



CLIMATOLOGICAL NOTE NO. 13

DISTRIBUTION OF DRIVING RAIN
IN IRELAND

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Distribution of Driving Rain in Ireland:

Rainfall driven against a wall may be partially absorbed if the wall is porous or may penetrate through cracks in the wall. The effects of rain on a building are related to the speed of the winds and the intensity of the rain. The Driving Rain Index is the product of the Average Annual Rainfall and the Average Annual Windspeed. The Driving Rain Index map for Ireland described by Murphy, (1973) had been updated using more recent wind and rainfall data.

The Driving Rain Index Map was produced using 30 year averages of rainfall and 10m windspeed for the period 1977 to 2006. This period was chosen because in recent years a number of synoptic weather stations were closed or relocated, and there are almost complete wind speed measurements for 13 stations with a good geographical spread.

Average annual rainfall for the period is already available on a 1km grid, this has been produced by regression-kriging of data from approximately 500 rainfall stations. The Average annual rainfall for the 1977-2006 period is shown in Figure 1.

A 1km grid of average annual windspeed was produced as follows:

Wind speeds for each location were adjusted to standard surface roughness using the method described by Logue(1989). The gross dependence of windspeed on location and coastal exposure was removed by linear regression and the residuals interpolated onto a 1km grid by inverse distance weighted interpolation. The values of the regression equation at each grid point were added to the gridded residuals to produce the final wind field. A smoothed contour map of the average annual windspeed produced is shown in Figure 2.

The rainfall field was then multiplied by the wind field to produce the final index field. The 1km index field was rather noisy, to produce smooth contours some smoothing was necessary, each grid point was averaged with its 4 nearest neighbours. The final contouring was adjusted manually to produce Figure3.

Note: There is no windspeed information available for mountainous areas and no attempt was made to allow for increasing windspeed with height or topographic effects. It is likely that the index is higher in mountain areas than shown on the map, the variation of index with height shown in Figure 1 is due to higher rainfall in hilly areas.

References:

Murphy E.M, 1973: Distribution of Driving Rain in Ireland. *Climatological Note No. 3*, Meteorological Service, Dublin.

Logue, J.J.,1989: The Estimation of Extreme Wind Speeds Over Standard Terrain in Ireland. *Technical Note No. 51*, Meteorological Service, Dublin.

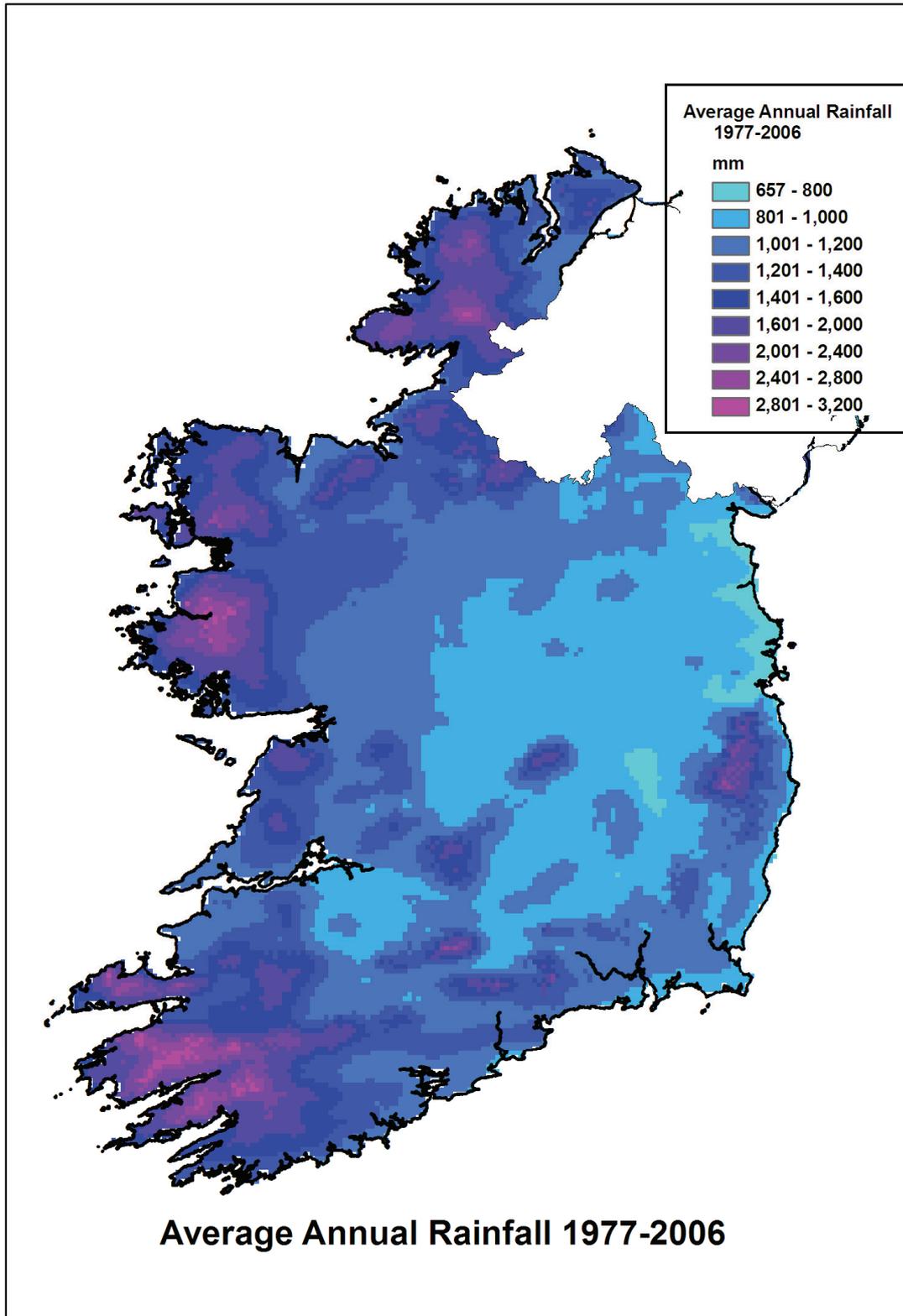


Figure 1
Average Annual Rainfall 1977-2006

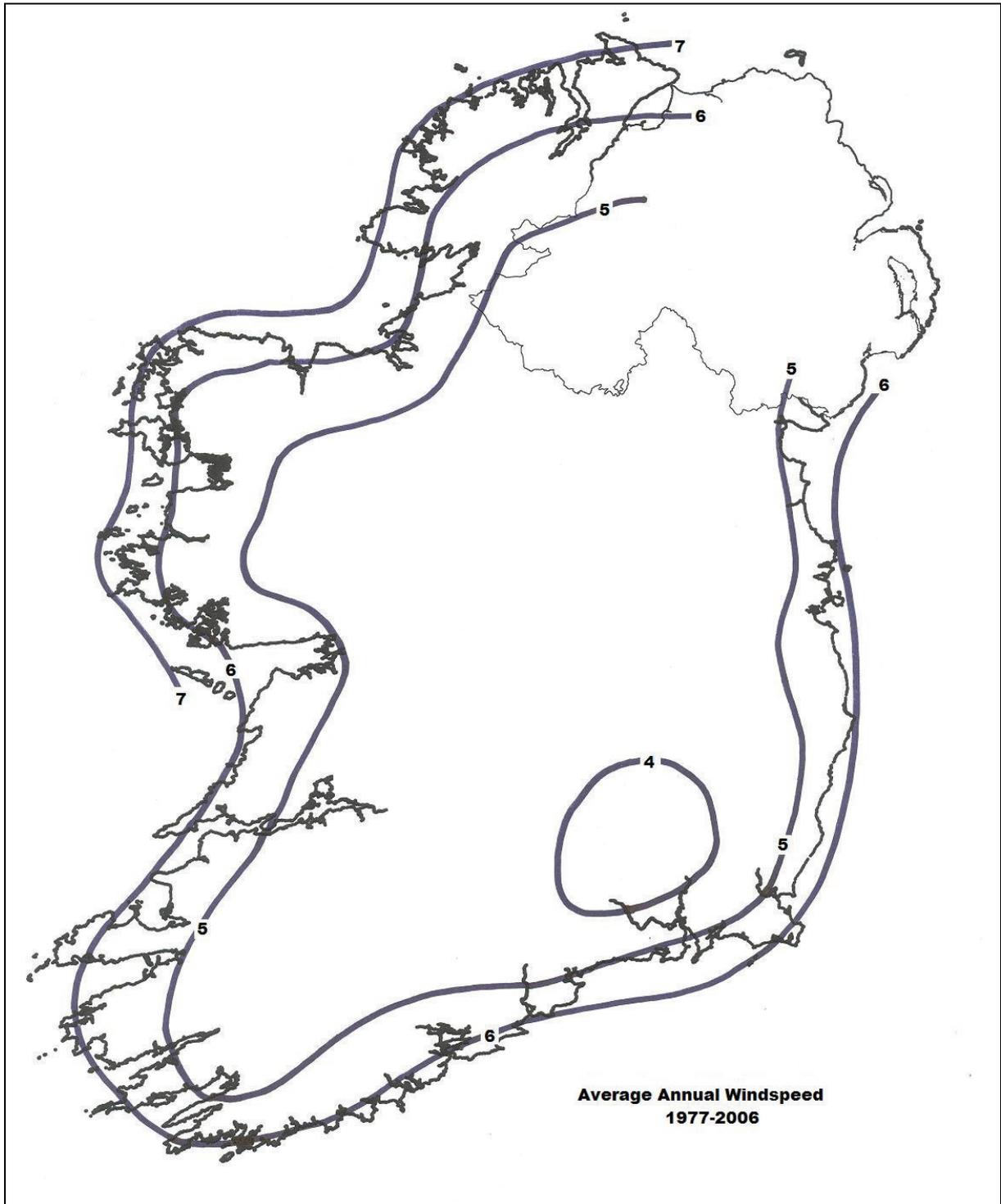


Figure 2
Average Annual Windspeed 1977-2006

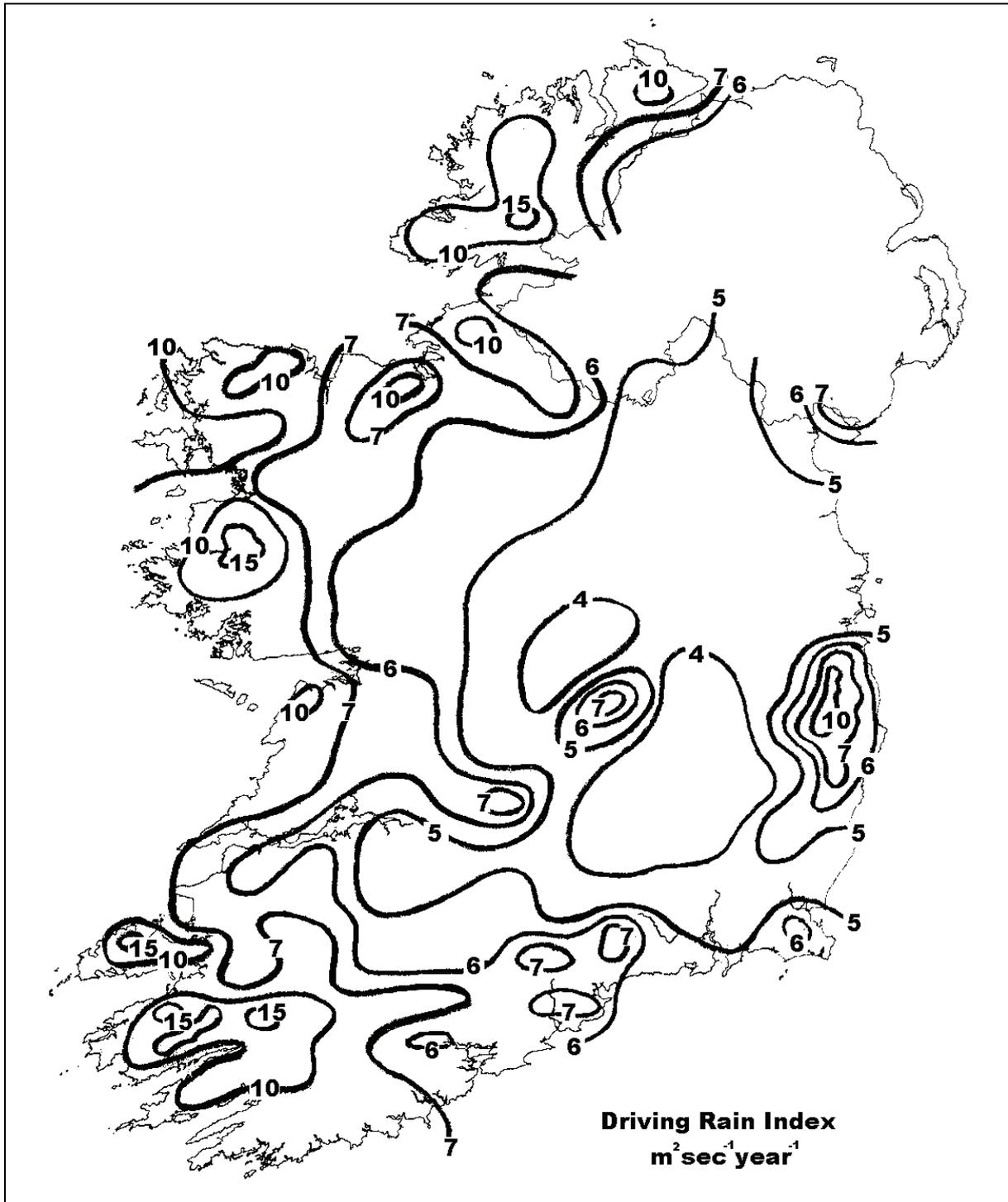


Figure 3

Driving Rain Index