

SUMMARY OF FINDINGS

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A Review of Groundwater Levels in the South-East of Ireland

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Abstract

Analysis of groundwater level records from Ireland's South Eastern River Basin District (SERBD) allowed fundamental information about the nature of bedrock and gravel aquifers to be investigated. Analysis of seasonal groundwater levels showed that the fractured bedrock aquifers recharge more quickly and typically have a longer recession period than gravel aquifers. The calculated recession periods for bedrock aquifers are longer than previous estimates for similar aquifers. Hydrograph analysis identified a number of notable phenomena including: a gravel aquifer's interaction with surface water and evidence of rejected recharge. Short term groundwater level fluctuations caused by global seismic events, recorded via chart recorders, are discussed. Specific yield values were calculated, for a number of settings, from annual average groundwater level variations. The values supported estimates from previous research on similar aquifers. An analysis to investigate if any impacts of climate change were evident showed no consistent change in the timing of groundwater level minima or maxima.

Key Words

Groundwater levels, South East River Basin District, Water Framework Directive

Background

Groundwater level monitoring, and the subsequent evaluation and interpretation of records, provides fundamental information on the nature of aquifers and the groundwater regime. Consistent monitoring over time allows hydrogeological trends to be identified and their implications assessed. Groundwater level data have been collected in Ireland since the late 1960s. Typically, monitoring was conducted during the course of different projects implemented by the Geological Survey of Ireland (GSI) or local authorities. In the 1990s, the Environmental Protection Agency took responsibility for groundwater monitoring in Ireland and set up a new national monitoring network for groundwater quality and levels. In 2006, this network was reviewed and updated in accordance with European Union legislation. This report presents the analysis of groundwater level data available for the SERBD.

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Key points

- SERBD is underlain by extremely heterogeneous geology with extensive and spatially variable overlying subsoil deposits.
- Alteration, cementation and intensive structural deformation mean that groundwater flow is through secondary porosity and dominated by fracture flow.
- Groundwater level data and monitoring point (MP) information for MPs within the SERBD have been collated into a publicly available database. Hydrographs with suitably long records have been analysed.

Findings/Recommendations

- Hydrograph analysis, in relation to effective rainfall and local hydrogeological setting, allowed a number of insights to be made such as: identifying the dominant factors influencing hydrograph character; identifying surface water control of groundwater and rejected recharge.
- Analysis of seasonal groundwater levels highlighted the differences in recession periods between aquifer types and over time; and allowed the calculation of aquifer parameters such as specific yield.
- Work previously conducted into the response of groundwater in the study area to global seismic events is reviewed.
- Analysis of long term groundwater level trends have the potential to show the influence of long term factors such as climate and land use changes.

For Further Information

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Publications connected to this work (References)

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