$$\tilde{P} = 40\log|\frac{\tilde{\lambda}_{env}(r)}{\tilde{\lambda}_{liq}}e^{ik[env(r)-liq]} + 1| + 40\log|\tilde{\lambda}_{liq}e^{ik\cdot liq}|$$
$$- 40\kappa\log r + 20\log G + 10\log P_0$$
$$= 40\log|\frac{\tilde{\lambda}_{env}(r)}{\tilde{\lambda}_{liq}}e^{ik[env(r)-liq]} + 1| + 40\log|\tilde{\lambda}_{liq}|$$
$$- 40\kappa\log r + 20\log G + 10\log P_0 \tag{1}$$