

Geological Survey of Canada

LOGAN CLUB
CLUB LOGAN

Commission géologique du Canada

**Carleton**
UNIVERSITY

OCGC Seminar

11:00 December 1, 2023

Teams Presentation (details below)

The British Groundwater Model (BGWM): it's origin, current status and future plans

Dr. Andrew Hughes

British Geological Survey

Abstract

The initial version of the national-scale groundwater model (British groundwater model, BGWM) has been implemented to simulate groundwater dynamics and budgets in Great Britain. The model, which includes 3-D geological complexity in the hydrogeological parameterisation, combines a MODFLOW6 groundwater flow model with a distributed runoff and potential recharge model (ZOODRM) to simulate monthly groundwater heads and flows in British aquifers. Notwithstanding the challenges of integrating a very large amount of data from multiple sources, finding a trade-off between computational efficiency and realism, performing automatic calibration of input parameters, and addressing multiple sources of structural and parameter uncertainty, a quantitative-qualitative evaluation approach showed that the BGWM provides a reasonably accurate simulation of groundwater systems and processes at a national scale. The model was then applied to understand the dynamics of groundwater resources through a quantification of budget components and their variability across multiple spatial and temporal scales. Comparisons showed regional differences linked to lithological and climatic variability in the inflows, outflows, and storage components which in turn can be associated with variable groundwater resilience to extreme climatic events. The use of the BGWM to date has informed the plans for the next phase of development.

Bio:

Dr Andrew Hughes (ORCID ID: <https://orcid.org/0000-0001-9940-1813>) is a Principal Groundwater Modeller at the British Geological Survey (BGS). His first degree was in Chemical Engineering and he has a PhD entitled "Gas movement through the unsaturated zone". Alongside this, his research interests include integrated modelling, variable density modelling, large-scale recharge and groundwater modelling, groundwater and volcanoes, groundwater flow into underground structures and the proper uptake of modelling results by

their intended audience. He has worked in a range of countries from Europe, the Americas, Middle East, Africa and the Indian sub-continent. He is BGS Co-PI for Hydro-JULES – development of groundwater component of British mainland and global groundwater model, leads on the brines component of the Lithium for Future Technologies (LiFT) project and is Co-PI for the Community Water Management for a Liveable London or CAMELLIA. He currently splits his time between developing understanding and modelling of high Andena salars for lithium extraction and large-scale groundwater modelling (national, continental, and global).

Microsoft Teams meeting

Join on your computer, mobile app or room device

[Click here to join the meeting](#)

Meeting ID: 261 058 778 33

Passcode: 2DPMCg

[Download Teams](#) | [Join on the web](#)

Join with a video conferencing device

teams@nrca-rnca.video.canada.ca

Video Conference ID: 118 952 727 7

[Alternate VTC instructions](#)

Or call in (audio only)

[+1 613-699-2160,224380774#](#) Canada, Ottawa-Hull

Phone Conference ID: 224 380 774#

[Find a local number](#) | [Reset PIN](#)

[Learn More](#) | [Meeting options](#)

Réunion Microsoft Teams

Participez à partir de votre ordinateur, de l'application mobile ou d'un appareil de la salle

[Cliquez ici pour vous joindre à la réunion](#)

ID de la réunion : 261 058 778 33

Code secret : 2DPMCg

[Téléchargez Teams](#) | [Participez sur le web](#)

Rejoindre avec un appareil de vidéoconférence

teams@nrca-rnca.video.canada.ca

No de vidéoconférence: 118 952 727 7

[Autres instructions VTC](#)

Ou composez le numéro de téléphone (audio seulement)

[+1 613-699-2160,,224380774#](#) Canada, Ottawa-Hull

No de conférence téléphonique: 224 380 774#

[Recherchez un numéro local](#) | [Réinitialisez le NIP](#)

[Pour en savoir plus](#) | [Options de réunion](#)