

**GEO Health Community of Practice (CoP)**  
**Deep Dive on Health Activities in the European Region**  
June 9, 2023

**In Attendance:** 46 participants

John Haynes (NASA HQ), Juli Trtanj (NOAA), Helena Chapman (NASA HQ/BAH), Emily Sylak-Glassman (NASA HQ), Trisha Castranio (NIEHS/NIH), Kim McMahon (NOAA NWS), Brian Tisdale (NASA Langley), Carl Malings (NASA Goddard; Morgan State Univ.), Ajay Gupta (HSR.health), Michael Temchine (HSR.health), Ram Peruvemba (HSR.health), Steve Moran (Google), Karly Harrod (Oak Ridge National Laboratory), Douglas Rao (North Carolina State U./NCICS/CISESS), Mark Seielstad (Univ. of California, San Francisco), Thilanka Munasinghen (Rensselaer Polytechnic Institute), Olayinka Osulale (Elizade Univ., Nigeria), Maria Joao Feio (Universidade de Coimbra, Portugal), Mahesh Jampani (IWMI), Wenbo Chu (GEO Secretariat), Martyn Clark (GEO Secretariat), Paschalis Tziastias (European Commission), Franz Immler (European Commission), Jean Dusart (European Commission), Erwin Goor (European Commission/REA), Cristina Ananasso (European Centre for Medium-Range Weather Forecasts), Julie Letertre (European Centre for Medium-Range Weather Forecasts), Andreas Skouloudis (iSteep.org), Haris Kontoes (National Observatory of Athens), Mirka Rossi (National Observatory of Athens), Argyro Tsantalidou (National Observatory of Athens), Konstantinos Tsaprallis (National Observatory of Athens), Theoktisti Makridou (National Observatory of Athens), Alexandra Kazmierczak (European Environment Agency), Nicola Pirrone (National Research Council, CNR, Italy), Quillon Harpham (HR Wallingford, UK), Bernd Eggen (UKHSA), Frederic Bartumeus (Spanish Research Council, Spain), Carlos Barboza (Ministry of Public Health, Uruguay), Christos Karydas, Nikos Perros, Sandra Gewehr, Spiros Mourelatos, Stefano Ferretti, Vaslliki Kosmidou, Damian Markov S-Viva.

**Summary Notes:**

*\*Prepared by Helena Chapman (NASA HQ/BAH)*

**John Haynes (NASA HQ)** and **Juli Trtanj (NOAA)** opened the telecon by welcoming all participants. **John Haynes (NASA HQ)** stated that their EO4Health team has been participating in the AmeriGEO Week planning meetings for [AmeriGEO Week 2023](#), which will be held from August 7-11, in Costa Rica. **Juli Trtanj (NOAA)** invited CoP members to contact us if they are interested in helping organize the One Health session and side event, attending AmeriGEO Week as in-person or virtual participants or submitting abstracts for the poster session.

**Welcome Words & Introduction**

**John Haynes (NASA HQ)**, **Juli Trtanj (NOAA)**, and **Helena Chapman (NASA HQ/BAH)** provided some welcome words to initiate the Deep Dive on Health Activities in the European Region.

**Wenbo Chu (GEO Secretariat)** described the priorities and activities of the GEO Work Programme 2023-2025, which includes five flagships, 19 initiatives, 20 pilot initiatives, four regional GEOs, and four engagement priorities (sustainable development, climate action, disaster risk reduction, urban resilience). She described the updated GEO webpage and 2023 Highlights Report, mentioned that they have shared the [GEO Post-2025 Strategy: Earth Intelligence for All](#), and commented on the Post-2025 Incubator (Global Ecosystem Atlas, Heat and Health). Finally, she reminded CoP members about two upcoming in-person events in Geneva, including the [GEO Symposium](#) on June 13-14 and the Open Data Knowledge Workshop on June 15-16.

**Juli Trtanj (NOAA)** asked how the CoP could help with the GEO Work Programme. **Wenbo Chu (GEO Secretariat)** said that they do not want to duplicate capacity development activities across the Work Programme, but rather clarify what impact-driven and impact-development mean and the next steps to implementation.

### **Introduction of Health Initiatives**

**Helena Chapman (NASA HQ, NASA)** expressed her appreciation and enthusiasm for the coordination of this *Deep Dive on Health Activities in the European Region*, and she welcomed **Paschalis Tziastas (European Commission)**, **Franz Immler (European Commission)**, and **Jean Dusart (European Commission)** to help moderate the project presentations.

**Paschalis Tziastas (European Commission)** introduced **Franz Immler (European Commission)**, who described an overview of the current projects and funding opportunities of the European Commission. He presented the Horizon Europe, noting that Pillar 2 (global challenges and European industrial competitiveness) incorporates health as a priority, and sharing the need for international cooperation to tackle global societal challenges and open science. He mentioned that there are six community systems and enabling conditions – including health and well-being, critical infrastructure, water management, land use and food systems, and ecosystems and nature-based solutions. Finally, he shared some funding opportunities in Horizon Europe for 2024, including environmental pollution in non-communicable diseases (e.g. air, noise, light, and hazardous waste pollution).

**Cristina Ananasso (European Centre for Medium-Range Weather Forecasts)** provided an overview on the Copernicus Thematic Hub, including marine, land monitoring services, climate change, security, and emergency management, which offers simplified access to existing Copernicus products relevant for specific user communities. She mentioned that ECWMF is responsible for two core services – Copernicus Climate Change Service (C3S) and the Copernicus Atmosphere Monitoring Service (CAMS).

**Juli Letertre (European Centre for Medium-Range Weather Forecasts)** shared that the [7<sup>th</sup> CAMS General Assembly](#) which would be held from June 13-15 in Valencia, Spain, and they planned to launch the Copernicus Health Hub on June 14. She highlighted that CAMS data have already been used in public health, especially as [PASYFO](#) (forecasts of personal allergy symptoms), which uses information on multiple air pollutants including pollen to provide high-resolution regional forecasts for personalized allergy symptoms. Then, she commented that C3S data have already been used in public health, especially the [Daily Climate Explorer for Europe](#) – using C3S ERAS reanalysis daily temperature and precipitation data – which enables users to rapidly assess the risks of threatening vector-borne diseases and communicate information to the public. She concluded that [Copernicus Land Monitoring Service](#) (CLMS), C3S, and [Copernicus Emergency Management Service](#) (CEMS) data have helped us better understand urban adaptation to climate change in Europe.

**Aleksandra Kazmierczak (European Environment Agency)** described the [European Climate and Health Observatory](#), which was driven by the EU Strategy on Adaptation to Climate Change 2021 and the EU Climate Law 2021. She mentioned that the Work Plan 2021-2022 focused on heat and infectious diseases, and the Work Plan 2023-2024 highlighted water, climate change and health, and climate and health literacy. She commented that we can analyze climatic suitability for malaria transmission, socio-economic status and percentage of workers highly exposed to high temperatures,

vulnerability of changing demographics or labor trends, and hence work with insurance companies (e.g. floods, wildfires). She also shared examples of case studies included in the [Catalog of Observatory Resources](#).

## **Introduction of Health Projects**

**Paschalis Tziastas (European Commission)** introduced **Haris Kontoes (National Observatory of Athens)**, who described the Early Warning System for Mosquito borne disease (EYWA) and showed the EYWA dashboard with continuous weekly monitoring. He said that before EYWA, there were siloed collections of entomological and epidemiological records, limited indicators providing dynamics in environmental, weather, and landscape changes for mosquito habitats, and no standardization in featuring engineering to support artificial intelligence or dynamic forecasting models. Hence, he said that EYWA set the state for data integration into one system, open spaces with environmental, entomological, health, socio-economic, and climatic indicators, and delivery of validated transfer learning and forecasting models for risk prediction. He shared the project timeline, which started in Greece and Italy (2020), expanded to France, Germany, and Serbia (2021), selected as the 1<sup>st</sup> EIC Horizon Prize on Early Warning for Epidemics, expanded to Cote d'Ivoire operationally and Thailand pre-operationally (2022), and is on track to support Ghana and East Germany (2023).

**Andreas Skouloudis (iSteep.org)** said that early forecasts are always useful and wondered if their team had plans for verifying the measurements. **Carlos Barboza (Ministry of Health, Uruguay)** said that the Brazilian Institute of Geography and Statistics publishes the dependence between cities, and that it would be interesting to explore these algorithms, especially related to trade and land transport of goods and people, and observe the possibility of mosquito activity and disease spread. **Ajay Gupta (HSR.health)** agreed that mapping human mobility can indicate vectors of travel for human-carried illnesses (including mosquitos and other pathogens). **Juli Trtanj (NOAA)** wondered if the EYWA interface is open to the public and if the data will be on a geoserver or portal. **Steve Moran (Google)** said that Atlas AI (Google Earth Engine Partner) may have the trade and transport data, and he shared the recent IEE paper ([An Open Source Tool to Extract Traffic Data from Google Maps: Limitations and Challenges](#)). **Haris Kontoes (NOA)** said that they have considered integrating mobility data across cities, but they have not identified an appropriate example that relies on analytic or systematic record collections to train models. He also commented that the in-situ entomological and health data are connected to a license (as they are owned by reference institutions), and they created Analysis Ready Data EO data with integrated series of environmental, landscape, and meteorological data to facilitate scientific collaborations. **Ajay Gupta (HSR.health)** said that his team develops health risk models including human migration and mobility and would be happy to discuss this topic offline. **Martyn Clark (GEO Secretariat)** suggested that their team review [Flowminder](#) that uses mobile call data records to examine mobility and disease transmission as well as shared a *Science* article ([Quantifying the Impact of Human Mobility on Malaria](#)).

**Nicola Pirrone (National Research Council of Italy, CNR)** described the e-shape Showcase Health, noting that they aimed to demonstrate the high value of EO data and tools in developing cost-effective strategies to mitigate risk for human health associated to environmental pollution. He said that they contribute to the Global Observation System for Mercury (GOS4M), Global Observation System for Persistent Organic Pollutants (GOS4POPS), and EO for Sustainable Development Goals (EO4SDG). He shared four pilot applications as web services co-designed with stakeholders and policy makers: 1) EO-based surveillance of mercury pollution; 2) EO-based surveillance of persistent organic pollutant pollution in framework of Stockholm Convention; 3) EO-based pollution-health risk profiling in urban

environment; and 4) [EYWA](#). Finally, he shared the new ESFRI RI (October 2022-2026) – Research Infrastructure for Environmental Exposure Assessment in Europe – that aims to fill the gap in European infrastructural landscape and pioneer the first EU infrastructure on human exposure research (environmental exposures and their impacts).

**Maria Feio (Universidade de Coimbra, Portugal)** described the [OneAquaHealth project](#) with 13 partners in 10 countries, which aims to protect urban aquatic ecosystems and determine adequate early warning indicators to assess ecosystem health and predict disease outbreak risks. She said that this project promotes One Health, as the health of freshwater ecosystems and human health and well-being in urban contexts are highly interconnected. She shared four research questions: How is urbanization contributing to increasing health risks for humans (physical/mental health) through the degradation of aquatic ecosystems and animals and plants? How is urbanization contributing to emergence/spread of pathogens from aquatic ecosystems to new hosts and humans? Which level of integrity of urban aquatic ecosystems (or of restoration) that allows for maintenance of human, animal, and plant health (e.g. constituting a barrier in facing emerging diseases?) Which environmental parameters are more effective in predicting the outbreak of diseases? She agreed that potential solutions include predictive models, open information hub, city dashboards, decision support systems, and citizen science applications.

**Frederic Bartumeus (Centre for Advanced Studies of Blanes, CEAB-CSIC)** described the [E4Warning project](#) (eco-epidemiological intelligence for early warning and response to mosquito-borne disease risk in endemic and emergence settings), as they aim to build upon existing models in endemic and non-endemic regions to minimize dengue importation. He shared two project goals: 1) to develop vector and host distribution spatial models at regional and continental scales and enable climate-driven disease risk forecasting; and 2) to introduce novel technologies (e.g. ground sensors, mobile phones, internet) and citizen science (like [Mosquito Alert](#)), explore risk factors for pathways and barriers for disease circulation, and identify strategies to make more resilient ecosystems in mosaic landscapes and urban/natural areas. He stated that they plan to combine FARSEER and D-MOSS (disease models in endemic settings) to incorporate citizen science applications where dengue is endemic and D-MOSS is operational, and hence improve water availability models from D-MOSS operational framework. They also plan to study wetlands and urban areas, which connect vectors, reservoirs, and pathogens, and examine the potential of mosquito-borne disease spillover in central Europe.

### **Concluding Remarks**

**John Haynes (NASA HQ)** and **Juli Trtanj (NOAA)** thanked **Paschalis Tziastas, Franz Immler,** and **Jean Dusart (European Commission)** for their support of this *Deep Dive on Health Activities in the European Region* and agreed that it provided an opportunity to share information, connect researchers, and leverage resources that can amplify current activities using Earth observations for public health applications. They all agreed that they would like to coordinate a follow-up teleconference to further discuss health activities in the European region.

**John Haynes (NASA HQ)** closed the teleconference and mentioned that the next community teleconference will be scheduled for Tuesday, June 20, 2023 at 8:30AM EDT (GMT-4).

Adjourned: 10:30AM EDT (GMT-4)