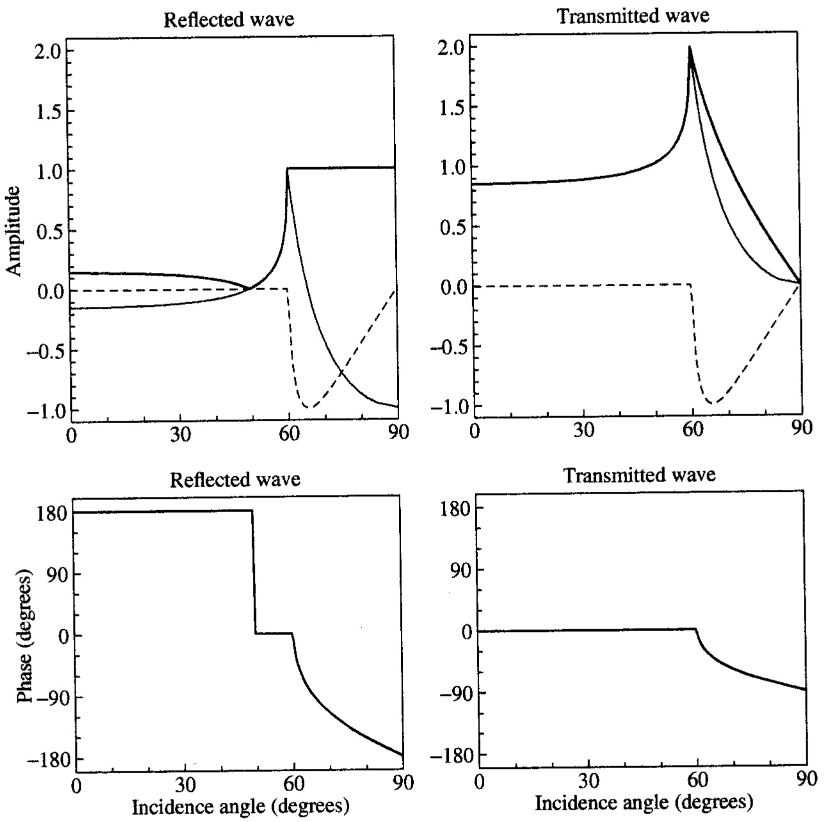

Figure 6.5 Reflection and transmission coefficients versus ray angle for a downgoing *SH*-wave incident on the Moho. In the top plots, the real part of the reflection coefficient is shown with a thin solid line, the imaginary part with a dashed line, and the magnitude with a heavy line. The lower plots show the change in the phase angle for a harmonic wave. The sign of the imaginary part of the reflection coefficients plotted here assumes that a phase shift of $-90°$ represents a $\pi/2$ phase advance (see text).

balance the energy flux, the amplitude of the near-horizontal rays must increase. The reflected wave is now positive in amplitude (no phase shift) and grows as θ increases in order to balance the displacements on both sides of the Moho.

This continues as θ approaches the *critical angle* (near 60° in our example), where the transmitted ray is horizontal. At the critical angle, the transmitted *SH*-wave has an amplitude of two and the reflected wave amplitude is one. All reflections at angles less than the critical angle are termed *precritical reflections.* To go beyond the critical angle, we face a problem in our calculations. This arises from the $\cos\theta_2$ term in the denominator of (6.46). Beyond the critical angle at which $\theta_2 = 90°$ there is no transmitted ray in the lower layer. How do we handle this situation? Recall that the vertical slowness is given by

$$\eta = u\cos\theta = \sqrt{u^2 - p^2}. \tag{6.58}$$