Table 5.26. Small-area adjustments used in the GSAM (percentage)

	Area (km²)				
	1	*10*	*100*	*1 000*	*10 000*
Inland (upper limit of values used)	50.0	37.5	25.0	12.5	0.0
Coastal (values used)	15.0	10.0	5.0	0.0	0.0

the area it encloses are required in order to obtain the convergence component from the appropriate DAD curves.

Catchment outlines can be hand-drawn on topographic maps, digitized and gridded. The area can then be calculated from the number of grid points within the catchment outline and the known resolution of the grid. More recently, catchment outlines are prepared and displayed via GIS and a script applied to calculate the area enclosed.

5.5.4.2 Convergence component PMP estimates

Once the catchment area and location have been determined, the standard convergence component envelope depths from the appropriate zonal database can be interpolated between the standard areas to the area of the catchment.

Transposition of the standard PMP convergence rainfall from the standard hypothetical location to the location of the catchment requires adjustment of the depths for the different moisture potentials of the two locations. A moisture adjustment factor (MAF) is calculated in an analogous fashion to the standardization factor: it is the ratio of the precipitable water at the catchment extreme dewpoint temperature to that at the standard extreme dewpoint temperature.

$$MAF = \frac{EPW_{catchment}}{EPW_{standard}}$$

where $EPW_{catchment}$ is the extreme precipitable water associated with the catchment extreme dewpoint temperature; $EPW_{standard}$ is the extreme precipitable water associated with the standard extreme dewpoint temperature.Since there are seasonal standard extreme dewpoint temperatures, four for the GSAM and two for the GTSMR, corresponding seasonal catchment extreme dewpoint temperatures are required. One technique is to take the centroid of the catchment as the catchment location and determine the seasonal extreme dewpoint temperatures for this latitude and longitude. A more recent practice is to derive catchment average values using GIS.

The envelope depths from each seasonal group were then multiplied by these catchment moisture adjustment factors. For each duration, a catchment PMP convergence depth was defined as the maximum of these depths across all seasons.

When applying the GTSMR to a catchment, the decay amplitude must be applied. Multiplying the convergence depth by this factor takes into account the geographic variation in the decay of the storm mechanism.

Thus the catchment PMP convergence component is obtained. The catchment-specific feature of the storm type is included by virtue of the zone in which the catchment is located and by virtue of the season which provides the greatest convergence depths at the area and location of the catchment for a given duration. Moisture content is included by virtue of the moisture adjustment factors for the catchment location. Finally, for catchments within the GTSMR region, the decay in the storm mechanism is included by virtue of the decay amplitude.

5.5.4.3 Estimating the topographic component of the PMP storm

The remaining adjustment that needs to be made in order to progress from the catchment PMP convergence component to the catchment PMP depth is to reconstruct the topographic component of the PMP storm at the catchment. The method for doing this is analogous to that for removing the same component for the storms in the database (section 5.5.3.3) and involves modifying the catchment PMP convergence component by the topographic adjustment factor (TAF).

$$\text{Catchment PMP depth} = \text{Catchment PMP convergence depth} \times TAF$$

where: $$TAF = \frac{\text{Total rainfall intensity}}{\text{Convergence rainfall insenity}}$$

However, because it was considered that the PMP event would have a greater convergence component than orographic component when compared with the storms in the database, which typically had an average recurrence interval of 50 to 100 years (see Klemes, 1993; Minty and others, 1996), some adjustment to the original TAF (section 5.5.3.3) was considered necessary. This was based