

# **Determination of the Regional and Residual Gravity Anomalies in the Cauvery Basin, Sri Lanka**

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The measured gravity field of the Earth contains two main components of short-wavelength residual anomalies and long-wavelength regional anomalies. In the petroleum industry, the most important component is the residual anomalies which correlate with shallow density variations such as sedimentary basins. The regional anomalies are caused by deeper density contrasts in the lithospheric mantle and the Asthenosphere. Usually, the residual anomalies are obtained by filtering out the regional anomalies mathematically. This study is focused to determine residual gravity of the Cauvery Basin, as the basement data is known up to a reasonable accuracy. In this study, a depth structure map of the basement in the Cauvery Basin was prepared initially using a two-way-travel time map and velocity data obtained from eight exploration wells. Depth data from selected 2D sections were used as input data for a Mathematica<sup>®</sup> program which was based on an iterative algorithm, developed to calculate the residual gravity anomaly caused by a 2D polygonal body having a density contrast with the surrounding. The difference of the calculated and the observed gravity was then used to obtain the regional gravity along the lines. A regional gravity map was created by interpolating the above data. A variation of -50 mGal to 71 mGal of the regional gravity was observed and a relatively high gravity anomaly was also observed in the central part of the basin. This may have been caused due to the crustal thinning process which occurred during the rifting phase of the basin. The residual gravity anomaly varies from about -60 mGal to 20 mGal in the region and follows the horst and graben structures. In conclusion, the authors identified undiscovered sub-basins which are related to the separations of Sri Lanka from the Gondwana supercontinent.

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