The potential V_C of the compensating masses thus is

$$V_C = G \iiint \frac{\Delta\rho}{l} \, dv \tag{8–30}$$

and their attraction (positive downward)

$$A_C = -\frac{\partial V_C}{\partial h_P} = G \iiint \frac{h_P + z}{l^3} \Delta\rho dv \tag{8–31a}$$

with $\partial l^{-1}/\partial h_P$ by (8–29). For a point at sea level ($h_P = 0$) this reduces to

$$A_C = G \iiint \frac{z}{l^3} \Delta\rho dv \quad . \tag{8–31b}$$

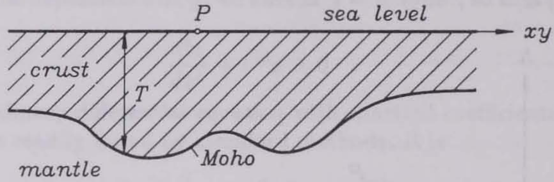

FIGURE 8.7: Illustrating the attraction of the compensating masses

The integral is extended over all compensating masses, and $\Delta\rho$ is their density contrast. For Pratt's model, $T \Rightarrow D$ (constant depth of lithosphere rather than variable depth of Moho, cf. Fig. 8.1), but the density contrast $\Delta\rho$ is variable, being given by (8–3). Thus (8–31b) becomes

$$A_C^{Pratt} = G \int_{x=-\infty}^{\infty} \int_{y=-\infty}^{\infty} \int_{z=0}^{D} \frac{z}{l^3} \Delta\rho dv \quad , \tag{8–32a}$$

with constant limits of integration (the integration from $-\infty$ to ∞ for x and y is, of course, purely formal). For Airy's and Vening Meinesz' models, the density contrast $\Delta\rho = \rho_1 - \rho_0$ is constant ($0.6\,\mathrm{g/cm^3}$, say), but the Moho depth T is variable (Fig. 8.7), so that for these models,

$$A_C = G\Delta\rho \iint_{-\infty}^{\infty} \int_{z=T_0}^{T} \frac{z}{l^3} \, dv \quad . \tag{8–32b}$$

The integrals are to be evaluated by numerical integration, using standard methods (cf. Heiskanen and Moritz, 1967, pp. 117–118; Forsberg, 1984).

Very similar integrals hold, of course, for the attraction of the topography, as we shall see in what follows.