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Lithofacies characterization in oil wells by inference of S-ratios using a Neuro Fuzzy Logic (NFL) system

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Using an algorithm of neuro fuzzy logic (NFL), to infer S-ratios via experimental magnetic susceptibility () data from 90 samples (670 meters) of the Colombian stratigraphic well Saltarín 1A (Llanos foreland basin), we found a possible relationship. The inference of S-ratio improves when the lithological divisions of the three formations involved (Guayabo, León and Carbonera) are taken into account separately. The fuzzy rules obtained for each individual formation do not seem to properly work upon the other two. However the fuzzy rules derived for the Guayabo formation, in Saltarín 1A, work quite well for the data obtained from the Venezuelan Guayabo group, in oil well Guafita 1X. High and low temperature measurements of the magnetic susceptibility, show the presence of stochiometric magnetite that seems to have partially replaced pyrite framboids. Pyrrhotite appears to be the chief magnetic mineral in León and Carbonera formations. The marked rock magnetic contrasts between these three formations are responsible for the inability of finding a unique set of fuzzy rules that could properly infer S-ratios over the whole well.