

## APPENDIX B

### Calculations for Sun Location:

$$jd =$$

$$\begin{aligned} & [1461 * \{y + 4800 (m - 14) / 12\}] / 4 + \\ & (367 * [m - 2 - 12 X \{(m - 14) / 12\}]) / 12 - \\ & (3 * [\{y + 4900 + (m - 14) / 12\} / 100]) / 4 \\ & + d - 32075 - 0.5 + hour / 24.0 \dots\dots\dots (2. 2) \end{aligned}$$

$$n = jd - 2451545.0 \dots\dots\dots (2. 3)$$

$$\psi = 2.1429 - 0.0010394594 * n \dots\dots\dots (2. 4)$$

$$L = 4.8950630 + 0.017202791698 * n \dots\dots\dots (2. 5)$$

$$g = 6.2400600 + 0.0172019699 * n \dots\dots\dots (2. 6)$$

$$\begin{aligned} l = L + 0.03341607 * \sin(g) + 0.00034894 * \\ \sin(2g) - 0.0001134 - 0.0000203 * \sin(\psi) \dots\dots\dots (2. 7) \end{aligned}$$

$$\begin{aligned} ep = 0.4090928 - 6.2140 * 10l^{-9} * n + \\ 0.0000396 * \cos(\psi) \dots\dots\dots (2. 8) \end{aligned}$$

$$ra = \tan l^{-1} [\{\cos(ep) * \sin(l)\} / \cos(l)] \dots\dots\dots (2. 9)$$

$$\delta = \sin l^{-1} \{\sin(ep) * \sin(l)\} \dots\dots\dots (2. 10)$$