

FLUID INCLUSIONS AND STABLE ISOTOPES STUDIES IN CARBONATE OF SERRA ALTA FORMATION, PARANÁ BASIN, BRAZIL

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In the Paraná basin, the extensive magmatic event of the Cretaceous, documented by the Serra Geral formation, affected considerably the sedimentary basin packages, making their thermal evolution more complex, making the understanding of the generation models and migration of hydrocarbons more difficult. In order to study the conditions of generation and migration of hydrocarbons in the Serra Alta Formation, geothermometric methods based on analysis of fluid inclusions in calcite veins were used as well as analysis of isotope ratios $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ in these same veins and calcitic cement of the host rocks. The homogenization temperatures measured in fluid inclusions present in calcite from veins formed after the deposition of the Serra Alta Formation are mainly situated between 91° and 278°C. These extreme variations could be indicative of thermal reequilibration post-entrapment caused by stretching processes associated with the burial of the sedimentary package and with the Serra Geral magmatism. These processes are further supported by the relatively constant salinities of these inclusions obtained from measurements of melting ice temperature. These values range 0.23 to 3.50 weight % NaCl equivalent. The study of stable isotopes of carbon and oxygen held in shales, siltstones, mudstones and limestones of the Serra Alta Formation and later carbonate veins show, in general, negative values of (delta) for $\delta^{18}\text{O}$ patterns (V-PDB) ‰ between -1.16 and -6.44. The same situation occurs for the isotope ^{13}C , which has negative values for patterns of $\delta^{13}\text{C}$ (V-PDB) ‰ between -2.34 and -8.69. Similar isotopic signatures obtained for the calcite veins and cements suggests pervasive action of hydrothermal fluids associated with the Serra Geral magmatism. The paper discusses the influence of these fluids on the generation and expulsion of hydrocarbons from the Serra Alta Formation.