International Association of Hydrogeologists
the World-wide Groundwater Organisation

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Groundwater across climates

Local challenges, shared insights






Leccion Magistral Emilio Custodio 2026

ONLINE WEBINAR

Groundwater: our last chance to restore the hydrological cycle

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Institute of Environmental Assessment and Water Studies, IDAEA
Spanish National Research Council (CSIC)
Barcelona



TALK OVERVIEW

Groundwater sustains rivers, ecosystems and drinking-water supplies, yet overexploitation, climate change and pollution threaten these functions. This lecture explores how managed aquifer recharge using floodwater and reclaimed water can help restore the hydrological cycle, and how reactive barriers can reduce contaminants and improve water quality.

17 December 2026 · 15.00-15.45 CET

Join via Zoom · No registration required
https://us06web.zoom.us/j/82063576889

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Abstract

Groundwater plays many roles in the natural and human water cycles. Beyond representing the largest available water reserve, filtration ensures that it is free of turbidity and pathogens, and the long residence time in aquifers ensures the degradation of the most recalcitrant compounds. All of this explains why groundwater usually displays excellent quality and represents the main source of drinking water worldwide. In addition to its human use, groundwater feeds surface water bodies and provides resilience of the hydrological cycle. Rivers flow during droughts because (if) they are connected to aquifers. Riparian forests are fed by alluvial aquifers. River-aquifer interactions are fundamental to aquatic ecosystems. Biochemical reactions in the hyporheic zone produce biofilms that are the substrate for microorganisms found at the root of multiple food chains. This process, which has ensured the quality of rivers and aquifers for millions of years, is being compromised by a combination of three factors: overexploitation of aquifers (groundwater is cheap to pump, but difficult to regulate), climate change (increased extremes can lead to reduced recharge), and increased pollution (worsened by the loss of ecosystem services). In this presentation I argue that reversing this trend requires managed aquifer recharge. I discuss its feasibility for floodwater and reclaimed water. The former is difficult because it is highly concentrated in time, but there are examples of successful cases. The latter is hampered by a lack of tradition and regulatory ambiguities. I show that, especially when a reactive barrier is in place, it eliminates pathogens and dramatically reduces concentrations of nutrients, emerging compounds, particularly endocrine disruptors, microplastics, or antimicrobial resistance. All of this points to managed aquifer recharge as our last chance to restore the hydrological cycle.