Research discovers underground pockets of water, natural gas

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(PhysOrg.com) -- Look out below! That's the warning a University of Alberta geophysics researcher has for hydrocarbon and water drillers after discovering uncharted land forms beneath the surface of the province. Deep valleys, cut out by glaciers and then filled with loose aggregate rock, silt and sand, are hiding fresh water reservoirs and natural gas deposits.

Both the water and the gas could be considered treasures, says Doug Schmitt, Canada Research Chair in rock physics. But, he says they can also be problematic.

"Energy exploration could unknowingly pollute the water," and then there's the potential for a gas explosion.

"Natural gas can collect in pockets in these porous rock formations," said Schmitt. "If drillers think they're pushing through dense bedrock and suddenly they hit loose porous rock with gas in it, that can be a serious safety hazard. Rigs have burned to the ground because of this."

Schmitt's group, in collaboration with the Geological Survey of Canada and the Alberta Geological Survey, combined a number of existing high resolution seismic and electrical underground mapping technologies used in the petroleum, mineral and environmental industries. The researchers discovered the 300 metre-deep valley hidden beneath the surface of the ground near the community of Rainbow Lake in northwestern Alberta.

"Seismic crews searching for natural gas had been all over the area in the past, but their search focused more on deep gas deposits within the bedrock," said Schmitt. "We collected multiple types of geophysical data over one 10 kilometre-long profile to show that right under their feet there's a valley, two to three kilometres wide."

Schmitt says there are hidden valleys like this all over Alberta and, indeed, the entire glaciated northern hemisphere of the planet.

One of Schmitt's concerns is for the fresh water aquifers that can lie in these underground structures. If they go undetected and a tailings pond is put in the area and the liner fails, the effluent could spread via the aquifer far and wide, says Schmitt.

In countries like Germany, Denmark, Norway and the United Kingdom, geological surveys of hidden glacial valleys are an important issue. Schmitt says these countries are much smaller than Canada with higher populations, and protecting ground water from pollution is a high priority.

Schmitt has co-authored a research paper on these findings that will be published this month by the Geological Society of America.

Schmitt is hoping the research will be seen in a positive light because it's a wake-up call.

"This is new information. We can delineate the ground beneath us in more detail and avoid polluting our fresh water supplies as well as offering people involved in resource exploration an added margin of safety."

Provided by University of Alberta (news : web)