

Chapter	Responder	Page	Line(s)	Comment	Reviewer	Notes
General	Fitzpatrick			<p>All three chapters (6,7, and 8) are very well done and based on solid science, as might be expected from the high caliber of the authors (who are to be thanked for such monumental efforts). All three chapters surpass the criteria set forth for the reviews. I was especially pleased to see appropriate doubts expressed about several issues I see as contentious:</p> <p>---The (probably small) role of solar changes in the warming of the last 100 years</p> <p>---The sense that human impacts on climate have only recently begun to emerge from natural variability.</p> <p>---Uncertainties about Bond's work on Fe-stained quartz, the inferred 1500-year cycle, and a possible link to solar forcing. The authors of both chapters 7 and 8 expressed this uncertainty in an appropriate way.</p>	a	<b>Noted</b>
General	Ch. 4 Fitzpatrick Ch. 5 Brigham-Grette / Miller			Numerous places refer to slow, long-term processes changing CO <sub>2</sub> but the background seems a bit brief (Ch 4, pg 15, ln 297-307: plate tectonics, weathering and volcanoes; Ch 5, pg 3, ln 41-42: cooling attributed to GHG decrease; Ch 5, pg 14, ln 282-284: complex changes in ocean-atm changed CO <sub>2</sub> ; Ch 5, pg 40, ln 872-875). A slightly more extensive primer on this topic would be helpful.	b	<b>Noted</b>
General	Fitzpatrick			Location maps are much needed, both for basic geography but also topography and bathymetry (in particular, Chapter 7). It is very difficult to appreciate the shallowness of peripheral Arctic seas or the relative position of shelf fans to Greenland outlet glaciers with no supporting figures.	b	<b>Accepted. Figures will be supplied during the technical edit.</b>
General	Leads as indicated in individual chapters please.			Continental drift vs plate tectonics: Usage of “drifting continents” feels fuzzy, especially since “continental drift” has effectively been replaced by “plate tectonics”. “Drift” may also have implications of randomness that don’t really apply. This comment applies in numerous places in the document: Ch 3 (pg 7, ln 152), Ch 4 (pg 5, ln 77-78; pg 14, ln 290; pg 16, ln 333; pg 19, ln 407), Ch 5 (pg 41, ln 897, 927), Ch 6 (ph 2, ln 22, 28; pg 22, ln 645-646).	b	<b>Taken into account in chapters</b>

General	Alley			Might it be useful to summarize how this report has advanced what is known about this mated beyond what was published by IPCC in 2007? A summary of open research questions/topics would also add value.	b	<b>Accepted. Section added.</b>
General	Fitzpatrick			For the most part, the text should be accessible to a reasonably informed non-specialist, though there are still a few tough spots here and there. With respect to the goals of the Prospectus, I believe all the questions can be answered positively.	b	<b>Noted</b>
General	Fitzpatrick			There is always a fine line between providing too little and too much information when describing particular results/conclusions/recommendations, but I feel the authors have overall managed to keep within a reasonable distance of the desired level of detail. Thorough references to the literature (past and present) provide more than adequate additional opportunity for the reader to delve more deeply.	b	<b>Noted</b>
General	Fitzpatrick			I found, that the scope of the report reflects very well the intent of the Prospectus and all mateds are clearly described in the report. All aspects of this charge are fully addressed. The authors do not go beyond their expertise.	c	<b>Noted</b>
General	Fitzpatrick			Evidences, analyses, and arguments adequately support the conclusions and recommendations of the report. Uncertainties or incompleteness in the evidence are explicitly recognized	c	<b>Noted</b>
General	Fitzpatrick			In my opinion, the report is not always appropriately balanced. Different sections have a very different level of complexity and comprehensiveness. For example, the use of a loan example to explain positive feedbacks and the discussion of the use of biomarkers for seawater temperature estimates have a very different level of comprehensiveness and addressed to a different level of the readership.	c	<b>Noted, will be addressed by USGS in technical edit</b>
General	All leads please take note!			Throughout the entire document it is important to be more specific when warming or cooling is mentioned: is this warming/cooling just for the summer time or for the entire year? Most of the time it is just for the summer and it should be specifically mentioned every time.	c	<b>Taken into account - see individual chapters.</b>

General	Fitzpatrick			Some of the report's findings are based on the collective opinions of the authors. Every time it was acknowledged, and the scientifically defensible reasons were given how those conclusions were made	c	<b>Noted</b>
General	Fitzpatrick			The scope and intent are within the intent of the Prospectus and are clearly described in the report.	d	<b>Noted</b>
General	Fitzpatrick			2) Are all aspects of this charge fully addressed? Do the authors go beyond this charge or their expertise? All the aspects seem to be addressed. It is difficult to judge whether the authors have gone beyond their expertise without knowing all authors or having read their contributions.	d	<b>Noted</b>
General	Fitzpatrick			3) Are the conclusions and recommendations adequately supported by evidence, analysis, and argument? In general, conclusions are well supported by evidence or by references to the literature. The analyses and argumentation are essentially uneven throughout, and this is the obvious consequence of having many authors each contributing their part. There is an obvious need for a main editor to bring continuity to the text, to make an effort to bring unity to the narrative. I have marked sections that I believe require this effort more than others in chapters 4,6, and 7.	d	<b>Taken into account as noted in individual chapters</b>
General	Fitzpatrick			4) Are the information and analyses handled completely? Completely is difficult to say, but information and analyses are plentiful throughout, though their quality is not uniform. To be more specific, the authors often seem to lose sight of who their audience is. Within the same page or chapter the narrative switches from heavily specialized, full of lingo, and profusely referenced, to the most pedestrian analogy or 'explanatory' argument that seems directed to a very unsophisticated audience. Most of these otherwise well-intentioned attempts fail or fall short of their mark. To paraphrase Einstein, things can be made as simple as possible, but not simpler. The use of analogies and similes is always welcome, but it has to be done intelligently and precisely. In order for an analogy to work it has to invoke some familiar event and then link it with the unfamiliar; and it needs to do it in a way that motivates further interest in the subject. (continued...)	d	<b>Noted, will attempt to level the treatment in technical edit, but multiple authorship makes creating uniformity highly problematic.</b>

General	Fitzpatrick			The risk is to hopelessly confuse the reader by creating an ‘understanding’ that not only is wrong, but that will persist for a long time creating unsolvable contradictions. Since the authors use many of these throughout (including one especially bad that uses credit card debt as analogy) it is important that these are carefully revised. Even an intelligent, well educated scientifically literate reader can be totally misled by a bad	d (continued)	(see above)
General				5) Are uncertainties or incompleteness in the evidence explicitly recognized?  Not always, and not uniformly. Again, the most obvious flaw is the lack of uniformity in the narrative/emphasis/discussion details. This is not surprising in a collective effort, but in order to be effective it needs a thorough editing job. I have noted a case in which the uncertainties in the aerosol forcing are not discussed (section 4.2.2). This is of great importance and the report should fairly handle this uncertainty least it becomes easy target of politically motivated criticism.	d	<b>See comment in Chapter 4 for response. Footnote on uncertainty added in Chapter 9.</b>
General	Fitzpatrick			6) Are the report’s exposition and organization effective? No. The organization makes one lose bearings quite quickly. Is the title appropriate? Yes, but it could be shorter and sexier.	d	<b>Noted. Organization addressed in USGS technical edit. Title mandated by CCSP.</b>
General	Fitzpatrick			7) Is the report appropriately balanced? Is the report’s tone impartial and devoid of special pleading?  It is not clear what is meant here by “balanced” The tone, in most of what I read, is impartial.	d	<b>Noted</b>

General	Fitzpatrick		<p>8) Are any of the report's findings based on value judgments or the collective opinions of the authors? If so, is this acknowledged, and are scientifically defensible reasons given for reaching those judgments?</p> <p>I did not find any glaring examples of personal opinion trumping science. But, there is an obvious insistence on citing just a small group of authors and ignoring others who may have contributed as much to the synthesis and argument discussed. It is clear that there are only relatively few Arctic specialists, so it is expected that some will be cited profusely. On the other hand the report usually makes general statements with global implications without really making an effort to summarize the abundant literature on many subjects that are not necessarily Arctic-based. Specifically, there is constant referencing of articles by members of particular research groups, e.g., Penn State, whether or not the reference is relevant. This is somewhat disturbing.</p>	d	<b>Noted. Of the nearly 500 references cited in Chapter 5, 16 have a current Penn State employee as first author; of the nearly 300 references cited in chapter 7, 18 have a current Penn State employee as a first author. Because Penn State is one of the larger groups, and because one of the Penn State employees is "highly cited" as listed by ISI, some citations to work of the group is unsurprising.</b>
General	Fitzpatrick		In general I find the report highly stimulating, very informative, securely based on relevant science, but poorly organized, way too long and poor in illustrations (both number and relevance).	d	<b>Noted</b>