PETROLEUM CHARGE AND BIODEGRADATION IN THE LLANOS BASIN. COLOMBIA.

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Biodegradation is the main control on the quality of crude oils reservoired in the central and southern areas of the Llanos basin.

The post-genetic alteration was recognized in most of the sampled fields. Samples show isotopic, molecular and compositional changes, describing a geographical trend which has been used to unravel the extension of the biodegradation processes.

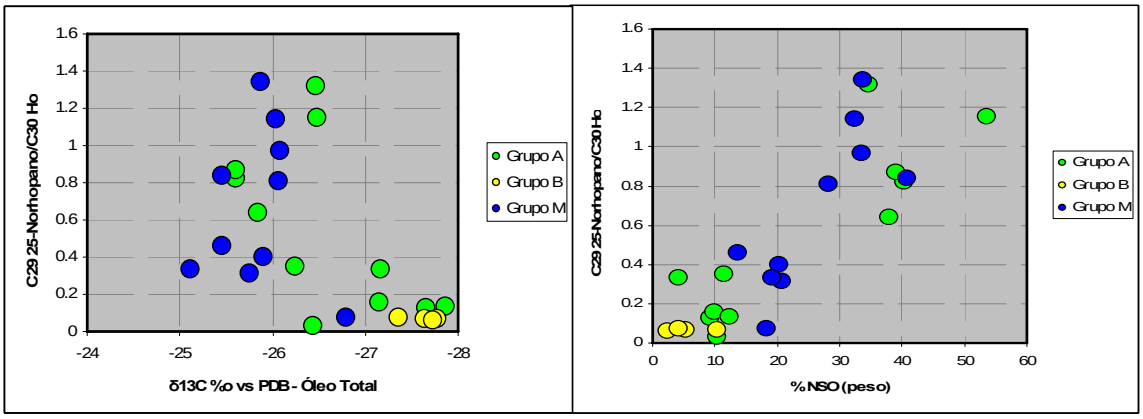

Figure 1. Molecular and isotopic evidences of biodegradation in samples from different genetics groups.

Samples with different biodegradation levels were compared against non-biodegraded ones in order to quantified the compositional losses and variations.

Biodegradation causes a strong increase of the NSO compounds of the crude oils and the concomitant decrease of the API values; differences up to 20 API grades are observed between the end-members of the biodegraded series.

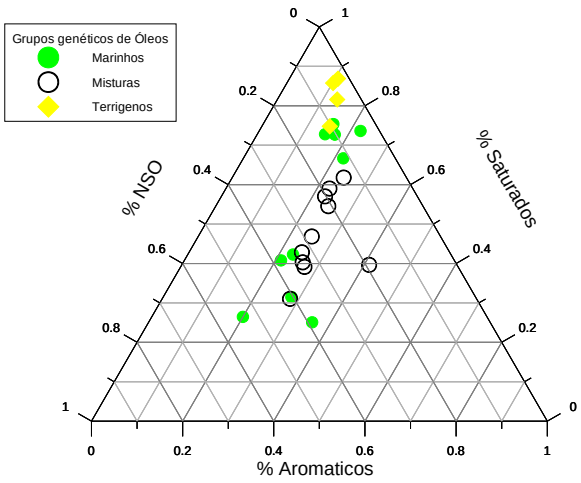

Figure 2. Increase the NSO compound in the biodegraded oils.

Modeling the reservoirs thermal history it was possible determine the chronology of the alteration, which is further used as a constraint of the charge history of the basin.

Reservoir tilting and lifting as well as quick burial processes, associated with the Andean deformation, controlled the burial and thermal history of the reservoirs and the biodegradation itself. Petroleum generation and migration happen associated to major structural variation, it affects the fluid distribution and its preservation in the reservoir

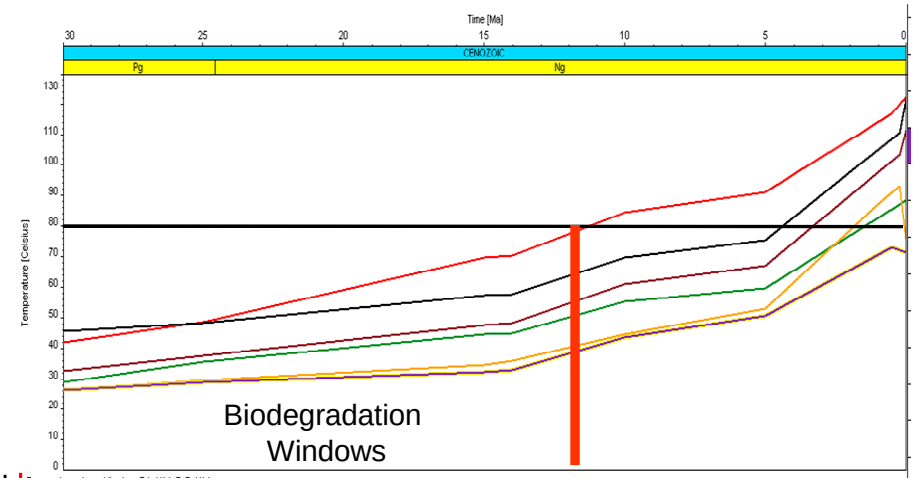

Figure 3. Thermal history of reservoirs filled with biodegraded oils. It was used to restrict the timing of charge for each field.