

Sunset hour angle

The sunset hour angle is given by:

$$\omega_s = \arccos(-\tan(\phi) \cdot \tan(\delta))$$

where ϕ is the latitude of the site. The latitude is positive for the northern hemisphere and negative for the southern hemisphere. The symbol δ is the [solar declination](#) in radians. The sunset hour angle is needed for the calculation of [daylight hours](#).

For a given latitude ϕ and using the [solar declination](#) as a function of the Julian day number J the sunset hour angle can be calculated with the following Python code. Example: latitude = 48 degrees north.

[sunsetangle.py](#)

```
from pylab import *
from numpy import *
def sunsetangle(latitude,J):
    ds=0.4093*sin(2*pi/365*J-1.405)    # to be replaced by class
    sha=arccos(-tan(latitude)*tan(ds))
    return sha
latitude=48
J=arange(1,365,1)
plot(J,sunsetangle(latitude,J))
ytext = ylabel('sunset hour angle')
xtext = xlabel('Julian day')
show()
```

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