Contribution ID: **539** Type: **Poster Presentation**

Wave Velocity Dispersion and Attenuation in Partially Saturated Porous Media

Monday, 13 May 2024 14:55 (1h 30m)

The understanding of the seismic signature of the partially saturated formation is critical to seismic monitoring in the hydrogen geo-storage, CO2 geo-sequestration and geophysical survey and exploration of oil and gas reservoir. The main objective of this study is to model the wave propagation in partially saturated rocks containing two immiscible fluids (i.e., gas-water), with a comparative case study on hydrogen (H2), methane (CH4), nitrogen (N2) and carbon dioxide (CO2) bearing rocks. The sonic velocities and the attenuations are influenced by several parameters, which interact in a complex pattern, particularly when the rock is saturated with multiple fluids. We developed a rock physics model that considers the effects of patchy saturation, wettability, effective pressure, and relative permeability. By examining wave propagation in each fluid-saturated case against water saturation, we improve our understanding of changes in sonic velocity and attenuation during the water saturation varies. This provides valuable insights for seismic and sonic monitoring during the injection and extraction of gas in the reservoir formation.

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References

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Session Classification: Poster

Track Classification: (MS19) Elastic, electrical, and electrochemical processes and properties in porous media