



International Association of Hydrogeologists

the World-wide Groundwater Organisation

IAH Commission on Managing Aquifer Recharge

<https://recharge.iah.org>

Catalin Stefan

Co-Chair of the IAH-MAR Commission

Annual Commission Meeting

48th IAH Congress, Brussels, Belgium, 9 September 2021, 17:30 – 19:00



(from left to right)

Catalin Stefan

Yan Zheng

Enrique Fernandez Escalante

Co-chairs of the IAH-MAR Commission

International Association of Hydrogeologists (IAH) Commission on Managing Aquifer Recharge



International Association
of Hydrogeologists
the World-wide Groundwater Organisation

IAH Commission on
Managing Aquifer Recharge



Photo: ISMAR10, Madrid, Spain

- Promotes the securing and expanding of water resources
- Encourages research, development and adoption of improved practices
- Facilitates international exchange of information between members
- Aligns with UNESCO IHP-VIII (2014-2021)

International Association of Hydrogeologists (IAH) Commission on Managing Aquifer Recharge



International Association
of Hydrogeologists
the World-wide Groundwater Organisation

IAH Commission on
Managing Aquifer Recharge

Current working groups:

- Clogging and its management
- MAR for Sustainable Development
- Economics of MAR
- MAR Regulations
- MAR Suitability Mapping
- Urban MAR
- MAR in Conferences

Closed working groups (activities still ongoing)

- Global MAR Inventory
- 60 years History of MAR
- MAR to MARKET
- Call to Action on Groundwater Management

MAR Communities of Practice:

Australia, Italy, China, Latin America



JOIN OUR MAILING LIST

Register with our large email group to share information, ideas and news concerning recharge enhancement.

[Join IAH-MAR email community](#)

Stay informed!

COMMUNICATION

Our website

<https://recharge.iah.org>



**International Association
of Hydrogeologists**

the World-wide Groundwater Organisation

**IAH Commission on
Managing Aquifer Recharge**

IAH Commission on
Managing Aquifer Recharge



WELCOME ABOUT THE COMMISSION EVENTS WORKING GROUPS COMMUNITIES COLLABORATIONS RESOURCES

Welcome



Attendees at ISMAR10, Madrid, May 2019 – the latest triennial symposium of IAH-MAR, UNESCO and ASCE

Welcome to the website of the International Association of Hydrogeologists Commission on Managing Aquifer Recharge (IAH-MAR). Here you can discover what our working groups are doing and contribute to their current projects, you can download resources on MAR, connect with people, get information on symposia coming up, and join our email list to stay informed of latest news. We also have sister sites in Spanish and Chinese.

Managed Aquifer Recharge

Managed aquifer recharge, also called groundwater replenishment, water banking and artificial recharge, is the purposeful recharge of water to aquifers for subsequent recovery or environmental benefit. It embraces methods such as riverbank filtration, stream bed weirs, infiltration ponds and injection wells, and uses natural water sources and appropriately treated urban stormwater, sewage and other waste waters to increase groundwater storage, protect and improve water quality, and secure drought and emergency supplies. Its growing scientific base supports its rapidly increasing use as a vital management tool in the sustainable use of the world's water resources.

Latest News



National Seminar on "Resilience of Groundwater Resources for Accommodating Changing Climate Scenarios" – 7 November 2020 in New Delhi,

CURRENT PROJECTS THAT YOU CAN JOIN

- New working group: **MAR in Conferences**. Coordinator: Daniela Benedicto van Dalen
- New working group: **Urban MAR**. Coordinator: Niels Hartog
- **LatinMAR Community of Practice** – a new initiative to advance MAR in Latin America. Coordinator: Adriana Palma
- **MAR Suitability Mapping Working Group**. Coordinator: Jose Bonilla
- Contributions to a second monograph on clogging-focussing on its management – **Clogging Working Group**. Coordinator: Russell Martin
- **Groundwater Solutions Initiative for Policy and Practice (GRIPP)** – a Collaborative International Project. Coordinator: Karen Viltholt

JOIN OUR MAILING LIST

Register with our large email group to share information, ideas and news concerning recharge enhancement.

Join IAH-MAR email community

- UPCOMING EVENTS -

(* = with IAH-MAR Plenary)

47th IAH Congress

Sao Paulo, Brazil, 22-27 August 2021

Due to COVID-19 pandemic, the 47th IAH Congress had to be organised online. A series of bi-weekly online seminars including marketing, technical and scientific, inspirational, and professional training themes are organised between 21 September 2020 and 27 August 2021. In August 2021, the organisers planned the organisation of a hybrid event, in coordination with the organisers of the 48th congress in Brussels. Read more at <https://iah2021brazil.org/en/>.

International Summer School on Managed Aquifer Recharge

Dresden, Germany, 22 August – 4 September 2021

The two-week course offers M.Sc./Ph.D./young professionals the opportunity to study basic, advanced and applied aspects of Managed Aquifer Recharge (MAR) and Riverbank Filtration (RBF). The course focuses on sharing and exchanging knowledge and new ideas in the field of MAR and RBF. The course consists of expert lectures, MAR computer modelling practice, laboratory experiments and technical excursions supplemented by participant presentations and informal discussion sessions. For more information check the school [website](#).

48th IAH Congress* Inspiring Groundwater

Brussels, Belgium, 6-10 September 2021

The IAH Belgian Chapter, together with its partners, is organising the 48th IAH Congress in the heart of Europe, Brussels. Abstract submission is open until 23 March 2021. For more information visit the congress website at <https://iah2021belgium.org>.



<https://twitter.com/IAHMARCom>



**International Association
of Hydrogeologists**

the World-wide Groundwater Organisation

**IAH Commission on
Managing Aquifer Recharge**



IAH MAR Commission

@IAHMARCom

IAH Commission on Managing Aquifer Recharge (MAR). Co-chairs: Enrique Fernández Escalante /-ef, Catalin Stefan /-cs, Yan Zheng /-yz

recharge.iah.org Joined February 2020

11 Following 63 Followers

Edit profile



IAH MAR Commission @IAHMARCom · Sep 6

The 48th @iahgroundwater Congress #InspiringGroundwater just kicked off in #Brussels. Thank you @MarijkeHuysmans and the entire team for making this event possible!



IAH MAR Commission @IAHMARCom · Sep 2

Join us next week in #Brussels for the 48th @iahgroundwater Congress and attend our multi-session on managed aquifer recharge on Mon/ Tue / and Thu. Also don't miss our Plenary Commission Meeting on Thu evening. Check conference programme for details iah2021belgium.org/programme/deta... /-cs



IAH MAR Commission @IAHMARCom · Aug 31

If you are NOT in Belgium next week: sign up to participate in the online @iahgroundwater General Assembly



IAH MAR Commission @IAHMARCom · Aug 31

Featured research: Identification of suitable sites for managed aquifer recharge under semi-arid conditions employing a combination of numerical and analytical techniques. Read more: rdcu.be/cwpEe /-cs



IAH MAR Commission @IAHMARCom · Aug 25

New book on "Managed Aquifer recharge: Southern Africa" written by Eberhard Braune and Sumaya Israel for The Groundwater Project @groundwaterproj. Download for free: gw-project.org/books/managed-... /-cs

WhatsApp

Aquifer Recharge Management



International Association
of Hydrogeologists

the World-wide Groundwater Organisation

IAH Commission on
Managing Aquifer Recharge

- Initiated before 47th IAH Congress in Brazil, still very active!



WhatsApp Group

Aquifer recharge management



Newsletters

<https://recharge.iah.org/newsletters>

IAH Commission on
Managing Aquifer Recharge



WELCOME ABOUT THE COMMISSION EVENTS WORKING GROUPS COMMUNITIES COLLABORATIONS RESOURCES ISMAR

Newsletters

Stay updated with the latest news on managed aquifer recharge collected in our monthly newsletters:



Please, keep reporting info: dinamar@tragsa.es



International Association
of Hydrogeologists

the World-wide Groundwater Organisation

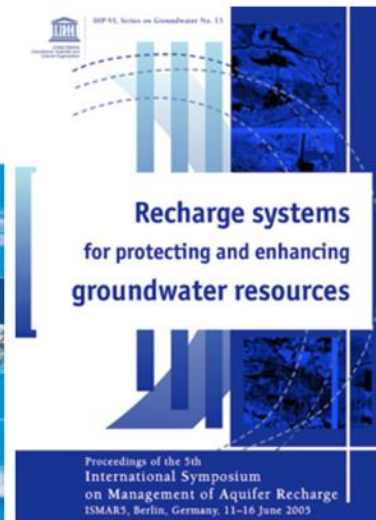
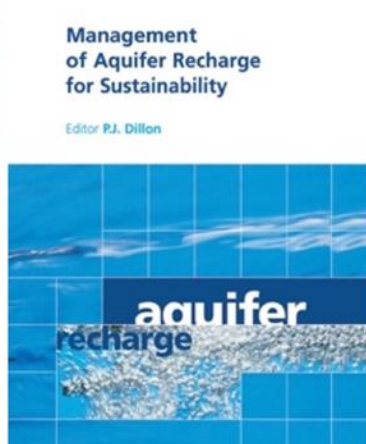
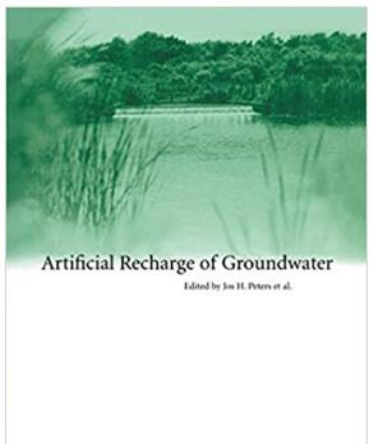
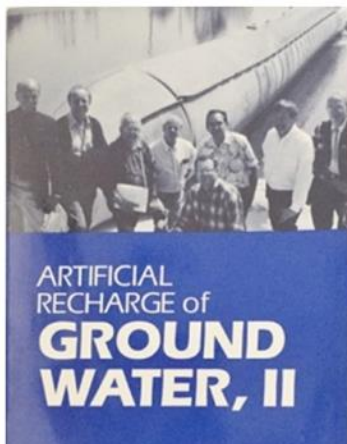
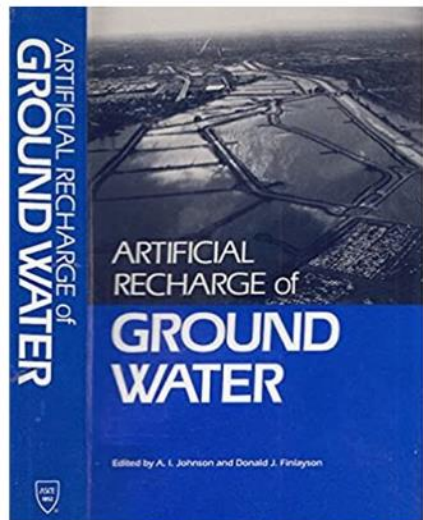
IAH Commission on
Managing Aquifer Recharge

2021

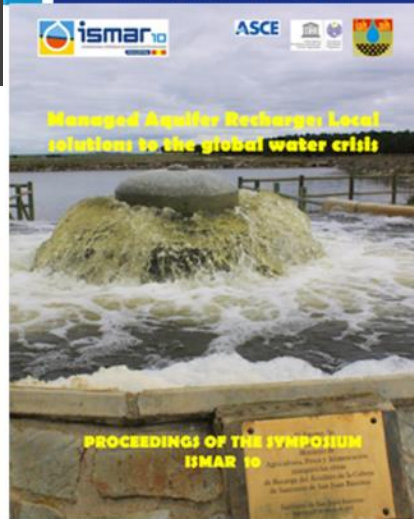
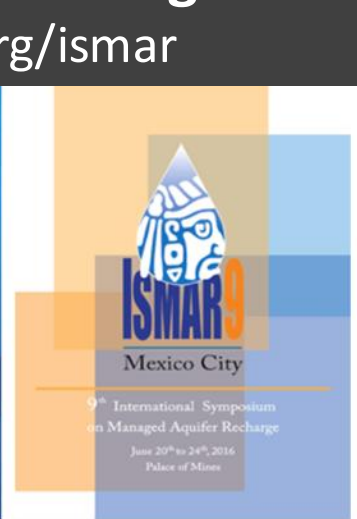
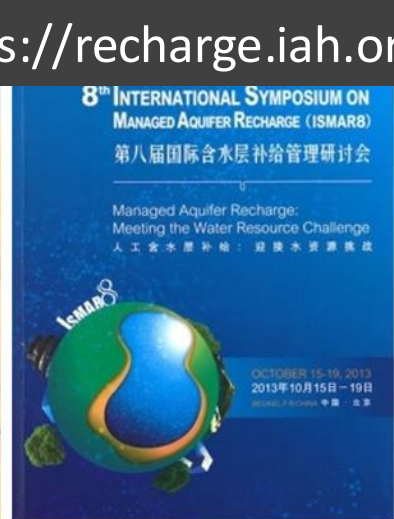
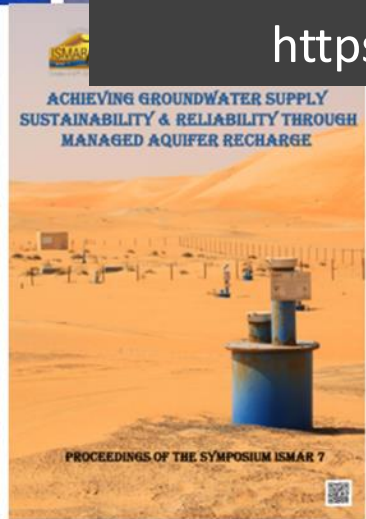
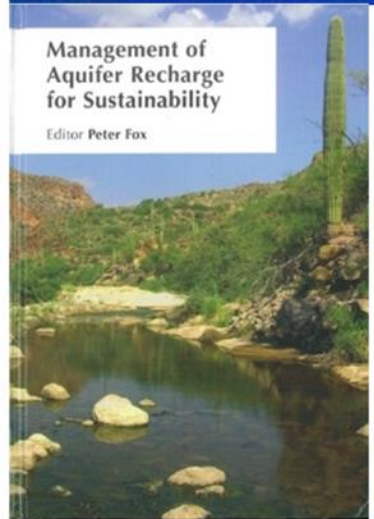
- 08-2021-IAH-MAR-newsletter
- 07-2021-IAH-MAR-newsletter
- 06-2021-IAH-MAR-newsletter
- 05-2021-IAH-MAR-newsletter
- 04-2021-IAH-MAR-newsletter
- 03-2021-IAH-MAR-newsletter
- 02-2021-IAH-MAR-newsletter
- 01-2021-IAH-MAR-newsletter

2020

- 12-2020-IAH-MAR-newsletter
- 10-2020-IAH-MAR-newsletter
- 09-2020-IAH-MAR-newsletter
- 08-2020-IAH-MAR-newsletter
- 07-2020-IAH-MAR-newsletter
- 06-2020-IAH-MAR-newsletter
- 05-2020-IAH-MAR-newsletter
- 04-2020-IAH-MAR-newsletter
- 02-2020-IAH-MAR-newsletter



ISMAR Books of Proceedings
<https://recharge.iah.org/ismar>



<https://dinamar.tragsa.es/>

- MAR books repository:
104 books to be
downloaded freely
(contributions welcome)
dinamar@tragsa.es

<https://dinamar.tragsa.es/post/actualizacion-update-libros-sobre-la-tecnica-mar-repositorio-mas-de-100-libros-mar-books-repository-more-than-100-free-books-on-mar-april-2021>



The screenshot shows the website interface for Dinamar, a project of Grupo Tragsa. The header includes the Dinamar logo, the Grupo Tragsa logo, and navigation links for INICIO, ARCHIVO, CONTACTARNOS, RSS, and VISOR WEB HIDROGEOPORTAL. The main content area features a news article dated ABR. 26, 2021, with the title "ACTUALIZACIÓN / UPDATE. Libros sobre la técnica MAR (repositorio) Más de 100 libros / MAR books repository. More than 100 free books on MAR. April 2021". The article text discusses the compilation of hydrogeology books, particularly those related to MAR technology, and mentions that the repository is open to contributions. A right-hand sidebar lists various categories such as "Contacto (2)", "Documentación técnica (258)", "Educación ambiental (303)", "Enlaces (1)", "Galería (19)", "Galería multimedia (21)", "Grupo Tragsa y MAR (157)", "Noticias (447)", "Presentación (2)", "Proyecto DINA-MAR (115)", and "VISOR WEB HIDROGEOPORTAL (1)". Social media icons for LinkedIn and Twitter are also visible at the bottom of the sidebar.

Networking opportunities

UPCOMING EVENTS

Save the date!

THE 11TH INTERNATIONAL SYMPOSIUM ON MANAGED AQUIFER RECHARGE

APRIL 11-15, 2022 | LONG BEACH, CALIFORNIA



A KEY TO SUSTAINABILITY

<https://www.ismar11.net>

Preliminary ISMAR11 Program (subject to change)

Monday, April 11

- Surface Water Recharge Workshop
- Subsurface Recharge Workshop
- Meeting Water Management Objectives with Managed Aquifer Recharge: The Role of MAR Governance and Policy

Workshops

Tuesday, April 12

- General Session
- Keynote Address
- Panel Discussions
- Herman Bouwer Awards Luncheon
- IAH Plenary Session

General Session
IAH Plenary

Wednesday, April 13

- 3 Concurrent Tracks
- 9 Sessions
- 45 Presentations
- Poster Session
- Reception
- Networking

Technical Sessions
Poster Session

Thursday, April 14

- 3 Concurrent Tracks
- 9 Sessions
- 45 Presentations
- Reception
- Networking

Technical Sessions

Friday, April 15

- Water Replenishment District of Southern California Albert Robles Learning Center
- Orange County Water District Surface Recharge System and Groundwater Replenishment System

Field Trips



ISMAR11 Key Topic Areas

MAR and Sustainable Groundwater Management

MAR Engineering And Design

MAR Economics/Water Markets

MAR and Integrated Water Resources

MAR Operations and Maintenance

MAR Modeling

MAR and the Environment

MAR in Developing World

MAR Education and Outreach

MAR Emerging Contaminants and Water Quality

MAR Climate Change

130 abstracts received

ISMAR 12

Call for expressions of interest

- IAH, IAH-MAR Commission, UNESCO and ASCE call for the expressions of interest.
- Those institutions willing to host the premier symposium on MAR, **ISMAR 12 in 2025**, please, inform IAH-MAR Commission co-chairs using the contact link: <https://recharge.iah.org/contact-us>





Save the date!

International Conference on Riverbank Filtration
Dresden, Germany, 27-29 September 2022



3rd International Summer School on MAR

Dresden, Germany, 23.08 – 03.09.2021

Organised by



Hochschule für
Technik und Wirtschaft
Dresden
University of Applied Sciences

Sponsored by



Federal Ministry
of Education
and Research



Deutscher Akademischer Austauschdienst
German Academic Exchange Service

Partners



Ongoing research activities

RESEARCH PROJECTS

MARSOLUT

Managed Aquifer Recharge Solutions Training Network (Mar 2019 – Feb 2023)

Coordinator: Christoph Schüth, Darmstadt Technical University, Germany. schueth@geo.tu-darmstadt.de.

Project website: <https://www.marsolut-itn.eu>.

MARSoluT is a four-year Marie Skłodowska-Curie Actions (MSCA) Innovative Training Network (ITN) funded by the European Commission. MARSoluT intends to tackle specific technical challenges in the operation of Managed Aquifer Recharge (MAR) sites on a scientific basis, specifically: a) chemical, biological and hydraulic processes resulting in clogging and reduction of infiltration rates; b) hydrogeochemical processes affecting the water quality, with special focus on micropollutants; c) performance monitoring and modelling, including reactive transport models to predict the fate of pathogens and emerging pollutants, and d) implications of the processes mentioned above on the technical design of MAR projects in the frame of regional flow models and water management plans. MARSoluT intends, at the same time, to train a significant number (12) of Early Stage Researchers (ESRs) to become experts in the application of MAR in the frame of an Integrated Water Resources Management.

DEEPWATER-CE

Development of an integrated implementation framework for managed aquifer recharge solutions for facilitate the protection of Central European water resources endangered by climate change and user conflict (May 2019 – April 2022)

Coordinator: Anikó Horváth, Mining and Geological Survey of Hungary. horvath.aniko@mbfsz.gov.hu

Project website: <https://www.interreg-central.eu/Content.Node/DEEPWATER-CE.html>.

The depletion of drinking water resources is a tremendous problem almost everywhere in the world. At the same time, there are more and more frequent heavy rains and floods, bringing huge amounts of water that we do not store. Eight DEEPWATER-CE partners are working together to build a joint water resource management strategy, including retention of excess water from periods of heavy rainfall that can be used to recharge groundwater.

As part of the DEEPWATER-CE project, pilot studies will be carried out in four countries (Poland, Hungary, Slovakia, Croatia) to examine available managed aquifer recharge solutions to develop the best methods and guidelines for Central Europe and the rest of the world.

FEMAR

Application potential of managed aquifer recharge (MAR) for a safe and sustainable water supply (July 2021 – June 2024)

Coordinator:

Thomas Grischek, University of Applied Sciences, Dresden, Germany

Partners:

Technische Universität Dresden (Germany), Umweltbüro GmbH Vogtland (Germany), Shiraz University (Iran), Yasouj University (Iran), Aleppo University (Syria), American University of Beirut (Lebanon)

Objectives:

The project aims to: a) provide a model based framework for integrated water resources management, b) to identify and propose suitable sites for managed aquifer recharge and c) to predict their impact on the regional water balance.

REPORTS FROM WORKING GROUPS

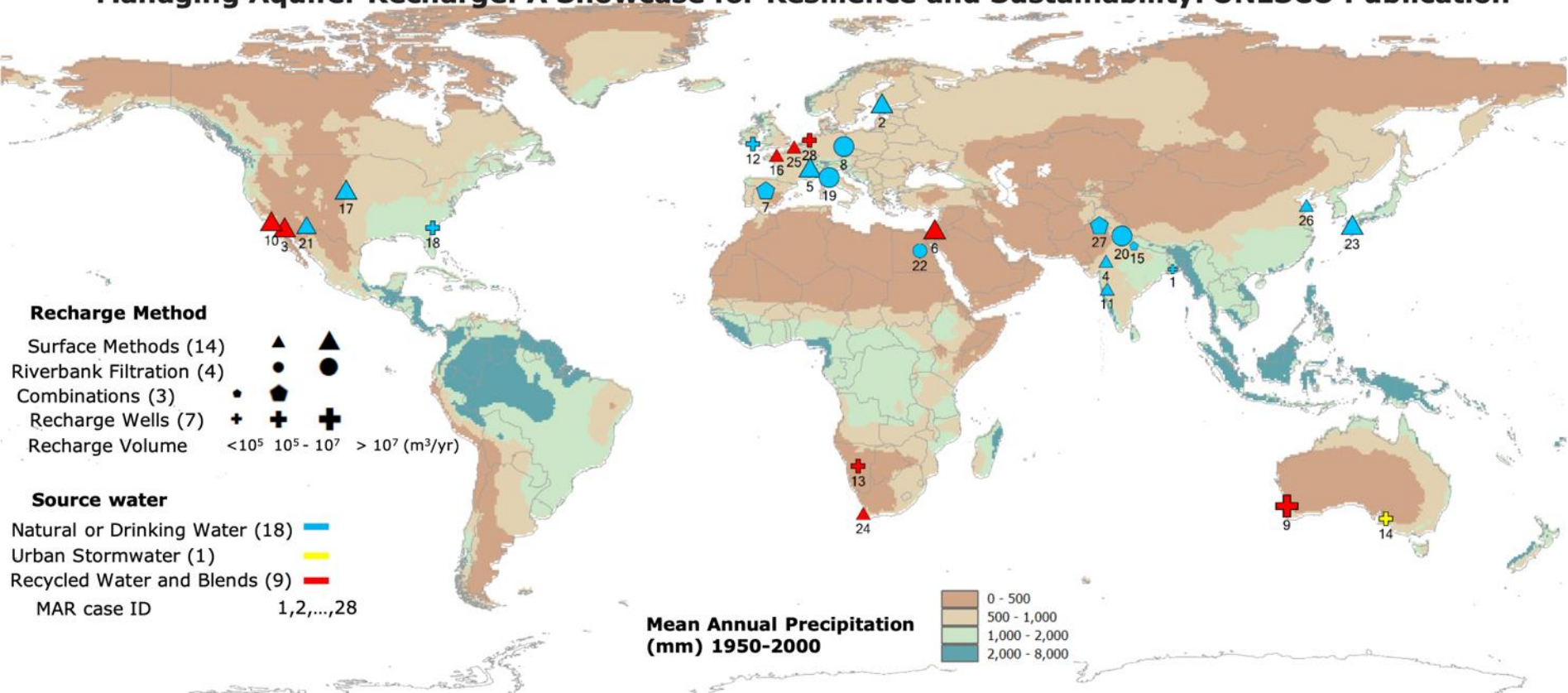
Working Groups

“Economics” and “MAR for Sustainable Development”

Andrew Ross (Australia), Yan Zheng, SUSTECH (China)

- The output from the “Economics” and “MAR for Sustainable Development” working groups focused on the UNESCO-IAH publication **“Zheng, Y., Ross, A., Villholth, K. G. and Dillon, P (eds). 2021 Managing Aquifer Recharge: a Showcase for Resilience and Sustainability. Paris, UNESCO (*in press*).**
- This publication includes showcases 28 exemplary case studies of MAR from around the world. Publication is expected later this year.
- On behalf of the economics working group Andrew Ross prepared an overview chapter on the economic costs and benefits of managed aquifer recharge and coordinated economic sections for the 28 case studies in consultation with the authors.

Locations of 28 MAR Schemes in Zheng, Y., Ross, A., Villholth, K and Dillon, P. (eds) (in press) Managing Aquifer Recharge: A Showcase for Resilience and Sustainability. UNESCO Publication



Andrew Ross (Australia), Yan Zheng, SUSTECH (China)

Part III

Cost and Benefit Analysis

Levelised Cost in 2016 US\$:

- the constant level of revenue necessary each year to recover all the capital, operating and maintenance expenses over the life of the project divided by the annual volume of water supply
- if purpose not for recovery then annual recharge volume is used
- operating life = 30 years, discount rate = 5.0%, are used for most schemes

Benefit:

- Complicated
- If the main benefit of a MAR scheme is additional water supply:
 - 1) Volume of water recovered or supplied multiplied by the price of water;
 - 2) Alternative cost of production (used for most schemes)
- If other purposes:
 - 1) Net benefit from agricultural/industrial production
 - 2) Costs of the next cheapest water treatment facility

Working Group “Global MAR Inventory”

Arnaud Sterckx, IGRAC (the Netherlands)

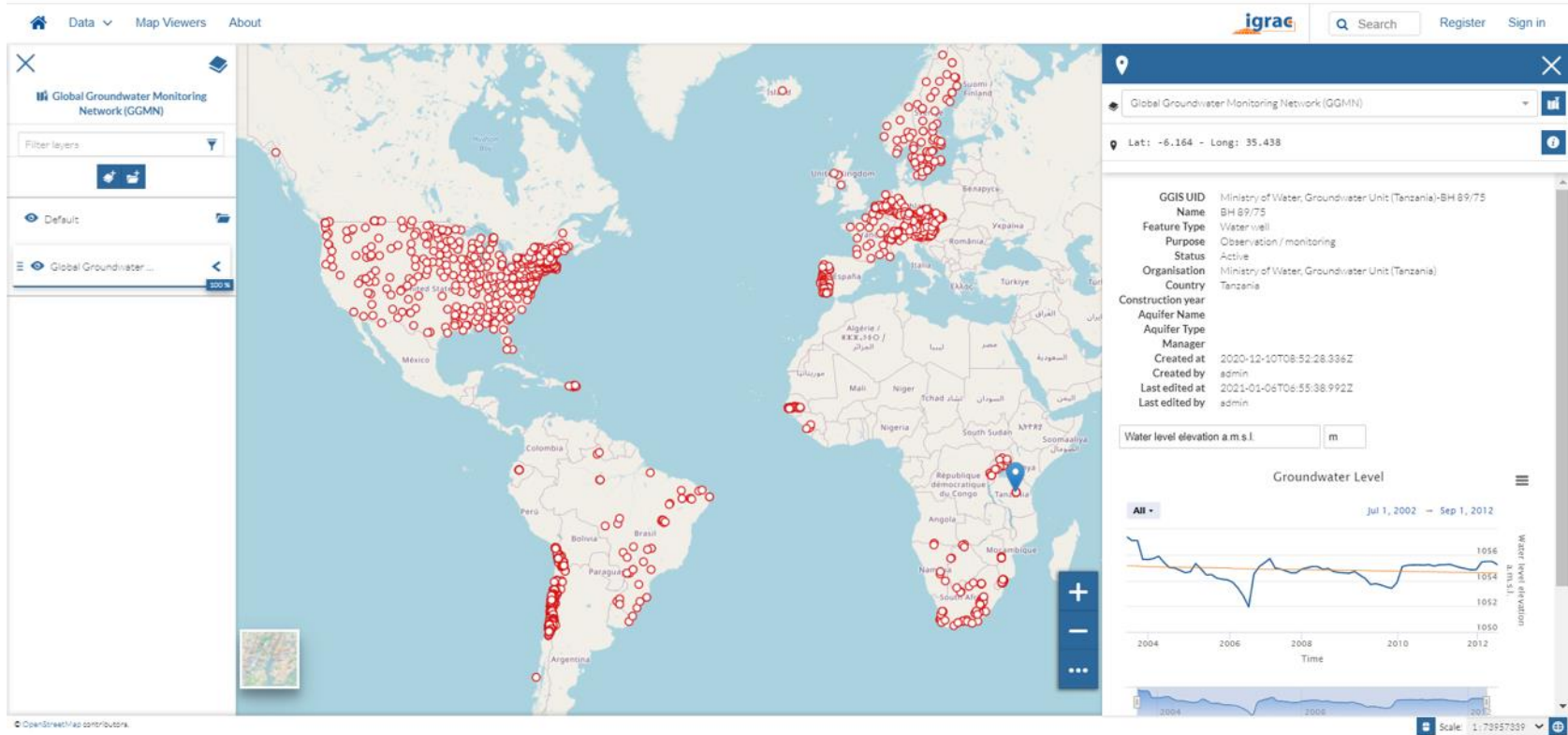
A new version of the **Global Groundwater Information System** was launched in February 2021. The MAR Portal is now accessible at <https://ggis.un-igrac.org/view/marportal>.



Working Group “Global MAR Inventory”

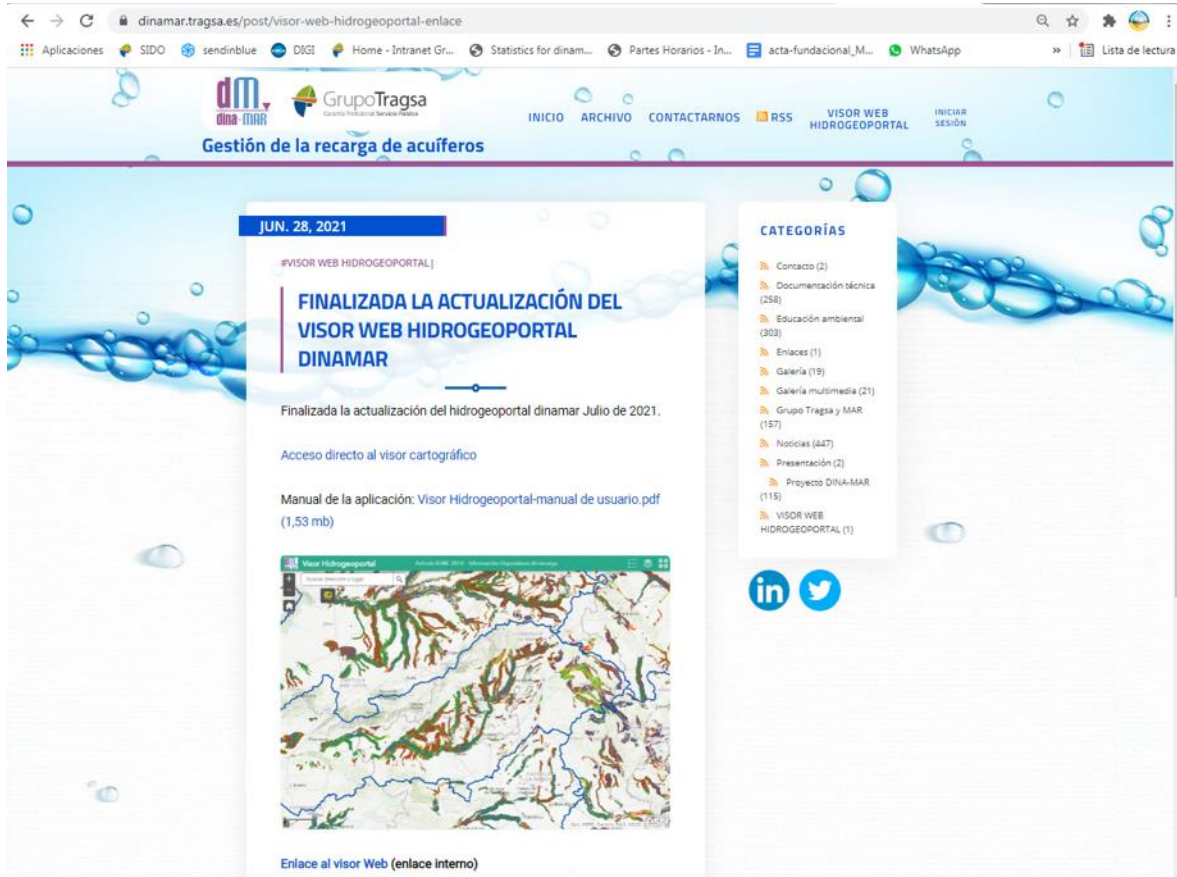
Arnaud Sterckx, IGRAC (the Netherlands)

Well and monitoring data are now integrated in the GGIS.



Working Group “MAR suitability mapping”

Report from Enrique Fernandez Escalante, Tragsa Group (Spain)



The screenshot shows a web browser displaying the website dinamar.tragsa.es/post/visor-web-hidrogeoportal-enlace. The page features a blue header with the logo for 'dina-MAR' and 'GrupoTragsa'. The main content area is titled 'Gestión de la recarga de acuíferos' and contains a news article dated 'JUN. 28, 2021'. The article headline is 'FINALIZADA LA ACTUALIZACIÓN DEL VISOR WEB HIDROGEOPORTAL DINAMAR'. The text below the headline states: 'Finalizada la actualización del hidrogeoportal dinamar Julio de 2021. Acceso directo al visor cartográfico. Manual de la aplicación: Visor Hidrogeoportal-manual de usuario.pdf (1,53 mb)'. A thumbnail image of the web viewer is shown, displaying a map of a river basin with various colored zones. To the right of the article is a 'CATEGORÍAS' sidebar with a list of categories and their counts: Contacto (2), Documentación técnica (258), Educación ambiental (303), Enlaces (1), Galería (19), Galería multimedia (21), Grupo Tragsa y MAR (157), Noticias (447), Presentación (2), Proyecto DINA-MAR (115), and VISOR WEB HIDROGEOPORTAL (1). Social media icons for LinkedIn and Twitter are also present.

JUN. 28, 2021


#VISOR WEB HIDROGEOPORTAL |

FINALIZADA LA ACTUALIZACIÓN DEL VISOR WEB HIDROGEOPORTAL DINAMAR

Finalizada la actualización del hidrogeoportal dinamar Julio de 2021.

Acceso directo al visor cartográfico

Manual de la aplicación: Visor Hidrogeoportal-manual de usuario.pdf (1,53 mb)



Enlace al visor Web (enlace interno)



MAR suitability map for Spain.
Improved in 2021
cartographic viewer on line

<https://dinamar.tragsa.es/post/visor-web-hidrogeoportal-enlace>

MAR suitability map for Spain v.2021



<https://sjc-arcgis.tragsatec.es/portal/app/s/webappviewer/index.html?i=d43af99e5b0e4ca8b89a8bc41902545d>

Working Group “*Urban MAR*”

Niels Hartog, KWR (the Netherlands)

Working Group “*MAR Regulations*”

Manuel Sapiano, Energy and Water Agency (Malta)



International Association of Hydrogeologists

the World-wide Groundwater Organisation

IAH Commission on Managing Aquifer Recharge

<https://recharge.iah.org>

