values are then adjusted for the variation in terrain effects throughout the region.

5.3.4.1 Storm separation method

In orographic regions, transposition of storms is generally limited to those places where the terrain and meteorological characteristics are the same as those at the place where the storm occurred. Concern for terrain homogeneity has restricted transpositions in most previous studies for orographic regions to very limited regions. In an effort to expand this region of transposability, it was desirable to identify the amount of precipitation from individual storms which resulted solely from atmospheric forces, termed free atmospheric forced precipitation (FAFP). The procedure assumes that in non-orographic regions the precipitation, or FAFP, would be solely the result of atmospheric forces. In orographic areas, the procedure assumes that the basic storm mechanism is unaffected when terrain feedback is removed. The method estimates the percentages of precipitations caused by topography and those caused by atmospheric dynamics based on analysis and assessment on observed precipitation data, isohyetal maps and the quantity and quality of all the existing meteorological data. Figure 5.31 is a flowchart of the method, details of which are outlined in Hyrdrometeorological Report (HMR) No. 55A (Hansen and others, 1988).

The first step is to select the area size and duration of interest (A/D category). The percentage of the storm precipitation resulting from topographic effects generally tends to increase with longer durations and larger area sizes. The first determination of the relation of the free atmospheric forced precipitation to orographic precipitation in a particular storm is based upon consideration of the observed precipitation amounts (Module 1). A comparison is made between the maximum observed precipitation in the non-orographic region to the maximum observed precipitation in the orographic region of the storm. Usually, as the difference between these two amounts decreases, the greater the convergence or FAFP in a particular storm.

A second evaluation is based on the storm convergence component of the isohyetal pattern (Module 2). The isohyetal pattern is compared with the terrain contours within the region. In this comparison, the higher the degree of correlation between topographic features and the isohyetal pattern in the region of the isohyet which encompasses the rainfall for the area of interest, the greater the amount of orographic precipitation within the storm.

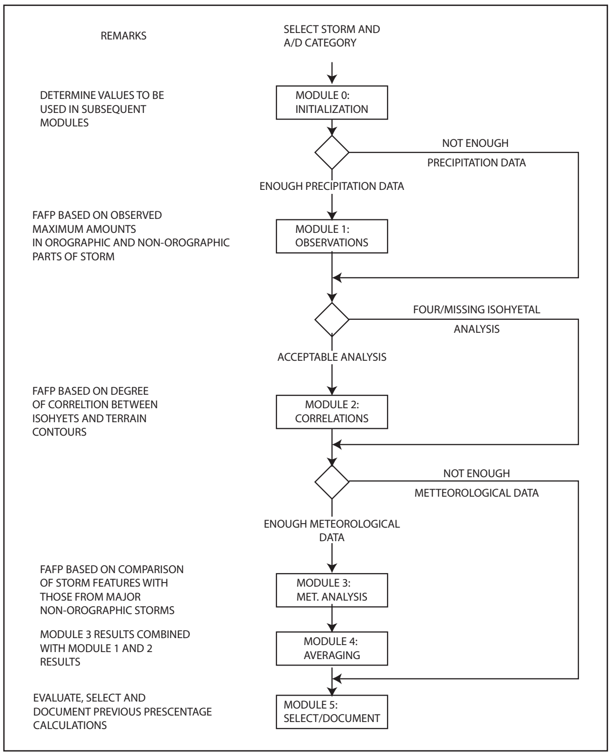

Figure 5.31. Schematic flow chart for storm separation method (Miller and others, 1984*b*)

A third method for evaluation of convergence involves a detailed consideration of the meteorological factors important in producing convergence precipitation (Module 3). Those factors present in the particular storm are compared with those present in major storms of record in non-orographic regions. Considerable effort should be expended in a detailed re-analysis of surface and upper-air charts where these may be crucial in estimating the percentage of convergence rainfall in a particular storm.

In the storm separation method, percentages are also determined by averaging the percentage obtained from use of the isohyetal analysis with that from the meteorological analysis and from the analysis of the precipitation observations with the meteorological analysis (Module 4). Five percentages are produced by this method if sufficient observational data, isohyetal and meteorological analyses are available. The selection of the final percentage is based on first quantifying the degree of confidence one has in how well the storm fits the assumptions underlying each step, and second on how well the data available for each step serve the purpose of that step. If percentages are considered equally reliable, the evaluation that results in the highest percentage of convergence or FAFP is chosen.