There are two methods of maximization, as follows:

(a) The first method is the same-multiple maximization, that is, the entire storm process is maximized using the product of the efficiency ratio and the moisture maximization ratio in a particular time interval. The method is applicable to determining PMP for up to 12 hours.
(b) The second method is the per-time-interval control and maximization, that is, the maximum efficiency in each time interval is found on the efficiency–time relation graph and then the control and maximization is performed for each time interval. The method is applicable to determining PMP for durations longer than 12 hours (Table 7.4 and 7.5).

7.3.5 Example calculations

An analysis using the same-multiple maximization method over the San-Hua region on the Yellow River is presented as an example.

7.3.5.1 Deducing qualitative characteristics of PMP storm models

This step directly makes use of the results from 7.2.5.4, which are summarized in Table 7.1.

The storm duration is set to be 5 days.

7.3.5.2 Model selection

The top three observed floods in the San-Hua region – occurring in August 1954, July 1958 and August 1982 – show similar characteristics as Table 7.1, so they can all be selected as representatives for the local model. The July 1958 storm, which formed the largest peak flood, is regarded as the main storm for the local model. The areal mean rainfall amount of the 5 days is shown in Table 7.2.

The storm has a recurrence period of about 50 years, so it is not a high-efficiency storm. As a result, the moisture factor and the dynamic factor both need to be enlarged.

7.3.5.3 Selection of dewpoints

Dewpoints representative of the storms are selected and traditional methods are used to calculate the average moisture from the stations on the inflow side of the storm, just at its edge.

The representative dew point (1 000 hPa) of the July 1958 storm is 24.4°C.

7.3.5.4 Calculating the efficiency of the typical storms

The daily maximum precipitation efficiency in the San-Hua region is calculated using Equation 7.2. The average elevation of the San-Hua region watershed is 655 m (194 grid points are calculated). The calculated efficiency is 3.35 %/h (Table 7.3).

7.3.5.5 Determining maximization parameters

Since data on storms observed in the San-Hua region are not adequate, frequency analysis methods are used to determine the probable maximum moisture and dynamic factors.

After calculation, the average of representative dewpoints of the storms is 24.1°C, the coefficient of variability C_v is 0.04, the deviation coefficient C_s is $2C_v$ and the 100-year value is 26.5°C. The average daily maximum efficiency is 2.46 %/h, C_v = 0.50, C_s = $3C_v$ and the 100-year value is 6.60 %/h.

7.3.5.6 Calculating maximization amplification

The calculation of moisture amplification K_W, efficiency amplification K_η, and a combined amplification $K_{W\eta}$ is shown in Table 7.4.

7.3.5.7 Maximizing typical storm

To get the 5-day PMP for the San-Hua region watershed use the joint maximization amplification of moisture and efficiency $K_{W\eta}$ = 2.37 (Table 7.4) to maximize daily rainfalls (Table 7.2) of the selected typical storm (Table 7.5).

Note that the same calculations were done on the 1954 and 1982 typical storms but these are omitted here.

Table 7.2. The areal mean rainfall amount of the July 1958 storm in the San-Hua region on the Yellow River

	Date (in July 1958)					*Total*
	14	*15*	*16*	*17*	*18*	
Rainfall amount (mm)	7.2	34.1	61.7	13.1	30.0	146.1