

The Bouguer gravity variation over South East Asia as derived from satellite altimeter data

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A Bouguer gravity map of the marine areas of South East Asia has been created by applying water-depth corrections to the free air gravity dataset which is derived from satellite altimeter measurements. Structures within the major bounding plates of the Indian and Pacific Oceans are sharply defined. These features include the Ninetyeast and Investigator Ridges of the Indian Ocean and the Kyushu-Palau Ridge of the Pacific Ocean. The strong gravity expressions of the Java and Philippines trenches are also well defined. Over the thicker and more complex crust of the Eurasian plate the gravity signatures are less clear, although major structural trends and basin boundaries can be seen. The gravity field over the marginal seas within the area indicates that the Celebes Sea has the most uniform and clearly oceanic crust. Over the Sulu, Andaman and Banda Seas there are gravity expressions of their crustal inhomogeneity. In the Gulf of Thailand the north-south trends of the Western Basin, the Ko Kra Ridge and the Pattani Trough are all marked by gravity expressions, as are the Malay, Penyu and West Natuna Basins and the Khorat Swell and Tenggol Arch to the south. To the east the Natuna Arch, the Con Son Swell and the Mekong Basin all have clear gravity effects. The South China Sea has a complex

gravity signature of intersecting northwest-southeast and northeast-southwest trends, with gravity values increasing in an almost stepwise manner towards the inferred axis of crustal extension. Some of the sharper northwest-southeast negative gravity features to the west of the Palawan and Borneo Trenches may be due to younger grabens controlled by the same structural fabric of the underlying crust.

There are not as yet any large regional marine gravity datasets within South East Asia suitable for comparison with the satellite derived data, but such a comparison can be made between two datasets over the adjacent North-west Shelf of Australia. The major gravity features of this area correlate very well between the two datasets confirming the basic reliability of the satellite data. Anomalies over both the offshore Canning Basin and the Browse Basin are expressed in both the marine and satellite data, but there is considerably more detail in the regional marine data which suggests that the present state of satellite gravimetry is best suited for the location and delineation of major basins, but that it is not very sensitive to intrabasin structures which can be mapped with marine gravity.