5.2.2 Term II: Advection

Little is known about this term. When averaged over a horizontal area larger than about 10 km by 10 km, it is often assumed that there is little horizontal variation in TKE, thereby making the advection term negligible. This is probably a good assumption over most land surfaces.

On a smaller scale, however, it is clear that this term must be important. For example, picture a reservoir of water cooler than the surrounding land. The lack of heating over the reservoir would allow turbulence to decay in the overlying air, while air over the adjacent land surfaces could be in a state of active convection. A mean wind advecting air across the shores of this reservoir would thus cause significant change in the TKE budget. Over ocean surfaces, the advection term would probably be negligible even on the small scales.

5.2.3 Term III: Buoyant Production/Consumption

Production. Fig 5.4 shows the variation of a number of TKE budget terms with height within a fair-weather convective ML. The most important part of the buoyancy term is the flux of virtual potential temperature, $\overline{w'\theta_v'}$. As we have already studied in

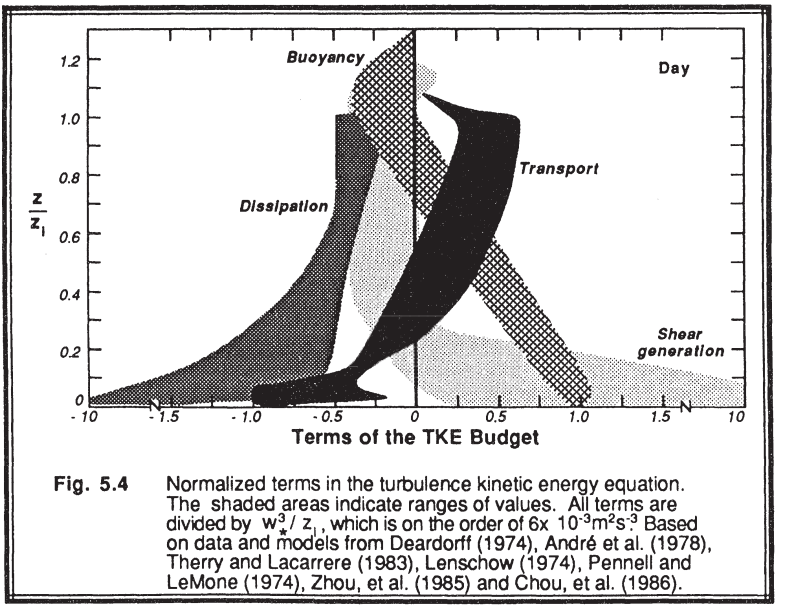

Fig. 5.4 Normalized terms in the turbulence kinetic energy equation. The shaded areas indicate ranges of values. All terms are divided by w_*^3 / z_i, which is on the order of 6x $10^{-3} m^2 s^{-3}$ Based on data and models from Deardorff (1974), André et al. (1978), Therry and Lacarrere (1983), Lenschow (1974), Pennell and LeMone (1974), Zhou, et al. (1985) and Chou, et al. (1986).