where R_{VT} is the vertical transposition adjustment; TE is the transposed/barrier elevation: the elevation of the transposed location or any higher barrier to moist airflow; $W_{P_{\max,TL,SE\,!\,300}}$ is the precipitable water associated with the maximum persisting 12-hour 1 000-hPa dewpoint considering one-half the increase (decrease) in precipitable water for the difference in elevation greater than ±300 m from the storm/barrier elevation; and $W_{P_{\max,TL,SE}}$ is the precipitable water associated with the maximum persisting 12-hour 1 000-hPa dewpoint above the transposed barrier elevation.

In the storm being considered here, the vertical moisture adjustment would be:

$$R_{VT} = 0.50 + 0.50R_{VT} = 0.50 + 0.50 = 0.92$$

In this method, adjustments for moisture maximization and horizontal transposition are treated separately and are done in the manner previously described.

Other storms are adjusted similarly by appropriate ratios, and the results are then treated as described in sections 2.8 and 2.9.

2.7 SEQUENTIAL AND SPATIAL MAXIMIZATION

2.7.1 Definition

Sequential and spatial maximization involves the development of hypothetical flood-producing storms by combining observed individual storms or rainfall bursts within individual or separate storms. The combination is carried out by hypothesizing critical sequences with minimum time intervals between individual events (sequential maximization), which also may be repositioned or geographically transposed (spatial maximization).

2.7.2 Sequential maximization

Sequential maximization is the rearrangement of observed storms or portions thereof into a hypothetical sequence such that the time interval between storms is at a minimum. The storms may have occurred in close succession, or they may have occurred years apart. The procedure is most often used for large basins, where outstanding floods result from a sequence of storms rather than from a single event. For small basins, where rainfall for one day or less may produce the maximum flood, sequential maximization may involve the elimination or reduction of the time interval between successive bursts in the same storm or in separate storms.

The initial step for sequential maximization is the same for large or small basins. In each instance, a thorough study of the meteorology of major storms in the area of interest is required (Lott and Myers, 1956; Myers, 1959; Weaver, 1962, 1968). Storm types associated with heavy rainfalls in or near the project basin are determined: movement of surface and upper-air lows and highs are examined; depth, breadth, and direction of moisture inflow are determined; vorticity advection is investigated; etc. It is usually impossible to study all major storms with the same degree of detail. In the case of older storms, for example, upper-flow patterns must be estimated from surface data.

The next step is to determine the storm sequences in and near the project basin. For large basins, storm sequences should be examined to determine the shortest reasonable time interval between individual storms of various types. The minimum time interval, usually measured in days, should be determined for each combination of storm types producing heavy precipitation. This interval is a critical factor in the hypothetical storm sequence established. For small basins, the procedure is similar, but concentrates on the interval, usually measured in hours, between bursts in individual storms. In some instances, the combination of bursts from separate storms is a possibility, and the time interval between similar storm bursts should be considered.

After storms have been examined and reasonable minimum time intervals between them determined, pairs or sequences of storms or bursts are developed. Each pair of storms, or individual bursts within a storm for small basins, is examined carefully to insure that meteorological developments following the first storm or burst – that is, movement of lows and highs, overrunning of the basin by cold air, etc – would not prevent the succeeding storm or burst from occurring within critical time limits.

If all the important features of the weather situation at the beginning of the second storm can be developed in a logical manner over a sufficiently large area, the necessary conditions for its onset will have been met. The successive hypothetical synoptic weather maps for the interval between storms or bursts are patterned to the greatest extent possible after the actual maps following the first storm or burst and preceding the second. Synoptic features – such as highs, lows and fronts – are allowed to move and change as indicated by