Global Mercury Assessment (GMA) Emission Inventory Work: Messages for Minamata Emissions Reporting

Minamata online science sessions:

Mercury emissions: Estimation and projection

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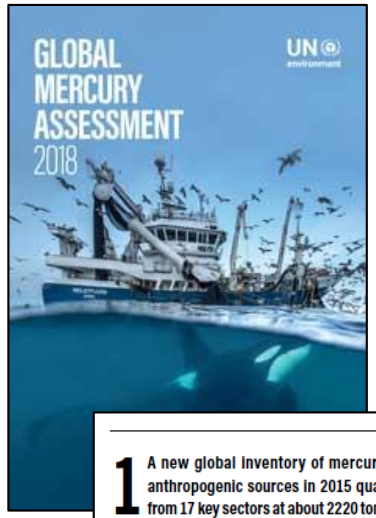
Simon Wilson

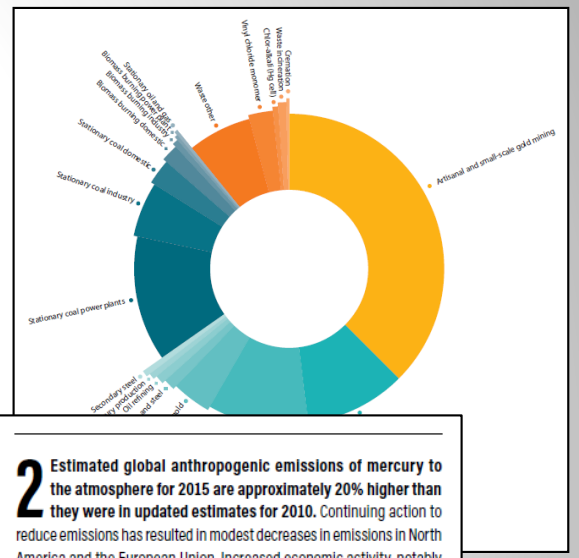
Arctic Monitoring and Assessment Programme (AMAP)

www.amap.no

GMA global anthropogenic emissions inventory

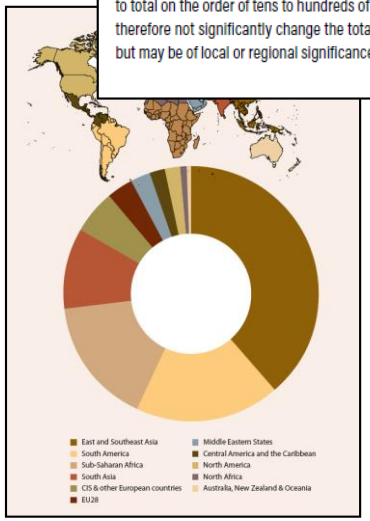
- GMA 2018 not a formal part of the Minamata process (UN Environmental Assembly mandate)
- Global inventory: methods based on work by Pacyna et al (1990, 1995, 2000, 2005); updated methodology introduced (2010, 2015)
- Mass balance approach – similarities to UNEP Toolkit used for MIAs but not identical
- Common methodology applied for global inventory of anthropogenic emissions to air for 2010 (GMA 2013) and 2015 (GMA 2018)
- Produced by international group of (40+) experts
- Inventory work included specific initiatives (e.g. workshops) to engage national experts from all UN regions
- National/sector-based estimates (200+ countries; 17 main sectors)
- Geospatially distributed: important to know not just how much but where emissions occur
- 2018 GMA included first global inventory of releases to water (to land+water for ASGM)

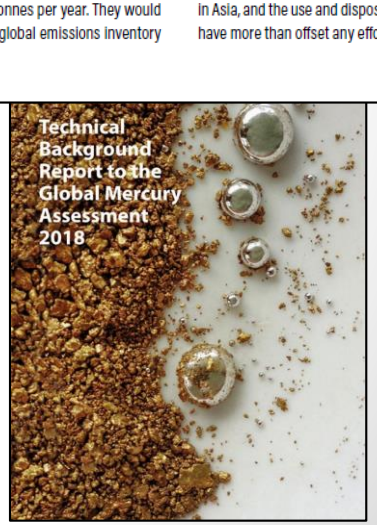




1 **A new global inventory of mercury emissions to air from anthropogenic sources in 2015 quantifies global emissions from 17 key sectors at about 2220 tonnes.** There are also smaller anthropogenic sources that are not yet possible to quantify in the detailed global inventory. Emissions from these additional sources are evaluated to total on the order of tens to hundreds of tonnes per year. They would therefore not significantly change the total global emissions inventory but may be of local or regional significance.

2 **Estimated global anthropogenic emissions of mercury to the atmosphere for 2015 are approximately 20% higher than they were in updated estimates for 2010.** Continuing action to reduce emissions has resulted in modest decreases in emissions in North America and the European Union. Increased economic activity, notably in Asia, and the use and disposal of mercury-added products appears to have more than offset any efforts to reduce mercury emissions.





https://www.unenvironment.org/resources/publication/global-mercury-assessment-2018

Message 1: Estimates are … estimates …

Approaches

- Mass balance (inputs >> outputs) approach
- Measurement-based
- National/regional reporting systems

All involve

- Information (knowledge)/data
- Assumptions (knowledge)
- Uncertainties (often not quantified)

Focus on 2018 GMA

Emission = Activity x Emission factor

Multi-component activity data (different amounts of fuels and raw materials with different mercury content); $Ef_{(abated)}$ vs $Ef_{(unabated)}$ (technology applied to reduce emissions); Intentional use sectors: ASGM; product waste handled differently

Emission = Concentration x Flow rate x Time

Measuring all emission release points? At all relevant source locations? Measurement frequency (continuous) in relation to changing operating conditions; measurement/estimation of flow volumes; sectors that are difficult to 'measure' (waste sites, ASGM)

National PTRs:

Plant/facility reporting; Reporting guidelines (*Ef*s); Reporting requirements: 'reporting threshold' (e.g. > 1 kg/year)

Message 2: Good information … key to good estimates

- Example: Emission factors, activity data
- Knowledge
- Need: Reliable, comparable data
- Need: Transparency concerning assumptions
- Desirable: Public domain information
- Availability: Global coverage?, Compiled?, Comparable over years/decades?

- Energy/industry: IEA, global statistical compilations, industry trade bodies
- Intentional use: Product waste – UN Supply and Demand
- National information: More detailed/refined; application of control technologies; location of emissions
- Industry information/engagement: Some but lots more potential

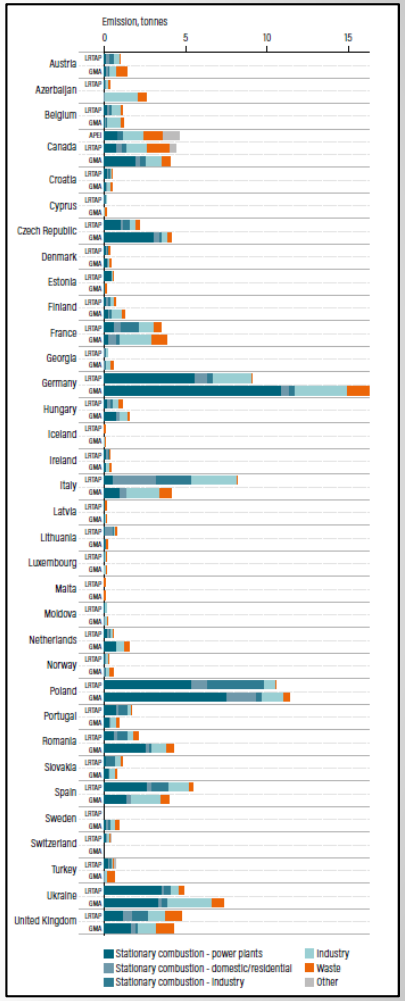
- Sectors not yet addressed
- Gaps – speciation, location
- Releases to Land/Water, Accumulation in Wastes … total picture …

Message 3: Transparency is essential …

- Core principle in GMA work
- Documentation of methodology; documentation of sources of information and data used as basis for estimates
- Why: To give confidence/trust in estimates

Comparisons with other estimates (including national PTRs, MIAs, etc.)

- Asking questions about emissions estimates should be viewed as a positive part of the process; comparisons are not a matter of 'which is best', but an opportunity to explain differences and/or identify needs for improved knowledge … requires transparency
- Provided insights into suitability of alternative reporting systems for Minamata applications



Sub-message: Case for independent estimates to validate national reporting

Message 4: Temporal comparability is challenging

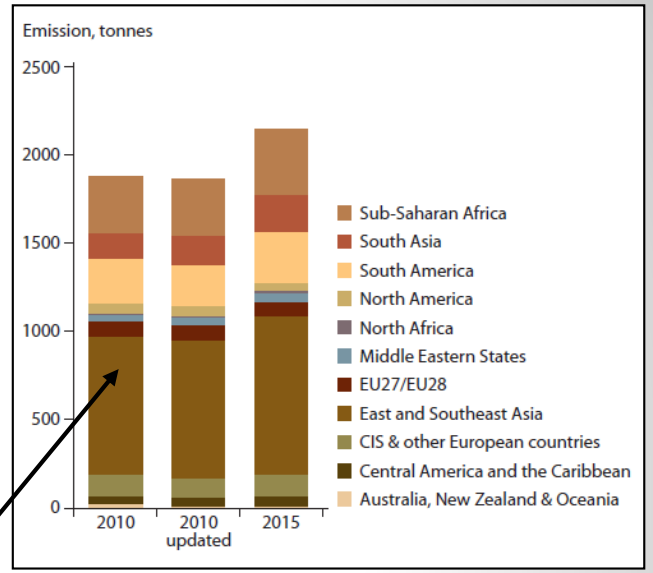
GMA 2018: 2015 inventory and updated estimates for 2010 ..

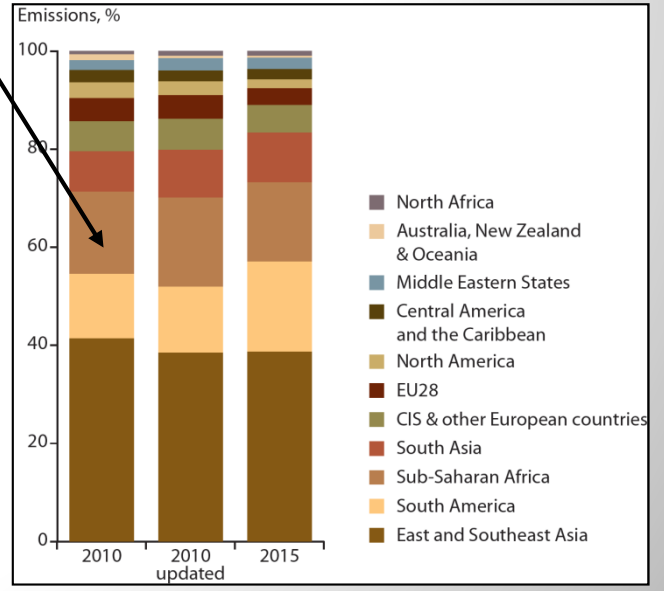
- New sectors introduced; preliminary statistical data updated; improved knowledge > refinement of assumptions

Minamata effectiveness evaluation …

- Implies need for consistency of methods and data over time, and if necessary, revision/updating of past estimates

… and remember … not just emissions .. also geographical patterns change over time





Sum-up …

Message 1: Estimates are … estimates …

- Recognition of uncertainties in emissions estimates

Message 2: Good information … key to good estimates

- How to ensure this information continues to be available and is transparent

Message 3: Transparency is essential …

- Is this a requirement in connection with national reporting to Minamata Convention?
- Need for an Independent process to QA/validate national reporting?

Message 4: Temporal comparability is challenging

- Is there a system in place to ensure capability to handle and emissions reporting/estimates (Minamata/GMA/national capacity, etc.)?
- Will there be a consistent/comparable approach to reporting to Minamata Convention that allows for updating past estimates?
- Documentation; availability of core data currently supplied by a few individuals

Plus – made only a short mention of GMA inventory of releases to water …

- **Message 5:** Should further extend work on releases to land/water/waste, etc.– to better understand fate of mercury mobilized by human activities, and ensure that, e.g., controlling emissions to air is not resulting in increased (uncontrolled) releases to water or land

Thankyou …

https://www.unenvironment.org/resources/publication/global-mercury-assessment-2018

- GMA 2018 – policy-makers summary
- Technical Background report … annexes detailing: individual country/sectors emissions estimates, and methods/examples, core activity data, emissions factors, technology assumptions, etc. used to produce them
- GMA Key Findings (in Arabic, Chinese, English, French, Russian, Spanish)