It should be kept in mind that the procedure described generally applies only to mid-latitude basins of no more than around 50 000 km^2. Also, since it is very unlikely that a project basin will have experienced all the outstanding storms of the region in which it lies, storm transposition is always required. When developing the PMP estimate for a basin, a range of storms with areas both larger and smaller than the basin should be considered for all durations so the appropriate degree of envelopment is achieved (section 2.8.2).

2.9.2 Procedural steps

The steps are as follows:

(a) Using weather, topographic, and preliminary total-storm isohyetal maps, determine the explicit transposition limits of storms, as described in section 2.5.

(b) Survey precipitation records to obtain outstanding storms on record within the region of transposability.

(c) Make DAD analyses of the storms selected in (b), as described in *The Manual for Depth–Area–Duration Analysis of Storm Precipitation* (WMO-No. 237). The results of the analysis for each storm are tabulated as shown in Table 2.2. (The DAD analysis of storm precipitation is a lengthy and tedious process even when done by computer. A ready file of storm DAD data is a great convenience in making PMP estimates. Some countries maintain a ongoing DAD analysis programme that accumulates a file of DAD data for both old storms on record and new storms as they occur. DAD data for storms in the area of transposability may be readily selected from such files, thus eliminating (b) and (c).)

(d) Determine the representative persisting 12-hour dewpoint for each appropriate storm, as described in section 2.2.4. Since this dewpoint is usually outside the rain area (Figure 2.2), its distance and direction (or bearing) from the storm centre should be specified (section 2.6.1.1). If wind maximization is indicated (section 2.4), select also for each storm the maximum 24-hour average speed of the wind from the moisture-inflow direction. Multiply the precipitable water W that corresponds to the representative storm dewpoint by the wind speed to obtain the representative storm moisture-inflow index (Figure 2.13).

(e) Determine the highest maximum persisting 12-hour dewpoint on record for the location of the reference dewpoint for the transposition site, as described in sections 2.2.5 and 2.6.1.1. Since several storms of different dates and with different reference dewpoint locations must be transposed, it is recommended that the maximum dewpoints for the entire storm season and for the project basin and surrounding areas be determined at one time, as described in section 2.2.5. Preparation of maximum persisting 12-hour 1 000-hPa dewpoint maps, such as Figure 2.4, is advisable. Such maps have an additional advantage in that they yield some indication of the geographic variation of PMP values in a plains area.

If wind maximization is required, survey storm wind data for the highest maximum 24-hour average speed from the direction of the moisture source. Multiply the precipitable water W corresponding to the maximum persisting 12-hour 1 000-hPa recorded dewpoint for the storm by the maximum 24-hour average recorded wind speed for the same date to obtain the maximum moisture-inflow index, as in Figure 2.13. Again, it is recommended that the maximum moisture-inflow index be determined for the entire storm season at one time.

(f) Compute the combined transposition and maximization ratio of the precipitable water W for the maximum persisting 12-hour 1 000-hPa dewpoint from (e) for the storm date, or within 15 days of it (section 2.3.1), to the precipitable water for the representative persisting 12-hour 1 000-hPa dewpoint for the storm (section 2.6). If wind maximization is involved, compute the ratio of the maximum moisture-inflow index to the representative storm moisture-inflow index.

(g) Multiply the values for various appropriate areas using DAD data (such as in Table 2.2) for each storm by the appropriate precipitable-water or moisture-inflow index ratio, as determined in (f).

(h) Plot graphs of the transposed maximized DAD values determined in (g), as shown in Figures 2.10 and 2.11, and insert envelope curves. Use envelope curve values to construct DAD curves of PMP, as shown in Figure 2.12. Although not mandatory, storms providing control points on the PMP curves should be identified, as indicated in Figure 2.12. This will assist with selecting actual storm patterns from