TORNADOES IN BIRMINGHAM, ENGLAND, IN 1931 AND 1946-2005, AND INFERENCES ABOUT BRITAIN'S TORNADO CLIMATOLOGY

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I. INTRODUCTION

In the context of needing to extend our knowledge of Britain's tornado climatology it would be useful to know the true rate (as opposed to recorded rate) of past tornadoes across the whole country. Previous work has concentrated on synoptic analyses (e.g. Bolton et al. 2003, Meaden et al. 2005) and detailed nationwide statistics (Meaden 1985, Reynolds 1999). Unfortunately data gathering is incomplete because of the great expanses of open country side that have a low population density dotted only with vulnerable farms, villages and small towns. A truer idea of the annual rate of occurrence of tornadoes for particular regions comes from studying the data for the great urban and suburban areas where there is much damageable property and a high density of affected residents and potential observers. Because of this, a fresh approach has been attempted by using the city of Birmingham as a specific case-study with regard to the risk of tornado impact.

II. PRESENTATION OF RESEARCH

Birmingham, whose population of one million makes it Britain's second largest city, has a good record of reported tornado incidences. Altogether, 15 significant tornado events are known to have occurred over a central area of 150 sq. km in this Midlands city on 12 different days in the 60 years from 1946 to 2005. This is the result of reviewing for this highly urbanised region actual tornado damage and tornado sightings, most of them daytime occurrences at force T2 or higher (minimum wind speed 37 ms^{-1}) where T values are force indicators on the 0-to-10 Beaufort-based International Tornado Intensity Scale (Meaden et al. 2007).

Fig.1. Birmingham tornado 28 July 2005. Photograph Ian Dunsford

Also in this paper, the synoptic conditions pertaining to Birmingham's two most severe tornadoes of the last century are described. The latest was the T5 tornado (>67 ms^{-1}) of 28 July 2005 which blazed a trail of damage 11 km long and up to 500 m wide from south to north through the eastern side of central Birmingham. Similar devastation happened 74 years earlier on 14 June 1931 when a T6 tornado (>78 ms^{-1}) up to a kilometre wide followed a nearly-parallel track at least 9 km long. Hundreds of stone or brick houses were destroyed or badly damaged, hundreds of business properties were wrecked, and death and injury resulted.

III. RESULTS AND CONCLUSIONS

Previous contributions to the study of Britain's tornado climatology produced data on return periods for wind-speed risks at selected sites (Meaden 1985) or regional data based on tornadoes that had affected a broad mixture of town and country. In this paper—as an attempt towards gaining a better insight towards a truer annual rate for *actual* tornado occurrences in central England—it could be argued that a long-term rate similar to that for central Birmingham 1946-2005 might broadly apply to part or much of central England *if it was all urbanised*. If, moreover, it was effectively possible to consider all of central and southern Britain (area c. 10^5 km^2) in this way, it would swell the estimated rate of tornado occurrence for the same 60 years in this bigger area to an average 165 tornadoes annually. This compares with the latest recorded annual average for 2004, 2005 and 2006 of 77 tornadoes per year for all the British Isles whose area is about three times bigger. Such information which is being extended, refined and tested with regard to other cities may be helpful to the building-standards research industry. A re-appraisal of tornadoes as known for London is being done first (cf. Elsom & Meaden 1982; Meaden 1985).

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