Towards attributed, parameterised and fully integrated 3D geoscience models and related GIS datasets for large urban regeneration projects in the UK

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Urban regeneration in the UK tackles deprivation stemming from industrial decline. These long-term projects (up to 25 years) are some of Europe's largest. They implement land recycling, sustainable development and effective management of land and water resources. Those engaged in regeneration and large-scale construction (e.g. Olympic Games 2012 in London) need accessible and readily understood environmental geoscience information. The British Geological Survey (BGS) increasingly meets these needs with interactive, bespoke, 3D attributed geologic models, constructed with GSI3D and other software, and related GIS datasets. Close partnerships with decision-makers, including environmental regulators, help ensure effective data use. For example, in the Clyde Corridor, Scotland's national regeneration priority, BGS works with Glasgow City Council, delivering 3D models of surficial deposits and bedrock in an urban area undermined for coal and ironstone, and masked by variably contaminated anthropogenic deposits. Comprehensive geochemical datasets are also produced. The models incorporate engineering data, and provide a platform for groundwater recharge and flow models, developed using ZOOM object-oriented software, which will be parameterized with data from a groundwater monitoring network under development. This will facilitate monitoring of groundwater quality and levels during regeneration, and aid assessment of: large-scale remediation of chromium waste; point-source groundwater recharge associated with sustainable urban drainage, a growing part of metropolitan drainage strategy; and the potential for and sustainability of ground source heat from extensive minewaters and aquifers beneath Glasgow.

Growing trends in BGS's urban geoscience research include:

- assessment of confidence in model layers to make their use more defensible in decision-making,
- characterisation of anthropogenic processes and their impacts
- model parameterisation to enable prediction e.g. of local climate change impacts such as extreme weather events,
- integrating buried infrastructure, built environment and archaeological data, and a broader range of environmental datasets, and
- exploration of transdisciplinary links e.g. with health-related data and socio-economic indices.

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