

2. Synopsis

Satellite gravity and bathymetry information covering the region $65^{\circ} \text{ E} - 95^{\circ} \text{ E}$, $10^{\circ} \text{ N} - 10^{\circ} \text{ S}$ ($\approx 2 \times 500\,000$ data points) of the Indian Ocean around Sri Lanka have been downloaded from the NOAA (<http://topex.ucsd.edu>) Geophysical database. Gravity anomalies have been interpreted to estimate the sediment thickness and other features of the shallow subsurface structure of the region using well-established techniques in Geophysics. A new method of extracting the gravity anomaly caused by the sediments deposited on folded oceanic crust from the observed anomalies, which involves frequency domain manipulations, has also been formulated. Most of the computer software needed for the interpretation has been developed as a part of the project. Downward migration of the oceanic crust due to the pressure exerted by nine prominent seamounts in the region has also been calculated considering the oceanic crust as an elastic plate lying over an invicid fluid half space and compared with the results of the gravity interpretations.

Results of the study show that the foot of the continental slope of Sri Lanka is situated approximately at an average distance of 68 km (≈ 23 nautical miles) from the shore line and the thickness of sediments deposited beyond the foot of the slope varies from little over 2 km to almost 0.8 km approximately over a distance of 170 km. Downward migration of the oceanic crust below the two main members of the Afanasy-Nikiten chain of seamounts has been calculated by interpreting gravity anomalies and the crust was found to have maximum depression of 5.5 km and 3.0 km. A similar study carried out over seven other smaller seamounts scattered over the central Indian Ocean shows that the maximum depression of the oceanic crust due to their pressure varies from 4.0 km to 1.0 km. Several profiles of gravity anomalies below 6° S of the equator covering the region $79^{\circ} \text{ E} - 87^{\circ} \text{ E}$, $2^{\circ} \text{ S} - 8^{\circ} \text{ S}$ have been interpreted and results were used to compile a isopach map. This map shows that the thickness of sediments goes down towards the middle part of the region to about 0.6 km and increases to 0.8 km at the periphery and again decreases towards the south.