INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

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PROGRESS REPORT

NATIONAL GREENHOUSE GAS INVENTORIES PROGRAMME

METHODOLOGICAL WORK ON AEROSOLS

Discussion Paper
from TFB-13

(Submitted by the TFI Co-chairs)

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INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
NATIONAL GREENHOUSE GAS INVENTORIES PROGRAMME

UNEP

IPCC NGGIP TASK FORCE BUREAU TFB 13/Doc.6
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Methodological work on Aerosols

Discussion Paper

1. Background

1.1 The Expert Scoping Meeting on Revision of the Revised 1996 Guidelines (Geneva, September 2003) did not reach agreement on the treatment of aerosol[1] issues within the context of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. A proposal was made that "Aerosols[2] will not be addressed in the main body of the guidelines but an appendix reviewing the existing methodological literature will be developed as a basis for further consideration."

1.2 The Task Force Bureau at its 11th session, held immediately after the Scoping meeting, considered the draft TOR and TOC for revision of the Revised 1996 IPCC Guidelines, and adopted them with a number of amendments. The TFB agreed that the issue of the aerosols was moved to a separate annex and would be noted in the cover to the document to be distributed to the IPCC Panel for its consideration[3].

1.3 The IPCC XXI considered the matter, but there was no consensus on whether to include the appendix on aerosols in the Revision of the IPCC Guidelines, and the draft TOR, TOC and WP were approved without the aerosol appendix. As a compromise on issue of aerosols, the IPCC Chair suggested that there should be a small expert meeting (as a WG-I - NGGIP cooperation project) to clarify the issues and to make proposals or consideration by the Panel XXII.

1.4 TFB 12 (Oslo, May 2004) considered this issue further, but there was no agreement on the expert meeting which was proposed to be held in September 2004 in Japan.[4]

1.5 There have been some exchanges of views on this matter among some TFB members, WG-I Co-chair and its TSU Head, and the IPCC Chairman. While there was general agreement among

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[1] A collection of airborne solid or liquid particles, with a typical size between 0.01 and 10 mm and residing in the atmosphere for at least several hours. Aerosols may be of either natural or anthropogenic origin. Aerosols may influence climate in two ways: directly through scattering and absorbing radiation, and indirectly through acting as condensation nuclei for cloud formation or modifying the optical properties and lifetime of clouds.

[2] It was anticipated that the appendix would cover black carbon and organic carbon aerosols and potentially mineral dust. Methodologies for sulphate aerosols are covered in other agreements and it was not anticipated that additional consideration would be needed for them.

[3] The proposed TOC started: "Appendix: Aerosols – Basis for Further Consideration This appendix will review available literature on quantifying anthropogenic emissions of relevant aerosols. A synthesis and preliminary consideration of methodological issues will be provided"

[4] Together with TFB 12. Doc 5 on the background on this issue, an informal note by Taka Hiraishi, containing the summary of TAR information on aerosols, was provided to TFB 12.

them that this "small expert meeting" should focus its considerations on inventory methodologies and should not attempt to re-assess the scientific information contained in IPCC TAR However, it has not been possible to schedule such a meeting, due to IPCC and other scientific meetings. A Proposed agenda for such a meeting which emerged in these exchanges is attached (Annex 1).

1.6 Recently it has been proposed that in the absence of clear guidance on the scope and focussing ot the required work, and to avoid any duplicative work with the ongoing AR4 work, especially that of WG-I on science on aerosols, any IPCC methodological work should take place after the completion of AR4. While an alternative proposal is that the expert meeting should take place sooner as the climate impacts of aerosols have been identified, there are gaps in the understanding of inventory issues associated with aerosols, including (i) which types of aerosols need to be estimated, (ii) if and how secondary aerosols could be dealt with, and (iii) how to handle naturally generated aerosols.

2. For Discussion:

2.1 First of all, TFB should consider if the methodological work on aerosols should be pursued before the completion of the work of AR4.

2.2 If TFB concludes to initiate the methodological work on aerosols immediately, the timing and location of the meeting should need to be agreed. It is further proposed that participants to the meeting should be selected by TFB, in consultation with the WG-I Bureau. Inventory methodology experts should be the central players at the meeting. In selecting the experts, the IPCC Reporting Procedures, section 4.2.2 should be taken into account. The expected outputs of the meeting need to be considered and the extent of any follow-up meetings should be discussed.

Annex 1
Proposed Agenda - Expert Meeting on Aerosols
Issues and Structure
26 May 2004

Objective: To conduct a preliminary assessment of issues related to developing anthropogenic emission estimates for aerosols identified in the Third Assessment Report (TAR) as having an impact on climate change.

Outline of Workshop:

1. First Plenary: Goal of this session is to provide a series of talks that form a basis for more detailed workshop discussions conveying the status of aerosols according to the TAR. Issues include:
   - Which aerosol types are identified in the TAR, and how significant are they?
   - How are they defined ("black carbon", "organic carbon", "elemental carbon" etc.)
   - What measurements (emission and ambient) are available for these aerosol types?
   - What emission estimates are available for aerosols and how do they relate to the types identified in the TAR?

   - ***Role and Significance of Aerosols in Climate System*** – an introductory talk (based on TAR) to provides some basic information about aerosols and climate (for the participants that are not climate experts) and summarizes the state of knowledge in particular aspects of aerosol science that have a relevance to the challenges of emission estimates (e.g. what aerosol properties are relevant to climate change, how do the various types of aerosols match these properties) . This should indicate the type of information that is needed
   - ***Types of Aerosol Emission Data*** – an overview talk of the types and purposes of aerosol emission estimates: what aerosols are currently estimated and/or measured (ambient and emission).The uses of the data will be summarised as a source of further information.
   - ***Overview of Aerosol Emissions*** – a series of talks about currently available data on aerosol emissions (knowledge/questions about sources, properties, species, regional distribution)
     - Global Overview of Emissions
     - National Estimates
     - Source Level Estimates
     - Measurement Issues

2. Break-out Groups: Probably 4 groups covering

   - fossil fuel combustion;
   - controlled biomass combustion (ie cooking/heating);
   - uncontrolled biomass combustion(i.e., fires);
   - other sources (e.g. mineral dust from human activities).

   Each Break-out group discusses the following issues:
   - Characteristics of emissions from the source

  - what are the emission processes, types of aerosol emissions, how these relate to the types identified in the TAR.
  - Distinction between anthropogenic and natural sources
- General methodological approaches to estimate emissions considering especially:
  - Spatial disaggregation (global, national, sub-national, "facility" level emissions)
  - Temporal disaggregation (annual, seasonal, etc)
  - Sources of uncertainty in emission estimates (and ways of reducing uncertainty)
  - Possible sources of emission estimates from other data sets and analyses (such as air quality emission estimates) and considerations if using such data
  - Practical situation for preparing estimates (i.e. data availability, resource requirements, level of capacity)
- Relevance/implications of secondary aerosol formation
- Next Steps/Recommended Actions

3. Final Plenary: Synthesis
   - Reports from Break-out groups
   - Discussion of key issues: Possibility, Practicality and Usefulness of Estimating Emissions

   - Next Steps
     - Within context of NGGIP/IPCC
     - Of general or scientific value