LANDSLIDE AND MASS MOVEMENT PROCESSES AND THEIR DISTRIBUTION IN THE WELLINGTON DISTRICT OF SOMERSET

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The British Geological Survey (BGS) has recently carried out a study of the slope processes that formed the landslide and mass movement deposits in the Wellington District of Somerset during the Quaternary. This landslide study, part of the continuing research into landslides and mass movement processes in Great Britain, recorded one hundred and eighteen landslides that were entered into the new National Landslide Database.

The landslides were studied using walkover field survey and office-based remote sensing techniques. Significant past and current landslide activity was found to be associated with three distinct slope behaviour units, which are defined by their bedrock geology and topology. The Upper Greensand Formation overlying the Mercia Mudstone Group defined slope behaviour unit A, the Upper Greensand Formation overlying the Lias Group identified slope behaviour unit B and the Penarth Group overlying the Mercia Mudstone Group, slope behaviour unit C. Geomorphological models for these units were created which described the landslide processes and the deposits that they engendered. The research in this area also enabled further refinement of the 'landslide domain' concept, which is being developed as a better way of describing and depicting the distribution of the wide range of landslides and mass movement deposits that are the result of the complex interaction of geological materials and climatic changes during the Quaternary.

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INTRODUCTION

This paper describes research to determine the landslide and mass movement mechanisms responsible for landside deposits in the Wellington District of Somerset (Figure 1) and determines the geographical extent of the resultant deposits. In 2002, detailed geological mapping in the district, by the BGS, was already at an advanced stage and had identified the lithologies most prone to landslide activity. However, mapping had also identified two main issues related to landslide activity. Firstly, evidence of the landslide processes and mechanisms active at the time of formation had been obscured by the degraded nature of the landslide deposit, making interpretation of the slope morphology difficult. Secondly, extensive areas of ground were thought to have been affected by landslide activity but had subsequently been reworked by natural and anthropogenic processes. At some locations, evidence was insufficient for the ground to be mapped as a landslide deposit according to the specifications required for depiction on a 1:10 000 geological map sheet, but it was thought likely that some form of landsliding had taken place in the past. To resolve these issues, a detailed landslide investigation was carried out. The investigation incorporated results from desk study, existing geological maps, new geological mapping, conventional interpretation of aerial photographs, digital photogrammetry and field surveying. The research was carried out in four phases, desk study, field investigation, remote sensing interpretation and analysis. Mapping of most of the 1:10 000 sheet areas had been completed prior to this survey and numerous landslides recognised. Completed field-slips and those in progress were made available to the landslide investigation team and were used in conjunction with an initial interpretation of orthometrically rectified digital aerial photographs. To obtain greater knowledge of the surface morphology of each landslide type in the district, walkover surveys were carried out in 2003. Individual slopes were selected for detailed case studies, and an interpretation of aerial photographs using ImageStation™ software to delineate landslide boundaries was carried out.

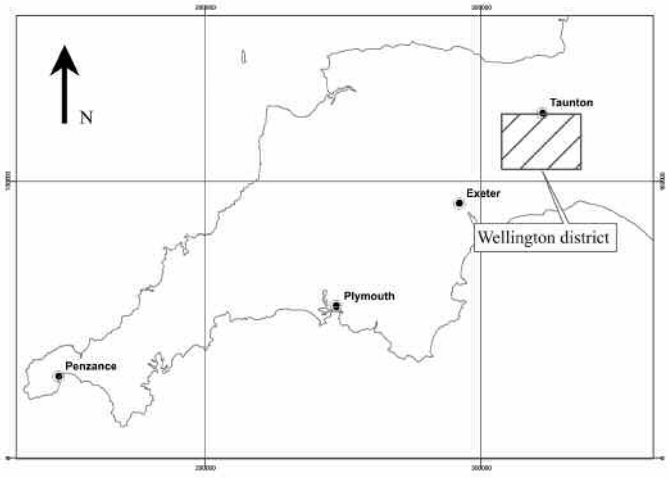

Figure 1. *Location of the Wellington District.*

One of the difficulties faced by this investigation was the identification of landslides within a degraded landscape. Although the Wellington District is south of the maximum ice limits of the Anglian and Devensian ice sheets, it has been subjected to repeated periods of periglacial conditions (Croot and Griffiths, 2001). Periglacial solifluction deposits in Britain have been recognised as having both morphological and compositional similarities to contemporary mudflows (Hutchinson, 1991; Wright and Harris, 1980).