

# Insolation: Factors and Distribution

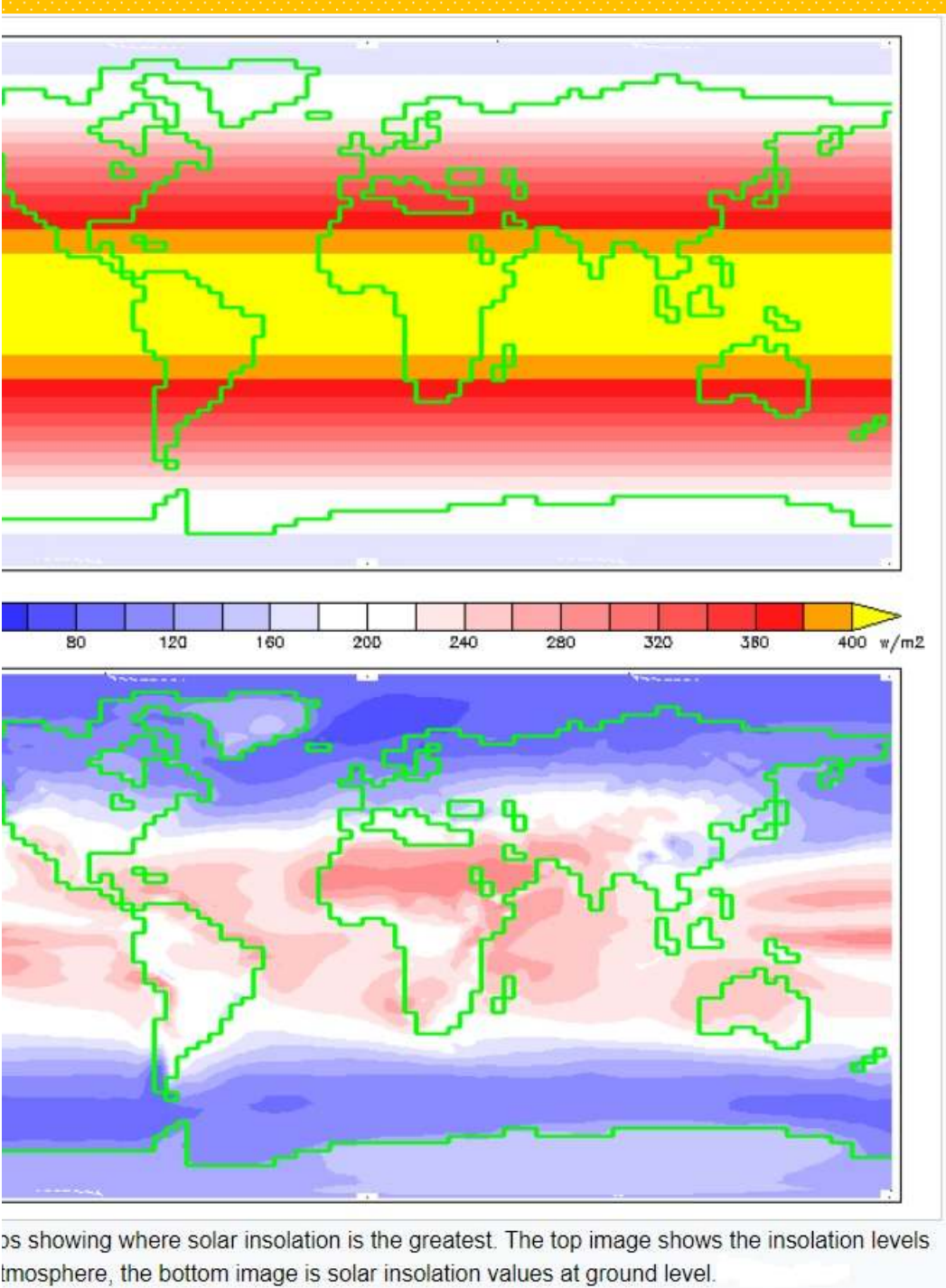
**Dr. Tushar Mandal, M.Sc., Ph.D.**  
**Assistant Professor in Geography**  
**Saltora Netaji Centenary College**  
**Saltora, Bankura, West Bengal-722158**  
**Email- [tushargeoindia@gmail.com](mailto:tushargeoindia@gmail.com)**

# What is insolation?

Insolation is the **incident solar radiation** onto some object. Specifically, it is a measure of the solar energy that is incident on a specified area over a set period of time.

The radiant energy received from the sun, transmitted in a form known as solar radiation or shortwave and travelling at the rate of 3 lakh km/second is called Solar radiation or INSOLATION” - Trewartha

Generally insolation is expressed two ways. One unit is **kilowatt-hours per square meter (kWh/m<sup>2</sup>)** per day which represents the average amount of energy hitting an area each day. Another form is **watts per square meter (W/m<sup>2</sup>)** which represents the average amount of power hitting an area over an entire year.



**Not all of the solar energy that reaches the Earth actually reaches the surface of the Earth. Although 1367 W/m<sup>2</sup> of sunlight strikes the outer atmosphere, about 30% of it is reflected back into space**

Source: Internet

# Now, lets get familiar with the 'Solar Constant'

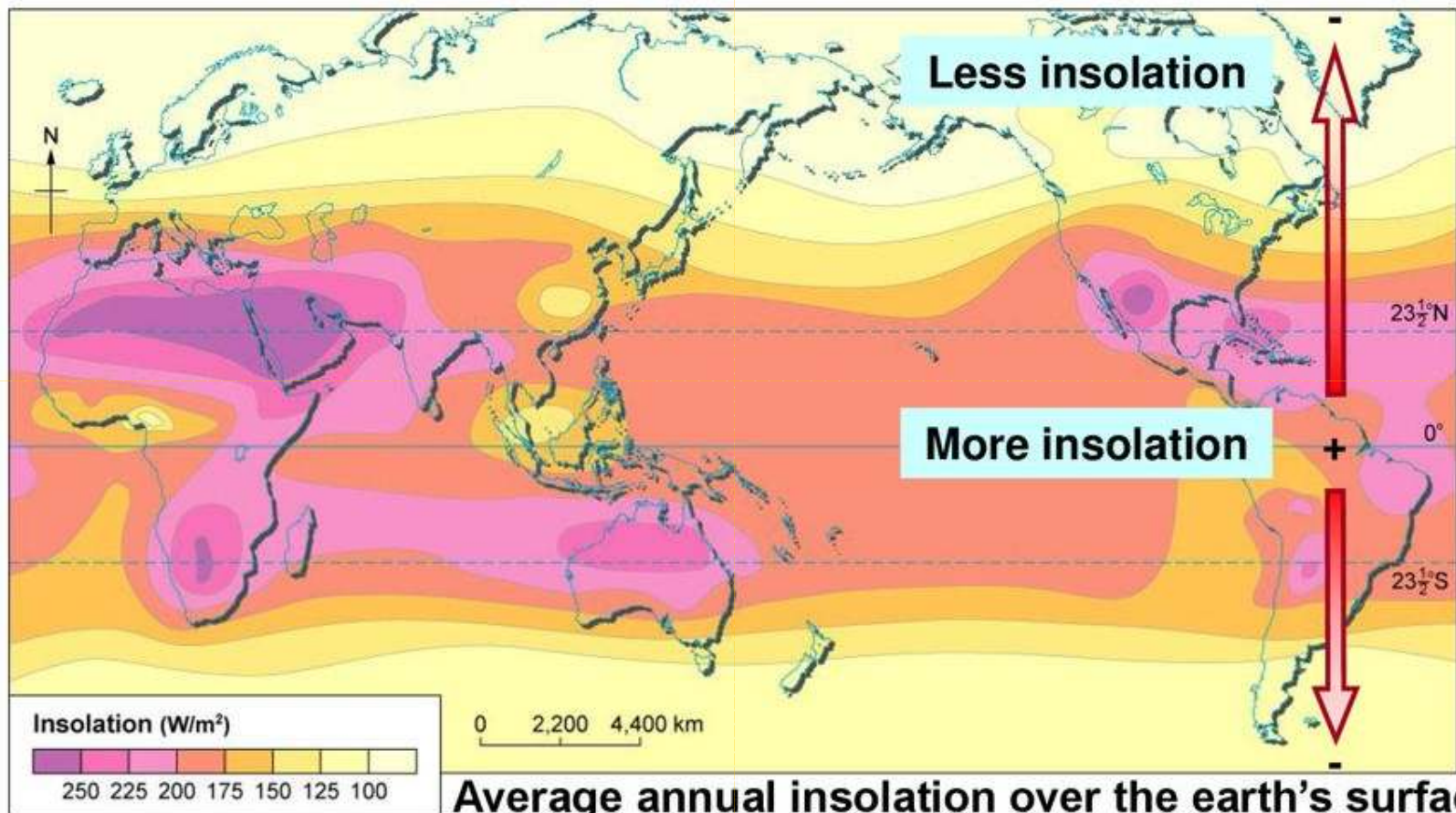
Solar constant refers to the **rate of radiation from the sun** which is the value of 2 gram calories per square centimeter per minute (2 gm cal/cm<sup>2</sup>/min).

# Distribution of Insolation over time & space

lets watch this video tutorial first 

<https://www.youtube.com/watch?v=ZrHCmlivoHI>

# Is insolation evenly distributed on the earth?

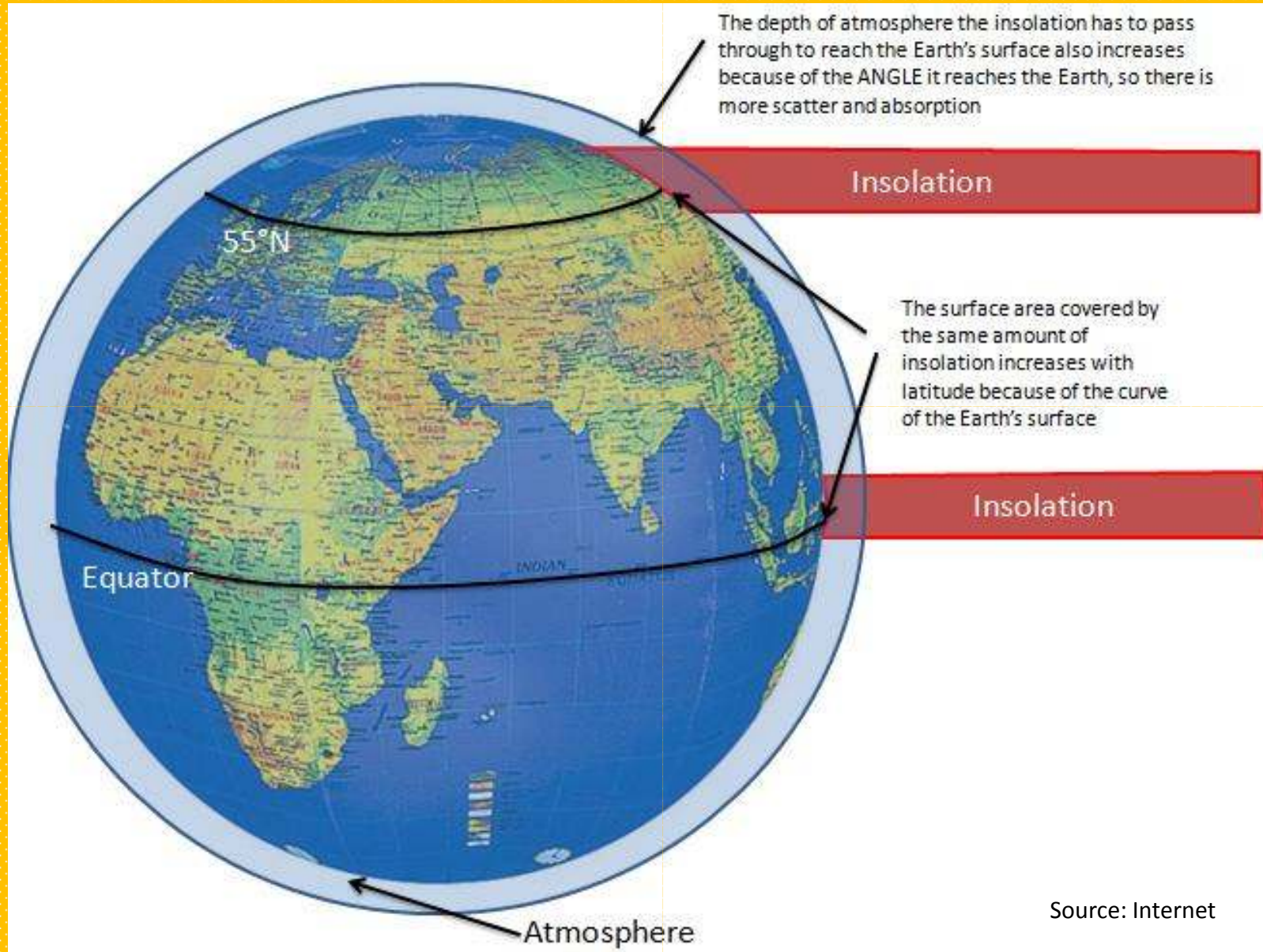


- In general, insolation received ( decreases / increases ) with increasing latitude.

# Various factors affecting the distribution of Insolation

1. Angles of the Sun's Rays
2. Length of the day
3. Distance between the sun and the earth
4. Sunspot
5. Effects of atmosphere

# 1. Angles of the Sun's Rays

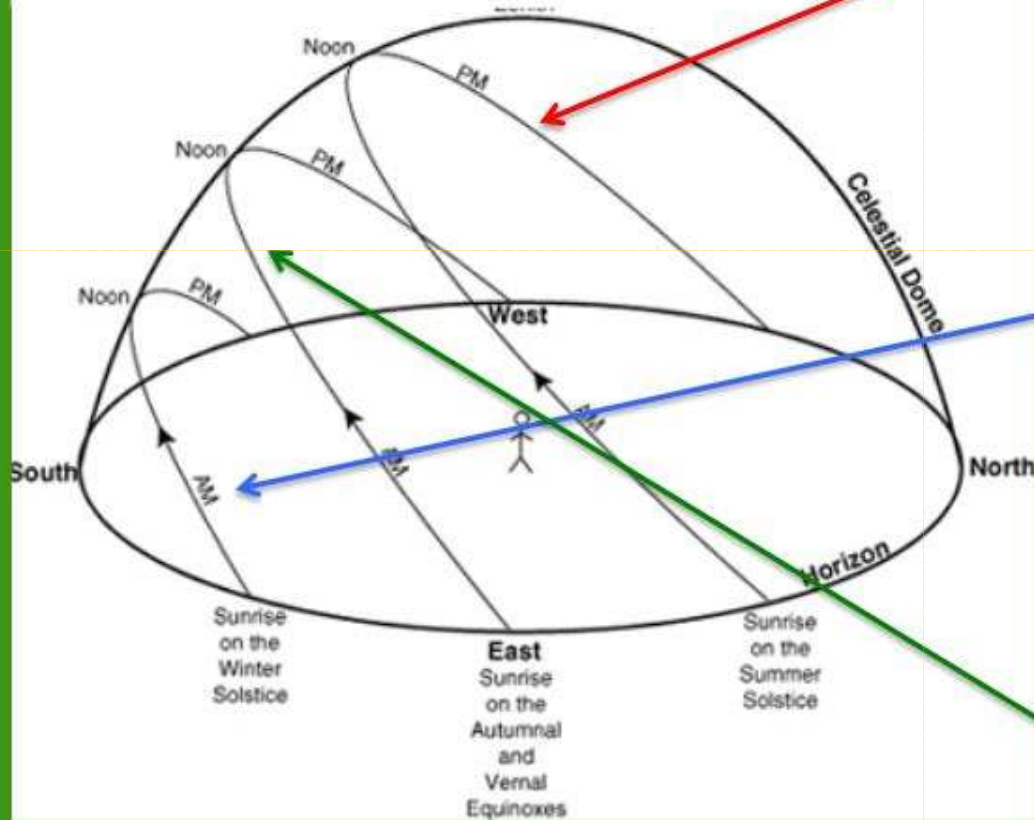




# Factors that Affect the Duration of Insolation

## Latitude and Seasonal Change

Apparent Pathways of the Sun from NY State



Source: Internet

During the summer solstice, NY state receives more direct insolation because the Sun is higher in the sky. Likewise, the apparent path the Sun takes from sunrise to sunset is greater.

Sun rises North of East and sets North of West

**Summer Solstice = 15 hrs. of daylight**

During the winter solstice, NY state receives less direct insolation because the Sun is lower in the sky. Likewise, the apparent path the Sun takes from sunrise to sunset is small.

Sun rises South of East and sets South of West

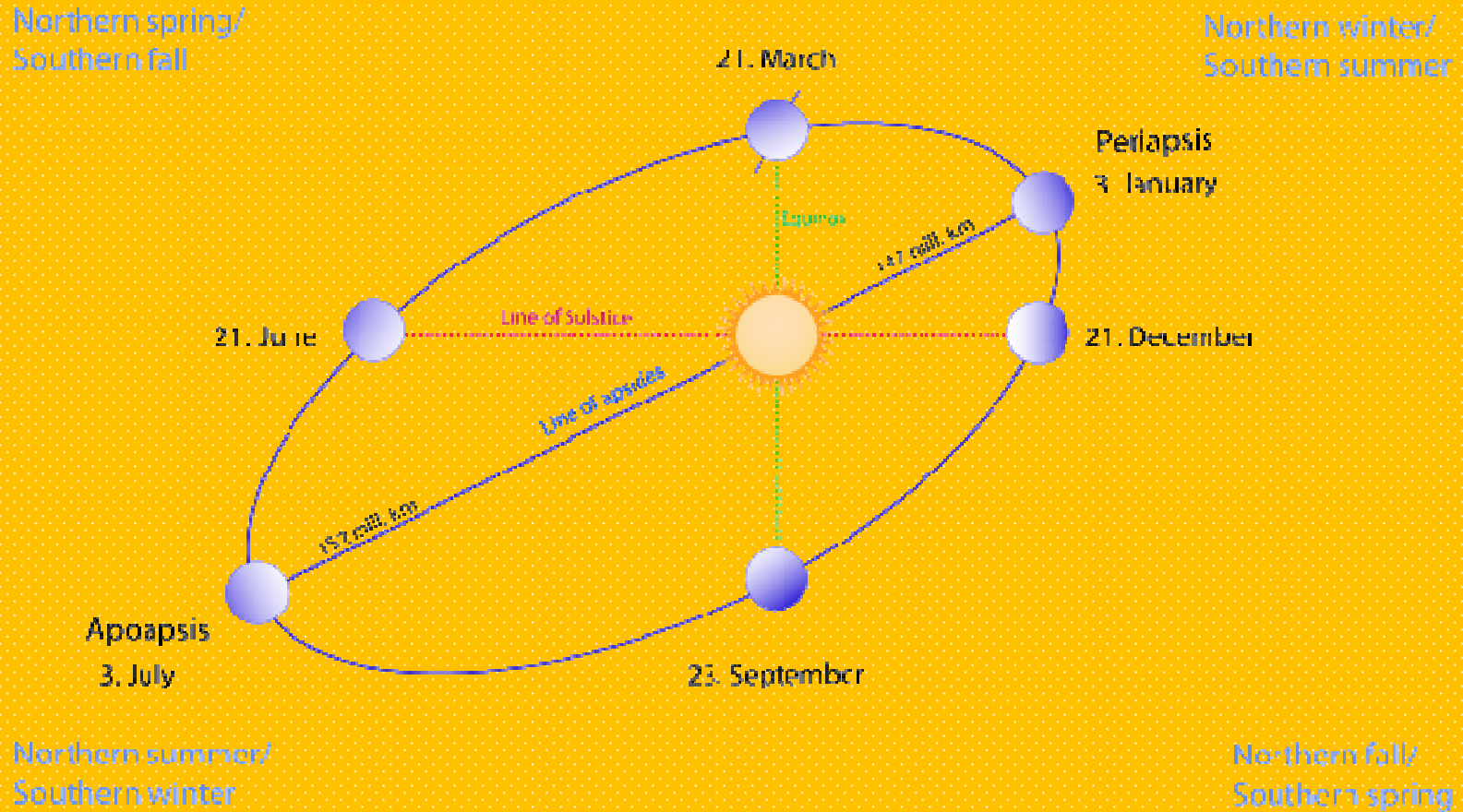
**Winter Solstice = 9 hrs. of daylight**

During the equinoxes, NY state receives more insolation when compared to the winter solstice, but less when compared to the summer solstice. Likewise, the apparent path the Sun takes from sunrise to sunset is greater when compared to the winter solstice, but less when compared to the summer solstice.

Sun rises due East and sets due West

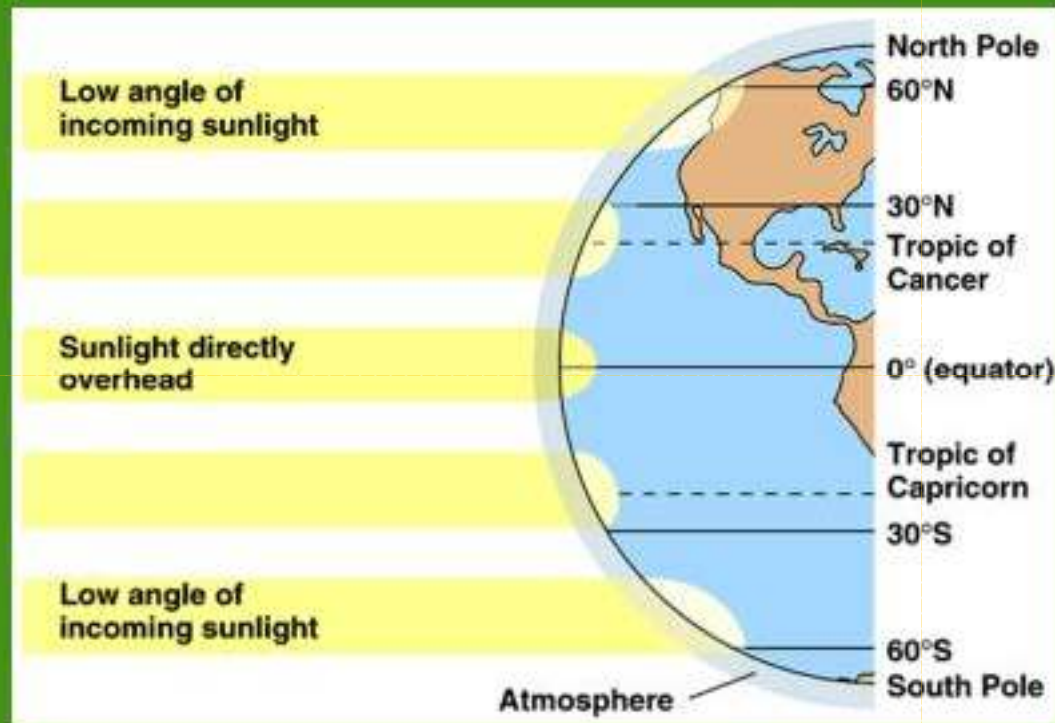
**Equinoxes = 12 hrs. of daylight**

# Distance between the sun and the earth



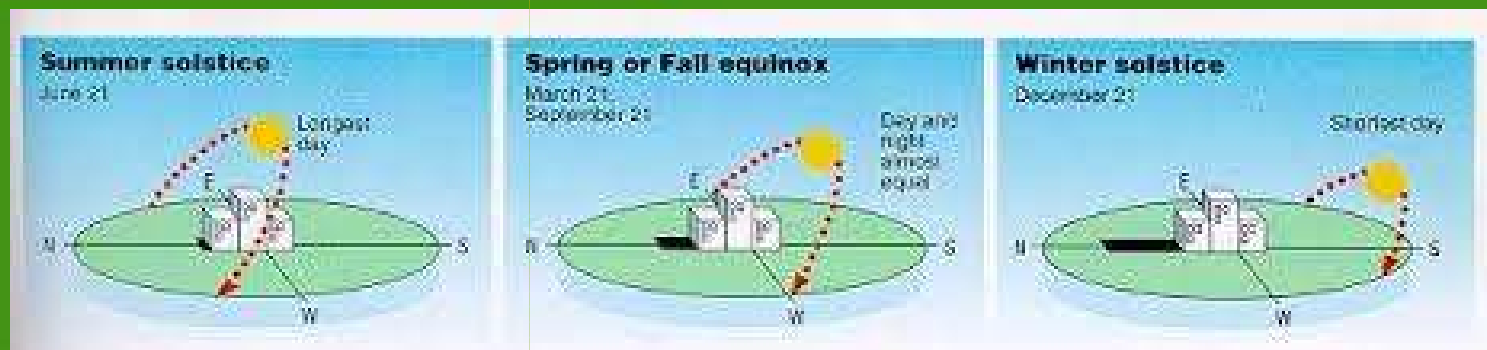
Source: Internet

# Variation of Insolation

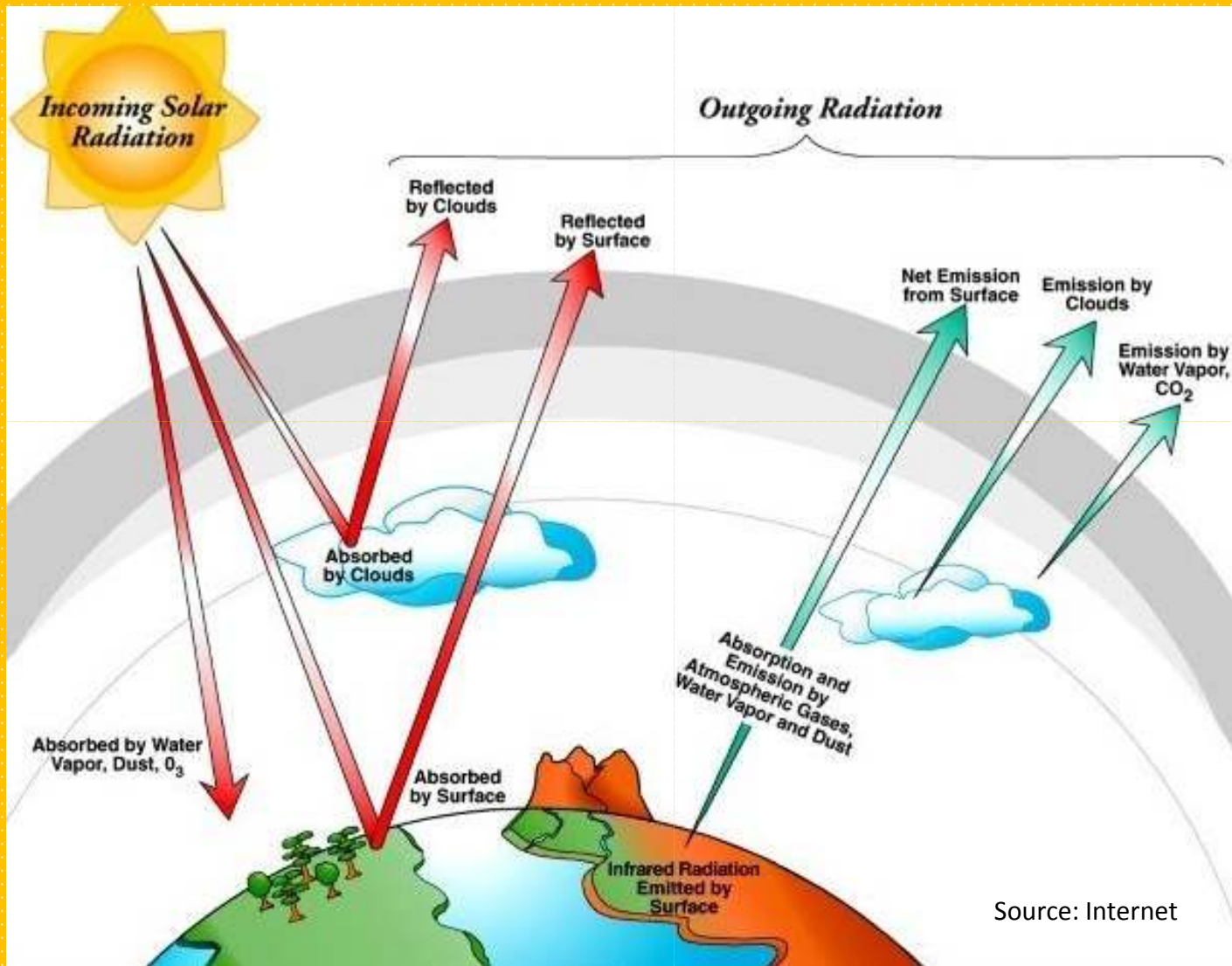


Insolation can vary by changes in its intensity and duration.

Source: Internet



# Effects of Atmosphere



**Thank you!**