

# SUN ANGLE CALCULATOR

National Oceanic and Atmospheric Administration's Solar Position Calculator Algorithm  
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YEAR

MONTH

DAY

HOUR

TIME ZONE

int. standard  
east of GMT +  
west of GMT -

LONGITUDE

int. standard  
east + / west -

LATITUDE

int. standard  
north + / south -



## ZENITH ANGLE

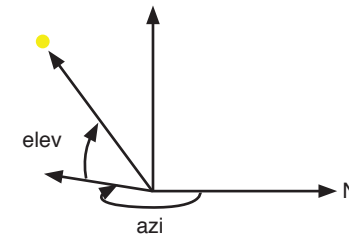
an angular measurement from straight up (zenith) to a point in the sky. Zenith angle is the complementary angle of the elevation (elevation =  $90^\circ - \text{zenith}$ ).  
*The cosine of the solar zenith angle is used to calculate the vertical component of direct sunlight shining on a horizontal surface.*

## SOLAR HOUR ANGLE

Solar Hour Angle for a particular location on the earth is zero when the sun is straight overhead, negative before local noon and positive in the afternoon. In one 24 hour period, the Solar Hour Angle changes by 360 degrees

## AZIMUTH & ELEVATION

an angular coordinate system for locating positions in the sky. Azimuth is measured clockwise from true north to the point on the horizon directly below the object. Elevation is measured vertically from that point on the horizon up to the object.



## EQUATION OF TIME

an astronomical term accounting for changes in the time of solar noon for a given location over the course of a year.

## SOLAR DECLINATION

the declination of the sun. The solar declination varies from  $-23.44^\circ$  at the (northern hemisphere) winter solstice, through  $0^\circ$  at the vernal equinox, to  $+23.44^\circ$  at the summer solstice. The variation in solar declination is the astronomical description of the sun going south (in the northern hemisphere) for the winter.