surrounding each storm centre, as shown in Figure 5.70. The standard areas chosen for the GSAM were 100, 500, 1 000, 2 500, 5 000, 10 000, 20 000, 40 000 and 60 000 km^2; the GTSMR added 100 000 and 150 000 km^2. The daily rainfall depths within each specified polygon were then averaged using an areal weighting technique. The result of this procedure was a series of daily (9 a.m. to 9 a.m.) percentages of the total storm depth, for each polygon area. The 3-hourly temporal distribution was then imposed on this daily distribution. This procedure thus provided a series of 3-hourly percentages of the total storm depth for each polygon area. Percentages at the exact standard areas were determined by interpolation between the polygon areas. The final step in the construction of the storm temporal distributions was to determine the maximum percentages of the total storm depth that fell within the standard durations of 6, 12, 24, 36, 48, 72, 96 and 120 hours, that is, the maximum 6-hour percentage, the maximum 12-hour percentage and so on. The GTSMR standard durations extend to 144 hours.

5.5.2.5 Depth–area–duration analysis

The maximum depth–area curve of each gridded storm was constructed by counting the number of grid points between evenly incremented isohyets from the maximum to the minimum isohyet, calculating the arithmetic mean rainfall per interval and determining a running-average rainfall depth and cumulative area over all intervals. The area calculations are based on the number of grid points counted and the known resolution of the grid. Once the depth–area curve for the total storm duration had been calculated, the depths at standard areas were determined by interpolation. These were then multiplied by the percentage depths in the storm temporal distributions as obtained in section 5.5.2.4 to produce a set of depth–area curves at standard durations and standard areas.

5.5.2.6 Storm dewpoint temperatures

To ensure that a storm dewpoint temperature is representative of the rain-producing airmass of a storm, surface dewpoint temperatures from a number of stations were averaged where possible. Suitable stations were either on the trajectory of the moisture inflow to the storm or in the area of the storm peak itself, and had recorded high dewpoint temperatures persisting over a period of 6 to 24 hours. Care was taken to ensure that these surface dewpoint temperatures were not contaminated by rain. Where the station elevation was above 100 m, the surfacedew points were reduced pseudo-adiabatically to 1 000-hPa values (United States Weather Bureau, 1951).

In the process of estimating a storm dewpoint temperature a considerable amount of judgement was required: in determining the moisture inflow direction, the influences of local topography, the timing of the precipitation process, the relevance of dewpoint temperature persistence, the

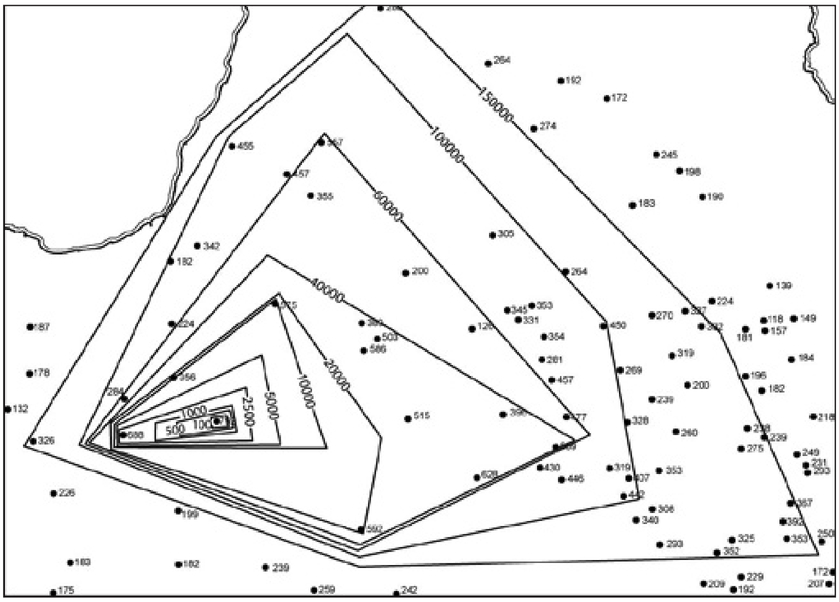

Figure 5.70. An example of a set of standard area polygons as applied to the 6-day storm, 18–23 January 1974