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An Analysis of the Connection between Gravity and Earth's Motion

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Abstract: There is a profound connection between gravity and Earth's motion. It is the force of gravity that ensures the smooth operation of our planet in its designated orbit, enables it to receive the radiant heat generated by the Sun, and gives rise to the four seasons throughout its journey. This paper provides a concise elucidation of the concept of gravity and focuses on the interrelation between gravity and Earth's motion, presenting substantial data and evidence to refute the traditional notion that the Earth's tilt is solely responsible for the four seasons. The discussion presented herein is scientific and targeted.

1. Introduction

Gravity is the fundamental force governing the existence of our Earth within the solar system, the solar system within the Milky Way galaxy, and is also a crucial factor in shaping the Earth's four seasons and propelling its motion. Centuries ago, Newton proposed the "Law of Universal Gravitation", describing the interdependent relationships between the Moon and the Earth, and between the Earth and the Sun. However, Newton did not provide an explanation for the source of gravity or the principles governing the mutual motion of celestial bodies. By employing the concept of "toward-force" and the associated "toward-gravity", we can comprehensively elucidate the principles underlying the motion of celestial bodies and the reciprocal relationship of their forces. Moreover, toward-gravity plays a significant role in the formation and succession of Earth's four seasons. This paper focuses on the study of toward-gravity, Earth's motion, and the succession of seasons, aiming to contribute further insights to this field. Hence, the term "gravity" is replaced with "toward-gravity" for greater accuracy.

2. The Connotation of Toward-Gravity Phenomenon

Earth's motion involves three forces: forward force, rotational force, and orbital force. These forces are related to atmospheric pressure and gas temperature. The Sun leads the planets in the solar system to orbit around the galactic center of the Milky Way. As the Sun moves forward, the Earth, alongside the Sun, also orbits the galactic center. The force that drives the Earth to follow the Sun's orbit is not solely the gravitational force of the Sun but the result of the combined toward-gravity created by the Earth and the Sun. The Earth is enveloped by its atmospheric layer, which is interconnected. The difference in temperature between hot and cold gases in the atmosphere is the sole cause and result of driving Earth's motion. Solar radiation is emitted along the solar radiation belt, and the flickering of solar flares is caused by the Sun's rotation, resulting in the ejection of hydrogen particles after the centrifugal collapse of internal substances in the Sun. The Earth receives the radiant heat emitted by the Sun, causing the atmosphere surrounding the Earth to become hot. In the face of solar radiation, the air on the side of the Earth directly facing the Sun expands vigorously due to the radiation received by the Earth's surface. The expansion of the air reduces air pressure. On the other hand, during nighttime when the Earth is facing away from the Sun, the air experiences cooling, resulting in contraction and an increase in air pressure. In the equatorial zone, the temperature difference between daytime and nighttime air is approximately eight degrees Celsius on average. In the natural world, air follows the pattern of cooling contraction and heating expansion. When the side of the Earth facing the Sun is heated, the air expands, while during nighttime, the air on the side facing away from the Sun contracts due to cooling. The increased air pressure during nighttime exceeds the decreased air pressure during daytime. The combined difference in air pressure between daytime and nighttime generates a thrust that drives the Earth closer to the Sun on one side. This is what we refer to as the phenomenon of gravity and the gravitational effect, which can be better described as toward-force motion. Toward-force and gravity have both differences and similarities. Gravity is a centripetal compression force, while toward-force involves a flow in the opposite direction.[1]

3. Toward-Gravity, Earth's Motion, and the Formation of Seasons

3.1. Formation of Seasons through Earth's Motion

The Earth is a spherical body. When it is noon and facing the Sun, the Earth's equatorial region, on both the eastern and western sides of the Earth's zenith, experiences different atmospheric conditions. On one side, the air is cold and contracts in the morning, resulting in high air pressure. On the other side, the air is hot and expands, leading to low air pressure in the afternoon. The atmospheric region above the high-pressure side in the morning will be pushed and squeezed by the contracting force of the air, causing a twisting motion at the midday region of the Earth toward the low-pressure side in the afternoon. This phenomenon is known as the Earth's rotational motion.The source and principle of Earth's rotation lie in the fact that the morning region of the Earth moves toward the afternoon region, which means the Earth's rotation is driven by the pushing force of the air. The air movement occurs before the Earth's motion. The occurrence of sandstorms in Beijing when sand from Mongolia is blown eastward is evidence that air movement is more powerful and faster than the Earth's rotation. When observing the Earth from space at the Sun's location, the Earth's rotation appears to be eastward in the morning and westward in the afternoon, in relation to the Sun as the reference point in the east. The Earth's rotation is outward, meaning it moves farther away. On the other hand, the Earth's orbital motion is inward, bringing it closer to the Sun. The distance between the Earth and the Sun is determined by the combined effects of Earth's rotation and orbital motion. It is also determined by the difference in magnitude between the two forces of Earth's rotation and orbital motion. According to the formula for planetary dynamics, the force (F) is equal to the difference between the high pressure and low pressure multiplied by the area of the pressure difference. The calculation formula for the distance from the Earth to the Sun is the difference between the toward-force and rotational force multiplied by time. This distance accounts for the Earth's forward motion as it orbits around the Milky Way.[2] Additionally, it is the difference in atmospheric temperature and pressure at the Earth's poles that drives the Earth's northward motion. The pressure difference between the South Pole and the North Pole pushes and compresses the Earth toward the direction of the North Pole, where it moves alongside the Sun in orbit around the Milky Way.

In the northern hemisphere, when it is summer, the Earth's position is on the lower side of the

Sun's equatorial region. By observing the transit of Mercury, it can be inferred that the sunlight radiates onto the northern hemisphere. At this time, the South Pole of the Earth experiences winter because it is colder than the North Pole. Therefore, the higher air pressure at the South Pole pushes and compresses the Earth to move northward. The Himalayas' east-west orientation is a result of this northward push from the South Pole. Similarly, the mountain ranges along the west coast of the United States are the result of a northward push from the South Pole and an eastward pressure from the west. The uneven force generated by the cold air pressure at the South Pole driving Earth's motion also contributes to the changing seasons on Earth. With the South Pole being cold and the North Pole being warm, the Earth moves faster in the northward direction. However, when the South Pole becomes warm and the North Pole becomes cold, the Earth's northward motion slows down. The speed of Earth's motion is determined by the difference in air pressure surrounding the Earth, which results in variations in the Earth's position relative to the Sun, leading to the occurrence of seasons.

3.2. Differences in the Motion of Earth and Other Planets in the Solar System

In comparison to other planets in the solar system, the motion of Mercury differs from that of Earth. Mercury moves away from the Sun when it is closest to the Sun due to the force of solar wind blowing it away. The solar wind blowing on Mercury creates impact craters, and all craters are formed by the blowing of gas, which is why meteorites are not found inside the craters. The same principle applies to the claim that the moon is hollow. When Mercury returns from its farthest point to its nearest point to the Sun, it is because the cold air pressure on the side facing away from the Sun is greater than the hot air pressure on the side facing the Sun. The pressure difference between the two sides pushes Mercury back toward the Sun. The air facing the Sun is hotter than the air facing away from the Sun, leading to lower gas pressure on the side facing the Sun compared to the side facing away from the Sun. The temperature difference between the poles can be as much as hundreds of degrees, so the pressure difference can be significant. Therefore, due to the cold, contracting pressure on its backside, Mercury returns to its nearest point to the Sun. The motion pattern of Mercury is as follows: it moves from the farthest point from the Sun to the nearest point, and its forward motion, together with the Sun, orbits around the Milky Way. Mercury moves faster than the Sun in this motion. However, when Mercury moves from the nearest point to the farthest point from the Sun, its forward motion is slower than that of the Sun. Mercury's movement away from the Sun follows an arc trajectory, while its return from the farthest point to the nearest point is mostly a straight line. This motion of Mercury is what leads to its orbital precession.The motion of Venus is half similar to that of Mercury. Venus moves away from the Sun due to the force of solar wind blowing it away. Its return motion is similar to that of Mercury. Venus has a retrograde rotation, which means it rotates in the opposite direction, and this is due to the influence of solar wind. The high atmospheric pressure on Venus, combined with the solar wind, causes the outer atmosphere of Venus to drag and result in a slow retrograde rotation.The asteroid belt is formed by space bodies being blown away by the solar wind when they are close to the Sun. Jupiter, being the largest planet in the solar system, is so because it has accumulated the material of space bodies blown away by the force of solar wind.Earth has only one satellite, the Moon, because the small celestial bodies near Earth have been blown away by the force of solar wind.The motion principle of Pluto and Charon is similar to that of the Milky Way. They orbit each other as a binary system. Saturn has rings because it has a fast rotation. The temperature difference on Saturn supports the presence of its rings. The solar system has a disk-like structure because the heat emitted by the Sun is concentrated in the equatorial region and the sides of the Sun. The motion of planets relies on the pressure difference of hot and cold air surrounding the planets' atmospheres. When explaining the solar system, we apply the principles of hot and cold air pressure.

3.3. Gravity and the Changing Seasons on Earth

The notion that the seasons are caused by the tilt of the Earth is incorrect. The seasons occur due to the varying strength and speed of the Earth's forward motion as it follows the Sun's movement around the Milky Way. When the Earth reaches the forward side of the Sun's equatorial region during its journey, it is because the Sun, along with the entire solar system, is moving forward around the center of the Milky Way. As the Earth approaches the perihelion region, it is located on the forward side of the Sun's equatorial belt. Due to the spherical shape of the Earth, the light from the Sun that would illuminate the northern regions of the Earth's northern hemisphere is obstructed by the vertex of the Earth's surface located at the Tropic of Cancer. Consequently, the sunlight does not reach the Arctic region, resulting in polar night. At this point, although the Earth is on the side closer to the perihelion, the northern hemisphere experiences shorter daylight hours and lower temperatures due to partial obstruction of sunlight, leading to winter in the northern hemisphere. This causes high atmospheric pressure to form in the northern polar region. Meanwhile, the southern hemisphere receives more sunlight. When the Earth moves to the backside of the Sun's equatorial belt, which is below the ecliptic plane, the northern hemisphere is exposed to a larger area of the Sun's heating, resulting in higher temperatures and the formation of summer in that region. This leads to the formation of low atmospheric pressure in the northern hemisphere.[3]

The Earth does not reach positions in front of or behind the Sun's poles because the Sun's thermal radiation is emitted primarily in the equatorial region and its surrounding areas. The Earth's motion is influenced by the amount of solar heat it receives, which is determined by the radiative heat value. The Sun's poles do not emit solar flares or intense radiation. For example, there is no flickering of solar flares at the poles. The South Pole of the Sun is colder than the North Pole. Although the Sun's North Pole is a high-temperature region, the South Pole does not experience the same level of heat. Therefore, driven by the pressure difference at the Sun's poles, the Sun leads the stars in the solar system to orbit around the Milky Way in the direction of the North Star. The motion of the gaseous planets follows the same principle. As the Earth revolves around the Sun, it also moves alongside the Sun in the direction of the North Star, orbiting around the Galactic Center.

3.4. Earth's Motion and the Alternation of Seasons

The force that drives the Earth to move towards the North Star is the difference in solar radiation received by the air at the Earth's north and south poles, leading to varying temperature differences and atmospheric pressures. This pressure difference between the air at the South Pole, which is colder and has higher pressure, and the air at the North Pole, which is relatively warmer and has lower pressure, pushes and compresses the Earth towards the North. Air pressure is a phenomenon where air, when cooled, contracts and moves towards the heat source. It follows the principle of cooling and contraction and heating and expansion. The same principle applies to gravity as well. Gravity can be seen as the manifestation of the compression of matter from colder regions to hotter regions. During summer in the Northern Hemisphere, when the Earth is at the aphelion position, it is located below the Sun's equatorial belt, specifically beyond the horizontal plane of the Sun's ecliptic. Therefore, the Sun radiates more towards the Northern Hemisphere, illuminating a larger area of the Arctic region. This results in polar daylight at the North Pole and the occurrence of summer in that region. The temperature at the North Pole is around 0 ℃ during this time. On the other hand, the Southern Hemisphere experiences winter during this period. The average temperature at the South Pole during winter is around -80 ℃, with the highest atmospheric pressure. Compared to the South Pole, the North Pole has lower atmospheric pressure and the pressure difference between the two is at its maximum. Consequently, the Earth is compelled to move towards the direction of the North Star under the compressive force exerted by the cold atmosphere at the South Pole.

The Earth is spherical, and the interconnected atmosphere surrounding it results in the cold air over the South Pole exerting a compressive force that pushes the Earth towards the North Pole. This force is a manifestation of the gravitational attraction of the Sun and is also known as the forward force that causes the Earth to move with the Sun in its orbit around the galactic center. It is determined by the pressure difference between the air at the Earth's two poles, and this pressure difference also determines the speed at which the Earth moves with the Sun. The Earth's speed of motion with the Sun is not constant. When the Earth is in the aphelion region, and the Northern Hemisphere experiences summer, the Earth is positioned behind the Sun, and it is farther away from the Sun. The forward force that the Earth exerts to catch up with the Sun is accelerated due to the increased temperature difference between the poles. From the summer solstice to the winter solstice, the Earth's average speed of motion is 17 kilometers per second, while the Sun's speed remains constant at 8 kilometers per second. During this time, the temperature difference between the Earth's poles ranges from 30℃ to 60℃, and the pressure difference varies with the temperature change. When the Earth's forward force is greater than the Sun's forward force, the Earth gradually catches up with the Sun, and the Northern Hemisphere enters autumn. As time passes, the Earth crosses the Sun's equatorial plane and appears in front of the Sun's equatorial belt. Eventually, the Northern Hemisphere experiences winter due to reduced heating. During winter, the Earth is in the perihelion region. In this phase, the Northern Hemisphere gradually experiences winter, and the reduced heat radiation causes polar night at the North Pole. As a result of the polar night, the Arctic air becomes colder, with temperatures around -30℃. The cooling of the Arctic air increases the Arctic atmospheric pressure. As the temperature difference between the Earth's poles decreases, the pressure difference between the two poles also decreases. Consequently, the Earth's speed of motion with the Sun gradually slows down. At this point, the temperature difference between the Earth's poles is minimal, and the Earth's forward force in the Northern Hemisphere during the winter solstice becomes nearly equal to the Sun's forward force, eventually balancing out. Meanwhile, the Earth's rotation on its axis continues, with slower rotation during the Northern Hemisphere's summer and faster rotation during its winter. The Earth's rotation is outward, while its revolution is inward toward the Sun. The Earth's distance from the Sun is related to its rotational force. The Earth's rotation and revolution are driven by the pressure generated by temperature differences. As the Earth's forward force weakens and its speed decreases, the Earth gradually falls behind the Sun. However, since the Sun is a constant star with an unchanging forward speed, the Earth slowly reaches the Sun's equatorial region, marking the arrival of spring. Over time, the Earth gradually lags behind the Sun, and the atmosphere is gradually heated from the cold. Subsequently, the Earth reappears behind the Sun's equatorial belt in the direction of the aphelion, and summer returns to the Northern Hemisphere.[4]

The Northern Hemisphere of the Earth is gradually exposed to more sunlight. The occurrence of the Tropic of Cancer and the Tropic of Capricorn is the result of the Earth's relative movement in relation to the Sun, rather than the Sun moving forward or backward. Due to the difference in air pressure between the Earth's North and South Poles, the Earth's forward force varies. When the Earth's forward force decreases, the Sun appears to fall behind the Earth on the side of the Sun's equatorial belt. During this time, the Northern Hemisphere of the Earth experiences summer due to increased heating. As the Earth's forward force increases, the Sun falls behind the Earth, and the Sun appears below the Earth on the side opposite the Sun's equatorial belt. This is when the Earth reaches a position above the front side of the Sun's equatorial belt, and the Northern Hemisphere experiences winter due to reduced heating. The changing position of the Earth throughout its orbit is what gives rise to our seasons. Therefore, the seasons are caused by the Earth's tilt and not by the Earth following the Sun in its orbit.

The Earth's forward force in its orbit around the galactic center is equal to the sum of the pressure difference between the atmospheric pressure at the South Pole and the smaller atmospheric pressure at the North Pole, multiplied by the area of the South Pole. The force F is equal to the difference in pressure G2 at the South Pole minus the pressure G1 at the North Pole, multiplied by the area of the South Pole: F={g2-g1}^m^2.[5]

4. Conclusion

This article has discussed the relationship between gravitational force and the Earth's motion, and has systematically refuted the traditional notion that the Earth's tilt is the main cause of the seasons. Instead, it proposes that gravitational force is the primary reason for the formation and alternation of the Earth's seasons, as the changing positions of the Earth and the Sun result in these seasonal changes. Looking to the future, the scientific theories regarding gravitational force and the Earth's motion are still vast and boundless. The quest to explore scientific knowledge will never cease. Let us continue to strive and explore the mysterious worlds of the Earth and space.

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