

Groundwater fate and climate change

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(Phys.org)—Simon Fraser University earth scientist Diana Allen, a co-author on a new paper about climate changes' impacts on the world's ground water, says climate change may be exacerbating many countries' experience of water stress.

"Increasing food requirements to feed our current world's growing population and prolonged droughts in many regions of the world are already increasing dependence on groundwater for agriculture," says Allen. "[Climate-change](#)-related stresses on fresh surface water, such as glacier-fed rivers, will likely exacerbate that situation.

"Add to that our mismanagement and inadequate monitoring of groundwater usage and we may see significant groundwater depletion and contamination that will seriously compromise much of the world's agriculturally-grown food supply."

In "Ground Water and Climate Change," Allen and several other [international scientists](#) explain how several human-driven factors, if not rectified, will combine with climate change to significantly reduce useable groundwater availability for agriculture globally.

The paper was published in late 2012 in the journal *Nature Climate Change*.

The authors note that inadequate groundwater supply records and mathematical models for predicting climate change and associated sea-level-rise make it impossible to forecast groundwater's long-range fate

globally.

"Over-pumping of groundwater for irrigation is mining dry the world's ancient Pleistocene-age, ice-sheet-fed aquifers and, ironically, at the same time increasing [sea-level rise](#), which we haven't factored into current estimations of the rise," says Allen. "Groundwater pumping reduces the amount of stored water deep underground and redirects it to the more active hydrologic system at the land-surface. There, it evaporates into the atmosphere, and ultimately falls as precipitation into the ocean."

Current research estimates oceans will rise by about a metre globally by the end of the century due to climate change. But that estimation doesn't factor in another half-a-centimetre-a-year rise, says this study, expected due to groundwater recycling back into the ocean globally.

Increasing climate-change-induced storm surges will also flood coastal areas, threatening the quality of groundwater supplies and compromising their usability.

This is the second study that Allen and her colleagues have produced to assist the Intergovernmental Panel on Climate Change (IPCC) in assessing the impact of climate change on the world's [groundwater](#) supply.

The IPCC, established by the United Nations Environmental Programme and the World Meteorological Organization in 1988, periodically reviews the latest research on climate change and assesses its potential environmental and socio-economic impacts.

This study is one of several guiding the IPCC's formulation of upcoming reports, the first being about the physical science behind climate change, due Sept. 2013.

More information: www.nature.com/nclimate/journal/nclimate1744.html

Provided by Simon Fraser University

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