of the same grid on all maps is advisable as it will minimize the work involved in storm transposition.

The fineness or coarseness of the grid depends on the topography. In very flat regions, a grid of 2 latitude degrees by 2 longitude degrees may be adequate. In mountainous regions, a 0.5 degree grid may be too coarse. It is not necessary to have a uniform grid over an entire region. If a region includes both flat and somewhat complex terrain, a coarse grid may be used over the flat area and a fine one over the less flat regions.

5.2.2.1.2 *Storm transposition limits*

In this technique, the explicit transposition limits of all storms important for determining the PMP estimates for a region are outlined on a series of maps. As with the grid point system, several base maps are required in this technique to ensure that the range of area sizes and durations is adequately represented. The storm values are then transposed to a number of representative points along their explicit transposition limits. In some cases, supplementary values are determined within the region defined by the explicit transposition limits. The number of points selected depends upon the gradient of the transposed rainfall amounts.

5.2.3 **Data smoothing (envelopment)**

In the preparation of a series of generalized PMP charts for a region, it is important that consistency of estimates be maintained within and between the various charts. It is unrealistic to expect variation in PMP between different durations and sizes of area to be irregular and erratic, and smoothing of computed PMP values is justified. Smoothing is in fact mandatory if consistency is to be achieved. The smoothing techniques used are similar to those described in section 2.8. This smoothing is termed implicit transposition.

5.2.3.1 **Data smoothing (envelopment) for grid point technique**

In use of the grid point method, depth–duration and then depth–area smoothing are completed first. Then, the areally and durationally smoothed values are plotted on maps and regional smoothing done.

5.2.3.1.1 *Depth–duration smoothing*

In depth–duration smoothing, maximum adjusted rainfall amounts for various durations and a specified size of area for each maximized and transposed storm applicable to a particular grid point or location are plotted on a depth–duration diagram. Figure 2.10 is an example of such a diagram for 2 000-km^2 values at one grid point. The data plotted are the largest maximized rainfall values for each duration, and a smooth curve is drawn to envelop these values.

5.2.3.1.2 *Depth–area smoothing*

Smoothing and envelopment across area sizes is similar to depth–duration smoothing. Here maximum adjusted rainfall values for various sizes of area and a specified duration for each maximized and transposed storm applicable to a particular grid point or location are usually plotted on a semi-logarithmic graph, with size of area being plotted on the log scale. Figure 2.11 shows such a plot for 24-hour PMP. The data plotted at 2 000 km^2 are the same data used in Figure 2.10 for the 24-hour duration.

5.2.3.1.3 *Combined depth–area–duration smoothing*

Depth–area and depth–duration smoothing is sometimes performed in one operation. This is normally done by plotting the data for various durations and sizes of area on one chart like that of Figure 2.12, with each plotted point being labelled with the appropriate storm identification and duration. Smooth isopleths are then drawn.

The combined smoothing procedure is sometimes confusing because of the relatively large amount of data plotted for each duration and size of area. The procedure is simplified by first subjecting the data to separate depth–duration and depth–area smoothing as described in sections 5.2.3.1.1 and 5.2.3.1.2 The values plotted on the combination chart are then taken from the enveloping depth–duration and depth–area curves. There is then only one value for each duration and size of area, as shown in Figure 2.12.

5.2.3.1.4 *Regional smoothing*

Isohyets of PMP are drawn to the smoothed storm rainfall values plotted at grid points on a map of the study region. Limits of transposition of storms will usually result in discontinuities between some adjacent grid points. Regional smoothing must, therefore, take into account the effect of an extreme storm beyond the limits of its area of transposability. This regional smoothing is termed implicit transposition. In drawing smooth isohyets, meteorological factors – such as moisture source, storm