

INTERPRETATION OF GRAVITY ANOMALIES OVER THE INDIAN OCEAN

REGION AROUND

SRI LANKA

BY

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**ABSTRACT**

Satellite gravity and bathymetry information covering the region 65°E - 95°E, 10°N - 10°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. Most of the computer software needed for the interpretation has been developed as a part of the study. 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 a viscoelastic plate lying over an incompressible fluid half space and compared with the results of the gravity interpretations. A similar study has been carried out for the 85°E ridge situated East of Sri Lanka.

Intense negative anomalies situated close to the foot of the continental slope of Sri Lanka have been explained in terms of the density variations over the oceanic-continental

boundary and due to sediment accumulation. Downward migration of the oceanic crust below the two main members of the Afanasy-Nikiten chain of seamounts has been calculated interpreting gravity anomalies and 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. This study has been extended to the 85°E ridge and it was found that the oceanic crust there has depressed from 9 – 14 km due to its pressure. Several profiles of gravity anomalies below 6°S of the equator covering the region 79°E-87°E, 2°S-8°S have been interpreted and results were used to compile an isopach map. This map shows that the thickness of sediments goes down to about 0.6 km towards the middle part of the region and then increases to 0.8 km at the periphery and again decreases towards the south.