

included in this manual), average trough-ridges and locations of subtropical anticyclones in the East Asia region were very similar. After the combination, mid-latitude areas maintained the dual-ridge and single-trough circulation type. This indicates that after the similar process substitution, the circulation type did not vary greatly, indicating that such a combination was possible and rational. Meridional circulations of the combined average circulation field were enhanced, which was favourable for the north–south exchange of cold and warm air and the enhancement of storm intensity.

7.5.5.1.5 Maximization of combination model

The 10-day rainfall of the combined storm was 177.1 mm, which was 34.1 per cent larger than the

typical-year 10-day rainfall (132.1 mm). Nonetheless, it was smaller than the 10-day storm rainfall (215 mm) of the historically largest flood, which occurred in 1750. The combined storm also didn't reach the PMP magnitude of the 1750 flood peak (16 000 m³/s at the Jiajiu station), so it was necessary to maximize physical factors.

Based on watershed characteristics and meteorological data, the moisture inflow index method (introduced in section 2.4.3) was used to maximize both the August 1966 storm and the July 1972 storm by 3 days. The ultimate 3-day PMP of the combined storm was 127.4 mm, while the 10-day PMP was 280 mm (Table 7.8). The latter was inconsistent with the post-moisture-maximization result of the back-induced 10-day storm rainfall of the 1750 flood,

Table 7.7. Table of typical storm process sequence in Manwan in 1966

Date	August 1966										Total
Item	21	22	23	24	25	26	27	28	29	30	
Areal rainfall (mm)	14.1	23.1	18.2	21.6	9.6	5.4	10.6	7.8	7.1	13.2	132.1
Circulation type	Dual-ridge and single-trough										
500 hPa	Shearing				Southern sub-trough shearing vorticity			Shearing trough (vorticity)			
Weather system	700 hPa	Shearing vorticity				Shearing vorticity			Shearing		
	Ground	Tibet monsoon depression				Plateau cold front and Burma monsoon depression			Burma monsoon depression and plateau cold front		

Table 7.8. Table of combined storm process sequence using similar process substitution method for the 1966 typical storm in Manwan

Date	August 1966				July 1955			July 1972			Total
Item	21	22	23	24	22	23	24	24	25	36	
Areal rainfall (mm)	14.1	23.1	18.2	21.6	10.1	28.6	15.6	12.5	18.5	14.8	177.1
Circulation type	Dual-ridge and single-trough				Dual-ridge and single-trough			Dual-ridge and single-trough			
500 hPa	Shearing				Low trough (vortex)			Shearing trough			
Weather system	700 hPa	Shearing vorticity				Shearing vorticity			Shearing		
	Ground	Tibet monsoon depression				Burma monsoon depression			Ground plateau cold front and Tibet monsoon depression		
PMP (mm)	14.1	46.8	36.8	43.8	10.1	28.6	15.6	23.1	34.1	27.6	280.0