

PRESS RELEASE

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Deep groundwater in coastal deltas protected from contamination

A new study by the British Geological Survey (BGS) and University College London (UCL), led by Dr Dan Lapworth, has been published today in *Geophysical Research Letters*. This study shows that groundwater pumped from depths below 150 m in the coastal regions of the Bengal basin is thousands of years old and generally secure from contamination by salinity and arsenic found in shallow groundwater.

Dan Lapworth (BGS and UCL Geography) explains that the “results reveal no modern components in deep groundwater with ages ranging from 1000 to 10,000 years. Traces of modern groundwater are, however, evident in a few pumping wells where they are associated with short-circuiting of vertical leakage within inadequately sealed boreholes.”

Deep groundwater provides an invaluable source of drinking water for over 80 million people in the coastal areas of Bangladesh and West Bengal, India. The discovery of arsenic contamination of shallow groundwater in Bangladesh in the early 1990s led to arsenic-mitigation strategies that included very rapid development of deep groundwater. There are, however, serious concerns surrounding the security of deep groundwater to the ingress of both arsenic-rich and saline shallow groundwater.



Groundwater sampling in Khulna, Bangladesh BGS © UKRI



The team, which included scientists from the UK, Bangladesh and India, analysed a suite of chemical tracers of groundwater age including radiocarbon and chlorofluorocarbons, known as CFCs, in samples from actively pumped wells and dedicated multi-level monitoring wells.

The implications for the coastal Bengal Basin, the largest of the Asian Mega-Deltas, may apply in other deltaic environments in south and southeast Asia where deep groundwater provides a critical supply of drinking water to tens of millions of people. Understanding the vulnerability of deep groundwater to contamination from shallow sources has, to date, been based on mathematical models and remains uncertain, however this new study will help to build knowledge of this.

Professor Richard Taylor (UCL Geography) says "This study supports the case for continued but carefully monitored development of deep groundwater for domestic water supply in the coastal region of the Bengal basin. Monitoring needs to capture both short-circuiting of contaminated water through poorly constructed wells, which may manifest itself over a timescale of years in pumped sites, and vertical leakage induced across the aquifer sediments, which may take much longer (many decades)."

Ends



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Notes for Editors

The following are available for interview:

- Dr Dan Lapworth, British Geological Survey & UCL
- Professor Richard Taylor, UCL

For additional information go to: www.bgs.ac.uk

You can find the full paper here:

<https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2018GL078640>

British Geological Survey

The British Geological Survey (BGS) is a world leading applied geoscience research centre that is part of UK Research and Innovation (UKRI) and affiliated to the Natural Environment Research Council (NERC). BGS core science provides objective and authoritative geoscientific data, information and knowledge to inform UK Government on the opportunities and challenges of the subsurface. It undertakes national and public good research to understand earth and environmental processes in the UK and globally. The BGS annual budget of approximately £60 million pa is funded directly by UKRI, as well as research grants, government commissions and private sector contracts. Its 650 staff work across the UK with two main sites, the head office in Nottingham and Lyell Centre, a joint collaboration with Heriot Watt University in Edinburgh. BGS works with more than 150 private sector organisations, has close links to 40 universities and sponsors about 100 PhD students each year. Please see www.bgs.ac.uk.

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