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A New Regard on the Tectonic Map of the Arabian–African Region Inferred from the Satellite Gravity Analysis

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Abstract

Satellite gravimetry is a powerful and reliable tool for regional tectono-geodynamic zonation. The studied region contains intricate geodynamical features (high seismological indicators, active rift systems and collision processes), richest structural arrangement (existence of mosaic blocks of oceanic and continental Earth's crust of various age), and a number of high-amplitude gravity anomalies and complex magnetic pattern. The most hydrocarbon reserves of the world and other important economic deposits occur in this region. Comprehensive analysis of satellite gravity data with application of different approaches was used to develop a sequence of maps specifying crucial properties of the region deep structure. Careful examination of numerous geological sources and their combined examination with satellite gravity (main), magnetic, GPS, seismic, seismological and some other geophysical data enabled to develop a new tectonic map of the Arabian–African region. Integrated analysis of series of gravity map transformations and certain geological indicators allowed to reveal significant geodynamic features of the region.

Key words: satellite gravimetry, gravity field transformations, integrated analysis, tectonics, geodynamics, Near and Middle East, Northern-Eastern Africa.

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