Cover

Generation of 3-D geoidal surface of the Bay of Bengal lithosphere and its tectonic implications

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1. Introduction

Offshore sedimentary basins surrounding India have not been sufficiently explored despite the fact that they contain large-scale hydrocarbon/mineral resources (Biswas 1982). Satellite altimetry has emerged recently as an efficient alternative to expensive and hazardous ship-borne gravity survey (Stewart 1985). The averaged sea surface height as obtained from satellite altimeter is a good approximation to the classical geoid, which contains information regarding mass distribution in the entire Earth. The anomalies (highs and lows) in geoidal surface are directly interpreted in terms of subsurface geological features, e.g. transform faults, basement highs and lows (Majumdar et al. 1998). The geoidal anomalies also are converted to free-air gravity anomalies which are particularly useful in the deep sea where traditional ship-borne geophysical data are either unavailable or scanty. In the eastern offshore regions of India, regional crustal features, e.g. the 85°E ridge, the Central Basin, the 90°E ridge, the Sunda Arc and the Andaman shelf, have been well defined from satellite-derived geoid/gravity anomaly patterns and have been verified with related ship-borne geophysical survey data (Majumdar et al. 1998). Haxby et al. (1983) have generated digital images from the combined oceanic and continental datasets and have specified their usages in tectonic studies. Sandwell and McAdoo (1988) have applied gradient methods for analysis of gravity and geoid information. Rapp (1983) has developed a method for the prediction of gravity anomaly using spherical harmonic coefficients (up to degree and order 30 and beyond). McAdoo (1990) has generated the gravity field of the Southern Ocean from Geosat Exact Repeat Mission (ERM) data. Majumdar et al. (1998) have developed a brief methodology for offshore structure delineation using altimeter.

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