Precession of the equinoxes

According to 'MATTER (Re-examined)'

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***Abstract**: Wobbling, caused by slow continuous change in the orientation of earth's apparent rotational axis, is called 'precession of the equinoxes'. Rotation of earth is an apparent motion only with respect to its central axis. Deflection of earth's apparent rotational axis is caused by shift in its center of gravity from its geometrical centre due to non-uniform distribution of its 3D matter-content rather than by precession due to its apparent spin motion. Deflections of earth's apparent spin axis, caused by northward shift of its centre of gravity, during earth's orbital path on either side of the Sun's mean path are in opposite directions and hence the resultant magnitude of deflection depends on eccentricity of earth's apparent elliptical orbit around the sun.*

In astronomy, 'axial precession' is a gravity-induced, slow, and continuous change in the orientation of an astronomical body's apparent rotational axis. In particular, the term 'axial precession' of the earth relative to the distant stars refers to the gradual shift in the orientation of Earth's (apparent) spin axis in a cycle of approximately 26,000 years. At different stages of history, precession of earth's apparent spin axis due to the shift of the equinoxes westward along the ecliptic relative to the fixed stars (opposite to the yearly motion of the Sun along the ecliptic) and its components were also called the precession of the equinoxes, planetary precession, lunisolar precession, precession of the equator, precession of the ecliptic or general precession.

The stars viewed from Earth are seen to proceed from east to west daily, due to the Earth's diurnal motion and yearly, due to the Earth's orbit about the Sun's mean path. At the same time the stars appear to anticipate slightly such motion, at the rate of approximately 50 arc seconds per year. This apparent phenomenon is known as the 'precession of the equinoxes'. Due to apparent precession of the earth's central axis, the positions of the south and north celestial poles appear to trace out circles on the sky against the space-fixed backdrop of stars, completing one circuit in approximately 26,000 years. This also causes slow changes in the position of the Earth in its orbit about the Sun's mean path at different times, defined relative to the seasons.

It is physically impossible for a free macro body to revolve around another moving body in any type of geometrically closed path. This can be observed by watching a person trying to move around another person running along a defined path. Planets are free macro bodies, the central body (the Sun) is a moving body and a circular/elliptical path is a geometrically closed path. Present explanation on planetary orbits does not take these facts into consideration. All macro bodies in a planetary system, together as a group, move (in the same direction) in a circular path around the galactic centre. Real orbital path of the Earth about the Sun is wavy about the mean path of the Sun (solar system) with the earth moving alternately to the front and to the rear of the Sun. Kindly see; http://vixra.org/pdf/1311.0018v1.pdf . Only when the central body (the Sun) is assumed stationary in space, orbit of the earth appears elliptical with the Sun at one of its focus.

For rotary motion, diametrically opposite points on a body, in the plane of its rotation, have to move in opposite directions. The Sun is estimated to move in space at a linear speed of about 250000m/sec. The Earth (its central axis) moves in space along with the solar system, at an average linear speed between 250000 ± 3000 m/sec (about 3000 m/sec in its elliptical path with respect to the sun). Differences in linear speeds of diametrically opposite points on earth's equatorial plane produce earth's apparent spin motion about its central axis. Due to earth's apparent spin motion, diametrically opposite surface points on its equator appear to move in opposite directions at linear speed of about 463.8 m/sec with respect to its central axis. Therefore, any point on earth's equator moves in space in the same direction at a linear speed between 250000 ± 3000 ± 463.8 m/sec along the Earth's orbital path. As all points on earth moves in the same direction, motion of the Earth does not constitute real rotation. Earth's rotation is apparent only in relation to its central axis. Therefore, the assumption that 'axial precession' of the Earth's central axis is due to precession caused by apparent spin motion is not tenable.

The Earth is not a perfect sphere but an oblate spheroid, with uneven 3D matter (mass) distribution. Greater part of earth's land mass above mean sea level is situated in the northern hemisphere. Hence, centre of mass of the Earth is away towards the North Pole from its geographical centre. Greater gravitational attraction on the northern hemisphere tends to continuously tilt the earth's central axis in the direction of gravitational attraction. Tilting efforts on earth towards each of its neighboring bodies, together, produce continuous resultant deflection of earth's central axis that appears as wobbling of the central axis in space. Therefore, 'precession of the equinoxes' of the Earth is caused by the gravitational attraction between the Earth and the Sun, the Moon, and (to a lesser extent) other nearby macro bodies.

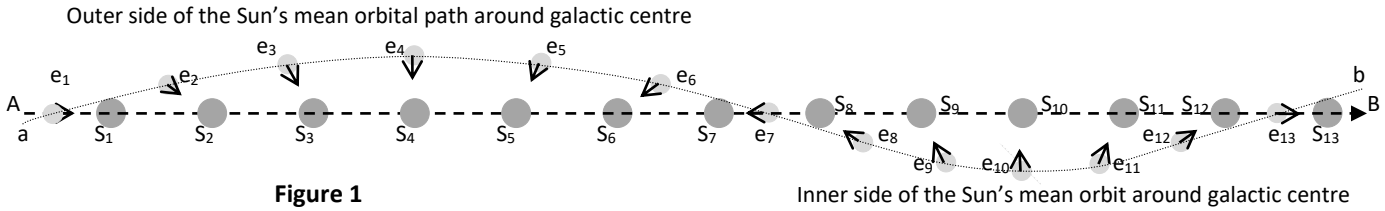

Figure 1

Figure 1 shows the representation of displacements of the Earth and the Sun in space during one year period. [All other planets in solar system also undergo similar displacements]. Median path of the

Sun in space is represented by the arrow AB. Positions of dark circles S_1, S_2, S_3, …… and S_{13} represent positions of the Sun at intervals of 1 month each. Positions of the Earth, corresponding to the positions of the Sun at S_1, S_2, S_3, …… and S_{13}, are shown by gray circles e_1, e_2, e_3, …… and e_{13} on the curved wavy orbital path of earth, ab. Small arrows, originating from gray circles towards corresponding dark circles show directions of displacements of earth due to gravitational attraction (central force) between the Earth and the Sun. Most important function of the central force on the Earth is to shape its orbital path about the Sun's mean path around galactic centre. Other less important functions cause apparent spin motion of the Earth about its central axis, changes in earth's shape due to tides, apparent precession of earth's central axis, etc.

Displacement of centre of gravity of earth (from its geometrical centre towards the North pole) tends to tilt earth's central axis in the plane of its apparent spin motion. Greater gravitational attraction on the northern hemisphere of earth tends to tilt earth's central axis towards the Sun. During its orbital motion, the earth places itself on either side of the sun's mean path, every successive half-orbit. Directions of deflection of the central axis during successive half-orbits, when the Earth is on either side of the Sun's mean path, are in opposite directions and they tend to almost wholly cancel each other. Therefore, magnitude of resultant tilt caused by the gravitational attraction between the earth and the sun in one whole year is very minute and cumulative. Magnitudes of resultant tilts caused by the gravitational attractions between the earth and other neighboring bodies depend on their relative positions with respect to earth.

Resultant tilt of the Earth's axis during one full year is very small (like 50 arc seconds per year) and may be noticed after a very long period. This motion is called 'precession of the equinoxes' and consists of a cyclic wobbling in the orientation of Earth's axis of apparent rotation. Similar tilting efforts due to gravitational attraction between earth and all other macro bodies in the neighborhood also are also present. Resultant of all these displacements, together, shows as 'precession of the equinoxes' of earth. Ends of earth's central axis wobble and trace apparent circular paths in space with a period of '*25,772 years'*.

Magnitude of wobbling of a planet's central axis depends on the difference between eccentricities of its orbital path on either side of central body's mean path. Should the eccentricities be equal on either side of central body's mean path, central axis of the planet would not wobble at all. For full description, kindly refer to the book: MATTER (Re-examined)' and http://www.matterdoc.info .

References:

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Tides: http://vixra.org/pdf/1008.0092v2.pdf
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