

The Cardiff Urban Geo Observatory, UK: monitoring of a shallow unconsolidated urban aquifer

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If the use of shallow geothermal energy is to be successful in the UK we must be able to 'de-risk' this technology for developers whilst also providing baseline data to allow environmental regulators, planners, and policy makers to make evidenced based decisions.

To address these future challenges we have established the '**Cardiff Urban Geo-observatory**'. The observatory is the largest city-wide (urban) groundwater temperature monitoring network in the UK, comprising of 60 instrumented boreholes collecting time series temperature data from a shallow (< 30 m) unconsolidated sand and gravel aquifer. The observatory also includes a demonstration open loop ground source heat pump system, which supplies heat to a local school. This 'proof of concept', which has been successfully operating for several years, shows that shallow aquifers can be sustainably used for shallow open loop geothermal energy applications in urban areas.

Future challenges for the 'Cardiff Urban Geo observatory' include creating a predictive hydrogeological model to understand optimum density for ground source heat pumps. The study area is a pilot site for the EU GeoERA MUSE project developing common methods for long-term monitoring of shallow open loop GSHP systems.

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