

Session title

Groundwater temperatures in a warming climate: risks, opportunities, and pathways for sustainable thermal management

Description

Groundwater temperatures are increasing worldwide, driven by expanding urban infrastructure, passive heat inputs, and the growing adoption of groundwater-based cooling and seasonal storage systems. Combined with global warming, these anthropogenic pressures alter the thermal regime of aquifers, with potential consequences for groundwater and drinking water quality, ecosystem functioning, and long-term resource sustainability. Rising groundwater temperatures present both risks, such as temperature-induced hydrogeochemical changes and ecological stress, and opportunities, particularly for harnessing shallow geothermal energy and recovering excess anthropogenic heat. Sustainable groundwater management therefore requires integrated strategies that balance climate adaptation needs with the thermal potential of the subsurface. This session invites contributions that advance monitoring and modelling approaches, assess thermal impacts, and explore innovative management and mitigation measures, design, and policy solutions for both urban and rural settings.

Keywords

Groundwater temperature, Climate change, Thermal management, Shallow geothermal energy, Mitigation measures, Urban hydrogeology

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