Geophysical Research Abstracts
Vol. 14, EGU2012-975-2, 2012
EGU General Assembly 2012

Statistical analysis of magnetic parameters in order to discriminate hydrocarbon-related conditions

M. Aldana (1), J. Ñuflo (1), V. Costanzo-Alvarez (1), O. Guzmán (1), S. Guerrero-Suárez (2), F. Martín-Hernández (2,3), M.L. Osete (2,3)

(1) Universidad Simón Bolívar, Venezuela , (2) Universidad Complutense de Madrid, España, (3) Instituto de Geociencias (UCM-CSIC), España

In this work we try to discriminate near surface magnetic anomalies related to hydrocarbon microseepage using just magnetic parameters. We present preliminary results for two oil fields located at Eastern Venezuela and characterized by different geochemical conditions. Cross-plots that combine hysteresis data (Mrs/Ms and Hcr/Hc), Magnetic Susceptibility (MS) and S-ratio were analysed searching for patterns associated with different type of MS anomalies, i.e. related (A type) and not related (B type) to hydrocarbon migration, with different reducing conditions (associated or not with the presence of organic matter) and/or with distinct chief magnetic mineralogies at these MS anomalous levels (i.e. Fe-oxides or Fe-sulphides). K-means and Hierarchical Cluster Analyses were applied and the possibility of pattern recognition, combining more than two magnetic variables, was examined. The results obtained seem to indicate that it is possible to discriminate between anomalies associated with different chief magnetic mineralogies. Nevertheless, the statistical analysis of the parameters applied here does not discriminate between anomalies related to hydrocarbon microseepage and those reflecting just lithological contrasts, or between anomalies associated with different reducing conditions.