used: storm meteorological factor maximization, statistical estimation and storm frequency analysis. A rational value was selected as the result that was adopted.

5.6.2 24-hour extraordinary precipitations in China

120 000 station years of observed rainfall data from Chinese hydrological and meteorological departments were processed and studied. Extremes of maximum 24-hour point rainfalls exceeded 500 mm, which all occured east of 103 °E. Among these, the largest is 1 748.5 mm, which occurred at Mount Ali, Taiwan, in 1996; records in Hainan Province and Guangdong Province also exceeded 900 mm. Records at multiple points in the west and north of the Sichuan Basin exceeded 400 mm, with a maximum of 578.5 mm. However, the difference between values in the south and north of China is not large. Maximum 24-hour storm rainfalls observed along the Haihe River, the Yellow River and the Huaihe River in the north of China exceeded 700 mm, while the record of maximum 24-hour rainfalls in north-east China (north of 40 °N) reached 657.9 mm. Orography has small effects on the average of short-duration storms, but it has strong effects on the average distribution of mid- to long-duration storms (Wang J., 2002). Studies of relations between extremes of short- and long-duration storms and orography in China had the same conclusions (Zhang, 1988).

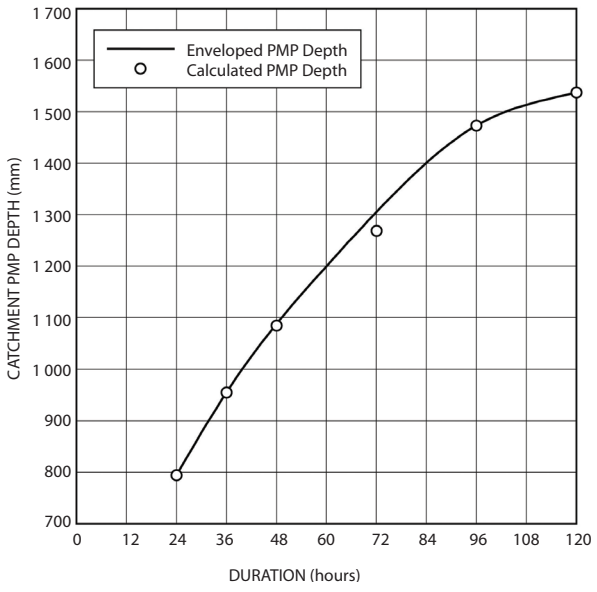

Figure 5.78. Enveloping process to define PMP depth across a range of durations for a specific catchment area

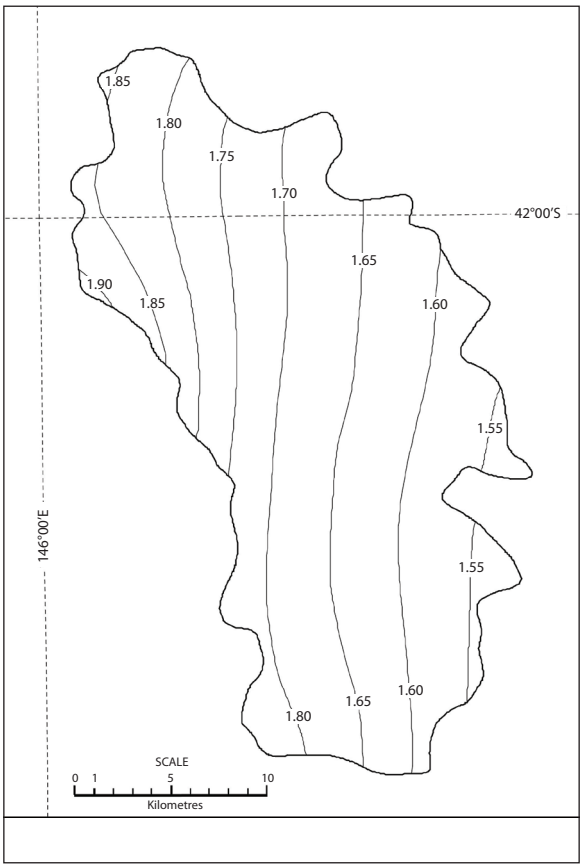

Figure 5.79. Example of a GSAM design spatial distribution

Data on more than 100 large storms were used in the study. Those data were all results of timely and careful surveys and therefore were reliable. For example, five surveys and re-surveys were performed (Zheng and others, 1979). It was validated that 8–12 hour rainfalls at five places in Wushenqi, which is on the border between Inner Mongolia and Shaanxi Province, exceeded 1 000 mm between 9 a.m. 1 August and 6 a.m. 2 August, 1977. Among these, the 8-hour rainfall reached 1 050 mm in the village of Shilanaohai. Some surveyed rainfalls were more than twice as high as the records of storms observed nearby, with some even exceeding world-wide records.

Provinces such as Henan, Shaanxi, Sichuan and Guizhou used results of historical flood surveys to trace values or magnitudes of historical storms. Those data are valuable references for regions that are short of data on large storms. Valuable storm information can be found from historical literature.

Based on processed data on storms and meteorological factors, as well as isoline maps that are drawn with the statistical parameters of storms, a