



Fig. 13.14 A schema of the residual mean meridional circulation of the atmosphere. The solid arrows indicate the residual circulation (B-D for Brewer Dobson) and the shaded areas the main regions of wave breaking (i.e., enstrophy dissipation) associated with the circulation. In the surf zone the breaking is mainly that of planetary Rossby waves, and in the troposphere and lower stratosphere the breaking is that of baroclinic eddies. The surf zone and residual flow are much weaker in the summer hemisphere. Only in the Hadley Cell is the residual circulation comprised mainly of the Eulerian mean; elsewhere the eddy component dominates.²²

Wave breaking and the residual circulation

Based on our discussion in the previous chapter of the wave-mean flow interaction and the (residual) Ferrel Cell, we might expect the Brewer-Dobson circulation to be a consequence of wave-breaking and enstrophy dissipation in the stratosphere. We ask:

- (i) What is the source of such waves?
- (ii) Does such wavebreaking give rise to a circulation of the right sense?
- (iii) Why is the circulation weakest in summer?