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Best practice approaches for characterizing, communicating, and incorporating scientific uncertainty in decisionmaking

Public Review Comments on Draft Prospectus for Synthesis and Assessment Product 5.2



Also available: CCSP Synthesis and Assessment Products. Four-page background document (dated September 2007). In addition, it is available as a PDF file and can be ordered in hardcopy from the GCRIO Online Catalog

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General Comments

General Comments from Eric Holdsworth / William L. Fang

According to the draft (p. 2, lines 10-13), the Strategic Plan for the Climate Change Science Program (CCSP) defines uncertainty (apparently for climate change purposes) as “[a]n expression of the degree to which a value (e.g., the future state of the climate system) is unknown” [footnote 1] (emphasis added).

The draft adds:

The level of certainty in the projections of climate change and its effects has emerged as a central issue in the public discourse, reinforcing the need to evaluate current methods and to define best practices for assessing uncertainty. The scientific community -- which includes researchers from academia, government, and the private sector, as well as scientific and operational agencies – are looked to by policymakers, decision makers, and the media for “answers” (or insights) about trends, rates, impacts, and adaptation options related to climate change.

[footnote 2]

The climate research community has taken steps in recent years to explain the nature of uncertainty in their assessment efforts. *The Intergovernmental Panel on Climate Change (IPCC), the largest international climate assessment effort, recognized the need for a more formal, decision analysis-based treatment of uncertainty in Chapter 11 of its report on Climate Change 1995: The Science of Climate Change (McBean et al., 1995). In response to this need, recommendations for reporting uncertainty were developed for the authors of the IPCC Third Assessment Report (TAR) and the ongoing Fourth Assessment Report (AR4).*

(Emphasis added.)[footnote 3]

The draft then states (p. 3) that the intention of Synthesis and Assessment Product (SAP) 5.2 is "to further develop this topic through the synthesis, assessment, and communication of what is known about the character of uncertainty (as it applies to climate), and to address some potential approaches to decision making under uncertainty." It adds that the "report will address uncertainty dimensions that are inherent to the full spectrum of decision support activities, ranging from the conduct and communication of research to the actual consideration and use of scientific knowledge and information products in decision making." It emphasizes that the SAP "is designed to address two distinct purposes and audiences" as follows (p.3):

One purpose of the report is to synthesize and communicate the current state of understanding about the characteristics and implications of uncertainty related to climate change and variability to an audience of policymakers with an interest in developing a fundamental understanding of the issue. . .An increased awareness and understanding of the characteristics of scientific uncertainty as applied to climate is a critical step in this effort.

The second purpose is to provide recommendations for best practices for characterizing, analyzing and communicating uncertainty for scientists, science managers, and technical operational entities involved in conducting research and assessments, and producing climate information in the context of decision support, based on a thorough, state-of-the-art assessment of the current state of understanding.

(Emphasis added.)

As to both purposes, we question why the intended “audiences” are apparently limited, in one case only to “policymakers” who are interested “in developing a fundamental understanding of the issue,” and in the other to “scientists, science managers, and technical operational entities.” [footnote 4] The purpose should be to broaden the audiences to include, among others, decision makers and affected representatives of, for example, industry, business, agriculture, workers and non-governmental organizations, as well as the media and the general public.

- **Response:** *The initial Prospectus language was not intended to preclude interest in this largely methodological paper on the part of a broader suite of stakeholders. The text in the final Prospectus has been modified to reflect the breadth of potential readers (page 3, line 13, and page 3, lines 34-35).*

Lastly, the draft states that the SAP “will address” a series of questions (p. 4) “in the context of climate change and variability.” While the listed questions are probably useful, there is no indication that there must be “balance” in scientific and other assessments, reports, etc. in order to ensure that uncertainty is treated on a par with other aspects of the assessments. Unfortunately, since that is not always the case, we request the addition of such an indication.

- **Response:** *This important topic falls under one of the themes identified in the Prospectus: challenges associated with estimating uncertainty. This comment will be passed along to the author team.*

Footnote 1: Random House Webster’s College Dictionary 1397 (2d ed. 1997) defines “uncertainty” to mean “1. the state of being uncertain; doubt; hesitancy. 2. an instance of doubt or hesitancy. 3. unpredictability; indefiniteness.” In the CCSP definition, the term “climate system” is used, but it is not defined. Is the definition of that term in FCCC Article 1 intended to apply here as well?

- **Response:** *The final Prospectus text has been modified to request that the NRC address issues associated with terminology (page 7, line 5).*

Footnote 2: In referring to and giving examples of what is included by the term “scientific community,” the draft explains in a footnote that “[i]n the context of this discussion operational agencies are those who regularly provide science-based products, including short-term climate forecasts and diagnostic information, for consumption by the general public” (emphasis added). This explanation is not very informative because it fails to explain how such agencies are distinguished from “scientific” agencies.

- **Response:** *This language has been clarified in the Final Prospectus (page 2, lines 26-27 and footnote #2).*

Footnote 3: While the IPCC Working Group I and II drafts for AR4 address “uncertainty,” the effort among the chapters is not uniform or extensive, and uncertainty is not even mentioned in the draft Summaries for Policy Makers. If the above reference to the IPCC assessments is intended as an example of such “steps,” we have doubts about their adequacy and effectiveness.

- **CCSP Response:** *The IPCC call for the development of more formal and systematic treatment of uncertainty and the subsequent guidelines are noted in the Prospectus in order to demonstrate that there is a recognition of and some action within the scientific community related to this important issue. The text of the final Prospectus has been modified to clarify this intent (page 2, lines 37-38).*