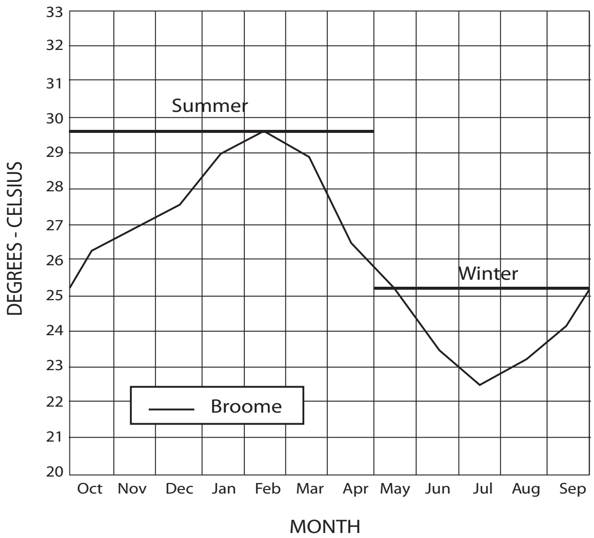

Figure 5.75. Extreme monthly 24-hour persisting dew-point temperatures for Broome and the standard extreme persisting dew-point temperatures for the GTSMR seasons

double-count it. The convergence intensity data (section 5.5.3.3), which present rainfall intensity assuming Australia is flat, serves to remove the effect of topography on rainfall. The existing information on maximum persisting dewpoints can be used to help remove the effect of moisture based on the following hypothesis:

$$R_c \approx \text{Smooth IFD}_a \# \left(\frac{\text{EPW}_{\text{Australia}}}{\text{EPW}_a}\right)$$

where R_a is the residual IFD value at point a; Smooth IFD_a is the flatland IFD value at point a; $\text{EPW}_{\text{Australia}}$ is the depth of precipitable water equivalent to the extreme 24-hour persisting dewpoint for Australia (the extreme 24-hour persisting dewpoint at Broome being chosen as it has the highest dewpoints in Australia at a reliable station, 29.5°C ⇔ 118.9 mm); EPW_a is the depth of precipitable water equivalent to the extreme 24-hour persisting dewpoint at point a.

Having standardized the IFD information for topography and moisture, what remains is any residual geographic variation due to other effects such as distance from the coast, distance from the equator, and the effect of barriers to preferential flow, along with any other more subtle variations.

To get the residual IFD data into a form that is usable, it is scaled into an amplitude factor based on supporting data (sea surface temperature (SST) and observed events). The distribution of amplitude is also smoothed to remove noise. The distribution of the resulting factor, known as the decay amplitude, is shown in Figure 5.76.

An important element of scaling and smoothing the data was the choice of where to position the southernmost latitudes for unmodified storms (and their coastal intersections), that is, those with a decay factor of 1.0. This was made partly on the basis of SST information, making the conservative assumption that the 25°C–26°C isotherm in SST is approximately the ocean temperature at which a tropical cyclone above the ocean can maintain its full potential. The latitude of this isotherm is therefore used to indicate where the southern extent of unmodified storm strength should lie. The basic asymmetry between the east and west coast in terms of the amplitude is replicated in the SST data.

Also considered was the location of some of the larger tropical cyclones that have reached higher latitudes. As part of the smoothing process, an example on the east coast was used to confirm the southern extent of the 1.0 value of the decay amplitude whilst a west coast example confirmed that the 1.0 value boundary should extend slightly further south.

5.5.3.6 Enveloping the depth–area–duration curves

The final step in generalizing the GSAM and GTSMR storm databases was to draw an enveloping curve to each standard-duration set of maximized, standardized convergence component depth–area curves for storms within the same PMP method region and

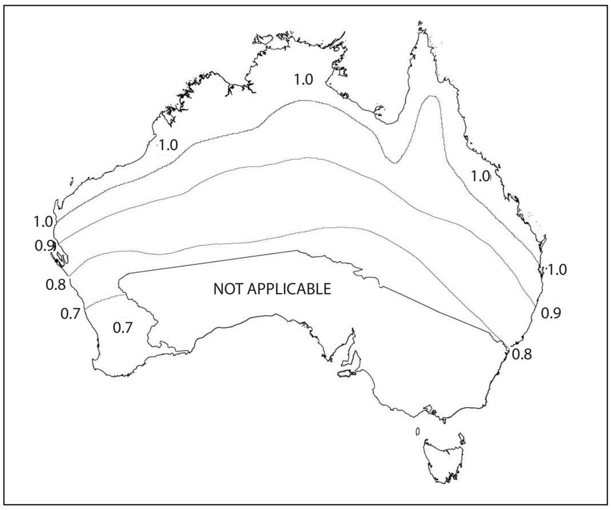

Figure 5.76. The distribution of amplitude factors defining the degree of mechanism decay expected over the GTSMR zone