A Technique for Resolving Faulting Problems on the Steeply-Dipping Flanks of Salt Bodies using Multiple Bischke Plot Analysis (MBPA)

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ABSTRACT

One of the most difficult problems facing geologists and geophysicists is to resolve the complex structural and stratigraphic problems that are present on the steeply-dipping flanks of salt bodies. In this region, steep bed dips often result in poor to non-existent seismic data, and the rapidly-thinning stratigraphic section can make the well log correlations difficult or tenuous. If missing section is incorrectly attributed to faulting rather than to an unconformity, then fault blocks will be incorrectly interpreted, resulting in inaccurate future well plans and erroneous reserve estimates. In this paper we review the geologic and geometric principles applicable to salt flanks, and demonstrate how these principles can resolve missing section problems using the Multiple Bischke Plot Analysis (MBPA) method. If all of the well logs are compared to each other, then faults and unconformities can exhibit fundamentally different properties with respect to missing section data. The missing section on unconformities is a variable quantity that changes between wells. However, in the case of faults, the missing section data stabilize about a near-constant value when compared to more off-structure wells. In this manner faults can be distinguished from unconformities. The MBPA method is an accurate and robust technique that can help refine any correlation study involving well logs or seismic data. Several different displays can enhance the interpretation of the method, and we present real salt flank examples from the Gulf of Mexico using stacked plots along with 3-D displays.