EVALUATION OF ASSOCIATED FRESH WATER RESERVOIRS IN BRAZIL USING EDM TECHNIQUE FROM NUCLEAR MAGNETIC RESONANCE LOGS

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The evaluation of fluvial reservoirs of Açu Formation (northeast of Brazil) is a technological challenge, due to oil and fresh water association. The methodology actually employed relies on the resistivity contrast yielded by the invasion of saline mud filtrate. The presence of residual oil increases the microresistivity readings in comparison to water bearing intervals. The exclusive usage of this methodology presents serious limitations which implies in largers costs in direct interventions for a reliable evaluation. The usage of Nuclear Magnetic Resonance (NMR) logs brought great application interest in the Potiguar Basin due the reservoir quality informations supplied by the tool as well as the possibility of fluid typing. The development of EDM (Enhanced Diffusion Method) technique enlarged significantly the possibility of NMR usage for that purpose. It supplies the residual oil saturation, allowing the separation of oil and water signals in situations where they would ocuur superimposed in the conventional T2 spectrum. This technique explores the diffusion contrast between intermediate viscosity oil and water. Resistivities and EDM logs responses are compared in two wells with oil reservoirs of several viscosities. The main goals obtained with EDM were the indication of pay zones not recognized before, more accurate oil/water contacts and larger sensibility fordetection of residual oil. It was also verified that the combination of reservoir quality information, as obtained in NMR total porosity acquisition, with the conventional logs interpretaion, allows a more consistent evaluation of the producing intervals in the wells.