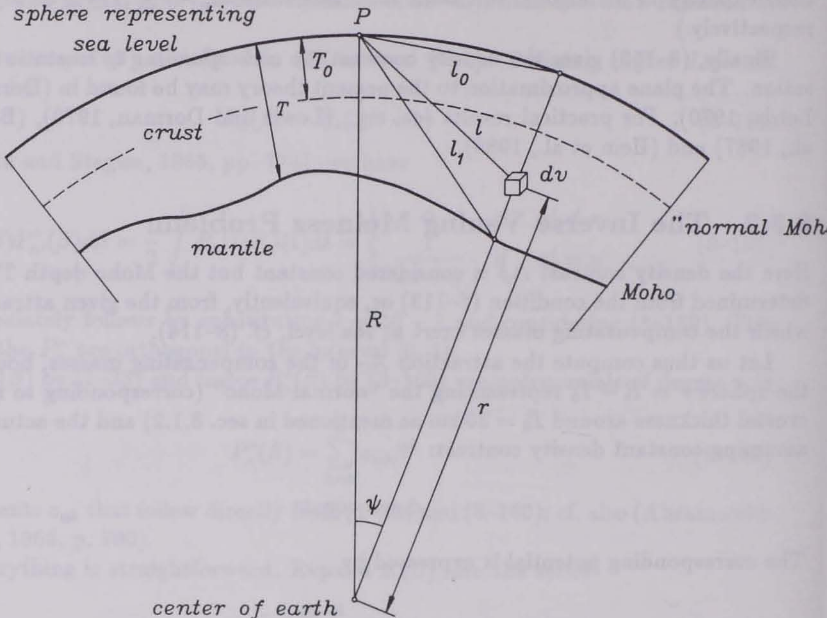

FIGURE 8.15: Notations for the inverse Vening Meinesz problem

concentric spheres $r = R - T_0$ and $r = R$. Disregarding this constant, which will be justified later, we may thus replace (8–168) by

$$A_C = -G\Delta\rho \iint_\sigma \int_{r=R-T}^{R} \frac{\partial}{\partial R}\left(\frac{1}{l}\right) r^2 dr d\sigma \quad . \tag{8–169}$$

Now, to a very good approximation

$$\frac{\partial}{\partial R}\left(\frac{1}{l}\right) = -\frac{\partial}{\partial r}\left(\frac{1}{l}\right) \quad . \tag{8–170}$$

This can be seen because if the sphere is replaced by a plane, the xy-plane, then the distance l between two points (x, y, z) and (x', y', z') is given by

$$l = \sqrt{(x-x')^2 + (y-y')^2 + (z-z')^2} \quad ,$$

and

$$\frac{\partial l}{\partial z} = -\frac{\partial l}{\partial z'}$$

is immediately verified by direct computation. In the spherical case, (8–170) holds as a "planar approximation" (sec. 8.2.1); to the same approximation we may replace r^2