

The last Glacial Cycle in Lowland England Devensian Stage, late Pleistocene. Prof. Phil Gibbard (Cambridge)

Professor Gibbard outlined our current understanding of the evidence for glacial activity in the last 100,000 years. There is abundant evidence for cyclical glacial activity at various time scales ranging from 600,000 yrs ago, 450,000 yrs ago 150,000 yrs ago and the Devensian. (The name is taken from an ancient tribe in the midlands of England) The evidence comes from oxygen isotopes, absolute dating for the devensian and samples from organic rich deposits and ice cores. There is broad agreement on the cyclic activity. The lecture took the opportunity to help the audience to appreciate what the evidence actually implies.

The isotope data shows that surface temperatures have typically been oscillatory with quite extreme fluctuations and rapid periods of change. When any oscillation is studied it reveals an oscillatory pattern within itself allowing instability to be recognised as the normal climatic condition.

Approximately 100,000 years ago the devensian phase is recognised as being initiated in the UK. Early deposits are seen at Chelford in Cheshire where beaver felled spruce tree stumps remain (Beaver and spruce are not native to the UK in the Holocene) this points to boreal forest climatic conditions. Deposits reveal evidence for cold –warm deposit sequences. In Norfolk Google earth aerial photos (of Mathwold Hythe) allow polygonal patterns and stone stripes to be identified on chalk lands reflecting permafrost conditions. At Acton (Creffield Road) sheet wash deposits are seen whilst the formation of tors was progressing, dry vallies in the Chalk were being created by meltwater and Head deposits were locally abundant – all symptomatic of periglacial conditions. Thus the southern England landscape evolved under a cold climate and we enjoy a fossil landscape reflecting those conditions.

At West Drayton flood deposits show rivers being energetic, producing wide, shallow braided deposits, probably from a spring melt. The Thames has 9 recognised gravel terraces reflecting the erosional activity and great width of the river (5km). 40,000 yrs ago warming occurred but no forests. 32,000 yrs ago Kempton Park has deposits showing oscillating climates over ten year periods. Herbs were abundant but no trees. 11,000yrs ago West Drayton shows the start of our conditions. The large Fauna during this period was mammoth, bison, reindeer and woolly rhinos. About 30,000 yrs ago Neanderthal peoples lived here, it is thought the sea barrier held up the arrival of Homo Sapiens.

The northern hemisphere evidence shows this glaciation was complex. In the early (100-60,000) phase the UK has no recognisable evidence for any conditions. In Siberia there were large ice caps and dammed lakes to the south. 60-30, 000 yrs ago the Scandinavian ice had increased, Siberian ice declined and the dammed lakes become huge. The last ice maxima (23-21,000 yrs ago) the UK had active erosional ice, Scandinavian ice had increased but the Siberian area was ice-free and the lakes had gone. The UK has evidence of these glacial conditions in the St bees Moraine in Cumbria and the Bride Moraine in the Isle of Man The NE of England has evidence at Warren House Gill (Easington area) GR 47724 42343) – this suggests three phases of ice activity. The ‘raised beach ‘ structure was formed but the cause is not clear. At

Sewerby (west of Hull, an old cliff line is seen in the cliffs showing sea level was higher than now, meltwater deposits pile up against the cliff line.

Heinrich Events – this term describes ice rafted debris and peak deposits are thought to indicate cold periods. They are common from the huge Laurentide ice mass.

28000 yrs ago England was covered by ice maxima along the north east-west line touching the Wash and South Wales. Ice thickness reached 2 kms. Later the European river system created the Channel as it drained through it, 1800 yrs ago Rhine flow was north so ice was gone. The North Sea was covered by ice 24-30,000 yrs ago but this may have been the only time it was all ice. In the Atlantic ice fronts moved south reaching southern Portugal in the Devensian, this would have huge impact on weather systems and moisture supply. The movement of ice to the west in the devensian is thought to be explained by precipitation changes.

The Loch Lomond ice advance was localised and occurred 12.8-11.5 000 yrs ago

The ice melt led to huge sediment fans forming off the continental slope in the SW approaches

Summary

Prof Gibbard lectured to the NEGS group on the evidence for Devensian glaciation in England with a detailed account of the evidence for last Glacial Cycle in Lowland England, Devensian Stage. He highlighted the nature of the evidence for rapid climatic oscillations, notably oxygen isotope records. The presentation was well supported with specific site images reflecting the sedimentary conditions, which had been responsible for the deposits. The UK has no reliable evidence for early devensian glacial activity but the last 100,000 years is reflected in sediments and structures in southern England. This allows the area to be described as a fossil landscape. Plant remains and faunal remains reinforce the sedimentary evidence. The situation in northern England remains quite a challenge with no detailed consensus on ice sources, tracks or convergence at this time.