RELATIONSHIP OF CONGO AND INDIAN CRATONS TO ANOMALIES OF GEOID.

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Let us consider two large ring geoidal lows (Centrafrican and North-Indian) in connection with structure of corresponding parts of lithosphere. It is known that anomalies of geoid reflect gravitational anomalies and have with them the same sign. Lower limit of sources of large anomalies (centres of masses) can occur in depths of 400–700 km (1). Hence, conformity of structures of anomalies and lithospheric formations (in our case AR cratons) testifies to deep mantle roots of these formations.

The Congo craton superstructure in central Africa (2) is well reflected in shape of geoid’s anomaly (fig. 2). Quasi-round in plane cratonic region coincides with the geoid low deep up to 20 m. Extension of the Congoian radius (a) in direction of St. Helena Isl. (g) is underlined by location of geoid isolines. A sector between the Gabonian (b) and the Tchadian (d) radii coincides with well expressed high. A sector between the North-Zaïrian (e) and the South-Tanzanian (f) radii includes flat negative plateau in transition region between Congo and Indian lows. These and other concurrences indicate causal relation of the Congo superstructure and the geoid anomaly. The Congo craton is characteristic of typical to AR regions thickened "light" continental lithosphere. North of Bangui (CAR) seismic sounding shows, for example, that contact of fractured and solid crystalline basement persists down to a depth of 160 km (3). It is supposed that continental "roots" go down into mantle to 400–700 km depth. Thick "light" craton's lithosphere as though "sunk" into denser surrounding mantle probably creates the deficit of mass which is reflected as the geoid low over the Congo craton.

Larger and deeper geoid low (upto −112 m) with characteristic concentric structure occurs in a northern half of the Indian ocean (fig. 1, 3). Cause of this anomaly by analogy with the previous one could be immersion into dense mantle relatively light continental masses of "sunk" ring Indian craton (diam. about 6000 km). The Indian peninsula in this case is a sector of this structure. Numerous examples of "sinking" and immersion of continental regions there are on the Earth and other celestial bodies. On Mars one observes partial destruction and flooding with oceanic lavas of Chryse and Isidis ring basins located at transitional zone between continental and oceanic regions. Subsided continental blocks with Pcm crust there are in vicinity of the Indian structure – Seychelles and Mozambique plateaux. In northern part of the Indian ocean "Magsat" observes anomalously thick magnetic crust –upto 20 km (4). This might indicate that altered continental blocks take part in its structure. Anomalous geochemistry and isotope composition of Indian oceanic basalts (5) apparently confirm this. Roughly radial pattern of the Indian superstructure is revealed by analysis of bottom features of ocean floor and cosmic magnetic and gravity data (i.e., 6) which show that the superstructure can be traced to considerable depth. Fan-like geological structure of the Indian peninsula confirms that it represents a sector of the ring structure. This sector is characterized by normal continental crust (but with anomalously high heat flow), thin lithosphere and well pronounced asthenosphere. These peculiar-
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Rides of the Indian shield become understandable if it is considered as held up on surface sector of on the whole subsided ring structure.


Fig.1 Centrafrican & Indian geoid lows(7), 10m int. Fig.2 Geoid anomalies (8) over Congo superstructure, 2m int., Hachure-tangential lines. Fig.3 Indian radial-concentric superstructure, 1. Geoid isoclines, m(8); 2. Tangential lines of 90 E ridge, b-line limiting Carlsberg ridge from S. & triple junction from N. c-Narmada-Son lin. d-Owen zone. 3-4. Radial lines: 3 after surface morphology e-E.-Indian, f-W.-Indian, g-N. extension of Chagos-Laccadive ridge, h-3. limit of Indian abyss. plain, i-Carls. r., j-Vema, k-SW ext. of "e", l-Chagos str., m-Comorin r., n-3. lim. of Ceylon abyss. plain. 4 after geoid anom. (7); 5. Ridges; 6. Grabens r.-Godavari, s-Mahanadi; 7. Traps; 8. Shillong mas.