zone. Enveloping effectively creates a single hypothetical storm of maximum moisture content and maximum efficiency from the database, that is, the standard convergence component of a PMP storm. The envelopment process can be best depicted visually (see Figure 5.77).

The drawing of the enveloping curves was carried out in a similar manner for the two generalized methods. Enveloping curves were drawn over the depth–area information to represent the theoretical maximum depth for each of the method zones and their relevant season across the range of standard durations. The next step was to combine all the depth–area curves for a particular zone onto a single plot. The curves were smoothed to remove inconsistencies or unlikely scenarios such as having a lower rainfall depth at a longer duration. Generally, the 24-hour, 48-hour and 72-hour curves were used to guide decisions on adjusting the shape of other curves as these are the most reliable, being based on the largest quantity of data. The enveloping process was designed to remove inconsistencies in depth and it was an iterative process.

As part of the GSAM development, the influence of the density of rain gauges on isohyets was tested. A data analysis of storms was used to establish the adjustment coefficient of small-area rainfall depth shown in Table 5.26. A similar test of storm analyses from the GTSMR database did not show any clear trends so no such adjustment was applied.

In total, 57 envelope curves were constructed for the GSAM: eight durations for each of the two zones and four seasons, except for inland spring for which there was only one recorded storm and therefore one curve, at 24 hours. The GTSMR produced 25 envelope curves: six durations for each of the three zones, plus an additional duration for the coastal summer zone and the coastal zone having curves for two seasons.

5.5.4 PMP estimation technique for a particular watershed

The final stage in the development of the two generalized methods was the establishment of a general technique for estimating PMP from the envelope curves of the generalized storm database. To estimate the PMP of a catchment, the catchment-specific features of the PMP storm must be derived and combined with the convergence component of the PMP storm as derived from the design DAD curves for the appropriate method, zone, season and duration. The catchment-specific features of the PMP storm were identified as:

(a) storm type;
(b) topographic influences;
(c) local moisture availability;
(d) mechanism decay (for the GTSMR only).

The features are interrelated, as are the techniques developed for reconstructing them.

5.5.4.1 Catchment area and location

An accurate specification of the catchment location is required to determine which of the generalized methods to apply and into which geographic application zone it falls. The catchment boundary and

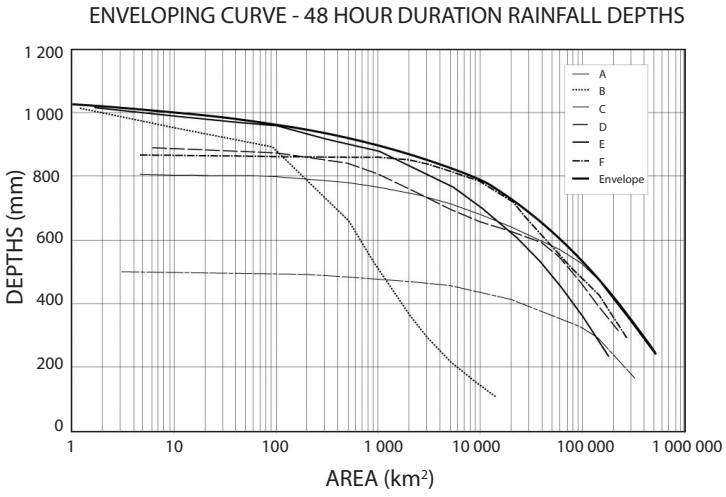

Figure 5.77. An example of the enveloping process for a set of storms (A–F) defined by depth-area curves of their convergence component