Geochemical evaluation of selected gases and condensates from Southern Romania

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Although Romania has a long history of petroleum exploration, relatively little has been published regarding the geochemistry of the oils and gases from this geologically complex area. This presentation uses the results from a geochemical evaluation of five gases and three condensates from different fields in the Moesian Platform and Getic Depression areas of southern Romania to evaluate their potential sources, maturity and alteration.

The gas samples were analysed for both their molecular (C_1-C_5 & CO_2) and isotopic composition ($\delta^{13}C$ C_1-C_4 & CO_2, δD C_1). The condensates had the carbon isotopic composition of the saturated and aromatic hydrocarbon fractions determined, and an extensive suite of molecular analyses were performed (gasoline-range hydrocarbons, diamondoids, aromatic hydrocarbons and biomarkers, including age-diagnostic compounds). These data were compiled into a regional geochemical database along with sparse published gas data for comparison.

The gases all contain a mixture of biogenic and thermogenic gas, ranging from almost purely thermogenic (Nenciulesti) to approximately 50-60% biogenic (Predesti and Paraieni). Identification of the kerogen type for the thermogenic gas in all samples is ambiguous, although the heavier isotopic composition of C_{2+} components in three of the gases suggests a probable Tertiary source rock, whilst a pre-Tertiary component is indicated for the Amaru and Predesti gases. Although unproven, one potential source for a pre-Tertiary contribution are widespread Paleozoic rocks, including organic-rich Silurian black shales.

Of the three condensates studied, one (Turburea-Bibesti) is particularly interesting in having been biodegraded and undergone migration contamination. It is isotopically heavier than the other two condensates, and appears to have a marine source rock with Type II kerogen of probable Paleogene age. The Mamu and Totea-Vladimir condensates also appear to have marine Type II source rocks, and in the case of Mamu age-diagnostic biomarkers indicate that this is most likely Tertiary, despite occurring in a Jurassic reservoir. Although the Totea-Vladimir sample may have had its biomarkers modified by slight migration contamination, its isotopic and diamond composition suggest a similar source as the Mamu condensate.