

## 35th Session of the ECE LRTAP Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)

Geneva, 5-7 September 2011

### Information from the Arctic Monitoring and Assessment Programme (AMAP)

Over the past year AMAP has continued its work on both monitoring and assessment of long-range trans-boundary pollution issues relevant to the Arctic. A brief update on activities of the Arctic Monitoring and Assessment Programme (AMAP) that are of possible relevance to the EMEP Steering Body is as follows:

#### Assessments:

A major new assessment of Mercury in the Arctic was released in May 2011 (updating previous assessments published in 1998 and 2002). The assessment was structured around a series of policy-relevant questions:

- Where does mercury in the Arctic environment come from, and how does it get there?
- What is the fate of mercury entering the Arctic environment?
- How does climate change influence Arctic mercury?
- Are mercury levels in Arctic biota increasing or decreasing, and why?
- What are the toxicological effects of mercury in Arctic biota?
- What are the likely changes in mercury concentration in the Arctic atmosphere and ocean under future emissions scenarios?
- What is the impact of mercury contamination on human health in the Arctic?

The summary report *Arctic Pollution Issues 2011*<sup>1</sup> includes recommendations for policy-makers. The technical background report is in the final stage of preparation and will be available on the AMAP website in the coming weeks.

A report jointly developed by AMAP and the UNEP Stockholm Convention Secretariat entitled '*Climate Change and POPs: Predicting the Impacts*'<sup>2</sup> discusses the potential influence of climate change on POPs cycling, with implications for systems established to monitor and assess environmental levels, trends and fate.

Based on funding from the Nordic Council of Ministers and from some Arctic countries, AMAP implemented three activities under an umbrella project on 'climate and contaminants', including (modeling) effects of climate change on of air transport of pollutants, studies on the effects of climate change on the movement of pollutants within Arctic food-webs, and effects of climate change on transport and fate of air pollutants.

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<sup>1</sup> <http://amap.no/documents/index.cfm?action=getfile&dirsub=&filename=AP2011%5FRLR2.pdf>

<sup>2</sup> <http://amap.no/documents/index.cfm?action=getfile&dirsub=&filename=POPs%5Fdef%5F10feb-S.pdf>

Results of this work are currently being published and plans developed for continuation activities in a Phase II of this project.

In 2008, AMAP prepared two background reports on 'non-CO2 drivers of climate change' (Quinn et al. *'The Impact of Short-Lived Pollutants on Arctic Climate'*<sup>3</sup>, and Bluestein et al. *'Sources and Mitigation Opportunities to Reduce Emissions of Short-term Arctic Climate Forcers'*<sup>4</sup>). The AMAP expert group on short-lived climate forcers (SLCF) has produced a new report on *'The Impact of Black Carbon on Arctic Climate'* that is currently in the final stage of publication. The Arctic Council has requested AMAP to continue its work on this subject and extend it to cover ozone and methane.

In May 2011, AMAP also released the results of its *'Snow, Water, Ice and Permafrost in the Arctic (SWIPA)'* assessment. This project was implemented by AMAP in cooperation with international partners including IASC and WMO (see [www.amap.no/swipa](http://www.amap.no/swipa)).

### **Emissions Inventories:**

The 2011 AMAP Mercury Assessment Reports include information on the following topics:

- The '2005 global inventory of mercury emissions to the atmosphere from anthropogenic sources', developed as a joint activity between AMAP and UNEP and published in 2008. This is the first global inventory to include emissions from both 'by-product' source sectors (coal burning, ferrous and non-ferrous metal production, cement production, etc.) and 'intentional-use' sectors (artisanal and small-scale gold mining, dental amalgam/cremation emissions, waste incineration, breakage and disposal of mercury-containing products, etc.);
- Re-analyses (and geospatial distribution) of the 1990, 1995, 2000, and 2005 global mercury emissions inventories using common methodologies<sup>5</sup>.
- Preliminary estimates for global mercury emissions in 2020 according to three emissions scenarios ('status quo', 'existing emissions control', and 'maximum feasible technological reduction').

The 2011 AMAP report on *'The Impact of Black Carbon on Arctic Climate'* includes detailed information on black-carbon emissions in the northern hemisphere.

### **Air Pollution Modelling:**

The 2011 AMAP Mercury Assessment Reports detail results from modeling studies by groups in Canada, Denmark, Russia and the USA using the above-mentioned inventory collections, investigating global transport and deposition of mercury to the Arctic, and the potential influence of climate change on these.

The 2011 AMAP report on *'The Impact of Black Carbon on Arctic Climate'* includes detailed information on black-carbon measurements and modeling.

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<sup>3</sup> <http://amap.no/documents/index.cfm?action=getfile&dirsub=%2FNon-CO2%20drivers%20of%20climate%20change&filename=Technical%20Report%201v2%20-%202008.pdf>

<sup>4</sup> <http://amap.no/documents/index.cfm?action=getfile&dirsub=%2FNon-CO2%20drivers%20of%20climate%20change&filename=Technical%20Report%202v2%20-%202008.pdf>

<sup>5</sup> <http://amap.no/documents/index.cfm?action=getfile&dirsub=&filename=AMAP%20Technical%20Report%203-2010%20-%20Historical%20Mercury%20Inventories.pdf>

### **Trends:**

Amongst other things, the 2011 AMAP Mercury Assessment Reports include results from trend studies looking into time-series from Arctic air monitoring stations, in particular the sites (Alert, Canada; Ny-Ålesund, Svalbard; Amderma, Russia; Pallas, Finland) for which potentially 'statistically powerful' time-series are now becoming available.

### **Monitoring Activities**

AMAP continues to support Arctic monitoring networks, and is currently revising/updating its own coordinated monitoring programme following a period of evaluation, to address future priorities.

One of these priorities remains the implementation of air monitoring stations in northern Russia. The mercury monitoring station Amderma (Russia) continues to operate from funding provided through AMAP; AMAP is currently looking into extending the Amderma facilities to include POPs monitoring. A new 'integrated' air monitoring station has been implemented at Tiksi (Eastern Siberia, Russia) together with several partners to monitor a range of pollutants (including POPs and mercury) and greenhouse gasses, etc.

AMAP is responsible for coordinating the Arctic Council led / IASC and WMO sponsored activity '*Sustaining Arctic Observing Networks*' (SAON) (<http://www.arcticobserving.org/>).

### **Issues for EMEP Steering Body Consideration**

A number of AMAP activities have overlap with activities conducted under the EMEP HTAP group. Some links have been established between the planned work of AMAP and that of the EMEP HTAP, based on AMAP participation in some HTAP meetings. However this contact is sporadic (as it is not always possible for AMAP representatives to attend all relevant HTAP meetings). Both AMAP and HTAP representatives are agreed that it would be desirable if these links could be strengthened. Development of a more formal agreement concerning cooperation between AMAP and relevant UN ECE EMEP bodies, similar to that between AMAP and UNEP, is one option that could be considered in this respect.

The SAON work, which also involves a number of other national and international bodies, will eventually strengthen the Arctic air monitoring network (and related data management activities). EMEP may therefore also benefit from collaboration in this area of the work.