

EVENT

Mercury air transport and fate research Partnership Area - 2020 Meeting

10 December 2020
Online, 15:00 - 17:00 CET



UNEP GLOBAL MERCURY PARTNERSHIP

Mercury air
transport and fate
research Area*



AGENDA

Welcome/Opening Remarks - **Stephanie Laruelle**, *Secretariat of the Global Mercury Partnership, UNEP*

Introductions - **Nicola Pirrone**, *CNR–Institute of Atmospheric Pollution Research, Italy*

Nomination and discussion of new co-lead, Celia Chen - **David Evers**, *Biodiversity Research Institute, U.S.*

Mercury Monitoring Guidance Document update - **Eisaku Toda**, *Senior Programme Officer, Secretariat of the Minamata Convention*

PAG-11 Update - **Stephanie Laruelle**, *Secretariat of the Global Mercury Partnership, UNEP*

Fate and Transport Projects:

- **GOS4M** - **Nicola Pirrone**, *CNR–Institute of Atmospheric Pollution Research, Italy*
- **Global Passive Air Mercury Project** - **Sandy Steffen**, *Environment and Climate Change, Canada*
- **GEF-STAP** - **David Evers**, *Biodiversity Research Institute, U.S.*
- **Communications** - **Celia Chen**, *Dartmouth College, U.S.*

Identify cross-cutting collaborations with other Global Mercury Partnership Areas for the future - **David Evers**, *Biodiversity Research Institute, U.S.*

Question and Answer - **David Evers**, *Biodiversity Research Institute, U.S.*

Wrap up - **Nicola Pirrone**, *CNR–Institute of Atmospheric Pollution Research, Italy*



UNEP
GLOBAL
MERCURY
PARTNERSHIP

UN
environment
programme



GLOBAL
MERCURY
PARTNERSHIP

Yellowfin Tuna, Courtesy NOAA Fisheries, © Photo by Jeff Muir

Welcome/Opening Remarks

Stephanie Laruelle, Secretariat of the Global Mercury Partnership, UNEP

UNEP GLOBAL MERCURY PARTNERSHIP

Mercury air transport and fate research Area*

Partnership Area Leads:

Nicola Pirrone, National Research Council of Italy (CNR-IRA)
David Giers, Biodiversity Research Institute (BRI)



Global Mercury Partnership Area on “Mercury air transport and fate research”



ISSUE

A global understanding of major processes and mechanisms affecting the dynamics of mercury in the atmosphere and at the interfaces with other ecosystems is important for setting and implementing strategies on mercury both at global and local levels.

Integrated and updated global assessments, based on reliable information from regional and national levels, are essential for improving global understanding of mercury and for predicting trends.



OBJECTIVE

The objective of the Partnership Area is to increase global understanding of international mercury emissions sources, fate and transport.



STRATEGY

To meet its objective, the Partnership Area puts priority on the following actions:

- Accelerating the development of sound scientific information on global mercury cycling and its patterns;
- Enhancing compilation and sharing of such information among various stakeholders;
- Providing technical assistance and training;
- Enhancing the development of a globally-coordinated mercury observation system including air and water ecosystems; and
- Enhancing the exchange of information and cooperation with relevant international organizations, groups and programmes.

* www.unep.org/globalmercury/implementation/mercury-air-transport-and-fate-research



CONTRIBUTION TO THE IMPLEMENTATION OF THE MINAMATA CONVENTION

The Partnership Area provides comprehensive technical expertise on different articles of the Convention, and more specifically its Articles 19 (Research, development and monitoring) and 22 (Effectiveness evaluation).

In particular for 2019, members of the Partnership Area contributed research and information related to mercury monitoring under the ad-hoc technical expert group on effectiveness evaluation established by the Conference of the Parties to the Minamata Convention.

Members of the Partnership Area, in cooperation with the United Nations Environment Programme (UNEP), CNR-IRA, WHO, BRI and the Jozef Stefan Institute contributed to the pilot project funded by the GEF “Development of a plan for global monitoring of human exposure to and environmental concentration of mercury” to harmonize approaches and strengthen capacities for accurate monitoring and analyses of mercury concentration in human and the environment. Ad-hoc field campaigns with passive air samplers and active systems to monitor mercury levels in air and human biomonitoring have been carried out in different countries. Additionally, two new technical reports developed marine and terrestrial approaches for mercury monitoring in biota and provided technical information on mercury monitoring in soil (presented to the third meeting of the Conference of the Parties as part of document UNEP/MC/COP3/INF/19)¹.

RELEVANT PROVISIONS OF THE MINAMATA CONVENTION ON MERCURY:

Provisions of relevance to Mercury Air Transport and Fate are included in **Article 8** (Emissions), **Article 9** (Release), **Article 12** (Contaminated sites), **Article 14** (Capacity building, technical assistance and technology transfer), **Article 17** (Information exchange), **Article 18** (Public information, awareness and education), **Article 19** (Research, development and monitoring), **Article 21** (Reporting) and **Article 22** (Effectiveness evaluation).

Overview of the UNEP Global Mercury Partnership

web.unep.org/globalmercurypartnership



- Voluntary multi-stakeholder network initiated in 2005
- Over 200 partners from Governments, IGOs, NGOs, industry, academia

Priority focus:

- Support timely and effective implementation of the Minamata Convention
 - Provide knowledge and science on mercury
 - Deliver outreach and awareness raising towards global action
-



Introductions

*Nicola Pirrone, CNR, Institute of
Atmospheric Pollution Research, Italy*



Nomination and discussion of new co-lead, Celia Chen, *David Evers, Biodiversity Research Institute*



Mercury Monitoring Guidance Document

*Eisaku Toda, Senior Programme Officer,
Secretariat of the Minamata Convention*

Article 22 – Effectiveness evaluation



1. The Conference of the Parties shall **evaluate the effectiveness of this Convention**, beginning no later than six years after the date of entry into force of the Convention and periodically thereafter at intervals to be decided by it.
2. To facilitate the evaluation, the Conference of the Parties shall, at its first meeting, initiate the establishment of arrangements for providing itself with **comparable monitoring data on the presence and movement of mercury and mercury compounds in the environment as well as trends in levels of mercury and mercury compounds observed in biotic media and vulnerable populations**.
3. The evaluation shall be conducted on the basis of available scientific, environmental, technical, financial and economic information, including:
 - (a) Reports and other monitoring information provided to the Conference of the Parties pursuant to paragraph 2...

Effectiveness evaluation – Decision MC-3/10



The Conference of the Parties,

1. Invites parties to submit views on the indicators set out in annex I to the present decision and requests the secretariat to compile those views in advance of the fourth meeting of the Conference of the Parties;
2. Requests the secretariat to advance the work by securing services for drafting:
 - (a) **Guidance on monitoring to maintain harmonized, comparable information on mercury levels in the environment**, taking into consideration the draft structure set out in the note on background information on mercury monitoring;
 - (b) Reports set out in the framework in annex II to the present decision with the exception of the emissions and releases report, the monitoring report, and the modelling report.

Roadmap for developing monitoring guidance



COP decision MC-3/10 requests the secretariat to advance the work by securing services for drafting **guidance on monitoring** to maintain harmonized, comparable information on mercury levels in the environment.

Late May 2020	Secretariat posts a <u>draft annotated outline</u> of the guidance for comments by 31 July. Comments and other information posted on the <u>online workspace</u> .
Early June 2020	Secretariat invites Parties and stakeholders to identify experts who contribute to the drafting of the guidance by 15 August.
10 June 2020	Online information session on monitoring guidance.
August 2020	Secretariat hires three consultants (Garth Martin – air; Dave Evers – biota; Nil Basu – human) for drafting the guidance.
15 September 2020	<u>First webinar</u> of the identified experts is convened.
October 2020	<u>Annotated outline</u> finalized.
27 Oct, 16, 18, 20 Nov, 2 Dec 2020	Thematic webinars of the identified experts
31 January 2021	Secretariat posts draft guidance on the website for comments.
By 31 March 2021	Parties and stakeholders submit comments on the draft guidance.
April – May 2021	Secretariat further develop the draft guidance taking into account the comments received, in cooperation with the consultants as appropriate.
May - June 2021	Secretariat convenes a final consultation meeting, inviting representatives of the parties and stakeholders that have submitted comments and other participants as appropriate.
July 2021	Guidance document finalized for processing as COP-4 document.

Guidance on monitoring to maintain comparable information on mercury levels in the environment and humans

Annotated outline



1. Acknowledgements
 2. List of abbreviations and glossary of terms
 3. Introduction and objectives
 4. Use of comparable monitoring data for the effectiveness evaluation
 5. Air monitoring
 - (1) Mercury monitoring in air – rationale
 - (2) Consideration of monitoring sites
 - (3) Sampling and measurement: methods
 - (4) Quality control and assurance
 - (5) Data collection
 - (6) Data management, analysis and evaluation
 6. Biota monitoring
 - (1) Identification of target ecosystems
 - (2) Mercury monitoring in biotic media – rationale
 - (3) Consideration of monitoring sites
 - (4) Sampling and measurement
 - (5) Quality control and assurance
 - (6) Data collection
 - (7) Data management, analysis and evaluation
 7. Human biomonitoring
 - (1) Ethical considerations
 - (2) Identification of target population
 - (3) Human biomonitoring for mercury exposure – rationale.
 - (4) Development of a survey protocol
 - (5) Data management, analysis and evaluation with particular emphasis on health/risk guidelines
 8. Cross-media data management, modeling and analysis
 9. References
- Annex 1: Review of existing monitoring, modeling and data management activities
- Annex 2: Gap analysis

MINAMATA ONLINE

SEASON 1 - 2020

Minamata Online is a new series of digital engagement to provide an opportunity for government officials, scientists, NGOs, and other stakeholders to better understand the Minamata Convention's provisions, as well as, policy and scientific aspects. The sessions are arranged according to three thematic streams.

The sessions are 1-1.5 hours long, and some will be held twice on the same day to accommodate different time zones. Each session will be announced individually, and registration will be available on the Minamata Convention website <http://www.mercuryconvention.org/>.

Our collaboration partners for Minamata Online are the Global Mercury Partnership (GMP), the International Conference on Mercury as a Global Pollutant (ICMGP), and the Geneva Environment Network (GEN).

SEPTEMBER

Tues. 15 SEP

14-16h



Monitoring guidance
(identified experts)

Thurs. 17 SEP

10-11h & 16-17h



Effectiveness evaluation
indicators

Thurs. 24 SEP

10-11h & 16-17h



Art21 Reporting and
Art15 ICC

Tues. 29 SEP

14-15:30h



Mercury material flow
Supply, demand and trade

OCTOBER

Thurs. 8 OCT

10-11h & 16-17h



Art3 Trade

Thurs. 15 OCT

14-15:30h



Mercury material flow
Waste

Thurs. 22 OCT

10-11h & 16-17h



Art8 Emissions

NOVEMBER

Tues. 3 NOV

COP-4
365 days to go



Thurs. 5 NOV

14-15:30h



Mercury emissions
Estimation and projection

Thurs. 12 NOV

10-11h & 16-17h



Art11 Mercury
Wastes

Tues. 17 NOV

14-15:30h



Multimedia modelling of
global mercury movement

Thurs. 26 NOV

10-11h & 16-17h



Art12 Contaminated
sites

DECEMBER

Tues. 1 DEC

14-15:30h



Socioeconomic impact
of mercury pollution

STREAMS



Implementation review and support



Mercury science



COP-4 preparation



UNEP
GLOBAL
MERCURY
PARTNERSHIP

UN
environment
programme



GLOBAL
MERCURY
PARTNERSHIP

Yellowfin Tuna, Courtesy NOAA Fisheries, © Photo by Jeff Muir

Eleventh meeting of the Global Mercury Partnership Advisory Group

*Stephanie Laruelle, Secretariat of the Global
Mercury Partnership, UNEP*

Selection of outcomes from PAG-10 (Geneva, 23 November 2019)

- Rodges Ankrah (US) & Teeraporn Wiriwutikorn (Thailand) designated co-chairs of the Partnership Advisory Group
 - Revision of the Partnership Overarching Framework
 - Request to initiate work on mercury from oil and gas as well as from non-ferrous metals mining and smelting
 - Other topics identified as possible future priority actions: further refinement of emission factors, establishment of a framework for a centralized database on mercury assessments, development of guidance to address mercury-added products and of tools to make information on waste technologies accessible, and the organization of webinars to facilitate information sharing
 - Interest raised by several Partnership Areas for joint actions
-

Information-sharing sessions

- Series of webinars organized by the Partnership



- Contributions to « Minamata Online » and joint events

EVENT
MINAMATA ONLINE - Multimedia modelling of global mercury movement
17 November 2020
Online, 14-15:30 CET

Tues. 17 NOV
14-15:30h
Multimedia modelling of global mercury movement

MINAMATA ONLINE
SEASON 1 - 2020

STREAMS
Implementation review and support
Mercury science
CDP-4 preparation

Outreach – Launch of Partnership Newsletter



Latest news from the UNEP Global Mercury Partnership - November 2020 (Newsletter #2)

As the world is facing the current Covid-19 pandemic, the Global Mercury Partnership is taking its activities online a step further: following the expert consultations on mercury from non-ferrous metals mining and smelting and from oil and gas earlier this year, the Partnership is rolling out a series of information-sharing webinars, currently on mercury-added products, with an upcoming event on mercury-skin lightening products organized in cooperation with the World Health Organization.

In this new edition, you will also learn more about the upcoming eleventh Partnership Advisory Group and Partnership Areas meetings, as well as useful resources, and discover our new members.

With our warm wishes,

The Secretariat of the UNEP Global Mercury Partnership

HIGHLIGHTS



The Partnership Advisory Group will hold its eleventh meeting on 15 and 16 December. Participants will exchange on recent activities and future priorities, discuss progress and next steps for the work on mercury from non-ferrous mining and smelting and from oil and gas, as well as contributions to COP4 and ICMGP15. Partners are welcome to attend as observers.



The Mercury Waste Management Partnership Area will meet on 27 November to review activities and future plans, discuss challenges in the management of mercury waste, technologies and services provided by partners as well as opportunities for matchmaking. Participants will also explore collaboration with other areas and contribution to ongoing consultations.

RECENT EVENTS



Discover guidance and tools shared at the mercury-containing medical devices webinar organized on 13 October by the Products Partnership Area together with WHO. The event exchanged knowledge on sphygmomanometers and thermometers and discussed challenges in meeting the 2020 phase out deadline as well as best practices towards sustainable replacement.

Tues. 17 NOV

14-15:30h



Multimedia modelling of global mercury movement

See presentations and recordings of the session on [Multimedia modelling of global mercury movement](#) co-organized on 17 November by the Fate and Transport Partnership Area together with the Secretariat of the Minamata Convention, the International Conference on Mercury as a Global Pollutant and the Geneva Environment Network as part of the [MINAMATA ONLINE](#).



See presentations and recordings of the webinar on [ASGM and National Action Plans in the Latin America and Caribbean region: lessons learned, tools and implementation](#) organized on 26 August by the ASGM Partnership Area to share global status and progress made on NAP development and review tools and assistance available from the Partnership and its partners.

WELCOME TO OUR NEW PARTNERS

- 3S Group Inc
- Centre for Mineral Technology
- "Clínica de Direitos Humanos e Direito Ambiental e Mestrado em Direito Ambiental", University of the State of Amazonas
- Conservation International
- Great Lakes Center for Occupational & Environmental Health, University of Illinois
- Laboratory of the Environment and Occupational Health, University of West Attica
- National Energy Technology Laboratory
- Picoyune
- Professor Satoshi Murao (Daichi Institute of Technology)
- X-PLD Services géologiques

[VIEW ALL PARTNERS](#)

[INFORMATION ON BECOMING A PARTNER >>](#)

Opportunity to raise awareness and feature highlights by Partnership areas and partners, events, resources, etc.

Consultations on mercury in oil and gas and in non-ferrous metals mining and smelting



Follow up to PAG-10 decision

Expert consultations in April 2020

Reports under preparation –
comments invited from experts and
relevant stakeholders on annotated
outlines and draft reports

Final reports expected in April 2021

Eleventh meeting of the Global Mercury Partnership Advisory Group

EVENT

Partnership Advisory Group Meeting 11

15 - 16 December 2020
Online



<https://web.unep.org/globalmercurypartnership/partnership-advisory-group-meeting-11>



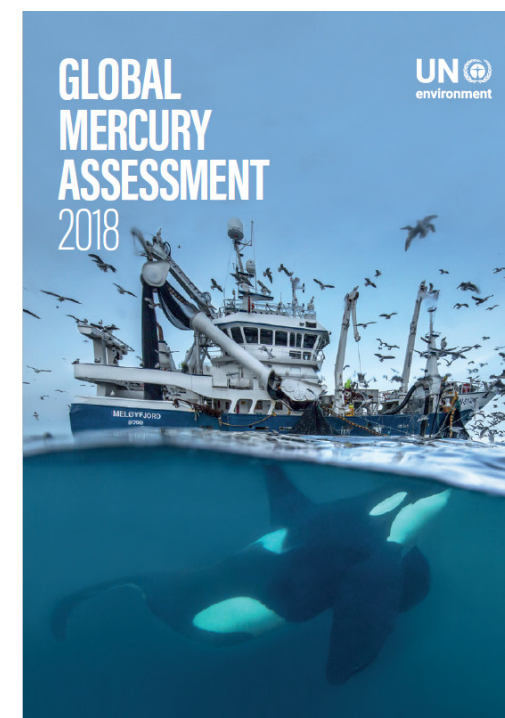
GOS4M - Nicola Pirrone, CNR–Institute of Atmospheric Pollution Research, Italy

UN Environment Global Mercury Partnership: Fate & Transport Partnership Area

Co-Chair: Nicola Pirrone (CNR, Italy)

Objective: To provide a scientific support to the policy making process to better characterize the relative contributions of chemical, physical and biological processes affecting the global Hg cycle and its impact on human health and ecosystems.

How: Fostering broad and inclusive cooperation with ongoing national and international projects and programs



Global Observation System for Mercury

- a GEO Flagship -

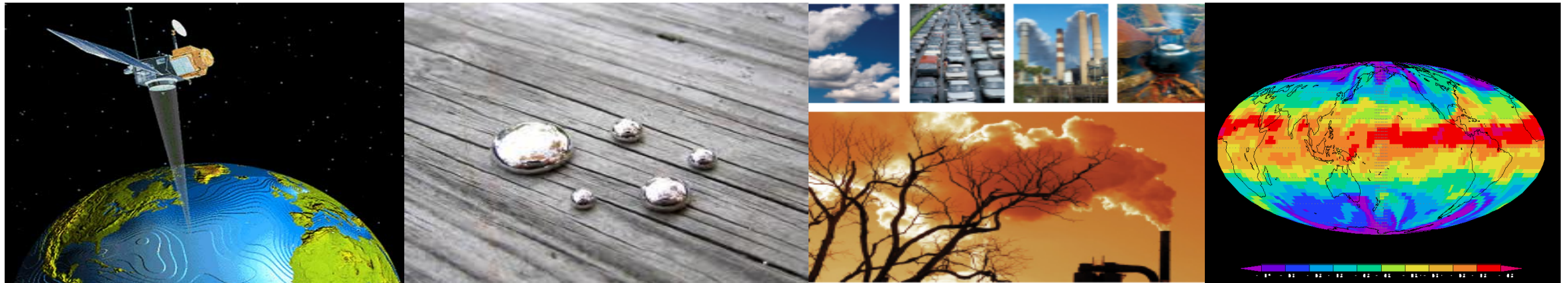


GLOBAL OBSERVATION SYSTEM FOR MERCURY

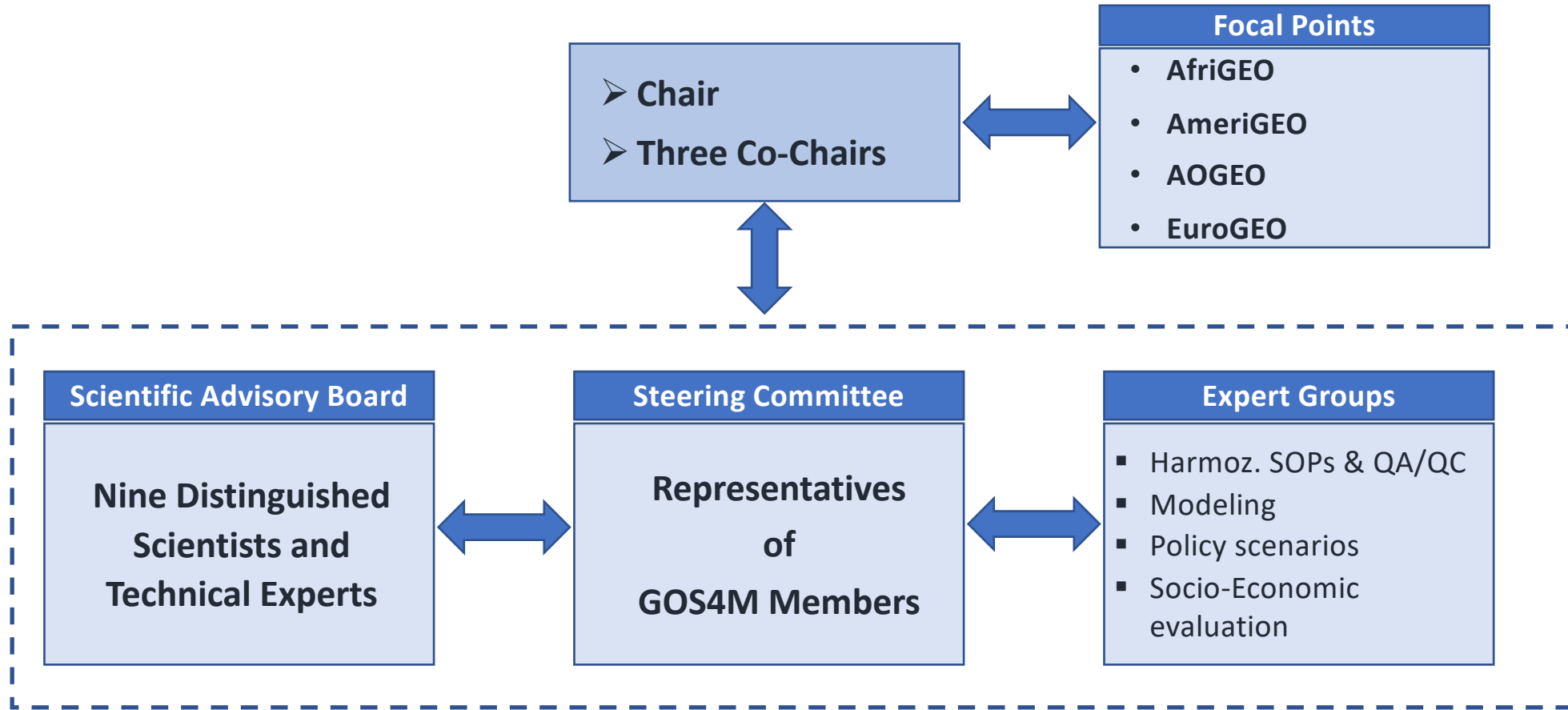
Focus: To provide EOs data and products to support policy makers and stakeholders in evaluating cost-effective strategies for reducing the impact of mercury contamination on human health and ecosystems

Platform: GEOSS

URL: www.gos4m.org



GOS4M Governing Bodies



more at: www.gos4m.org

GOS4M Governing Bodies

Chair: Nicola Pirrone, Italy

Co-Chairs:

- Lynwill Martin, South Africa
- Alexandra Steffen, Canada
- Shuxiao Wang, China

Focal Points:

- **AfriGEO**, [Lynwill Martin](#), South Africa
- **EuroGEO**, [Aurélien Dommergue](#), France
- **AmeriGEO**, [David Schmeltz](#), USA
- **AOGEO**, [Noriyuki Suzuki](#), Japan (*tbd*)

Scientific Advisory Board:

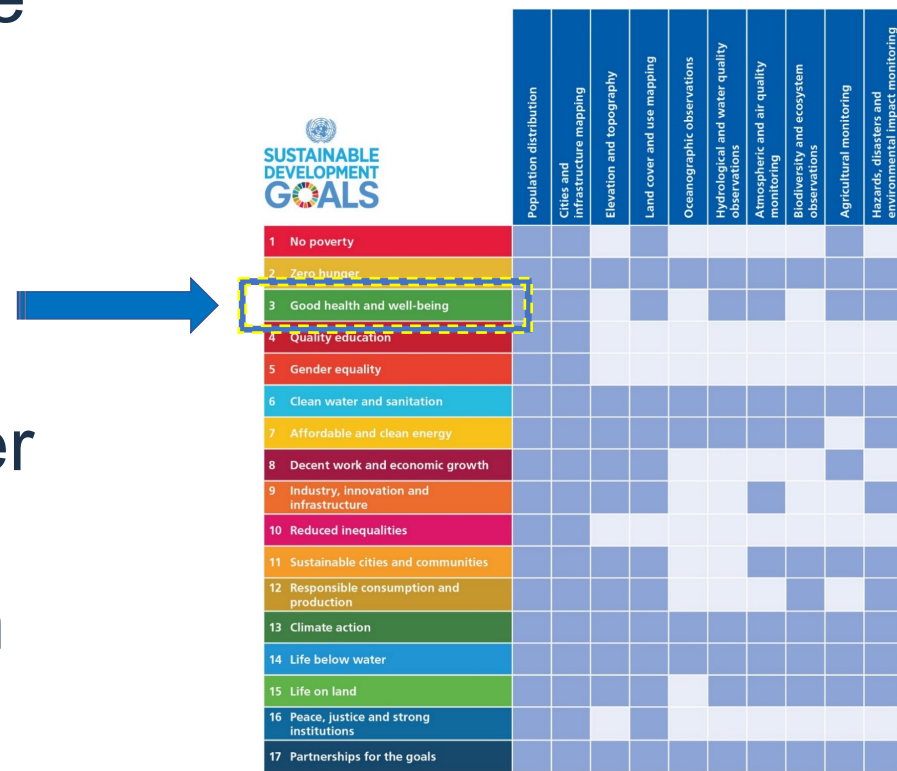
- 9 distinguished experts ...to be proposed by SC members

Steering Committee Members:

- David AMOUROUX, IPREM, France
- Paco BUSTAMANTE, LINKS, France
- María DIEGUEZ, INIBIOMA-CONICET, Argentina
- Aurélien DOMMERGUE, Univ. Grenoble-Alpes, France
- Ralf EBINGHAUS, HZG, Germany
- David EVERS, BRI, USA
- Xinbin FENG, IG-CAS, China
- Katriina KYLLÖNEN, FMI, Finland
- Milena HORVAT, Jožef Stefan Institute, Slovenia
- Tamara KHODZHER, Limnological Institute, Russia
- Viktor KOMOV, IBIW-RAS, Russia
- Nicola PIRRONE, CNR, Italy
- Jeroen SONKE, GET, France
- Joel KNOERY, IFREMER, France
- Lars-Eric HEIMBURGER, MIO, France
- Lynwill MARTIN, SAWS, South Africa
- Nikolay R. MASHYANOV, LUMEX, Russia
- Katie READ, Univ. of York, UK
- David SCHMELTZ, USEPA, USA
- Alexandra STEFFEN, Environment Canada, Canada
- Shuxiao WANG, Tsinghua University, China

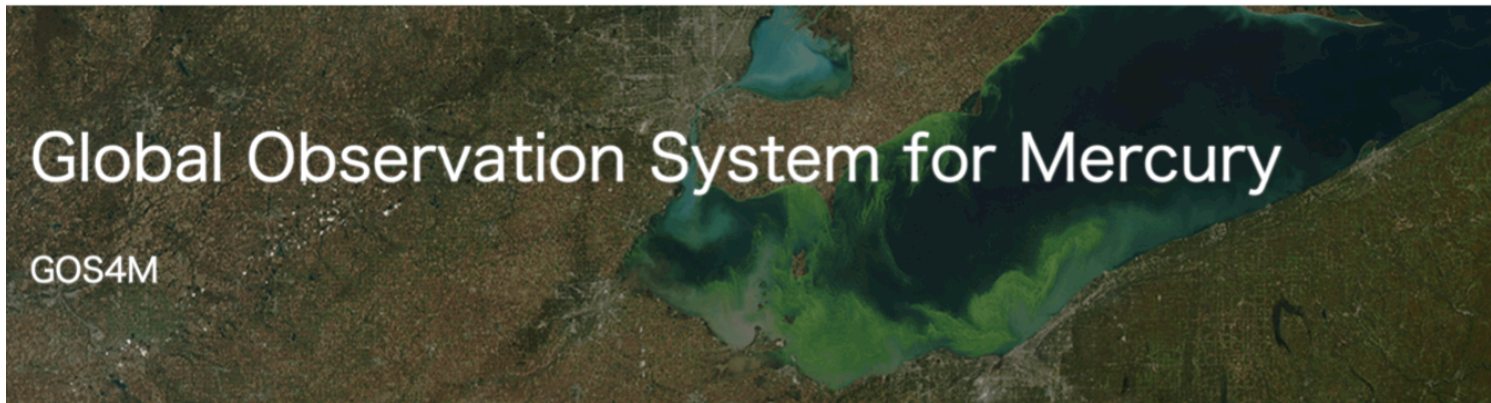
Scope

It is aimed to support all interested parties and the UN Environment in the implementation of the **Minamata Convention** by providing a **Knowledge Hub on Mercury** designed to **assess the effectiveness of measures** that Parties may consider for reducing the mercury level in the environment and its impact on human health.



Objectives

- **Enhance integration of in-situ and satellite observations** to better understand the transport and deposition patterns of **Hg** at continental and global scales and identify/explain hotspots;
- Provide **global comparable monitoring data** for Hg and other key parameters needed for data analytics and modeling purposes;
- Support the **development of new cost-effective equipment/sensors** to lower investment and management costs of monitoring networks/programs;
- **Enhance the geographical coverage** of in-situ global monitoring;
- **Foster the validation of regional and global scale models** for policy scenario analysis including the evaluation of associated costs;
- **Facilitate actions toward a full interoperability** of data, models and knowledge.



October 2, 2020

News

Italy ratified the Minamata Convention on Mercury

The Italian Senate ratified the Minamata Convention on Mercury (DDL S. 1171 (<http://www.senato.it/leg/18/BGT/Schede/Ddliter/51523.htm>). The ratification of the Minamata Convention by the Italian Parliament is very much welcomed by the scientists of the Institute on Atmospheric Pollution of the CNR (CNR-IIA) who in the last 20 years have coordinated important research projects funded by the European [...]

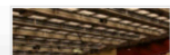


September 30, 2020

News

GOS4M Virtual Kick-off Workshop

The kick-off workshop of the GOS4M GEO Flagship will be held online on October 7 and 8. The virtual kick-off workshop will convene major scientific experts on mercury monitoring and will be opened by Monika Stankiewicz, Executive Secretary of the Minamata Convention on Mercury and Gilberto Camara, Director of the GEO Secretariat. The workshop will officially [...]



December 13, 2019

News

Search

GOS4M DATA

[GOS4M DATA CATALOG](#)

[GOS4M MIRROR PORTAL](#)

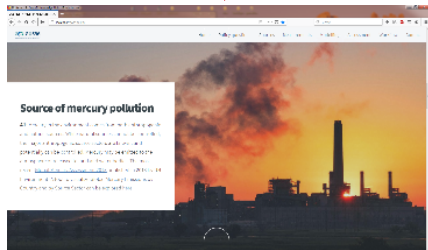
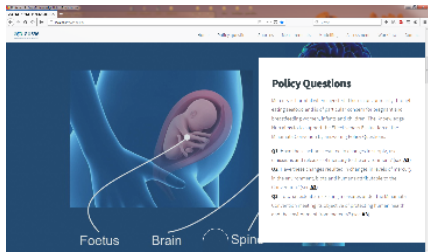
[GOS4M KNOWLEDGE HUB](#)

[HERMES DSS](#)

[GOS4M NETWORK](#)



Policy questions

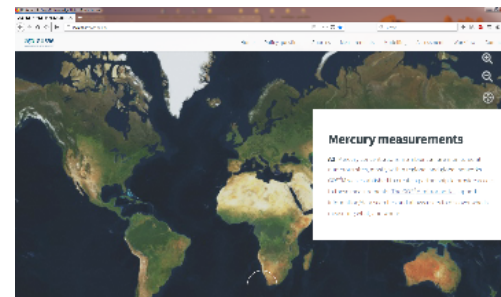
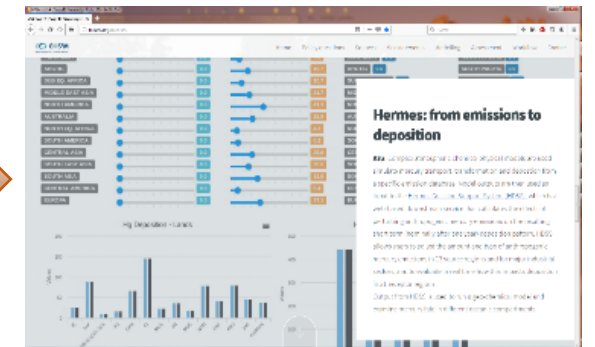
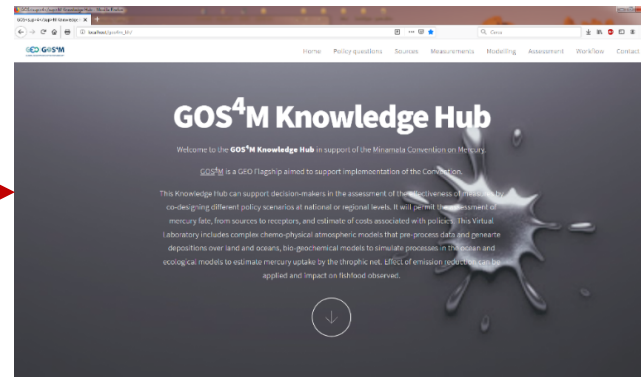


Co-design Policy Scenarios

GOS4M Knowledge Hub (conceptual framework)



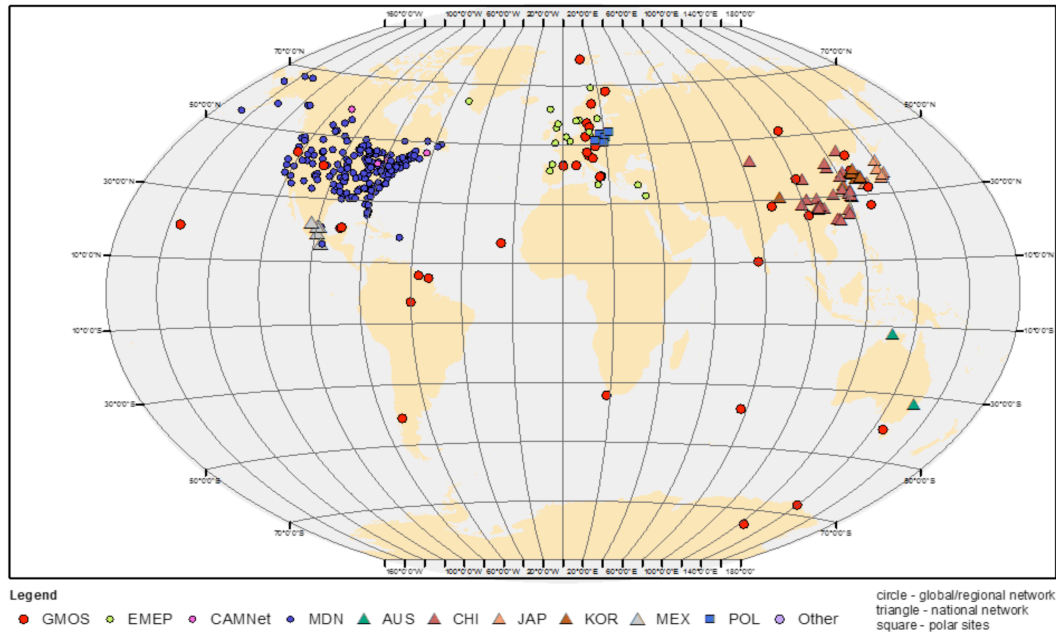
Policy scenarios assessment



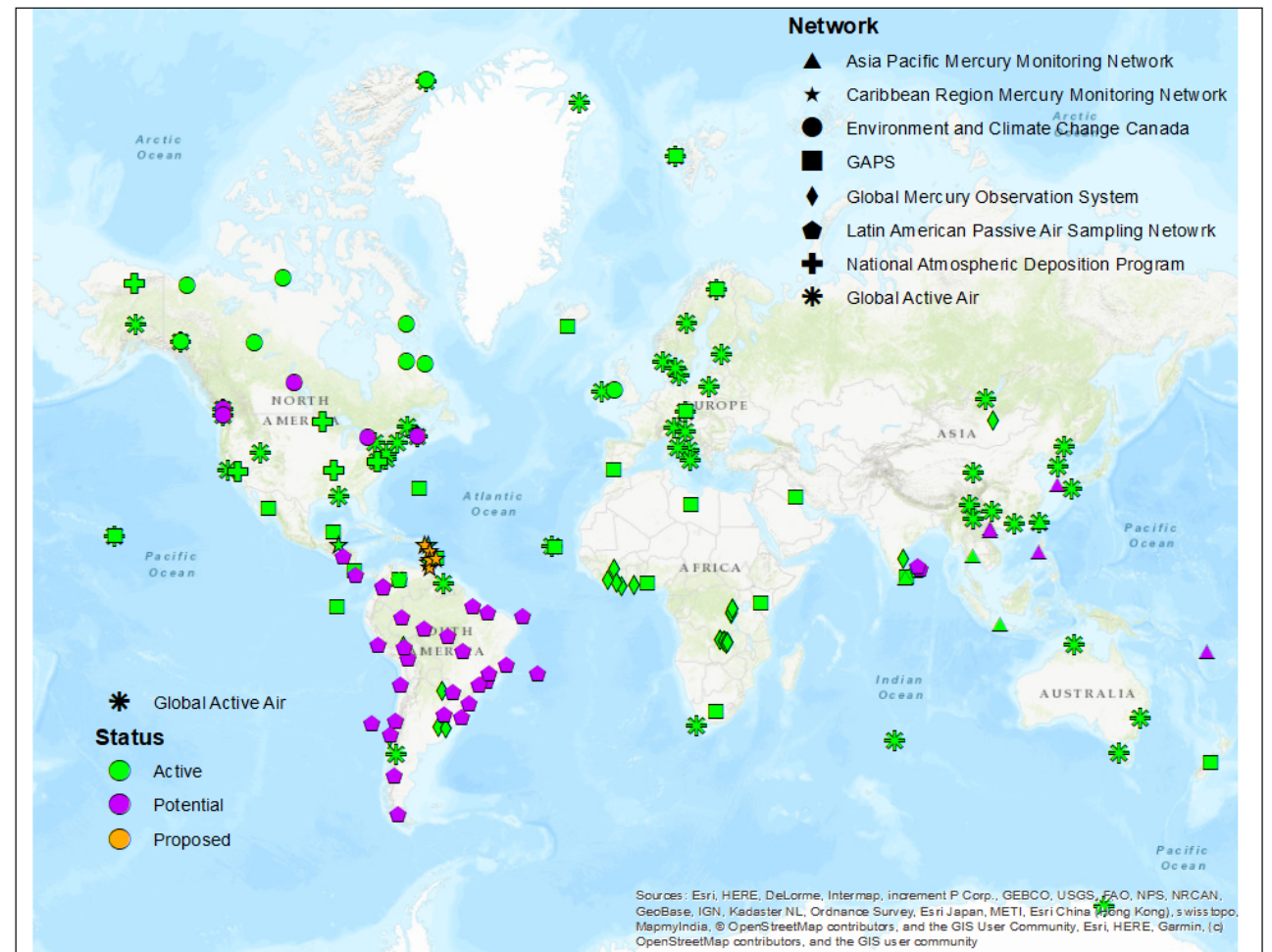
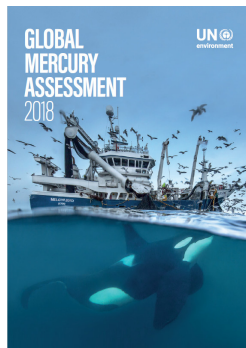
EOs data sets



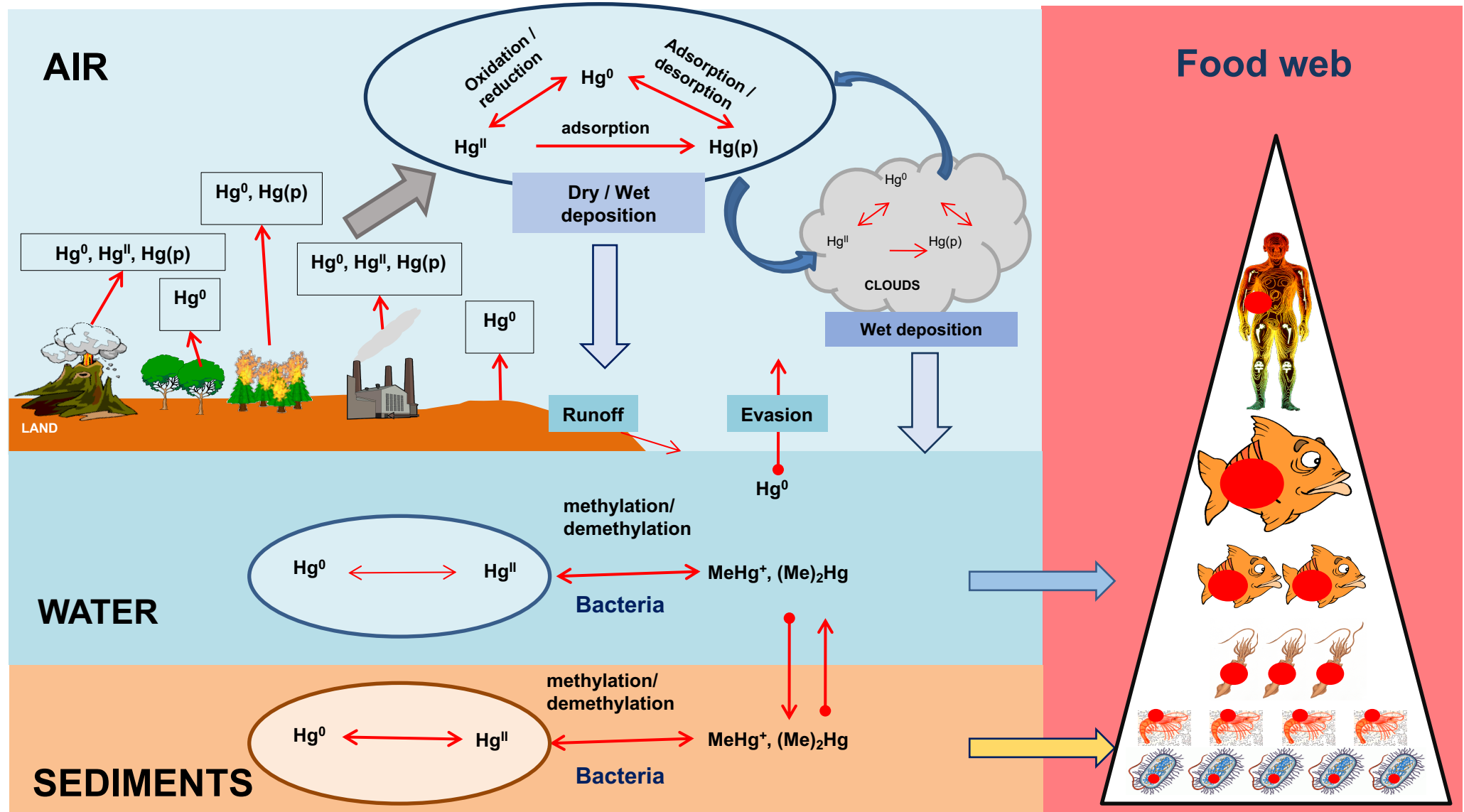
Global Coverage of in-situ Hg monitoring



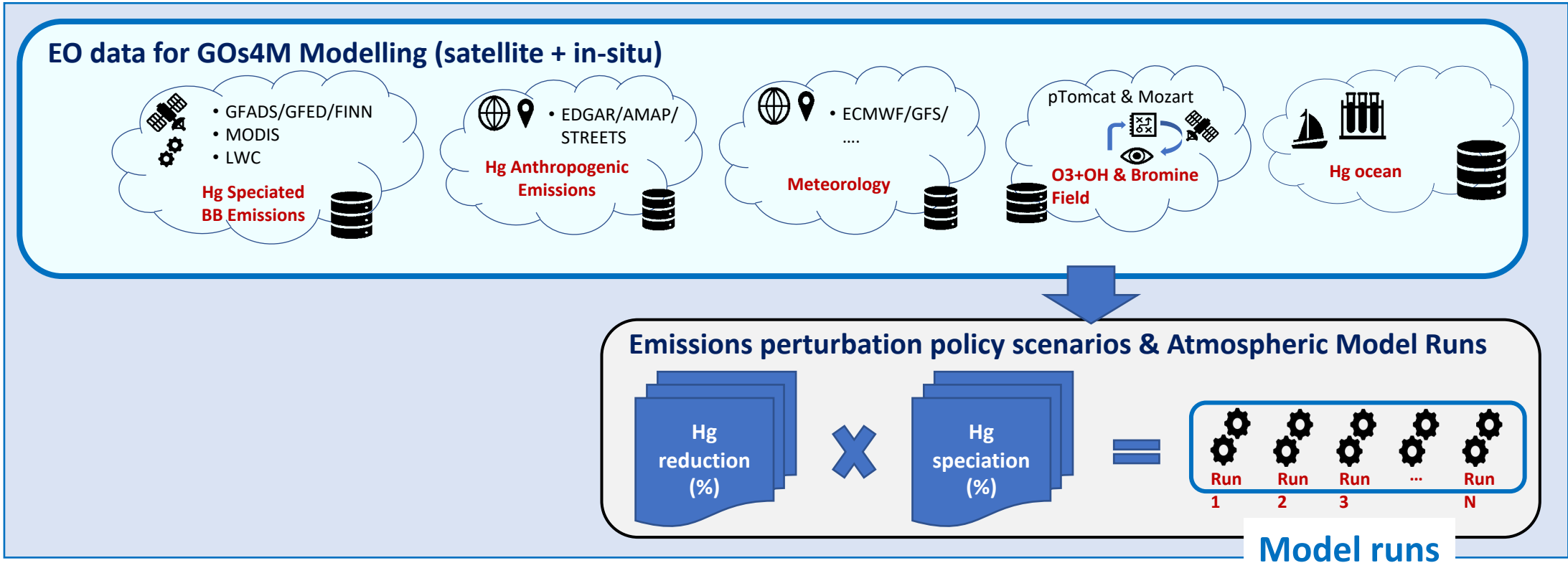
Source: Fig.1 of "Levels of Mercury in Air". Chapter-3, GMA-2019 for COP3



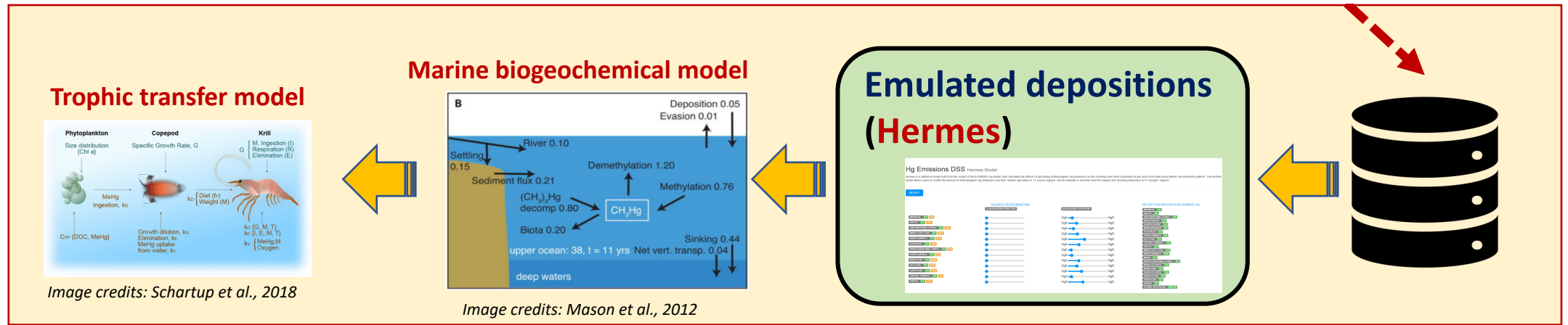
Source: Revised Fig.1 of "Levels of Mercury in Air". Chapter-3, GMA-2019 for COP3 (by A. Steffen)



Pre-processing

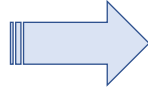
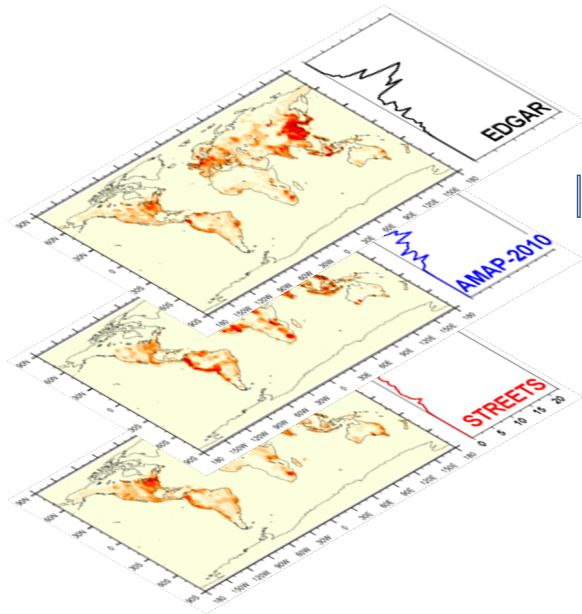


Post-processing



Ensemble of Atmospheric Hg Global Models

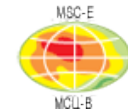
Emission Inventories: EDGAR, AMAP, ...



ECH^{MERIT}



Global EMEP Multi-media
Modeling System (**GLEMOS**)



MSC-E

GEOS-Chem

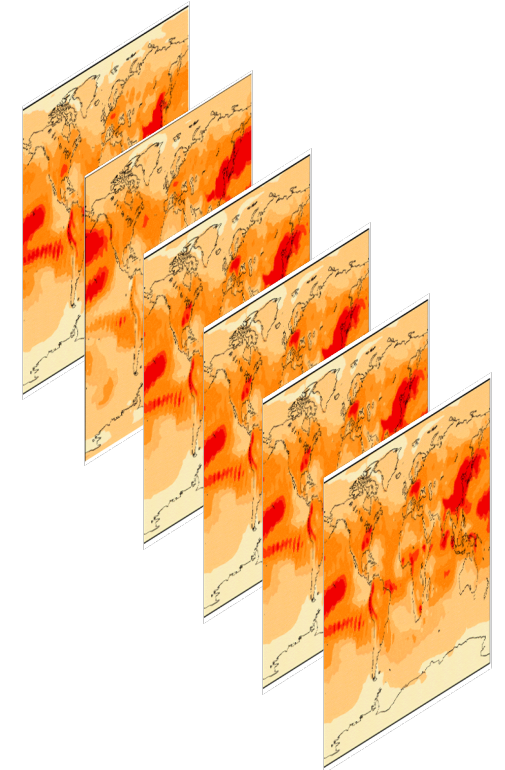
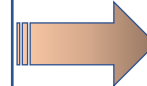


Global/Regional Atmospheric
Heavy Metals Model (**GRAHM**)



Environment and
Climate Change Canada
Environnement et
Changement climatique Canada

Models' Outputs for Emission Scenarios



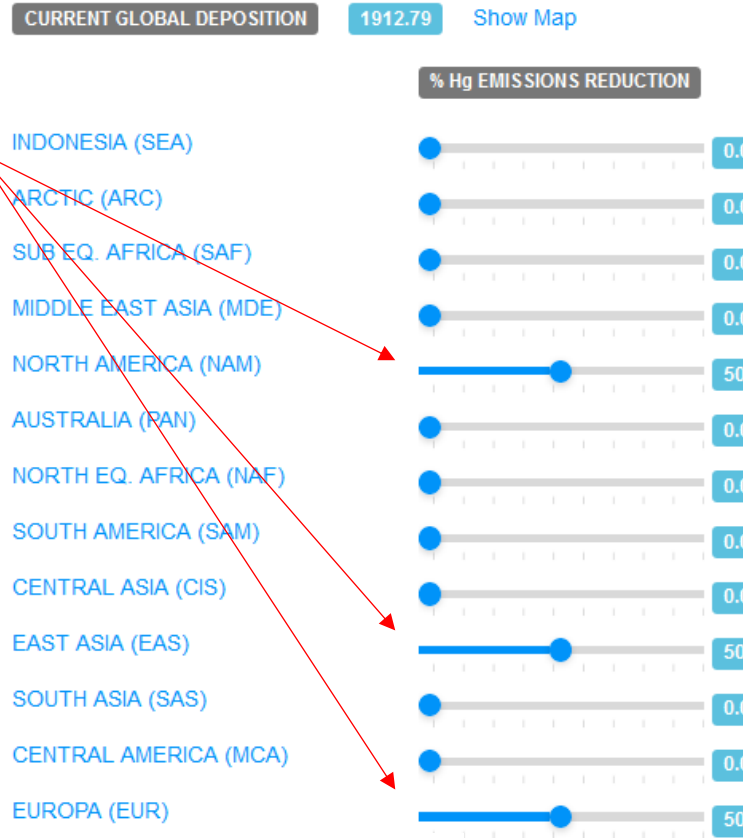
Workflow

Example

- 50%
- Europe
- North America
- East Asia

ANTHROPOGENIC EMISSION PERTURBATION

It is possible to reduce Hg Anthropogenic emission from 12 source regions



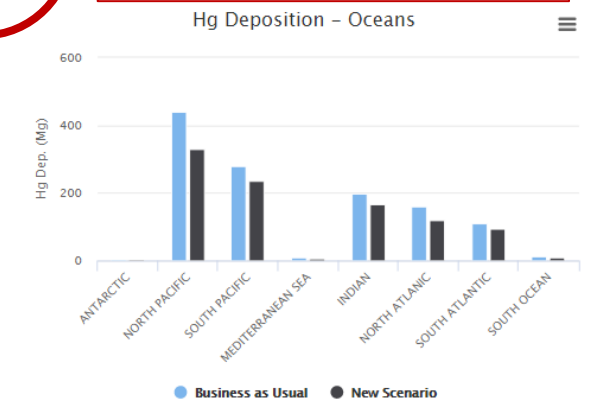
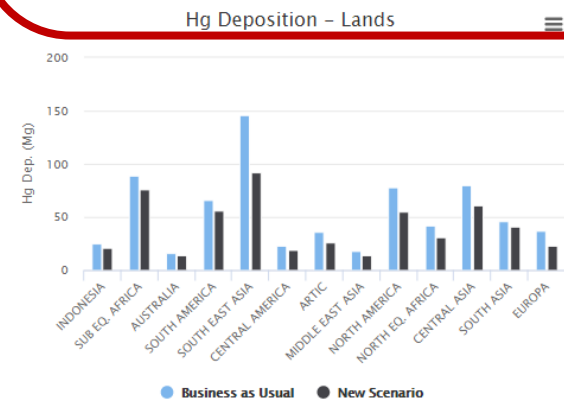
DEPOSITION CHANGES
The inputs are passed in near-real time to the statistical engine that calculates the change (%) on Hg deposition due to the selected emission reductions. If a reduction is not statistically significant (95% confidence interval) the deposition change is shown in blue. If reduction is significant for a given receptor the value is displayed in green.(De Simone et al., 2017)

GLOBAL DEPOSITION SCENARIO 1492.08

Region	% Change	Region	% Change
INDONESIA (SEA)	-17.99	NORTH PACIFIC	-25.01
ARCTIC (ARC)	-26.48	SOUTH PACIFIC	-15.69
SUB EQ. AFRICA (SAF)	-15.39	MEDITERRANEAN	-31.82
MIDDLE EAST ASIA (MDE)	-21.93	INDIAN	-15.76
NORTH AMERICA (NAM)	-29.95	NORTH ATLANTIC	-25.43
AUSTRALIA (PAN)	-13.09	SOUTH ATLANTIC	-14.92
NORTH EQ. AFRICA (NAF)	-25.28	SOUTH OCEAN	-14.28
SOUTH AMERICA (SAM)	-15.22	ANTARCTIC (ANT)	-14.06
CENTRAL ASIA (CIS)	-23.06	GLOBAL OCEANS	-20.41
EAST ASIA (EAS)	-37.05	Biogeochemical response	
SOUTH ASIA (SAS)	-10.61	Oceans at 10 years	-17.59
CENTRAL AMERICA (MCA)	-20.16		
EUROPA (EUR)	-37.11		

% of reduction is shown

blue = not significant
green = significant



GOS4M Planned activity (2020-2021)

- ✓ Enlarge the partnership.
- ✓ Define **GOS4M Advisory Scientific Group** and consolidate the **Expert Groups**
- ✓ Enhance **dissemination activity** in policy & scientific meetings.
- ✓ Promote **intercomparison of QA/QC methods** and on-line products.
- ✓ **Continue cooperation with UNEP and MCM and all interested parties.**
- ✓ **Promote intercomparison of biogeochemical models** to estimate Hg in marine biota.
- ✓ **Contribute to the COP4 of the MCM** - in Bali, Indonesia in 2021.
- ✓ **Contribute to ICMGP 2022 in South Africa.**

Resources Mobilization

- ✓ + National/international funding of all GOS4M Members will be provided on the GOS4M portal
- ✓ **ERA-PLANET/iGOSP** (H2020-689443) (CNR, CNRS, FMI, HZG, IJS,)
- ✓ **ERA-PLANET/iCUPE** (H2020-689443) (FMI, HEL, CNR, CNRS, HZG, ...)
- ✓ **E-shape** (H2020-820852) (ARMINES, CNR, CNRS, FMI, HZG,
- ✓ **GMOS-Train** (H2020-860497) (IJS, IFREMER, CNR, CNRS, HZG, SPRI...)
- ✓ **Merc-OX** (H2020) (IJS, CNR,)
- ✓ **EIRENE ESFRI RI** (H2020 - **under evaluation**) (MU, CNR, CNRS, IJS,...)
- ✓ **GEF-STAP** (should start in the first QR of 2021)
- ✓ **I-SEED** (H2020 – starting Jan 1st 2021) (IIT, CNR, SSA, Wageningen Univ.,...)



e-shape

EuroGEOSS Showcases: Applications Powered by Europe



MSCA ITN Global Mercury Observation Training Network

in Support to the Minamata Convention



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement no. 860497.

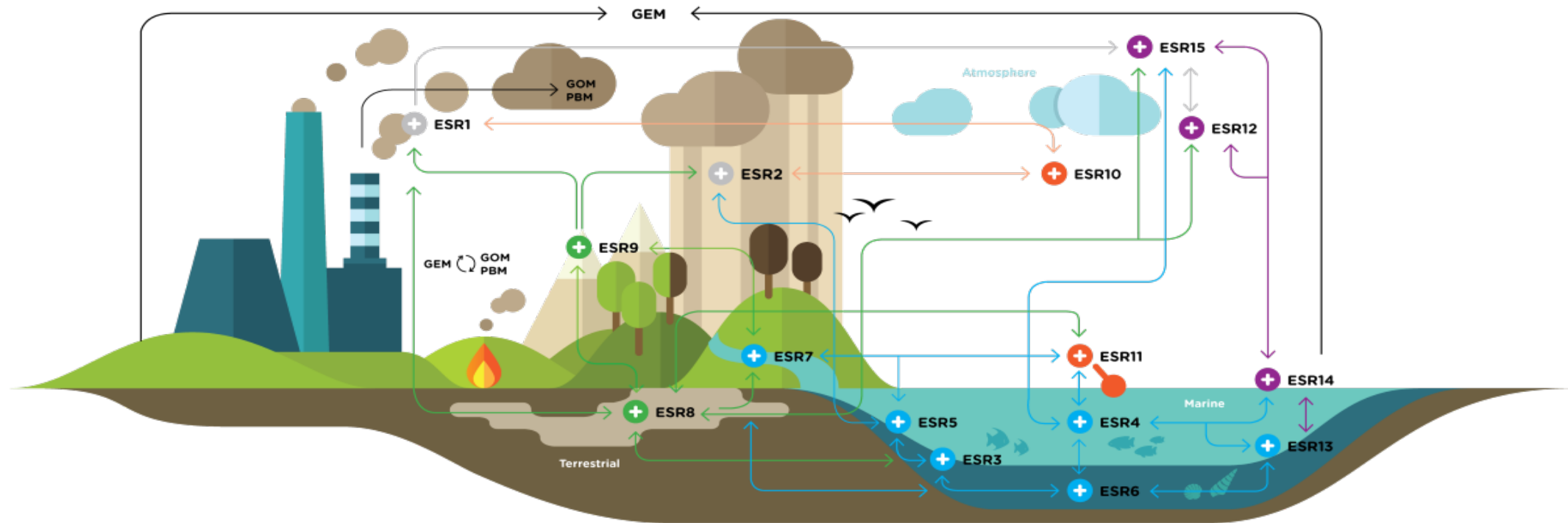


15 Early Stage Researchers

Global biogeochemical Hg Cycle

The overall objectives are:

- 1) to provide urgently needed training in Hg science within the context of the UNEP Minamata Convention
- 2) to fill key knowledge gaps in biogeochemical Hg cycling linking anthropogenic emissions and Hg in marine food webs



Legend 1

- WP1 (ESRs 1-2) Atmospheric processes
- WP2 (ESRs 3-7) Marine processes
- WP3 (ESRs 8-9) Terrestrial-land-water systems
- WP4 (ESRs 10-11) Traceability & sensors
- WP5 (ESRs 12-13) & WP6 (ESRs 14-15) Modeling

Legend 2

- | | | |
|---|----------------------------------|----------------------------------|
| ESR1 Oxidants and RM | ESR6 Lower food web | ESR11 Sensors |
| ESR2 Kinetics/deposition/re-emission | ESR7 Land water interactions | ESR12 Regional models |
| ESR3 C/H/Hg compound specific analyses | ESR8 Permafrost | ESR13 Ecosystem model |
| ESR4 Ocean speciation/cruises | ESR9 Terrestrial/canopy | ESR14 Ocean/atmosphere exchanges |
| ESR5 Coastal dynamics Methylation/demethylation | ESR10 Traceability/comparability | ESR15 Global models |



9

ACADEMIC
BENEFICIARIES



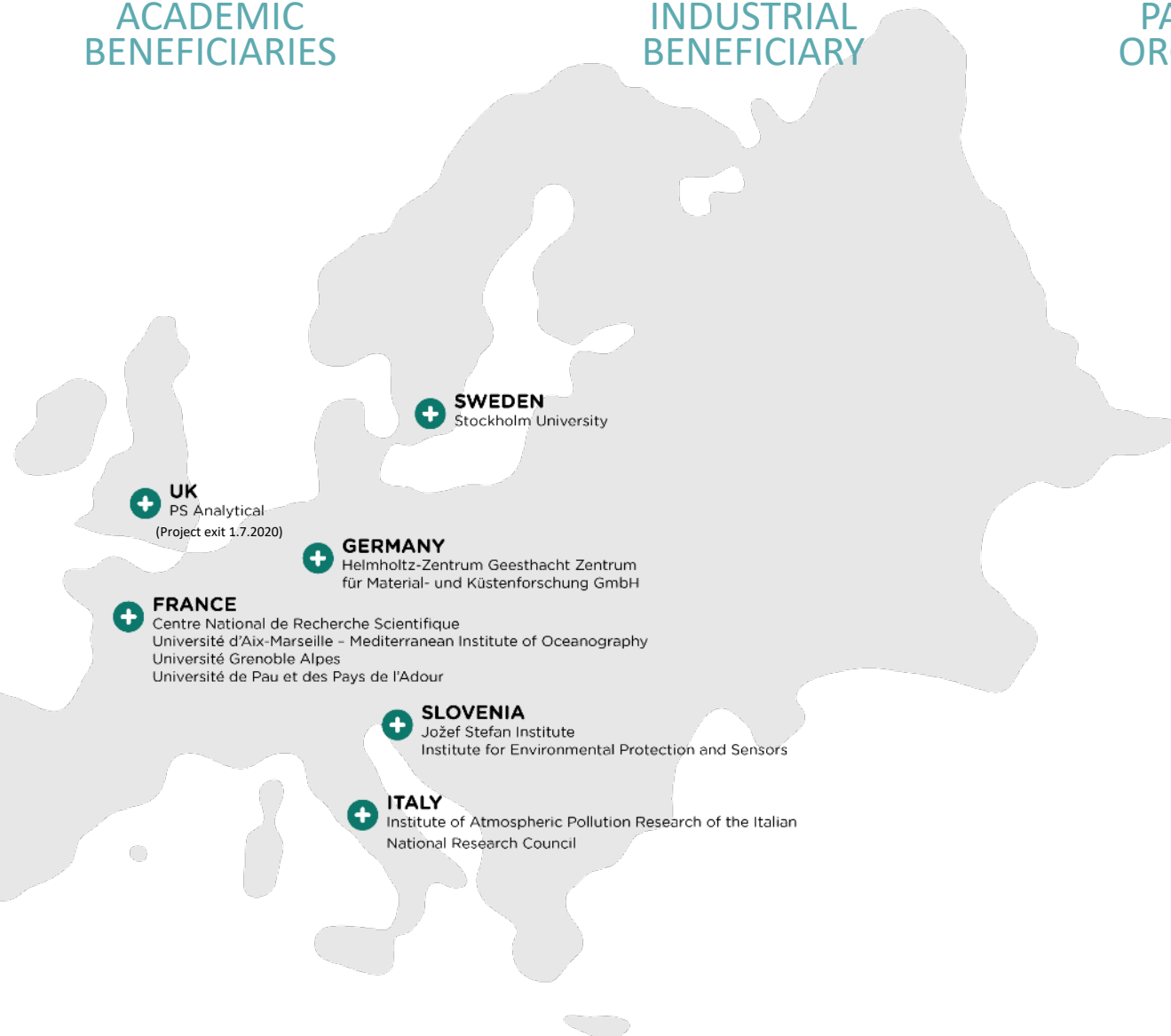
1

INDUSTRIAL
BENEFICIARY



16

PARTICIPATING
ORGANISATIONS



Participating Organisations (ESRs secondments)

Arctic Monitoring and Assessment Programme	AMAP	Norway
United Nations Environmental Programme	UNEP	Switzerland
Massachusetts Institute of Technology	MIT	USA
Harvard University	Harvard	USA
PS Analytical	PSA	United Kingdom
Institut de Recherche pour le Développement	IRD	France
Swedish Polar Research Secretariat	SPRS	Sweden
European Environmental Bureau	EEB	Belgium
Tekran	Tekran	Canada
Lumex	Lumex	Germany/Russia
Dutch National Standard Laboratory	VSL	The Netherlands
Aristotle University of Thessaloniki	AUTH	Greece
Meteorological Synthesizing Centre – East of EMEP	MSC-E	Russia
International Postgraduate School Jožef Stefan	IPSJS	Slovenia
Université Paul Sabatier	UPS	France
Université Bretagne Loire	UBL	France



Thanks



© Julia Ronkainen

UNEP
GLOBAL
MERCURY
PARTNERSHIP

UN
environment
programme



GLOBAL
MERCURY
PARTNERSHIP

Yellowfin Tuna, Courtesy NOAA Fisheries, © Photo by Jeff Muir

Global Passive Air Mercury Project

*Sandy Steffen, Environment and Climate
Change, Canada*

Passive air sampling for mercury on a global scale to fill the gaps

Sandy Steffen

Geoff Stuppel and Frank Wania

Environment and Climate Change Canada, Air Quality Research Division, Toronto

University of Toronto Scarborough, Canada

Instruments Corporation, Toronto, Canada.

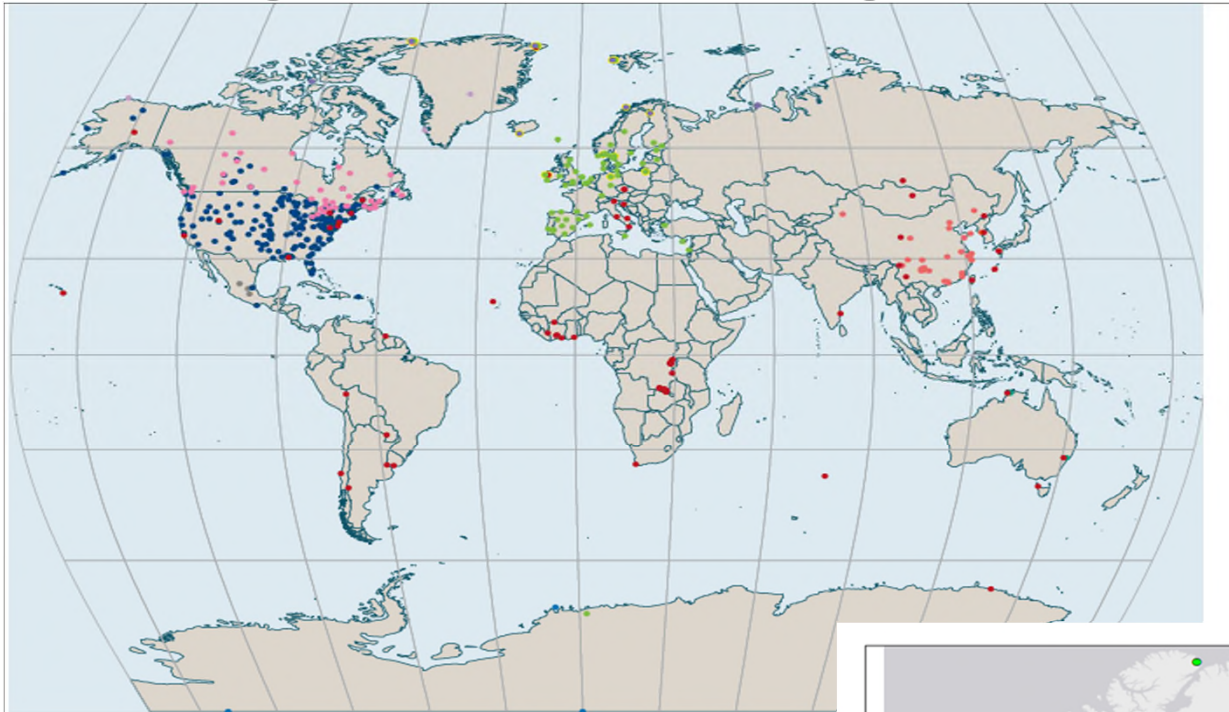


Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada 

Change is in the air globally...

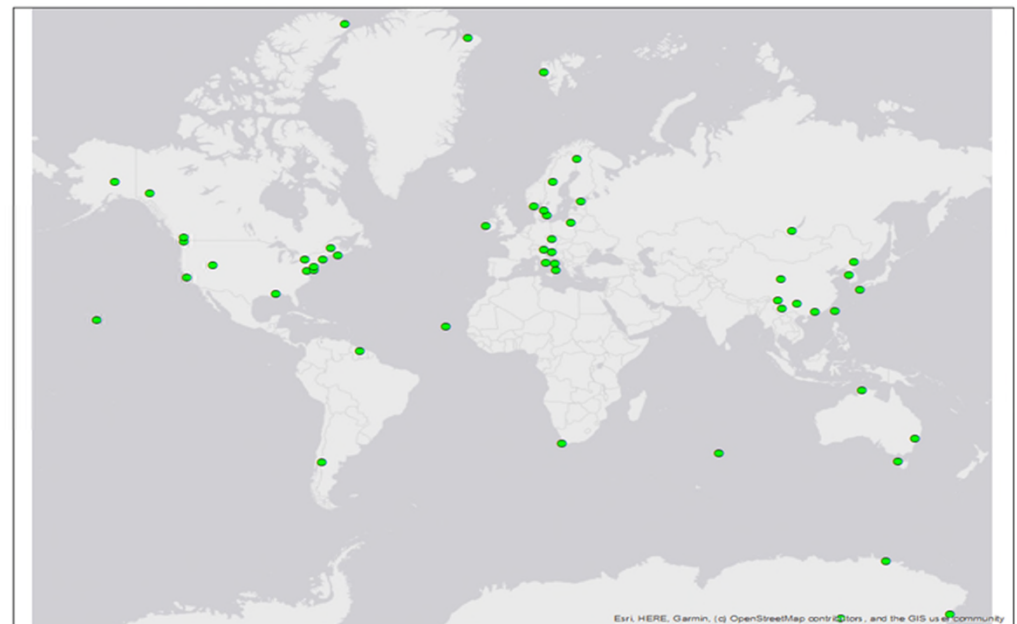


- | International networks | | National networks | |
|------------------------|---|---------------------|----------|
| ● AMAP | ● MDN (Canada and United States) | ● Australia | ● Canada |
| ● EMEP | ● Long-term air monitoring (>10-year time-series) | ● China | ● Japan |
| ● GMOS | | ● Republic of Korea | ● Mexico |

Figure 4.1 Global map of Hg monitoring networks (www.gos4m.org and metadata description therein for

What once looked pretty good ...

Now needs a little help



Time for some passive sampling

Canadian technology developed at University of Toronto

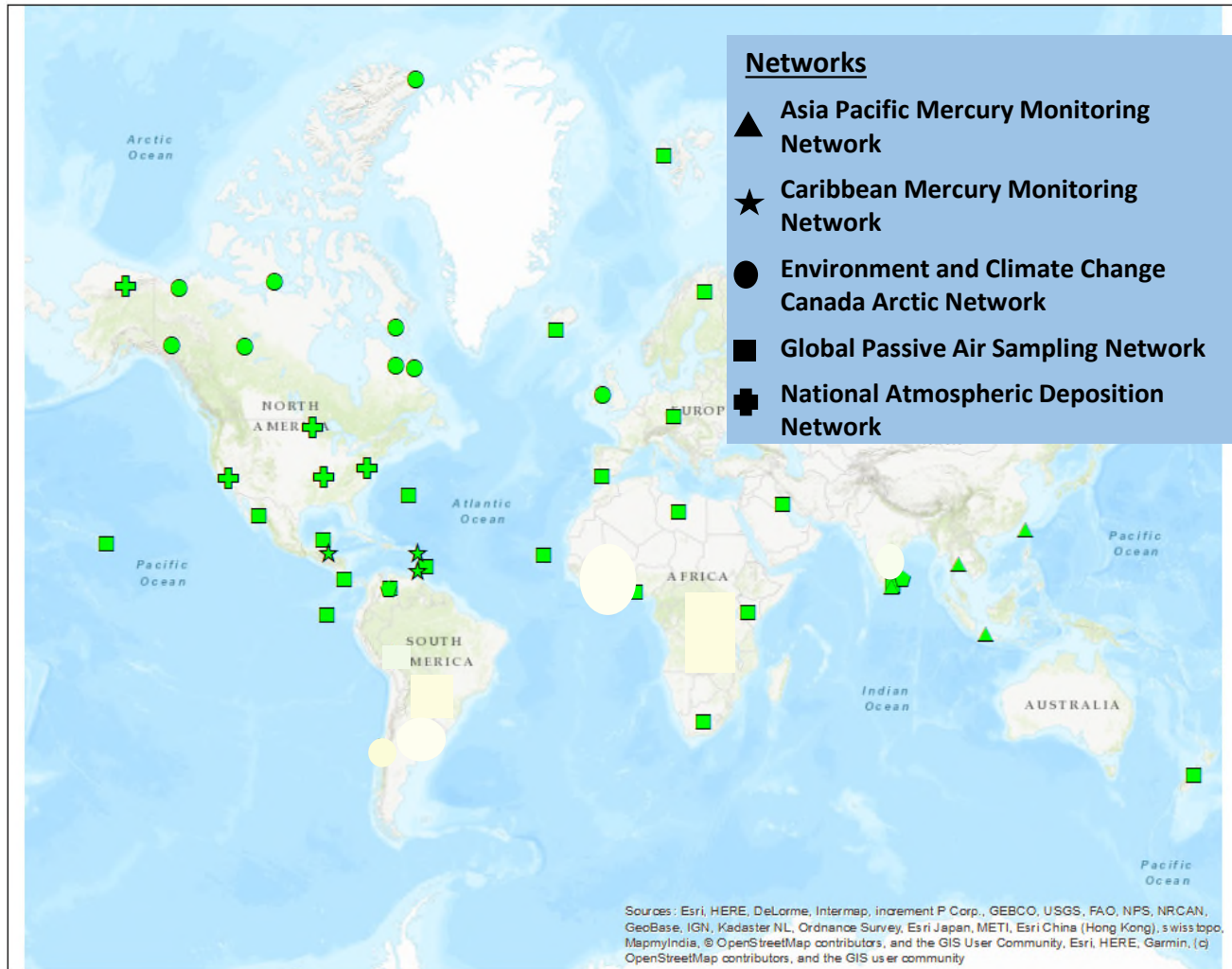
- David McLagen/Frank Wania/Carl Mitchell, UTSC
- Commercially available at Tekran Instruments Corp. as MerPAS®



Sulphur impregnated carbon

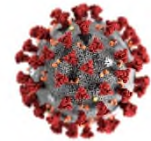


Progress so far in the global pilot study



- 55 sites
- ~285 deployed
- ~ 200 lab

But...



We have not had access to the lab to analyze the samples yet.

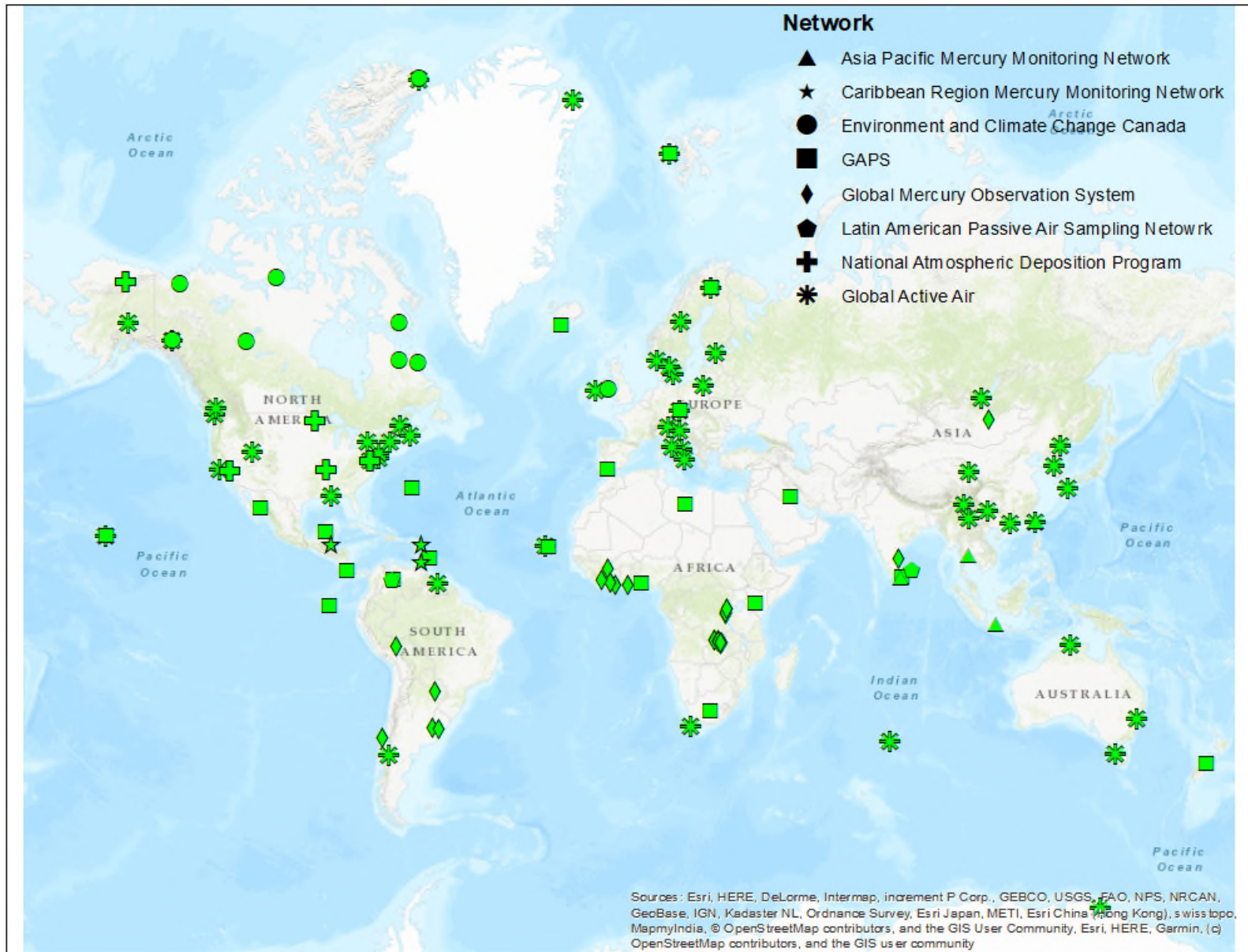


Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada

Passive and active measurements combined



While we are moving forward, there are still many gaps to fill



**GEF-STAP - *David Evers, Biodiversity
Research Institute, U.S.***

EVENT

Mercury air transport and fate research Partnership Area - 2020 Meeting

10 December 2020
Online, 15:00 - 17:00 CET



GLOBAL BIOTIC MERCURY CONSIDERATIONS

David Evers, PhD
Biodiversity Research Institute
Portland, Maine, USA

TECHNICAL INFORMATION REPORT ON MERCURY MONITORING IN BIOTA

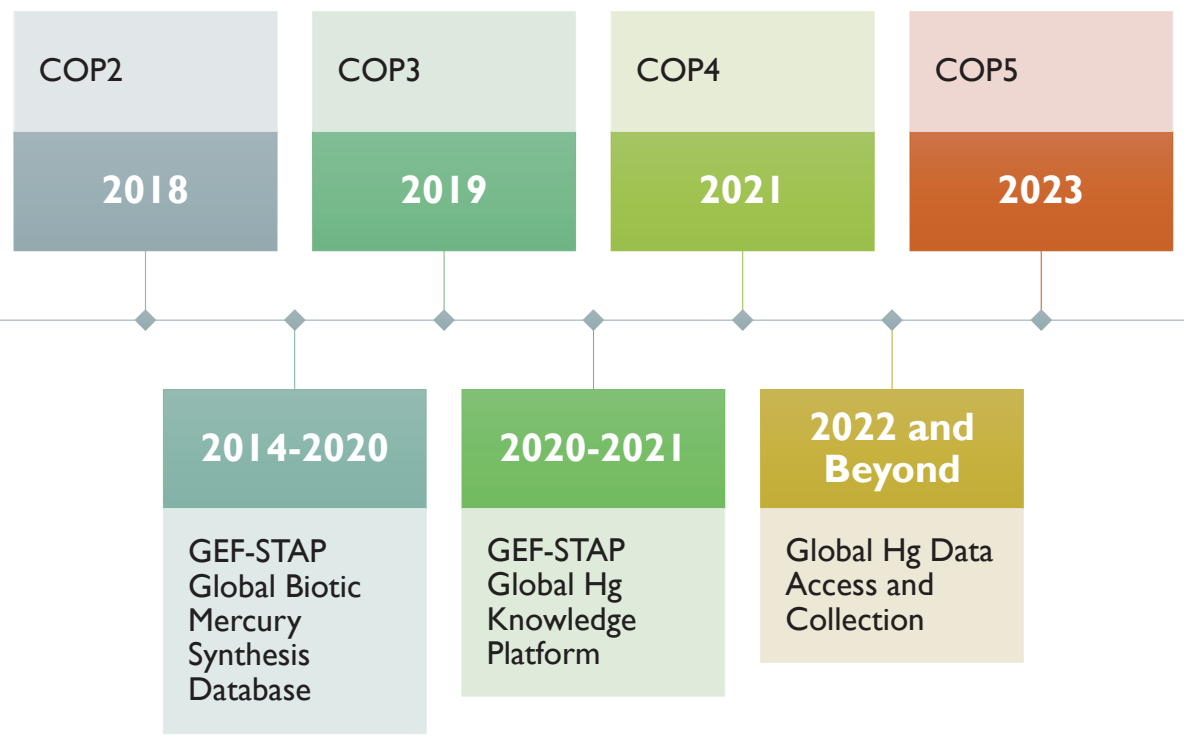
November 2019



Proposed components towards a strategic long-term plan for monitoring mercury in fish and wildlife globally.



DEVELOPING A GLOBAL MERCURY KNOWLEDGE PLATFORM FOR BIOTA



PROJECT OBJECTIVES

Establish

Establish a Science-Policy Advisory Panel to guide the project – work through the Fate and Transport GMP;

Assess

Assess web-based Global Knowledge Platforms for a collaborative, open-source system with an inclusive and scalable platform;

Generate

Generate a centralized database for existing mercury concentrations in biota (based on GBMS) and a national database

Identify

Identify a suite of queries collated from Parties and other stakeholders of the Minamata Convention through a process involving the Science-Policy Advisory Panel;

Collaborate

Collaborate with data providers, information technology experts, end-users, and other stakeholders to design and develop a functional online platform

Conduct

Conduct testing of the platform capabilities, including data acquisition, data ingestion, data quality control, information synthesis, data query, and data visualization

STAP SCIENTIFIC AND TECHNICAL
ADVISORY PANEL
*An independent group of scientists that advises
the Global Environment Facility*



GLOBAL BIOTIC MERCURY SYNTHESIS DATABASE

- Peer-reviewed publications: >1,400
- Locations: ~ 3,500
- >760,000 biotic Hg concentrations

	Fish	Sea Turtles	Birds	Marine Mammals	Subtotal
Ocean Basins					
Antarctic	1,228		5,274	2,894	9,396
Arctic	1,811		5,233	7,189	14,233
Gulf of Mexico-Caribbean	8,162	415	222	529	9,328
Indian	5,511	196	2,305	180	8,192
Mediterranean	11,502	476	1,063	1,420	14,461
North Atlantic	25,559	1,122	24,582	5,484	56,747
North Pacific	19,649	611	44,037	4,817	69,114
South Atlantic	11,422	397	1,748	1,011	14,578
South Pacific	5,869	6	2,667	171	8,713
Subtotal	90,713	3,223	87,131	23,695	204,762
Continents					
Africa	5,238	277	1,459	388	7,362
Antarctica			5,062	2,724	7,786
Asia	8,011	326	4,525	2,001	14,863
Australia	95		1,526	117	1,738
Europe	7,945	747	20,887	4,053	33,632
North America	179,205	1,322	89,850	14,466	284,843
South America	32,634	551	2,457	968	36,610
Subtotal	233,128	3,223	125,766	24,717	386,834
Total	461,018	6,169	250,073	49,046	766,306

BRI's Global Mercury Projects
 BRI has partnered with UN agencies, country ministries, IGOs and NGOs around the world (n = 74 countries) to better understand mercury exposure to people and the environment, and to help Parties meet goals of the Minamata Convention. To view an interactive map of where we have conducted sampling or assisted countries from 2014-2018, visit: www.brioon.org/minamata

Scandinavia:
 >50,000 fish Hg samples available

Canada: 186,000 fish Hg samples available

USA: 162,700 fish Hg samples available

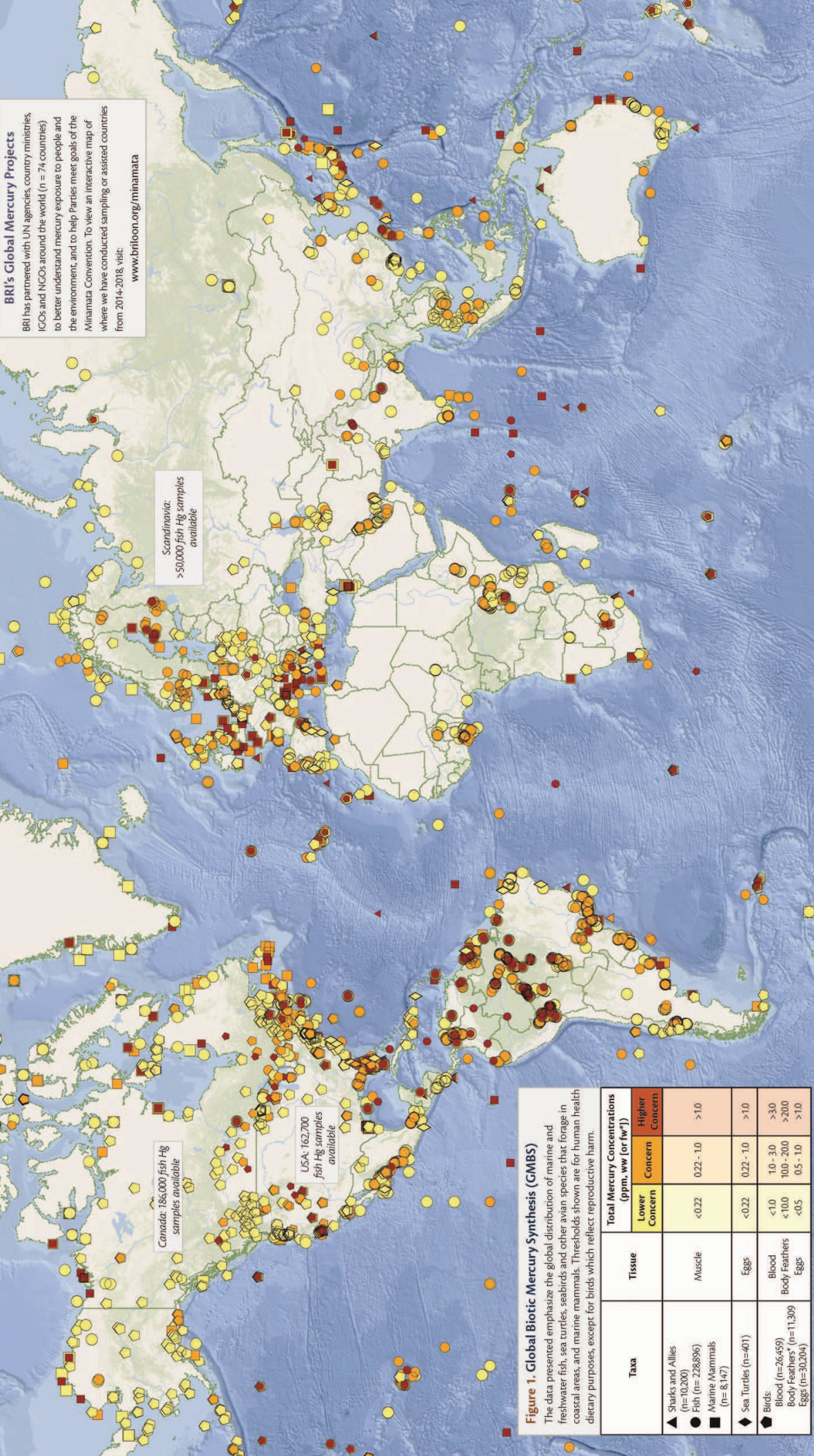
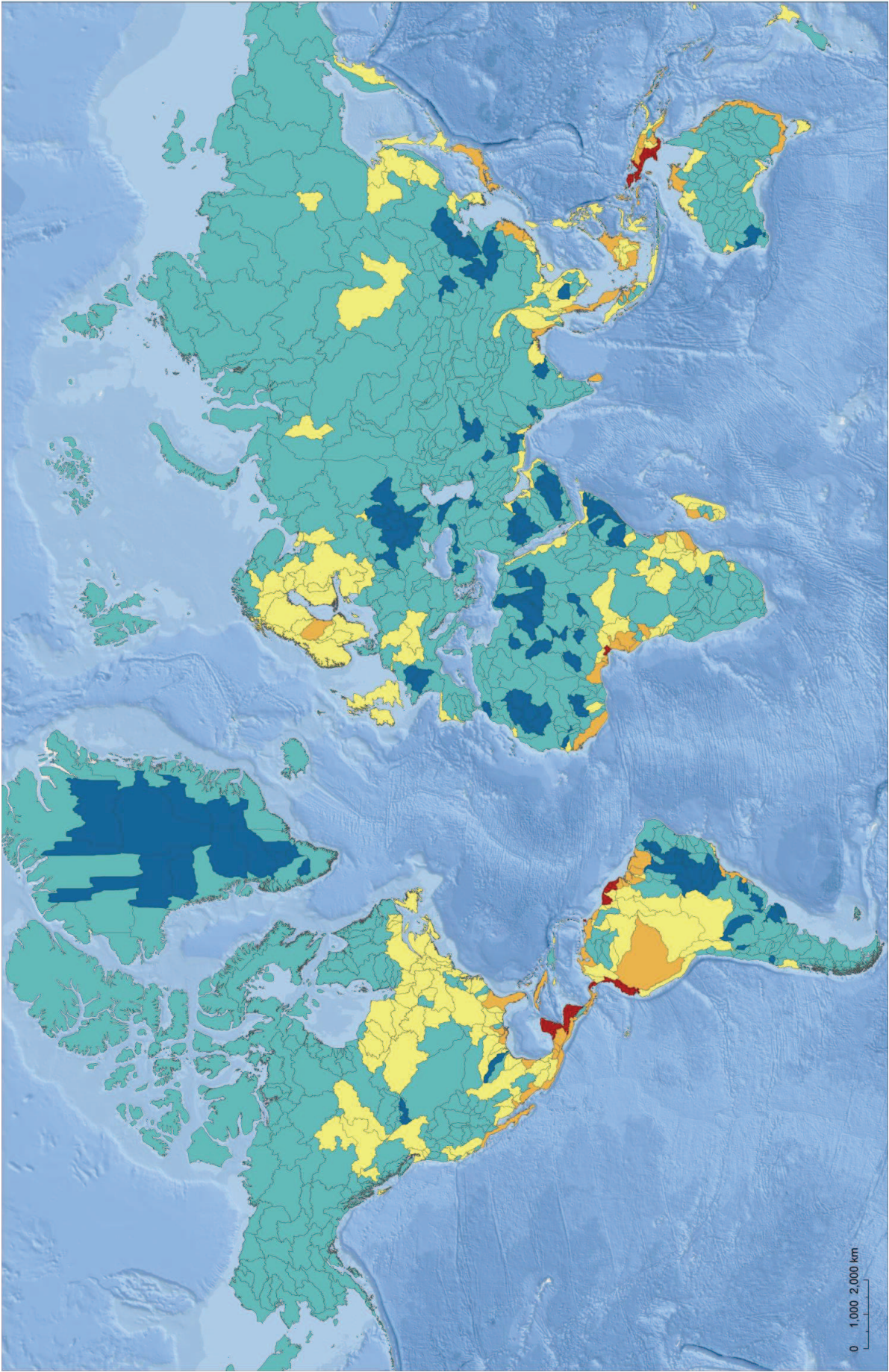


Figure 1. Global Biotic Mercury Synthesis (GBMS)
 The data presented emphasize the global distribution of marine and freshwater fish, sea turtles, seabirds and other avian species that forage in coastal areas, and marine mammals. Thresholds shown are for human health dietary purposes, except for birds which reflect reproductive harm.

Taxa	Tissue	Total Mercury Concentrations (ppm, ww [or fw*])	
		Lower Concern	Higher Concern
▲ Sharks and Allies (n=10,200)			
● Fish (n=228,896)	Muscle	<0.22	>1.0
■ Marine Mammals (n=8,147)			
◆ Sea Turtles (n=401)	Eggs	<0.22	>1.0
● Birds: Blood (n=26,459)	Blood	<1.0	>3.0
● Body Feathers* (n=11,309)	Body Feathers	<100	>200
● Eggs (n=30,204)	Eggs	<0.5	>1.0

A provisional slate of some potential bioindicators for evaluating and monitoring environmental Hg loads (Evers et al. 2016 Sci. Total Environ. 569-570:888-903)

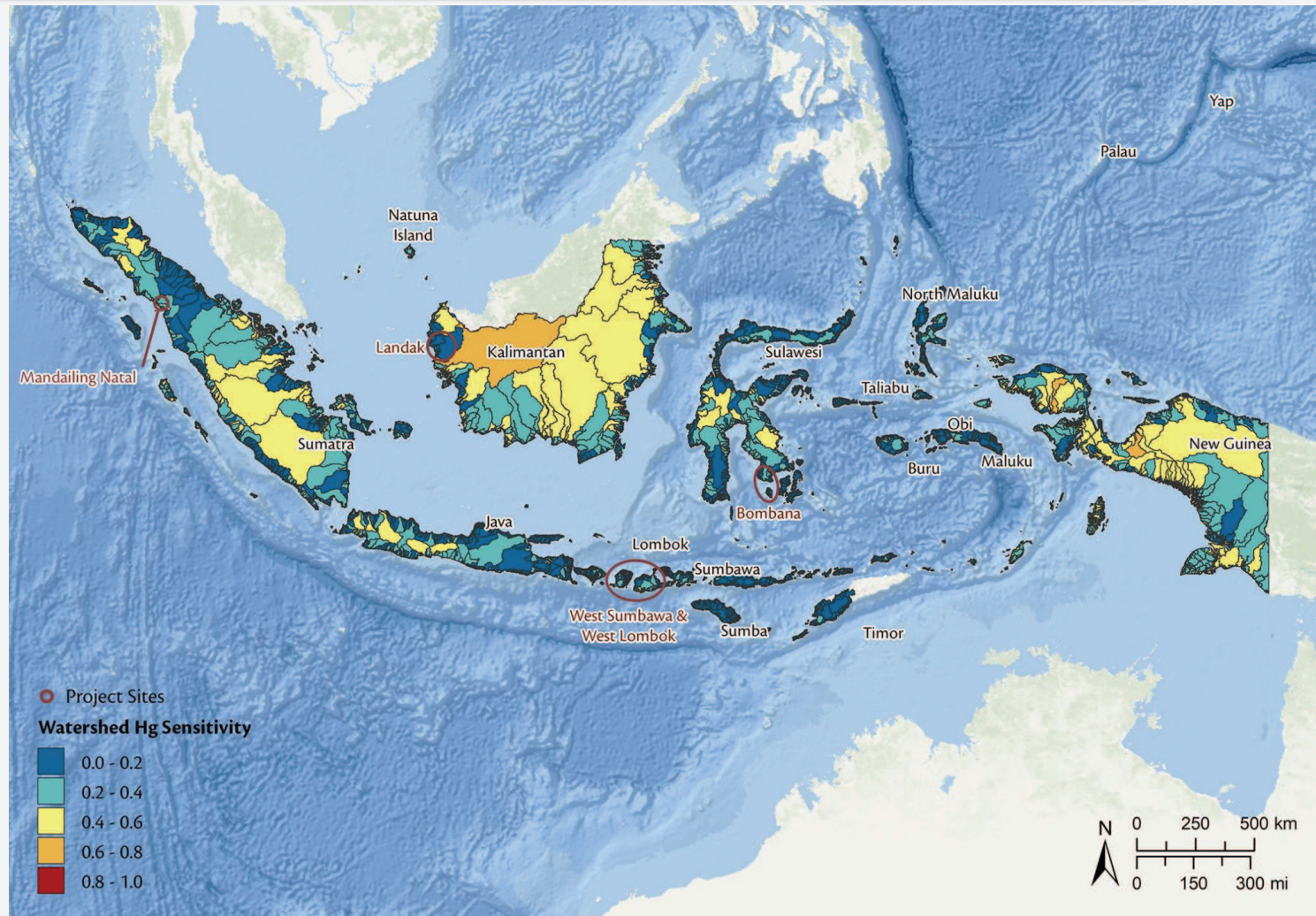
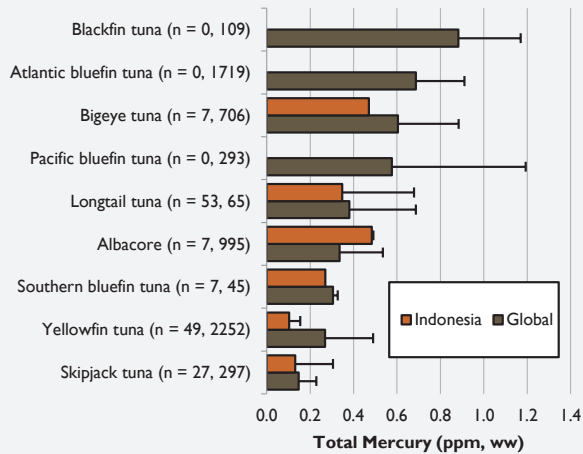
Target Terrestrial Biomes	Associated Aquatic Ecosystems	Ecological Health Bioindicators				Human and Ecological Health Bioindicators		
		Freshwater and Marine Fish	Freshwater Birds	Marine Birds	Marine Mammals & Sea Turtles	Freshwater Fish	Marine Fish	Marine Mammals
Arctic Tundra	Arctic Ocean and associated estuaries, lakes, rivers	Sticklebacks ¹ (freshwater); Arctic Cod ² Sculpin ³ (marine)	Loons ^{4,5}	Fulmars ⁶ Murres ⁶	Polar Bears ⁷ Seals ⁸	Arctic Char ⁹ Arctic Grayling ¹⁰	Halibut ¹¹ Cod ¹¹	Beluga ^{12, 2} Narwhal ^{12, 2}
Boreal Forest and Taiga	North Pacific and Atlantic Oceans and associated estuaries, lakes, rivers	Perch ¹³ (freshwater); Mummichogs ¹⁴ (marine)	Loons ¹⁵ Eagles ¹⁶ Osprey ¹⁷ Songbirds ¹⁸ (Warblers, Flycatchers, Blackbirds)	Osprey ¹⁹ Petrels ²⁰	Mink ^{21,22} Otter ^{21,22} Seals ²³	Catfish ¹¹ Pike ¹⁰ Sauger ¹⁰ Walleye ¹⁰	Flounder ¹¹ Snapper ¹¹ Tuna ¹¹	Pilot Whale ²⁴
Temperate Broadleaf and Mixed Forest	North Pacific and Atlantic Oceans, Mediterranean and Caribbean Seas, and associated estuaries, lakes rivers	Perch ¹³ (freshwater); Mummichogs ¹⁴ Rockfish ¹¹ Sticklebacks ²⁵ (marine)	Loons ⁴ Grebes ^{5,26} Egrets ²⁷ Herons ²⁷ Osprey ¹⁷ Terns ²⁶ Songbirds ¹⁸ (Warblers, Flycatchers, Wrens, Blackbirds, Sparrows)	Cormorants ²⁸ Osprey ^{5,19} Terns ^{26,28}	Otter ^{21,22} Sea Turtles ²⁹ Seals ²³	Bass ^{10,30,31} Bream ¹¹ Mullet ¹¹ Walleye ³¹	Barracuda ¹¹ Mackerel ¹¹ Mullet ¹¹ Scabbard-fish ¹¹ Sharks ^{11,32} Tuna ^{11,32}	
Tropical Rainforest	South Pacific and South Atlantic and Indian Oceans and associated estuaries, lakes, rivers	Catfish ²³ Piranha ³⁴ Snook ¹¹ (freshwater); Bay Snook ^{11,34} (marine)	Egrets ²⁷ Herons ²⁷ Kingfishers ³⁵ Songbirds ³⁶ (Wrens, Thrushes, Flycatchers)	Albatrosses ^{37,38} Noddy ³⁹ Shearwaters ³⁹ Terns ³⁹ Tropicbirds ³⁹	Otter ⁴⁰ Sea Turtles ²⁹ Seals ⁴¹	Catfish ¹¹ Snakehead ¹¹	Barracuda ¹¹ Grouper ⁴² Sharks ^{43,44} Snapper ¹¹ Swordfish ^{11,45} Tuna ^{11,45}	



ECOSYSTEM SENSITIVITY MODEL

Risk Factors (included)

- ASGM Activities
- Wetlands (Mangroves and ricefields)
- Forest Cover
- Soil Type
- River riparian habitat (oxbows)
- Peatlands
- Urban areas
- Agricultural areas





Communications - *Celia Chen, Dartmouth College, U.S.*

F&T PARTNERSHIP COMMUNICATION

Improving Inclusivity and participation

- Current representation (academic, government, private sector, NGO)
- Geographic, sector, and expertise representation
- Other experts that would benefit the advisory role of the Partnerships

Types of communication

- Online meetings of F&T Partnership
- In person meetings prior to COP (after COVID)
- Newsletters for sharing activities of membership
- Email updates pertaining to Minamata-related activities
 - Online webinar schedule
 - Reports and guidance documents
 - Activities of other Partnerships

