

as class-two estimation results of PMP at the calculation point.

5.6.6 Drawing 24-hour point PMP isoline maps

5.6.6.1 Analysis and determination of statistical results

The following analyses should be performed on the various PMP estimates at each station to select a consistent value.

- (a) The relative reliability of each result should be assessed from perspectives such as data availability and assumptions of method, and the results of estimation by various methods at the same place should be analysed.
- (b) The rationality of the regional distribution of PMP estimates in different places should be analysed by comparing the distribution map of records of the largest storms observed or surveyed, the distribution map of the isolines of storm statistical parameters or the precipitation with a particular frequency (100-year or 10 000-year return period) and the distribution maps of factors such as meteorology and orography that are related to the formation of storms.

5.6.6.2 Steps in drawing isoline maps

The main steps in drawing isoline maps were as follows:

- (a) Most provinces selected the centres of large storms observed or surveyed. After calculations with multiple methods and then comprehensive analysis, 24-hour PMP values of these point rainfalls were determined and used as values of supporting points.
- (b) The values of the supporting points were used to determine corresponding values of locations of rainfall stations according to certain correlations. Then provincial isoline maps were drawn and used as the initial estimates.
- (c) The rationality of the initial estimates were analysed and isoline maps of various statistical parameters were compared to adjust them and draw correction maps.
Some provinces directly selected a large number of calculation points, performed estimations with multiple methods, and then adopted selected values as the points for drawing isoline maps. Then they performed a rationality check and correction and drew correction maps.
- (d) The country was broken down into nine sections, with each section containing three to

five provinces. The correction maps of all the provinces were pieced together; magnitudes of PMP of the provinces were harmonized along with isoline values and trends in border regions; isoline maps of all the provinces were modified; 24-hour PMP isoline maps of all the points in all the sections were drawn.

- (e) Finally, isoline maps of all the sections were adjusted and pieced together to create the national isoline map. Figure 5.80 shows the 24-hour point PMP isoline map of China.

5.6.7 Application of the 24-hour point PMP isoline map

The 24-hour point PMP isoline map of China is applicable to watersheds with areas less than 1 000 km². Firstly, probable maximum point storm rainfalls of the design time intervals of the watershed where the study project is located are calculated based on the isoline map. Then, the corresponding areal mean rainfalls of the time intervals on the corresponding given watershed area are calculated based on the point–area relationship of the storm. Finally, the temporal distribution of PMP is determined based on a certain typical or generalized map.

The calculation of PMP of t points of design time intervals is conducted as follows:

$$\text{PMP}_t = \text{PMP}_{24} \# t^{1-n}$$

where n is the storm degression index, which is a term used in Chinese hydrological engineering and is the exponent n in the relation

$$a_{t,p} = \frac{s_p}{t^n}$$

where s_p is the average rainfall intensity in one hour with probability p ; and $a_{t,p}$ is the average rainfall intensity in t hours with probability p .

While completing the 24-hour point PMP isoline maps in their own regions, all the provinces offered a set of auxiliary charts for the DAD relation and the temporal distribution of storms in their regions for use in project designs. Table 5.28 shows the point–area relation of storms in Henan Province, China.

5.7 NOTES

Generalized or regional estimates of PMP are representative for individual basins having topographic features similar to the generalized topography used