Michigan Basin Geological Society

January Virtual Membership Meeting

FREE

WHEN **Wednesday January 14th, 2026**
7:00 PM - 8:00 PM

WHERE **Virtual**
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Meeting ID: 285 397 703 883 65
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Mapping Geologic Hydrogen Prospectivity in the Conterminous United States

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ABSTRACT: The geologic and geophysical inputs necessary for the favorability mapping of geologic hydrogen systems are presented here in support of the U.S. Geological Survey's efforts to create the first map of geologic hydrogen prospectivity in the conterminous United States. The geologic hydrogen system model has several components that are required for a viable accumulation: 1) a source of natural hydrogen, 2) a reservoir to store hydrogen in the subsurface, and 3) a competent seal to retain the hydrogen and prevent leakage to the Earth's surface. In total, there are 21 geologic layers in the model and the distribution of chance of success values are assigned to each layer based on our interpretation of the geologic hydrogen model and our comprehensive knowledge of the United States' geology.

The geologic hydrogen source component is divided into three sub-components comprising serpentinization-type water reduction sources (SP), radiolysis of water sources (RD), and deep mantle sources (DP). Layers within the SP sub-component include: 1) an area defined by a magnetic anomaly in the offshore, eastern United States, 2) onshore areas where ultramafic rocks are present at the surface, and are inferred to extend into the subsurface, and 3) deep subsurface areas that have high-amplitude, positive gravity anomalies. Layers within the RD sub-component include 1) areas with known uranium deposits, 2) areas that are favorable for the concentration of uranium, 3) areas underlain by the Precambrian cratonic platform, and 4) areas that are underlain by accreted terranes and contain Phanerozoic-age, granitic rocks at the surface. Layers within the DP sub-component include 1) areas of mapped, km-depth scale surface faults, 2) areas of Paleoproterozoic-age suture zones, and 3) areas of modeled, deep crustal boundaries interpreted from geophysical data. Finally, migration pathways were applied to specific source component layers. Regional-scale hydrogen migration pathways are derived from the basement topography, and consumption of hydrogen during migration is accounted for by diminished prospectivity with increased migration distance.

The reservoirs and seal components are split between sedimentary (e.g., siliciclastic, carbonate) and crystalline rocks (e.g., igneous, metamorphic) based on high-resolution, surface geologic maps of the United States. An additional seal layer accounts for areas where salt is present within the subsurface. A final layer includes areas where sedimentary basins contain thick (i.e., >1,000 feet) accumulations of both porous reservoir rocks and impermeable rocks for geologic hydrogen storage and seal, respectively.

Collectively, these layers comprise the geologic inputs for the first edition of a geologic hydrogen prospectivity map of the conterminous United States.

BIOGRAPHY: Jane Hearon is a geologist with the U.S. Geological Survey in Denver, Colorado. She currently conducts regional-scale research and resource assessments on both petroleum systems and geologic hydrogen. Jane has worked in a variety of geologic settings throughout her 15-year career, from sediment-hosted gold deposits to deep-marine depositional systems. Jane's research spans both hard- and soft-rock geology, and she has expertise in reservoir characterization, sedimentology and stratigraphy, mineralogy and core analysis, reservoir quality modeling, and natural resource assessments. She holds degrees from Cornell University (BA) and Colorado School of Mines (MS and PhD).