Foreword

The GMOS-Train project represents a significant forwards in our collective journey to tackle the challenges posed by mercury pollution. Since the signing of the UNEP Minamata Convention in 2013 and its subsequent ratification in 2017, there's been a growing acknowledgment of mercury's pervasive toxicity and its global impact.

Despite years of research, there remain significant gaps in our understanding, particularly regarding the fundamental processes driving mercury transformations. This is where GMOS-Train steps in – a bold initiative aimed at nurturing the next generation of researchers to confront the mercury challenge head-on. As we near the culmination of the GMOS-Train journey, there's a tangible sense of pride and anticipation. The dedication of our ESRs has been truly inspiring, propelling us closer to groundbreaking discoveries. As we prepare to gather for our final meeting at the ICMGP 2024 conference in Cape Town, South Africa, we're reminded of the incredible voyage we've undertaken – a journey fueled by curiosity, collaboration, and a shared commitment.

Concluding our project with a visit to the southernmost tip of Africa feels significant – a reminder of the vastness of our planet and the interconnectedness of our efforts. The memories we've forged along the way will endure, serving as a testament to the power of collaboration and the enduring spirit of exploration.

We are looking forward to the meeting in Cape Town!

Prof. Milena Horvat, GMOS-Train coordinator

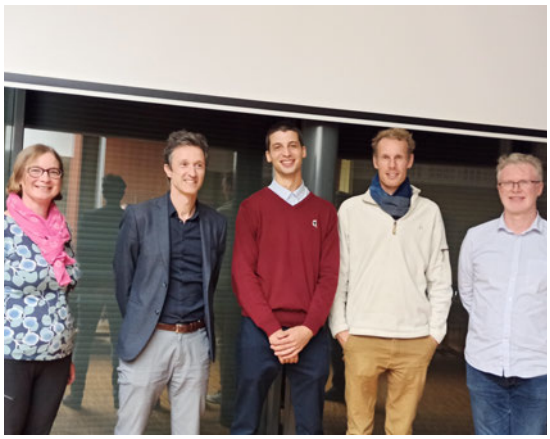
COMING UP . . .

GMOS-TRAIN PROJECT MEETING IN CAPE TOWN, SOUTH AFRICA

19. – 20. July 2024

GMOS-TRAIN FINAL CONFERENCE IN PORTOROŽ, SLOVENIA

9. – 10. October 2024



ALKUIN CELEBRATES PhD DEFENSE SUCCESS WITH GLOBAL COLLABORATORS AND FRENCH TRADITION

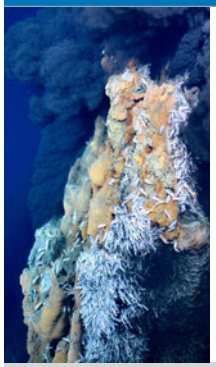
Alkuin Maximilian Koenig successfully defended his PhD thesis "New Constraints on Atmospheric Mercury Cycling from Two Mountain Observatories in the Southern Hemisphere Tropics" on November 2, 2023. The GMOS-Train was well-represented at the defense, both on stage and in the audience, including online attendees. Following the defense, a traditional French pot de thèse was held, featuring a blend of Latin-American, French, and German cuisine to reflect Alkuin's life trajectory.

GOM MEASUREMENT CHALLENGES: ADVANCEMENTS AND INSIGHTS FROM SREEKANTH'S PhDO JOURNEY

Sreekanth Vijayakumaran Nair advances mercury measurement methods, leveraging GMOS-Train training. He publishes in Analytica Chimica Acta and presents at Goldschmidt 2023. Active in workshops and COP 5, he co-authors papers and conducts lab experiments on GOM stability, aiming for further publications and an oral presentation at ICMGP 2024.

LUISA'S EXCITING RESULTS AND COLLABORATIVE ACHIEVEMENTS

Luisa Malberti completes lab work for her PhD, presenting results at GMOS-Train meeting. Collaboration at UPPA yields intriguing findings. She participated in Goldschmidt Conference 2023 with a poster on C and Hg fractionation during MMeHg photodegradation, soon to be published as her 1st paper.

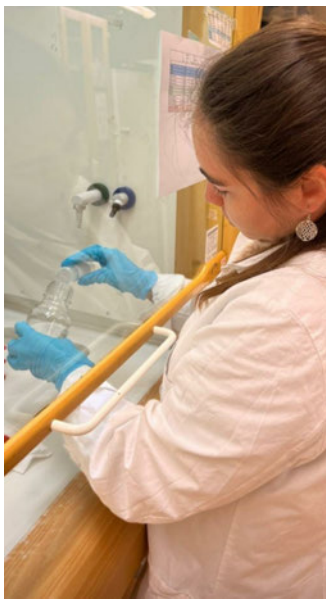


UNVEILING HYDROTHERMAL MERCURY

Natalia Torres Rodriguez has released her inaugural paper examining the impact of anthropogenic mercury emissions on oceanic mercury levels. Contrary to previous assumptions, her study on hydrothermal venting at the Trans-Atlantic Geotraverse reveals a smaller-than-expected natural mercury flux into the ocean. This suggests that the majority of mercury in the ocean is of anthropogenic origin, emphasizing the importance of emission reduction efforts outlined in the UNEP Minamata Convention.

BRIDGING RESEARCH AND COLLABORATION WITH UPLA, CHILE

Alina Kleindienst participated in a three-week exchange program in Valparaíso, Chile, funded by ECOS-ANID international cooperation program. She presented her PhD project on "Methylated Mercury Compounds in Coastal Ecosystems" at a seminar held at UPLA, facilitating interdisciplinary exchange on Hg biogeochemistry.



ISABEL'S DYNAMIC ENGAGEMENT

Isabel García Arévalo engaged in diverse activities spanning data acquisition, career development, and international collaboration. She contributed to the ongoing CAMELIA campaigns, exploring trace metal and nutrient dynamics along the Loire River and estuary. Additionally, she conducted phytoplankton mercury uptake experiments and collaborated on mercury sorption/desorption studies. She underwent modelling training and participated in conferences and conventions, showcasing her research on mercury dynamics. She also initiated collaboration networks in Ecuador for mercury monitoring.

SONJA EXPLORES POLAR MERCURY DYNAMICS

Sonja Gindorf embarked on scientific endeavors from 2023 to 2024, focusing on mercury research in both the Southern and Arctic Oceans. Collaborating with colleagues at MIO in Marseille, she analyzed samples collected during the SCALE winter cruise, with ongoing data analysis. Subsequently, during the Arctic Ocean II cruise onboard the research vessel Kronprins Haakon, Sonja collected a diverse array of samples including water column, zooplankton, fish muscle tissue, benthic biota, surface sediment, and sea ice samples. These samples are currently undergoing analysis at Stockholm University, contributing to our understanding of mercury speciation and distribution in these critical oceanic environments.

PRESENTING RESEARCH AT ACES AMID MATERNITY LEAVE

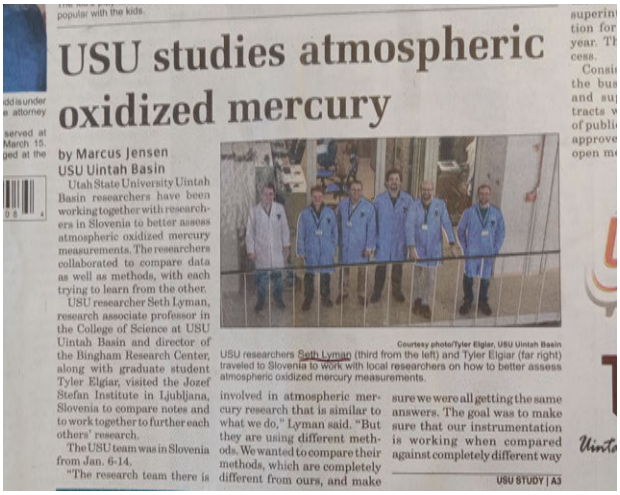
During **Charlotte Haugk**'s maternity leave, professional activities were temporarily paused, but a notable event marked her return: ACES Day.

OPTIMIZING MERCURY ISOTOPE ANALYSIS

Saeed Waqar Ali began the second half of 2022 with virtual participation in the International Conference on Mercury as a Global Pollutant, presenting his work on mercury determination and seasonal isotope signatures in foliage samples. Recognizing the need for improved efficiency in mercury pre-concentration methods, he successfully optimized an existing method, expanding his dataset and benefiting the wider scientific community. In 2023, despite parental responsibilities, he published his optimization work and collaborated on peer-reviewed publications.

ADVANCEMENTS IN ATMOSPHERIC POLLUTANT ANALYSIS: CONTRIBUTIONS TO METROLOGY AND EDUCATION

Teodor-Daniel Andron collaborated with Dr. Igor Živković in an inter-calibration campaign orchestrated by CNR Italy in the scenic Cosenza region. Over the span of a month, they meticulously compared various calibration and detection devices provided by different private partners. Their collaborative efforts promise to yield valuable insights, with anticipation for forthcoming publication.



USU studies atmospheric oxidized mercury

by Marcus Jensen
USU Uintah Basin

Utah State University Uintah Basin researchers have been working together with researchers in Slovenia to better assess atmospheric oxidized mercury measurements. The researchers collaborated to compare data as well as methods, with each trying to learn from the other.

USU researcher Seth Lyman, research associate professor in the College of Science at USU Uintah Basin and director of the Bingham Research Center, along with graduate student Tyler Elgiar, visited the Jozef Stefan Institute in Ljubljana, Slovenia to compare notes and to work together to further each others' research.

The USU team was in Slovenia from Jan. 6-14.

"The research team there is involved in atmospheric mercury research that is similar to what we do," Lyman said. "But they are using different methods. We wanted to compare their methods, which are completely different from ours, and make sure we were all getting the same answers. The goal was to make sure that our instrumentation is working when compared against completely different way

Courtesy photo/Tyler Elgiar, USU Uintah Basin
USU researchers Seth Lyman (third from the left) and Tyler Elgiar (far right) traveled to Slovenia to work with local researchers on how to better assess atmospheric oxidized mercury measurements.

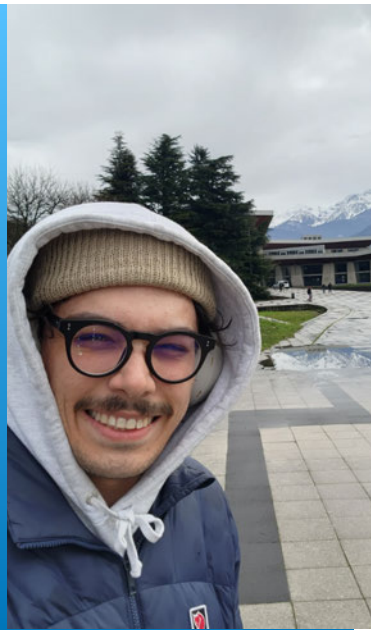
USU STUDY | A3

ALLWIN PRESENTS HIS REASERCH IN POREČ, CROATIA

Allwin Mabes Raj showcased his research on Mer B (Organomercurial-lyase) mediated mercury detection in Poreč, Croatia, during a Conference themed "Power of Microbes." Collaborating with his supervisors Dr. Aleš Lapanje and Dr. Tomaž Rijavec, alongside colleagues from the Biocolloid group, Allwin's poster presentation highlighted advancements in gold electrode preparation and protocol optimization for Histag protein functionalization.

JARED IS SHAPING HIS RESEARCH GOALS AFTER ERCA 2024 WINTER SCHOOL

Jared Walsh, a new ESR12 in the GMOS-Train program, finds himself at the nascent stages of his PhD journey. In January 2024, he had the privilege of attending the ERCA 2024 Winter School in Grenoble, France, where he acquired vital training in Atmospheric Chemistry, laying a robust foundation for his research endeavors. Armed with this newfound expertise, Jared is now honing his research questions and objectives for his thesis. His forthcoming investigations will delve into the intricacies of DGM production in the South Atlantic Ocean, particularly within the framework of DIC remineralization. Moreover, Jared plans to employ modeling techniques to explore the dynamics of Hg release into the atmosphere within this context.

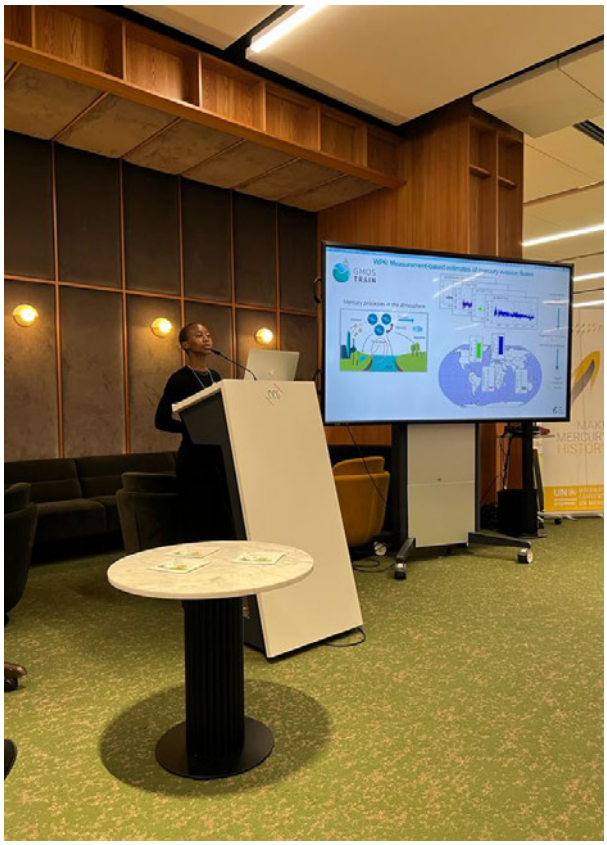


SECONDMENTS, COLLABORATION AND PARENTAL LEAVE

David Amptmeijer embarked on a productive summer, commencing with collaborations in Stockholm alongside Sonja Gindorf on Southern Ocean data. Subsequently, he optimized models for policymaking with Charikleia Gournia at CNR in Rende, Italy. David also supervised master students in Hg uptake modeling at the University of Hamburg. Transitioning to parental leave, he now nurtures GMOS trainee, Bo, until October 2024, when he plans to submit his thesis.

KOKETSO'S DYNAMIC YEAR: EVENTS, SECONDMENTS AND CONFERENCES

In 2023, **Koketso Molepo** had a bustling year filled with various engagements. She commenced the year with the GMOS-Train Modeling Winter School & Hackathon in Hamburg, Germany, followed by a reunion with fellow ESRs at the GMOS-Train meeting in Nantes, France. Later in November, Koketso embarked on her second secondment at L'Institut des Géosciences de l'Environnement (IGE), Université Grenoble Alpes, France, where she collaborated with prominent mercury researchers. This coincided with her participation in the Conference of the Parties to the Minamata Convention on Mercury (COP-5) in Geneva, Switzerland, presenting the GMOS-Train project alongside her team. Additionally, Koketso's abstract for the 16th International Conference on Mercury as a Global Pollutant (ICMGP) in Cape Town was accepted, offering her a valuable opportunity to reconnect with fellow researchers and visit her home country after an extended absence.



TRAINING AT JRC AND SECONDMENT AT MIT

Charikleia Gournia embarked on a transformative journey during her PhD, marked by invaluable experiences and impactful collaborations. Her training at the Joint Research Centre in Ispra, guided by Dr. Marilena Muntean, provided insights into the EDGAR inventory, enriching her knowledge base. Further enhancing her expertise, Charikleia's major secondment at the Massachusetts Institute of Technology under the mentorship of Professor Noelle Selin proved to be pivotal. Despite the brevity of two months, these experiences stood out as the highlight of her doctoral journey.

PAST EVENTS

Metrology in mercury measurements virtual training
prof. dr. M. Horvat and dr. I. Živković (JSI), 29. & 30. 9. 2022

Winter School 3
Hereon, Hamburg, Germany, 6. 2. - 8. 3. 2023

Summer School 2
IFREMER, Nantes, France, 18. - 20. 9. 2023