

PS High-Resolution Sequence Architecture and Seismic Sedimentology Interpretation of Fan Delta, Shahejie Formation, Bohai Basin, China*

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Abstract

The primary sedimentary pattern of the 1st and 2nd members of the Shahejie Formation in Oilfield A, Bohai Bay Basin, is a fan delta, with thick reservoir, vertically continually deposited and laterally superimposed in migrating, which is based on high-resolution sequence architecture. The comprehensive analysis proves that research on thick reservoir of fan deltas follow the principle of regarding description on the main sedimentation area as core and treating different facies differently. Guided by reservoir correlation patterns, sequence boundaries can be clarified by degrees, including 5 short-term cycles and 12 super short-term cycles under 1 mid-term base level cycle. Based on best option for seismic data of certain frequency, 4 stratal slicing patterns about multiple fans are built to accomplish seismic sedimentology interpretation in high-resolution sequence architecture. The results show that fan size of the 1st and 2nd members of Shahejie Formation in Oilfield A expand at the first stage and then shrink gradually and the fan shape evolves from skirt-rim pattern to ribbon pattern, according with sequence architecture division.

Selected References

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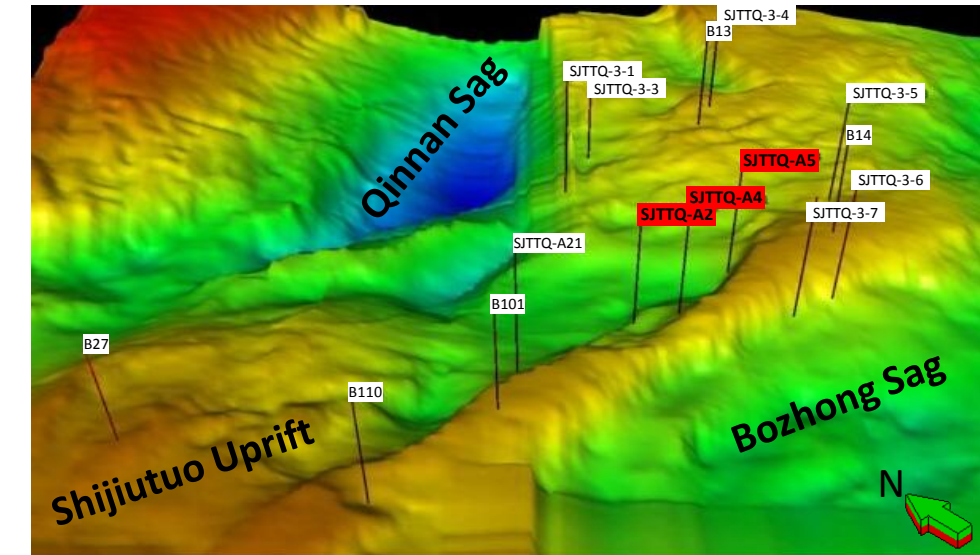
High-resolution Sequence Architecture and Seismic Sedimentology Interpretation of Fan Delta

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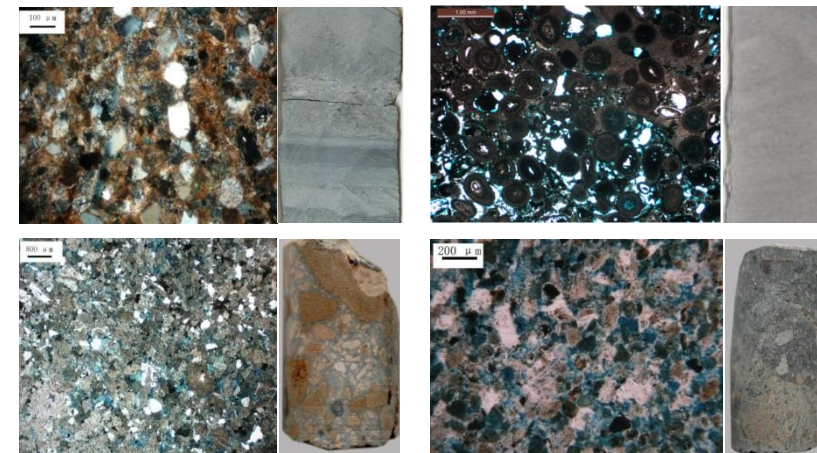
Abstract High-resolution sequence architecture of fan delta in Oilfield A, Bohai Bay Basin is built, and seismic sedimentology interpretation is conducted for reservoir distribution. The comprehensive analysis proves that research on thick reservoir of fan delta follow principles of centering on description of main sedimentation area and treating different facies differently. Guided by reservoir correlation patterns, sequence boundaries of different levels can be recognized, including 5 short-term cycles and 12 super short-term cycles under 1 mid-term base level cycle. Based on best option for seismic data of certain frequency, 4 stratal slicing patterns about multiple fans are summarized, which are successive progradation, successive retrogradation, retrogradation to progradation and progradation to retrogradation, to accomplish seismic sedimentology interpretation in high-resolution sequence architecture. The results show that, fan size of 1st and 2nd member of Shahejie Formation in Oilfield A expand at the first stage and then shrink gradually. Fan shape evolves from skirt-rim pattern to ribbon pattern, conforming to sequence architecture division.

Key words fan delta; thick reservoir; high-resolution sequence architecture; seismic sedimentology; stratal slice

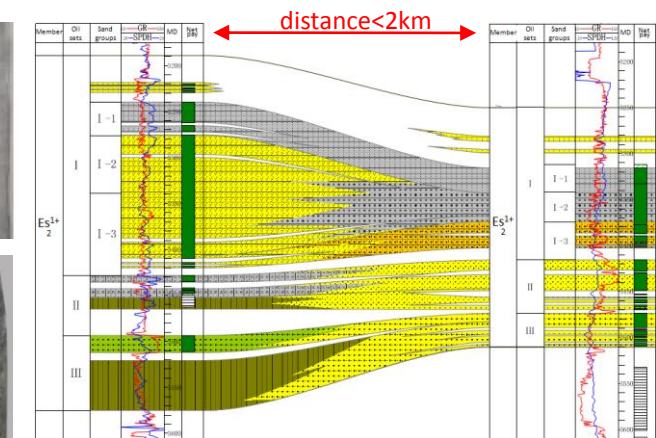
1. Geological Settings



2. Reservoir characteristics of fan delta



Hybrid sedimentary, more than 5 rock types



Unsteady sedimentation leading to laterally lithologic changes

Single Layer Thickness
Max. 130m
Min. 5m



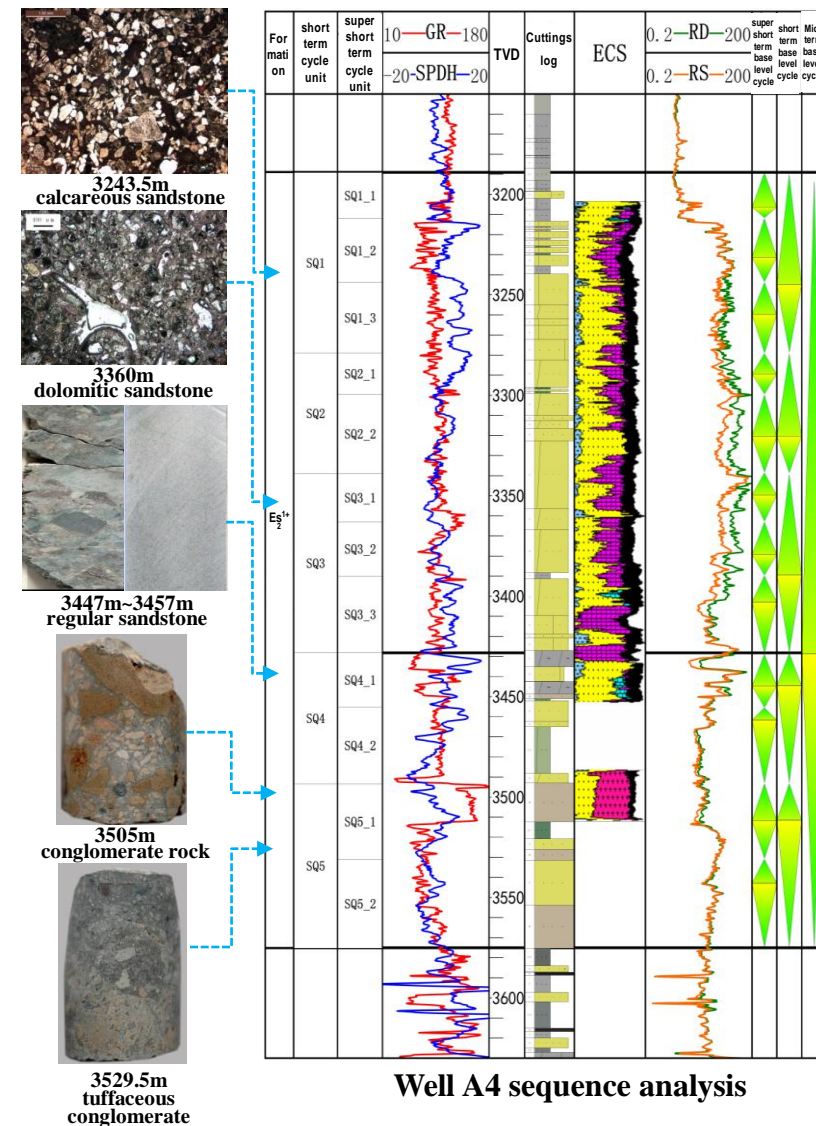


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3. High-resolution sequence architecture of fan delta

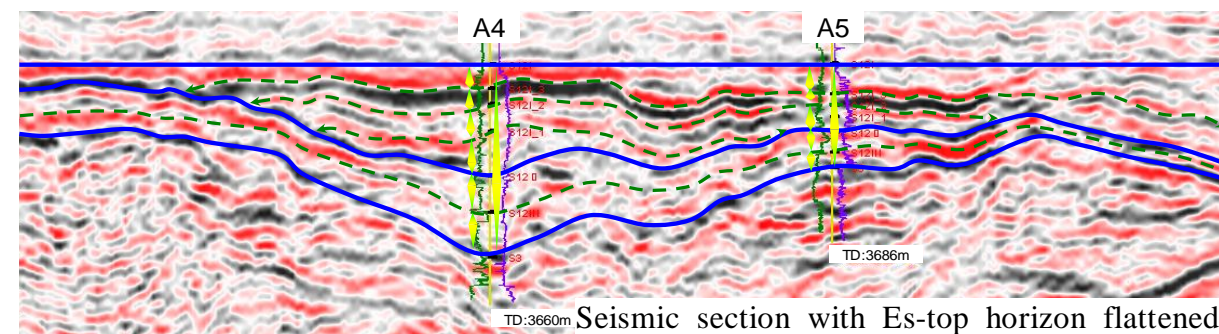


Well A4 sequence analysis

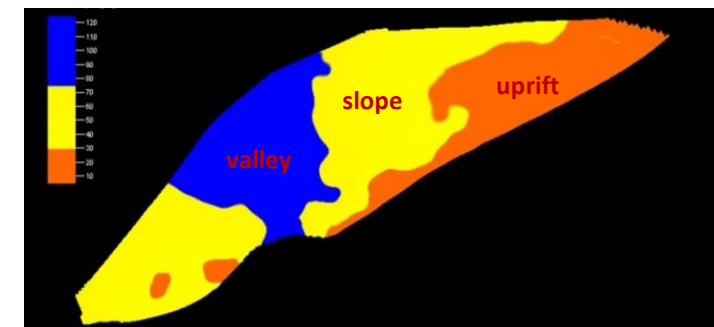
Mid-term base level cycle: include upper and lower half cycles, upper cycle is made of high calcareous and dolomitic ingredient, overlapping lower cycle, which consists of high tuffaceous ingredient

Short-term base level cycle: include 5 cycle units. Influenced by Paleotopography evolution, each unit has different ECS responses.

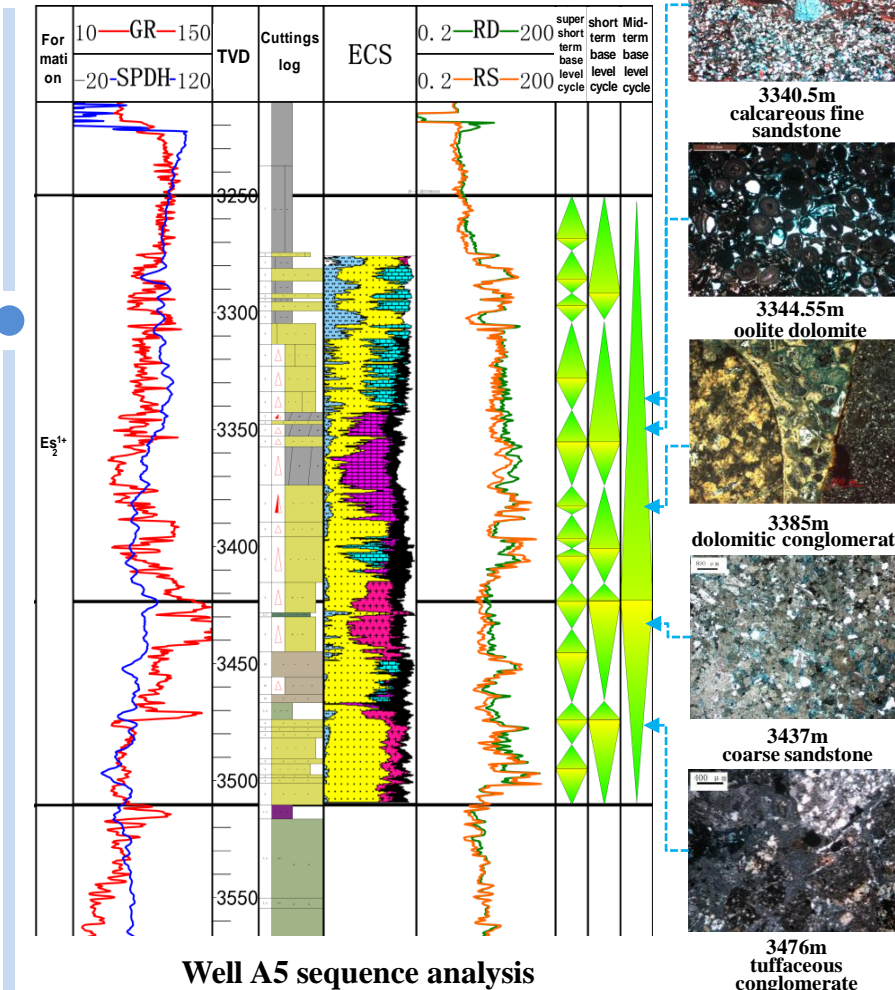
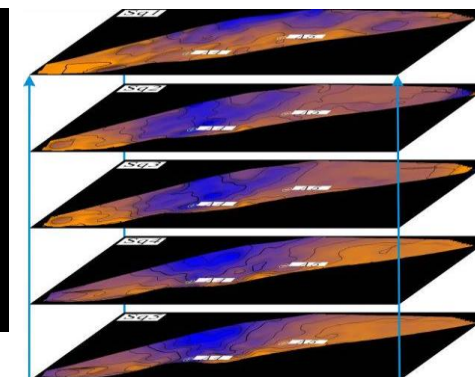
Super short-term base level cycle: include 12 cycle units.



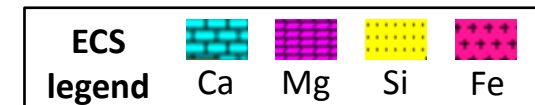
Seismic responses of mid-term and short-term cycle surfaces



Paleotopography and evolution



Well A5 sequence analysis





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4. Seismic sedimentology interpretation

