Reviewer	Referring To	Comment	Response
Does the document address relevant features of the climate of the region?			
Reviewer 13	Whole document	The document does a very good job of addressing the relevant features of the climate of the region, except perhaps for historical changes in growing season length. I think it would be useful to have an analysis of historical changes in growing season length, thaw date, and freeze-up in the climate trends section that starts on page 6. This would provide a nice “baseline” for the projected trends in these variables that is presented on page 24 and in Figures 17-19.	There is no published literature providing comprehensive information on trends in these variables through Alaska. We added text noting this and also describing results for Fairbanks for which analyses have been done
Does the document incorporate the best information available?			
Reviewer 13	Whole document	For the most part, but the statements about changes in fire regime on page 9 are not based on recently published syntheses (see my specific comments below).	We extensively revised this section adding in several recent citations
Are data and information presented in an accurate and clear manner?			
Reviewer 13	Whole document	In general yes, except for the statements related to fire regime on page 9.	We extensively revised this section adding in several recent citations
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
Reviewer 13	Line 38	Delete the first “the” in the sentence?	Deleted.
Reviewer 13	Line 115	Change “result in” to “have resulted in”, as this phenomenon has largely ceased since the mid to late 1990s.	Changed.
Reviewer 13	Line 169-170	I’m don’t think that Shulski and Wendler (2007) is the most appropriate reference for vulnerability to wildfire. Perhaps cite Kasischke et al. (2010) in this context: Kasischke, E.S., D. Verbyla, T.S. Rupp, A.D. McGuire, K.A. Murphy, J.L. Allen, E.E. Hoy, R. Jandt, P. Duffy, M. Calef, and M.R. Turetsky. 2010. Alaska’s changing fire regime – Implications for the vulnerability of its boreal forests. Canadian Journal of Forest Research 40:1313-1324. doi:10.1139/X10-098.	Added citation as an additional resource.
Reviewer 13	Line 263	It is not clear to me what you mean by “three of the most severe fire years”. A suggested change to the sentence that starts on this line is: “During the 2000s, an average of 767 000 ha year–1 burned in interior Alaska (17% of the landscape), which is 50% higher than in any previous decade since the 1940s (Kasischke et al. 2010).”	Revised this paragraph extensively, including replacement of opening statement with the reviewer's statement (and citation of Kasischke et al., 2010).
Reviewer 13	Lines 264-167	I’m not sure I agree that warmer springs and a lengthening of the growing season were responsible for the large fires of the 2000s. First of all, were the springs in the 2000s substantially earlier than the springs of the 1990s? I haven’t seen any evidence of this. In fact, my casual observation is that the autumns in the 2000s were extended in interior Alaska in comparison with the 1990s, but that the springs were not earlier in the 2000s than in the 1990s. Also, I don’t agree with the suggestion that “the springtime vegetative growth and fuel supply” associated with a lengthening growing season plays much of a role in large fire years. The key thing that causes an outbreak of fires is a blocking high that lasts longer than 10 days and substantially dries out the soil. The large fire years occur when these conditions happen, lots of fires get started, and the rains don’t arrive to put out the fires. It is the amount of area burned later in the summer that has increased over the last several decades, not the amount of area burned early in the season. Besides the lack of rain, it is also thought that deeper active layers allow fires to persist in the organic horizons of black spruce forests. See Kasischke et al. (2010).	Revised this paragraph by removing statement about earlier fires; addressed the "earlier spring" issue by inserting new paragraph in section entitled "Climatic Trends - General". Added statements about the blocking high and the deeper active layers.

Reviewer 13	Lines 271-274	I don't agree with these last two sentences. Also, don't know how the content of the last sentence can be attributed to Balshi et al. (2009). I looked through Balshi et al., and lightning/thunderstorm activity was never mentioned. In fact, Kasischke et al. (2010) state in their abstract that "Over the past 60 years, there was a decrease in the number of lightning-ignited fires, an increase in extreme lightning-ignited fire events, an increase in human-ignited fires, and a decrease in the number of extreme human-ignited fire events." If the growing season has lengthened over the last 60 years, then the conclusion of Kasischke et al. (2010) is at odds with the last sentence of this paragraph.	Removed offending statements and reference to Balshi et al. (2009) and added reference to Farukh et al. (2011), who provide evidence of a recent increase in lightning frequency in Alaska. However, retained caveat about changes in lightning detection network.
Reviewer 13	Line 602	This line states "2000-2009", but Figure 22 states "2000-2006". Please reconcile.	Corrected text (formerly line 602) to say "2000-2006"
Reviewer 13	Line 603	I did not understand the reference to Fig. 19 in this line, as Fig. 19 was compiled for 15 models. Do you mean Fig. 10, which was compiled for 5 models?	"Fig. 19" corrected to say "Fig. 10". Thanks for catching that.
Reviewer 13	Line 683	It would be good to cite Larsen et al. (2009) in this sentence: Larsen, P.H., S. Goldsmith, O. Smith, M.L. Wilson, K. Strzepek, P. Chinowsky, and B. Saylor, 2008: Estimating future costs for Alaska public infrastructure at risk from climate change. Global Environmental Change, 18(3), 442-457.	Citation of Larsen et al. (2008) has been added at end of section entitled "Permafrost Projections". Reference also added to reference list.

Please provide any additional suggestions or recommendations.

Reviewer 13	Whole document	The information on recent decadal-scale changes about growing season length in Alaska has been somewhat confusing and not clearly stated. It would be really helpful to have spatial maps of historical changes in growing season length, spring thaw, and fall freeze as well as decadal scale spatially averaged plots of the variables for specific regions of the state. My experience is that more and more people are incorrectly representing these changes based on some early incomplete analyses.	New paragraph on frost-free season length and growing season length has been added in response to these concerns. See section entitled "Climatic Trends - General" -- second paragraph of that section.

Reviewer	Referring To	Comment	Response

Does the document address relevant features of the climate of the region?

Reviewer 14	Whole document	Yes. This document includes regional climate trends, and important features for Alaska such as permafrost, sea ice, coastal storms, floods and changing temperature means and extremes.	No response necessary.

Does the document incorporate the best information available?

Reviewer 14	Whole document	Yes. This document presents information available from NOAA NCDC, from the Alaska Climate Research Center, the Scenarios Network for Alaska and Arctic Planning, and relevant recent publications.	No response necessary.

Are data and information presented in an accurate and clear manner?

Reviewer 14	Whole document	Overall, yes. Specific suggestions for clarification and revisions are listed below.	No response necessary.

Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.

Reviewer 14	Page 3, Lines 97-98	I suggest adding topography and/or orography to this list of elements that impact variation in precipitation.	Added topography to the list.
Reviewer 14	Page 3, Lines 110-117	The section on Rising Temperatures is accurate and well stated. I am curious why forestry impacts were chosen as an example over other examples (such as melting glaciers for tourism or ocean temperature impacts on oyster contamination (vibrio) on cruise ship passengers)	Added several additional examples of impacts (snow season length, recreation, glaciers, tourism, oyster contamination).
Reviewer 14	Page 5, Line 148	The paragraph below discusses sea ice decline as well as ocean acidification. You might consider including "Sea Ice Decline" in this section heading.	Added "Sea Ice Decline" to heading.

Reviewer 14	Page 5, Lines 162-163	My understanding is that the floods are caused when up-stream ice jams dislodge causing a rush of water that then backs up against a downstream section of river that is still frozen (i.e. not yet broken up). You might consider adding a bit more explanation as to the cause of the floods. For anyone not familiar with break-up in Alaska, it might not be intuitive as to why a dislodged ice jam would cause a flood (one might assume that the in-place ice jam would cause flooding up stream of the jam and thus a dislodged ice-jam would release the backed up waters).	Revised the paragraph on Floods to distinguish the two types of floods caused by ice jams.
Reviewer 14	Page 6, Lines 182-184	This last sentence of the paragraph may require a bit more explanation/context. Figure 3 clearly shows the shift from negative to positive PDO in 1976. However, Table 1 shows mean temperatures 1949-2009. The average reader might find the statement that little warming has occurred since the shift in 1976 to be confusing in light of the time period over which the mean is calculated in Table 1.	Added a reference to Fig. 3 which clearly shows a rapid warming at the time of the PDO phase shift. The figure also shows a 5-tear running average which shows a rather flat trend.
Reviewer 14	Page 6, Lines 194-200	I had to read these sentences several times to get the meaning. You might consider revising them for clarity	Reworded text for clarification.
Reviewer 14	Page 6, Lines 202-203	You might consider including a bit more explanation regarding the cold and heat wave indices here and in the figure caption. How is the index derived? How can the graphs (Fig. 4) be interpreted? Do the numbers on the left axis increase linearly? For example, does the lower graph indicate that 2001 had more extreme heat by a factor of 2-7 (i.e. 1.4 vs 0.4 and 0.2)? What do the graphs and indices mean for an agriculturalist or for city planning or the tourism industry, for example?	Rearranged a portion of the paragraph - some text had gotten separated - and added text for further clarification. I did not make any mention of the y-axis, as it is represented as a linear axis and should be interpreted as such. I also did not attempt to interpret the meaning of the indices for specific stakeholders as I believe that is outside the scope of this paper. Interpretation should be done on an individual basis.
Reviewer 14	Page 9, Lines 255-256	These two sentences seem contradictory (i.e. one sentence “no significant change in the frequency of strong storm events…” and the next sentence “there has been a significant increase of strong storms.” This may require an explanation of the definition of “strong storms.” The explanation may be that one definition is tied directly to air pressure (either at the surface or at altitude), while the experienced impact of those "strong storms" is tied more directly to erosion and lack of sea ice. The last sentence of this paragraph (L. 259-260) implies that lack of sea ice causes higher wave heights and more severe impacts. It may be helpful to provide this more explicit explanation	Reworded these two sentences a bit to clarify the distinction that was being made, i.e., no overall change in frequency of strong storms, but an increase in frequency is seen along the northern and northwestern coasts when a protective sea ice cover is not present during the summer and autumn months.
Reviewer 14	Page 9, Line 263	I suggest adding “on record” to this sentence.	Added the requested text.
Reviewer 14	Page 9, Line 272	I have the understanding that the tundra fires have also been linked to decreased sea ice extent	Added a statement about this linkage and the reason for it (and new reference to Hu et al., 2010).
Reviewer 14	Tables 2 and 3	I think Tables 2 & 3 are a very good addition. It is interesting to see the reporting of extremes.	No response necessary.
Reviewer 14	Page 12, Line 355	RE “… increase in temperature compared to 1971-2000.” Do you mean the mean temperature in this time period (as well as multi-model mean)? If so, it would be good to explicitly state that both in the text and also in the figure. If not, this needs clarification.	Temperature changes are relative to corresponding model means for 1971-2000; added clarifying text.
Reviewer 14	Page 12, Line 357-358	Does this mean that the difference between B1 and A2 increases over time? This sentence could use clarification	Yes. Modified text to clarify.
Reviewer 14	Page, 14, Line 377	It would be good to explain, both in the text and in the figure caption, why you provide this for A2, but not B1.	Differences between A2 and B1 plots are summarized in newly added sentence. Since patterns are qualitatively similar for A2 and B1, additional figure would add little to presentation.
Reviewer 14	Page 14, Line 394	You might consider adding a summary sentence at the end of this paragraph such as: “Thus, while variation exists among the models, all show an increase in temperature.”	Added such a sentence.
Reviewer 14	Page 17, Lines 430-431	The implications of this sentence are not clear. Does this just re-iterate that AK is a large state and there are large variations impacted by topography? Or is there another meaning implied?	Added a sentence to clarify the point – statewide averages are inadequate for local and regional changes

Reviewer 14	Page 17, Line 437	It may be more intuitive to the audience to describe winter temperatures close to 0C and thaw.	Restructured this paragraph to begin with description of changes in near-freezing temperatures.
Reviewer 14	Page 17, Line 444	I suggest adding “relative” so the sentence reads, "relative to one historical time period."	Temperatures are for, not relative to, the historical reference period. Added a crucial word “and” to make this clear.
Reviewer 14	Page 17, Line 463	The time period 1991-2000 doesn’t seem to make sense in the sentence.	Corrected to 2091-2100. Thanks for catching that.
Reviewer 14	Page 24, Line 539	Perhaps include in the discussion about precipitation a brief mention of relative water availability (in the soil and for vegetation and ecosystems). I.e. increasing temperatures in spring and autumn will increase the length of time that plants grow and therefore increase the overall water uptake by plants. Similarly, increasing temperatures will presumably increase evaporation. Thus, while models all predict increasing precipitation, this may not result in increasing water availability.	Added a paragraph covering this discussion as well as a reference to a figure from IPCC.
Reviewer 14	Page 31, Line 623	Perhaps add the observation that the variation between model outputs is greatest for the summer and fall months (JJA+S and sometimes O) (and also into the winter in Barrow -esp for A2).	Added a sentence stating this.
Reviewer 14	Page 36, Line 668	It would be worthwhile to define the SRES acronym	Added footnote with definition and link to IPCC website.
Reviewer 14	Page 36	The permafrost section is well done	No response necessary.
Reviewer 14	Page 38, Line 729	I suggest replacing the word “greater” with “new.”	Made the suggested change.
Reviewer 14	Figure 27	Figure 27 is somewhat blurry. Can you get ahold of a higher resolution figure?	Pasted in a sharper version of this figure.

Please provide any additional suggestions or recommendations.

Reviewer 14	Whole document	No comment given	No response necessary.

Reviewer	Referring To	Comment	Response

Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.

New Reviewer AK1	Line 378	Can numbers be provided specifically for Alaska?	Numbers were added
New Reviewer AK1	Line 433	"precipitation" - Suggest adding "(rain and melted snowfall)"	We added this phrase
New Reviewer AK1	Line 478	Does permafrost need to be explained here?	A paragraph of explanation on permafrost was moved to here from Section 3.5
New Reviewer AK1	Line 655	Any chance of updating through 2012?	We extended to 2012
New Reviewer AK1	Line 978	Can anything be said about the unique nature of arctic temperatures with respect to inversions and how much the modeling of such has influenced the tmp predictions….or whether that has been properly accounted for in the models?	Two sentences about temperature inversions were added at the beginning of the temperature section
New Reviewer AK1	Line 1166	Given my previous comment, perhaps you could refer people to here when first mentioning permafrost.	We have moved this text to the earlier section discussing permafrost
New Reviewer AK1	Line 1266	This is not what was said in section 2.1. It mentioned using observations from stations that produce hourly reports, with some mention of Coop obs. I don’t recall seeing a mention of E. Anglia.	The reference to the E. Anglia data set was erroneous. We have removed this text.

Reviewer	Referring To	Comment	Response

Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.

New Reviewer AK2	Pages 2-3	Suggested edits to text of Preface (provided as tracked changes in document)	Some sections of text edited as suggested, some minor suggested edits not implemented as they did not read well.
New Reviewer AK2	Pages 6-9	Suggested edits to text of Introduction (provided as tracked changes in document)	Some sections of text edited as suggested, some minor suggested edits not implemented as they did not read well.

New Reviewer AK2	Page 11	Suggested edits to text of Section 2.1 (provided as tracked changes in document)	Some sections of text edited as suggested, some minor suggested edits not implemented as they did not read well.
New Reviewer AK2	Pages 11-12	Suggested edits to text of Section 2.2 (provided as tracked changes in document)	Some sections of text edited as suggested, some minor suggested edits not implemented as they did not read well.
New Reviewer AK2	Line 340	A footnote to a listing of the stations would be good; or perhaps even a table of the 26 stations. A table noting data % and location within Alaska would also preclude the need for a lot of text in this paragraph.	Footnote listing stations has been added.Including the data %'s deemed unnecessary, as the summary in the paragraph conveys the important information.
New Reviewer AK2	Line 373	Three areas are noted but only one region; are the Southeast and Southwestern Islands of Alaska indeed in one region? If they are, that is fine, but that seems unlikely given the differences between the Panhandle of Alaska in the southeast and the Aleutians in the southwest.	Reworded to distinguish the three primary regions more clearly.
New Reviewer AK2	Pages 14-15	Suggested edits to text of Section 2.3 (provided as tracked changes in document)	Did not edit first sentence as suggestion did not read well. Other edits accepted.
New Reviewer AK2	Line 456	Some definition of spring break-up (of river ice I assume) and discharge pulse (meltwater going into the ocean (I assume) would be good and how they are related to winter recreation would be good to consider.	Definition added.
New Reviewer AK2	Line 546	Standard climatological normals are typically 30-years in length; why not use the recent 1981-2010 normals produced by NCDC?	This paragraph refers to the analysis done by Shulski and Wendler (2007) who used that period to compute the long-term average, so we are just reporting what they did. We have removed the word normal to avoid any confusion with standard 30-yr normals. In any event, the interpretation of the long-term variations is not sensitive to what period is used in the averaging. The first sentence of that section now reads "Average annual precipitation, when examined as a percent of the long-term average (Shulski and Wendler 2007;1949-2005 is used as the averaging period for the long-term average in their analysis), shows a statewide increase of about 10%, with both regional and seasonal variation."
New Reviewer AK2	Line 563	"...stations in each region...": A map depicting these regions would be quite useful.	High quality map not available, but added a reference which links to a publication containing such map
New Reviewer AK2	Page 18	Suggested edit to Fig. 5 caption (provided as tracked changes in document)	Caption re-worded for clarity
New Reviewer AK2	Pages 18-20	Suggested edits to text of Section 2.4 (provided as tracked changes in document)	Text amended accordingly
New Reviewer AK2	Line 591	Is there a reference that justifies this selection for extremeprecipitation in Alaska?	Inserted a sentence as a justification for using periods longer than one day
New Reviewer AK2	Line 633	This is a very puzzling statement in the context of the previous sentence. First, we say that there have been increases in lightning since the 1990s (past 15-20 years) and then we say that enhancements to the lightning dtection complicate the detection of these trends. This needs some better explanation.	Added a statement about the large uncertainties in the trends, a consequence of changes in the lightning detection network.
New Reviewer AK2	Line 642	Given the record low sea ice levels across the Arctiv in 2012, it would be a real hole not to update this section to include the 2012 summer sea ice state as well. It is possible that 2012 may have actually exceed 2007 in Alaska as it had across the Arctic. This is a serious omission that needs to be addressed.	Added new text to update this section, and pasted in two updated figures that can replace older ones. Updated Fig. 7 goes through December 16, 2012.
New Reviewer AK2	Line 654	It would be interesting to know what the implications of increased seasonal ice are. Some climate skeptics may interpret this to mean that this means there is no problem here – so just a few words on what the climatic significance of this would be quite helpful.	Added sentences at the end of this paragraph about the implications of the thinner seasonal ice.
New Reviewer AK2	Page 22	Suggested edits to text of Section 3.1 (provided as tracked changes in document)	Text edited as suggested
New Reviewer AK2	Line 710	What about the period from 2013-2020?	Added a sentence about timeframe rationale at end of paragraph.
New Reviewer AK2	Page 24	Suggested edits to text of Section 3.2 (provided as tracked changes in document)	Removal of acronym deemed unecessary
New Reviewer AK2	Line 765	Did the author mean 1971-2000? A standard 30-year period.	Time period is correct as listed.
New Reviewer AK2	Page 50	Suggested edits to text of Section 3.5 (provided as tracked changes in document)	Text edited as suggested

New Reviewer AK2	Line 1120	"Permafrost is characterized by an actve layer...": How deep?	Inserted range that is typical for active layer depths
New Reviewer AK2	Pages 54-55	Suggested edits to text of Summary (provided as tracked changes in document)	Some sections of text edited as suggested, some minor suggested edits not implemented as they did not read well.
New Reviewer AK2	Line 1266	Again, incorporating the 2012 summer sea ice season is important as noted previously.	Updated as in text.

Reviewer	Referring To	Comment	Response
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
New Reviewer AK3	Section 2.1	"...stations were generally"...why the ambiguity?	Reworded to remove ambiguity as exceptions to the general rules are explained in following text
New Reviewer AK3	Section 2.1	"...Northway have a few values..." - what is meant by 'values'?	this was reworded to remove ambiguity
New Reviewer AK3	Section 2.1	"Other stations that include values..." - again, what is meant by values?	Text reworded to remove word "values"
New Reviewer AK3	Section 2.1	Second paragraph: "...a small number of stations" - how many exactly?	We have removed this paragraph as we decided not to use any of the COOP stations
New Reviewer AK3	Section 2.2	Please define "late fall" and "late spring"	There is considerable variability in these dates. Any further narrowing of the time period is not warranted by the data
New Reviewer AK3		Please provide a Figure for the geographical cross-referencing of major Alaskan areas. Many readers will not know these specific locations without a map.	These regions are general in nature, and the region names adequately define them. A map would contain no new information
New Reviewer AK3	Figure 3	The legend goes up to 16,000mm. Why not just say >3635mm?	The figure is accurate as presented
New Reviewer AK3	Section 2.3.2	Second sentence does not add anything about "climate" to the already short section. Delete.	This sentence provides the physical reason why thawing permafrost is a problem for such infrastructure. This is helpful background for the reader.
New Reviewer AK3	Section 2.3.3	"Coastal erosion is happening at an (sic) alarming rate..." - The word "alarming" is subjective. Remove.	Changed "alarming" to "accelerating"
New Reviewer AK3	Section 2.3.4	The term Ocean Acidification is used in the title and the first sentence, but nothing about the impacts from ocean acification are disucssed in the section.	We have removed ocean acidification from this section
New Reviewer AK3	Section 2.3.5	"Particularly unique to..." - please remove this. Ice jams can occur anywhere cold air persists for a length of time, including the Midwestern USA. Then the text should read, "High-latitude regions of the globe are susceptible to..."	We have made suggested change to text
New Reviewer AK3	Table 1	Reference for ACRC (2012) does not appear in the References section	This has been corrected
New Reviewer AK3	Section 2.4.2	The authors make a point in Section 2.1 to state that 26 hourly stations were selected for analysis, but most of these sections just cite other work. So why make noise about doing their own analysis if the results are never shown? Certainly the 26 stations say something in agreement with or contrary to Shulski and Wendler?	Our own analysis of these stations was limited to temperature extremes in Section 2.4.3
New Reviewer AK3	Section 2.4.3	"In a study..." did the authors do the study?	We added the reference after the word "study". The author of that study is the same as the lead author of this report.
New Reviewer AK3	Section 2.4.3	Table 2 in the text says it shows the changes in the frequency of extremes. But the Table caption says it shows the number of STATIONS showing increasing trends. Please clarify the disconnect.	We have modified the text to clarify the findings
New Reviewer AK3	Section 2.4.3	"(as defined in the Figure caption)" - this is lazy. Please help the reader here by telling us what the Figure says and then repackage that for a Figure caption.	We have expanded considerably the discussion of the indices in the text
New Reviewer AK3	Section 2.4.4	Needs a references for: Kruk, M.C., and D.L. Levinson, 2008: Evaluating the \impacts of climate change on rainfall extremes for Hawaii and coastal Alaska. 24th Conference on Severe Local Storms, Amer. Meteor. Soc., Savannah, GA.	This is not a peer-reviewed source of information and have elected not to reference it

New Reviewer AK3	Figure 11	Please show a change in temperature map. Without knowing a "base" it's impossible to know if the plotted values differ at all from present-day climate. Please show a change map.	The existing information is technically accurate. While changes are shown in other figures in this document, we believe that display of actual values is just as useful, particularly when assessing the impacts of changes. We also believe that the qualitative characteristics of changes are easily discernible in these maps and it is not necessary to have additional maps displaying these changes.
New Reviewer AK3	Figure 12	Please show a change in temperature map. Without knowing a "base" it's impossible to know if the plotted values differ at all from present-day climate. Please show a change map.	The existing information is technically accurate.While changes are shown in other figures in this document, we believe that display of actual values is just as useful, particularly when assessing the impacts of changes. We also believe that the qualitative characteristics of changes are easily discernible in these maps and it is not necessary to have additional maps displaying these changes.
New Reviewer AK3	Figure 13	Again, please show a change map.	The existing information is technically accurate. While changes are shown in other figures in this document, we believe that display of actual values is just as useful, particularly when assessing the impacts of changes. We also believe that the qualitative characteristics of changes are easily discernible in these maps and it is not necessary to have additional maps displaying these changes.
New Reviewer AK3	Figures 14-16	A blue bar is shown in the legend but is not plotted graphically. Please explain or clarify the reason for this.	The blue bar denoted the 1961-1990 period. We have replaced all of these figures with new versions that include the 1961-1990 period that was missing in the originals.
New Reviewer AK3	Figure 17	Again, without knowing a "base" number of growing length days, it is impossible to tell if the plotted values in Figure 17 are drastically different than present-day climate. Please show a change map.	The existing information is technically accurate. While changes are shown in other figures in this document, we believe that display of actual values is just as useful, particularly when assessing the impacts of changes. We also believe that the qualitative characteristics of changes are easily discernible in these maps and it is not necessary to have additional maps displaying these changes.

Reviewer	Referring To	Comment	Response
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
Reviewer GP-1	Whole document	Considerations of the factors affecting monsoon patterns and importance of summer rainfall patterns and seasonality need to be further developed. In addition, the manner in which PET rates have changed over time, as well as AET changes observed from the limited pan evaporation observations over the Great Plains indicate that water stress over the Great Plains have geographic variations which have an impact on agriculture and water resources.	Several sentences were added to the general climatology section, discussing the North American Monsoon. A detailed discussion of PET and AET is beyond the scope of these documents.
Reviewer GP-1	Whole document	Discussion of how the winter spring transition and the north south gradient from the southern Great Plains into the Central Great Plains affect the occurrence of ice storms and the frequency and range of these events have been changes or stayed the same over the past 50 years or so.)	A paragraph was added, describing the climatological patterns of freezing rain occurrence as reported in Changnon and Karl (2003). The purpose of this section was to describe the important climate factors in this region but not trends.
Reviewer GP-1	Whole document	Needs to cover the overall region better, seems to have a northern bias. Considerations of the factors affecting monsoon patterns and importance of summer rainfall patterns and seasonality need to be further developed. In addition, the manner in which PET rates have changed over time, as well as AET changes observed from the limited pan evaporation observations over the Great Plains indicate that water stress over the Great Plains have geographic variations which have an impact on agriculture and water resources.	Section 2.3, Important Climate Factors, is the one with extensive discussions of sub-regions within the Great Plains. However, in its current state, it does not seem unbalanced. The discussions of drought, heat waves, convective storms, and hurricanes are primarily focused on the south while the discussions of flooding, winter storms, and cold waves have a more northern focus. Based on this analysis, we did not make any changes to the section

Reviewer	Referring To	Comment	Response
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
Reviewer GP-2	Whole document	Throughout the document, but particularly in pages 1-18, there is a lack of citations. When they are sticking specifically to the regional climatology, this is less problematic - though still a problem in some places. However, in this beginning section of the document they often veer from a discussion of regional climatology into impacts, and in many instances their comments on impacts (and even commenting on risk/vulnerabilities at times) is not supported by citations. My recommendation is to either a) find citations for these comments and word and cite accordingly (and I can help with this), or b) take out the parts where they make unsupported statements about the human dimensions and socio-economic issues. To be clear, I am not necessarily saying their statements are wrong, but just unsupported by documentation as written.	Citations added: overview of heat related illness, case study of Chicago heat wave (although not in the Great Plains…it has good general information), articles on heat related stress in livestock and another on cattle specifically, article on heat stress and corn, articles on cold stress in humans, crops, and livestock, articles on other cold air outbreaks, Ogallala aquifer, water resources and climate change.
Reviewer GP-2	Page 2	There should probably be some discussion of the uncertainty inherent in downscaled model output. I know uncertainty is mentioned throughout, but I think it would be helpful in the introduction to have some overarching statement about uncertainty in regional models and the relative uncertainty between temperature and precipitation.	Graphics have been revised to depict model agreement and uncertainty. Additional text added.
Reviewer GP-2	Whole document	Need to either explain what A2 and B1 scenarios are or at least refer reader to where they can learn more	Text added in intro section.
Reviewer GP-2	Lines 61-68	Only a climate modeler or someone very literate in climate models would understand this section. Need to explain, esp. what the difference is between statistically- and dynamically-downscaled models. Or again, at least refer reader to where they can learn more about what these terms mean and the difference between the techniques.	Text added in intro section.

Reviewer GP-2	Pages 12-13	The Atlantic Tropical Storm Trends and Climate change section is excellent, but quite long relative to other sections and needs to be better tied in to what this discussion implies for the Great Plains eco-region and livelihoods since the Gulf region of the Texas Gulf water basin is not really Plains, per se, given eco-region scale (versus state or watershed scale, which I know is what the NCA uses, but not really what the rest of the report focuses on).	We have added a paragraph describing the areal extent of heavy precipitation caused by tropical cyclones, along with a figure (Fig. 7 in revised document) that illustrates the extent
Reviewer GP-2	Line 114	Is this consistent with how we talk about urban areas in other parts of the report? What is “major”? We also include Denver in other parts of report where this one doesn’t have Colorado or N Mexico. We should at least refer readers to Southwest region report to see climate for these areas. What about cities like Denver, Omaha, NB, Oklahoma City, OK, Wichita, KS. Some of these cities have more urban density than the cities they name here.	We changed the text to list those cities that are in the top 100 metropolitan statistical areas as defined by OMB. Thus, the new text reflects an objective definition. Denver is not in this region.
Reviewer GP-2	Line 115	"These urban centers experience the typical types of sensitivities that are...": Add the word "climate" before "sensitivities".	Edited as suggested.
Reviewer GP-2	Lines 122-123	"However, for the most part, this is not a highly urbanized region and large segments of the population live in small to moderately-sized communities": Again, need to make sure this is in line with how we define urban/rural areas elsewhere in report. At least half the population lives in urban areas, so this statement isn’t really true.	This sentence has been deleted
Reviewer GP-2	Lines 125-130	Need citations for this section (discussing Native American tribes and tribal lands), and/or refer to where discussed elsewhere in the report.	We have taken out the sentence about vulnerability to extremes.
Reviewer GP-2	Lines 125-130	Suggest adding the following sentence to the end of the section: "However, since tribes have been forced to live on marginal lands for some time now, they can also be highly resilient to environmental stressors."	This was not added as we do no have any supporting documentation for such a statement
Reviewer GP-2	Lines 132-141	Not sure we need this (section of Agriculture) here as it is already covered elsewhere in report and there are no citations here.	This overview is not covered elsewhere. Thus, we have left in, as is.
Reviewer GP-2	Lines 143-146	Same with this (major river basins). Covered elsewhere.	This is not covered elsewhere. Thus, we have left in, as is.
Reviewer GP-2	Lines 170-173	Veering into impacts again here (regarding drought) but with no refs. Redundancies of other places in report? I think it would be good to have historical drought in this part. See next comment: (I did include some of this in the water sector report, so it wouldn’t need to be lengthy)	We added a paragraph of description on the 2011 drought in the southern Great Plains

Reviewer GP-2	Page 6	Add paragraph on historical drought for context. Notes from Kristen A: Historical Context (This was a contribution from Jeff Lukas, Western Water Assessment, that was used in the State of the Climate Report, 2011, see: http://www.ncdc.noaa.gov/sotc/drought/2011/8#paleo-perspective) • PDSI observations extend back to 1895 • The 2011 drought was the most severe drought event in the observational record • However, the most prolonged drought was a 6 year period in the 1950s • But… looking at the 429-year tree-ring reconstruction (1550-1978) of Texas summer (June-August) PDSI • "Extreme" statewide summer droughts (PDSI below -4) such as 2011 and 1956 are seen in about 1 in 40 years in both the instrumental and reconstructed records. • Considering errors in tree ring reconstructions—1789 is only year in the extended record during which a drought with a PDSI as extreme as that occurring in 2011 was experienced in Texas • Several prolonged drought events in the record similar to the extended drought in the 1950s • So although the 2011 drought is not necessarily unprecedented, it is a relatively rare event Causes: • Although the drought is consistent with projections of more intense drought events as a consequence of climate change (IPCC SREX, 2012), this event has not been specifically attributed to anthropogenic forcing/climate change • Rather, the drought appears to be connected to natural variability, and specifically La Nina conditions in the Pacific Ocean, as well as the Pacific Decadal Oscillation (PDO) and Atlantic Multidecadal Oscillation (AMO) • Top ten TX droughts (Oct-Jun) were all associated with La Niña (2011, 1925, 1956, 1971, 1996, 1917, 1967, 1918, 1951, 2006)! (K. Wolter, pers. com) • Both PDO and AMO have been in warm phase ; last time this co-occurred was during	We added a paragraph of description on the 2011 drought in the southern Great Plains.
Reviewer GP-2	Page 6	Insert figure here on summer PDSI with tree-ring construction for Texas if necessary	Figure not deemed neccessary
Reviewer GP-2	Page 7	Need more recent refs in Winter Storms section, e.g. Schwartz and Schmidlin 2002, Cerruti and Decker 2011, Houston and Changnon 2009, Changnon and Changnon 2007	Schwartz and Schmidlin 2002 reference already in document. Cerruti and Decker reference added. We consider these adequate
Reviewer GP-2	Figures 3 and 4	These two charts seem to be out of place here and should maybe go in the water sector climate change section instead?	We do not have a water sector climate change section. No change made.
Reviewer GP-2	Line 307	Can cross reference to other parts of the report where we talk about various aspects of the 2011 drought	Other mentions of the 2011 drought are in the same section.
Reviewer GP-2	Line 308	Need refs/cross-ref in report per above comment for this on impacts. Some public health impacts data would be helpful if available	Added citations for public health impacts.
Reviewer GP-2	Line 317	"Although not as long lasting, the intense heat made its way to the northern portions of the region, impacting crops and cattle": Again if talking impacts need to cross-ref within report or have citations	Took out impact sentence
Reviewer GP-2	Line 320	"While these are preliminary reports...": Reports from where?	Added citation - Aberdeen American News
Reviewer GP-2	Line 321	"...more finalized crop and cattle reports will show the true extent of the agricultural losses from the 2011 heat wave": Need to let reader know what the official source of this will be. Where can they find this info when available?	We have deleted this sentence

Reviewer GP-2	Line 329	"...departure from the average temperature...": Departure from the average low temperature you mean? Departure from the mean or from the standard deviation? And what is the source of this definition? Is this an agreed upon definition across the country or globe?	Definition of cold wave was revised.
Reviewer GP-2	Lines 348-353	"Cold waves can also have significant implications for agriculture...": Redundant of ag section? Or should it go in ag section or just be cross-referenced?	I took out that part…I think it would be better to just cross reference the impacts to the appropriate sections.
Reviewer GP-2	Line 358	Roth (2000) reference. Nothing more current that including last decade?	Roth (2000) has been updated to Roth (2010).
Reviewer GP-2	Lines 370-380	I can't help but wonder what these stats (tropical storm statistics) look like when you include the last decade.	Roth (2010) is the most recent publication on the history of Texas hurricane climatology. No changes made.
Reviewer GP-2	Line 380	Needham and Keim (2011). Would pulling data from this resource help with my above comment?	The Needham and Keim (2011) reference details the physical processes of storm surge and does not offer a Texas hurricane landfall climatology.
Reviewer GP-2	Pages 12-13	"Atlantic Tropical Storm Trends and Climate Change": This section is good, but quite long and perhaps too much info on hurricanes. Also doesn't tie back into Great Plains climatology, so not sure if needed?	We have tied it into the Great Plains through the effects on extreme rainfall. We added a figure showing where in the Great Plains tropical cyclones have caused extreme rainfall events
Reviewer GP-2	Page 14	"Sea Level Rise": Again, how much do we need coastal info in the great plains report?	This region does include sizable coastal areas and therefore we need to cover it
Reviewer GP-2	Page 14	In the climatic trends discussion at the bottom of the page, they mention how the 1950s was the driest multi-year period and included the single driest year (drier than the 1930s), but that the 1930s were particularly hot. Yet, the 1930s Dust Bowl was, as they say on page 3 (albeit un-cited), was arguably the worst climate-related disaster in the U.S. It would be interesting to have a little more discussion from a climate perspective on why the 1930s resulted in a worse disaster (presumably because of the temperatures trumping and exacerbating the precip - but they don't specifically say this). I imagine there are social dimensions as well that resulted in more risk buffering in the 1950s, but we should discuss this in other sections. Here, the climate comparisons in more detail would be useful as I think it also ties into what we will discuss in the water section regarding the importance of understanding the role of T and E/T for water availability and allocation in a future climate.	We have added discussion about the characteristics of the 1930s. Of most relevance, while the 1950s were the driest multi-year period, the 1930s had the driest summers, coincident with the hottest summers.
Reviewer GP-2	Page 14	Also in the Climate Trends section it would be very useful to have the temperature changes during all seasons, as well as the overall change values where they give "per decade" values (bottom of page 14). I don't know if Martha has done this yet for the Great Plains, but it would be great to have something like what she did for Alaska showing temperature changes at various stations/regions for each season throughout the region. I found this VERY helpful in my Alaska research. See example here: http://climate.gi.alaska.edu/ClimTrends/Change/TempChange.html (the bottom table in particular is what I am referring to).	Added table and graphs displaying region-wide temperature and precipitation trends for each season.
Reviewer GP-2	Line 481	"Eight of the last ten summers have been above average": Compared to what time frame?	Re-worded sentence as follows for clarity "Eight of the ten summers during the last decade (2002-2011)..."
Reviewer GP-2	Line 482	"Temperatures during the other seasons (not shown)": This would be quite useful to see.	Graphs for all seasons are now included.
Reviewer GP-2	Lines 484-487	"States in the northern portion of the Great Plains region have experienced the most change in their long-term average temperatures": What are the overall trend values?	Overall significant trends for the region are now shown in a table.
Reviewer GP-2	Page 16	Extreme temp/precip sections are a bit weak in explanation and could use some more details on how and why they are defining extremes as they do. For example, what is considered "severe cold" (line 511)? Also, in Figure 9 what is the threshold that the "hotter than the threshold" periods are exceeding? And while they do talk about growing season here, again, it would be helpful to have temp/precip obs for the transition seasons as well given the importance for fall and spring seasons for many climate-dependent livelihoods like agriculture, for example.	We added a paragraph to the extreme precipitation section, providing the motivation for the metric. The following sentence relates directly to the motivation for use of return periods: "This type of definition is commonly used for design applications, for example, in the design of runoff control structures." We also added temperature and precipitation trend graphs for all seasons, including the transition seasons.

Reviewer GP-2	Lines 512-523	"A separate analysis of the northern and southern parts of the region indicates that the tendency toward fewer cold waves recently is more prominent in the north than in the south.": Do you have any numbers for this?	We have added some numerical values to the discussion
Reviewer GP-2	Figure 10	This graph and caption are much easier to understand than the 3 above.	Replaced graphs with new versions including trend lines and expanded captions.
Reviewer GP-2	Lines 566-580	This part (types of analyses used) is written for other climate scientists, not non-experts, so it should either be moved into an appendix and/or translated into terms others can understand.	We have done some reorganization and rewriting for clarity but these documents are meant for technically-knowledgeable experts. Thus, this level of detail is justifiable
Reviewer GP-2	Pages 19-44	The regional outlook section is written in a highly technical manner that only other climate experts will fully understand. On page 19 several things need to be explained like the discussion about grid points and re-gridded data (lines 566-567). Please explain in plain English what this means. Also, in the description of data sources explain what 1/8 degree versus 50 km means in terms stakeholders can understand (e.g., what does this cover on a map?), and why are they given in different units and how do they compare in scale?	Text has been added to the introduction of the outlooks section in order to provide clarity on the points described.
Reviewer GP-2	Whole document	Also, somewhere in the document there should be some explanation (and ideally with references to where the reader can go to understand the difference) between statistically downscaled and dynamically downscaled regional climate modeling. The way it is explained in the introduction on page 2 is understandable only to people who have some literacy in climate modelling, which is a small minority of the human population. Somewhere it at least needs to explain that dynamical models are still coupled with the global scale models so they retain the processes that are happening globally and how that differs from statistical downscaling methods. Not asking for a lot of detail here, just a basic, easy to understand description is needed.... somewhere.	Introduction has been expanded to include paragraphs describing dynamical and statistical downscaling.
Reviewer GP-2	Whole document	There needs to be a short explanation somewhere of what the A2, B1 scenarios mean, including what SRES stands for (which is explained nowhere, but is used in Fig 12 and 13). This is important to explain in the context of mitigation/adaptation options and planning, which will be addressed elsewhere in the report. and, of course, it also has implications for how one understands the ranges of possible temp changes.	Added text describing scenarios to intro section.
Reviewer GP-2	Whole document	Are we also including Celsius values? We discussed awhile back having both Metric and English values throughout so that we aren't mixing	Only English units are used throughout.
Reviewer GP-2	Line 616	Text regarding NARCCAP model simulations: Why is this model's output generally warmer?	We do not understand this comment. Warmer than what? Original Fig. 13 shows that the NARCCAP warming is similar to the driving GCMS. No changes made.
Reviewer GP-2	Line 620	"Springtime warming is smaller than...": Give the range for comparison	Edited text as necessary.
Reviewer GP-2	Line 637	Meaning 2035? Or earlier? What time period are you talking about here?	Edited text.
Reviewer GP-2	Line 638	"...relatively insensitive to the emissions path...": Relative to what? 2035 still shows a 2.8F increase	Edited text to clarify.
Reviewer GP-2	Line 638	Need a bit more explanation on what "sensitive" to emission paths mean, esp. as this is important in the context of mitigation/adaptation measures to be discussed elsewhere.	Edited text to clarify.
Reviewer GP-2	Figures 11-17	One general comment about the Figures in this section is that they are sometime confusing in how they are labeled and colored (one e.g. is page 28, fig 17 that is about TMax days changes but yet is in a blue/green color scheme).	Color schemes have been revised. Temperature maps now use blue/red colors and precipitation maps use brown/teal colors.
Reviewer GP-2	Line 659	"Temperature increases are largest in the summertime...": This has big implications for heat waves and water availability and water-energy nexus issues we refer to elsewhere	No action needed.
Reviewer GP-2	Line 661	"...starting at about 2.7°F in 2035 and ending at 7.1°F in 2085": What is value for 2055?	Value can be read from the graph.

Reviewer GP-2	Figure 14	It would be nice to have all of these mean values given in #'s as well so you don't have to try to figure it out from the graph. Some are given in the narrative above, but it would be useful to have all of them. Also, would be clearer to list out the months instead of having just the letters for each season.	Other reviewers were against listing every single value in the text. Months are now listed in figure caption.
Reviewer GP-2	Table 1	Need to explain what the percentiles mean.	Percentiles are widely used, not only in scientific analyses, but commnication of test scores, among other applications. In addition, the intended audience for this document is technically trained people, who will understand percentiles
Reviewer GP-2	Line 686	Explain what "model differences" means. Not clear to a layperson.	Edited text to clarify.
Reviewer GP-2	Lines 691-692	"the daily NARCCAP and CMIP3 daily statistically-downscaled data sets": Suggest re-wording to: "the daily NARCCAP dynamically-downscaled data and the CMIP3 daily statistically--downscaled data sets"	Edited text as suggested.
Reviewer GP-2	Line 697	"NARCCAP multi-model mean": Does this mean NARCCAP *plus* the multi-model mean?	Other reviewers did not have a problem with this sentence.
Reviewer GP-2	Line 702	"fewest number of days": How many?	Not necessary, can be determined from map.
Reviewer GP-2	Line 725	"derived variable at each gridpoint": ? explain	Reworded sentence.
Reviewer GP-2	Figures 15-17, 19-21, 27-28	NARCCAP figures. Top and bottom?	Fixed. Now refers to left, center and right.
Reviewer GP-2	Figure 15	The colors are counter-intuitive since you are talking about increases in number of temp max days but the color scheme turns out to be blue/green, which is usually used to show either cooling, hydro, or vegetation. It would help to have a color scheme that is entirely in the yellow, orange, red, color scheme	Color schemes have been revised. Map now uses a yellow-orange-red color scheme.
Reviewer GP-2	Figure 16	This is also confusing with the red color scheme versus the blue color scheme and with different scales.	Blue color scheme is used to indicate the number of cold days, whereas a red scheme is used on the difference map to represent warming. It is not possible to use the same scale for both.
Reviewer GP-2	Figure 17	Same comment on color scheme as for Fig. 15.	Color schemes have been revised. Temperature maps now use blue/red colors and precipitation maps use brown/teal colors.
Reviewer GP-2	Lines 763-769	This is a key section (analysis of CMIP3 and NARCCAP temperature variables) for findings.	No action needed.
Reviewer GP-2	Line 766	"There is also a larger increase in the run of days the maximum temperature exceeds 95°F and 100°F": How many days???	Not necessary, can be seen in table.
Reviewer GP-2	Lines 772-782	This whole paragraph (discussion of variability) is hard to read and not very clear.	This portion of the text has been extensively rewritten
Reviewer GP-2	Line 786	"For annual temperature, there is an increase in variability at 2035 and 2085, but a small decrease at 2055": Can you give any explanation for why this might be? It intuitively doesn't make much sense, esp. given that each season shows increased variability, but the annual shows a decrease. Also, why would the climate system become more variable in earlier and later Century, but not in the mid-Century? What could possibly be an explanation for this?	We have not yet undertaken the type of thorough diagnostic analysis to explain this behavior. One possible explanation is that the temporal correlation of temperature anomalies is not very high beyond a season. Thus, the anomalies may be switching sign from season to season and thus canceling over the period of a year. We will explore this further as time allows; figure has been removed.
Reviewer GP-2	Line 789	Would be helpful to explain to the reader what increased variability means "on the ground" and what the implications of an increase might mean….	This paragraph has been removed.
Reviewer GP-2	Line 792	Suggest changing "positive climatological trend" to "warming trend".	Re-worded sentence.
Reviewer GP-2	Line 802	"...between 400 and 800 cooling degree days:. Is there an explanation somewhere of what these values mean for cooling (and heating) degree days? If not, should be somewhere in the document.	Added paragraph explaining degree days.
Reviewer GP-2	Pages 35-40	"Mean Precipitation Projections" section: The rest of the document on precip is quite long. Should probably be shortened to just capture the highlights/key findings. While also having some explanation again about difficulty of precip projections and inherent uncertainties of the model result.	Graphics have been revised to depict model agreement and uncertainty. Additional text added. All content was considered valuable - none removed.
Reviewer	**Referring To**	**Comment**	**Response**

Does the document address relevant features of the climate of the region?

Reviewer 15	Whole document	Yes, although the southern regions seem emphasized relative to the northern regions.	We feel that the report is a good overview of the entire Great Plains region, but we now discuss similarities and differences between the north and the south.

Does the document incorporate the best information available?

Reviewer 15	Whole document	Yes, to the extent possible, given the constraints that only CMIP3 (and not later) climate model output be used.	No response necessary.

Are data and information presented in an accurate and clear manner?

Reviewer 15	Whole document	Yes	No response necessary.

Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.

Reviewer 15	Page 5	Dallas and Houston are indeed Megaplexes. But what about urban centers further north, such as Oklahoma City, Kansas City, and Omaha?	These are now referred to. Specifically, we put in all urban areas in the top 100 metropolitan statistical areas.
Reviewer 15	Lines 239-240	60-120 inch snowfalls – were those seasonal totals?	Yes, these were seasonal totals…added that clarification to the document.
Reviewer 15	Lines 243-244	"This can be amplified during conditions of..." This could be expanded, and needs some citations.	This sentence has been deleted
Reviewer 15	Whole document	Cold waves seem to be given little attention relative to other concerns, such as Texas hurricanes.	Added a section on the Easter Freeze of 07.
Reviewer 15	Whole document	The projected future changes in tropical cyclone frequency and intensity are too speculative, and unsupported by documented understanding.	Current references have an excellent handle on the state of the science of the potential changes to tropical cyclones in a warming climate. No changes made.
Reviewer 15	Lines 470-472	Is this a generalization for the entire Great Plains?	We have edited this section and the accompanying figure. Specifically we added separate time series for the northern and southern sub-regions of the Great Plains. We now discuss similarities and differences between these two sub-regions. We also added seasonal time series, allowing for an even more detailed discussion and comparison

Please provide any additional suggestions or recommendations.

Reviewer 15	Whole document	The importance of the Platte River (and associated Greater Platte River Basin) seems understated. While the Platte is by definition a tributary of the Missouri River, it, and its hydrologic behavior under a changing climate, is of paramount importance to Nebraska, Wyoming, and Colorado.	A few sentences are added here to note the importance of the Platte.
Reviewer 15	Whole document	Drought is a key and ubiquitous feature of the Great Plains. Historic and paleoclimate evidence suggests drought can occur on a variety of time scales, from seasonal to historic (‘Dust Bowl’) to the megadroughts of the Medieval period. This is a key concept, but little comes through in the current write-up.	We now provide some paleoclimatic information related to the 2011 drought
Reviewer 15	Whole document	I don’t see any information about future climate change projections? Is this intentional?	The title of section 3 has been changed to "Future Regional Climate Scenarios"

Reviewer	Referring To	Comment	Response
Does the document address relevant features of the climate of the region?			
Reviewer 5	Whole document	Yes, except the coverage of humidity is very limited.	We have expanded the humidity section considerably (see more detailed response below).
Does the document incorporate the best information available?			
Reviewer 5	Whole document	Yes, regional data are used and future scenarios from CMIP3 and NARCCAP are used. Not enough CMIP5 data are available for future projections.	No response necessary.
Are data and information presented in an accurate and clear manner?			
Reviewer 5	Whole document	In most cases, yes, but there are some notable suggestions that I have itemized in my extensive review.	We have responded to the reviewer's specific comments below.
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
Reviewer 5	Figure 7	What is MGDD. Use common English in labeling graphs	We revised the figure caption to define MGDD.
Reviewer 5	Page 15	The discussion under the heading General needs to be rewritten. For instance the following is a long and tedious read: "As with the recent increase in the global rate of temperature increase, the CRUTEM3 data set, a homogenized data set with spatial resolution of 5x5°, indicates that the annual mean temperature over the Midwest increased by approximately 0.0590°C per decade when the period 1900-2010 is considered, increasing to 0.120°C per decade for the period 1950-2010, and 0.260°C per decade for the period 1979-2010." Reference for CRUTEM3?	Paragraph was re-written and a reference added.
Reviewer 5	Page 15	"there are multiplepoint in time when temperature shifts occurred..."	We corrected the grammar of this sentence.
Reviewer 5	Page 19	Wind paragraph needs to be rewritten. The grammar in this section is particularly confusing. For example I find one sentence contains 58 words and requires numerous rereadings to understand: There is a relative paucity of long-term records of near-surface wind speeds, which coupled with inconsistencies manifest in different data sets, the highly uneven spatial coverage of surface observing stations and issue pertaining to local land-cover change in the proximity of the observational site, confound accurate assessment of wind climates and the presence or absence of temporal trends.	We have extensively revised this paragraph to simply sentence structure and provide additional discussion of the quality of wind records.
Reviewer 5	Page 19	"Snowfall has increased in the shoreline areas of the Great Lakes": (all shoreline areas?? Correctly stated on p 10)	We have revised this section to provide more specific information about trends and added a reference for this information.
Reviewer 5	Page 22	The humidity paragraph is quite disappointing. Humidity is a key variable for air conditioning needs (and hence changes in energy demand) in this region. And with the rising humidity levels mentioned anecdotally there will be changes in future summertime energy demands. Also, the impact of heat waves will be exacerbate by higher humidity. Furthermore, human health problems (e.g., mold in basements) and plant diseases will be more challenging in a more humid climate. More basic information on humidity trends would be quite useful for follow-on assessments. And if there is a lack of research reports on humidity characteristics and changes, this paucity of information should be cited as an area needed further research.	We have expanded this section considerably. We added references and also did a specialized analysis of warm summer nights, which are most likely related to humidity. A figure was added to this section.

Reviewer 5	Page 27	I find the following sentence: "On a temporal scale, warming increases over time, and also increases between B1 and A2 for each respective period." First, the introductory phrase is redundant. Secondly, the sentence says that the "...warming increases over time..." and not "...temperature increases over time..." Do you really mean that? Perhaps an argument could be made for this in the NW portion of the plots in Fig 23, but not in general and not for B1.	This entire paragraph has been rewritten and the offending phrase has been removed.
Reviewer 5	Page 27	The potential for misinterpreting 'warming increase' as 'temperature increase' comes up in other places, such as on p. 27: For 2055, warming ranges between 3.5 and 5.5°F for B1 and between 5.5 and 6.5°F for A2. For 2085, the increases are 4.5 to 6.5°F for B1 and 7.5 to 9.5°F for A2. Change "the increase" to "temperature increase" to be precise.	We have made these changes here and in the other regional documents.
Reviewer 5	Page 27	"The increases for the B1 scenario are nearly as large in 2035 at 2.5°F, but by 2085 the increase of 4..5°F is over 3°F smaller than in the A2 scenario": Could be improved by stating this as "The increases for the B1 scenario are nearly as large in 2035 at 2.5°F, but by 2085 the increase of 4.5°F is little more than half of that projected by the A2 scenario."	We have re-written this sentence to improve clarity.
Reviewer 5	Page 30	The wrong image was inserted for figure 25. The text and caption discuss temperature, but precipitation is shown.	The wrong figure was inserted. We have replaced with the correct (temperature) figure.
Reviewer 5	Figure 26	Ditto for Figure 26. I can't judge the credibility of the discussion on seasonal temperature changes to be shown in Figure 26 since the wrong images are given. I am surprised to read that summers are projected to warm more than winters. This seems to be consistent with Figure 24 but at odds with IPCC GCM results.	The wrong figure was inserted. We have replaced with the correct (temperature) figure.
Reviewer 5	Figure 27	Could be more clear. The top is a different plot and the bottom two are the plots used to create the differences, Use of the same colors but with different values between top and bottom is confusing.	Color schemes have been revised. Temperature maps now use blue/red colors and precipitation maps use brown/teal colors, in accordance with another reviewer's suggestion to use color schemes identifiable by those with color blindness.
Reviewer 5	Figure 27	Furthermore, inference is that both bottom figures are "reference" periods. More common usage reserves the contemporary climate (1979-2000) as the "reference" period (see caption on Figure 30 for common usage) and any future simulation as a "future scenario" period. This common usage is violated in Fig 27.	Graphics have been revised to use NARCCAP simulations driven by NCEP Reanalysis data for the climatology. Maps are also now titled appropriately.
Reviewer 5	Figures 28-29, 31-33, 39-40	Ditto for Figure 28, 29, 31, 32, 33, 39, and 40.	Graphics have been revised to use NARCCAP simulations driven by NCEP Reanalysis data for the climatology. Maps are also now titled appropriately.
Reviewer 5	Table 2	Discussion of Table 2 primarily repeats what is given in the table. The table offers some valuable insight that the authors overlook on the difference (particularly trends when extremes increase) between GCMs and RCMs on representing this metric of extremes. Conveying some insight on these differences would be far more valuable than repeating the tabular values in the narrative.	We have re-written the paragraph to give comparison between two model data sets.
Reviewer 5	Page 32	"Consecutive warm days can have large impacts and are analyzed here as one metric of heat waves, which have not been frequent high over the past few decades." The sentence is vague as to whether consecutive warm days or heat waves have not been frequent. Reword to avoid misinterpretation.	We have removed the phrase "which have not been frequent high over the past few decades".
Reviewer 5	Figure 33	Figure 33 needs scales	Replaced figure with corrected version.

Reviewer 5	Page 49	I find the statement: "For the NARCCAP data, the number of days with precipitation exceeding high thresholds increases for all variables, with values of between +23 and +94%. Interestingly, the increases are higher for the more extreme thresholds." It sounds like the authors are surprised to find more extreme values increase more than less extreme values, but if you simply move the distribution to the right (toward more extremes generally) the rare cases increase by a larger percentage than the less rare because of a smaller denominator. It happens with extremes of all variables when there is a shift in the pdf.	We have removed the word "interestingly".

Please provide any additional suggestions or recommendations.

Reviewer 5	Whole document	Be consistent in use of abbreviations (hour, year, etc) see for example, p15: "For example, the number of 24 hour, once in 5-yr storms has increased by about 4% per decade"	Removed abbreviations such as -hr, -yr (i.e. consistently use 24-hour, 5-year etc. throughout this and the other regional documents).

Reviewer	Referring To	Comment	Response
Does the document address relevant features of the climate of the region?			
Reviewer 6	Whole document	The authors were given a challenging task – address historical climate variability and potential future climate change in a document of modest length and in a form understandable to a wide range of readers and users. I thought they did a very good job addressing this charge.	No response necessary.
Reviewer 6	Whole document	The document addresses a number of important climate features of the region. However, some features that are important to the region are not addressed in as much detail as others. For example, the document does not capture particularly well the lake modified climates in the Great Lakes region. Part of the reason is the relatively large isoline interval and considerable smoothing of Figure 1-7 (with the exception of Figure 6). I suspect that the authors experimented considerably with different isoline intervals and degrees of smoothing, and I realize how difficult it is to choose an isoline interval especially for a relatively large area such as the Midwest. However, I am concerned that the isoline interval may be somewhat too large and is masking important sub-regional features.	These figures were created from a gridded data set that does not have the resolution to well-represent the small scale modifications created by the Great Lakes. Since the data do not support an accurate representation of such features, we have added a caveat to the captions indicating this limitation.
Reviewer 6	Whole document	The authors chose not to address a number of interesting features of the Midwest climate such as nocturnal precipitation, straightline wind events (derechos), low level wind maxima, frequency and path of midlatitude cyclones, mesoscale convective systems, hail occurrence, or lightning frequency, all of which have been investigated for the Midwest region. I realize that not everything can be covered, but the above list includes some particularly unique characteristics of the Midwest climate.	We have considerably expanded the "Severe Thunderstorms" section to include additional information.

Does the document incorporate the best information available?

Reviewer 6	Whole document	"Best" is perhaps a term one should stay away from when describing climate data. What is "best" for one application may not be so for another. Furthermore, all climate data suffer from numerous inhomogeneities.	An entire section (2.1 Description of Data Sources) has been added to discuss the COOP data. This section (of 1.5 pages in length) provides the following rationale for use of the COOP data for analysis of trends: "For examination of U.S. long-term trends in temperature and precipitation, COOP data is the best available resource. Its central purpose is climate description (although it has many other applications as well); the number of stations is large, there have been relatively few changes in instrumentation and procedures, and it has been in existence for over 100 years." This section also includes an extensive discussion of sources of data inhomogeneities and their potential impacts on trends.
Reviewer 6	Whole document	I think the authors need to make it clearer what data were actually used, particularly for the first part of the manuscript on climate trends. The authors state that they employ observations from the US Cooperative Network for the historical trends portion of the report. However, they don't explicitly state whether only USHCN stations were used or if other COOP stations beyond those included in the USHCN were also employed. If the latter, the authors do not discuss what homogeneity analyses were conducted, the minimum period of record that was needed to be included in the analysis, how missing values were dealt with in the trend analysis, etc. A map of station density would also be very helpful when interpreting the regional trends.	We have added 1.5 pages on data sources (new section 2.1 Description of Data Sources), which includes a detailed discussion of data homogeneity issues. We have also added to this section the number of stations used for very long-term trend analyses (218 for precipitation, 215 for temperature). We have not excluded the analysis to USHCN stations. NCDC's new climate division data set (CDDv2, now referred to at several places in text) uses many non-USHCN stations. These non-USHCN stations have been subjected to extensive quality control and inhomogeneity adjustments to the monthly data. Those non-USHCN stations passing the missing data criterion were included in the very long-term trend analyses in order to increase data density in the data-sparse regions of the western U.S. For consistency, such stations were included for the remainder of the U.S.
Reviewer 6	Whole document	For the climatic trends, the authors provided an average trend for the entire region. This is a concern as a portion (but not all) of the Midwest region falls within a "warming hole". Others have reported a cooling trend in southern portion ofthe Midwest region and a wanning trend in the northern portion (e.g., Strode 2(03). This makes the interpretation of an areally averaged trend challenging. At a minimum, the authors need to acknowledge this difficulty. The analyses based on the CRUTEM3 data set would also have this same issue, although perhaps to a lesser extent given the very coarse (5° lat x 5° lon) resolution of CRUTEM3.	The warming hole is mainly a warm season phenomena in this region. We have added seasonal temperature time series, which illustrate this. We have added text that discusses the warming hole phenomena.
Reviewer 6	Whole document	In my opinion, the authors also need to explicitly address the spatial inconsistency in the trends shown in Figure 12, part b. Stations with significant positive trends in the precipitation in the 10 wettest days are surrounded by stations without a significant trend. One possible explanation for these spatial differences in trend is data quality.	We have seen this type of station-to-station variability in many prior analyses of extreme precipitation. It is not possible to definitively point to a cause. Natural variations most likely make a substantial contribution, but the data quality undoubtedly also plays a role. This points out the primary reason to examine many stations since both of the above effects are likely to be random and any actual change in the physical climate change can emerge if many stations are analyzed. We have added text to explain this.
Reviewer 6	Whole document	Furthermore, supporting documentation is not provided for all the trends discussed in the manuscript. For example, there are no references or figures to support the statements on page 19 regarding trends in snowfall.	We have added references to several recent publications on snowfall trends and also added some key figures.

Are data and information presented in an accurate and clear manner?

Reviewer 6	Whole document	The writing of the first part of the report on climate trends is concise and clear (with a few expectations noted below). However, the historical climate section is written at a considerably more general level then the section on climate projections. In particular, most (but not all) subsections of the section labeled "Important Climate Factors" are quite general, and I wonder if it would have been better incorporate the text from this section into the "Climate Trends" section instead. Also, the different degree of detail for the subsections makes the "Important Climate Factors" section a bit disjoint. For example on page 14 there is fairly detailed information of heat waves but much less information provided for Great Lakes water levels and winter storms. I assume that the authors want to keep the length of the document on the shorter side and are reluctant to expand the "Important Climate Factors" section to provide similar detail for each of the subsections. An alternative strategy would be to simply "bullet" the different factors with each having a sentence or two of discussion. At least that approach would make the discussion more consistent across the different factors and would emphasize that this is primarily a listing rather than a detailed discussion of climate impacts in the region.	We added text on winter storms, water levels, snowfall, and humidity to give a more consistent degree of detail.
	Whole document	I question the inclusion of adaptation measures and strategies in this section, such as the discussion of City of Chicago heat wave strategies and green roofs found on page 14.	Some of this text has been removed but we kept in the basics. The NCADAC, at its May 11, 2011 meeting, directed that "scenarios should be prepared to provide an overall context for assessment of impacts, adaptation, and mitigation". Thus, this discussion is within the scope of these documents.
Reviewer 6	Whole document	In contrast, the Regional Outlook section is not as accessible to non-climatologists. I had to read some sentences/paragraphs a few times to understand the meaning, and I am quite familiar with these datasets and approaches.	We have added/modified to clarify data sources and analyses. Since these documents are meant for a technically sophisticated user, complex material is within the scope of these documents.
Reviewer 6	Whole document	For both sections there are some essential missing details (base values for the degree day calculations, for example), and the figure captions are often not complete. There are also some errors, including wrong figures and/or wrong axes labels. See below for details.	Added description of degree days. Re-wrote figure captions. FIxed errors in figures.
Reviewer 6	Whole document	With respect to the figures showing the projected changes estimated from the NARCCAP simulations, I don't understand why the figures beginning with Figure 27 display the model reference period "for comparison". Usually, when a delta method is used (i.e., the difference (absolute or percent) between a model future and a model reference period), the delta is applied to historical values. The appropriate map "for comparison" would be a historical plot (say 1971-2000) of the climate variable. The simplistic assumption behind calculating a "delta" is that error in the model reference and model future simulations is constant and the subtraction removes this error. Thus, the delta is then applied to historical values. I think these figures could be just two panels: a) NARCCAP projected change, b) historical climatological values.	Revised figures now show climatology from NARCCAP simulations driven by NCEP Reanalysis data, as well as a future projection (climatology + modeled change).
Reviewer 6	Whole document	I am somewhat uncomfortable using the BCSD monthly time series to look at future changes in interannual variability given that adjusting the distribution of the monthly temperature and precipitation values to better match the observed distribution is a key factor in this downscaling method. The rationale provided by the authors for this approach is not very convincing and not likely to be understandable by non-climatologists unfamiliar with the BCSD type of bias correction and downscaling.	We have removed the interannual variability analysis and deleted this section

Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.

Reviewer 6	Pages 3-6, 9 and Figures 1-5, 7	See above for concerns about isoline interval.	As stated above: These figures were created from a gridded data set that does not have the resolution to well-represent the small scale modifications created by the Great Lakes. Since the data do not support an accurate representation of such features, we have added a caveat to the captions indicating this limitation.
Reviewer 6	Pages 6-7	Why show only summer and fall precipitation? Depending on the natural or human system or application, winter and spring precipitation are also important.	Maps of spring and winter precipitation have been added.
Reviewer 6	Page 8	Are the dots on Figure 6 the locations in the stations used in the analysis? If so, this needs to be included in the figure caption. Also, are these the same set of stations used for all of the historical maps or does the station density and type vary by climate parameter?	Figure caption amended.
Reviewer 6	Page 9, Figure 7	Need to include in the figure caption the base for the growing degree day calculations. Keep in mind that base 50°F is typically used for com and 40°F for soybeans and small grains, all of which are important commodities in the region.	Figure caption amended.
Reviewer 6	Page 10	Paragraph beginning "The Great Lakes ...": This area is also a popular winter vacation destination (e.g., skiing, snowmobiling). This is mentioned in on page 11 in the paragraph beginning "With several large ..."; however, the authors might consider combining these two paragraphs so that the message is more consistent	We did not make the suggested for the following reason. The paragraph starting with "The Grea Lakes.." is intended to describe the mean climate conditions of the lakes area. The paragraph on tourism is meant to discuss the potential impacts of climate variability. Thus, they focus on two difference aspects of climate.
Reviewer 6	Page 10	Sentence "The risks of significant losses from such events are often higher for smaller producers and for specialty crops": Somewhat problematic sentence. What is a "significant loss"? Both small and larger producers can have significant losses but the small producer may not be able to bear the loss as easily if they have more limited financial resources. The authors perhaps are arguing that larger producers would experience less loss because of the larger area of their operation but some weather/climate hazards, such as drought, can be spatially extensive. The reference to specialty crops is also not clear. Why would risk of significant loss be higher for specialty crops? Because of they are subjected to weather/climate hazards throughout the year rather than during relatively short growing season? If so, this needs to be stated more explicitly.	This sentence was removed.
Reviewer 6	Page 10	Does the urban heat island "effect" really "prevent" cooling at night? Or is the urban heat island partly the result of warmer nighttime temperatures?	We revised text to provide an expanded explanation of this phenomena.
Reviewer 6	Page 11	" ... shut down ... ", perhaps "closed" instead. Also, I don't think the river was "shut down" (or closed).	Text edited as suggested.
Reviewer 6	Page 12	"very high nighttime temperatures": In BOTH the areas with moderate drought and the area with too much precipitation?	It was over the whole region and this is now explicitly stated.
Reviewer 6	Page 14	"the factors that determine the region's climate favor... ": I found this a bit too generaL	We revised the text to explicity identify the factors, which are the lack of a moderating or blocking surface feature and warm, moist air masses from the Gulf of Mexico.
Reviewer 6	Page 14	Paragraph starting "In response to ....": Needed?	We have considerably reduced the length of this paragraph. It now focuses simply to the Chicago heat wave response plan.
Reviewer 6	Page 15	"multiple points in time when temperature shifts occurred": may need to explain what is meant by "temperature shifts".	This phrase was removed.
Reviewer 6	Page 15	Why include the coarse (5° lat/5° long) CRUTEM3 data set?	Justification added.
Reviewer 6	Page 15	"seasonally the trends are not as obvious" Do you mean to say that most of the warming has occurred during the cool season?	We have added seasonal time series graphs, a table of temperature trends, and accompanying text. This shows that while the annual temperature trend is statistically significant, spring is the only season with a statistically significant trend
Reviewer 6	Page 15	"Very cold winters have been scarce ... ". "Infrequent" is probably a better term than "scarce". Also, "quite warm" is a vague description, as is "about normal".	Text edited as suggested.

Reviewer 6	Page 15	" ... in the Midwest is obtained in the ten ..." perhaps better is "in the Midwest occurs during the ten .."	Text edited as suggested.
Reviewer 6	Page 15	Something is wrong with the structure ofthe sentence, 'This emphasizes the importance of intense precipitation events in the Midwest, and is evident from analysis of the precipitation received during the top-10 wettest days". The "this" appears to be the amount ofprecipitation in the top-10 wettest days.	We have rewritten this sentence to remove the ambiguity and make the relationship much more explicit.
Reviewer 6	Page 15	"Spatial patterns in both metrics ... " -what are the metrics being referred to here? I only see the precipitation during the top-10 wettest days.	We have edited the text to explicitly identify the metric.
Reviewer 6	Page 15	"... exhibit significant changes in the metrics ..." statistically significant changes?	We have added the word "statistically".
Reviewer 6	Page 17	The trends shown in Figure 10 could be compared to the global trends for the different time periods, as shown in the IPCC AR4 Working Group I report.	We have added text on global trends reported in IPCC AR4.
Reviewer 6	Page 17, Figure 11	Fig. 11 caption probably needs further explanation on how to read the values. Also, it looks as though only the USHCN stations were used for this analysis, which should be noted.	Modified figure caption.
Reviewer 6	Page 18, Figure 12	Fig. 12 caption: Rather than "mean sum" perhaps "Average precipitation per year during the 10 wettest days".	Text edited as suggested.
Reviewer 6	Page 18, Figure 12	See above regarding the need for a discussion in the text regarding spatial inconsistencies in the trends.	As noted above, a discussion of this was added
Reviewer 6	Page 18, Figure 13	Fig. 13 caption. It is not clear from the caption what" extreme precipitation index" is being plotted. Also, "Analysis is averaged ..." is awkward.	The awkward wording was revised. Several sentences describing the derivation of the extreme precipitation index were added
Reviewer 6	Pages 19 and Page 20, Figures 14-15	How is an "intense cold wave defined"? It is not defined at the top of page 19, and the caption for Figure 14 says"... the occurrence of cold waves defined as 4-day periods colder than the threshold ..." but the "threshold" is not provided. Similarly, the definition of an "intense heat wave" is not provided.	Several sentences describing the derivation of the heat and cold wave index were added
Reviewer 6	Page 19	The sentence, "However, recent heat waves such as the 1995 event ...", needs a reference (or a figure) to support the claim.	We added two references that support this statement.
Reviewer 6	Page 19	There is something wrong with the structure of the sentence, "There is a relative paucity ..." particularly "observing stations and issue pertaining to .... ".	This paragraph was extensively re-written to improve clarity and remove ambiguities
Reviewer 6	Page 19	The DS3505 data set needs to be defined and an explanation given for why it is considered to be "reasonably" representative.	Text added to clarify and a reference provided.
Reviewer 6	Page 19	"Reanalysis data" have not been defined, and readers are not likely to know what reanalysis data are.	The intended audience for this document is expected to know about reanalysis data or be of sufficient technical competence to learn about it.
Reviewer 6	Page 19	There are no references or figures to support the statements on page 19 regarding trends in snowfall.	Reference added.
Reviewer 6	Page 20, Figure 14	Need to include in the figure caption that this is for the Midwest region. Same for Figure 15. Also, need to provide definitions for a "cold wave index" and for a "heat wave index". What are the thresholds used to calculate these indices?	A several-sentence description of the algorithm is now included in the caption
Reviewer 6	Page 21, Figure 17	How was this figure calculated? Was the length of the growing season calculated for each individual station and then the values averaged? Or was the length ofthe growing season calculated from regionally averaged temperature values? I assume the fonner, but probably best to be specific.	Additional detail now included in caption
Reviewer 6	Page 22	"... the first decade of the 21 st Century have also ...": should be "has" rather than "have".	Text edited as suggested.
Reviewer 6	Page 22	Is the trend for Lake Michigan-Huron significant?	Edited text to clarify.
Reviewer 6	Page 22	I don't get what is meant by "... which illustrate an increase in the annual occurrence of dewpoints compared to the 1920s-1930s drought and heat waves".	The text was edited to clarify our meaning
Reviewer 6	Page 23, Figure 18	Need to include in the Fig. 18 caption that the straight line is showing the linear trend in lake level.	Edited figure caption to state this.
Reviewer 6	Page 23, Figure 19	Fig. 19 caption. Should be "coldest" and "warmest".	Text edited as suggested.

Reviewer 6	Page 24, Figure 21	Fig. 21 caption. Should be "date" rather than "data. The definition of the nonnalization procedure is not very clear.	Corrected mistake.
Reviewer 6	Page 26	"mean of all the available models' values ... ": Awkward.	This entire section has been expanded and re-worded for clarity
Reviewer 6	Page 26	A reference is needed to support "... a number of research studies have found that the multi-model mean is superior to any single model in reproducing the present-day climate ... ".	Reference added.
Reviewer 6	Page 26	I am not certain that you can argue that "A multi-mean analysis of future spatial patterns may be the most robust estimate of future change" especially if the number of model runs is small (which is the case for NARCCAP). Additionally, for some applications it is helpful, if not essential, for decision making to see the range of model projections.	We have removed this sentence. Range of projected model values are given in the tables.
Reviewer 6	Page 26	There needs to be more explanation regarding how the statistically downscaled daily temperature and precipitation series were created.	Text added in introduction to section.
Reviewer 6	Page 26	The spatial resolution of the CMIP3 GCM output needs to be included.	We included the range of resolution of the great majority of models
Reviewer 6	Page 27	Spatial variations are relatively small ... is this because of the coarse spatial resolution ofthe CMIP3 output?	Probably a consequence of the fact that air masses with coherent temperature patterns are of relatively large extent and that smoothing occurs when multiple models are averaged. The AR4 temperature change maps are highly coherent spatially and we have referenced the relevant chapter.
Reviewer 6	Page 27	What is meant by "Ranges in the fall season ... are the most spatially uniform"?	Text edited to clarify.
Reviewer 6	Page 27	There is considerable discussion on this page regarding the differences between the projections derived using the A2 versus the B1 greenhouse gas emissions scenarios, with a greater difference at the end of the century compared to early century. However, these emissions scenarios are not defined, nor is it explained that the emissions scenarios do not deviate much from each other until around 2050. Rather, the authors state that the projections are —insensitive to "the emissions path early in the 21st century".	Text added describing scenarios.
Reviewer 6	Page 27	I think it should be "pathway", rather than "path".	Text edited as suggested.
Reviewer 6	Page 27	I had to read this sentence several times. It needs to be clearer that the "NARCCAP GCMs" refers to the set of GCMs used to drive the NARCCAP simulations.	Text edited to clarify.
Reviewer 6	Page 28, Figure 23	Fig. 23 (and other similar figures). I had shown some of these figures to students and it was not immediately obvious to them that the temperature and precipitation change over the Great Lakes was not included, and they did not understand the reasons for the jagged white areas around the Lakes. Perhaps something is needed in the legend to address this.	Text was added to the captions to explain the masking.
Reviewer 6	Page 30	"… lowest warming…", probably "least warming".	Made change as suggested.
Reviewer 6	Page 30	"… starting at…" and "…ending at…" don't seem to be the best choice of wording.	Changed to "from" and "to".
Reviewer 6	Page 30	"The range of individual model temperature changes" is somewhat confusing.	Re-worded sentence.
Reviewer 6	Page 30	Might want to define "inter quartile range".	Added definition.
Reviewer 6	Page 30	The sentence, "Although the total range is seen …", begs further discussion or at least some speculation.	We have added a couple of sentences, but it is outside of the scope of these documents to speculate about causes
Reviewer 6	Page 30, Figure 25	Lots of confusion here! Is this figure suppose to be for precipitation or temperature? Note that the vertical axis says "Precipitation Change %", whereas the caption is referring to mean temperature change. Also, the information in the text and what is shown on the figure do not agree.	Wrong figure was inserted. Replaced with correct (temperature) figure.
Reviewer 6	Page 31, Figure 26	Again, the figure has the wrong axis. Says "Precipitation Change %", whereas the text and figure caption refer to temperature change. Consequently, the discussion in the text and the figure do not agree.	Wrong figure was inserted. Replaced with correct (temperature) figure.

Reviewer 6	Page 32	"… where the number of occurrences in the present climate is highest": Only if the model reference period is a good simulation of the observed current climate.	The intended audience for this document are astute enough to understand this.
Reviewer 6	Page 32	Why was a minimum temperature of 10oF selected?	We added text to justify this. In the revised document, this is the second paragraph of section 3.4. This indicates that the choices of extreme thresholds is somewhat arbitrary and the thresholds have different implications in different climatic zones. However, the qualitative changes are not sensitive to the exact threshold chosen and the results thus have general relevance about changes in low temperature extremes.
Reviewer 6	Page 32	"historical reference period": Comes across to me as observations, when in fact the authors are referring to the model control simulation.	Changed to "model reference period"
Reviewer 6	Page 32	"… with some areas decreasing by up to 25 days": Poor sentence structure as the areas do not decrease although the number of cold days decrease	Re-worded sentence.
Reviewer 6	Page 32	Something is the matter here: "… which have not been frequent high over the past few decades".	This phrase was removed.
Reviewer 6	Page 32	Meaning of "The pattern is similar to the change in the total number of days exceeding 95oF for both the difference map, as well as its respective climatology‖ is not unclear. Also ―respective climatology" is not appropriate terminology for the model control simulation.	We have removed this phrase
Reviewer 6	Page 32	"average annual longest string of days": awkward wording.	Re-worded sentence.
Reviewer 6	Pages 33-35, Figures 27-29	Figs. 27, 28, 29 captions. Is the multi-model mean for 2041-2070 a "model reference period"?	Changed to "future time period"
Reviewer 6	Page 36	"For the NARCCAP changes" – I think the authors are referring to the NARCCAP multimodel means.	We changed "changes" to "simulations"
Reviewer 6	Page 36	"exceeding various thresholds" can be deleted, as can "falling below various thresholds".	we have re-worded text
Reviewer 6	Page 36	"A measure of heat waves is the run of days exceeding thresholds": too general.	We have removed this phrase
Reviewer 6	Page 36	The table indicates that base 50oF was used for growing degree days, but this was omitted in the text. Also, why wasn't GDDs for base 40oF also included given that threshold is more suitable for some of the crops (e.g., soybeans) grown in the Midwest?	New text on degree days added, including base value. The 50 deg F base is the most commonly used one
Reviewer 6	Page 37	The sentence "Since this is likely to affect a small minority of the future simulated values, it is unlikely to affect the sign of any changes, but could add uncertainty to the quantitative value" is not clear to me. Shouldn't a substantial number of projected temperatures for the end of the 21st century fall outside of the control simulation (and observed) range? What am I missing here?	This section has been deleted
Reviewer 6	Page 37	The states of Michigan, Wisconsin, etc. are not able to "indicate an increase".	This has been reworded
Reviewer 6	Page 37	Nowhere (text, Table 2 or Figure 32) does it say what base was used for calculating cooling degree days.	New text on degree days added, including base value.
Reviewer 6	Page 37	"annual total cooling degree days": should this be "annual average number of cooling degree days"?	Text edited as suggested.
Reviewer 6	Page 37	"least amount of increase", perhaps "smallest increase". Also note in this paragraph that units have sometimes been forgotten. "1000 CDDs" rather than just "1000", for example.	Text edited as suggested.
Reviewer 6	Page 37	A base value also needs to be provided for heating degree days. Same issue with units as seen in previous paragraph.	New text on degree days added, including base value.
Reviewer 6	Page 38, Figure 30	Fig. 30 caption. Need to make it clear that this is interannual variability.	This figure has been removed due to another reviewer's comment
Reviewer 6	Page 39, Figure 31	Fig. 31 caption. Need to define frost-free season. Also, I would recommend only including the delta map and a map of the observed historical values.	Definition of freeze-free season added to text. Revised figures show climatology from NARCCAP simulations driven by NCEP Reanalysis data, as well as a future projection (climatology + modeled change).

Reviewer 6 Page 40	Need to include the base value for calculating cooling degree days. Also, I would recommend only including the delta map and a map of the observed historical values.	New text on degree days added, including base value. Revised figures show climatology from NARCCAP simulations driven by NCEP Reanalysis data, as well as a future projection (climatology + modeled change).
Reviewer 6 Page 41	Need to include the base value for calculating heating degree days. Also, I would recommend only including the delta map and a map of the observed historical values.	New text on degree days added, including base value. Revised figures show climatology from NARCCAP simulations driven by NCEP Reanalysis data, as well as a future projection (climatology + modeled change).
Reviewer 6 Page 42	Table 3. Table legend needs to indicate that NARCCAP values are also included.	We have greatly expanded the table legend (now Table 6) to add information about NARCCAP.
Reviewer 6 Page 42	A geographic region does not "indicate a decrease".	we have corrected this.
Reviewer 6 Page 42	"The range of changes vary", should be "varies".	Edited text as suggested.
Reviewer 6 Page 42	Second paragraph. I don't see a value of 24% in Table 3. Also, shouldn't the lowest value be a negative number rather than "7% (B1, 2055)"? Furthermore, the lowest and highest values for B1 appear to be -3% and 4%, not 7%.	We have edited the text to add clarity. In particular, the phrase "CMIP3 inter-model" was inserted before "range" to explicitly identify the metric.
Reviewer 6 Page 42	"The NARCCAP changes vary from a low of -2% to 11%" would be clearer if rewritten "The NARCCAP changes vary from a low of -2% to a high of 11%".	We have removed this sentence and replaced with a sentence that quantifies the range, in parallel with the previous sentence that quantifies the range of CMIP3 model simulations
Reviewer 6 Page 42	Third paragraph. Needs to be clearer that these are the multi-model average changes, so to avoid confusion with the previous paragraph which describes the NARCCAP projected changes ranging from -2 to 11%.	We added the phrase "multi-model mean" before "annual and seasona" to clarify
Reviewer 6 Page 42	What is meant by the sentence "The greatest variability occurs in two of the wettest seasons, summer and fall, with ranges of 25%". What is meant by "variability"? Spatial variability? Interannual variability?	This refers to spatial variability. We added the word "spatial" before variability to clarify
Reviewer 6 Page 41, Figure 34	Are these the BCMD downscaled CMIP3 values? If so, that needs to be included in the figure caption.	The figure caption has been greatly expanded to add information about the figure data sources
Reviewer 6 Page 45	"very differences".: Delete "very".	Word deleted.
Reviewer 6 Page 45	I don't understand the sentence "The range of individual model changes in Fig. 36 is quite large, particularly compared to the very differences in the multi-model means, as also illustrated in Table 3." Table 3 doesn't show multi-model means, instead is shows the low, high, median values of the individual model projected changes in mean annual precipitation. The next sentence—"In fact, for all three future periods and for the two scenarios, the individual model range is much larger than the differences in the CMIP3 multimodel means" – is also confusing. Are you referring to the differences in the CMIP3 multimodel means by greenhouse gas emission scenario and time period? Otherwise, isn't there just one multimodel mean per time period and emission scenario?	Corrected mistake in text referring to table instead of figure and edited text.
Reviewer 6 Page 46, Figure 36	I am rather suspicious of Figure 36 as the pattern is very similar to that shown in Figure 25 for temperature. Is this the correct figure?	Figure 25 was the wrong figure. Correct figure now inserted.
Reviewer 6 Page 46	By "the decreases are largest in summer" are you referring to the multimodel means or the individual model means? I assume multimodel means, but this needs to be stated explicitly as both the multimodel means and the individual model means are shown in Figure 37. Similar edits are needed to the other sentences in this paragraph.	We have added the phrase "in the CMIP3 multi-model means" after "Decreases" to clarify.
Reviewer 6 Page 47	Are the BCSD downscaled CMIP3 data being used for the change in variability analysis? If so, and as indicated earlier, I am somewhat uncomfortable using that dataset to explore changes in variability. I would be more comfortable if the NARCCAP output were used instead, although I realize that there is considerable bias in the NARCCAP control simulations when compared to observations.	We have removed the interannual variability graphs in response to a comment by another reviewer.
Reviewer 6 Page 48, Figure 38	The figure caption needs to include the data source.	This figure was removed (see previous comment).

Reviewer 6	Page 49	How were the mean changes in Table 5 calculated? Average over all the gridpoints? You might want to refer to this as a "spatial mean" or "spatial average of the gridpoint multimodel means".	The text at the beginning of Future Climate Scenarios section was expanded to add information on calculation of multi-model means.
Reviewer 6	Page 49	Text ends rather abruptly. Is a summary needed?	A summary section was added.
Reviewer 6	Pages 50-51, Figures 39-40	I think you need only need to show the percent change map (top diagram) and then a historical observation-based map (on which you would apply the "deltas" from the top diagram).	Revised figures show climatology from NARCCAP simulations driven by NCEP Reanalysis data, as well as a future projection (climatology + modeled change).

Please provide any additional suggestions or recommendations.

Reviewer 6	Whole document	None.	No response necessary.

Reviewer	Referring To	Comment	Response
Does the document address relevant features of the climate of the region?			
Reviewer 2	Whole document	Short answer is yes.	No response necessary.
Does the document incorporate the best information available?			
Reviewer 2	Whole document	The short answer is yes.	No response necessary.
Are data and information presented in an accurate and clear manner?			
Reviewer 2	Whole document	The text is very descriptive. There is very little assessment of the changes: past or future. How well do models do in simulating the past observed changes? Are the past changes due to some signal (a response to some change in radiative forcing) or just natural variability? The answer to these questions determines how the reader should interpret the future projections and assess the model fidelity.	We have added figures and text comparing model and observational time series of temperature and precipitation. Attribution of trends was beyond the scope of this study.
Reviewer 2	Whole document	For the future projections, some measure of uncertainty is needed. The uncertainty of the future scenario and in the model response is mentioned. However the relative magnitude of these uncertainties to that due to natural variability is missing. I assume that natural variability is as large as the projected changes discussed.	We have calculated statistical significance of (future-present) differences and modified the maps to show three classes of model agreement on changes. This is a scheme suggested by C. Tebaldi in a 2011 J. Geophysical Research paper.
Reviewer 2	Whole document	I am surprised that there is no Executive Summary. What are the 10 main findings? I do not know the format of the whole document but would lobby for each major section having a summary.	A summary has been added.
Reviewer 2	Whole document	I would also lobby for a paragraph to describe in a general way the future scenarios used here. What do these scenarios need to make the projections used? The idea that population growth, technical growth, and mitigation efforts WORLD-WIDE are needed to make the projections is important information. This information could be located in other parts of the assessment. If so, they should be referenced here.	Explanation of IPCC scenarios along with references has been added to the Introduction section.
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
Reviewer 2	Page 2, Line 52	"These air masses can bring …." – The sentence hangs. More is needed or delete.	Reworded - incorporated main point into preceding sentence.
Reviewer 2	Page 2, Line 56	"...shielding the western part from …" - Is not this mainly an elevation effect? The Gulf supplies lots of hot, humid air to the upper Plains and into northwestern PA and western NY.	The reviewer is correct with respect to the Gulf source of warm humid air. We have added a phrase indicating that the Gulf is a source.
Reviewer 2	Page 2, Line 67	"blocking effects of the Appalachian Mtns." – Elevation?	We have removed this phrase.
Reviewer 2	Page 2, Line 82	Last few words – distance from the coast – Is not this mainly an elevation effect?	Comparison of temperatures at coastal stations and interior locations indicates that elevation does not account for all of the decrease. However, it is a contributor and we have added a phrase to this effect.
Reviewer 2	Page 4, Line 107	"western Atlantic" – Add Ocean.	Changed as recommended.
Reviewer 2	Page 4, Line 112	"are a consequence of" – Change to “can occur in”	Changed as recommended.
Reviewer 2	Page 4, Line 113	"relatively warm eastern Great …" – Delete “relatively warm”. Not needed here.	Deleted text as recommended.
Reviewer 2	Page 4, Line 117	"most urbanized …." – By what measure? Total area? Fraction of total area? More needed.	This is by population density. We have added text that provides the values.
Reviewer 2	Page 4, Line 121	"raises summer temperatures" – Add “nighttime” before temperatures.	Since UHI effect can raise both daytime and nighttime temperatures, and this statement is rather generic, I've elected to leave it as-is. Though nighttime increases are greater in magnitude, daytime increases are still significant and should be included.
Reviewer 2	Page 5	Important Climate Factors – Seems like a lousy title to me. Extreme Events or Extreme Weather Events and their impacts….better?	Left title as-is in order to remain consistent with other regional documents. Also, not all elements of this section can be classified as a type of 'extreme'.
Reviewer 2	Page 5, Line 136	"number one hazard" – Add “weather related” before hazard.	Added recommended text.
Reviewer 2	Page 8, Line 263	"a step function" – Is “sharp break” better? It really is not a step function.	Replaced 'step function' with 'clear shift', as I did not think 'sharp break' was much clearer than the original wording, though I agree it needed editing.

Reviewer 2	Page 8	"Summer precipitation does not exhibit an overall trend, but, over the past 10 years, there have been a few very wet summers" – Does this include 2011? I thought 2011 would be the wettest year/summer.	The body of the text in Section 2.4.2 was reworded to clarify that the anomalies shown are for the time period from 1895 to 2011 with respect to the long-term average taken over the period of 1901-1960. The text now indicates that 2011 was the wettest year while 2006 and 2009 are the wettest summers.
Reviewer 2	Page 12, Figure 6	Hard to relate x-axis labels to pith marks. Redraft.	Figure has been redrafted. labels are centered directly under pith marks. Intervals are clear and even.
Reviewer 2	Page 14	Snow Depth paragraph – These changes are surprising to me and not consistent with my expectation from model results (unlike that for the other variables in this section). Is this just natural variability? … or what?	Since temperature has been increasing, this result seems perfectly reasonable to us. No changes made.
Reviewer 2	Page 20	CMIP3 15 models – A table of models used: both CMIP3 (15 models) and NARCCAP (9 models) would be very helpful. Not sure what model results are statistically downscaled from reading the text – those 16 models should be also identified.	Table of models has been added.
Reviewer 2	Page 20, Line 496	"delta method" – Reference? What is it?	Explanation of method and references for greater details have been added.
Reviewer 2	Page 20	This is a good place for a paragraph on the future scenarios used….or reference to some other part of the Assessment for that discussion.	As previously noted, an explanation of IPCC scenarios along with references has been added to the introduction section.
Reviewer 2	Page 21, Lines 508-509	"Spatial variations are small" – Relative to what?...the contour interval?	Changed wording to "Little spatial variation is simulated..."
Reviewer 2	Page 21, Line 533	The small plus sign … - Delete sentence. It is in the caption.	Text deleted as recommended.
Reviewer 2	Page 21, Line 543	"range .. is quite large" – Is this difference due to sampling (i.e. natural variability) or some difference in the model response? I assume the former but it needs checked and discussed. Pick a model with a large ensemble to check this…	When examining individual time series, some of which are now shown in the section comparing models and observations, there is some sampling variability, but model differences (sensitivity to the forcing) is the dominant source of differences.
Reviewer 2	Page 23, Figure 17	1) The label for the temperature key on the figure is wrong. 2) Make the contours and shading the same as in Fig. 16. Why not show all the model results together? Annual results in 1 figure and the seasonal results in the 2nd figure	Label for temperature key has been corrected. A note has been added to the figure caption mentioning the differing color scales. Annual and seasonal results are shown in one multi-panel figure.
Reviewer 2	Page 24, Figure 18	What is the difference in Fig. 18 between the NARCCAP and NARCCAP GCM? Please relate to data description on page 20. This confusing terminology is also found in the precipitation section.	Figure captions updated to clarify the difference between the 9 NARCCAP models and the 4 GCMs used to drive the NARCCAP.
Reviewer 2	Page 24	Discussion of Fig. 19 – How do the model results compare to the observations?	Comparison of model and observations has been added later in document.
Reviewer 2	Page 25, Lines 594-595	"overall uncertainty arising from the combination of model differences and emission pathway" – Natural variability matters a lot too….i.e. sampling issues.	When examining individual time series, some of which are now shown in the section comparing models and observations, there is some sampling variability, but model differences (sensitivity to the forcing) is the dominant source of differences.
Reviewer 2	Page 26, Line 604	"model reference period" – I am not sure why the word “model” is included. Delete?	Left as is, to clarify that the modeled (not observational) reference period was used.
Reviewer 2	Page 26, Line 608	2055 – This is a missing leading label for the period 2041-2070. I would use “mid-21st century” or something similar. 2055 occurs many places on this page and the next.	It is explained in the Future Regional Climate Scenarios 'Analyses' section that the time periods will be referenced by their midpoints - no changes made.
Reviewer 2	Page 26, Line 618	Page 26, 17 lines down – decrease in the number of days – Add “very cold” before days.	Sentence reads well as written. No change made.
Reviewer 2	Page 26, Line 622	Page 26, 21 lines down – climatology – Wrong word. Replace with “recent observed changes”.	Reworded text as recommended.
Reviewer 2	Page 27, Figure 20	Hard to see shading values on bottom 2 figures. Show differences? Rescale color bar?	Color bar rescaled as recommended.
Reviewer 2	Page 29, Figure 26	Hard to see shading values on bottom 2 figures. Show differences? Rescale color bar?	Color bar rescaled as recommended.
Reviewer 2	Page 30, Table 2	What time period? Define “st dev of change? Standard deviation of what relative to what?	Figure headings and caption expanded to be more descriptive.
Reviewer 2	Page 31, Line 686	BCSD – Redefine here. Not common usage.	These sentences were removed. Expanded definition of BCSD added to beginning of section.

Reviewer 2	Page 32, Figure 23	Surprising result. Other papers see little or no variance changes. I doubt any of the changes statistically significant. Stouffer, RJ., and RT Wetherald, 2007: Changes of Variability in Response to Increasing Greenhouse Gases. Part I: Temperature. Journal of Climate, 20(21), 5455-5467. Zwiers, F. W., and V. V. Kharin, 1998: Changes in the extremes of the climate simulated by CCC GCM2 under CO2 doubling.J. Climate, 11, 2200–2222	In response to this and other review comments, we have deleted this figure.
Reviewer 2	Page 38, Figure 28	Use same contours/shading as figure 27.	Contours/shading updated. Figures now match.
Reviewer 2	Page 41, Lines 842-843	"standard deviation of precipitation" – I am concerned by the use of statistical analysis (i.e. standard deviation) which assume normal or near normal distributions with a 0 bounded variable. I think all this variability change results are suspect…at best. Use rank ordering or similar statistical analysis…Delete section?	This figure has been deleted.

Please provide any additional suggestions or recommendations.

Reviewer 2	Whole document	No comment given	No response necessary.

Reviewer	Referring To	Comment	Response

Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.

New Reviewer NE1	Line 414	How many Coop stations in the Northeast were used in this study?	We added the number of COOP stations.
New Reviewer NE1	Line 438	Not sure if “extremely” applies when comparing it to some other regions of the US. Not that the terrain isn’t diverse	We have removed the word "extremely".
New Reviewer NE1	Line 445	"Compared to other regions...": All others?	We have rewritten this section to explicitly identify the specific regions which the Northeast is cooler than.
New Reviewer NE1	Line 453	"The coast generally receives the most average annual precipitation at around 45 to over 50 inches in some areas": Poorly worded sentence…. Also, in NJ the coastal region is the driest.	We have rewritten this section to explicitly identify the driest and wettest areas, outside of the orographically-enhanced regions.
New Reviewer NE1	Line 526	"Perhaps the most infamous flash flood occurred in 1977 in Johnstown, PA.": Comment - How can this be the most infamous when beneath it you cite the 1889 flood….that is the most infamous one.	We replaced "Perhaps the most infamous..." with "A recent...".
New Reviewer NE1	Line 535	Storms don’t limit infiltration “limit” infiltration. I think this could be better stated.	This was reworded to now state that frozen ground and wet soils are what limits infiltration.
New Reviewer NE1	Line 557	Why just limit the 3-6” per hour statement to January 1997…that doesn’t make sense, as such rates are frequently observed in lake effect bands. Also, the Montague 95” report is incorrect. See the NWS/NCDC report that disproved the accuracy of this figure (which I believe was only 77” yet still shown to be too high. This must be removed from this report!	We removed this sentence.
New Reviewer NE1	Page 17	Suggested edits to text of Sections 2.3.5-2.3.7 (provided as tracked changes in document)	We made all of the minor edits. The major ones are addressed below (lines 51-54).
New Reviewer NE1	Line 593	"...have experienced no more than 8 hurricane strikes": Why not just give the actual number?	We changed this to give the range (between 1 and 8).
New Reviewer NE1	Line 602	I don’t consider Irene’s path all that similar to the 1938 storm. Those in NJ, the Catskills and VT would agree.	We took out the wording that says that the paths were similar.
New Reviewer NE1	Line 604	Initially Irene was considered a hurricane upon landfall in NJ but the NHC changed this in a post storm evaluation. This must be changed in this document.	We changed this to "tropical storm".
New Reviewer NE1	Line 614	I think Agnes in June 1972 deserves mention here.	We added a sentence about Agnes.
New Reviewer NE1	Line 639	"the “Climate Division Database version 2 beta” (CDDv2) is scheduled for public release in January 2013": This seems odd to mention here when this document will be published/released after Jan 2013.	This document will be released about the time of the release of the data set, not after.
New Reviewer NE1	Page 19	Suggested edits to text of Section 2.4.1 (provided as tracked changes in document)	We made the suggested edits.
New Reviewer NE1	Line 657	"temperatures have generally remained above the 1901-1960 average...both annually and during the winter.": "Especially during winter”??	We added "especially during winter" as winter exhibits the largest temperature trend.

New Reviewer NE1	Line 657	I imagine 2012 will surpass 1998 but will this be permitted to be added to the final document? If not, the 1998 record should be put in temporal context…e.g. “through 2011, the warmest….”	We added the qualifier "through 2011".
New Reviewer NE1	Page 21	Suggested edits to text of Section 2.4.2 (provided as tracked changes in document)	We made the suggested edits.
New Reviewer NE1	Line 876	"This change was primarily the result of the sinking of the Earth’s crust, as it continued to adjust from the melting of the ice sheets associated with the last ice age.": This needs a bit more explanation, as most readers know about isostatic rebound from ice sheets, not isostatic subsidence due to an area’s proximity to a former ice sheet.	We reworded this text to be more explicit and complete about the physical processes.
New Reviewer NE1	Line 879	"This reflects the increase in ocean water volume as the oceans warm as well as the melting of glaciers and ice sheets, in addition to the geological processes": Also due to changes in ocean circulation…see latest study on the middle Atlantic coast as a sea level rise “hot spot”, speculated to be in part due to ocean circulation changes.	We added the phrase "...and changes in Atlantic Ocean circulation...".

Reviewer	Referring To	Comment	Response
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
Reviewer 8	Whole document	I think that there are other important variables (e.g., solar radiation, max/min temperature) that are of particular interest to process modelers that are not included, at least in this report.	The scope of these documents was to provide a consistent (across the regions) analysis of a representative subset of climate variables. Specifically, the NCADAC, at its May 11, 2011 meeting, directed that "scenarios should be prepared to provide an overall context for assessment of impacts, adaptation, and mitigation". The scope doesn't include input to the process modeling community.
Reviewer 8	Whole document	For the most part, yes but the presentations are pretty general and averaged. I suspect there is going to be some confusion and head scratching by potential users of the data when they look into the actual spread of the models at a particular location instead of over the regional averages. This is particularly true of those who will be using actual time series instead of broad averages or summary statistics. I am also puzzled by the use of such long averaging periods (2041-2070). Although this aides in reducing the variability, it also obscures important transient responses and model-to-model differences over the time range.	There have been a number of additions to add informational content concerning the scenarios. We believe these additions enhance the discussion considerably and largely address this review comment. These additions include: (1) agreement, or lack thereof, among models is now quantified and displayed on the maps using a recently proposed scheme of Claudia Tebaldi and collaborators; (2) an analysis of decadal-scale changes was conducted and a set of graphs added showing these results-essentially these illustrate the distribution and statistical significance of decade-over-decade changes in temperature and precipitation; (3) a set of graphs of individual model time series from 1900 to 2100, along with observations for 1901-2010, were added, showing the variations among models and how well as a set the models reproduce observations.
Reviewer 8	Figures 17-18	Check to make sure the units/magnitude of heating degree days and cooling degree days are correct. They seem very high to me.	Values for heating and cooling degree days are correct. A definition of degree days has been added for clarity.

Reviewer	Referring To	Comment	Response
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
Reviewer 9	Figures 1-2	The maps of climatology (Figs 1 and 2) would look a lot better using (a) PRISM data and/or (b) locally relevant color scale.	We did not change this. While there are certain advantages to PRISM data, the current maps contain the latest quality-controlled NCDC data set that incorporates a number of inhomogeneity adjustments. This new data set is used for all subsequent time series and trends tests. Thus, its use in the climatology maps creates a consistency throughout the document.
Reviewer 9	Figure 3	Time series plots with red and grey curves (Fig 3) - the visual message is that the red one matters and the grey one doesn't. We suggest finding a different way of presenting the two curves - two colors with similar intensity, for example, or symbols without a connecting line (since the lines tend to emphasize the year-to-year variability, whereas the symbols emphasize the data values).	Figures have been revised to show annual and seasonal data series in different colors.
Reviewer 9	Section 3	Color scales in Figs 12, 14, and others - a considerable amount of research suggests that the 'rainbow' color scale is problematic, for at least 2 reasons - people with red/green colorblindness have trouble, and even normally sighted people are slower to perceive the sequence in the rainbow than with color scales where all that varies is color intensity (as is used in Figs 8, 9, 13, 18, etc.). Suggest replacing all rainbow scales with intensity scales. Also, some of the maps make little use of the color scale (Fig 17 is a good example - uses only 2 of the 8 colors in the legend).	Figures have been revised and now use color-blind friendly schemes. Also, unique scales are used for this region.
Reviewer 9	Page 5, Line 149	Page 5 line 149 - snow line 4500-5500 ft - really? that sounds a little high. I would have thought more like 2500 ft (northern WA) to 3500 ft (southern OR) - after all, the ski resorts in the Cascades mostly have base elevations 3000-4000 ft.	Revised, more precise text was provided by Kelly Redmond.

Reviewer 9	Figures 3-6	On the time series, it would be useful to add linear trends (as in Fig 7) and t-tests with envelope of 5/95 percentile	Trend lines have been added to time series. We did not include the 5/95 percentile lines in order to achieve an uncluttered appearance in these graphics. Statistical tests of trend significance were performed on the temperature and precipitation time series and the results included in the text and/or caption.
Reviewer 9	Section 3	For the maps of extremes, it would be more useful (although we recognize probably very computationally intensive) to calculate the extremes relative to a locally determined percentile (e.g. 99th) instead of number of days above or below an absolute threshold (e.g., Tmin <10F). If this is not possible, then perhaps split the region into dry half and wet half at the Cascades, separate the maps, and use different thresholds (e.g. P>1" west, P>0.3" east)	We performed a 0.3" threshold calculation and have included this as an additional map. The use of an absolute threshold for temperature has value in illustrating the regional climatological distribution. Of specific interest is the different behavior across the Cascade Mountains with increases to the east of the Cascades and little change or decreases on the west side of the Cascades.
Reviewer 9	Section 3	Would it be possible to show any additional variables, e.g., summertime cloudiness, wintertime extreme winds, separate Tmin and Tmax means?	The scope of these documents was to provide a consistent (across the regions) analysis of a representative subset of climate variables. An analysis of all variables of possible interest was beyond our scope.

Reviewer	Referring To	Comment	Response
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
New Reviewer PI1	Pages 2-3	Suggested edits to text of Preface (provided as tracked changes in document).	We have accepted the changes.
New Reviewer PI1	Line 55	"NOAA Regional Climate Centers": NOAA funds the RCCs, but they are not part of NOAA.	NOAA has been quite proactive in incorporating the RCCs in their plans and activities and they now have a 25-yr history of funding from NOAA. The term "NOAA Regional Climate Centers" has become common usage.
New Reviewer PI1	Pages 6-10	Suggested edits to text of Introduction (provided as tracked changes in document).	We have accepted these changes.
New Reviewer PI1	Lines 204-214	For the entire paragraph CO2 is noted in gigatons of emissions and then all of a sudden the discussion turns to ppm of concentration. While understandable to a climate scientist without some explanation I think this could lose some folks and be confusing. Gigatons of emissions vs. ppm of atmospheric concentration – what does that mean to the average citizen who will look at this. Some scale or referencing is required here.	We added two sentences providing the relationship between emissions and concentrations, and also noting that a sizeable fraction of the emissions are absorbed by the oceans.
New Reviewer PI1	Page 11	Suggested edits to text of Paragraph 2.1 (provided as tracked changes in document).	We have accepted these changes.
New Reviewer PI1	Page 12	Suggested edits to text of Paragraphs 2.2.1 and 2.2.2 (provided as tracked changes in document).	We accepted these changes.
New Reviewer PI1	Page 13	Suggested addition of figure and edits to text of Paragraph 2.2.3 (provided as tracked changes in document).	We accepted these changes ("sub-region").
New Reviewer PI1	Line 435	There is much more on tropical cyclones in section 2.3.2.3 and I suggest moving that section up to here.	We accepted this change. Specifically, we moved a paragraph in section 2.3.2.3 to after first paragraph in section 2.2.3 . We also incorporated the paragraph with additional Diamond references in section 2.2.3 that was offered by the reviewer.
New Reviewer PI1	Page 13	Suggested edits to text of Paragraphs 2.2.4 and 2.2.5 (provided as tracked changes in document).	We accepted these changes ("sub-region").
New Reviewer PI1	Page 15	Suggested edits to text of Paragraph 2.3 (provided as tracked changes in document).	We accepted these changes ("sub-region").
New Reviewer PI1	Line 515	Adding the latitude and longitude extent of this sub-region might be useful here as well as for the sub-region descriptions to follow.	We have added a new figure (Fig. 2) showing the locations of the regions discussed in the document.
New Reviewer PI1	Page 15	Suggested edits to text of Paragraphs 2.2.3.1.1 and 2.3.1.2 (provided as tracked changes in document).	We reject changing Hawai'i Island to "Big Island". We chose to keep as "Hawai‘i Island". This is the proper name ("Big Island" is a popular nickname).
New Reviewer PI1	Page 17, Figure 3	Suggested edit to figure caption (provided as tracked changes in document).	We accepted these changes ("sub-region").
New Reviewer PI1	Page 20	Suggested edits to text of Paragraph 2.3.2.1 (provided as tracked changes in document).	We accepted suggested changes.
New Reviewer PI1	Lines 651-653	This factor is not unique to the Pacific Islands; so I question the need to bring it up here. Many climate stations around the world are at airport locations. An unfortunate factor, but certainly not unique in this region. As climate scientists realize while the heat sinks can raise temperatures in the record, it is not the value that is important, as much as the trend. Menne (2010) has shown that even the trend of poorly sited COOP stations in the US follow the same trend as well sited USCRN sites.	We deleted the phrase "which introduces the confounding factors of paved-surfaces and artificial heat-sinks into the record."
New Reviewer PI1	Line 659	"Micronesia": Not wanting to confuse the Micronesian sub-region with the nation of FSM itself, and while I know what is meant here, I just changed this to a generic term of sub-region here and below.	We accepted suggested changes.
New Reviewer PI1	Page 22, Figures 9-10	Suggested edit to figure captions (provided as tracked changes in document).	We accepted these changes ("sub-region").
New Reviewer PI1	Page 23	Suggested edits to text of Paragraph 2.3.2.2 (provided as tracked changes in document).	We accepted these changes ("sub-region").

New Reviewer PI1	Lines 23-24	Suggested edits to text of Paragraph 2.3.2.3, addition of paragraph, and addition of figure (provided as tracked changes in document).	We added the suggested paragraph and moved to section 2.3.2.3.
New Reviewer PI1	Line 728	This information should all be moved up to section 2.2.3	We accepted this suggestion.
New Reviewer PI1	Lines 730-731	The Western North Pacific is the world's only typhoon basin; so in this case the more generic term of "tropical cyclone" is more appropriate.	We accepted the suggested changes.
New Reviewer PI1	Line 731	"31 tropical cyclones":The figure of 31 is correct if taking into account all storms, but since we went with named storms earlier, I thought it best to be consistent here. The data is from the International Best Tracks Archive for Climate Stewardship dataset maintained at NCDC.	We changed this number to 25-26 as suggested and added the IBTRACS reference (Knapp et al).
New Reviewer PI1	Line 738	I have inserted the figure below if the authors want to use it. If you wish to not use it that is fine as well.	We decided not to include this figure as it doesn't seem necessary. The text provides the number of storms and the reference, which is adequate.
New Reviewer PI1	Page 24, Figure 11	Suggested edit to figure caption (provided as tracked changes in document).	We accepted these changes ("sub-region").
New Reviewer PI1	Page 24	Suggested edits to text of Paragraph 2.3.3.1 (provided as tracked changes in document).	We accepte the changes for "sub-region". We included a regional map (new Fig. 2) where "CSP" is defined; thus, there is no need to define it here.
New Reviewer PI1	Page 36	Suggested edits to text of Summary (provided as tracked changes in document).	We accepted the new text. We changed websites to www.islandpress.org/NCAreports and www.cakex.org/NCAreports. We also accepted the suggested tropical cyclone final bullet in summary section.
New Reviewer PI1	Pages 37-41	Suggested addition of references (provided as tracked changes in document).	We added these references.

Reviewer	Referring To	Comment	Response
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
New Reviewer PI2	Pages 6-10	Suggested edits to text of Introduction (provided as tracked changes in document).	We accepted these changes.
New Reviewer PI2	Line 473	Suggested addition of additional citations (provided as tracked changes in document).	We accepted this.
New Reviewer PI2	Line 491	Suggested addition of additional citations (provided as tracked changes in document).	We accepted these additions.
New Reviewer PI2	Page 15	Suggested edits to text of Paragraph 2.3.1.1 (provided as tracked changes in document).	We accepted these changes.
New Reviewer PI2	Page 18	Suggested edits to text of Paragraph 2.3.1.2 (provided as tracked changes in document).	We accepted all the changes except "varying". We changed to "and corresponding higher rates of warming at high elevations" .
New Reviewer PI2	Line 707	Suggested addition of additional citation (provided as tracked changes in document).	In 2.3.2.3 we changed to "Like Hawaii (Chu 1995), drought tends to be the most extreme during the winter and spring months following an El Niño". We accepted the citations.
New Reviewer PI2	Page 18	Suggested edits to text of Paragraph 2.3.1.2 (provided as tracked changes in document).	We accepted these changes.
New Reviewer PI2	Page 36	Suggested edits to text of Summary (provided as tracked changes in document).	We accept changes to summary bullets.
New Reviewer PI2	Pages 37-41	Suggested additional references (provided as tracked changes in document).	We added these references.

Reviewer	Referring To	Comment	Response
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
New Reviewer PI3	Page 11	Section 2.1.1, first sentence: the average temperature - is that computed over all the Islands, or is Honolulu the basis for the computation?	Computed statewide. This should be clear in that it says "in Hawaii".

New Reviewer PI3	Page 11	Last sentence in section 2.1.1: very vague. Define storminess. What is meant by "increased" rainfall? No mention of Kona lows?	We added, from NOAA CNP climatology reference: "Kona" Storms can generate widespread heavy rain and wind that last for days, as well as intense local showers for several hours. Kona storms are cut-off lows in the upper level subtropical Westerlies that usually occur to the north of Hawaii, and are associated with surface lows.
New Reviewer PI3	Page 11	Please provide a latitude and longitude range for each of the sub-regions.	As responded to reviewer 1, I have sent you a map of the regions with marked lat/long on the axes.
New Reviewer PI3	Page 12	Section 2.1.3 - what station data comprise the average temperature? Given the sparse density of stations, it can only be a few.	This is correct. The PCCSP ref actually refers to Samoa (not Am Samoa) data. As the number of stations is so few in Am Samoa, in the full PIRCA report we use Samoa data. We have re-worded this as "In Samoa, about 50 miles west of American Samoa...
New Reviewer PI3	Page 12	Section 2.2.1 - what is meant by "the North Pacific High reaches its peak size..."?	We changed to "...reaches its largest spatial extent".
New Reviewer PI3	Page 23	References to Kruk et al. (2012) throughout the manuscript should be changed to Kruk and Marra (2012): A Regional Intercomparison of Rainfall Extremes. 92nd Annual Meeting of the Amer. Meteor. Soc., New Orleans, LA.	We accepted this change.
New Reviewer PI3	Page 23	The Kruk et al. (2012) reference is for Pacific Storm Climatology Products - a suite of extremes products for rainfall, high seas, and strong winds. Kruk and Marra (2012) based their findings on Pacific Storms data.	W accepted this change.
New Reviewer PI3	Page 29	Section 3.3: can the authors hypothesize reasons for this projected gradient in future mean precipitation? That is, why are the models indicating this gradient to begin with? Fewer Kona storms? More TCs?	While we have a working hypothesis for this, we do not think the work is sufficiently mature to include in this document.
New Reviewer PI3	Whole document	Overall it is a good summary document for a lay audience. In some instances, I felt it was really too toned down (as evidenced by some single-sentence paragraphs).	Thanks for the comment. We could have easily expanded many sections, but the scope of this report was to provide a general description of basic features. However, we think that our descriptions provide enough basic information to be useful.

Reviewer	Referring To	Comment	Response
Does the document address relevant features of the climate of the region?			
Reviewer 3	Whole document	Yes	No response necessary.
Does the document incorporate the best information available?			
Reviewer 3	Whole document	Almost but also some of the worse	We have responded to the reviewer's specific comments below.
Are data and information presented in an accurate and clear manner?			
Reviewer 3	Whole document	No, see review below	We have responded to the reviewer's specific comments below.
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
Reviewer 3	Whole document	Big picture: I assume the “top folks” told the authors what they needed. The paper has a nice review of some of the features of climate in the SE. Followed by a very bad quick summary of CMIP_3 and its offspring. Based on the current writing any intelligent person who was thinking of moving to the SE USA would not join us because there are only bad, frequent things like heat waves, droughts, floods, hurricanes, storm surges, etc. On the other hand, the South can be a pleasant place to live and global climate change will make it better.	Our charge in this chapter was to describe the physical climate of the region. A discussion of potential benefits, including those associated with climate change, is to be left to the authors of the other sector chapters. Nevertheless, we have added a sentence at the end of the first paragraph on page 3 to illustrate the point made above. Regarding the comment on the CMIP3 analysis, we have added considerable material to this section. This includes an expanded background discussion of the modeling data sets and revised graphics illustrating the model variations and consistency.
Reviewer 3	Whole document	The paper is very poorly written. I have been a teacher for 50 years and I would flunk anyone writing this poorly. In particular Figures and Figures legends should almost stand-alone. In the report the content of the figures is not explained in the figure legends.	We respond to specific figures below.
Reviewer 3	Whole document	VERY important: In the climate prediction scientific community, we know-repeat know-that we may only give stakeholders probability forecasts. It is very bad science to pretend that these deterministic forecasts have any value at all. Even projections should estimate uncertainty. At least discuss it.	It was not our intent to portray these as deterministic forecasts. To address this concern, we have modified some of the CMIP3 model simulation maps to include information about the model variations and consistency. Specifically these maps now show three categories of model variability as follows: (1) areas where most models do not indicate statistically significant changes in climate conditions; (2) areas where most models are in agreement about both the statistical significance of changes and the sign of the changes; and (3) where most models indicate statistically significant changes, but do not agree on the sign of the changes. We have also added a sentence in the preface that states "The scenarios are not intended as projections as there are no established probabilities for their future realization. They simply represent an internally consistent climate picture using certain assumptions about the future pathway of greenhouse gas emissions.
Reviewer 3	Whole document	Everyone knows the AR4 models are seriously flawed. This is why we are spending a billion dollars to do AR5.	We are quite aware of model strengths and weaknesses. We added a few paragraphs summarizing model performance. The NCADAC has decided to use the CMIP3 model simulations as the climate input for the chosen scenarios
Reviewer 3	Whole document	The Deep SouthEast climate is modulated extremely by EL NINO AND LA NINA. While ENSO is mentioned, its importance is not highlighted. Are you aware that AR4 models do not have adequate ENSO events?	We have added a paragraph pointing out this limitation and cautioning that this adds a layer of additional uncertainty in ENSO-sensitive regions
Reviewer 3	Page 11	What is the purpose of this page? It adds nothing to the report.	We believe that it provides a vivid illustration of the complexity of climate variability and how a given location can experience an unusual mix of conditions. We have added a few sentences to clarify this point.

Reviewer 3	Page 12	Maximum Storm Surge map shows data where tide gauges exist. These data are very misleading because hurricanes are rare events. What is the purpose of BOX 2 in this report?	The model-generated surge maps that are being used now rely on information from the gauge network, as do the satellite-derived surge maps, so they are useful. While hurricanes may be considered rare events, the time series of the gauge dataset is long (1880 to present) and the map does provide useful information on where these surge events are greatest along the Gulf Coast (i.e. the FL west coast has a lower risk relative to the northern Gulf Coast due to the natural path of hurricanes around the subtropical high).
Reviewer 3	Page 15	Fires: La Nina drought in Florida causes the main increase in fires from Jan to May of the La Nina year. The fire in June 1997 was a manmade isolated, but big event.	The text should have read June 1998, not 1997. We have corrected this. Yes, the dry conditions in June 1998 and earlier that spring were unusual for an El Nino year, but the wet conditions in the winter that aided in the growth of underbrush were predicted based on El Nino patterns.
Reviewer 3	Page 26	Hurricanes: Current belief by the active hurricane community expects a slight decrease in Atlantic hurricanes with a small increase in intensity.	This section of the document was intended to discuss historical and current conditions, not future projections. The Future Climate Scenarios section is limited to temperature and precipitation. Projections of hurricances, as well as other extreme storm conditions, was not in the scope of these documents. Instead, a series of workshops with their own workshop reports to be published in BAMS was undertaken to address this issue.
Reviewer 3	Page 28	Data from the Gulf Coast (except western Gulf) show no increase in sea level rise beyond the steady state of 2 mm/year. Yet, this paper insists on giving the sat[ellite] data of 3.5 mm/year, which is not occurring along Florida. Yes sea level is rising and will continue to rise.	Perhaps the reviewer is referring to the following document (see: http://www.seclimate.org/pdfpubs/201108mitchum_sealevel.pdf). We would have liked to include this information, but it is not peer-reviewed. A review of Dr. Mitchum's recent peer-reviewed papers does not confirm these numbers. We have already noted that there is variation in sea level rise along the Southeast coast, but we were unable to obtain specific numbers at specific locations from peer-reviewed articles. We have attempted to clarify this in the text on page 27.
Reviewer 3	Figures 1-2	Large Lake, called "Big O" is missing. Needs discussion of N/S gradient.	We have included an outline of Lake Okeechobee in the figures. The north-south gradient in temperature is discussed on pages 3-4.
Reviewer 3	Figure 3	"Big Lake O" shows less rainfall. Why? Hint. No data on lake, method poor.	There may be less precipitation over the lake because of the lake-breeze circulation, which is active over the wet season. Pielke (1974) and Michaels et al. (1987), among others, have published on this and document precipitation shadows over the lake that relate to lake-breeze and sea-breeze interactions. Dyer and Garza (2004) also demonstrated that radar-derived precipitation estimates are not particularly reliable over the lake. Based on the results of these studies, the PRISM model appears to provide physically reasonable estimates of precipitation over and around the lake.
Reviewer 3	Figure 4	In the south snowfall is a rare event. To take 1-2 occurrences and divide by 30 years and state annual rate is 0.1-0.5 inches is very poor science. In addition column bar is very poor.	We have revised this figure to more accurately show the mean annual snowfall across the region, particularly across the northern half of the region where snowfall is much more common. Mean annual snowfall was only calculated for stations that reported at least 15 days of measurable snowfall over the 30 year period of record. Those stations reporting less than 15 days were identified on the map with open circles.
Reviewer 3	Figure 5	Needs discussion.	The top paragraph of page 7 provides a detailed description and discussion of the figure. We have provided more details on the data used to produce the figure in the caption.

Reviewer 3	Figure 6	There are obvious errors in these data. Look at bulls eyes, say SE GA. These data have not been quality controlled.	Temperature and precipitation are affected by local conditions and so it is not unusual to see variations across individual weather stations in these analyses. They provide a more physically accurate representation of the complexity of the patterns. These data are from the GHCN and therefore have been quality-controlled. We have added a statement to the captions regarding local effects such as topography and land cover/use that affect the variability among stations.
Reviewer 3	Figure 7	Very bad column bar. Poor choice of categories.	We have revised this figure to better illustrate the pattern of sub-freezing temperatures across the Florida Peninsula, where this threshold plays such a critical role in agriculture, energy, and water use. We have also revised the color scheme to make the patterns more discernible.
Reviewer 3	Figure 8	Tornadoes are rare. Plotting by county for such a large region only raises incorrect conclusions.	The only conclusions one would take from this map is that tornadoes are rare (as you state) and that strong tornadoes (F2 and greater) have traditionally occurred most frequently in the southwest part of the region (“Dixie Alley”). Neither of these conclusions is in any way misleading. Nevertheless, we state the biases in using tornado counts by county in the caption.
Reviewer 3	Figures 9-10	Clearly shows no increase in rain in region over time. This should be stated in the figure legend.	We chose not to re-state something that is already clearly stated at the beginning of the first paragraph on page 15. However we did add the following sentence in the figure caption "Time series are dominated by decadal scale variability."
Reviewer 3	Figure 11	The legend should tell the reader what is the conclusion from this graph.	This is Fig. 13 in revised version. We added all seasons to the figure. We now state explicity which seasons show statistically significant trends
Reviewer 3	Figure 12	If the data started in 1930, no one would see any trend. This is just decadal variability.	The figure (numbered 21 in revised document) has been revised to show annual values without smoothing. If a linear trend line was fitted to these data beginning around 1930, an increasing trend would still be noted. Just eye-balling the time series shows an obvious trend with decadal variability superimposed on this trend.
Reviewer 3	Figures 13-14	What is the conclusion? There are almost as many negative and positive data.	The conclusion is stated in the first paragraph on page 19: increases in extreme precipitation are most pronounced across the lower Mississippi River Valley and along the northern Gulf Coast. The clustering of “negative” and “positive” data is in regions that show relatively smaller changes over time.
Reviewer 3	Figure 15	No trend. Why not say so in the figure? (except for Florida S.E.)	This figure is numbered 10 in revised document and now includes all seasons. We now state in the figure caption that none of the trends is statistically significant
Reviewer 3	Figure 16	There are no positive or negative temperature trends. Why not state it? (The graph is impossible to read.)	The fact that there are no long term trends is mentioned in the text (page 19). The reference to recent increasing trends is for the most recent decade and is stated explicitly at the end of the first paragraph on page 25 of revised document and in the figure caption.
Reviewer 3	Figures 17-21	Drop these. They have no information.	They do have information – they show the trends in temperature extremes at GHCN stations across the region.
Reviewer 3	Figure 22	Ok	No response required.
Reviewer 3	Figure 23	No error bars. Heat air and it warms up. Model mean is no good for 1950-2000, so why believe it for 2041-2070?	We have changed this map to indicate various categories of model consensus. We disagree about the value of the model data and choose to keep these maps in the climate document

Reviewer 3	Figure 24	Downscaling adds nothing to global model	We agree that the downscaling results are essentially the same as the global models which we acknowledge in the text. However this is not the case for precipitation where the NARCCAP models are somewhat wetter than CMIP3 (see new Figs. 37 and 38, and Table 6). In the text discussion, we note this and provide a possible explanation. Inclusion of the temperature maps (even though there is little difference) is important because it provides some additional confidence in the CMIP3 results. Since NARCCAP results are not available for the B1 scenario and also not for the late 21st Century, we must rely on CMIP3 for those periods.
Reviewer 3	Figures 25-26	I don't get it. Why average over several regional areas to get one number? Just use the global model.	On these figures, each plotted plus sign represents the results for one model simulation and they are mostly from the global models, the dark green symbols being the exception as they represent NARCCAP models. Each plotted value is the change averaged over the southeast region, not several regions. It is not possible to represent all aspects of model variability in one graphic. This method of presentation was chosen as one compact method to represent model variability.
Reviewer 3	Figure 27	No comment. I am getting tired.	No response required.
Reviewer 3	Figure 28	Drop figure - why show all zeros?	Figure has been revised to use custom color scale, which brings out more spatial detail.
Reviewer 3	Figure 29	I don't understand the metric	Metric is explained in text.
Reviewer 3	Figure 30	Now you can show error bars. Why not?	In response to other review comments, this figure has been deleted
Reviewer 3	Figure 31	What happens in real data? In Florida it is well known that the number of frost free days is decreasing. Farmers are planting later and harvesting earlier. The model is already too hot by 2000. We get frost every year in central Florida.	Figure has been revised to show climatology from NARCCAP simulations driven by NCEP Reanalysis data.
Reviewer 3	Figure 32	Very poor column, "all red?"	Figure has been revised to use custom color scale.
Reviewer 3	Figure 33	Units are wrong. You have annual Heating degree days of over 1000? Do I need to explain further?	Annual values of heating degree days are above 1000 across much of the region A definition of heating degree days has been added to the caption. A definition of cooling degree days has been added to the previous figure.
Reviewer 3	Figures 34-35	I think it is well known that CMIP3 precip is very bad. In any event, you show changes +/- 10 percent. Heavens we see this every year or so due to ENSO.	Figure has been revised to show model consensus. This analysis indicates that generally the models do not show statistically significant changes in precipitation or they disagree on the sign of the changes.
Reviewer 3	Figure 36-37	No change, why not drop the figure?	We want to show the extent of the variability of model precipitation. We think this is valuable information for the report authors.
Reviewer 3	Figure 38	Why?	In response to other review comments, this figure has been deleted
Reviewer 3	Figures 39-40	No change. Drop figure.	Figures have been revised to use custom color scale; changes can now be seen.
Please provide any additional suggestions or recommendations.			
Reviewer 3	Whole document	No comment given	No response necessary.

Reviewer	Referring To	Comment	Response
Does the document address relevant features of the climate of the region?			
Reviewer 4	Whole document	Yes and no. See response below.	No response necessary.
Does the document incorporate the best information available?			
Reviewer 4	Whole document	Yes. It uses the IPCC AR4 model information, NARCCAP, statistically downscaled data (BCSD) and supplements with observations archived at NCDC.	No response necessary.

Are data and information presented in an accurate and clear manner?

Reviewer 4	Whole document	No. The presentation is misleading and plain wrong.	We have responded to the reviewer's specific comments regarding presentation below.

Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.

Reviewer 4	Figure 12	If authors are claiming a trend as in lines 425-426 then they are obligated to show that the trend passes statistical significance test.	We have carried out a statistical test on this data. Trend line is displayed and text updated.
Reviewer 4	Figures 13-14	Likewise differences shown in Figs. 13 and 14 should pass statistical significance test.	We have carried out statistical tests on Figs. 13, 14. The figure captions now includes the results of the field significance test
Reviewer 4	Figures 18-21	Similarly Figs. 18, 19, 20, 21 need to show only those differences that are statistically significant	We have carried out statistical tests on Figs. 18-21.The figure captions now includes the results of the field significance test
Reviewer 4	Figurea 13-14, 18-21	Unlike Fig. 22, which is reproduced from a peer reviewed journal, all the above mentioned figures are generated by the authors. Therefore I would insist that they do statistical significance test.	We have carried out statistical tests on these figures. See comments above. The figure captions now includes the results of the field significance test
Reviewer 4	Section 3	The entire section on regional outlook is misleading. The authors have to realize that climate prediction or projection is probabilistic in nature. It is simply wrong to portray climate projection in a deterministic manner as is done in many of the figures of this section 3 (e.g. Figs 23, 24, 27, 28, 29, 30,31, 32, 33, 34, 35, 38, 39, 40).	Specific maps have been regenerated to now show the model variability and degree of model consensus, using the Tebaldi et al (2011) scheme. See the comment on line 15 above. Additional graphical products display variability. The purpose of Figs. 25, 26, 36, and 37 (28, 29, 39, and 40 in revised document) was as a complement to the multi-model mean, showing the variability. We have indicated that the interpretation of the multi-model mean maps needs to consider the information presented in these figures.
Reviewer 4	Section 3	There is no reference or discussion of the merits and deficiencies of the individual models. This is an important aspect of the document that I feel cannot be ignored. Show the performance of the individual and multi-models in the 1971-2000, especially for the high impact weather events for the region. Also have a discussion of the climate sensitivity of the models (see below).	Text has been added to the introductory material, summarizing information in the IPCC AR4 about model merits and deficiencies. In addition, a section with several figures has been added which compares time series of observed temperature and precipitation with time series from model simulations. These are included for all four seasons and the year as a whole.
Reviewer 4	Section 3	There is a great debate in the community of climate scientists on judging a “good” from a “bad” model. The authors seem to be oblivious of this or have ignored. I would refer the authors to read Knutti et al. (2008) as a start on this debate. There are many more who have chimed in on this with differing opinions.	We are aware of such discussions. We have added a paragraph at then end of the introduction summarizing the issues with multi-model means. In addition, we have adopted a scheme proposed by Tebaldi et al (2011) to display the nature of model variability and consensus.
Reviewer 4	Section 3	What is A2, B1 scenario? Where do we currently stand relative to either of the two scenarios. Why are these two scenarios chosen. Again these discussions are necessary to properly inform our anticipated readers with diverse backgrounds.	Text and graphic on scenarios added to beginning of section.
Reviewer 4	Section 3	IPCC AR4 said it was “extremely likely” (>95%) that warming trends of the global mean surface temperature was from external radiative forcing from the anthropogenic injection of greenhouse gases in our atmosphere. They were not as confident about regional climate change. There is a physical reasoning for this. It stems from the fact that we can define the global climate sensitivity mathematically (although admittedly there are issues for determining this quantity even). For regional climate sensitivity this is not as straightforward as boundary flux terms also can play an important role.	In these regional documents, we are not addressing attribution issues relative to historical trends and variations. We are presenting the climate model simulations of the 21st Century for use by the assessment report authors and are including information about the regional inter-model variations of these simulations. Our intent is that there is sufficient information in the report about model variability that the authors will be able to make appropriate use of the information.
Reviewer 4	Section 3	What is the validity of the multi-model mean? Is it an accepted norm to use multi-model mean especially for climate projections, when these models display a huge range of climate sensitivity? I would comfortable showing the plots with the spread. Are the differences between the current and future climate more significant than the model spread?	As noted above, we have developed some additional graphics designed to address these issues. Most importantly, the CMIP3 maps showing future simulations now include information that addresses model consensus and the statistical significance of future changes relevant to the variability of the historical climate.

Please provide any additional suggestions or recommendations.

Reviewer 4	Whole document	The report up to the first 14 pages is well written. These pages give a good succinct description of the climate of the region and the climatology of the high impact weather events. The overall quality of the figures are also very good and appealing.	No response necessary.
Reviewer 4	Whole document	This report will be read by a cross-section of people across disciplines who are not going to be necessarily climate experts. Therefore I strongly feel that the document should pass a high bar of rigor.	We have responded to the reviewer's specific comments above.

Reviewer	Referring To	Comment	Response
Does the document address relevant features of the climate of the region?			
Reviewer 10	Whole document	I thought the document did a good job summarizing temperature and precipitation climatology and projected changes. However there are other relevant features of the climate of the Southwest that are neglected. Here is a brief list of climate features of the Southwest that have significant societal importance that would be relevant to a subsequent impacts assessment, yet are addressed minimally, if at all, in this chapter on scenarios: 1) Runoff: The Southwest is an arid location with a growing population, and climate change is likely to result in more arid conditions. Yet variability and changes in runoff are barely addressed here. Precipitation and temperature are addressed separately, but runoff is a complex combination of the two that can have some non-obvious features, especially once snow is included. Research on this includes works such as Gleick 1987 Climatic Change v. 10 p. 137; McCabe and Wolock 2007 Geophys Rev Let v. 34 p. L22708; Seager et al. 2007 Science v. 316 p. 1181; Christensen and Lettenmaier 2007 HESS v. 11 p. 1417; Barnett and Pierce 2009 Proc Nat Acad Sci v. 106 p. 7334; Rajagopalan et al. 2009 Water Resources Research v.45 p. W09201; etc. It's hard to imagine that a subsequent assessment of climate impacts in the Southwest could be meaningfully done without considering scenarios of runoff change. 2) Winds: The topic is barely mentioned in the chapter. Yet wind, and changes in winds, have a number of important effects that should be considered in a subsequent impacts assessment. For example, Santa Anas have important economic and societal implications through their role in driving destructive wildfires, yet are not even mentioned. Presumably Santa Anas are only found in the Southwest, so I'm not sure why they would be described in another chapter rather than this one. There has been some research that suggests that in the future Santa Anas will become less frequent and intense but hotter and drier. Winds also drive evaporation, and changes in evaporation might be critical to the Southwest. Will wind-driven changes exaggerate or mitigate temperature-driven changes in evaporation? Finally, our research unit has gotten continual interest from the energy industry about possible future changes in winds, and what that might say about the advisability of wind-driven power generation. I	The reviewer identifies elements of the climate of the Southwest that are important. A fully comprehensive description of all climate features of interest was beyond the scope of this document. Regarding the specific features identified: (1) An analysis of hydrologic variables was beyond the scope of these documents; 2) analysis of wind data confronts some challenges, the most important being the high sensitivity of wind measurements to station siting and the consequent lack of long homogeneous records. We are not aware of definitive work examining trends in wind. However we have added two sections (new 2.3.5 and 2.4.8) on Santa Ana winds. 3) As noted above, an analysis of hydrologic variables was beyond the scope of these documents; 4) & 5) An analysis of coastal features (marine layer and upwelling) was beyond the scope of this report.
Does the document incorporate the best information available?			
Reviewer 10	Whole document	I think mostly it does. There are various papers in review that are relevant, but it's not fair to hold up a report such as this for them to appear since there will always be relevant papers set to appear shortly. Likewise, I don't fault the chapter for not including CMIP5 simulations, seeing how delayed those have been.	No response necessary.
Are data and information presented in an accurate and clear manner?			
Reviewer 10	Whole document	Yes.	No response necessary.
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
Reviewer 10	Page 5, Line 134	"hence" makes it sound like 10-20 years after preparation of this document, is that what is meant? I believe the intended meaning would be clearer if it said "afterwards" instead of "hence".	Change made.
Reviewer 10	Page 6, Line 177	"the region has seen a steady increase in average overnight minima, as noted earlier...": I don't see where this is noted earlier. Up to this point no trends have been discussed.	The reviewer is correct. We have changed to point to the following section on Climatic Trends.

Reviewer 10	Page 6, Line 180	“Obviously a warm event in the cool portion of the year has fewer consequences than in summer...”: This seems speculative to me, not obvious. What if a big winter storm dropped rain instead of snow, causing extensive flooding? Even if it didn’t cause flooding the water might be allowed to run out to the sea instead of being retained in reservoirs, according to current operational practices, and contribute to water shortages later in the year. Also, my understanding is that overly warm winters can be harmful to some fruit and nut crops, which are valuable to California. I’d omit this sentence.	We have removed this sentence.
Reviewer 10	Page 6, Line 197	Suggest saying “as LARGE as any in the US” (or “intense”) instead of “as IMPRESSIVE”.	We made the suggested change.
Reviewer 10	Page 6, Line 205	I find the phrase “continues to settle southward” confusing. Are you saying that the storm track is shifting to the south? That’s what it sounds like. As far as I know, it’s actually shifting north.	we are referring here to the annual climatological cycle. We have change the text to be more explicit.
Reviewer 10	Page 9, Line 306	Back on line 181, the text states “In much of the region, summer temperatures have not shown appreciable trends up to the turn of the millennium.” Here, referring to Fig 4, the text says “Annual temperature has generally increased over the past 115 years...” Is the distinction simply between summer temperatures and annual? Together, without more information, these two statements seem discordant to me. It would be useful to add clarifying text.	We have now included seasonal graphs for all four seasons and revised this text to more accurately reflect this figure.
Reviewer 10	Page 9, Line 314	“For maximum, minimum, and mean temperatures, the recent 10-yr averages all surpass any previous value by a considerable margin”: If we look at the last blue dot on the T maximum plot (Fig 5, upper) it’s about 67.5 F or so. The values in both the 1930’s and 1950’s reached 67.3 F or so. I think it’s stretching it to say “by a considerable margin” for the maximum temperature, and would reword the sentence accordingly.	We have removed this phrase.
Reviewer 10	Page 10, Figure 4 (top panel)	Units look off to me. Text suggests a mean of 15.4 inches (line 292) but from the plot it looks like 1.4 somethings?	The units in the figure are inches/month. We have redrawn this figure so that is shows the total precipitation and thus matches the discussion in the text.
Reviewer 10	Page 15, Figure 10 and Lines 383-387	This factoid about the Great Salt Lake seems disconnected from the logical flow of the document. What is the importance, significance, or implication of Figure 10? If you are looking to cut material, I’d suggest this figure first.	We think it is a useful graph because it illustrates a metric which is an integrated response to climate variations. We have added several sentences to this section to provide motivation for inclusion of this graph.
Reviewer 10	Page 16, Line 413	“...each model’s data...”: The models are mentioned here but described below. It would make more sense to reverse this order, saying what models are being used before describing how the model data is being used. Otherwise, when you read this line (413), the natural question is, what models are we talking about?	Changed order of paragraphs as requested.
Reviewer 10	Page 16, Lines 440-443	How is this different from the BCSD method, which typically uses adjusted historical analogue months to provide daily data from the monthly model averages? If this is some different technique, a reference should be provided. Were these data bias corrected?	Text revised to clarify that BCSD method was used to produce the monthly values and are thus bias-corrected. Historical analogue months provided the daily data associated with the monthly values (reference included) and the daily data from these analogue months are also adjusted to remove biases; this is indicated by the text 'Daily statistically-downscaled data were then created by randomly sampling historical months and adjusting the values using the “delta” method"' (Section 3.1).
Reviewer 10	Page 20, Line 515	“The range of individual model temperature changes is large relative to the differences between seasons....”: This is true but as stated may be slightly misleading. I suspect each individual model (or at least a clear majority of them) shows more summer warming than winter warming, so in that sense the seasonality result is likely robust. The wording makes it sound like the seasonality result may not be robust.	Re-worded sentence to avoid misinterpretation.

Reviewer 10	Page 21, Table 1	Column titles are slightly odd since 3 are percentiles and two aren't. I suggest using "lowest" and "highest" instead of "low" and "high" to at least try to make this more obvious. Otherwise, the question it raises is "what percentile is a 'low' percentile?".	Made change as suggested.
Reviewer 10	Page 27, Line 644	"A metric which has increased significantly over the past century": Sentence fragment, perhaps replace with "This metric has increased significantly over the past century."	Edited text as suggested.
Reviewer 10	Page 32, Table 3	Title says "mean" but median is shown (along with selected percentiles).	Table caption edited to avoid misinterpretation.
Reviewer 10	Page 32, Line 714	"...the largest decreases occurring in northern California...": it would be more accurate to say "...the largest decreases occurring over the Sierra Nevada...".	Edited text as suggested.

Please provide any additional suggestions or recommendations.

Reviewer 10	Whole document	I'm not sure if the overall structure of the National Assessment scenarios report precludes it, but this chapter would benefit greatly from a succinct listing of the key points and findings, either at the beginning or the end. The chapter as it stands is quite detail oriented, which is not bad, but does make it so that you have no choice but to read the entire thing even if all you want is an overview of the most salient points.	Added summary section.

Reviewer	Referring To	Comment	Response
Does the document address relevant features of the climate of the region?			
Reviewer 17	Whole document	Generally speaking, yes. (But see comments below regarding historical trends in snowpack, etc.). The introduction to the national summary (pgs 3-4) is quite good, and likely to have applications far beyond the NCA. On the whole the discussion of the climate projections is quite good, though I have provided some specific suggestions in the "comments" section below That said, the report definitely has a Midwestern and Eastern bias/feel to it. This is not a show stopper by any means. But, I think it's clear that adding someone with more Western water resources/snowpack hydrology expertise to the writing team would have resulting in a product with a noticeably different look and feel. Again, this doesn't mean the report shouldn't move forward, but definitely something to think about over the next four years.	Most of the graphics (34 out of 42) are nationally focused. Of the remaining eight, two focus on West/Southwest and the remaining six focus on Midwest/East. So perhaps there is a slight imbalance. However, overall the report does not concentrate more heavily on the east than the west.
Does the document incorporate the best information available?			
Reviewer 17	Whole document	The summary of station data (ie, temp and precip summaries) and of future projections do in fact use the base information available. However, the discussions related to specific climate indicators (eg, snowpack, streamflow, etc.) are somewhat lacking. See comments below.	The scope of these documents was to provide a consistent (across the regions) analysis of a representative subset of climate variables. An analysis of all variables of possible interest was beyond our scope.
Are data and information presented in an accurate and clear manner?			
Reviewer 17	Whole document	Yes. The projection maps (page 24 onward) are quite good. From an aesthetic standpoint, I would have preferred that the authors use something other than MS Excel to create many of their charts and graphs (Line see figure 8, pg 11). I suspect that many of these figures will find their way into briefings and presentations for years to come. So, why not present them at the highest, most professional quality possible? My two cents, and this doesn't change the accuracy or clarity of the presentation.	Graphs have been remade using IDL where possible.
Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.			
Reviewer 17	Page 17	The section on paleohistory should either be expanded to include a larger swath of the US, or left out entirely. There are now many tree-ring based hydroclimatic reconstructions for rivers across the US (particularly in the West), and not all of these records tell the same story that we see in the Colorado River. Moreover, Ed Cook and others have produced a wonderful paleodrought atlas for the entire US. Discussion of this atlas would give the report a much richer geographic context, and the records still span >1000 yrs.	We agree that a more complete discussion would be useful. However, since this is not our area of expertise, we decided to follow the reviewer's alternative suggestive to leave out entirely.
Reviewer 17	Page 17	The discussions of "inland hydrology" and "snow depth" (do the authors really mean snow cover or SWE?) starting on pg 17 are very poor compared to the rest of the report. Focusing on a small part of New England is absurd given that 1) related trends/changes are so incredibly important in the western US, and 2) many regional to national scale summaries are available [google Greg McCabe's work, for example]. Overall, these pieces are very weak.	Since the focus of the report is on climate, and not hydrology, we have deleted this section.

Reviewer 17	Page 14	On a similar note, the focus on water levels in the Great Lakes and Great Salt Lake seems overly region-specific. I can understand why these bodies of water might be featured— it's hard to find lakes that are not heavily dam-regulated for starters. However, would be great to spread the attention around the 48 states a bit.	These lakes are natural and large and their levels are primarily driven by climate conditions. They thus provide an integrative metric of climate conditions There are no other lakes of comparable size. The Great Lakes are the most important lake system in the U.S. and an emphasis on this system is warranted. The long record of the Great Salt Lake provides a unique climate perspective for the intermountain West. There are no other lakes in the U.S. with such important attributes. We have added some text to better justify our rationale.

Please provide any additional suggestions or recommendations.

Reviewer 17	Page 22	The only glaring omission I saw in the "national outlook" section (pg 22 onward) was the lack of a graphic showing change in number of days with tmin < 32F. This is a critical threshold in many parts of the West, particularly in locations where the hydrology is dominated by snowmelt and runoff. Figure 29 does get at something similar, but misses the mark in terms of understanding impacts on water management (again, particularly in the West).	We have added a figure for number of days with Tmin < 32F.

Reviewer	Referring To	Comment	Response

Does the document address relevant features of the climate of the region?

Reviewer 18	Whole document	Mostly, although the discussion is kept to the regional and national scale, with no discussion of smaller scale features, which is where "the rubber meets the road" in terms of impacts.	The purpose of this document was to provide a large-scale analysis. This is meant as a complement to the other eight regional documents whose focus logically is more on the smaller-scale features.

Does the document incorporate the best information available?

Reviewer 18	Whole document	This paper describes the features of US climate in a fairly general way, keeping the discussion at the regional and national scales. While it is not possible to go into much detail on specific smaller scale features in a piece of this length, a general discussion of this scale is warranted. It seems insufficient to simply state the grid resolution of the GCMs and RCMs. I would really like to see this translated into a statement of the known climatic patterns they do not capture as a result of their relatively coarse resolution. Features at the landscape scale, well below the 50-km NAARCAP resolution, remain largely unmodeled by RCMs. There is now enough literature on very small-scale climate variability to make for a topic worth discussing, as examples of the limitations of the current state of knowledge. Below are three example references. One of the main themes of these papers is that it is no longer sufficient to just show a projected temperature delta. To fully understand the impacts of that delta, especially in complex terrain, it needs to be accompanied by additional information on projected changes in the distribution of upper-air circulation patterns, which may dramatically alter temperature patterns on the ground. However, before those circulation projections are to be trusted, modeled patterns for historical periods must compare reasonably well with observed patterns. I do not believe such comparisons have been made in a systematic way. Ashcroft MB, Chisholm LA, French KO. 2009. Climate change at the landscape scale: predicting fine-grained spatial heterogeneity in warming and potential refugia for vegetation. Global Change Biology 15: 656–667. Daly, C., D.R. Conklin, and M.H. Unsworth. 2010. Local atmospheric decoupling in complex topography alters climate change impacts. International Journal of Climatology, 30, 1857–1864. Pepin, N., C. Daly, and J. Lundquist. 2011. The influence of surface/free-air decoupling on temperature trend patterns in the western U.S. Journal of Geophysical Research – Atmospheres, 116, D10109, doi:10.1029/2010JD014769.	Landscape issues are a very complex topic, as noted by the reviewer, and the importance of such issues is undeniable. This is very much on the cutting edge of climate science. Detailed treatment of these issues is beyond the scope of this document.

Are data and information presented in an accurate and clear manner?

Reviewer 18	Whole document	Overall, the figures and tables are adequate, except for those discussed in the detailed comments below. I have also noted overuse of the term “impact,” which limits the presentation in several places.	Several instances of "impact" have been reworded. We have responded to the reviewer's specific comments on figures and tables below.

Please provide detailed comments with reference to specific page numbers and paragraphs, figures or tables.

Reviewer 18	Line 103	A citation is needed to back up the statement that tribal populations are more vulnerable to climate extremes.	The paragraph on Native American tribes was removed.
Reviewer 18	Line 111	The implication here is that an increase in >=$1 billion claims is due to climate change, but it seems that changes in infrastucture, population increases, etc. could be major factors as well. These may need to be mentioned to cover the bases.	We added a sentence and two references, making this point.
Reviewer 18	Lines 150-162	Have there been any significant man-made changes to the Red River system (dams, diking, channelization) that could have played a role in the increase of flood events? Would be good to add a statement on this, one way or the other.	This section has been removed.
Reviewer 18	Line 199	Tuscaloosa is the elephant in the room when talking about tornado disasters. It would be remiss to not add a sentence on that tornado disaster.	This paragraph was changed to specifically refer to the Tuscaloosa and Joplin tornadoes.
Reviewer 18	Line 202	What does “smaller in size” mean? Too small to be damaging?	This was changed to "too small to cause much damage".
Reviewer 18	Line 207	Use other words instead of “impacts.” If you find yourself using it, you are probably not using a more precise term that would be more specific and informative.	Changed to "modulates".

Reviewer 18	Lines 210-211	I don't see how high humidity during a heat wave would stress crops more than low humidity. The next sentence seems to underplay the effects of dry heat in the West. Overall, this paragraph needs to be more balanced and re-written.	We have removed this discussion of humidity.
Reviewer 18	Line 216	"Impacts" doesn't say anything. Perhaps something along these lines: "...portions of the central U.S. seriously affected the livelihoods of many people, through crop and livestock failures, depletion of water supplies, and more."	We have reworded as suggested.
Reviewer 18	Line 223	Start the sentence with "During most winters,"	Changed as suggested.
Reviewer 18	Lines 229-230	The first two sentences of this paragraph repeat the effects on agriculture. Need to re-write. There is that "impacts" word again.	This paragraph has been removed.
Reviewer 18	Line 231	Use "delay" rather than "impact." Say "replanting of damaged crops" rather than just "replanting."	This paragraph has been removed.
Reviewer 18	Line 232	Try "reduce" rather than "negatively impact"	This paragraph has been removed.
Reviewer 18	Line 254	Add "across the coterminous United States" after "precipitation."	We made this change.
Reviewer 18	Figure 8	It's a little scary to see linear trend lines on these diagrams. For example, the precipitation trend line is unduly influenced by the first and last few years of the record. I know everyone still uses these things, but I don't know anyone who thinks they are very meaningful. An alternative, or added, feature, would be a moving average, perhaps 10 years worth, which would highlight some of the important cycles that have occurred over the past century, and that are sometimes referred to in the text. I won't press the issue, but it seems like the time has come to try something new.	We have added a statistical analysis of trends. This analysis used non-parameteric methods that are not unduly influenced by the end points. This analysis was done by region and showed that, for the most part, trends are not statistically significant.
Reviewer 18	Line 407	Do you really want to talk about adaptation here? It seems a little out of place.	This section has been removed.
Reviewer 18	Line 439	I was expecting to see some data from West Coast sites to give a kind of balance to the picture. Are any available which could be added here?	This section has been removed.
Reviewer 18	Figure 19	This plot does not show a convincing decrease in snow depth. The curve looks lost amidst all that scatter. Can this be re-plotted to show a stronger visual picture?	This figure has been removed.
Reviewer 18	Figures 22-23	As is so nicely done starting in Figure 26, it would be really informative to show plots of the 1971-2000 control maps in addition to the change maps. These plots will provide the reader with a realistic assessment of the spatial features that are and are not captured by the models.	In the interest of space, it was decided not to include the control maps, as these figures each already contain 5 or 6 panels. In addition, Fig. 1 already provides the base climate for Fig. 22.
Reviewer 18	Figure 24	Define the acronyms in the legend.	New figure caption with acronyms defined.
Reviewer 18	Lines 609-619	It looks like this paragraph was in the middle of being edited when it was saved. Omit "impacts" in lines 613 and 616.	Paragraph re-worded.
Reviewer 18	Figure 28, Line 656	This says consecutive days above 95F, whereas the previous figures do not say consecutive. If true, it seems inconsistent with the others.	It is indeed consecutive days and the others are not. This particular metric was computed as a possible heat wave surrogate and complements the figure showing total number of days above 95F. The results are very similar and this is an important point we want to make.
Reviewer 18	Lines 717-718	Of course the range in percent summer precipitation change is large in southern California; the mean is nearly zero! These anomalies have very little, if any, meaning.	Very true. We have deleted that sentence.
Reviewer 18	Figure 34	The zero line on the y axis should be shifted down to the center of the graph. It looks out of place so far above center.	We have re-drawn this figure such that the zero line is much closer to the center of the y-axis.
Reviewer 18	Line 769	"Extreme precipitation measures" sounds like climatological doomsday. Might want to replace this sentence with: "The frequency of such extreme precipitation events has been increasing throughout the U.S. since 1991." Also, a citation is needed.	Re-worded text and added reference.
Reviewer 18	Line 775	Replace "large impacts" with something more specific and informative.	Changed to "reduce soil moisture levels and put stress on plants".

Please provide any additional suggestions or recommendations.

Reviewer 18	Whole document	There is currently no section that describes the limitations of the projections. This might be the best way to incorporate a discussion of the scale limitations I referred to above.	Text added to inroduction section.