

Emissions of condensable and semi-volatile organic particulate matter: Conclusions of the TFEIP Workshop

The TFEIP held its annual workshop on 16th May 2016 in Zagreb, Croatia. The workshop was hosted by the Croatian Agency for the Environment and Nature.

Workshop Objectives:

- 1) Provide background and context to explain the “Condensables issue”.
- 2) Discuss the needs of the modelling community and the information available from the emissions inventory community in a common language
- 3) Identify:
 - a. Research needs;
 - b. Short-term actions;
 - c. Long-term goals.

Introduction and Context

Following introductions and the welcome, the Chairs provided an overview of the policy context for particulate matter (PM). It was noted that fine PM has 2020 ceilings under the National Emissions Ceiling Directive (NECD) and therefore the way in which PM is defined and reported is important. There is a clear need to ensure comparability across countries, and it was noted that there is increasing political interest.

Bertrand Bessagnet (TFMM) provided an introduction to cross-cutting issues on semi-volatile organic compounds (SVOC, or condensables). He presented information that had been gathered from the TFMM and the modelling community within the CLRTAP more generally.

He explained that SVOCs are partly included in emission inventories in PM, and options on how to obtain more complete data were discussed. Short term (2 years) and long term (10 years) actions for the modelling community and inventory compilers were suggested.

The CLRTAP modelling community would, in the short term, ideally like to achieve:

- Establishing a common organic matter (OM)/EC/Other split for PM by sector, subsector, country, and identifying what OM represents in each case.
- Understanding country methodologies for the establishment of PM emission factors.

In the long term, actions included updating PM estimates to include SVOC, split by components and volatility, or separating PM and OM, and determining the OM/SVOC split by volatility.

Session 1: Perspectives of the Modellers

David Simpson (MSC-West) presented work on the use of PM emission estimates in modelling studies under the CLRTAP.

It was noted that the dominant sources of PM (e.g. wood burning, biogenic VOCs) are least understood. Biomass burning especially dominates across Europe in winter, and biogenic secondary organic aerosol (SOA) dominates across Nordic countries in the summer.

Modelled PM emissions have been compared with those reported in inventories. The differences decreased when the condensable component was added to national emission inventories. It was recognised that gaining a better understanding of which components of PM were and were not currently included in national inventories was necessary.

Session 2: Thoughts from the Emissions Inventory Community

The EMEP/EEA Emissions Inventory Guidebook

Mark Broomfield (UK) provided a review of condensable and filterable particles in the UK emissions inventory. An overview of the information on whether PM emission factors include condensables or not, in the updated EMEP/EEA Guidebook chapters, was also presented.

The EMEP/EEA Guidebook had not previously been explicit about the methodology used to determine PM emission factors. The recent Guidebook update project has therefore focused on identifying the methodologies used, and adding this information where possible. Some sectors which have potentially large sources of condensable PM only had a filterable PM emission factor. For some sectors it was not possible to reliably determine the relevant components for the emission factor, such as residential combustion and wood processing.

Current Discrepancies in Modelled and Measured European PM Concentrations

Jeroen Kuenen (TNO) provided an overview of discrepancies between modelled PM concentrations (derived from national emissions estimates) and measured PM concentrations.

Modelling studies that have used new residential wood combustion emissions, with the condensable component included, were shown to be better at reproducing measured PM in Norway and Sweden. Estimates of PM emissions including the condensable component were shown to significantly differ from the national reporting under the Convention. The implications for national ceilings, if condensable PM is to be included in official reporting, were discussed.

Condensables from Small-scale Combustion

Karin Kindbom (Sweden) presented results from a Nordic Council project to measure the emissions of short lived climate pollutants (SLCP) from small-scale combustion sources. SLCP emissions were found to be highly dependent on operational conditions. Moist and dry fuel both generated higher emissions than 'standard fuel'. The use of modern and pellet boilers reduced the PM_{2.5} emission factor to 1/6th of the emission factor for old boilers. Load was also found to have a large influence, with part-loading increasing PM emissions four-fold in old technology boilers. The condensable fraction was found to be less important in modern and pellet boilers as the combustion is typically more efficient; condensables represent a larger fraction in old and more inefficient boilers.

Session 3: Facilitated Discussion and Actions

Martin Adams reflected on a background paper from the TFMM/TFEIP working group, and the co-chairs led a discussion session.

During this session several short-term actions were agreed. To understand the extent to which condensables and semi-volatile components of PM are currently included in national inventories:

ACTION: The TFEIP will support CEIP in drafting a questionnaire to gather PM methodology information from Parties (target is to request this with the 2017 submission).

This is necessary as a first step as it became clear that countries are not using a standardised approach on which components of PM are included in reporting.

The current Tier 1 methodology for estimating PM emissions from the domestic combustion sector was discussed, and there was agreement that it is inadequate.

ACTION: The TFEIP will lead a drafting of a revised Tier 1 methodology which will include appliance-specific methodology information, and potentially regional-specific defaults (target for the first draft is before May 2017).

It was also agreed that information needs to be circulated to the emissions inventory community to explain the current issues, and the expected future activities, so that they are well placed to prepare for any significant changes to methodologies or reporting requirements.

ACTION: The TFEIP will lead a drafting of a guidance documents on condensables (expected delivery before May 2017).

This will explain the issues with reporting and estimating emissions, and propose various short-term and longer-term actions.

A long-term aim of standardised reporting of PM emissions, including both filterable and condensable components, was agreed by the TFEIP and TFMM. It was recognized that this will require substantial revisions to the EMEP/EEA Guidebook.

The TFEIP also agreed that further research is needed to understand how the emissions of the organic matter (OM) component of PM may be better measured and estimated. However the TFEIP recognized that they are not well placed to lead on this, and will therefore raise the issue at the EMEP Steering Body in September 2016.

Close

The co-chairs thanked the Croatian Agency for Environment and Nature for hosting the workshop, and then closed the meeting.