TIDES

According to 'MATTER (Re-examined)'

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Abstract: This article attempts to give a simple and logical explanation to tidal mechanism, based on a radically different dynamics, presented in book 'MATTER Re-examined)' [1]. Tides are caused by (accelerating) actions of external efforts on a linearly moving spinning-macro body. Each external effort alters shape of spinning macro body, separately, to produce its own set of tides. Change in shape of a spinning macro body, rather than displacement of its parts, cause tides. Displacement of ocean water in the direction of moving tide is superficial and it cannot produce tidal drag on earth's solid core body.

Keywords: Rotation, tides, tidal mechanism, solar system, apparent orbit, real orbit.

Introduction:

Present explanations, on mechanism of tides, are based either on centrifugal action or on gravitational attraction. 'Centrifugal force' (due to motion of a body in circular path), being an imaginary effort, explanations based on its actions are not factually correct. One fundamental assumption used to derive equation for gravitational attraction is that whole matter-content (mass) of a macro body is concentrated at its centre. This makes it illogical to assume that different parts of same macro body have different magnitudes of gravitational attraction towards another macro body. It is also not justifiable to derive separate 'central force' and 'tide producing force' of different magnitudes from gravitational attraction between two macro bodies. Therefore, explanations on tides, based on differences in gravitational attractions on different parts of macro bodies, are perversions of present theory on gravitational attraction.

Matter-content of a planetary body, orbiting about a central body, is associated to matter-content of central body by 'central force'. Direction of action of 'central force' on planetary body is towards central body and there is no other external effort on planetary body. Every 3D matter-particle in planetary body is attached to central body in this way. Hence, all 3D matter-particles in planetary body, separately and together, are at equilibrium. There can be no relative motion between them due to 'central force'. Hence, the assumption that tides on planetary bodies are caused by different magnitudes of gravitational attraction towards central body (and satellites) is not valid.

Apparent orbital motion of macro body about epicentre of a system is used in some explanations. In nature, no free macro body can orbit around another moving body, in geometrically closed path. Orbital

path of earth about sun (or that of moon about earth) is neither circular nor elliptical around central body but it zigzags about sun's (earth's) median path in space. Hence, explanation based on revolution of planetary body around an epicentre is pure imagination. It is also illogical to assume that equal tide on opposite sides on surface of planetary body is produced to balance shift in 'rest mass', by same external efforts.

According to current rules of dynamics, more than one external linear effort on a rigid macro body produce only one resultant linear motion. Yet, earth experiences distinctly separate sets of tides from 'central forces' towards moon and sun. This clearly contradicts any explanation of tide related to displacement of parts of a macro body in the direction of external effort. Only logical reason for greater lunar tides than solar tides is that action of 'central force' between earth and moon is greater than that between earth and sun. This cannot be substantiated by current gravitational laws.

Alternative concept, presented in book 'MATTER Re-examined)', envisages a universal medium made of structure-less quanta of matter, in 2D latticework formations – 2D energy-fields. 2D energy-fields in all possible planes, together, form universal medium that fills entire space (outside basic 3D matter-particles) without voids. It performs all actions, currently assigned to apparent interactions between matter-bodies, to do away with assumption of 'actions at a distance through empty space'. Universal medium, in and about a macro body, contain sufficient distortions to sustain its integrity and state (of motion). This part of universal medium id matter-field of macro body. Actions by efforts ('forces') are performed by transfer of distortions in latticework-structures of matter-field, separately in each plane. During transfer of distortions in universal medium, 3D matter-particles in the region are carried along with distortions.

Transfer of distortions in matter-field, in linear direction, cause linear motion of macro body. In matter-field of a non-spinning macro body, latticework-squares in its matter-field are symmetrical about linear effort. Therefore, whole of external effort is used to invest additional work in linear direction, which causes linear motion of macro body. In a spinning macro body, latticework-squares in its matter-field are asymmetrical about line of action of an external linear effort. Asymmetry of latticework-squares splits action of external linear effort into linear force and torque. Hence, action of an external linear effort on a spinning body depends not only on its magnitude but also on symmetry of latticework-squares of its matter field to direction of external linear effort and on locations of individual 3D matter-particles in macro body. Further, this alternative concept does not recognize pull nature of external efforts that acts through empty space, to pull at parts of a rotating body to create tides.

In this article, all movements are with respect to an absolute reference, provided by universal medium. Figures are not drawn to scale.

Tides:

Tide means deformation in the shape of a (linearly moving or not moving) spinning macro body. Tides are induced by an external linear effort (or torque). Sources of external effort (or torque) or consistency of rotating macro body are immaterial. Therefore, tide is a localized phenomenon and it is not directly related to gravitational attraction between central and planetary bodies, in particular. Any type of external effort can cause tides on a rotating macro body, moving in linear direction along curved or straight-line path.

Tide affects only absolute paths of 3D matter-particles on an orbiting planetary body, in space. Tide is applicable to 3D matter-particles on central body, only as much and when central body is considered as an orbiting planetary body and planetary body as central body. Hence, phenomenon of tide is a product of parameters of orbiting planetary body, alone. Its parameters may be modified by presence of other macro bodies in vicinity. Tide on any particular macro body is its own creation and no external influences are involved, other than to prepare suitable conditions.

Phenomenon of tide, on a free macro body, is produced by combined effect of its simultaneous linear and spin motions. Except for external effort, tide on one macro body is not related to any other macro body. Macro body needs not be member of a planetary system, to develop tide. All that is

required for formation of tide is presence of an external linear effort on a linearly moving macro body that develops spin motion (or on a spinning macro body that develops linear motion).

Tides on a macro body depend on its absolute motions. Since we currently have no absolute reference, it is almost impossible to determine absolute speeds of a macro body. In cases of planetary bodies, relative position in orbital path, direction of spin axis, orbiting plane, magnitude of fluid (water) body on surface, latitude of point considered, any independent movements, etc. also affect magnitudes and relative positions of tides on their surfaces. All these factors, together with influences from number of other macro bodies in neighbourhood, which may affect planetary body's parameters of motion; determine relative position and magnitude of resultant tide at any point on the surface of a spinning planetary body.

Gravitational actions and inter-particle field-efforts hold 3D matter-particles of a macro body together. Additionally, gravitational attraction between 3D matter-particles tends to move them towards centre of macro body. Gravitational action aids field-efforts to integrate 3D matter-particles into a single composite macro body. With respect to a macro body, its linear and rotating motions are distinctly separate. Only an external linear effort, applied evenly on a macro body, can modify its linear motion and only another torque (linear effort applied unevenly) can modify its rotary motion. Although an external effort may simultaneously invoke linear and rotary motion of a macro body, additional work invested in macro body's matter-field is distinct for each of these motions.

For linear motion, work is in the form of additional linear distortions in latticework-structures of matter-field and for spin motion; work is in the form of additional linear distortions but varying in magnitude and direction about centre of rotation of macro body. In macro body's steady state, each nature of additional distortions produces respective motions independently. Even at very high linear speed of a spinning macro body, additional work corresponding to its spin motion remains latent within its matter-field and rotates the macro body about its centre of rotation. Transition period, between one steady state to another, is macro body's acceleration stage. During acceleration stage, external linear effort (or torque) modifies additional distortions in latticework-structures of macro body's matter-field.

Modifications of additional distortions in matter-field, during acceleration period, involve reshaping latticework-squares in 2D energy-fields of matter-field. Modification of additional distortions, corresponding to each type of motion, takes place without interfering with other type of motion of macro body. Change in macro body's linear speed does not affect its spin speed and a change in its spin speed does not affect its linear speed. Combination of these separate motions is exhibited as resultant motion of macro body.

All efforts are of push nature. Tides are produced by linear (push) efforts on rotating macro bodies or by rotating (push) efforts on linearly moving macro bodies. Both, linear and rotary motions are involved, together. Otherwise, external linear effort simply produces linear acceleration of macro body and external torque produces spin acceleration of macro body.

If a spinning spherical macro body is under constant action of an external linear effort, across its spin axis, cross sectional planes (perpendicular to spin axis) of macro body maintain their elliptical shapes. This makes rotating body bulge outwards, in both directions, towards and away from the direction of incoming external linear (push) effort. Increase in diameter of rotating spherical body (in cross sectional planes perpendicular to spin axis) due to bulges along the direction of external linear (push) effort creates the phenomenon of tide.

Mechanism of tide:

In a spinning macro body (of uniform consistency and shape), there is no relative displacement of its 3D matter-particles, other than movements required to curve their paths to suite macro body's spin motion. 3D matter-particles of macro body are not attracted towards (or displaced in) any direction to create phenomenon of tide. Similar action takes place also during action of a torque on a macro body under linear motion. Phenomenon of tide takes place only during accelerating stages of a macro body, either rotary or linear. Once accelerating stage is over, macro body settles down to its steady states in both linear and rotary motions. Tidal effects are not present any more. In order to sustain tides, it is

essential to maintain constant action of (acceleration due to) external effort. Since tide is not related to macro body's steady state of motions, each of external efforts, acting on macro body, produces its own tides on macro body, separately.

No free macro body (except stable galaxies) in space can remain static without translational motion. They move, mostly in curved paths about some other macro body or group of macro bodies. Let us consider a spherical spinning body in space moving in a linear path. A 3D matter-particle on equator of macro body apparently traces a circular path around macro body's spin axis. Simultaneously, the 3D matter-particle is carried with macro body in its linear motion.

Figure 1 shows path of a 3D matter-particle on the surface of a rotating macro body, moving along a straight-line path. Circles in figure show representations of equatorial plane of a spinning macro body, moving in linear direction (perpendicular to its spin axis). Macro body moves linearly in the direction of linear arrow while spinning in the direction of curved arrows. A 3D matter-particle (plane section of a 3D matter-particle on equatorial surface of macro body) at A', shown by black dot, is carried along curved path GA'DFCAE. 3D matter-particle has a constant angular speed, ω, about spin axis of macro body.

Let a constant external effort, f, shown by block arrows, act evenly on macro body, continuously. Direction of external effort, as shown in figure is downwards. Part of external effort, in equatorial plane, acts on 3D matter-particle. It is accelerated in the direction of external effort (downwards, in this case). Additional work, introduced by action of external effort in matter-field of macro body, has to accommodate itself within additional work already existing in macro body's matter-field and producing its linear and rotary motions.

Newly introduced additional distortions modify existing distortions in matter-field, during accelerating stage. Since action of external effort is continuous, rate of modification of additional distortions in matter-field is of constant magnitude. Part of additional distortions due to external effort f, which has attained stability, causes 3D matter-particle (and hence whole macro body) to move at constant linear speed in the direction of external effort. Part of additional distortions due to external effort f, which is in transition stage, causes constant magnitude of linear acceleration of 3D matter-particle (and hence whole macro body's) in the direction of external effort.

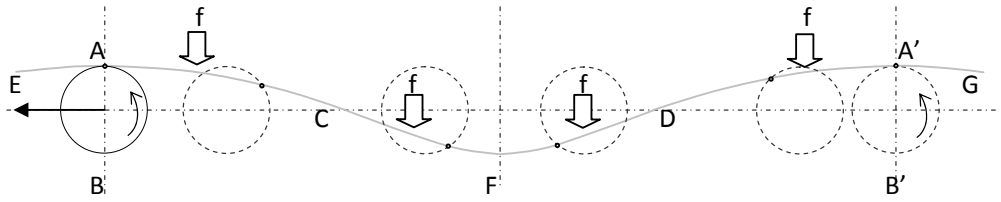

Figure 1

In a rotating macro body of constant spin speed, all of its 3D matter-particles (except those situated directly on spin axis) have constant angular speed about its spin axis. Directions of their linear motions, contributing to spin motion of macro body are indeterminate. At any instant, direction of linear motion of a 3D matter-particle in a rotating body depends on its relative position with respect to macro body's centre of rotation (in space). Consequently, modifications to instantaneous linear displacements of 3D matter-particles in a rotating macro body by an external effort in a steady direction depend on their relative (instantaneous) position with respect to macro body's centre of rotation.

Assuming, direction of instantaneous linear motion of a 3D matter-particle in a rotating macro body is tangential to its curved path; linear acceleration of macro body in steady direction modifies angular displacement of 3D matter-particle along its curved path. 3D matter-particle experiences additional angular acceleration with respect to spin axis of macro body. Direction of resultant angular acceleration depends on relative position of 3D matter-particle about centre of its curved path. Resultant angular speed of 3D matter-particle along curved path is modified accordingly, without affecting its tangential linear speed.

Tangential linear speeds of constituent 3D matter-particles, in a rotating macro body, are proportional to spin speed of macro body. As tangential linear speeds of constituent 3D matter-particles

are not affected, spin speed of macro body is not affected by its linear acceleration in any direction. Simultaneously, linear acceleration has caused angular speed of 3D matter-particles to vary. Requirement to change angular speeds of constituent 3D matter-particles, without varying spin speed of macro body, essentially necessitates changes in shape of macro body's equatorial (and parallel) plane(s). Changes in their shapes culminate in tides.

As shown in figure 1; from position at A' to position at D, 3D matter-particle is on left side of macro body's centre of rotation. It is traveling along top-left quadrant. Direction of its instantaneous tangential motion has a downward component, which is in same direction as direction of action by external effort, f. External effort pushes at 3D matter-particle at convex side of its curved path to increase curvature of path. Downward linear acceleration of 3D matter-particle tends to enhance its angular speed (by moving 3D matter-particle downward at faster rate than rate due to original spin motion). Resultant action causes 3D matter-particle's angular acceleration in anti-clockwise direction. Total angular speed of 3D matter-particle in its curved path increases. Due to additional downward displacement, 3D matter-particle reaches position at D, earlier than it would have reached under original angular velocity. Due to increased curvature of its path, 3D matter-particle is nearer to central line, when it is at D. Center of rotation of macro body is displaced downward, as well. Effective vertical radius of macro body increases in length and effective horizontal radius reduces.

From position at D to position at F, 3D matter-particle is on left side of macro body's centre of rotation. It is traveling along bottom-left quadrant. Direction of its instantaneous tangential motion has a downward component, which is in the same direction as direction of action by external effort, f. External effort pushes at 3D matter-particle at concave side of its curved path to reduce curvature of path. Downward linear acceleration of 3D matter-particle tends to increase its angular speed (by moving 3D matter-particle downward at faster rate than rate due to original spin motion). Resultant action causes increase in 3D matter-particle's angular acceleration in anti-clockwise direction. Total angular speed of 3D matter-particle in its curved path increases. Due to action of external effort on concave side, curvature of 3D matter-particle's path reduces to move it leftward so that it reaches central line, when at position F. Due to additional downward displacement; 3D matter-particle has moved farther down, when it reaches position at F, than it would have reached under original angular velocity. Center of rotation of macro body is displaced farther downwards. Effective vertical radius of macro body increases in length, compared to horizontal radius.

From position at F to position at C, 3D matter-particle is on right side of macro body's centre of rotation. It is traveling along bottom-right quadrant. Direction of its instantaneous tangential motion has an upward component, which is in opposite direction to action of external effort, f. External effort pushes at 3D matter-particle at concave side of its curved path to reduce curvature of path. Downward linear acceleration of 3D matter-particle tends to reduce its angular speed (by impeding 3D matter-particle's upward motion). Resultant action causes 3D matter-particle's angular deceleration. Total angular speed of 3D matter-particle in its curved path is reduced from its enhanced value at position F. 3D matter particle reaches position C with reduced angular speed and later than, it would have to reached under its enhanced angular speed. 3D matter-particle tends to move away to the right from macro body's center of rotation, but it would not yet reach position C. Increased radius of 3D matter-particle's curved path remains shorter than its original length. Center of rotation of macro body remains displaced downwards.

From position at C to position at A, 3D matter-particle is on right side of macro body's centre of rotation. It is traveling along top-right quadrant. Direction of its instantaneous tangential motion has an upward component, which is in opposite direction to action of external effort, f. External effort pushes at 3D matter-particle at convex side of its curved path to increase curvature of path. Downward linear acceleration of 3D matter-particle tends to reduce its angular speed (by impeding 3D matter-particle's upward motion). Resultant action causes 3D matter-particle's angular deceleration. Total angular speed of 3D matter-particle in its curved path reduces further, to its original value. 3D matter-particle reaches original position A with respect to macro body's center of rotation, with original angular speed. Center of rotation of macro body remains displaced downwards with increased length of vertical diameter and reduced horizontal diameter.

Relative direction of external effort with respect to 3D matter-particle changes as it moves along the curved path. Angular acceleration of 3D matter-particle, produced by external effort, varies relative to direction of action of effort. Magnitude of angular acceleration/deceleration is highest when line of action of external effort is farthest from centre of rotation at D or at C and 3D matter-particle has no angular acceleration or deceleration, when line of action of external effort is coincides with centre of rotation, at A, at F or at A'. Magnitude of angular acceleration with respect to spin axis varies in proportion to cosine of the angular displacement from D. Therefore, mean magnitude of angular acceleration in any quadrant is equal to $2/\pi$ times of highest magnitude (produced at C or D).

Increase in diameter along direction of action and reduction in diameter in direction perpendicular to direction of action of external effort on 3D matter-particle deforms circular path to elliptical shape, with major axis along direction of external effort. Circular path of every 3D matter-particle in a rotating macro body is deformed during action of a linear external effort across its spin axis. Macro body bulges in both directions along direction of action of external effort, while reducing its diameter in perpendicular direction. This kind of change in shape of a spinning macro body forms tides on it.

As a result of tide, centre of rotation of macro body effectively shifts in the direction of external effort and macro body has effectively bulged outwards (about macro body's new centre of rotation) in both directions along line of action of external effort. In appearance, whole of macro body has shifted in the direction of external effort, carrying its centre of rotation to new position.

Increase in length of macro body's diameter, in the direction of external effort varies in proportion to magnitude of its action and to tangential speed of 3D matter-particle (spin speed of macro macro body). Magnitude of external effort being constant, higher rotational speed of macro body tends to increase magnitudes of tides. As rotational speed increases to higher values, magnitudes of tides increase considerably and may affect the integrity of a spinning macro body.

As long as external efforts are in planes parallel to equatorial plane (direction of external effort perpendicular to macro body's spin axis), relative direction of external effort, to path of linear motion of macro body does not affect magnitude of tides formed on macro body. Directions of tides depend on direction of external effort, f. All 3D matter-particles in macro body are affected identically. Change in shapes of paths of 3D matter-particles on one side of macro body is undone when they are on other side. Magnitude of total additional work in matter-field of macro body remains constant and maintains its altered shape, without consuming additional work, as long as magnitude of external effort remains constant.

Figure 2 shows transformation of equatorial plane of a (spherical) spinning planetary body, linearly moving along its orbital path, under action of an external effort. Component of 'central force' that causes planetary body's radial motion towards central body, which is acting evenly on whole of planetary body, is shown by thick downward arrow. Curved arrow shows direction of spin and straight arrow to left indicates direction of linear motion of planetary body. Backward shift of center of gravity of planetary body [1], due to its linear speed, is not considered.

In figure 2, green circle, $a_1c_1b_1d_1a_1$, is original shape of equatorial plane of spinning spherical planetary body. Ellipse (in red dashed line), shows path of a 3D matter-particle on planetary body's surface. Changes in curved paths of constituent 3D matter-particles of planetary body (due to action of linear 'central force') change shape planetary body's equatorial (and parallel) planes, as shown by ellipse $a_1c_2b_3d_2a_1$. It has elongated in the direction away from 'central force'. Similar actions take place in all planes of planetary body, perpendicular to its spin axis. Spinning planetary body elongates along the direction of 'central force'.

Circle in black line, $a_2c_1b_2d_1a_2$, is assumed median shape of planetary body, with respect to centre of rotation, shifted to new location. With respect to this assumed shape of equatorial plane, surface points on planetary body are situated at different radii from new centre of rotation.

Points, a_1 and b_3, are farther (higher) than assumed median surface of planetary body. These points correspond to high tides on planetary body. Points, c_2 and d_2, are nearer (lower) than assumed median surface of planetary body. These points correspond to low tides on planetary body.

As planetary body spins, relative direction of 'central force' changes with respect to planetary body's

surface. Consequently, high and low tides appear to revolve around planetary body. In reality, directions of tides with respect to direction of 'central force' (and central body) are steady, but observer on surface of spinning planetary body is carried through different stages of tides.

Since tides are formed due to linear acceleration of spinning macro body, rather than due to change of its state of motion (change in linear speed), no additional work is expended for their creation. Only the shape of macro body is changed. Mere (temporary) changes in shape or direction of motion do not constitute additional work. To change shape of macro body, original additional work, existing within macro body's matter-field is re-deployed during investment of more additional work (acceleration) in matter-field by external effort.

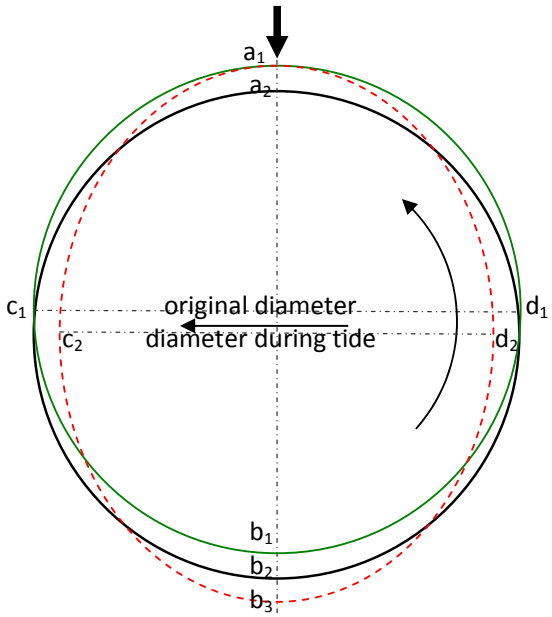

Figure 2

No additional work (energy) is used from any source to produce tidal effects on a spinning macro body and hence, tidal effects cannot do any work. Energy from other sources (like gravity, during changes in levels of ocean water) may be derived to do other works during tides. Additional work, invested by external effort in a planetary body, is used solely to change its state (of motion) by modifying its linear or spin speeds in its orbital path. 'Central force' on a planetary body is used to produce its orbital motion and spin motion. Action-stage (acceleration period) of 'central force' causes tides.

During tides, introduction of additional distortions (work) changes matter-field of a planetary body. Changes in matter-field vary planetary body's shape in correspondence with 'central force' on it. Magnitude of change depends on magnitude of component of 'central force', acting to move planetary body (radially) towards central body. No additional distortions, from action of 'central force', are consumed during development of tides. Additional distortions, which temporarily increase angular speed of constituent 3D matter-particle in one side of centre of rotation of planetary body, are retuned to matter-field during motion of 3D matter-particles on other side of centre of rotation.

Change in shape of planetary body is simply due to re-arrangement of its matter-field during acceleration period rather than due to any motion of planetary body or displacement of its parts. Paths of constituent 3D matter-particles are rearranged by distortions in matter-field to reflect modified shape. Hence, any numbers of external efforts on a planetary body are able to introduce as many sets of tides in a planetary body. Even while planetary body is moving linearly, it is able to have tide effects simultaneously in many directions, corresponding to direction of each external effort on it.

Spin component of 'central force' acts on rear hemisphere of planetary body [1]. Hence, its action is not evenly distributed on planetary body, as envisaged in above given description. Imbalance in action of external effort additionally modifies angular speeds of constituent 3D matter-particles of spinning planetary body. Due to shift of centre of gravity of a planetary body to rear, angular acceleration of 3D matter-particles, when they are in front is relatively less compared to angular deceleration of 3D matter-particles, when they are in rear part of planetary body.

During both half-cycles in real orbital path, action of spin component of 'central force', with respect to tide formation, tends to have a resultant acceleration and move planetary body towards its central body. As magnitude of this displacement is too small and it is in same direction as displacement caused by radial component of 'central force', it may be integrated with planetary body's radial motion due to 'central force' and neglected for all practical purposes.

Terrestrial tides:

Earth is a spinning planetary body, moving linearly along its real orbital path about sun. 'Central force' between sun and earth guides earth along its wavy orbital path about sun. Earth is also under another 'central force' towards moon, which is orbiting about earth. These two external efforts are independent of each other. 'Central forces' towards sun and moon, due to gravitational attractions, act evenly and continuously on earth, to provide external linear efforts on spinning planetary body of earth. 'Central forces' due to other cosmic bodies are too small to be considered for practical purposes.

Each of 'central forces', independently, transforms shape of earth to increase its diameter along directions of their actions, each one in its own direction. Since centre of earth's orbital path is too far from earth, for practical purposes, small part of earth's orbital path can be assumed as a straight line. Hence, tides on both sides of earth can be considered to have same height. Small differences in their heights due to curvature of orbital path may be ignored. Variations in parameters due to eccentricity or inclination of orbital paths are also too small.

Actions of efforts in universal medium in each plane are distinct and they have to be considered separately. Gravitational attraction ('central force'), calculated according to equations for 3D spatial system, is not valid for calculations in 2D spatial system. Magnitude of 'central force', calculated for 2D spatial system, between earth and moon is higher (by about 2.3 times) than magnitude of 'central force' between earth and sun. This accounts for greater magnitude of lunar tides compared to solar tides.

To find magnitude of tide on earth, 'central force' should be determined separately for each common plane, parallel to equator. By doing so, when measured from datum, average magnitudes of solar tide (by rough calculations) give two high tides of heights 0.132 m each and two low tides of depths 0.132 m each. Similarly, when measured from datum, average magnitudes of lunar tide (by rough calculations) give two high tides of heights 0.304 m each and two low tides of depths 0.304 m each. Magnitudes of lunar tides are approximately 2.3 times higher than magnitudes of solar tides.

For convenience, we regard earth as a spheroid or a sphere. All cross sections of earth, perpendicular to its spin axis, are considered as perfect circles. In order to account for differences in diameters of earth's cross sections, due to tides, mean length of earth's diameter is used as a datum to set earth's shape as a sphere. Water levels on earth's surface are then related to this datum.

Earth, in its nature, has uneven surface of land masses and oceans. Although tidal effects, felt by rigid land mass and fluid oceans are similar, their reactions are slightly different. Ocean water conforms to tidal effects freely, whereas landmass does it reluctantly. This difference tends to create differences in ocean levels more easily. Gravitational actions due to earth's matter-content try to overcome differences in ocean levels and create superficial flow of ocean water from one place to another, locally.

However, there is no overall displacement of ocean water along with progressing tides. If ocean water was to move to create tides, there would have been a constant westward flow of ocean water (at least, in cases where there are no land masses to break the flow). Tendency of such water flow is not observed on earth. When earth as a whole is considered, it may appear that crests and troughs of large-scale traveling wave system comprised of tides, strive to sweep continuously around earth, following relative positions of moon and sun. This is mere appearance due to motion of observer in opposite direction. While earth spins, its shape remains steady in space, with respect to sun or moon. An observer, static with respect to earth's surface, moves through high and low tide regions in easterly direction and experience feeling of tides traversing him in opposite direction. Changes, the observer experiences, are not caused by lateral displacement of ocean water but due to vertical changes in shape of earth.

As there is no flow of ocean water from one part of earth's surface to another, laws of fluid dynamics do not apply to tides (except for local actions). Since there is no relative linear motion between ocean water and land mass at ocean floor, there is no frictional effect at ocean floor. Assumption that earth's spin speed slows down due to such friction is baseless. In fact, earth's orbital motion has an accelerating effect on its spin motion [1].

Not all natural phenomena that cause temporary rise or fall of water level in ocean can be interpreted as tidal effects. Tides are rise and fall of a point on surface of earth with respect to a datum,

in same direction of or away from an external linear effort on it.

In case of terrestrial tides, effects due to eccentricity of earth's orbital path, inclination of orbital planes, topography on ocean floor, flow of water into confining channels or nearly closed oceanic basins, dynamic considerations during local flow of water due to level differences, atmospheric conditions and contiguous current in oceans also are needed to be taken into account. All of the above (and other less important influences) can combine to create a considerable variety (of many magnitudes) in observed magnitudes and phase sequence of tides – as well as variations in times of their arrival at any location.

Of a more local and sporadic nature that may cause important meteorological contributions to tides are known as 'storm surges'. They are caused by a continuous strong flow of winds either onshore or offshore, which may superimpose their effects upon normal tidal actions to cause variations in magnitudes of tides on earth. High-pressure atmospheric systems may depress tides and deep low-pressure systems may cause them to increase height. Higher inclination of lunar orbit makes large variety between tides at equatorial region and higher latitudes of earth.

Conclusion:

Tidal effects on a spinning macro body take place separately in each plane, perpendicular to its spin axis. Acceleration (linear or rotational) due to external efforts produces tides on a spinning macro body. Change in the shape of a macro body causes tides on it. There are neither displacements of body-parts nor flow of ocean water during tidal formation. Superficial flow of ocean water during tides is caused by effective level differences of earth's surface, due to presence of land masses and their distribution. Since there is no relative motion between earth's core and ocean water, tidal drag on earth's solid body is a fallacy. Phenomenon of tides on planets should be interpreted on facts rather than on their appearances.

Reference:

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

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