extent for the basin, and the fact that at a given time slopes in only one direction can be maximally effective. This procedure was to analyse depth-area relations of most orographically influenced rainfalls from major storms of record in the region. Figure 5.40 shows the variation of orographic PMP with basin size developed from these storms.

5.3.5.3 Durational variation

Variation of orographic precipitation with duration depends on the durational variation of winds and moisture. The variation of maximum 6-hour incremental winds at the 500-hPa and 900-hPa pressure levels for Tucson, Arizona, were used as a guide for the durational decay of wind. The durational variation of maximum moisture was based on consideration of the highest persisting 12-hour 1,000-hPa dewpoints for seven stations throughout the Colorado River and Great Basin drainages. The maximum persisting 1,000-hPa dewpoints for 6, 12, 24, 36, 48, 60 and 72 hours for each of 12 months at each of seven stations were expressed in centimetres of precipitable water assuming a saturated atmosphere with a pseudo-adiabatic lapse rate. This dewpoint variation was combined with wind decay for the total durational variation for orographic PMP (Figure 5.41). For locations between the two latitudes shown, a linear interpolation was recommended. These durational decays were verified by comparison with variation in precipitation in major storms in the south-western part of the United States. Another comparison was to develop ratios of maximum observed 6- to 24-hour and

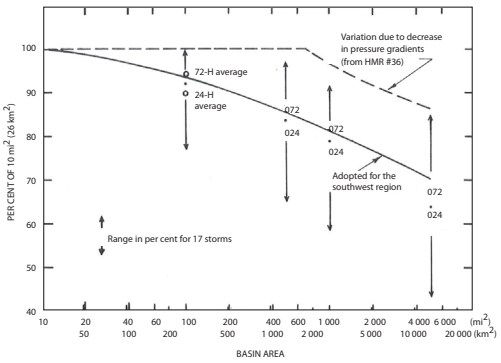

Figure 5.40. Variation of orographic PMP with basin size for Colorado River and Great Basin drainages (Hansen and others, 1977)

72- to 24-hour precipitation. These comparisons confirmed the adopted durational variation.

5.3.5.4 Combination of orographic and convergence PMP

The orographic PMP discussed in the preceding sections can be computed for any basin in the Colorado River and Great Basin drainages of south-western United States. This orographic component of PMP is combined with the convergence component of PMP for the basin to obtain an estimate of total PMP. The convergence PMP is developed as discussed in section 3.3.4. In the development of the convergence component of PMP only those storms that are consistent with general storms that produced large orographic precipitation amounts are considered.

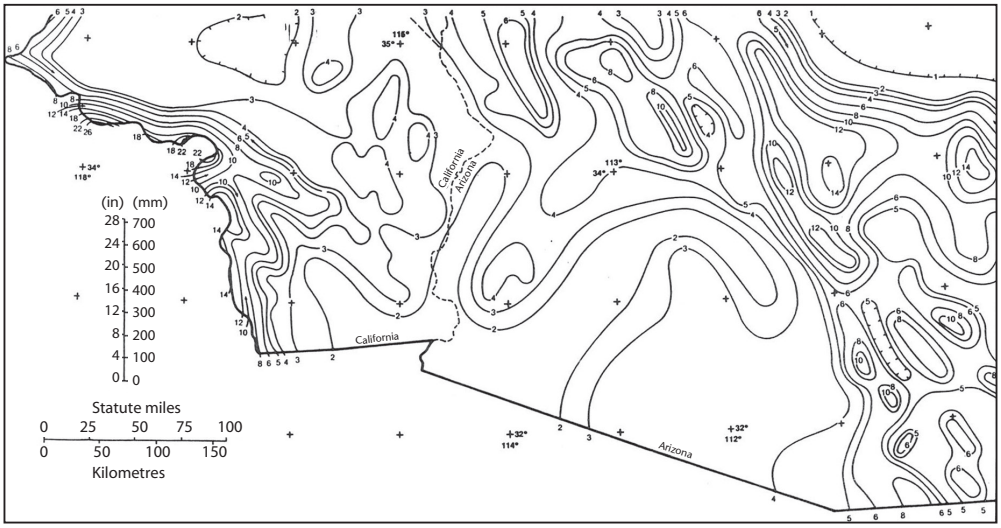

Figure 5.39. Twenty-four-hour 25.9 km2 orographic PMP (inches) for southern Arizona, south-western New Mexica and south-eastern California (Hansen and others, 1977)