | Define "NDVI." |
| 272 | Chapter 10: Grasslands | Text Region |  | 251 | 251 | 19 | 19 | Define "GPP." |
| 273 | Chapter 10: Grasslands | Text Region |  | 255 | 255 | 1 | 1 | Define "SOM." |
| 274 | Chapter 10: Grasslands | Text Region |  | 255 | 255 | 12 | 12 | "C4MIP" should be "CMIP4." |
| 275 | Chapter 10: Grasslands | Text Region |  | 255 | 255 | 13 | 13 | Define "SOC." |
| 276 | Chapter 10: Grasslands | Text Region |  | 257 | 257 | 35 | 35 | USGCRP guidance for this section requests that the authors identify for the NCA 2018 whether the chapter is most relevant to the northern or southern Great Plains NCA region. |
| 277 | Chapter 10: Grasslands | Text Region |  | 257 | 257 | 36 | 39 | Need a source/sources for these statements. |
| 278 | Chapter 11: Arctic/Boreal/Permafrost regions | Whole Page |  | 271 |  |  |  | Section 11.1.1 This section reads well, but lacks a clear link/implication to C-cycle and thaw |
| 279 | Chapter 11: Arctic/Boreal/Permafrost regions | Whole Page |  | 272 |  |  |  | Section 11.1.3 You could reference some of the geospatial work by Julie Jastrow and Umakant Misrha (http://tessfa.bio.anl.gov/downloads/publications.pdf?20161115165152) |
| 280 | Chapter 11: Arctic/Boreal/Permafrost regions | Whole Page |  | 273 |  |  |  | Define LGM unless it is done elsewhere. |
| 281 | Chapter 11: Arctic/Boreal/Permafrost regions | Whole Chapter |  |  |  |  |  | There is remarkably little remote sensing or information derived from remote sensing in this chapter. This is particularly true for the section on permafrost. There has been significant progress on the use of remote sensing for determining Active Layer Thickness and this should be addressed in the chapter. The most straightforward way of doing this would be to get Kevin Schaefer to serve as a contributing author to write a page or two on what radar can do and has done for this issue. His ReSALT initiative is a good example of what is out there.  There is almost no mention of CARVE results, which are very pertinent to the subject of this chapter. Reaching out to Chip Miller on what was learned from CARVE about the state of the carbon cycle in Arctic and boreal regions would be a straightforward way of resolving this issue.  The vegetation carbon pool section is very weak. A suggestion there is to consult Chris Neigh, who can help describe what has been learned recently using GLAS and other methodologies. The Canadian have developed several large scale products using MODIS that work well (see Beaudoin et al. 2014). The GLAS work of Margolis et al. (2015) provided biomass estimates for individual ecozones in Alaska and Canada. The CBM model was designed for this purpose and seems to be largely absent. A suggestion is to find a biomass person to strengthen this.  There is a section on fires (Eric Kasischke could help strengthen this, or Tatiana Loboda) but nothing on insects (mountain pine beetle, spruce budworm) which are perhaps equally important to the carbon budget of boreal North America (David MacLean at University of New Brunswick has done a lot of work on this subject.)  Katey Anthony could easily provide inputs on Arctic lakes and carbon.  Methane: There is lots of pertinent information in Nadeau et al. (2013) â€“ not just the results of this particular study. For example, at the daily scale, the two main controls on methane emissions were found to be the water table position and the peat temperature at 0.3 m under the surface. Contrary to other studies, seasonal methane emissions peaked when the water table was at its maximum distance from the surface, around mid-August. No clear diurnal pattern could be found in methane emissions, indicating that methane was produced quite deep within the peat.  Overall, this chapter could definitely benefit from a focus on what is new since the last report. |
| 282 | Chapter 11: Arctic/Boreal/Permafrost regions | Whole Chapter |  |  |  |  |  | Key References: Beaudoin, A., Bernier, P.Y., Guindon, L., Villemaire, P., Guo, X.J., Stinson, G., Bergeron, T., Magnussen, S., and Hall, R.J. 2014. Mapping attributes of Canada's forests at moderate resolution through kNN and MODIS imagery. Can. J. For. Res. 44: 521â€“532. doi:10.1139/cjfr-2013-0401. Margolis, H.A., Nelson, R.F., Montesano, P.M., Beaudoin, A., Sun, G., Andersen, H.E., Wulder, M.A. 2015. Combining satellite lidar, airborne lidar and ground plots to estimate the amount and distribution of aboveground biomass in the boreal forest of North America. Can. J. For. Res. 45: 45: 838â€“855. doi: 10.1139/cjfr-2015-0006. Nadeau, D.F., Rousseau, A.N., Coursolle, C., Margolis, H.A. 2013. Summer methane fluxes from a boreal bog in northern Quebec, Canada, using eddy covariance measurements. Atmospheric Environment, 81: 464-474. |
| 283 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 270 | 270 | 27 | 27 | Please Clarify why "climate change is amplified in high latitude regions". What is driving this response? |
| 284 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 270 | 270 | 36 | 37 | This sentence reads awkwardly and might need to be re-phrased |
| 285 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 270 | 270 | 1 | 2 | Please quantify what you mean by "most" and "colder" |
| 286 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 272 | 272 | 19 | 24 | Maybe include a % coverage by vegetation category to help the reader conceptualize the distribution and contribution |
| 287 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 273 | 273 | 36 | 36 | Define yedoma. |
| 288 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 273 | 273 | 11 | 11 | Spell out acronyms like "LGM" |
| 289 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 273 | 273 | 27 | 30 | Maybe compare to the global land C pool for reference and relevance? |
| 290 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 273 | 273 | 36 | 36 | You should reference where the "accumulating data" is coming from. Julie Jastrow's team is doing a considerable amount of work on Yedoma along with Chin-lu Ping |
| 291 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 274 | 274 | 1 | 17 | Please include estimated accumulation rates |
| 292 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 274 | 274 | 31 | 42 | Are you referring to methane clathrates here? |
| 293 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 275 | 275 | 37 | 37 | I noticed the significant figures associated with "1.011Pg" is different than other numbers in the chapter. |
| 294 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 276 | 276 | 3 | 3 | Please clarify "large impacts" do you mean fire, invasive, nutrient limitations |
| 295 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 276 | 276 | 7 | 17 | Please provide citations for your reported values |
| 296 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 276 | 276 | 18 | 22 | Are these just placeholders for a future section? |
| 297 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 277 | 277 | 1 | 13 | Be sure to cite the source of these values |
| 298 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 277 | 277 | 6 | 8 | Quantify "absolute levels of CO2 flux are low" |
| 299 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 277 | 277 | 1 | 13 | Is this just a limitation of wintertime measurements? |
| 300 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 277 | 277 | 30 | 30 | 2 g C deg C-1 (is this per degree C?) |
| 301 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 278 | 278 | 6 | 6 | Are you referring to methane clathrates here? |
| 302 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 278 | 278 | 1 | 14 | What about the spring time "burp" of methane trapped under the snow and ice? |
| 303 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 279 | 279 | 11 | 17 | Would a table work better here? |
| 304 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 280 | 280 | 10 | 11 | please clarify why the estimates are low |
| 305 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 280 | 280 | 21 | 21 | Is this missing or a placeholder? |
| 306 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 280 | 280 | 27 | 27 | You might consider using the term "evaluation" rather than "judgement". |
| 307 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 281 | 281 | 2 | 2 | Are you referring to a process, landscape, or ESM model? |
| 308 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 281 | 281 | 25 | 40 | Are there any benchmarking experiments or MiPS? |
| 309 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 282 | 282 | 13 | 14 | As CO2 or CH4? |
| 310 | Chapter 11: Arctic/Boreal/Permafrost regions | Text Region |  | 283 | 283 | 15 | 15 | What is FMPO? |
| 311 | Chapter 12: Soils | Whole Page |  | 299 |  |  |  | Where in the text are each of these Key Findings discussed, or how were they derived from the text? See how this was done in section 10.4 of Chapter 10. |
| 312 | Chapter 12: Soils | Whole Page |  | 301 |  |  |  | Section 12.2 seems to roll together "Historical Context" and "Current Understanding." To be consistent with other chapters in the report, the authors should separate the text in Section 12.2 into separate sections, one for Historical Context and one for Current Understanding. |
| 313 | Chapter 12: Soils | Whole Page |  | 310 |  |  |  | The USGCRP guidance for this section of the report is to organize the text around both the 2014 and the 2018 NCA regions of the U.S., not around ecosystem types, as the authors have done. As organized and written, the information presented will be useful to scientists, but it will be of little use to regional and local "U.S. decision makers and policymakers," as outlined in the "Geographical Scope" section of the guidance, because those types of decisionmakers are highly unlikely to make policy decisions based on ecosystem types. |
| 314 | Chapter 12: Soils | Whole Page |  | 310 |  |  |  | Given the extensive body of research that has been conducted on soils from Alaska over the past decade, there is a need to provide at least a paragraph of text on current understanding of C in soils from this U.S. state. This could be really useful for decisionsmakers in Alaska. To address this shortfall, it might be worthwhile to tease apart section 12.4.4 such that information concerning Alaska is assembled into a paragraph for section 12.4.1. |
| 315 | Chapter 12: Soils | Whole Page |  | 317 |  |  |  | Section 12.6, Synthesis, Knowledge Gaps and Outlook, needs to be written. |
| 316 | Chapter 12: Soils | Whole Page |  | 322 |  |  |  | Need to complete the "Supporting Evidence" section by adding text. |
| 317 | Chapter 12: Soils | Whole Page |  | 347 |  |  |  | Figure 12.1 needs a header and an attributable source needs to be included in the header. |
| 318 | Chapter 12: Soils | Whole Page |  | 348 |  |  |  | Possible Figure 12.2 needs a header and an attributable source needs to be included in the header. |
| 319 | Chapter 12: Soils | Text Region |  | 299 | 299 | 2 | 2 | What is meant by "â€¦stoccks and uncertainties in these stocks...?" Stocks of what? |
| 320 | Chapter 12: Soils | Text Region |  | 299 | 299 | 28 | 28 | "SOM" should be defined in this sentence rather than the next sentence. |
| 321 | Chapter 12: Soils | Text Region |  | 300 | 300 | 8 | 9 | Something is missing in this sentence. |
| 322 | Chapter 12: Soils | Text Region |  | 300 | 300 | 25 | 25 | Table 12.1 needs a title/header as well as a source reference. |
| 323 | Chapter 12: Soils | Text Region |  | 301 | 301 | 12 | 12 | Change to "â€¦help for understanding spatialâ€¦" |
| 324 | Chapter 12: Soils | Text Region |  | 302 | 302 | 31 | 31 | Define "NPP." |
| 325 | Chapter 12: Soils | Text Region |  | 310 | 310 | 24 | 25 | A word seems to be missing in the sentence. |
| 326 | Chapter 12: Soils | Text Region |  | 312 | 312 | 1 | 2 | Table header needs to also include a source for the data. |
| 327 | Chapter 13: Terrestrial Wetlands | Whole Chapter |  |  |  |  |  | To improve readability, I think mineral soil wetlands should be spelled out, MSW is not intuitive for a lay audience. |
| 328 | Chapter 13: Terrestrial Wetlands | Text Region |  | 350 | 350 | 29 | 36 | I think a brief explanation of why the difference between SOCCR1 and 2. For example, is there a scientific reason why we split thing up - they functional behave differently? As written, it seems arbitrary. |
| 329 | Chapter 13: Terrestrial Wetlands | Text Region |  | 351 | 351 | 30 | 36 | Is this current main causes for wetland loss or historical? It seems inconsistent with the "no net-loss". In short, is it still going on or have the damage already been done - what is the current state change, if any? |
| 330 | Chapter 13: Terrestrial Wetlands | Text Region |  | 351 | 352 | 39 | 3 | This part about migratory birds is out of scope, what does this have to do with carbon? Is the point we don't manage/consider carbon when it comes to wetland? |
| 331 | Chapter 13: Terrestrial Wetlands | Text Region |  | 353 |  | 11 |  | This part discussing unpublished results should be removed - it doesn't add to the story. |
| 332 | Chapter 13: Terrestrial Wetlands | Text Region |  | 353 |  | 12 |  | Is this allowed, a recommendation on future science? |
| 333 | Chapter 13: Terrestrial Wetlands | Text Region |  | 353 |  | 26 |  | I think it needs to be more specific, the oxygen availability, not necessary the water table, that influences methane flux. Perhaps make the link between water table and O2. |
| 334 | Chapter 13: Terrestrial Wetlands | Text Region |  | 353 | 355 | 33 |  | Certain parts of this section refer to organic matter oxidation, and others decomposition. I think the terminology needs to be consistent. |
| 335 | Chapter 13: Terrestrial Wetlands | Text Region |  | 353 |  | 38 |  | What is exactly meant by using carbon density? It seems the quality of the carbon (i.e. decomposability) would be more important concerning this report. Regardless, make it clear why C density is relevant metric for C cycling. |
| 336 | Chapter 13: Terrestrial Wetlands | Text Region |  | 356 | 356 | 30 | 38 | This read like a recommendation of future science and should be removed from the report. |
| 337 | Chapter 13: Terrestrial Wetlands | Text Region |  | 356 | 357 | 41 | 20 | I believe these passages are misleading. While the PPR region do cover ~777,000 km2, only ~70,000 km2 (pg 353, line 3) are actually remain. Most is managed Ag lands. Overall, this overstated the current importance of PPR in the C cycle. Just make it clear that the actual area of PPR is |
| 338 | Chapter 13: Terrestrial Wetlands | Text Region |  | 360 | 361 | 18 | 17 | Unless it is somewhere else (coastal), consider discussing briefly sea level rise on terrestrial wetlands - swamps. |
| 339 | Chapter 14: Inland waters | Whole Page |  | 379 |  |  |  | Where in the text are each of these Key Findings discussed, or how were they derived from the text? See how this was done in section 10.4 of Chapter 10. |
| 340 | Chapter 14: Inland waters | Whole Page |  | 388 |  |  |  | USGCRP guidance for this section requests that the authors identify the applicability of this discussion to both the NCA 2014 and NCA 2018 regions. |
| 341 | Chapter 14: Inland waters | Whole Page |  | 392 |  |  |  | Need to complete the "Supporting Evidence" section by adding text. |
| 342 | Chapter 14: Inland waters | Whole Page |  | 403 |  |  |  | Figures need to include attributable sources in the figure headers. |
| 343 | Chapter 14: Inland waters | Text Region |  | 382 | 382 | 19 | 32 | There is discussion of a global increase in the construction of dams, and therefore retention of water. However, in the U.S., there has been some removal of long-standing dams in recent years, and so, for the U.S., is it also true that more water is now retained than 10 years ago or less? For regional and local U.S. decisionmakers, it might be useful to understand what the trend has been in the U.S. |
| 344 | Chapter 14: Inland waters | Text Region |  | 384 | 384 | 1 | 1 | The word "and" seems to be missing in this sentence between "â€¦terrestrial ecosystems" and "the atmosphere." |
| 345 | Chapter 15: Tidal wetlands and estuaries | Whole Page |  | 405 |  |  |  | Section 15.1 Nicely written |
| 346 | Chapter 15: Tidal wetlands and estuaries | Whole Page |  | 417 |  |  |  | donâ€™t forget to italicize species names |
| 347 | Chapter 15: Tidal wetlands and estuaries | Whole Chapter |  |  |  |  |  | There seems to be little attention given to methane which is shocking since these systems are major players in the global methane cycle. You should consider including an accounting or CH4 values throughout the chapter |
| 348 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 406 | 406 | 13 | 13 | Maybe a map or figure showing the distribution of the "relative area" would help drive home the importance |
| 349 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 407 | 407 | 1 | 5 | Historical loss or coverage? |
| 350 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 407 | 407 | 17 | 17 | Clarify why C is buried |
| 351 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 407 | 407 | 35 | 35 | What you do you mean by "mature" |
| 352 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 407 | 407 | 38 | 38 | Why is it longer lived? |
| 353 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 408 | 408 | 22 | 22 | Are the values missing at this time or was this a PDF error? |
| 354 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 409 | 409 | 6 | 6 | Provide context for the area and contribution of these areas |
| 355 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 410 | 410 | 11 | 11 | partition CO2/CH4 flux |
| 356 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 410 | 410 | 19 | 32 | what about the response to CO2 fertilization? See work by Bert Drake and Pat Megonigal |
| 357 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 411 | 411 | 19 | 19 | With respect to encroaching salt, how does this impact the C cycle? |
| 358 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 411 | 411 | 39 | 39 | clarify what you mean by "carbon stocks may potentially increase as a result of statewise trends" |
| 359 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 412 | 412 | 36 | 36 | What is "NEWS" |
| 360 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 413 | 413 | 6 | 7 | Clarify why these systems have radically decreased |
| 361 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 413 | 413 | 35 | 36 | The statement on Mexico seems incomplete and sticks out by itself |
| 362 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 414 | 414 | 18 | 18 | What is "NTEP" |
| 363 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 415 | 415 | 15 | 20 | What about the DOC transport from thawing permafrost and thermokarsts? |
| 364 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 417 | 417 | 1 | 1 | Does "yo-yo" mean cryoturbation? |
| 365 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 417 | 417 | 12 | 12 | clarify why these systems are understudied |
| 366 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 418 | 418 | 9 | 34 | Some of these examples lack linkages to carbon cycling. While important to these systems, it's not clear how they impact SOCCR. |
| 367 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 418 | 418 | 28 | 28 | you might clarify the role of CO2 in acidified seawater |
| 368 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 419 | 419 | 24 | 38 | link these statements/findings back to the C cycle |
| 369 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 421 | 421 | 11 | 28 | This section seemed less developed |
| 370 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 423 | 423 | 2 | 2 | I would suggest not using "blue carbon" as it could be interpreted different ways depending on the reader and context. |
| 371 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 424 | 424 | 6 | 6 | you mention restoration practices here, but restoration for how long? Especially since wetland regulations have short ~5 year accountability periods. |
| 372 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 424 | 424 | 13 | 13 | There is an extra "s" after "are" |
| 373 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 424 | 424 | 39 | 39 | Is this section missing? |
| 374 | Chapter 15: Tidal wetlands and estuaries | Text Region |  | 425 | 425 | 1 | 14 | Do we have an adequate capture of these systems in global and Earth system models? |
| 375 | Chapter 15: Tidal wetlands and estuaries | Whole Chapter |  |  |  |  |  | The overall chapter is too long. Suggesting to cut down on the overall overview (15.1 and 15.2) and capitalize on table 15.1 to shorten text in section 15.4 |
| 376 | Chapter 15: Tidal wetlands and estuaries | Figure | 15.1 |  |  |  |  | the figure is too busy, suggesting simplifying |
| 377 | Chapter 15: Tidal wetlands and estuaries | Figure | 15.2 |  |  |  |  | suggest omitting Fig 15.2 or duplicating for USA and Canada for consistency |
| 378 | Chapter 16: Oceans and Continental Shelves | Whole Page |  | 445 |  |  |  | Section 16.3 This section has lots of details â€“ a table or figure would help, maybe color coded by flux, and estimates of uncertainty are needed |
| 379 | Chapter 16: Oceans and Continental Shelves | Whole Page |  | 446 |  |  |  | Section 16.3.4 Can the uncertainty in exchange across ice and as ice-cover declines be discussed? |
| 380 | Chapter 16: Oceans and Continental Shelves | Whole Chapter |  |  |  |  |  | The uncertainty in fluxes is large, but should still be estimated â€“ what are the estimates, how uncertain are they? |
| 381 | Chapter 16: Oceans and Continental Shelves | Text Region |  | 439 | 439 | 1 | 16 | The chapter focus is on 2 of several factors â€“ are the others less important? For example, riverine inputs may be very important, correct? What about storm surge â€“ it isnâ€™t mentioned, is it not important? Or is this dealt with in other chapters? |
| 382 | Chapter 16: Oceans and Continental Shelves | Text Region |  | 439 | 439 | 25 | 25 | Define â€œExclusive Economic Zoneâ€ |
| 383 | Chapter 17: Consequences of rising atmospheric CO2 | Whole Chapter |  |  |  |  |  | This chapter provides a catalog of effects under some expected consequence headings - ocean acidification, terrestrial plant responses and ecosystem changes, and warming responses - mixed with discussion of carbon balance mechanisms I would have expected to be discussed in other chapters. The consequence/response items tend to be thrown in as a collection of topics with little discussion of magnitude or uncertainty. |
| 384 | Chapter 17: Consequences of rising atmospheric CO2 | Whole Chapter |  |  |  |  |  | 17.5 This section is disjointed and appears out of place here. is it not better covered in chapter 18? |
| 385 | Chapter 17: Consequences of rising atmospheric CO2 | Whole Chapter |  |  |  |  |  | Appendix A This appears to be a collection of preexisting mitigation text pasted in. I recommend that the portions of this that do deal with consequences to human communities be extracted and written in section 17.4.2 in context rather than have an appendix to a chapter. |
| 386 | Chapter 17: Consequences of rising atmospheric CO2 | Text Region |  | 476 | 476 | 12 | 23 | it is curious to see a single paragraph appeal for SLCF mitigation here, and it also appears out of place in a chapter on CO2 consequences. Further, it appears unbalanced - If co-emitted (aerosols and gas-phase) species are on the table, all species and effects should be included, not just picking out BC and methane. Combustion of e.g. coal will have a greater cooling effect (from sulfur) than warming (from BC). if the section doesn't take the time to present a combined picture, the BC and methane should be dropped here. |
| 387 | Chapter 18: Decision-support/Informing decisions, social, behavioral, economic | Whole Page |  | 519 |  |  |  | Toward end of chapter, I realized that while authors recognize that carbon data exhibit uncertainty and/or can exhibit error, they don't go to the next step to ask decisionmakers how much uncertainty would be acceptable for such data to be used. To me, this is a naive academic approach in writing this chapter. I think a decisionmaker would have started the chapter differently, i.e., by starting with the classes of decisions, how much uncertainty is allowable for data to be incorporated into the analysis, and robustness of decision choices. Also given how old much of the references are, i didn't get much out of this chapter. |
| 388 | Chapter 18: Decision-support/Informing decisions, social, behavioral, economic | Text Region |  | 510 | 510 | 24 | 24 | The reference suggesting a "new model" is needed is out of date, given the old reference. Nothing new in past decade? |
| 389 | Chapter 18: Decision-support/Informing decisions, social, behavioral, economic | Text Region |  | 510 | 510 | 3 | 3 | This is an old reference, suggesting not much done in past decade. Suggest provide a more current reference. |
| 390 | Chapter 18: Decision-support/Informing decisions, social, behavioral, economic | Text Region |  | 510 | 510 | 31 | 31 | This sentence, and many others (eg, 514), need to be fixed. Authors didn't proof read. |
| 391 | Chapter 18: Decision-support/Informing decisions, social, behavioral, economic | Text Region |  | 519 | 519 | 4 | 7 | The relationship between this statement on net carbon emissions from biomass and the section heading (stock changes compared to fluxes and uptakes) needs to be clarified.  Note also that the Science Advisory Board perspective does not necessarily reflect EPA policy and should not be considered as such. The SAB analysis may provide guidance to EPA policy development, but should not be considered as policy itself. |
| 392 | Chapter 18: Decision-support/Informing decisions, social, behavioral, economic | Text Region |  | 522 | 522 | 26 | 39 | The key finding is speculative and is not supported by the evidence presented here. The evidence base does not address whether the scientific results are "more relevant and useful to decision makers," but only notes that models are being designed to connect to human drivers. |
| 393 | Chapter 19: Future projections and associated climate change in N. America | Whole Page |  | 541 |  |  |  | Section 19.3.1 What about the effects of ongoing LULCC, agriculture and forest management practice, etc? If this is covered in later section it should be stated up front that this section is about â€œnaturalâ€ systems only. |
| 394 | Chapter 19: Future projections and associated climate change in N. America | Whole Page |  | 542 |  |  |  | section 19.3.2 This section talks about how systems change (are changing) but not enough about how they WILL change â€“ how will change \*\*change\*\*? |
| 395 | Chapter 19: Future projections and associated climate change in N. America | Whole Page |  | 546 |  |  |  | section 19.7.2 Nothing here on gaps in understanding of disturbance or LULCC effects on C |
| 396 | Chapter 19: Future projections and associated climate change in N. America | Whole Chapter |  |  |  |  |  | Generally - the chapter is incomplete, and what is present is more on terrestrial changes generally and not working very much with either LULCC or emissions scenarios, so lots of work is needed. The chapter is also too much on how things are changing rather than about how they will change going forward |
| 397 | Chapter 19: Future projections and associated climate change in N. America | Whole Chapter |  |  |  |  |  | Section 19.2.1 Not sure the material on model improvements is needed here â€“ if it is covered somewhere else. The chapter doesnâ€™t really get going until section 19.3.1 and the sections before donâ€™t say much. If modeling is to be covered, it would be more useful to talk about where model improvements are most needed to project changes, rather than how theyâ€™ve improved since SOCCR3 |