Characterization of salt-sediment interaction in passive margin through 3D seismic attributes: Application to the Tarfaya Basin (Morocco)

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Abstract

Understanding of salt tectonics in deep-water settings is key for reducing risks during hydrocarbon exploration. Salt structures influence the occurance and properties of sedimentary bodies, known as salt-sediment interaction. During its evolution, salt structures condition the topographic relief controlling reservoir quality and trapping geometry amongst other factors.

This project focuses on the interpretation of a 3D seismic dataset aiming to characterize the interaction between salt and the surrounding sediments during the Cenozoic of the Tarfaya Basin, SW Morocco. Tarfaya Basin constitutes a rifted passive margin developed from Triassic times recording the initial opening of the Central Atlantic Ocean. Late syn-rift salt (halite) was deposited during the Late Triassic- Early Jurassic. Salt evolved through different stages: initial active diapirism triggered by thermal subsidence (Early Jurassic), differential loading causing passive diapirism (Late Jurassic - Early Cretaceous), initial shortening (Late Cretaceous), erosion (Base Cenozoic) and successive periods of shortening and halokinesis during the Cenozoic.

Through seismic interpretation and attributes calculation, sedimentary bodies, such as mass-transport deposits, channels and lobes were characterized. Simultaneously, three key seismic-sections were interpreted in order to define the different stages during salt growth in the Cenozoic. As a result, an evolutionary conceptual framework relating the evolution of salt structures and these sedimentary features is proposed.