Burial and Thermal History of the Central Platform Basin

The basin and burial history regarding to this study was encountered by a number of problems especially those related to the construction of models. The major problems were the quality and quantity of data and the complexity of heat flow in this area which was experienced during the Laramide, Ancestral Rocky and Rio Grande rifting (Bartolini et al. 2003). Despite the very poorly suites and penetrations, a number of well penetrations have existed indicating that most were experienced during the pre 1980s vintage leading to the estimation of the periods when they took place. Most of the picks regarding to the age and formation have been carried out without the use of core or biostratigraphic information. This is because of the thermal and geochemical data.

Figure 1

Retrieved from http://www.searchanddiscovery.net/documents/2004/raatz/images/05.htm

The estimation of heat over time has been found out to be a major factor in determination of any model of burial history. The area around Rio Grande Rift has a thermal regime that is one of the most complicated regimes in the whole world. The burial history is clearly indicated on the above figure on how the process went through three phases. The three faces are carbonaceous, Late Permian and Pliocene Quaternary. This is a clear indication of the role that heat and pressure played in the formation of the features. The figure above gives an illustration on how the effects of salt structures and how the temperatures distributes.

Figure 2 retrieved from http://www.searchanddiscovery.net/documents/2004/raatz/images/08.htm

Bartolini et al (200) asserts the figure above to depend highly on the extent of erosion and Kimmerian uplift. The burial history presented by the Vlieland Basin indicates a deviation from the high levels and the platforms due to two reasons. The first one is the start of subsidence of the Vlieland Basin, and the contemptuous deposition of the Schieland Group during the Late Jurassic times and secondly, due to the relatively chalk Group that developed thinly in the inverted basin. From the two illustrations depicting the burial history, it is clearly indicating how the region was affected by three the Late Carboniferous, he Late Permian and the Rijland Group.

Thermal history relates to the reconstruction that occurred to the platform through the constant flow of heat through the boundary at a condition of 60mw/w2 with a combination of sediment water, the presence of interface temperatures and paleo waters depths. The distribution of temperatures in a sedimentary basin at specific periods in history with an assumption of steady and constant conditions depend highly on spatial differentiation of basal heat flow input, sediment water interface temperatures and the distribution of the bulkiness in the thermal conductivity of the subsurface.

The thermal conductivity of the of sedimentary units that are clastic together with carbonates are found to range between 1.4-3.5mWK (Bartolini et al. 2003).As a result of the thermal conductivity of salt reducing, due to the increase in temperatures, the salt units often tend to in the same way as sediments thermally. In the shallower region of the basin parts, salt diapiric structures often disturb the flow of heat in a significant manner. The focus of heat flow through the structures of the salts leads to an increase in the temperatures on the top parts of the salt structures and the lithostratigraphic units adjacent to them. This leads to a decrease in the temperatures of the units that lie immediately under these salt structures.

References

Bartolini, C et al. (2003). *The Circum-Gulf of Mexico and the Caribbean: hydrocarbon habitats, basin formation, and plate tectonics.* New Mexico: AAPG.