

First-ever global map of surface permeability informs water supply, climate modelling

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University of British Columbia researchers have produced the first map of the world outlining the ease of fluid flow through the planet's porous surface rocks and sediments.

The maps and data, published Friday in [Geophysical Research Letters](#), could help improve [water](#) resource management and climate modelling, and eventually lead to new insights into a range of geological processes.

"This is the first global-scale picture of near-surface permeability, and is based on rock type data at greater depths than previous mapping," says Tom Gleeson, a postdoctoral researcher with the Department of Earth and Ocean Sciences.

Using recent world-wide lithology (rock type) results from researchers at the University of Hamburg and Utrecht University in the Netherlands, Gleeson was able to map permeability across the globe to depths of approximately 100 metres. Typical permeability maps have only dealt with the top one to two metres of soil, and only across smaller areas.

"[Climate models](#) generally do not include groundwater or the sediments and rocks below shallow soils," says Gleeson. "Using our permeability data and maps we can now evaluate sustainable groundwater resources as well as the impact of groundwater on past, current and future climate at the global scale."

A better understanding of large scale permeability of rock and sediment

is critical for water resource management--groundwater represents approximately 99 per cent of the fresh, unfrozen water on earth. Groundwater also feeds surface water bodies and moistens the root zone of terrestrial plants.

"This is really an example of mapping research from a new, modern era of cartography," says Gleeson. "We've mapped the world, peering well below the surface, without ever leaving our offices."

The study's maps include a global map at a resolution of 13,000 kilometres squared, and a much more detailed North American [map](#) at a resolution of 75 kilometres squared.

The research also improves on previous permeability databases by compiling regional-scale hydrogeological models from a variety of settings instead of relying on permeability data from small areas.

Provided by University of British Columbia

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