WWQA
World Water Quality Alliance

A community contribution to:

UN WATER

6 CLEAN WATER AND SANITATION

Provisional Agenda

World Water Quality Alliance (WWQA)

2nd Annual Global Meeting

Virtual Meeting

27 and 28 January 2021,

10:00 AM – 2:00 PM (CET)

Co-Hosted by the UN Environment Programme (UNEP) and African Ministers Council for Water (AMCOW)

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Actions and Demonstrative Pilot Projects for a Post-pandemic Resilient Society by Comparative World Water Quality Nature-based Solutions

Eduardo Mario Mendiondo
Water-Adaptive Design & Innovation - WADI Lab
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Escola de Engenharia de Sao Carlos - EESC
Universidade de Sao Paulo - USP
Brazil

Motivation: science-based & policy-driven actions towards comparative world water quality solutions

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…at global scales through downscaling modelling outputs

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Current Opinion in Environmental Sustainability

Global multi-pollutant modelling of water quality: scientific challenges and future directions☆

Maryna Strokal[1], J Emiel Spanier[1], Carolien Kroeze[1], Albert A Koelmans[2], Martina Flörke[3], Wietse Franssen[1], Nynke Hofstra[4], Simon Langan[5], Ting Tang[5], Michelle TH van Vliet[1], Yoshihide Wada[5], Mengru Wang[1], Jikke van Wijnen[6] and Richard Williams[7]

Science of the Total Environment 762 (2021) 144162

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

A stage-based approach to allocating water quality monitoring stations based on the WorldQual model: The Jubba River as a case study

Miguel A. Vega-Rodríguez [a,*], Carlos J. Pérez [b], Klara Reder [c], Martina Flörke [d]

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[d] Hydrological Engineering and Water Resources Management, Ruhr-Universität Bochum, Universitätsstraße 150, 44801 Bochum, Germany

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Current Opinion in Environmental Sustainability

Bridging global, basin and local-scale water quality modeling towards enhancing water quality management worldwide☆

Ting Tang[1], Maryna Strokal[2], Michelle TH van Vliet[2], Piet Seuntjens[3,4,5], Peter Burek[1], Carolien Kroeze[2], Simon Langan[1] and Yoshihide Wada[1,6]

…and systematic world water quality modelling training courses

Example: SWAT(Soil & Water Assessment Tool) Training Course at USP, Brazil

Motivation: science-based & policy-driven actions towards comparative world water quality solutions

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…at local and mid-size scales through upscaling nature-based solutions

Science of the Total Environment 738 (2020) 139408

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Ecosystem service valuation method through grey water footprint in partially-monitored subtropical watersheds

D. Taffarello [a,b,*], M.S. Bittar [a,c], K.S. Sass [d], M.C. Calijuri [a], D.G.F. Cunha [a], E.M. Mendiondo [a]

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Hydrol. Earth Syst. Sci., 22, 4699–4723, 2018
https://doi.org/10.5194/hess-22-4699-2018

Hydrology and Earth System Sciences Open Access EGU

Science of the Total Environment 647 (2019) 923–931

Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

Stormwater volume reduction and water quality improvement by bioretention: Potentials and challenges for water security in a subtropical catchment

Marina Batalini de Macedo [a,*], César Ambrogi Ferreira do Lago [a], Eduardo Mario Mendiondo [b]

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[b] University of Sao Paulo, Av. Trabalhador Sãocarlense, 400 CP 359, São Carlos, SP CEP 3566-590, Brazil

Modeling freshwater quality scenarios with ecosystem-based adaptation in the headwaters of the Cantareira system, Brazil

Denise Taffarello[1], Raghavan Srinivasan[2], Guilherme Samprogna Mohor[1,3], João Luis Bittencourt Guimarães[4], Maria do Carmo Calijuri[1], and Eduardo Mario Mendiondo[1]

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[4]Aquaflora Meio Ambiente, Curitiba, PR, 82100-310, Brazil

Panta Rhei — IAHS AISH — Everything Flows — Change in Hydrology and Society

Special Issue: Advancing socio-hydrology

Blue and grey urban water footprints through citizens' perception and time series analysis of Brazilian dynamics

Felipe Augusto Arguello Souza, Namrata Bhattacharya-Mis, Camilo Restrepo-Estrada, Patricia Gober, Denise Taffarello, José Galizia Tundisi & ...show all

Received 21 Jan 2020, Accepted 02 Dec 2020, Accepted author version posted online: 20 Jan 2021

Download citation https://doi.org/10.1080/02626667.2021.1879388 Check for updates

Within existing WWQA Work Plan and Workstream:

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- In the annual work plan of the Alliance, the **iMandala** proposal will ***boost synergisms*** among workstreams: “Capacity and Development”, “Friends of Urban Health and Cities”, “Social Engagement Platform”, and “Private Sector Engagement”.

- The iMandala proposal will address the specific challanges and scope of:

- “Capacity and Development”, thereby exploring common and complementary agendas and capacities among Alliance members to support a broader network and to prepare for a WWQA Capacity Development Consortium; the consortium shall work collectively with the GEMS/Water CDC and UNEP towards a multi-year capacity development strategy

- “Friends of Urban Health and Cities” through novel and affordable low-cost Pilot to be developed around citizen engagement and low-tech monitoring alternatives in developing countries

- “Social Engagement Platform” using Eurecat, UNEP and SDC to convene a group of experts and scientists and artists to develo and enhance a joint concept for a workflow and initial pilots incl. a science storybook on water quality;

- “Private Sector Engagement” with illustrated by an “insight piece” on key water quality driven issues affecting current and future businesses and markets, especially addressing adaptation gaps through feasible WWQA Nature-based Solutions (NbS)

Proposal Rationale/Summary:

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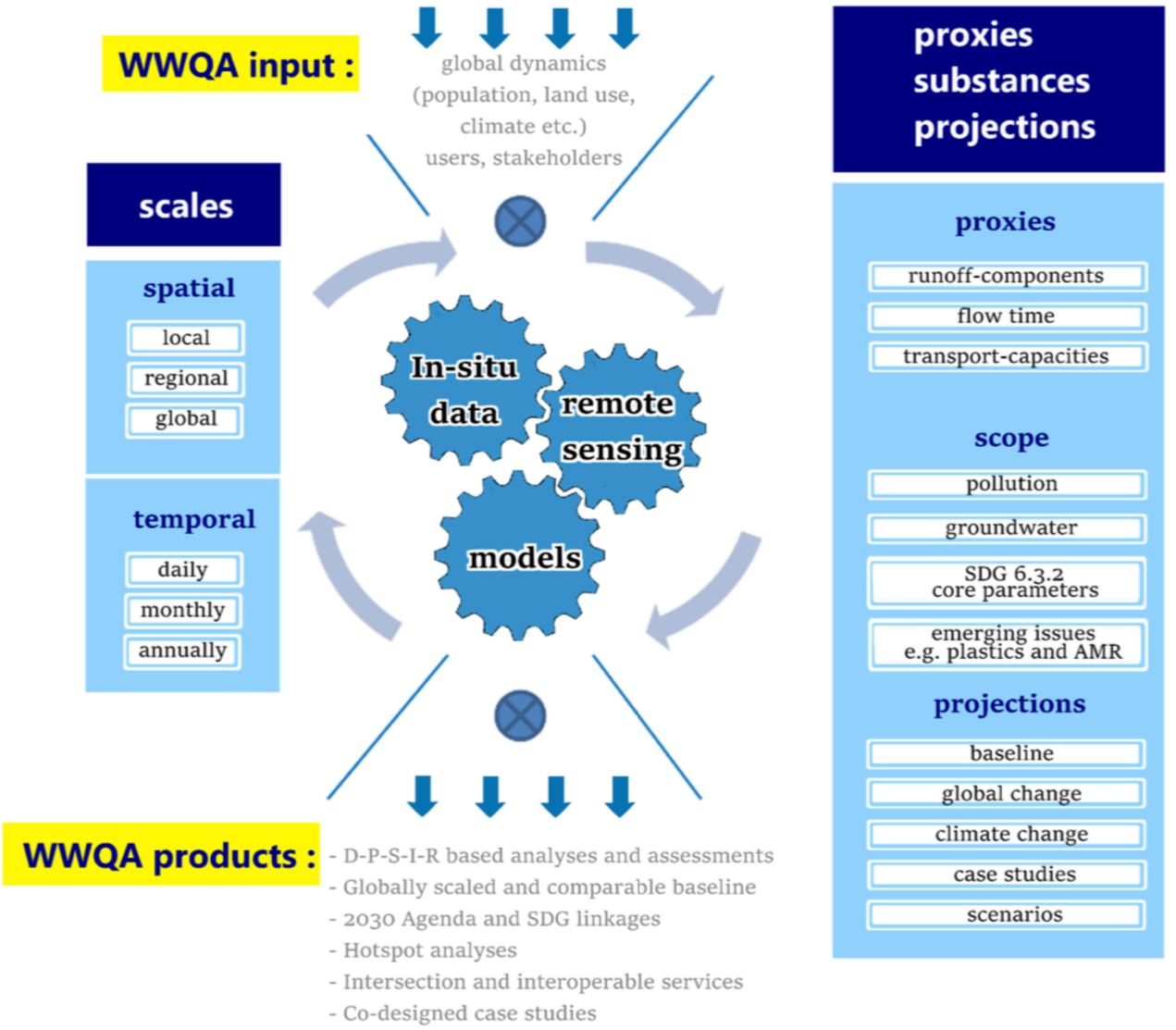
- The overall concept of **iMandala** Project addresses the multidimensional scaling around water pollution to protect and restore water-related ecosystems through a low-cost initiative for a review update, water quality modeling and a follow-up on demonstrative pilot projects aligned with UNEP WWQA and Water/ GEMS.

- The main assumptions consider a multi-source approach to help WWQA at local studies. For Activity 1 (**"Reset, Boot and Kick-off New WWQA actions"**), iMandala Project will dentify inter-disciplinary considerations at local scales of water quality problems in selected cases of Asia, Africa, Europe and the Americas, including stakeholder and society knowledge and perceptions about grey water footprint (Souza et al, 2021).

- For Activity 2 (**"Scalable Modeling of World Water Quality"**) we will revisit stage-based approach for optimal sites to allocate the monitoring stations, using pollutant estimates from the World Qualmodel (Vega-Rodriguez et al, 2020).

- For Activity 3 (**"WWQA Demonstrative Pilot Projects"**), iMandala will include new measures and ecosystem-based valuation initiatives taken for public/societal engagement on running projects adapted to regional and local aspects in each selected country or continent (from Taffarello et al, 2020), and with adaptive water strategies from COVID-19 pandemic at local scales (Marinho et a., 2021).



Source: WORLD WATER QUALITY ALLIANCE ASSESSMENT – AGENDA SETTING -SERVICES linking the global water quality agenda to the nexus and national local relevance
Hartwig Kremer, UN-Environment, Inception Workshop WMO/Geneva 28/11/2018 & Follow Up, JRC ISPRA21-24/06/2019; World Bank 1-2/04/2019; OECD 06/06/2019

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Objectives

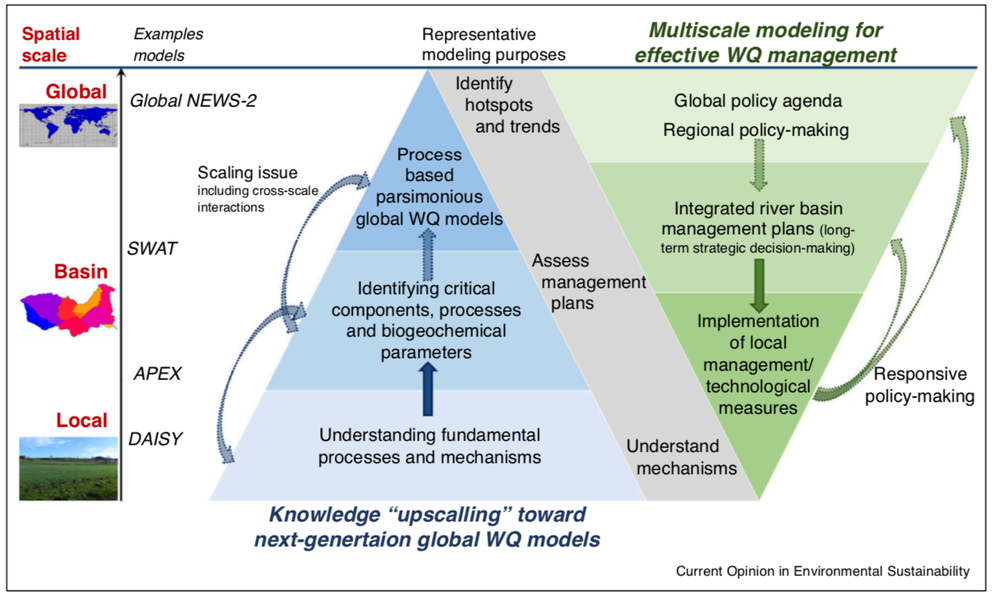
- **iMandala** Project aims to adapt the World Water Quality Alliance Work Plan through Low-Cost and Affordable Modeling and Demonstrative Pilot Projects Envisioning a More Participative and Holistic Post-pandemic Resilient Society Under Change and with comparative sites in the Americas, Europe, Asia, Africa and Australia

- Sub-objectives:

  - (1) Provide an international review of lessons learned and experienced gained towards a Post Pandemic Society through WWQA and Water/GEMS Demonstrative Pilot Projects,

  - (2) Assess, merge and combine nested and sizeable model outputs from different databases, repositories and modeling runs into a scalable transfer of knowledge at different spatiotemporal conditions under COVID-19 disruptive pulses and under medium- to long-term climate change scenarios, and

  - (3) Provide demo-sites with low-cost, participatory experimental and modeling setups for public-private partnership and citizen engagement in order to mitigate migration, hunger and energy shortage derived from water quality hazard risks.



The proposed framework to improve the linkages of WQ modeling at different spatial scales, from a global WQ model development (left triangle) and water quality management (right triangle) perspective. Examples of WQ models at different scales are presented.

Source: Tang et al (2020) Bridging global, basin and local-scale water quality modeling towards enhancing water quality management worldwide, *Current Opinion in Environmental Sustainability* 2019, 36:39–48.
https://doi.org/10.1016/j.cosust.2018.10.004

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Outputs, Deliverables and Milestones:

- A Review Community Concept Paper on WWQA Projects for a Post-Pandemic Society: Lessons Learnt and Experienced Gained
- A Cycle of Webinars of International Scholars, i.e. UNEP-INWEH-JRC-ACEWATER-ERCE-UNESCO Chair coalition for Action with Local Actors
- A 2nd Review Concept Paper on WWQA: New Demonstrative Pilot Projets and Participatory Engagement of Stakeholders
- 3rd Concept paper: "A Review of World Water Quality Model Assessment : Old and New Results with Reinterpretation and Reuse for Policy Makers"
- A Webinar Series of International Scholars with a UNEP-INWEH-JRC-ACEWATER-UNESCO Chair coalition for Action with Municipality Representatives thriving Private-Public Partnerships Oppportunities
- Setup of NbS-driven, low-cost demonstrative pilot projects with social engagement around goals for WWAQ UNEP and local stakeholders

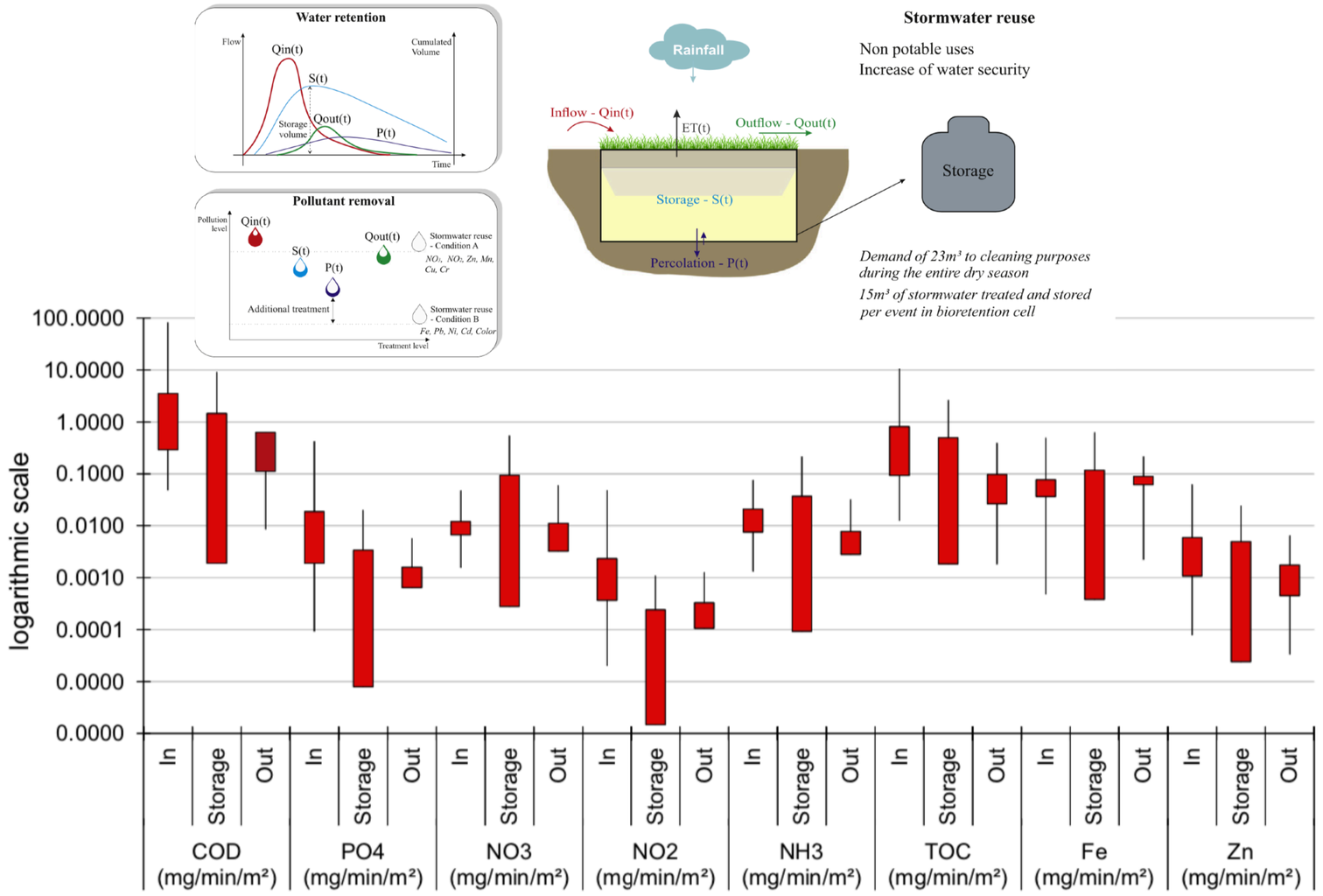

Fig. 5. Pollutant mass balance, for n = 100.

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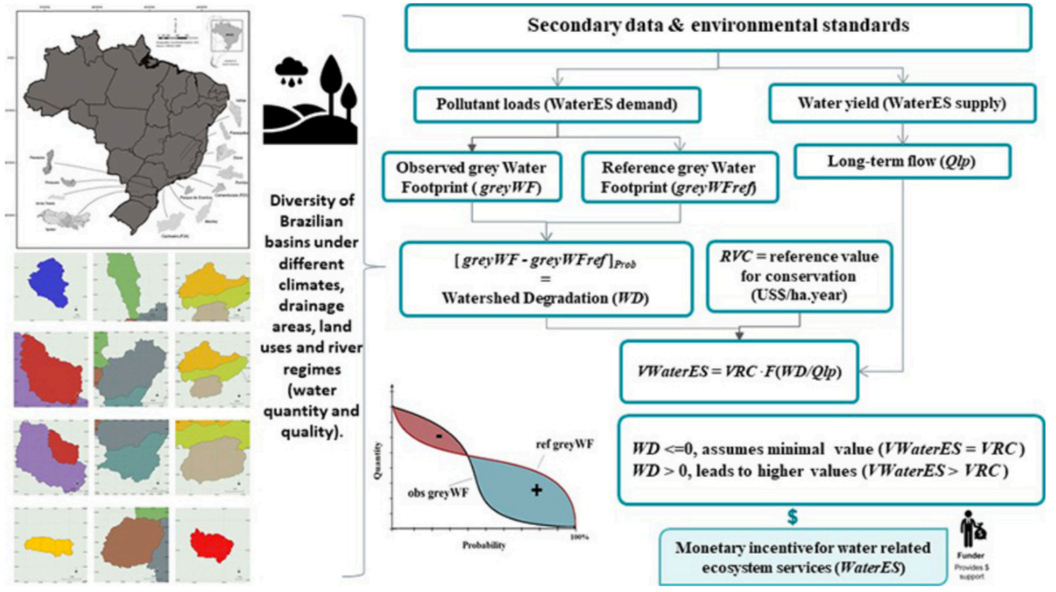

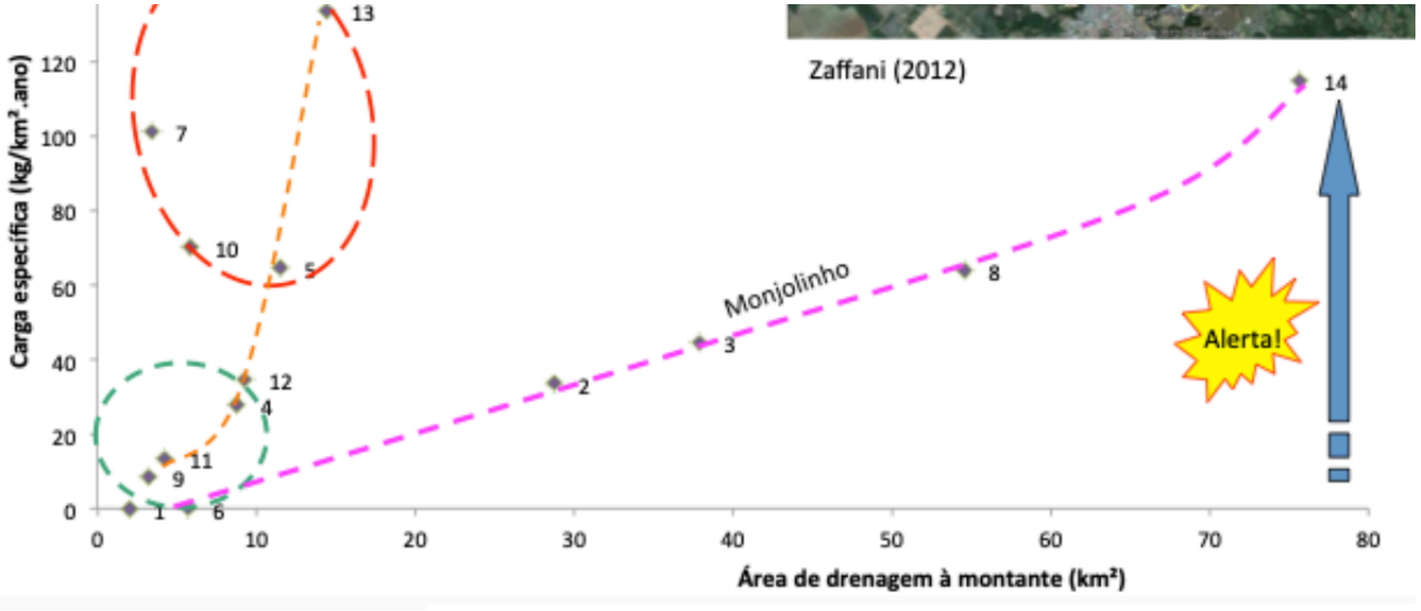

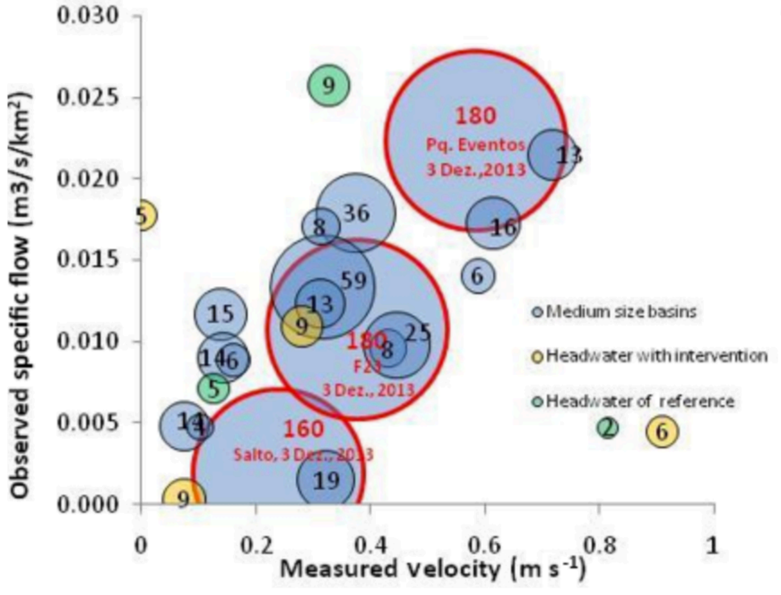

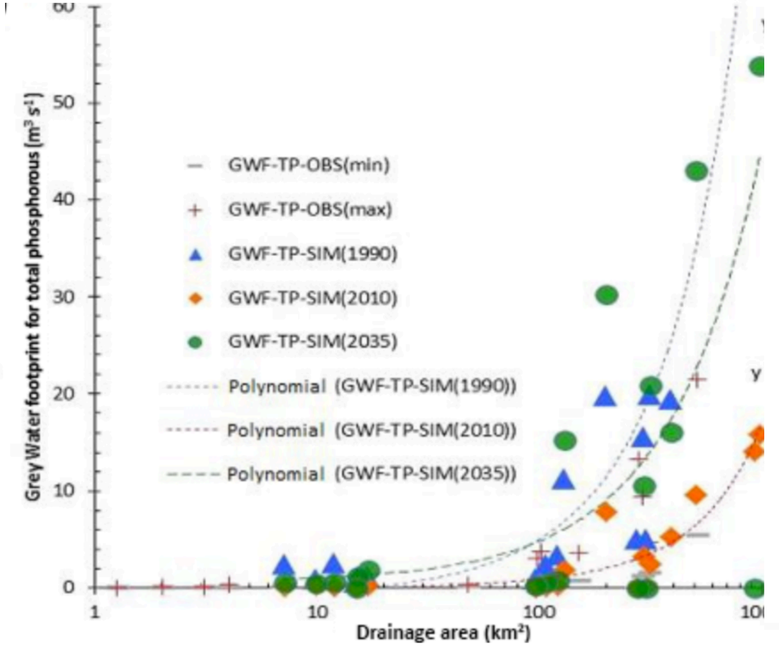

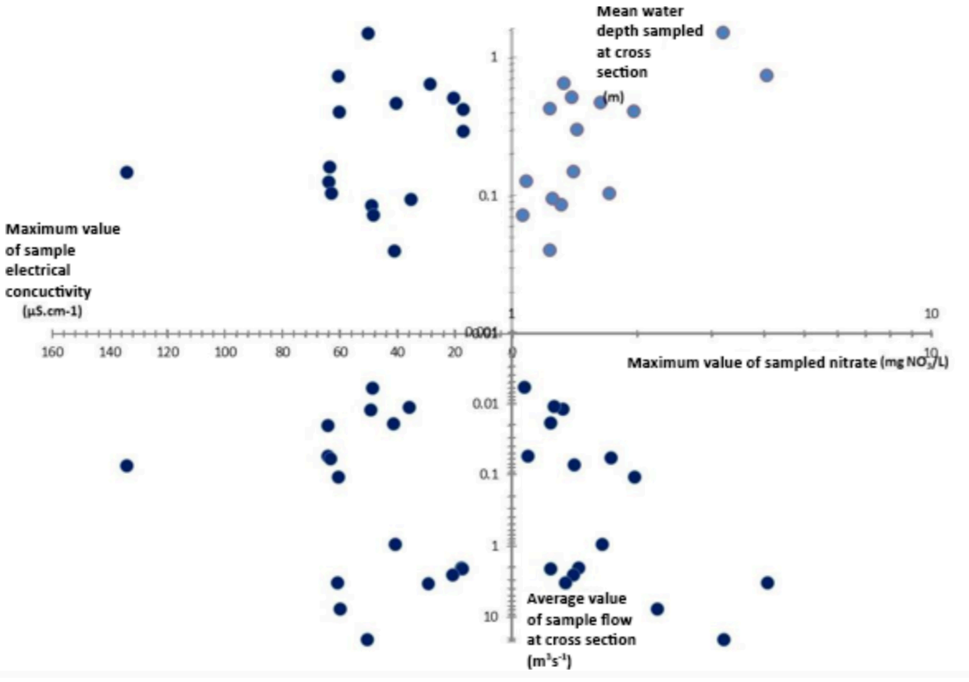

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Impacts and outcomes:

- **Mid to long-term impacts and outcomes**: an ‘integrated pathway of viable actions merging Workplan's workstreams of: “Capacity and Development”, “Friends of Urban Health and Cities”, “Social Engagement Platform”, and “Private Sector Engagement”
- A **diversity of integrated WWQA low-cost case studies** (with flexible NbS-driven setups) at local scales replicable for several countries
- A scalable **WWQA outreach and communication among ‘thinkers', ‘shapers' and ‘doers’** , upscaling lessons learnt and downscaling regional/global modeling metrics, also under COVID19 constraints
- **Friendly and accessible integration of these WWQA demo-sites with other global agendas** of DRR/Sendai, SDGs, IPCC, etc.
- Contribution to the objectives of the World Water Quality Alliance and the Assessment merging GEMS/Water Mandate with **strong societal engagement around WWQA feasible goals at local scales**.
- Expected impacts and outcomes: (a) create new opportunities of **WWQA-related jobs** for local stakeholders being engaged with UNEP WWQA actions, i.e. in Brazil, integrating education and learning facitilies (USP) with water quality standards (CETESB) and local Municipality Secretaries that bring important benefits for water management; similar cases are viable in India, Nigeria, etc
- It is expected **participation of under-represented groups** (indigenous people, refugees and climate pilgrims) could lead with new iMandala WWQA ’s demonstrative pilot projects in face of climate change impacts and the protection and restoring local watershed ecosystems

Regions of Operation & Invited Partners

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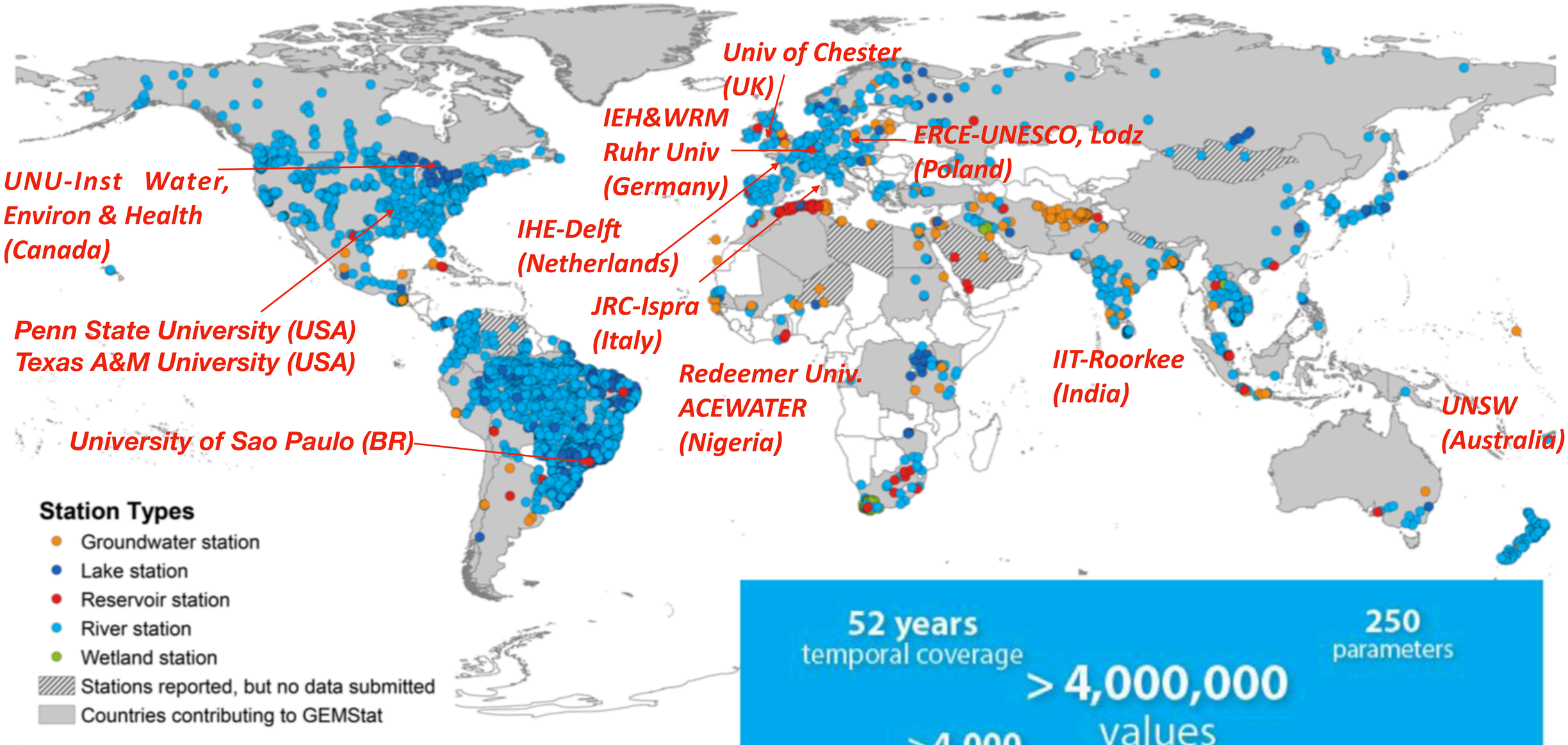

52 years temporal coverage

250 parameters

> 4,000,000 values

> 4,000 stations

75 participating countries

Thank You - Merci - Obrigado - Gracias

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PANTA RHEI OPEN SCIENCE FOR A FUTURE EARTH: Envisioning a Post Pandemic Resilient Society

Center for Artificial Intelligence

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School of Advanced Studies on Water & Society Under Change
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Observatório Sócio Hidrológico de Segurança Hídrica para Redução de Riscos de Enchentes e Aumento da Resiliência Comunitária sob Cenários de Mudanças e de COVID-19