USGS Maps Groundwater Corrosivity across the U.S.

Geological Society of America 2016 Annual Meeting Science

Boulder, CO, USA: Untreated groundwater from 25 states could be potentially highly or very highly corrosive, a recent study finds. Corrosive water, while itself not dangerous, can dissolve lead and other metals from pipes, plumbing, and other metal surfaces into drinking water.

"The USGS has a 30-year history of monitoring water quality across the nation. And because of the recent situation with water quality issues in Flint, Michigan, a number of us wondered, 'What does this mean for people who rely on their own domestic wells for water?' " says USGS hydrogeologist Kenneth Belitz.

Belitz will speak on the USGS findings on Wednesday, 28 September, at the meeting of the Geological Society of America in Denver, Colorado.

The USGS study focused on the potential corrosivity of groundwater, and not municipal water, because approximately 44 million people in the United States rely on groundwater from wells as their water source. While the quality of municipal water supplies is regulated and treated, domestic well owners are responsible for the treatment of their personal water supplies.

To study the quality of source water for wells, the USGS wanted to map groundwater corrosivity across the United States. They collected water samples from over 20,000 springs, supply wells, observation wells, and domestic wells from across all 50 states and the District of Columbia. Belitz and colleagues utilized two different measures for corrosivity, both of which are used frequently by water quality managers.

"There had been no national map prior to this work," says Belitz. "This is the first map of this type."

Belitz and colleagues found that the prevalence of potentially corrosive groundwater is high throughout the eastern United States, with very high corrosivity in portions of the Southeast and Northeast. The Pacific Northwest and Hawaii are also highly prone to having corrosive groundwater.

The map showed that 11 states and the District of Columbia have wells with a very high likelihood of having corrosive water, 14 states were listed with a high likelihood, 19 states with a moderate likelihood, and six states have a low likelihood of having corrosive water. Of the two corrosivity indicators, the Langelier Saturation Index found one-third of water samples were potentially corrosive. The second index, the Potential to Promote Galvanic Corrosion, labeled two-thirds of the water samples as moderately corrosive and about one tenth as highly corrosive.

Belitz hopes these maps will make private well owners more aware of the chemistry of their groundwater and will provide valuable information for trade groups that specialize in groundwater, water monitoring, and drinking water quality. "Once people are aware of the groundwater corrosivity in their state, they will be able to take action if needed," says Belitz.

For example, Belitz cautions that the study concentrated on the corrosivity of a well's source water and did not measure the amount of lead in pipes or amount of lead entering homes.

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"It is a good idea to get water tested at the tap," says Belitz. "It is probably the most urgent in states with the highest prevalence."

In the future, Belitz hopes to explore the relationship between groundwater corrosivity and aquifer type in addition to mapping corrosivity by state. Groundwater reacts with rocks as it flows underground, and the chemistry of the rocks influences the water's corrosivity. In addition, the longer the water remains in contact with the rocks, the more time the rocks and the water have to react.

Belitz and his colleagues will also be working to develop other corrosivity indices.

"We are looking at better indices that predict the occurrence of lead in water," says Belitz. "The two indices we use are not the most direct ways of getting at it. We are looking at alternatives."

Learn more: http://pubs.usgs.gov/sir/2016/5092/sir20165092.pdf

WHAT: Session No. 278 T31. Water Quality and Aqueous Contaminants Session link: <u>https://gsa.confex.com/gsa/2016AM/webprogram/Session40532.html</u> Paper 278-7: National Perspective on Corrosivity of Groundwater, USA Abstract link: <u>https://gsa.confex.com/gsa/2016AM/webprogram/Paper288241.html</u>

WHERE & WHEN: Wednesday, 28 September 2016: 8:00 AM to 12:00 PM Colorado Convention Center Room 302 Presentation Time: 9:45 AM

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Map of the potential for groundwater corrosivity in wells across the United States. Credit: Kenneth Belitz, Bryant Jurgens, and Tyler Johnson. Click on the image for a high-res version

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