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## **A continent-wide framework for local and regional stratigraphies**

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## EPILOGUE

The stratigraphical evidence and information involved in this thesis covers the published literature for the period until September 2005, when the manuscript was submitted for publication and public examination. New evidence, such as the discovery of flint artefacts within the Cromer Forest-bed-Formation at Pakefield in Norfolk (England), is not included (Parfitt *et al.* 2005)<sup>1</sup>. The findings of Palaeolithic material within warm-stage deposits containing *Mimomys savini* is the first of such kind in northern Europe. It implies that the earliest human occupation of northern Europe already would have taken place during the first substage (e) of MIS 15, or even during a warm isotope stage prior to MIS 16, centered at around 600 ka.

The flints artefacts at Pakefield are found in organic fine-grained channel fill and overbank deposits that are incised into marine, estuarine and fluvial sediments. These warm-stage deposits are unconformably overlain by glaciofluvial deposits (Corton Sands) and the Lowestoft Till synthem of Anglian (= MIS 12) age. They were originally correlated with similar deposits of the Cromerian stratotype at West Runton, 60 km to the northeast, on the basis of the occurrence of *Mimomys savini*, palynology and malacology. The authors assume that both sites are close in age, also confirmed by AAR evidence, and suggest an early Middle Pleistocene age. It is the special combination of *Mimomys savini* with the occurrence of large mammals such as *Hippopotamus amphibius*, *Megaloceros dawkinsi* and *Palaeoloxodon antiquus* that distinguishes the Pakefield sequence from that of West Runton, lacking these large mammals. The authors propose an older age for the Pakefield sequence and hence an earlier presence of humans, i.e. before MIS 16. Their arguments are the occurrence of *Mimomys pusillus*, which indicates a pre-Donian age, and a new lithostratigraphical

interpretation of the overlying sedimentary sequence suggesting evidence for a glaciation cycle coinciding with MIS 16.

The marine sediments overlying the warm-stage sediments at West Runton, noted in this thesis, are thought to reflect a marine transgression cycle in the Anglo-Dutch North Sea type region equivalent to MIS 13 or MIS 15 substage a. They do not contain *Mimomys savini* and post-date the Pakefield warm-stage sediments (Gibbard *et al.* 1991). The last appearance date of *Mimomys savini* would then just have overlapped the presence of *Hippopotamus* and *Palaeoloxodon antiquus* in the Pakefield sequence. The option that the Pakefield flints date from MIS 15 (substage e) cannot be excluded therefore. The precise stratigraphical position of both warm-stage sequences, however, remains unclear as yet. Notwithstanding, the findings of flint artefacts at Pakefield in warm-stage deposits containing *Mimomys savini* does not necessarily contradict the conclusion made in this thesis that there is no sound evidence of early human occupation before c. 600,000 years ago. At least they confirm the proposed lowering of the age boundary for the 'short chronology' theory (*sensu* Roebroeks & Van Kolfschoten 1995) from 500,000 to 600,000 years ago.

<sup>1</sup> Simon A. Parfitt, Rene W. Barendregt, Marzia Breda, Ian Candy, Matthew J. Collins, G. Russell Coope, Paul Durbidge, Mike H. Field, Jonathan R. Lee, Adrian M. Lister, Robert Mutch, Kirsty E. H. Penkman, Richard C. Preece, James Rose, Christopher B. Stringer, Robert Symmons, John E. Whittaker, John J. Wymer & Anthony J. Stuart 2005. The earliest record of human activity in northern Europe. *Nature* 4227, vol. 38, p. 1008-1012.

