FLATTENING OF EARTH'S POLES

According to 'MATTER (Re-examined)'

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Abstract: Flattening of the earth's polar regions and bulging of its equatorial region are usually attributed to the 'centrifugal force' due to the 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 the same (mean) direction as the direction of the sun's linear motion, at slightly different linear speeds. Very small centrifugal action (due to the differences in linear speeds of its constituent 3D 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 the earth.

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

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

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

Earth is assumed to spin 360° in 24 hours with respect to its spin axis. The highest tangential linear speed of any 3D matter particle on earth's surface (due to this apparent spin motion) is 463 m/sec. Superimposing the displacements due to apparent rotation and linear speed of earth, all 3D matter particles on earth move at linear speeds between 249537 m/sec and 250463 m/sec in the mean direction of the sun's linear motion. With respect to an absolute reference (or a reference outside the solar system), earth has negligible rotary motion, and that may not qualify as a spin motion. Therefore, although the earth appears to spin about its north-south axis, it has negligible rotary motion in space. This precludes sufficient centrifugal actions on its 3D matter particles to produce the observed deformation of the earth.

Due to the gravitational attraction, all 3D matter particles tend to move towards each other. In a

macrobody, gravitational attractions between its 3D matter particles gradually reduce the macrobody's size. This phenomenon is the gravitational collapse. All macrobodies are continuously under gravitational collapse. The 3D matter particles of a planet move towards each other and a common centre. Linear speeds of the 3D matter particles due to gravitational collapse are higher during initial stages of planetary formation, and they reduce until the reaction from within the planetary body is able to balance the actions by gravitational collapse.

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

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

Let us consider the 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 the 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 the direction of linear motion of the 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.

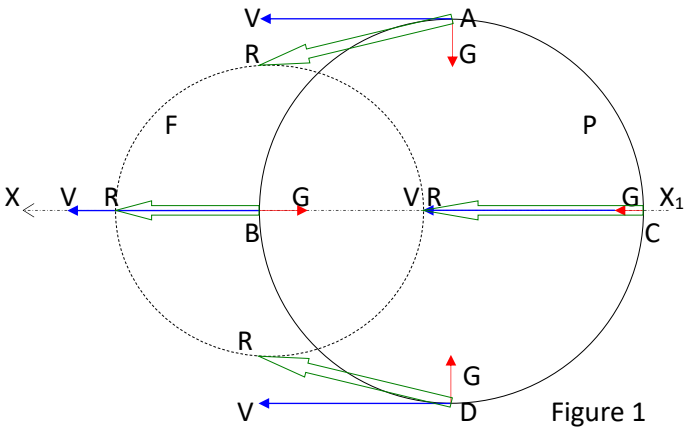

Figure 1

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

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

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

As a result, during the initial stages of gravitational collapse (formation of the earth), its shape gradually

becomes smaller and changes to a spheroid, as shown by the smaller circle, F, in the dashed line. Polar regions A and D are flatter compared to equatorial regions BC. Flattening of polar regions, A and D has nothing to do with the negligible (real) spin motion of the earth.

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

Flattening of polar regions and bulging of equatorial regions continue as long as displacements of 3D matter particles due to gravitational collapse continue. The degree of flattening of polar regions is proportional to the linear speed of the macrobody rather than to its spin speed. Similar effects are applicable to all linearly moving macrobodies, which are under appreciable gravitational collapse.

Reference:

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

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