

Geological Survey of Canada

**LOGAN CLUB**  
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Commission géologique du Canada



uOttawa



**Carleton**  
UNIVERSITY

OCGC Seminar

11:30am November 16<sup>th</sup> 2023

Room: **STEM 464**

*Coffee will be available from 11:00*

**Dr. Barbara Sherwood Lollar**  
**(University of Toronto)**

**The Hidden Hydrogeosphere: The Contribution of  
Deep Groundwater to the Planetary Water Cycle**

**Zoom Meeting ID: 941 1249 7043;**

**Passcode: kKGw0F**

<https://uottawa-ca.zoom.us/j/94112497043?pwd=UitKdDUwSE05dE1neHE2dHBsaWRqdz09>

### Abstract

The canonical water cycle assumes that all water entering the subsurface to form groundwater eventually re-enters the surface water cycle by discharge to lakes, streams, and oceans. Recent discoveries in groundwater dating have challenged that understanding. Here we introduce a new conceptual framework that includes the large volume of water that is estimated to account for 30–46% of the planet’s groundwater, but that is not yet incorporated in the traditional water cycle. This immense “hidden hydrogeosphere” has been overlooked to date largely because it is stored deeper in the crust, on long timescales ranging from tens of thousands to more than a one billion years. Here we demonstrate why understanding of this deep, old groundwater is critical to society’s energy, resource, and climate challenges as the deep hydrogeosphere is an important target for exploration for new resources of helium, hydrogen, and other elements critical to the green energy transition; is under investigation for geologic repositories for nuclear waste, and for carbon sequestration; and is the biome for a deep subsurface biosphere estimated to account for a significant proportion of the Earth’s biomass.

For further information, please contact Oliver Warr ([owarr@uottawa.ca](mailto:owarr@uottawa.ca)).