

Risk assessment for Petroleum Exploration using Modern Decision Support Systems

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In petroleum exploration, the geologic risk is always difficult to quantify due to the number of variables and uncertainties in the data. Modern techniques using interactive computer based systems, so called Petroleum Exploration Decision Support Systems (PE-DSS), enable these risks to be more accurately quantified. These recent technical developments help people to solve problems and make decisions; more quickly and for lower costs.

1D, 2D and 3D Exploration Models of the Santos basin offshore Brazil are used to illustrate the required data, the workflow and the results of a DSS which is specifically directed at supporting exploration decisions by integrating and processing regional-scale G&G data. The Exploration Model integrates all of the related components of the geologic and petroleum system which controls the petroleum risk. The complex problems with a large numbers of variables and are managed by the Petroleum Exploration DSS. The quantitative analysis itself is then performed by a 3D simulator which can accurately resolve all of the essential petroleum generation and migration processes. The final component is the full integration of risk analysis procedures, including Bayesian methods which enable prior geologic information to be taken into account.

This recent application in the Santos Basin illustrates the ability of modern Petroleum Exploration DSS and the Improvements for the geologic risk results. This can then be used in standard corporate risk assessment workflows and marks the difference between exploratory success and failure.
