Abstract

Identifying low-risk CCUS reservoirs with limited subsurface geologic data; utilizing stacked reservoirs for inferring seal integrity

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Methods

1.) Targeted seals: characterizing regional geologic history and formation continuity of confining lithology from well logs and core

2.) Identifying site-specific seal bypass systems using seismic attribute analysis

3.) Characterizing brine compositions from stacked reservoirs

Conclusions

The sealing potential of stacked reservoir systems can be evaluated to determine geologic integrity of these systems using new data through the following methods:

1.) Well log and core analysis to define the regional stratigraphic, geologic, and diagenetic history of each reservoir to establishing or confirming seal integrity.

2.) Seismic attribute analysis to identify low-seal potential systems that could impact sealing formation integrity.

3.) Fluid analysis from stacked reservoirs to induce hydrocarbon recovery.

At our study site, this methodology has allowed us to conclude that:

• Seismic attribute analysis identified primary seal bypass systems, specifically fault and fracture systems, throughout the study.
• Seismic attribute analysis highlighted the potential of seal bypass systems in the study area.
• Detailed brine analysis indicated a significant correlation with the Amaden and Madison seal systems.

Figure 2: Paleosol/soil development associated with Pleistocene geologic activity.

Key points:

1.) Amaden carbonate reservoirs are indicated by a decrease in the formation factor and resistivity values.
2.) Madison limestone reservoirs are indicated by an increase in the formation factor and resistivity values.
3.) Detailed brine analysis of stacked reservoir fluids shows evidence of hydrocarbon communication.

Selected References


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