

PROBABILISTIC PETROLEUM SYSTEM ASSESSMENT CONSTRAINED BY EXPLORATION SCENARIOS. RESULTS FROM A CASE STUDY.

Spadini, G., Ruffo, P., Ponti, D., Corradi, A. Eni Agip Division, RIGE Dept., Via Europa Unità 1, S. Donato Mil., ITALY

Input parameters for petroleum system modelling are often highly uncertain and constrained within geological interpretation scenarios which are also far from being unquestionable. In the proposed methodology two different interpretative scenarios of source rocks feeding the secondary migration system have been tested; each scenario was investigated with a probabilistic approach by a set of simulations. The aim is to obtain a set of results which best cover the range of possible solutions. A sensitivity analysis has been performed to investigate the answer of the system to the simultaneous variation of several parameters. Input data for these simulations are obtained by optimally sampling the uncertainty hypercube defined by the input ranges of a set of potentially critical parameters. Calculated quantities of entrapped hydrocarbons are then calibrated to oil and gas volumes in place in drilled traps by selecting, among all the simulations performed, the ones that best match the data. The result of the calibration phase are sensible probability distributions for oil and gas volumes in undrilled traps, which cannot be provided with a straight application of conventional Montecarlo method. The proposed methodology shows how a probabilistic approach to basin modelling, considering interpretation scenarios and uncertainty of input parameters, appears to provide valuable information to prospect risk evaluation and reduction.