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A new approach for estimating the amount of eroded sediments: A case study from the Canning Basin, Western Australia

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Statement of the Problem: Understanding the amount of exhumed sections in sedimentary basins is a key step in the determination of the basin'sprospectivity. This is important in terms of defining the source rock burial history and subsequently, its maturation and hydrocarbon generation potential. In the conventional realm, this is important in constraining the time of trap formation relative to the time of hydrocarbon expulsion from source rocks. In the unconventional reservoirs, on the other hand, deep burial and subsequent exhumation "excites" the kerogen, and brings the thermally mature source rocks closer to the surface.

Methodology & Theoretical Orientation: The most common approach to the measurement of exhumed sections in a sedimentary basin is the use of Apatite Fission Track Analysis. While this method is routinely used in the industry, it has its limitations. Here, we have estimated the exhumed sections by obtaining a representative compaction trend, and interpolating data from different wells on this curve in order to measure the displacement. Furthermore, a mathematical relationship between exhumation and the sonic transit time (DT) and depth of burial is established.

Conclusion & Significance: This study has been able to obtain erosion magnitudes from different parts of the Broome Platform of the Canning Basin independent of the basins thermal history, thereby providing more accurate constraints and inputs into the basins burial and thermal history model. Also, the established mathematical relationship between depth, sonic DT, and exhumation appears to be in good agreement with the observed thickness of eroded sections and the measurements from Apatite Fission Track analysis.

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Stabilizing gas lift systems by reducing initial gas bubble sizes

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During oil production, gas lift methods can be affected by two-phase (gas and liquid) flow instability within the production tubing. This problem is caused by two main phenomena; the casing heading pressure and the flow perturbation due to the development of the flow regimes and its density wave oscillation. This paper presents a novel technique that reduces gas bubbles sizes, pressure drop long pipe and flow instability. A laboratory-scale two-phase flow experiment was designed and built to investigate the effects of flow perturbation and flow instability. The rig consisted of a 2 m long by 66 mm ID transparent PVC pipe, with an air injection point situated at 0.1 m above the base of the test section. The generated air bubbles within the two-phase flow were captured using a digital camera and the images were analyzed using an image processing package to obtain bubbles velocities, sizes and number long the test pipe. A novel air injection technique was then developed that reduced the overall bubbles sizes. As a result of this, the overall average air bubbles sizes were reduced by 22%, the big bubbles (Taylor bubbles) by 8.22%. In addition, the number of small bubbles was increased significantly and well distributed in the whole pipe area even near to the pipe wall (wall peaking), instead of (core peaking) the centre of the pipe. In comparison to (sharp edge) normal orifice gas lift valve with the same port size area and operating conditions, and also the lifting performance (production rate) was increased by 7.5%.

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