Solar Azimuth Sign Convention

Q. What is the sign convention on solar azimuth? And why are we using a different convention?

A. The real question is, why does Sukhatme use a different sign convention then the rest of the world?

Okay, that’s not entirely true. In fact, some texts take a solar azimuth before solar noon as being positive, just like Sukhatme does. However, many texts – including most of the prominent and commonly-referenced texts – take a solar azimuth before solar noon as being negative. They also take a negative value of hour angle as being before noon.

WE WILL ADOPT THE SAME CONVENTION IN THIS COURSE: Negative $\omega$ or $\gamma$ refers to values before solar noon. Positive values occur after noon.

Q. Does this change in sign convention mess up our calculations in the textbook?

For $\omega$, no. All angle equations involving the hour angle involve the cosine of the hour angle, and $\cos(-\omega) = \cos \omega$.

However, Equation (3.5.9) gives the opposite sign of our new convention:

$$\cos \gamma_s = (\cos \theta_z \sin \phi - \sin \delta) / \sin \theta_z \cos \phi$$

(3.5.9)

So to be safe, make note of this in your book, or use the alternate equation,

$$\sin \gamma_s = \frac{\cos \delta \sin \omega}{\cos \alpha_u},$$

which gives the correct sign for our convention.