

# **INTEGRATED GEOPHYSICAL INTERPRETATION FOR OFF-SHORE PETROLEUM EXPLORATION**

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Integration interpretations of gravity, aeromagnetic and geo-thermal anomalies for petroleum in offshore sedimentary basins have been carried out in South China Sea. We developed a visualization software package GMTI to perform this job integrating 2-D and 2.5-D modeling and inversion of gravity and magnetic anomalies and 2-D finite element technique for temperature calculation within basins. Observed heat flow data, Curie depth by high resolution aeromagnetic, depth to the basement and depths to different interfaces within a basin by seismic are the main boundary conditions. The lower semi-space from the mantle to the surface is divided into blocks accordingly to the variation of rock density, magnetization and heat flux, heat production rate, specific heat etc. Each block is a homogeneous unit. Blocks can be very small within a basin or in a belt to simulate rock property changes. Relationships between rock properties of three sorts, i.e. density, susceptibility and heat parameters are established by statistics of laboratory measurements. Once one sort of rock property parameters is given, integration calculation can be performed automatically. Or, each block can get rock parameters manually by dialogue on the screen. Preliminary simulation of density, susceptibility and temperature structures of Wanan and Nanwei basins showed the high efficiency and significance of GMTI application.