



Hudson – Mohawk Professional Geologists Association

JANUARY MEETING

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January 17, 2024

Characterization of the PFAS-Contaminated Fractured Rock Aquifer (FRA) Beneath the Rutland- Southern Vermont Regional Airport (RSVRA)



Overturned limb of the anticline beneath the RSVRA.

Speaker: Jonathan Kim, PhD
Geologist, Vermont Geological Survey

This course is approved for 1 PDH+

Abstract: In 2018, many wells and springs near/at the Rutland Airport were found by the Vermont DEC to be contaminated with PFAS. The PFAS point sources are areas where aqueous film-forming foam (AFFF) was used to conduct annual equipment testing and to extinguish aircraft fires. The Vermont Geological Survey and partners used an aquifer characterization approach that integrated physical (geologic mapping, GIS analysis of well driller reports and geophysical logging) and chemical (PFAS, major and trace elements, stable isotopes, and recharge-ages) components to build a robust 3D conceptual site model (CSM) for understanding groundwater flow and contaminant transport in the study area.

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Abstract: (cont'd) Bedrock geologic mapping was combined with photogrammetric analysis of structures observed in ground and drone photo mosaics of outcrops in the Clarendon Gorge. The structural chronology (oldest to youngest) is 1) isoclinal fold set and cleavage, 2) superposed anticline and syncline, 3) a third fold set that interferes with the second fold set and forms a dome and basin pattern, and 4) fracture zones with igneous intrusions. Geophysical logging of selected wells was used to map subsurface bedrock structures and lithologies in areas with limited outcrops. Contour maps of the bedrock surface show an irregular pattern of hills and valleys beneath the surficial deposits, which may influence groundwater flow.

Piper diagrams, 2H/H vs. 18O/16O stable isotope plots, and average recharge-ages (tritium and CFCs), and PFAS species have proven useful for discriminating groundwater geochemical groups that reflect water-rock interaction. Low alkalinity, PFAS-free, "old" groundwater (> 50-year average recharge-age) was likely recharged into Cambrian quartzites on the west flank of the Green Mountains, traveling along flow paths to the fractured rock aquifer beneath the Rutland Airport. Our CSM suggests that groundwater and PFAS transport in the subsurface are influenced by a fractured, refolded, anticline – syncline pair.

Kim, J., Klepeis, K., Ryan, P., Romanowicz, E., Boyles, J., and DeJong, B., 2022, A Conceptual Site Model for the PFAS-Contaminated Fractured Rock Aquifer Beneath the Rutland- Southern Vermont Regional Airport (RSVRA), Vermont: Vermont Geological Survey Technical Report VGTR2022-2, 28 p.



About the Presenter: Jonathan (Jon) Kim is a returning speaker who received his Ph.D. in Geology from the State University of New York at Buffalo (1996), an M.S. from University of South Florida/Tampa (1984), and a B.A. from Colgate University (1981). He began working for the Vermont Geological Survey, a division within the Vermont Dept. of Environmental Conservation, in 1997, where much of his research relates to the characterization of fractured bedrock aquifers using structural geology, geochemistry, and hydrogeology. He currently collaborates with professors and students from Middlebury College, the University of Vermont, and SUNY at Plattsburgh; State of Vermont organizations including the agencies of Agriculture and Transportation; and federal agencies such as EPA- Region 1 and the U.S. Geological Survey.



Reservations are required by Monday
January 15, 2024

Whether attending the dinner or only the in-person presentation
Register on-line at www.hmpga.net

Questions? Call or email Jonathan Dippert at (518) 786-7563 • j.dippert@ctmale.com

Dinner and Program Cost:

\$10.00	Student Members*
\$30.00	Dormant (Ret.) Geologists
\$40.00	Members
\$50.00	Non-Members

***PDH Certificate Available for Additional Cost:**

\$10.00	Member attending Dinner
\$15.00	Member (Program Only)
\$20.00	Non-Member attending Dinner
\$35.00	Non-Member (Program Only)

In-person Program Only: Free

* Student dinner sponsorship available for qualifying students - contact Jonathan Dippert • j.dippert@ctmale.com

Location: Century House
997 New Loudon Road
Latham, NY 12110

Time: Social Hour 5:00pm
Dinner 6:00pm
Program 7:00pm

Sponsorship is available for this meeting! Dinner sponsors receive free dinner, a display table set up for the social hour and a 5-minute presentation to the dinner audience, prior to the presentation. Please contact Jonathan Dippert at j.dippert@ctmale.com for more information.