
Structural Characterization of Inverted Salt-Detached Ramp-Synclines and Associated Salt Structures: Results from 3D Seismic Interpretation Obtained from Analog Modeling

Katlen Barrientos

Supervisors: María Roma, Oriol Ferrer

KEYWORDS: Salt tectonics, Salt-Detached Ramp-Syncline, Analog modeling

ABSTRACT

This research project is based on three analog models with different tectonic situations, two extensional events and inversion. The aim is characterized the structures of inverted salt-detached ramp-synclines and associated salt structures. These models are developed in extensional settings and are characterize by synclinal sedimentary mini-basins detached on salt and formed above the hanging wall of active ramp-flat-ramp extensional faults, which bounded by salt structures. In addition, the formation of these extensional systems requires the presence of salt layer, which gives a different structural style. Nevertheless, to obtain a deeper understanding of the geometry and kinematic evolution of these salt-detached ramp-syncline basin. It is necessary to use a tool to interpret it and Petrel was the software used to analyze the data obtained from analog sandboxes, which help to construct the isochore maps and structural models related with salt tectonic. Thus, Voxel techniques help to improve the interpretation of salt structures. Once time that the main horizons were interpret and structural models were create. We can determine that: The development of the ramp-syncline basin is relate to the master fault during the extensional phase, salt detached ramp-syncline basins occur above of salt layer and the Inversion structures related with salt may have promoted good trap geometries. In addition, Isochore maps of salt unit at the end of extension and inversion constrained the location of welded areas that generally are difficult to characterize in real seismic. These isochore maps help us to compare the behavior of salt during the extension and inversion phases.

Nowadays, the oil companies are the more interested to explore in basins related with salt. They found the significance for future exploration is relate with traps nearby salt diapirs. There are hundreds of oil-and-gas traps formed due to salt tectonics, which host the most important hydrocarbon reserves around the world such as Gulf of Mexico, North Sea, and Santos in Brazil.

