

# The Actual Orbital Plane of Earth

R. S. Muduli

*Ex. Adtl. GM, NTPC Limited*

**Keywords-- Orbital Plane, Season change, sunrise, poles, Equator.**

## I. INTRODUCTION

Change of seasons and day & night on this earth have made this earth habitable and beautiful. From the time immemorial scientists are working on this field to find out the clue for which this useful change is taking place and suggested so many propositions on the subject matter, the best among the theories is in practice and adopted by one & all. An important factor of season change is evaporation and precipitation of the most valuable matter i.e. water present on earth; and the same is governed by the action of sun's ray which supplies the necessary energy for processes or conversions to take place which again is a matter of proximity and distance of earth from the sun. From our observation, experience and studies we came to know that one hemisphere of the earth is more exposed to sun for a period of six months (say from 21, March to 23, Sept) and hence receives more sun light causing summer & rain during this period and other hemisphere receiving less sun's ray during the same period passes through winter, dark and rain/snow fall. In the next six months period (say from 23, Sept to 21, March), on revolution of the earth along its orbit, the hemispheres alternate their positions and hence change in season is experienced. Keeping this in mind and with 50 years of observations, the model is designed to provide the most plausible solution to this dilemma/situation being encountered/ experienced on the earth's surface.

Earth revolves round its own axis and that makes 12 hours day and 12 hours night in a 24 hours period and this is known as daily motion or rotation of the earth. Apart from this motion earth moves along a circular (more correctly elliptical) path around the sun and this motion takes full one year to complete one revolution round the sun along this path. The earth as it passes through these regions it brings in summer, rain & winter seasons at different places during its journey/motion, causing a change in season for its occupants, regions and environment. If we map these points along the yearly motion on daily basis for all 365 days, we will find that each day will form a different point and when we draw a curve along these points, it will form a closed and smooth curve.

And again when we pass a plane along all these 365 points, all will be found on the same plane. The shape of this plane will be elliptical and this is known as orbital plane of the earth.

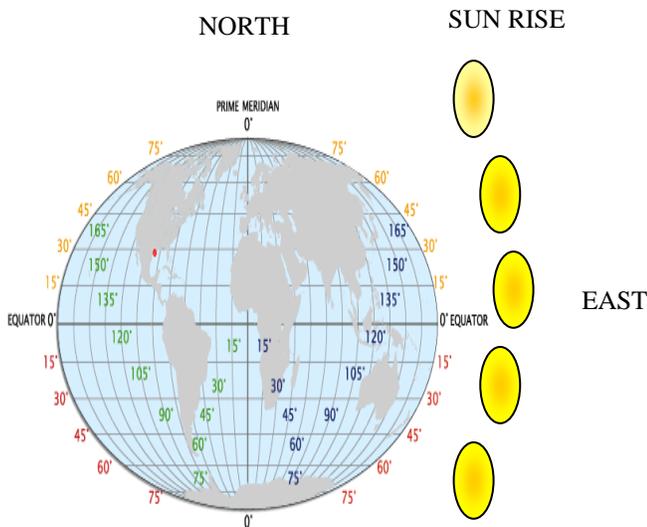
At any moment when we join the centers of the earth and the sun, this will be a straight line. Thus numerous lines will be formed and for all 365 days we can think of 365 straight lines and interestingly the earth's orbital plane will also contain all these 365 straight lines in the same plane.

Another uniqueness we shall observe from the orbital motion of the earth that out of 365 days, there will be 182 pairs of positions of the earth with respect to certain datum. That means at least two days in a year the position of the earth with reference to that datum will be equal but placed at two different locations. For example, on March, 21 and Sept, 23 earth will be at same height with respect to that datum but placed at different locations (like vernal equinox and autumnal equinox). Similarly, other pairs we can assign as March, 20 and Sept, 24; March, 19 and Sept, 25; towards winter solstice in upward position of earth's orbital path and March, 22 and Sept, 22; March, 23 and Sept, 21 towards summer solstice in downward motion along the orbit of the earth.

On earth's orbital plane we shall notice that the four nodal points, such as summer solstice, autumnal equinox, winter solstice, and vernal equinox are located at three different levels with both equinoxes at the same level, summer solstice at the lowest level and winter solstice at the highest level with respect to the above datum.

## II. SUN RISE AND SUN SET

On an open field where we perform morning walk and sun is visible in rising moment at the horizon, we observe that sun does not rise at one point on the east skies everyday. Over a period of one year, for all 365 days sun rises at almost 364 points along the east skies. On June, 21 sun rises on extreme left (towards north) of the east skies; on Dec, 21 sun rises at extreme right (towards south) of the east skies and on March, 21 & Sept, 23 at mid of the east skies.



**Fig.#1: Apparent positions of Sun as seen from earth during sun rise**

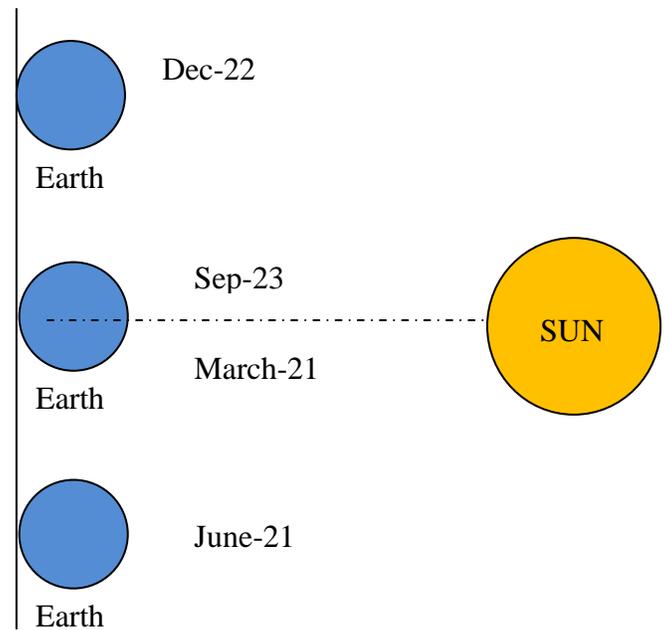
Setting of the sun on west skies is not at the same point for all 365 days. The pattern of setting of sun on west skies is corresponding to rising points on east skies. As described in above, on Dec,21 sun will set on extreme left(the corner of west and south) of the west skies. On June,21 sun sets at corner of west and north skies; and on March,21 & Sept,23 sun sets at mid of the west skies.

From this observation we conclude that sun can not move along the east skies as we see practically at horizon on a line from north to south and as sun is fixed for our investigation purpose, conversely earth can move up and down during its yearly motion, on its orbital path. On June,21 earth is lowered below the datum level and the north pole is more exposed to sun's ray making northern hemisphere more hot with its summer season. During this period south pole is not fully exposed to sun and receives less sun light and heat making winter season in southern hemisphere.

Practically we observe that from Sept,23 sun moves towards the south(Daskhinayan) making summer in southern hemisphere and continuous six months day at south pole and from March,21; sun moves towards north(Uttarayan) making summer in northern hemisphere and continuous six months day at north pole is experienced. With theory available in our knowledge bank till date, actually sun does not move towards north or south; only position of the earth along its orbital path changes (up and down) and that makes it appears the movement of sun in east skies.

As earth moves along its orbit from vernal equinox, summer solstice and autumnal equinox, earth moves down with summer solstice at lowest point and earth moves up from summer solstice to autumnal equinox. When earth remains at lowest point on its orbital path, sun appears at the highest point of north pole, and this period from vernal equinox to autumnal equinox six months uninterrupted day is experienced at north pole and northern hemisphere faces summer season.

From the existing concept of earth's orbital plane that all equinoxes and solstices at the same reference level, the present pattern of change in seasons is not possible. The equinoxes remaining at the same level, the positions of solstices quite opposite and different from equinoxes can bring such change in season as depicted in Fig.#2 as shown below.



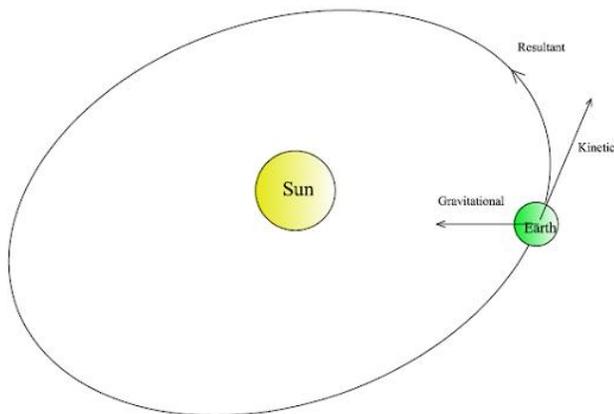
**Fig#2. Projected view of Earth positions at different seasons of the Year**

As earth moves along its orbit from autumnal equinox to winter solstice and vernal equinox, earth moves up with winter solstice at highest point and sun appears at lowest point of south pole, making summer for southern hemisphere. From autumnal equinox to vernal equinox, as more sun shines are received at lower part/hemisphere, an uninterrupted day for six months is experienced at south pole.

From our experience and observation north pole during this period passes through six months continuous night, as sun is not visible due to geometry, material and position of the earth, not allowing sun's ray to fall over the earth's surface.

From this observation we can conclude that actually, sun (which is fixed and stationary) can not move or oscillate within equinoxes as mid point, but our earth which is a revolving and rotating body around the sun and being a planet of the sun, can move up and down being placed at different datum along its orbital path around the sun. During different part of the year we observe movement of the sun along east skies with rising and at setting in west skies over a period of one year, this appears due to motion of the earth along its orbital path in different manner round the year.

Earlier concept to account for continuous day or night for six months at polar region is due to tilt of the earth's rotational axis tilted by  $23.5^{\circ}$  which makes one pole to get tilted towards the sun or away from the sun and this mechanism brings continuous day or night for six months at polar region. But this concept fails to stick to gravitational laws that if one pole remains tilted towards the sun, the same pole should remain tilted towards the sun throughout its orbital motion.



**Fig.3 Orbital Path of Earth**

Earth moves along its orbit with very high velocity, 1,08,000 Km/Hr and extreme ends of north/summer solstice and south/winter solstice a slight higher energy level can put the earth out of the gravitational field/pull of the sun, but gravitational attraction of sun is so strong that it keeps the earth to rotate along its elliptical orbit around the sun.

Earth moves with such a high speed along its orbital path that by virtue of its mass & velocity, it develops a very high momentum/kinetic energy and this force tries to fly away it from sun's gravitational pulling area. But sun's gravitational pull applies sufficient coercive force at extreme end of the longest span like at summer solstice (June,21) and winter solstice (Dec,22) and keeps it from flying away from the gravitational field. Such type of forces are experienced both end of the motion like during Dec,22 and June,21 of the year. Due to this reason one pole of the earth remains quite away from the sun and other pole nearer to sun, one and at the same time, and this enables one pole to receive more light from sun making its summer and other pole receives less light & heat during the same period, making its winter.

### III. CO-RELATION

*Poles:* north and south poles with respect to rotational motion of the earth upon its own axis, move very slow or almost zero speed and equatorial region around,  $0^{\circ}$  latitude is moving at highest speed (about 1700 Km/Hr.). Other rings/circle of latitude  $15^{\circ}$ ,  $30^{\circ}$ ,  $45^{\circ}$ ,  $60^{\circ}$ ,  $75^{\circ}$  etc are rotating at decreasing velocities. We observe earth revolves from west to east and thus we see rising sun on east and setting sun on west skies. With March, 21 and Sept,23 as fixed(mean) positions earth moves up and down both wards to the same extent  $22.5^{\circ}$  along orbital motion. Therefore as we see sun rising at  $22.5^{\circ}$  N latitude in east skies, it is to set at  $22.5^{\circ}$  N latitude on west and sun rising at  $22.5^{\circ}$  S latitude in east skies, it is to set at  $22.5^{\circ}$  S latitude on west, because it is a particular time & day of the year on the orbital path. And thus sun rising at  $22.5^{\circ}$  N latitude in east skies, can not set at  $22.5^{\circ}$  S latitude on west skies on the same day. Because sun rising at  $22.5^{\circ}$  N refers to a day in the month of June, and sun setting at  $22.5^{\circ}$  S refers to a day in the month of December of the year. Therefore sun rising at north hemisphere can not set at south hemisphere on the same day.

From rising pattern of sun in east skies and setting pattern of sun in west skies as observed over a period of one year, the positions of the earth at equinoxes are at the same level with respect to certain datum, during summer solstice  $22.5^{\circ}$  down with reference to this reference level and during winter solstice  $22.5^{\circ}$  up, with reference to the said datum. From above information one can visualize the shape and orientation of the earth's orbital plane.

## International Journal of Emerging Technology and Advanced Engineering

Website: [www.ijetae.com](http://www.ijetae.com) (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 7, Issue 1, January 2017)

On Dec,22 and June,21; earth possesses maximum kinetic energy ( $1/2 mv^2$ ) by virtue of its mass and velocity and can fly away from its orbit to outer space, but sun's gravitational attraction is so strong that it coercively pulls back the jumping earth and forces earth to revolve around its normal orbital path. Earth's orbital plane is a matter of two dimensional figure covering three dimensional spaces.

### IV. SUN AT THE NUCLEUS

From the theory atomic structure we know that heavy particles: protons and neutrons are concentrated at the atomic nucleus and lighter particles like electrons move round the nucleus. In the similar manner, the sun the most energetic agent of the solar system is assumed to be at the center position like atomic nucleus and the planets & their satellites move around the sun, in an imaginary three dimensional spherical space.

The planets are moving round the sun not on a simple orbital plane, they are moving round the sun, keeping sun at the center like that in a solid spherical space of three dimensional nature and not like a plane of two dimensional area. Of course the distance of the individual planets from the sun is maintained at every point of their motion in a solid space from the sun as reference center as usual. For example earth can be any where in the space in between 1,47,300,000 and 1,52,100,000 Km from the sun and will be inside a sphere of 152,100,000 Km radius excluding sun at the center with Mercury and Mars inside this sphere.

The total solar system in this way is enclosed in a sphere with sun at its center/nucleus. Neptune is the last planet or outermost member rotating in outer area/ surface of this imaginary sphere of radius 4566 million Km. The entire solar system does not contain on a plane of paper or page of website as shown to readers. The orbital plane of a single planet may be a plane. But this plane is not parallel to orbital plane of any other planet. The orientation of orbital plane of all planets are different from each other. The innermost planet which is nearest to sun receives maximum sun's radiation, hence hottest and brightest, the outermost planet which is farthest from the sun receives minimum sun's radiation, hence coldest and darkest.

The distance between adjacent planets is sufficient to prevent any collision with other planets during orbital motion round the sun. The satellites of planets are also independently rotating around their respective planets without any collision between themselves or with other planets and/or their satellites.

The orbital plane of each planet is different and their inclination to sun's principal axis are all different, of course all planets have their regular orbital plane.

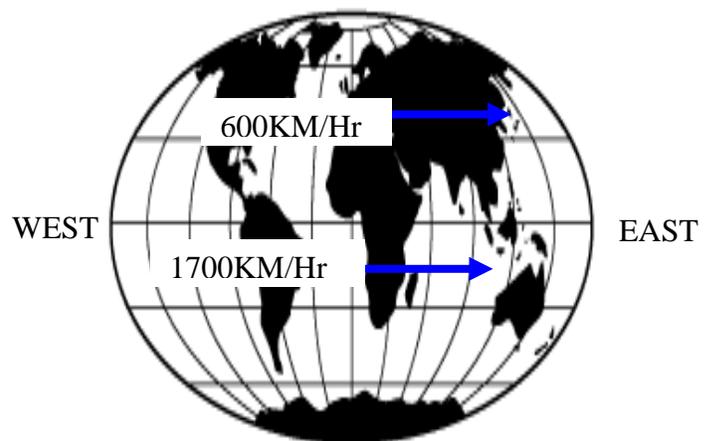
Every planet revolves round the sun, keeping sun at the nucleus, the principal center. Yes, one thing may be common among all orbiting planets, that all are to be moving in the same direction, either clockwise or anticlockwise around the sun. Since earth is moving/orbiting anticlockwise, all other planets of solar system are supposed to be orbiting the sun in anticlockwise direction. The orientation of their orbiting plane are all different, but all are orbiting in a large spherical space containing sun at the center.

### V. SIX MONTHS DAY AND SIX MONTHS NIGHT

Six months day and six months night is experienced in polar regions: at a stretch six months day in north pole from March,21 to Sept,23; and during same period south pole passes through six months night at a stretch.

The title indicates one pole remains lighted up with sun light for six months period. That means earth's position during this six months period is such that its daily rotation upon its own axis and yearly movement along its orbit enables it /pole to receive sun light continuously for six months without any break

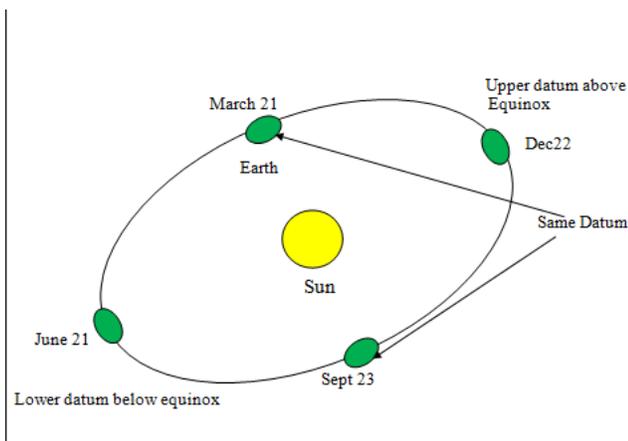
If sunlight is available for one pole for so long/ six months period, then it is obvious that due to constructional features of the earth (opaque & spherical) the other pole will not receive any light and pass through darkness/night for continuous six months. We are arriving at the same conclusion by backward calculation applying all sources of information known to us till date available in knowledge bank.



**Fig.#4: Linear speed of earth's surface at different sections of latitude**

For our explanation purpose we will indicate the position of earth on 21<sup>st</sup> March and 23<sup>rd</sup> September with respect to sun as datum. These two positions of earth are thought to be at same level but at different locations.

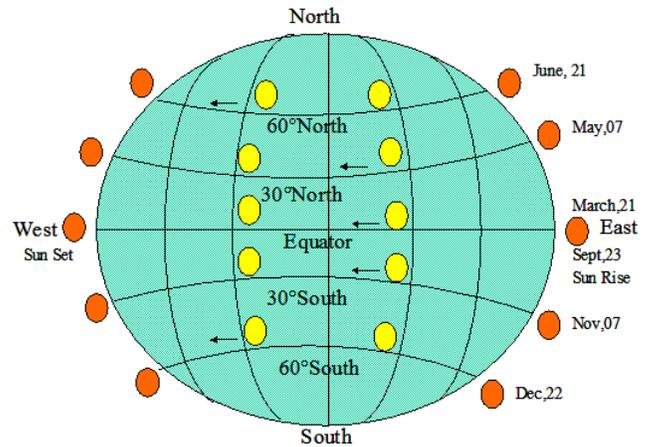
For new theory, it is thought that the position of the earth from day to day with respect to Sept 23 datum position rises along its orbital motion and on Dec, 22 it reaches the highest position. Keeping sun at datum position/equinox level earth gets lifted up with a slow/normal motion, exposing its lower part i.e southern hemisphere to full sunlight from Sept, 23 to Dec, 22 and further to March,21 till earth descends from winter solstice position to vernal equinox position experiences 24 hours day at south pole. Automatically, as explained earlier as earth is spherical and opaque, the North Pole remains in dark and does not receive any sunlight and will experience continuous night for six months.



**Fig.#5: Inclined Orbital Plane of Earth**

Again from Dec,22 to March,21 earth will come down slowly from top position to datum position and during this period also the lower part i.e. southern hemisphere/south pole of earth will remain exposed to sunlight continuously and experiences continuous day. From constructional features and configuration as it is, on Dec, 22, south pole is more exposed to sun for longer period and nearer to sun and it is supposed to be the hottest day of the south pole and for the southern hemisphere.

Hence from above investigation, the earth is moving in such a fashion that its south pole is exposed to sun from Sept 23 to March 21 and with this effect continuous day is experienced in South Pole. During this period the North Pole receives no light due to spherical shape and opaqueness of the earth and passes through six months night at a stretch.



**Fig.#6: Apparent movement of sun over earth**

From March 21; the earth descends from its datum position and day by day, the north pole is more exposed to spherical sun which remains at a upper position with exposure of entire north pole to sun. The north pole receives more sunlight and as per configuration assumed and continuous day is experienced till the earth reaches the lowest position on June,21. with rotation upon its own axis and movement along the orbit, the south pole receives no sun light and remains dark as north pole gets lighted up due to spherical shape and opaqueness of the earth.

June,21 remains the longest and hottest day at north pole ad hence on June,21; the south pole experiences coldest & shortest day of the year.

Again from June,21 the earth ascends from its lowest position day by day till Sept,23 and still north pole remains exposed to sun and continuous day continues up to Sept,23 the datum position. During this period as explained above the South Pole remains in darkness due to spherical shape and opaqueness of the earth as sun's ray is falling more on opposite hemisphere.

Thus we see from March, 21 to Sept, 23 north pole experiences six months continuous day and south pole six months continuous night.

During motion along the orbit earth passes through autumnal equinox, winter solstice, vernal equinox and summer solstice, all these points remain in one plane and at all locations earth is equally exposed to sun and radiation received on earth surface is uniform at every spot over a period of one year.

From above treatise it is obvious that the equator of the earth always remains in central position with respect to sun along the orbital motion of the earth in one year and experiences 12 hours day and 12 hours night throughout the year.

It is concluded that the orbital plane of the earth though a perfect geometrical plane, it is not parallel to the plane containing autumnal equinox, winter solstice, vernal equinox and summer solstice at the same reference datum or level; but it is inclined to that imaginary plane with winter solstice up and summer solstice down. The exact degree of inclination can be determined from further studies and it is estimated that the inclination must be minimum  $22.5^{\circ}$

In case it would not been the condition, the sun would have been rising only at the center of the east skies and setting at the mid of the west skies with a monotonous season throughout the year and earth would have not been habitable as we see it today. In other words we can say that this discovered path along which the earth rotates round the sun along its orbital path is responsible for the change in seasons on this earth.

#### VI. LONGER DAYS AND SHORTER NIGHTS

As we move from equator to poles, the distance between the center of the imaginary vertical rotational axis of the earth and the surface of the earth gets on reducing; and the rings of latitude covering the entire earth's surface gets on diminishing/smaller. Hence  $45^{\circ}$  N latitude circles will be smaller than  $35^{\circ}$  N latitude circles. When sun rises at any latitude *vis-à-vis* areas as per day of the year it sets at that latitude only and due to obvious reason, sun on appearing, lights up more segments/sectors of the earth at higher latitude area than at the lower latitudes. Suppose,  $52^{\circ}$  N entire latitude on earth surface will be a larger circle than  $62^{\circ}$  N latitude rings. When sun rises at  $52^{\circ}$  N latitude it lights up, suppose 60% sectoral area of the circle, then when sun rises at  $62^{\circ}$  N latitude it will light up 70% of the circle. In case sun lights up major portion of the sectoral area of any latitude, then the day will be automatically longer and hence night will be shorter along that latitude. From this observation and inference, we conclude that sun rising at higher latitude will have longer duration of days and shorter duration of nights, with equal day and night at  $0^{\circ}$  latitude or at equator. Because when sun rises at equator, it lights up maximum 50% of the equatorial ring.

#### VII. TWELVE HOURS DAY AND TWELVE HOURS NIGHT

Since sun and earth remained aligned throughout the year during orbital motion of the earth, 12 hours day (light) and 12 hours night (dark) in 24 hours is possible at equatorial region: adjacent to  $0^{\circ}$  latitude. Had earth's rotational axis been tilted (say by  $23.5^{\circ}$ ), 12 hours day (light) and 12 hours night (dark) at  $0^{\circ}$  latitude could not been possible at equator as we observe today. The word 'aligned' is meant that the center of the earth and the center of the sun if joined at any moment, it will be a straight line on a fixed orbital plane with certain fixed rules on locational dimensions. The same is demonstrated with reference to following diagram.

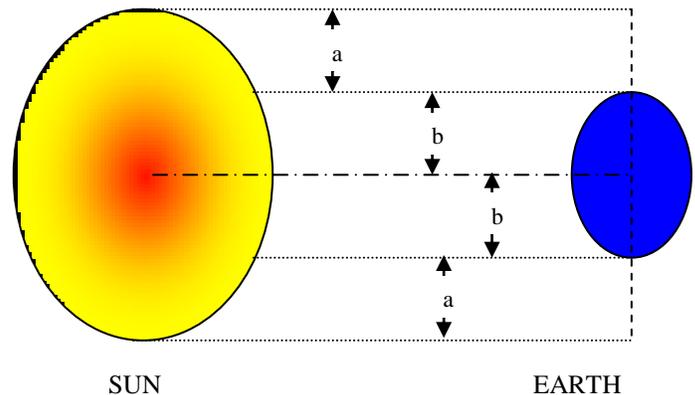


Fig.#7: Earth's alignment with Sun during orbital motion

The above figure shows the case of alignment of sun and earth, the distances marked as 'a' & 'a' are equal and 'b' & 'b' are equal when a & b as indicated in figure carry usual meanings with reference to the drawn diagram.

Presently we find ourselves twice at datum position, i.e. once at vernal equinox and once at autumnal equinox in a year. In case earth's orbital plane would not been inclined, we would have a constant temperature and same season pattern at a place throughout the year(as presently being experienced at equatorial regions: monotonous season, characterized as daily rainfall and ambient temperature varying from  $25^{\circ}\text{C}$  to  $28^{\circ}\text{C}$ ), and the season would have been neither vernal (spring) as at present on March 21 nor autumnal (autumn) as at present on Sept, 23. Inclination of the earth's orbital plane brings extreme of the ambient conditions like temperature  $-80^{\circ}\text{C}$  at south pole in winter and  $+50^{\circ}\text{C}$  at tropics. This temperature gradient  $-80^{\circ}\text{C}$  and  $+50^{\circ}\text{C}$  provides the necessary propelling force for movement of air and water (in moisture form) to propagate each nook and corner of the earth, forming a living environment on earth.

#### VIII. SIGNIFICANCE OF THIS POSTULATE

This postulate clarifies new routes to following facts:

1. The secret of six months day and six months night at a stretch at polar regions.
2. Clarifies the mystery behind longer days and shorter nights; shorter days and longer nights prevailing at different parts of the earth during different parts/season of the year.
3. A longitude, say the prime meridian situated in southern hemisphere and northern hemisphere both being exposed to sun's ray all at one and same time do not receive equal intensity of radiations throughout its length at any moment, even though facing the sun from the same side.
4. Monotonous same season: rain, being experienced at equatorial region and winter in polar region throughout the year.
5. A new avenue for change of season being experienced at many locations of the earth. Earlier information was conveying the fact that season change is taking place with annual/yearly motion of the earth, with earth moving around the sun on a horizontal plane. Present study is conveying the idea that earth is orbiting around the sun in a fixed path on an inclined plane so that sun's ray is falling or focusing on earth surface in distributed manner with respect to time and this distribution of sun's energy falling upon the earth's surface over a period of one year in fixed sequence is contributing to the change in season over many locations of the earth. It is clarified that this season change is not taking place all over the earth's surface.
6. Sun's ray (like a flame), considering one year period and more completed years, is falling on earth's surface, southern hemisphere and northern hemisphere similar to movement of pendulum of a clock with equator as mean position and pattern of rainfall on earth also follows this sequence.

7. For positions of the earth with respect to the sun during vernal equinox and autumnal equinox seems to be identical with respect to certain datum/reference as shown in fig.#2 and for this reason we experience moderate climate/temperatures during these periods. But very high temperature during summer solstice and very low temperature during winter solstice is attributed to different positions of earth with respect to the sun as indicated in fig.#2. These positions are opposite and are very low & very high respectively and definitely not same as either equinoxes or counter solstice, as it is experienced from ambient temperatures at different parts of the earth.

#### IX. CONCLUSION

Earth is an unique planet which contains essential ingredients to support life and we are proud of our mother earth. Every thing available on earth is natural and we human beings are also natural. But with skill and knowledge human beings have created many things which are artificial to secure comforts. These artificial things are going against the rule of nature and creating unsuitable conditions for sustaining further lives on this earth. This attempt is a correct method of recognizing our environment and based upon this theory further studies on related matter can be continued for development of a safe and sound procedures to lengthen lives on the earth. Since base of this theory seems to be correct, results obtained in applying this theory for different applications will be more correct than the present predicted values.

#### REFERENCES

- [1] [www.wikipedia.com](http://www.wikipedia.com)
- [2] [www.google.com](http://www.google.com)
- [3] [www.gaisma.com](http://www.gaisma.com)