AI could free up time to solve the world's problems, suggests hydrology expert

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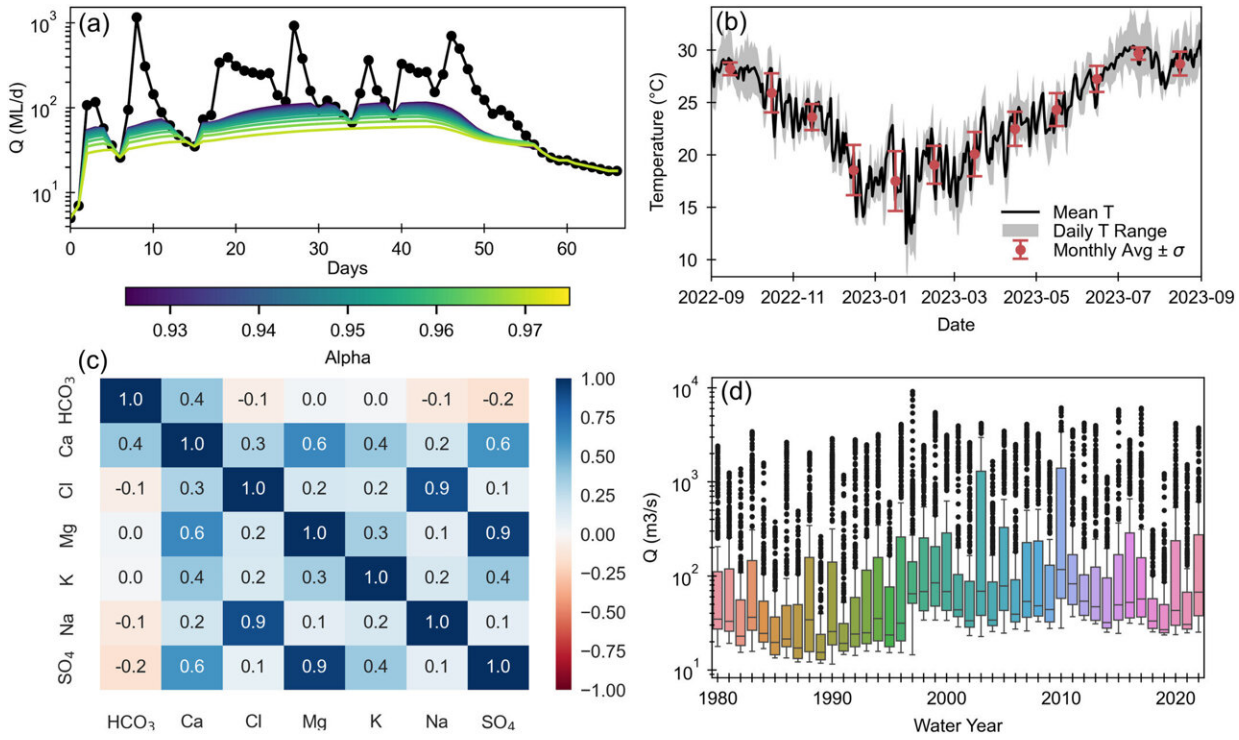

Outputs from data analyses utilizing ChatGPT. (a) Conversion of R functions to Python to perform baseflow separation (data from Ladson, 2023). Credit: *Hydrological Processes* (2023). DOI: 10.1002/hyp.15015

A Charles Darwin University (CDU) water expert who uses ChatGPT to analyze hydrological data in a fraction of time says artificial intelligence (AI) could allow researchers to dedicate more time to the world's most

pressing problems.

CDU groundwater hydrology expert Dr. Dylan Irvine, alongside Dr. Landon Halloran and Dr. Philip Brunner from the University of Neuchâtel in Switzerland, have discussed the opportunities and limitations from using new capabilities of ChatGPT for hydrological analyses in a paper titled "Opportunities and limitations of the ChatGPT Advanced Data Analysis plugin for hydrological analyses." The paper was published in *Hydrological Processes*.

The paper explores the results of using ChatGPT to translate between coding languages, plot data, generate codes and analyze data in a hydrological science setting.

The authors found people with limited or no coding ability can conduct data assessments with ChatGPT in either the free version, or with the Advanced Data Analysis plugin in the paid version, and time could also be saved through the speed at which ChatGPT can analyze data.

Other benefits include the ability for ChatGPT to suggest data analysis options, summarize academic papers and reports, troubleshoot and debug code, and generate, edit and test code.

The authors found while the benefits were numerous, users needed to check the accuracy of results and tweaks prompts because ChatGPT is prone to errors.

Dr. Irvine, who began experimenting with AI tools to analyze data, said integrating AI into his processes has become a significant asset to his work.

"Computer codes that used to take me days to write can now be written in an hour or less. Solving problems and overcoming issues is much

quicker now," Dr. Irvine said.

"It used to be that if I wanted to lean a new technique, such as something in machine learning, I'd often have to spend a long time reading, and trawling the web for examples. Often there was one part that was hard to set up and without it, the entire code doesn't work.

"Now, fixing errors or learning new approaches is much easier. I'm expanding my skillset into adjacent disciplines. I'm a groundwater researcher by training but I can now do a lot more surface water-related work."

Dr. Irvine said carefully and appropriately incorporating AI to automate low-level tasks could have a positive impact on the hydrological sciences by freeing up time to focus on complex problems common in the field.

"I'm an Earth and environmental scientist. It's amazing to get to study how the world works, and the work that we do is as important now as ever," Dr. Irvine said.

"However, we struggle to convince students to study Earth science, and/or water resources. This shortage basically means that there's more work to do than we have capacity for. Automating basic tasks using AI can free up time so that we can focus on more challenging tasks."

More information: Dylan J. Irvine et al, Opportunities and limitations of the ChatGPT Advanced Data Analysis plugin for hydrological analyses, *Hydrological Processes* (2023). DOI: 10.1002/hyp.15015

Provided by Charles Darwin University

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