

SEVERE HAILSTORMS IN THE BRITISH ISLES; A CLIMATOLOGY SURVEY AND HAZARD ASSESSMENT

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I. INTRODUCTION

In 1986, the Tornado and Storm Research Organisation (TORRO) developed a Hailstorm Intensity Scale to characterise more than 2,500 hailstorms known to have occurred in the British Isles since the first documented hailstorm event of 1141 AD; this scale has now been adapted for international use. The most intense British hailstorm reached intensity H8 on the TORRO international scale which extends from intensities H0 to H10.

In 2005, eight hailstorms reached intensity H3 or H4, the severe category, capable of damaging glass and other light structures and (at H4) vehicle bodywork; a further nine confirmed storms reached H2, at which there is potential for considerable and costly damage to growing crops and fruit. The corresponding numbers of storms which reached these thresholds in 2004 were sixteen and five.

II. PRESENTATION OF RESEARCH

For the 75 years 1930 to 2004 this paper examines (a) significant, H2 or more, storms and (b) severe, H3 or more intensity, events, in respect of seasonal frequency and geographical distribution.

This paper also discusses the less common, but potentially devastating storms of H5 intensity or more, using the much longer period 1800 to 2004 and with particular attention to hail swath lengths and widths. The synoptic origins for these major events, where known, are discussed, with particular reference to Lamb's classification of weather types across the British Isles from 1861 onwards (Lamb 1972).

III. RESULTS AND CONCLUSIONS

More than 2,500 British and Irish hailstorms are recorded in TORRO's database of which over 800 are of hailstorm intensity H3 or more, including 144 British storms since 1800 that reached intensity H4-5 or more on the International H scale.

The geographical distribution of hailstorms in the British Isles shows that the highest frequency of severe storms (H3 or more intensity with hailstones usually over 20mm diameter) has occurred in central and eastern England, with the East Midlands, East Anglia and the lower Thames Valley most conspicuous when the incidences are mapped.

Since 1870 the severest (H5 intensity or greater) events have been predominantly associated with cyclonic, southerly or south-easterly types; however a significant minority (19%) occurred with an anticyclonic element in the classification. For storms of this severity (e.g. with potential for severe structural damage, pitting of aircraft bodywork and even the risk of serious injuries), reporting will have been more consistent over a longer period.

These destructive storms, (the most recent "cluster" of which was between 1992 and 1997) have typically followed a track from the S, SSW or SW to the N, NNE or NE with a swath length often 25 km or more (reaching 335 km in one case) and a swath width sometimes in excess of 10 km. Analysis of the database since 1800 indicates a very conspicuous July maximum for these more extreme events (H5 intensity plus).

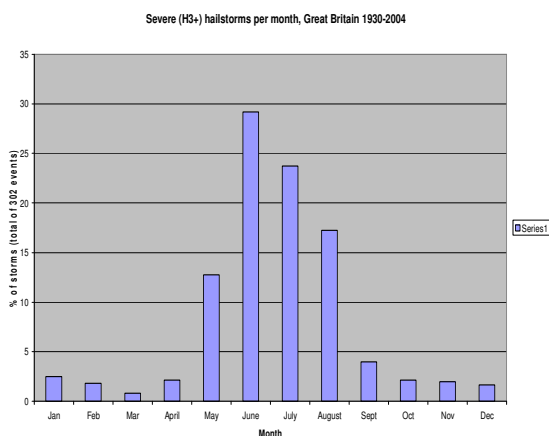


FIG. 1: Monthly distribution of severe (H3+) storms, 1930-2004.

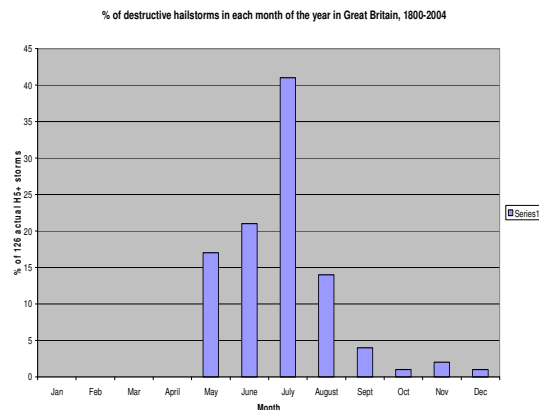


FIG. 2: Destructive (H5+) hailstorms, per percentage in each month 1800-2004.

IV. REFERENCES

Lamb, H. H., 1972. British Isles Weather Types and register of daily sequence of circulation patterns 1861-1971. *Geophysical Memoir* 116, HMSO, London.