

# FLATTENING OF EARTH'S POLES

According to 'MATTER (Re-examined)'

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*Abstract:* Flattening of earth's Polar Regions and bulging of its equatorial region are usually attributed to 'centrifugal force' due to earth's spin motion. 'Centrifugal force' is fictitious, yet it is assumed to physically affect earth's shape. Earth's spin motion is apparent only with respect to its own north-south central (spin) axis. With respect to absolute space, every point on earth continuously moves in same (mean) direction as the direction of sun's linear motion, at slightly different linear speeds. Very small centrifugal action (due to differences in linear speeds of its constituent matter-particles) on earth is not sufficient to produce the observed magnitudes of equatorial bulge and flattening of its polar regions. This article intends to describe an alternative mechanism that causes observed physical deformation of earth.

*Keywords:* Flattening of polar regions, bulging of equatorial region, gravitational collapse, shape of earth.

Due to uneven structures of landmass near its surface, shape of earth (in minute details) is very complicated. However, for general purposes, shape of earth is determined as oblate spheroid (or oblate ellipsoid). This is the nearest approximation of earth's shape, which bulges at equator and is comparatively flatter at polar regions. As southern hemisphere has more water surface, at other latitudes, it is flatter than northern hemisphere. Bulge at equator, by which earth's diameter in equatorial plane is greater than its diameter in north-south direction, is currently attributed to imaginary 'centrifugal force', due to earth's apparent spin motion.

No macro body can stay static (without translational motion) in space. Sun, the central body of solar system, is a moving body. Its linear speed along curved path around galactic center is determined as about 250000 m/sec. All macro bodies in solar system move along with sun. Therefore, real orbital paths of planets are wavy about sun's mean path, with planets moving to front and rear of sun periodically. Average linear speeds of planets, in the direction of sun's linear motion, is the same as sun's linear speed.

Earth is assumed to spin  $360^\circ$  in 24 hours, with respect to its spin axis. Highest tangential linear speed of any matter-particle on earth's surface (due to this apparent spin motion) is 463 m/sec. Superimposing displacements due to apparent rotation and linear speed of earth, all matter-particles on earth move at linear speeds between 249537 m/sec and 250463 m/sec in the mean direction of sun's linear motion. With respect to absolute reference (or a reference outside solar system), earth has negligible rotary motion and that may not qualify as spin motion. Therefore, although earth appears to spin about its north-south axis, it has negligible rotary motion in space. This precludes sufficient centrifugal actions on its matter-particles, to produce observed deformation.

Due to gravitational attraction, all 3D matter-particles tend to move towards each other. In a macro body, gravitational attractions between its 3D matter-particles gradually reduce macro body's size. This phenomenon is called gravitational collapse. All macro bodies are continuously under gravitational collapse. Matter-particles of a planet move towards (each other and) a common centre. Linear speeds of matter-particles due to gravitational collapse are higher during initial stages of planetary formation and they reduce until reaction from within the planetary body is able to balance actions by gravitational collapse.

Efficiency of external effort to act on a macro body depends on its linear speed and relative direction of external effort. As linear speed of macro body increases, efficiency of (component in the direction of matter-body's linear motion of) external effort reduces. Theoretically, when macro body is moving at the speed of light, efficiency of action of external effort on it, in the direction of its linear motion, becomes zero. That is, external effort or its components in the direction of macro body's linear motion cannot affect the macro body, when its linear speed becomes equal to speed of light. In fact, long before a macro body achieves linear speed equal to speed of light, it would decompose into constituent 3D matter-particles. At the speed of light, only photons (corpuscles of light) can survive. However, external efforts or their components in opposite direction or in perpendicular direction to linear motion of macro body are fully effective on the macro body.

In figure 1, two circles, P and F, represent planes passing through earth and containing direction of its linear motion and north-south axis. Large circle, P, in bold line represents earth during initial stage of its formation and smaller circle, F, in dashed line represents earth in advanced stage of formation. A and D are north and south poles. B and C are points on equator, B is foremost point and C is rearmost point, on earth's surface. Central line  $XX_1$  is the direction of earth's linear motion.

Let us consider resultant linear displacements of 3D matter-particles at four representative points on earth's surface during its formation/gravitational collapse. Magnitude and direction of linear motion of 3D matter-particles at points A, B, C and D are represented by blue arrows, V. They are equal and unidirectional. Red arrows at these points represent displacements of 3D matter-particles due to gravitational collapse.

Gravitational attractions along AG and DG, being perpendicular and gravitational attraction along BG, being opposite to direction of linear motion of earth, have 100% efficiency and thus are fully effective. Magnitudes of displacements by them are represented by arrows AG, DG and BG. Resultant displacements of 3D matter-particles at A, B and D are represented by green block arrows, R. AR and DR are directed inward and are of equal magnitudes.

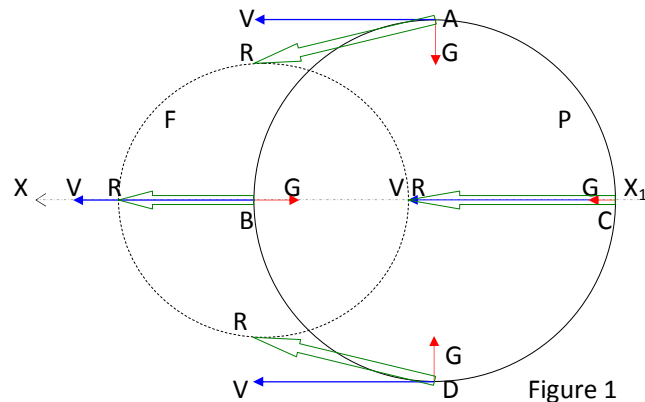


Figure 1

Since BV and BG are in opposite directions, their resultant BR is smaller in magnitude.

Gravitational attraction along CG, being in same direction as the direction of earth's linear motion, is less efficient. Magnitude of its action is inversely proportional to earth's linear speed. Hence magnitude of displacement, CG, is shown smaller. However, linear displacements due to earth's linear speed and gravitational attraction along CG are unidirectional. Their resultant is shown by green block arrow, CR.

3D matter-particles at all other points on earth experience gravitational attraction at different angles to direction of earth's linear motion. Their components, which oppose or are perpendicular to direction of earth's linear motion, are fully effective. Efficiency of their components, which are in the same direction as direction of earth's linear motion, reduce in proportion to earth's linear speed.

As a result, during initial stages of gravitational collapse (formation of earth) its shape gradually become smaller and changes to a spheroid as shown by smaller circle, F, in dashed line. Polar regions, A and D are flatter compared to equatorial region, BC. Flattening of polar regions A and D has nothing to do with negligible spin motion of earth.

Earth's southern hemisphere has greater surface area under water. Hence, it is comparatively smoother. All actions by gravitational collapse and deformation of earth, caused by it are, more or less, evenly distributed. Uniform distribution of gravitational collapse makes curvature of surface even. This appears flatter compared to surface of northern hemisphere, where actions by gravitational collapse are unevenly distributed. Macro bodies with continuous fluid surface have even curvatures for both of their hemispheres.

Flattening of polar regions and bulging of equatorial action continue as long as displacements of 3D matter-particles, due to gravitational collapse, continues. Degree of flattening of polar regions are proportional to linear speed of macro body rather than to its spin speed. Similar effects are applicable to all linearly moving macro bodies, which are under appreciable gravitational collapse.

### Reference:

- [1] Nainan K. Varghese, *MATTER (Re-examined)*, <http://www.matterdoc.info>

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