



# "Challenges in Modelling Mercury Dynamics Across Atmosphere, Ocean, and Terrestrial Systems"

Joint GMOS-Train and MCHgMAP Workshop

Grand Hotel Bernardin, October 9-11, 2024, in Portorož, Slovenia

Zoom link: <https://us06web.zoom.us/j/86081452329?pwd=wXNaCDBQc93jICAtNmO65iljJkpc3.1>

Meeting ID: 860 8145 2329

Passcode: 322353

---

## *Preamble*

The MCHgMAP coordination meeting will be held from October 9-11, 2024, in Portorož, Slovenia, organized by the Meteorological Synthesizing Centre – East (MSC-E), in collaboration with the Jožef Stefan Institute and the EU GMOS-Train project.

The Multi-Compartment Mercury Modeling and Analysis Project (MCHgMAP) focuses on supporting the evaluation of the Minamata Convention on Mercury and the Convention on Long-Range Transboundary Air Pollution through multi-model mercury analysis. By employing a range of environmental mercury models, MCHgMAP seeks to provide a consistent and comprehensive understanding of mercury dynamics across various environmental compartments.

The meeting will review progress from the first phase of MCHgMAP experiments on mercury trends, addressing both the challenges and the next steps for contributing to the Minamata Convention's effectiveness evaluation. It aims to foster collaboration among MCHgMAP modeling groups, encourage participation from young scientists of the GMOS-Train project, and promote cross-community cooperation in mercury modeling and environmental research.

This workshop also provides an important platform for GMOS-Train researchers to explore potential collaborations, especially in relation to their role in supporting the Minamata Convention's global process. Engaging in this international forum allows GMOS-Train scientists to align their expertise in mercury monitoring and modeling with broader global efforts to assess and mitigate mercury pollution. Such involvement strengthens the project's long-term impact and ensures that research outcomes contribute directly to policy evaluations and international mercury governance.

A poster session will demonstrate some of the outcomes of the GMOS-Train project, offering participants an opportunity to engage deeply with the research findings and explore avenues for ongoing collaboration.

---

---

## Wednesday, 9th October 2024



**09:00 – 10:30**

### Introduction (Setting the stage):

- GMOS-Train (Milena Horvat) – 15 min
- MCHgMAP multimedia modelling (Ashu Dastoor) – 20 min
- Atmospheric modeling (Oleg Travnikov) – 20 min
- Ocean modeling (including ecosystems) (Johannes Bieser) – 20 min
- Discussion

**10:30 – 11:00**

### Coffee & Tea Break

**11:00 – 12:30**

### Emissions & releases inventories:

- EDGAR Hg Emissions inventory (Marilena Muntean) – 20 min
- P-CAME Hg Emissions inventory (Qingru Wu / Shuxiao Wang) – 20 min
- Future emission scenarios (Flora Brocza) – 20 min
- Discussion

**12:30– 14:00**

### Lunch Break

**14:00 – 15:30**

- Volcanoes and hydrothermal vents (Alkuin Koenig, Natalia Torres Rodriguez) – 20-30 min
- Geogenic emissions, volcanoes, and forest fires (Eric Roy) – 20 min
- Terrestrial emissions (Che-Jen Lin) – 20 min
- Discussion

**15:30 – 16:00**

### Coffee & Tea Break

**16:00 – 17:00**

- Releases: riverine input, input to the Arctic, coastal erosion, groundwater discharge, permafrost (*David Kocman, Eisaku Tada, Sofi Jonsson*)
- Discussion

**19:00**

**Evening: Joint Dinner, science slam, (Arcade Club Hotel Histrion)**

---

---

**Thursday, 10th October 2024**



**09:00 – 10:30**

**Measurements:**

- Atmospheric measurements (*to be confirmed*) – 10 min
- Measurements of reactive mercury (Jan Gačnik) – 10 min
- Speciation and interconversion of atmospheric mercury (A. Kalizhov) – 10 minutes
- Air-Land exchange fluxes (Aryeh Feinberg) – 10 min
- Seawater concentrations and fluxes (Anne Soerensen) – 10 min
- Natural archives (Una Jermilova) – 10 min
- Discussion of uncertainties

**10:30 – 11:00**

**Coffee & Tea Break**

**11:00 – 12:30**

**MCHgMAP simulations: Phase I results:**

- Setup of the MCHgMAP simulations (Oleg Travnikov) – 10 min
- Atmospheric Multi-model results and evaluation (Andrei Ryjkov) – 20 min
- Methods for assessing inventory accuracy (Eric Roy) – 10 min
- Atmospheric mercury trend issues (Aryeh Feinberg) – 10 min
- Discussion

**12:30 – 13:30**

**Lunch Break**

**13:30 – 15:00**

**MCHgMAP simulations: Phase I results (Continued):**

- Ocean Multi-model results and evaluation (Johannes Bieser) – 15 min
- ICON-MERCY (Johannes Bieser) – 10 min
- MITgcm (Shaojian Huang / Yanxu Zhang) – 15 min
- Discussion

**16:00 – 17:00**

**Excursion on a boat, Dinner (Restaurant Pavla – to be confirmed)**

---

---

**Friday, 11th October 2024**



**09:00 – 10:30**

- Discussion of issues, uncertainties, and planning next phase simulations
  - Atmosphere
  - Ocean
  - Multimedia

**10:30 – 11:00**

**Coffee & Tea Break**

**11:00 – 12:30**

- Discussion of issues, uncertainties, and planning next phase simulations (continued)
  - Atmosphere
  - Ocean
  - Multimedia
- Conclusions
- Planning next phase simulations

**12:30 – Lunch**

**End of the Meeting**

---

---

## List of posters:

1. **Requirements for comparable mercury speciation analyses in seawater**, Igor Živković, Lars-Eric Heimbürger-Boavida, Mariia V. Petrova, Aurélie Dufour, Ermira Begu, and Milena Horvat
2. **Gold sampling for atmospheric mercury analysis: insights and limitations**, Jan Gačnik, Sarrah M. Dunham-Cheatham, Seth Lyman, Mae Sexauer Gustin
3. **Stability of common preconcentration methods for gaseous oxidized mercury in air**, Sreekanth Vijayakumaran Nair, Saeed Waqar Ali, Jan Gačnik, Igor Živković, and Milena Horvat
4. **Development of an improved continuous calibration method for gaseous elemental mercury measurements**, Teodor D. Andron, Warren T. Corns, Igor Živković, Saeed W. Ali, Sreekanth Vijayakumaran Nair, Milena Horvat
5. **An improved remote sampling technique for atmospheric pollutants**, Teodor D. Andron, Milena Horvat, Brian Neary, Tony Rogers, Matthew Dexter, Warren T. Corns
6. **Tree rings as historical archives of atmospheric mercury**, Jan Gačnik, Mae Gustin
7. **GMOS-Train uncertainty course – training young scientists in fundamentals of metrology and determination of measurement uncertainty**, Igor Živković, Alkuin Maximilian Koenig, Sreekanth Vijayakumaran Nair, Luisa Ma. Malberti, Natalia Torres Rodriguez, Alina Kleindienst, Isabel García Arévalo, Sonja Gindorf, Charlotte Haugk, Saeed, Waqar Ali, Teodor-Daniel Andron, Allwin Mabes Raj, David Amptmeijer, Koketso Michelle Molepo, Charikleia Gournia, and Milena Horvat
8. **Mercury dynamics in heavily polluted Idrijca and Soča River**, Jože Kotnik, Igor Živković, Ermira Begu, Polona Klemenčič, Saeed Waqar Ali, Tamara Kerševan, Milena Horvat
9. **Mercury speciation in cement plant emissions and impact on ambient air quality and Hg distribution**, Jože Kotnik, Igor Živković, Jan Gačnik, Sreekanth Vijayakumaran Nair, Tanja Ljubič Mlakar, Milena Horvat,
10. **Assessment and modelling of the impact of climate change on Hg concentrations in contaminated sites – the Idrijca and Isonzo (Soča) rivers and the Gulf of Trieste**, Dušan Žagar, Gorazd Novak, Matjaž Četina, Klaudija Lebar, Nejc Bezak, Nataša Atanasova, Mateja Škerjanec, Jože Kotnik, Milena Horvat
11. **Use of corrected reactive mercury measurements for model evaluation: Analysis and implications for global model estimates**, Oleg Travnikov, Jan Gačnik, Sreekanth Vijayakumaran Nair, Igor Živković, Milena Horvat
12. **Particulate-bound mercury sampling using membrane materials: biases due to adsorption of gaseous oxidized mercury**, Jan Gačnik, Natalie Allen, Sarrah M. Dunham-Cheatham, Seth Lyman, and Mae Sexauer Gustin
13. **Pre-concentration method for Hg isotope analysis in low-concentration foliar samples: Optimization and validation**, Saeed Waqar Ali, Dominik Božič, Sreekanth Vijayakumaran Nair,

Igor Živković, Jan Gačnik, Teodor-Daniel Andron, Marta Jagodic Hudobivnik, David Kocman, Milena Horvat

14. **Investigating mercury dynamics during litter decomposition: Insights from a mesocosm study**, Saeed Waqar Ali, David Kocman, Igor Živković, Sreekanth Vijayakumaran Nair, Jan Gačnik, Milena Horvat
  15. **Evaluating Implementation of the Minamata Convention in Slovenia case study: HBM in support of the phase out of dental amalgams**, Vanja Usenik, David Kocman, Davor Kontić, Milena Horvat, Adna Alilović, Janja Snoj Tratnik
-