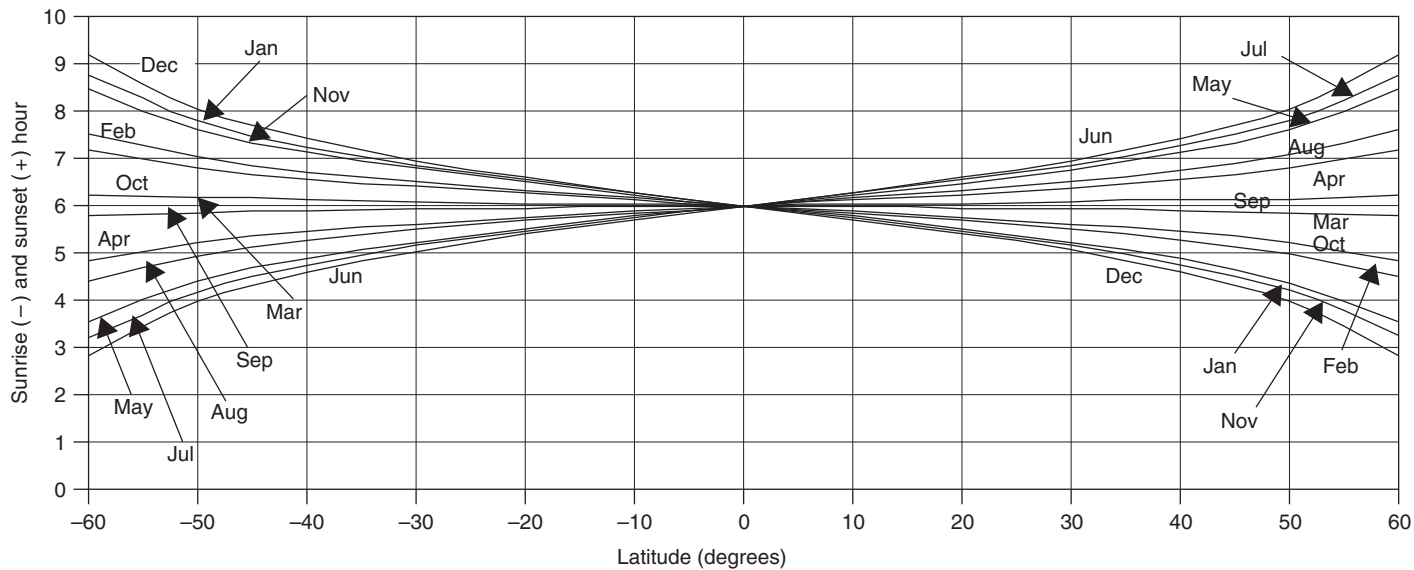


Appendix 3: Sun Diagrams

This appendix contains useful diagrams for quick reading of various design parameters.

**FIGURE A3.1**

Sunset and sunrise angles in various months for a number of latitudes.

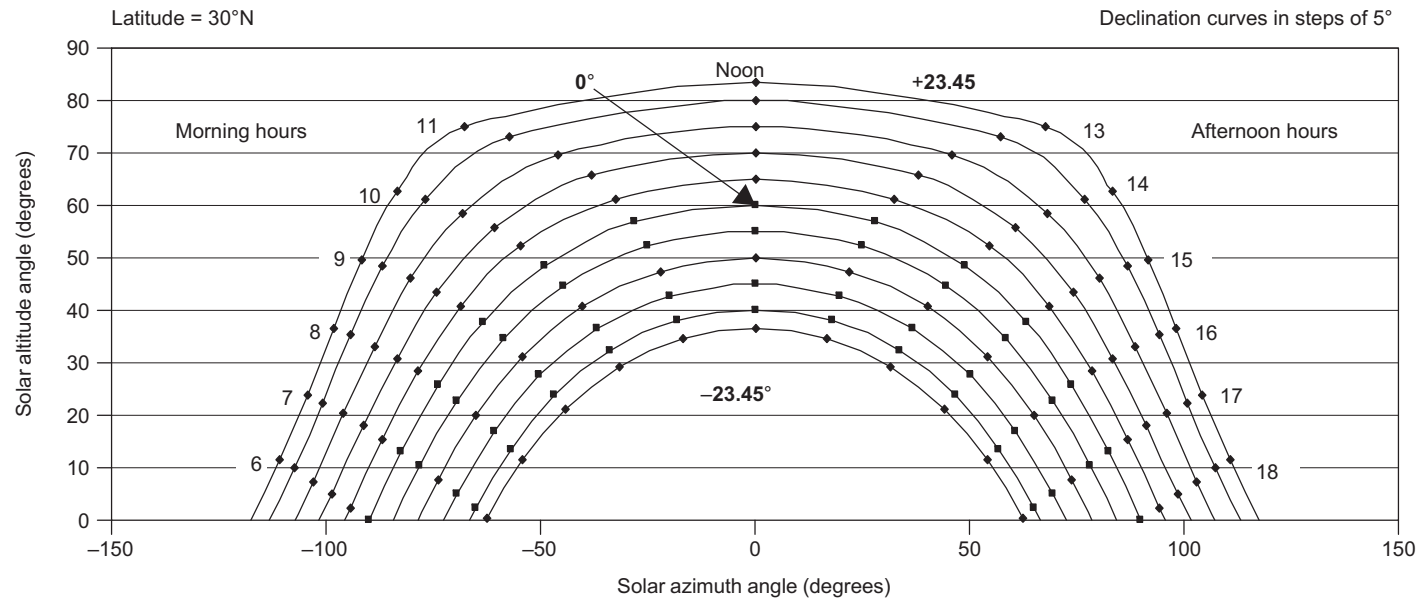
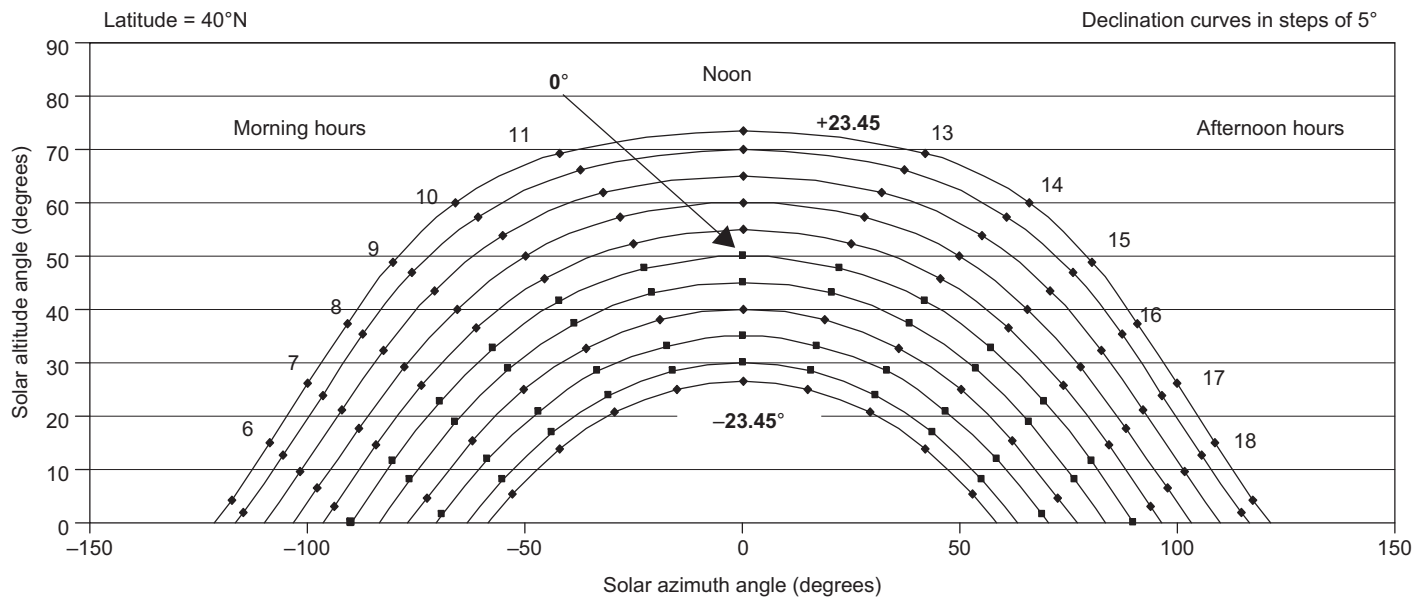


FIGURE A3.2
Sun path diagram for 30°N latitude.

**FIGURE A3.3**

Sun path diagram for 40°N latitude.

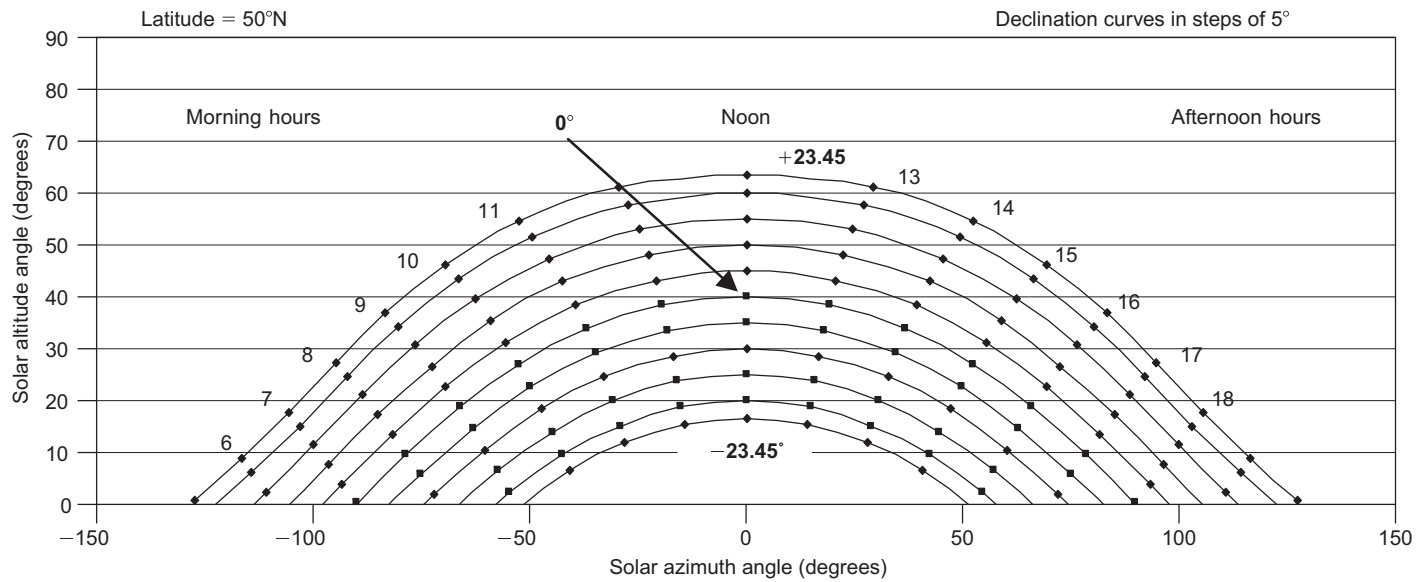
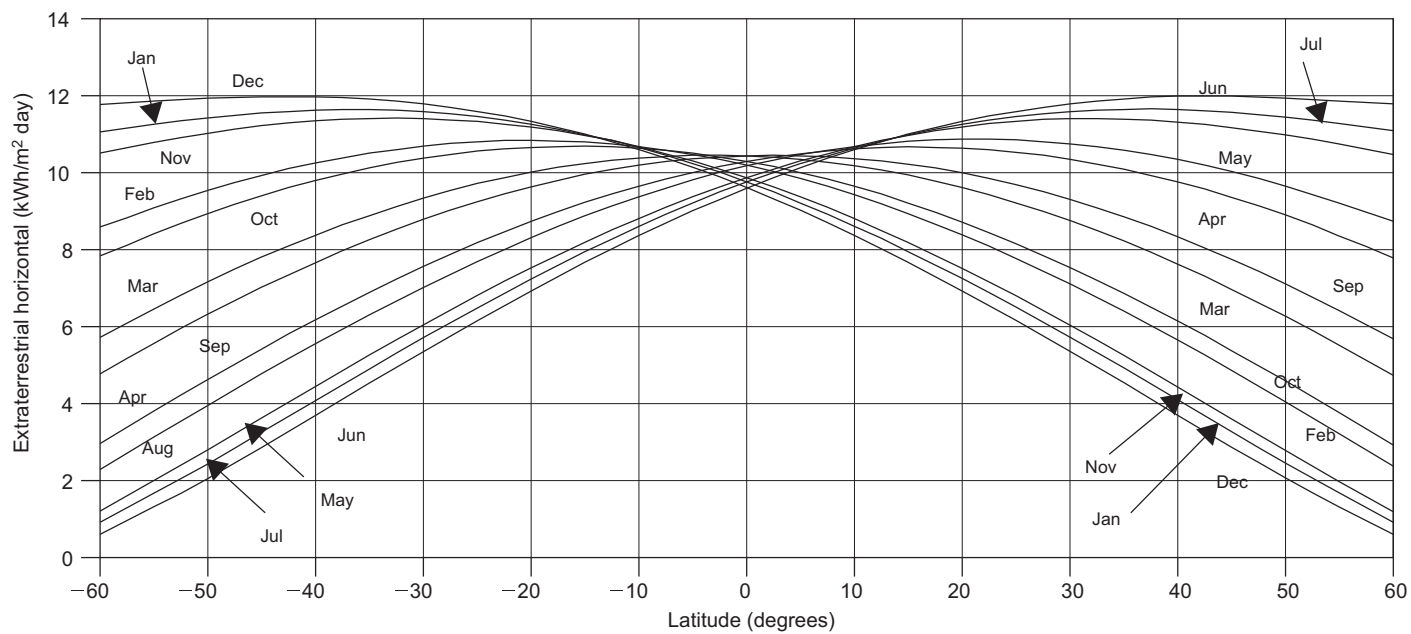


FIGURE A3.4

Sun path diagram for 50°N latitude.

**FIGURE A3.5**

Monthly average daily extraterrestrial insolation on horizontal surface (kWh/m² day).

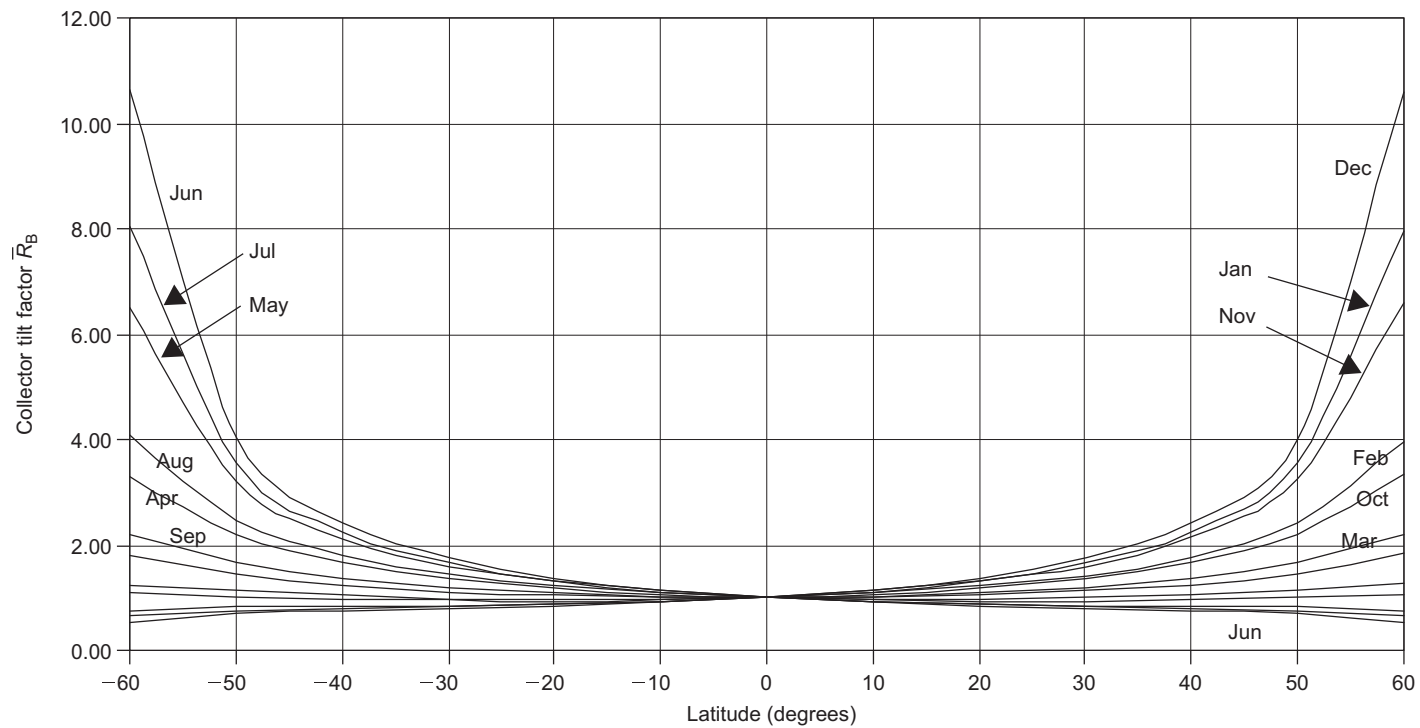
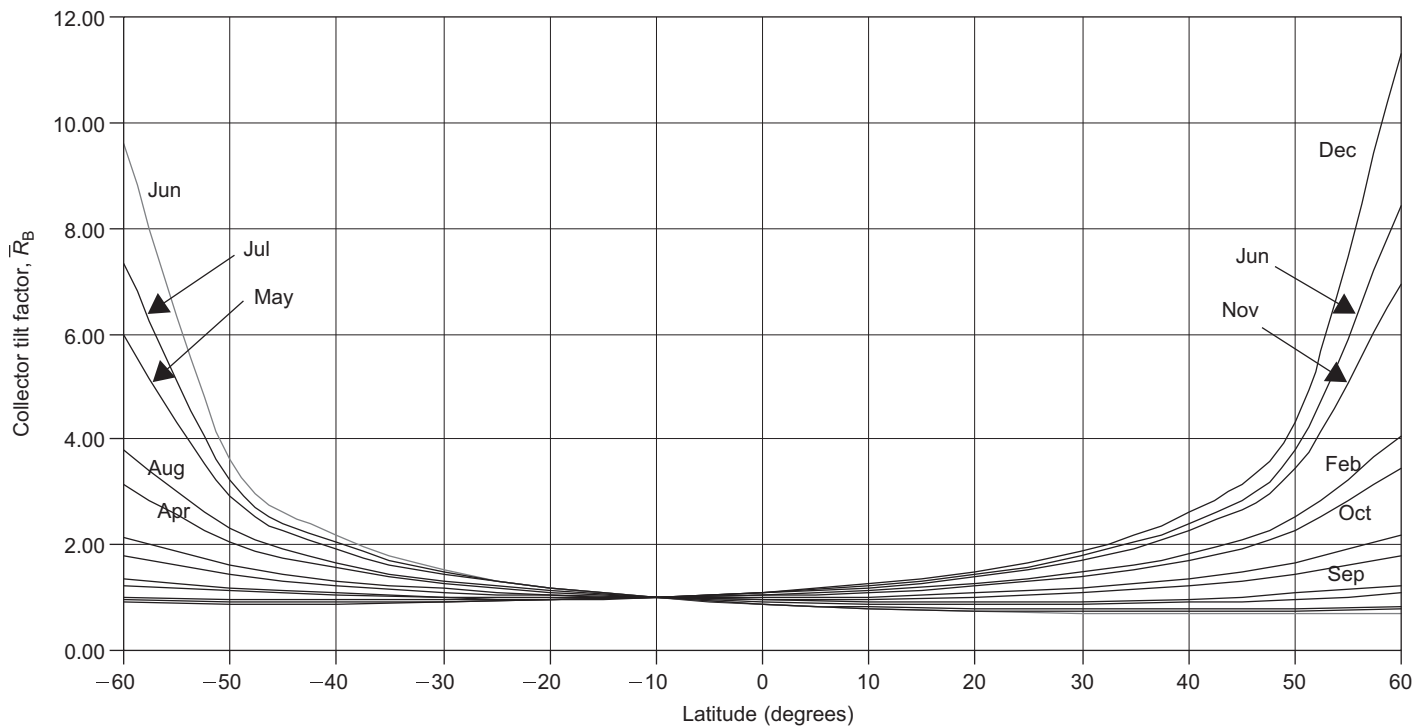
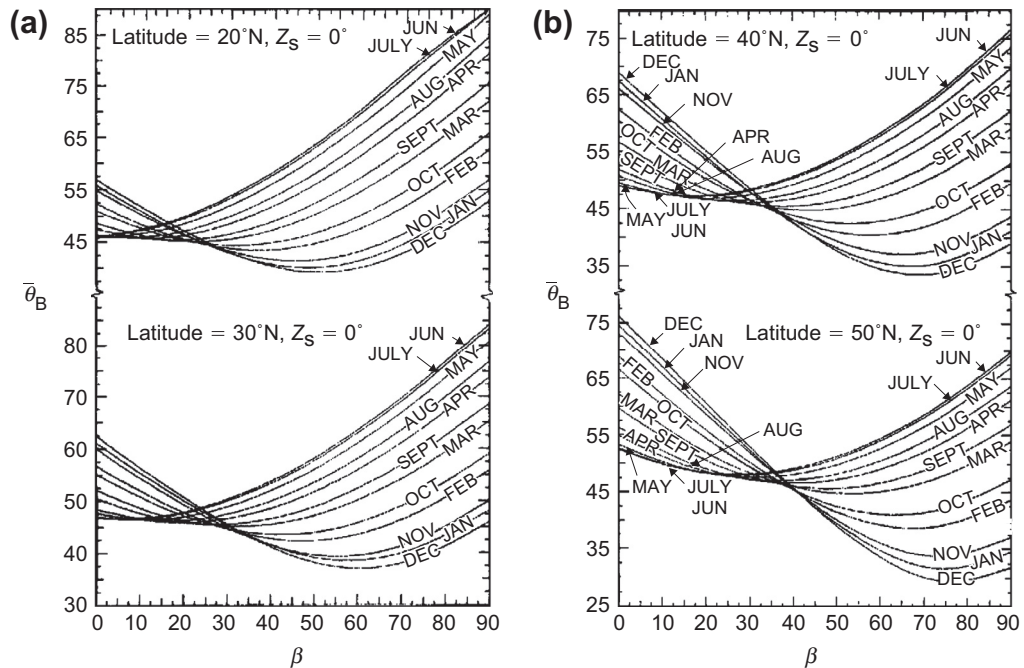


FIGURE A3.6

Values of $\bar{R}_B$ for collector slope equal to latitude.

**FIGURE A3.7**

Values of $\bar{R}_B$ for collector slope equal to latitude $+10^\circ$.

**FIGURE A3.8**

Monthly average beam-incidence angle for various surface locations and orientations (*reprinted from Klein, 1979, with permission from Elsevier*). Note: For Southern Hemisphere, interchange January with July, February with August, March with September, April with October, May with November, June with December, July with January, August with February, September with March, October with April, November with May, and December with June.

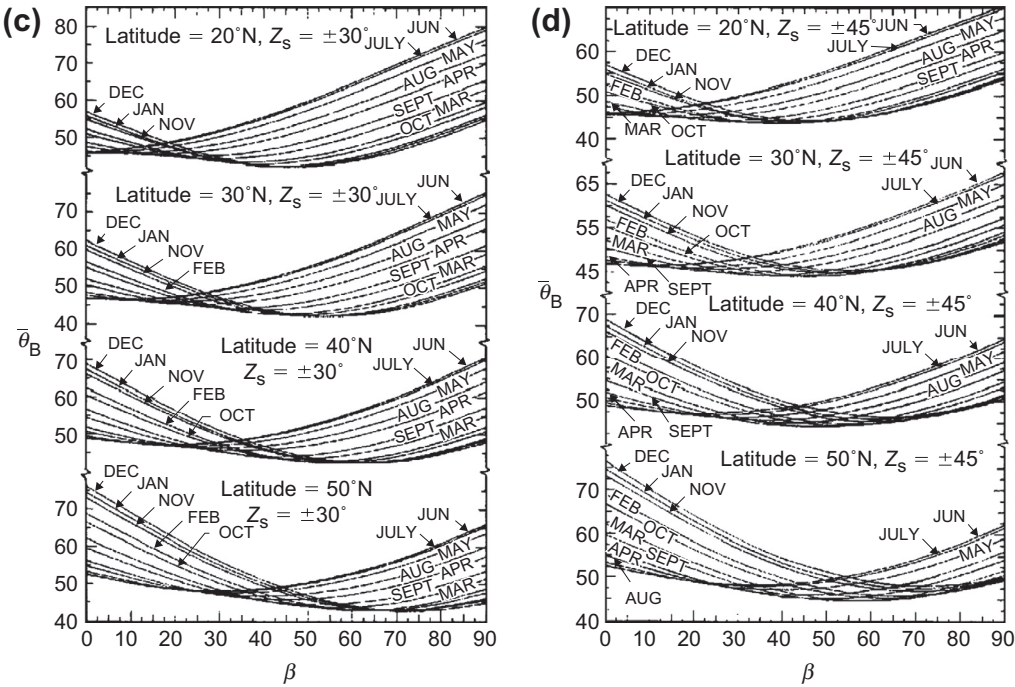


FIGURE A3.8

(Continued).

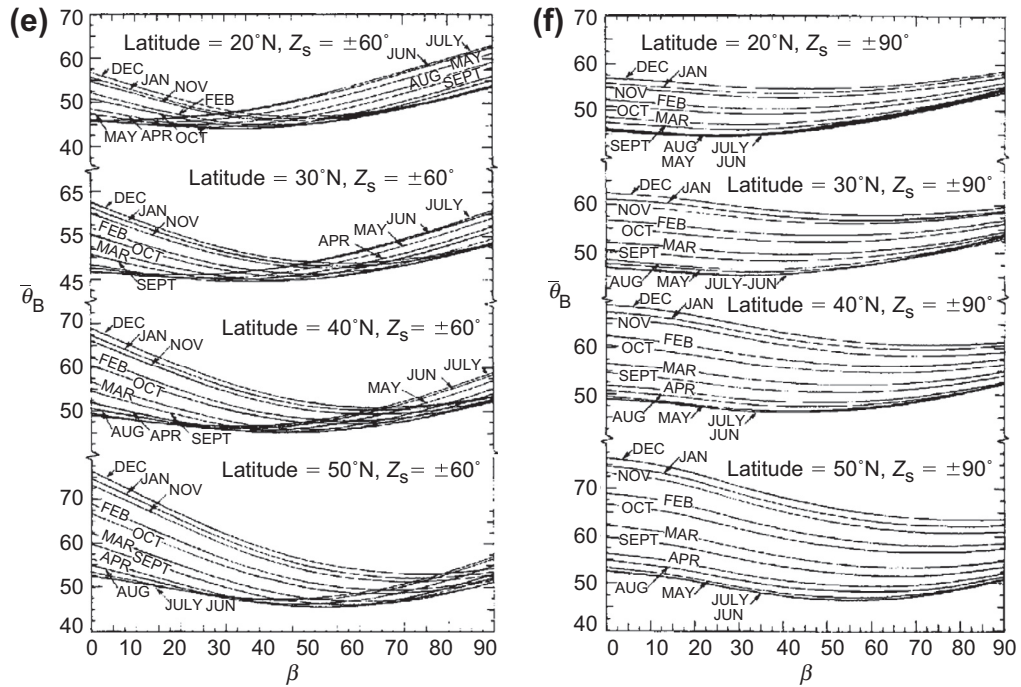


FIGURE A3.8

(Continued).

Reference

Klein SA: Calculation of monthly-average transmittance-absorptance product, *Sol. Energy* 23(6):547-551, 1979.