What is insolation on earth

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What factors are responsible for Insolation variation?

Insolation is derived from the words "incoming solar radiation". Insolation is specifically applied to radiation which is arriving at earth"s atmosphere first and then earth"s surface. The heat comes from solar energy. Insolation is the solar radiation that reaches the earth"s surface. It is measured by the amount of solar energy received per square centimetre per minute. Solar energy received over the planet"s surface varies according to season, latitude, transparency of the atmosphere, and aspect or ground slope.

Insolation affects temperature. The more the insolation, the higher the temperature.

The amount of insolation received on the earth"s surface is not the same everywhere. It varies according to the place and time. Tropical regions get the most insolation, it gradually decreases towards the poles. Insolation happens more in summers and less in winters. The major factors which influence the amount of insolation received are:

Since the earth is a geoid resembling a sphere, the sun"s rays strike the surface at different angles at different places. This depends on the latitude of the place. The higher the latitude, the less is the angle they make with the surface of the earth. The area covered by the vertical rays is always less than the slant rays. If more area is covered, the energy gets distributed and the net energy received per unit area decreases. Moreover, the sun"s rays with small angle traverse more of the atmosphere than rays striking at a large angle.

The earth is revolving around the sun in an elliptical orbit, resulting continuous change in the distance between sun and the earth on annual basis. It leads to seasonal variation in solar energy received by the earth.The mean distance between the earth and sun is about 149,600,000 kilometers (92,900,000 miles). When earth position is farthest (152 million km) from sun is known as "aphelion" on July 4. It is perihelion (147 million km) occurs on January 3 each year which is the closest distance. During aphelion the northern hemisphere is facing the sun and therefore receives energy about 7% less than the perihelion (southern hemisphere).

Atmosphere is not transparent for all the radiation coming from the sun because of different composition and layers. It is also one of the controlling factors of insolation to reach earth surface. The atmosphere is composed of gases, water vapour and particulate matters. The atmosphere is a mixture of gases: nitrogen (N), oxygen (O2), Argon, carbon dioxide, Neon (Ne), Helium (He), Methane (CH4), Krypton (Kr), Ozone (O3), Nitrous oxide (N2O), Hydrogen (H) and Xenon (Xe). The atmosphere also contains water vapour, water in the gaseous state.

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