non-orographic drainages of the eastern United States. This recommended pattern is shown in Figure 5.5. The pattern should be centred over a drainage to obtain the hydrologically most critical runoff volume. Since most drainages have irregular shapes, the pattern shape in Figure 5.5 will not fit exactly over any individual drainage, so there will generally be portions of the drainage that will not be covered by the pattern for a particular area size of PMP. The precipitation that lies outside the area of the PMP pattern is termed residual precipitation. It should be emphasized that residual precipitation is outside the area of the defined PMP storm pattern (section 5.2.7.5), but not necessarily outside the drainage. This residual precipitation is considered in developing the average depth over the basin and in the computations for any resulting flood hydrograph.

Table 5.1. Shape ratios of isohyetal patterns for 53 major rain events in the eastern United States_ (Hansen and others, 1982)

	Shape ratio								
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*Total*
Percentage of total	3.8	41.5	20.8	20.8	7.5	3.8	1.9	0	100
Accumulated percentage	4	45	66	87	94	98	100	100	

5.2.7.3 Isohyetal orientation

It is possible to place the isohyetal pattern of the PMP storm over the drainage in any direction. However, thismay not be meteorologically reasonable. In the eastern United States, the question was examined to determine if there were preferred orientations for major storms in the region. Figure 5.6 shows the resulting analysis of preferred orientations for major storms in the eastern United States, based on the orientation of several hundred large storms. In addition to the isolines of preferred orientations, the orientations of 31 selected major storms are shown. Because of the variability in the observed orientations of storms, any orientation within ±40° of the isolines shown on the map was considered to be within the preferred orientation of major storms.

In the application of PMP to the specific drainage, therefore, full value of PMP was used for the range of orientations within ±40° of the value read from the map (Figure 5.6). Beyond this range of orientation some reduction of the PMP would be expected. The percentage reduction was determined from the examination of major storms. Within various storm regions, the amount of precipitation in major storms was expressed as a percentage of the maximum value within that region (the value that was associated with the preferred orientation) and plotted on a series of graphs (not shown). These graphs were used to develop the relation for determining the adjustment factor to apply to isohyetal values (Figure 5.7). No reduction was applied to storms of less than 777 km^2, since this area was considered to

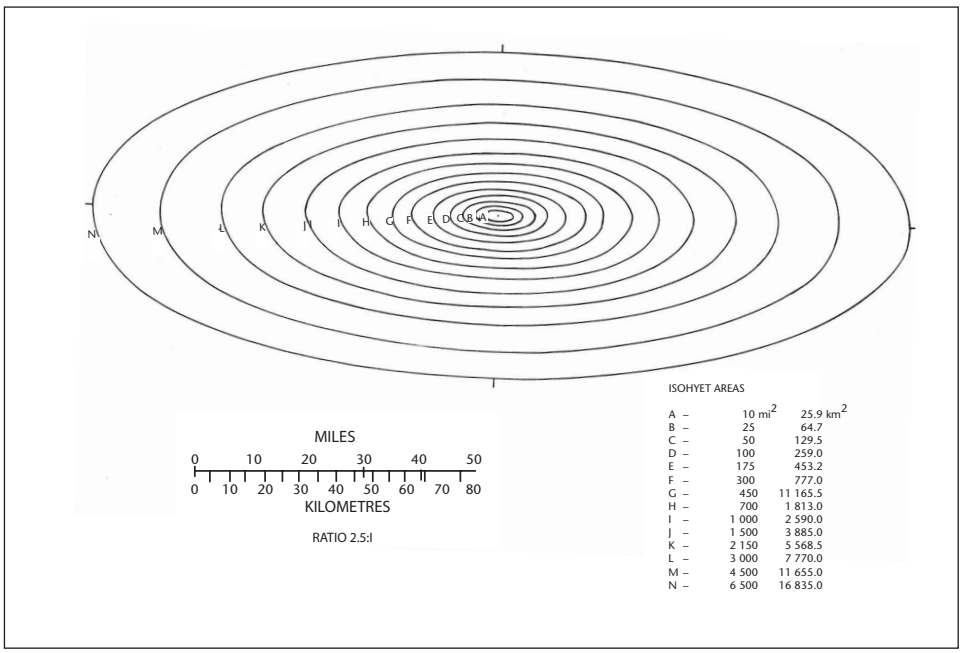

Figure 5.5. Standard isohyetal pattern recommended for spatial distribution of PMP for the United States east of the 105th meridian (Hansen and others, 1982)