

## **THE PALAEOENVIRONMENT IN WALES**

### **Introduction**

A substantial amount of palaeoenvironmental data already exists for Wales, but on closer inspection it becomes apparent that for any given period or geographical region the information available is frequently very limited. Similarly, the nature of the evidence, for example pollen, bone, seeds, and beetles, varies considerably. Against this background, broad themes have been identified and key questions and areas suggested for future research. Some of the research opportunities identified are specifically archaeological, whilst others are essentially palaeoenvironmental but of relevance to archaeological issues.

### **Themes**

#### *Environmental Context and Landscape Change*

How was the human presence in Wales during the Palaeolithic related to environmental conditions?

- A multi-disciplinary approach is required to provide a basis for environmental reconstruction and to enable landscape and predictive modelling.
- Work needs to be closely linked to Quaternary research on non-archaeological sites.
- The potential of off-shore and inter-tidal Pleistocene deposits needs to be assessed.
- The great potential of Welsh caves has been demonstrated and needs further developing.
- There is an urgent need for additional high-resolution, well-dated records.

How did the availability of resources influence Mesolithic occupation?

- Biological evidence is especially relevant to questions of seasonality and sedentism.
- Any Mesolithic site with evidence for the use of plant and animal resources is of very high priority. Waterlogged Mesolithic sites are particularly important.
- Shell middens have a particular priority, especially where they occur with waterlogged organic deposits.
- Sites in a range of landscapes need to be investigated.
- Studies should focus on sites where the lithic and palaeoenvironmental evidence can be closely correlated.
- Buried land surfaces beneath reservoir edges, former shorelines of natural lakes, inter-tidal submerged surfaces and riverside sites, especially ecotonal sites, offer particular opportunities for investigation.

What were the environmental conditions in the immediate area and surrounding region of Neolithic and Bronze Age funerary and ritual monuments?

- An understanding of the landscape setting of these monuments can only be realised fully by investigation of the environmental conditions.
- On-site and off-site analyses are required.

Is there evidence of continuity of land-use and in the types of crops grown from the Romano-British to the Early Medieval Period?

- The environmental context of early-medieval sites has received little attention, and integrated archaeological and palaeoenvironmental studies are required, focusing on known areas of activity.

Is there similar evidence across the Iron Age/Romano-British boundary?

- Integrated archaeological and palaeoenvironmental studies are required to assess whether the Romans had any impact on agricultural production.

What were the environmental conditions associated with wetland sites?

- Wetland archaeological sites are often found by accident; they should be thoroughly investigated employing a full range of palaeoenvironmental techniques when they are found.
- Investigations should include radiometric dating and, if possible, dendrochronology.

*The development of agriculture and changing agricultural practices*

When and where did cereal cultivation and animal husbandry begin during the Mesolithic/Neolithic transition in Wales?

- Integrated archaeological and palaeoenvironmental investigations involving on-site and off-site analyses are required.
- Particular emphasis should be given to dating environmental disturbance, for example burning episodes during the Mesolithic, particularly the late Mesolithic, when it was associated with pre-elm-decline cereal pollen.
- Recovery and dating of charred plant remains from securely stratified contexts is vital.
- Pollen analysis is required from small, inland, lowland sites, for example the edge of palaeochannels in river valleys.
- The investigation of coastal wetland sites may provide the evidence for the beginnings of animal husbandry.

What was the nature of farming activity during the Neolithic and earlier Bronze Age in Wales?

- Neolithic sites with plant and animal resources should have a very high priority, as there is a continuing major debate about the extent of cereal growing and whether Neolithic communities were mainly mobile pastoralists. The relative importance of wild plant foods is still unclear. On-site and off-site analyses are required.

When did changes in agricultural practices occur and what was the nature of these changes?

- The investigation of field-system evidence with associated environmental studies has been a particularly neglected aspect of Welsh archaeology.
- Off-site palaeoenvironmental investigations need to be linked with on-site archaeological excavations of, for example, settlements and field systems.

What was the economy of medieval and post-medieval farms in the uplands and to what extent did climatic and other environmental changes contribute to farm abandonment and changes of agricultural regime?

- Integrated archaeological, documentary and palaeoenvironmental studies need to be undertaken.

#### *Mining activity and industrialization*

What was the impact of metal-mining on the environment from the Bronze Age through to the medieval period?

What was the impact of iron-working on the landscape from the Iron Age to medieval times?

What impact did post-medieval industrialisation have on the surrounding environment and what is the longevity of its environmental signature?

- Integrated archaeological and palaeoenvironmental studies, including pollen, soil, sedimentological and geochemical analyses, are required for all periods.
- The latter should be supported by appropriate dating techniques.

#### *Urban studies*

What were the living conditions of people in Welsh towns through the ages?

What were their diets?

What industries were based in urban contexts?

What were the trades and trade networks of Welsh towns?

- There should be an emphasis on obtaining biological evidence for traded goods, the networks of trading links and the activities associated with ports, especially given the wealth of evidence identified, but never fully studied, across the estuary in Bristol. There the pace of waterfront building slackened just as it may have been taking off at some of the south Wales ports.
- A particular interest is the history of the fishing industry, especially the origins of the North Atlantic fishery.
- Because of the increased likelihood of favourable conditions for the preservation of environmental evidence, urban waterfronts offer particular potential for investigation. A full range of scientific analyses should be employed.

#### *Climate Change*

What was the relationship between climate change and successive human communities?

How did climate change influence human colonisation during the Late-glacial Period in Wales?

- Further investigations are required to determine the complexity of climate change during the Late-glacial Period in Wales.
- Pre-Late-glacial climatic change is also important.
- Investigation of sites with a full Late-glacial sequence using a multi-proxy approach, including good dating control, is required. Speleothem records,

for example, from cave sites have potential for pre-Late-glacial climate reconstruction.

What is the evidence for climatic change during the Holocene?

- Areas for future research include investigation of the palaeoenvironmental evidence for a general worsening of climate in the later Bronze Age, deterioration in climate c. AD 400-600, the 'Little Ice Age', following the medieval climate optimum, and the implications of these for human communities.
- Proxy climatic studies using bog-surface wetness combined with good dating control are required, especially for periods pre-dating documentary records and instrumental observations.
- Upland blanket mires offer great potential for reconstructing patterns of precipitation change. Proxy climate evidence with dating control exists for the lowland raised mires at Tregaron and Borth, and research needs to focus on its relationship with settlement pattern history and agricultural change in the surrounding areas. Very little research has focused on the effects of climate and environmental changes on upland farms and agriculture.

#### *Alluviation in non-tidal river valleys*

How far has river channel and floodplain development influenced the archaeological record from the Palaeolithic to the present?

What is the relationship between river alluviation, erosion episodes, climate change and land-use change?

- Geomorphological survey should accompany archaeological survey of river valleys. Data collected need to be of the appropriate spatial and temporal scales for evaluating cause-and-effect relationships. Representative reaches over an entire basin need to be examined.
- Detailed palaeoecological evidence with good dating control is required to determine causal relationships between environmental change and fluvial activity to be identified with greater confidence.

#### *Coastal alluviation and sea-level change*

How did marine transgression and regression phases affect human activities, especially in prehistory?

How did humans adapt to the coastal environment?

- This is a particularly important question in relation to the Mesolithic and Neolithic. There are exceptional opportunities to address it in the inter-tidal exposures of submerged forests and peat; any of these deposits which are directly associated with archaeological evidence deserve investigation. Such sites also have a very high potential for developing dendrochronological sequences.

What is the evidence for the seasonal use of coastal wetlands in later prehistory and what was the nature of the economy practised?

What was the relationship between wetland settlements and those on dry land?

## Palaeoenvironmental

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At what date and in what environmental circumstances did human communities, in the various regions of Wales, first start to modify the coastal environment by digging drains and building sea-banks?

What forms of agriculture and other activities were practised in the reclaimed landscapes?

Is there evidence for increased coastal dune-building and sanding-up during the Little Ice Age, AD 1550-1850, and other episodes of climate change?

- Estuaries are key areas for investigation, as well as submerged forests and peat deposits. Multi-disciplinary studies are required.
- These investigations need to be underpinned by high-precision radiocarbon, OSL (Optically Stimulated Luminescence) and dendrochronological dating.

### Priorities

What were the environmental and economic relationships during the Mesolithic, especially in the coastal zone?

What was the nature of the Neolithic economy and were populations becoming more sedentary with the development of agriculture?

When did practices in animal and plant husbandry change and how?

How far, and in what periods, is it possible to recognize seasonality or transhumance?