the limited data available are unlikely to include extreme values of dewpoints or outstanding storms equivalent to those that would be observed over a long period of record. The heaviest recorded storms may be relatively weak, and their moisture inflow rates are likely to be less than those associated with maximum precipitation-producing effectiveness. Increasing both wind and moisture yields (to a higher degree of maximization than the moisture adjustment alone) compensates, at least in part, for an inadequate sample of observed data.

Wind maximization is sometimes used when the seasonal variation of maximum 12-hour dewpoints gives a false indication of the seasonal variation of PMP. This is most likely to occur in regions where summers are dry and all major storms are experienced in the cold half of the year. The dewpoint curve almost always peaks in summer, and the seasonal variation of maximum wind speeds must be considered in developing a representative seasonal variation curve of PMP (sections 2.10.3 and 2.10.4). In cases where this is done, individual storms are maximized for both moisture and wind, as described in sections 2.4.3, 2.4.4 and 2.10.2.

2.4.3 Winds representative of moisture inflow in storms

Low-level winds are generally used to estimate moisture inflow in storms because most of the moisture usually enters the storm system in the lowest 1 500 m. The winds in this bottom layer can be obtained from pilot-balloon or rawinsonde observations. The winds at 1 000 m and 1 500 m are perhaps the most representative of moisture inflow. Upper-air observations, however, have several shortcomings. They have relatively short records and cannot be used for maximizing the older storms. Pilot-balloon observations cannot be made in storms. Upper-air-wind observations are made at considerably fewer stations than surface-wind observations and are hence often inadequate for determining moisture inflow into small-area storms. For these reasons, surface data are often used as an index of wind movement in the critical moisture-bearing layer.

2.4.3.1 Wind direction

The first consideration in developing wind adjustments is the wind direction associated with moisture inflow during major storms. Only winds from those directions critical for inflow of moisture are considered in deriving wind-adjustment ratios. If more than one direction provides moist-air inflow, separate seasonal maximum wind-speed curves should be constructed for each direction. This is particularly advisable if the different wind directions bring in moisture for different source regions.

2.4.3.2 Wind speed

Various measures of wind speed have been used to develop wind maximization ratios. Among them are:

(a) average wind speed through the moisture-bearing layer computed from representative upper-air wind observations;
(b) average speed in the moist layer computed from two or three consecutive 6- or 12-hour upper-air wind observations; and
(c) average surface-wind speed or total wind movement for a 12- or 24-hour period at a representative station, the 24-hour period being preferred because of diurnal variations.

Only wind speeds from critical directions are considered (section 2.4.3.1). Wind observations during the 24-hour period of maximum rainfall are usually the most representative of moisture inflow to storms of that of longer duration. For storms of shorter duration, average winds need to be computed for the actual storm duration only.

2.4.4 Wind maximization ratio

The wind maximization ratio is simply the ratio of the maximum average wind speed for some specific duration and critical direction obtained from a long record of observations, for example, 50 years, to the observed maximum average wind speed for the same duration and direction in the storm being maximized. The monthly maximum average values obtained from the records are usually plotted against date of observation, and a smooth seasonal curve drawn so that storms for any time of the year may be maximized readily (Figure 2.13, part C). The maximum wind speeds used for maximization are read from the seasonal curve.

Wind records appreciably shorter than around 50 years are unlikely to yield maximum speeds reasonably representative of those obtained from a long record. Frequency analysis is advisable for such short records. The computed 50- or 100-year values, usually the former, are used to construct the seasonal variation curve of limiting wind speed.

Sometimes the moisture values (precipitable water), both maximum and storm-observed, are multiplied by the corresponding wind speeds to provide a