

British Ecological Society Mires Research Group (MRG)

The past as the key to the present? Temporal scales in wetland ecology

September 9th 2003

Manchester Metropolitan University

Chair: Dicky Clymo*

WARNER, B (guest speaker 40 min)

University of Waterloo, Canada

The long-term perspective on contemporary problems in peatland

Recent views of community ecology recognize the importance of combining spatial and temporal scales at finer resolutions generally studied by ecologists with the broader scales studied by palaeoecologists. This expanded view of community ecology and ecosystem dynamics can be readily applied to peatlands and can prove valuable in assessing human impacts on the environment of industrial pollutants, land use changes, altered hydrological cycles, and anthropogenic climate change and energy use. This longer time frame perspective can greatly aid development of ecotechnological designs, wise use resource management strategies, and conservation policies.

O8. BAIRD, A.J.

University of Sheffield, UK

Hydrological and thermal processes in peat soils: the present as the key to the future.

Carbon models for northern peatlands are one-dimensional and make very simple assumptions about thermal and hydrological processes operating in peat soils. This paper reviews these assumptions and argues that better process understanding is essential if we are to improve predictions of carbon cycling in northern peatlands in a changing climate.

O154. RYDIN, H.

Uppsala University, Sweden

Stratigraphic data to test ecological theories: too little used or too uncertain?

A central theme in ecology is competitive exclusion among similar species. Stratigraphic data show that Sphagnum species can co-exist over several centuries within one square dm. Such data could be used more often to test ecological theories, but what are the pitfalls and weaknesses that we have to consider?

O70. MCMULLEN, J.A.

University of Aberdeen, UK

Is taxonomic resolution important in the construction of descriptive models from gradients produced by DCA?

Stratigraphic plots of detrended correspondence analysis (DCA) sample scores are used to reconstruct past changes in the water level of raised bogs, and by inference, changes in the climatic evaporation:precipitation ratio. This paper looks at how the use of different taxonomic levels may alter the results of such analyses.

O3. BUNTING, M.J.

University of Hull, UK

Problems of resolution: using pollen analysis to investigate ecological problems.

Pollen analysis permits the reconstruction of past vegetation communities and ecosystem dynamics, but these results are often too generalised to address ecological problems. This paper explores theoretical and empirical approaches to assessing the spatial resolution and quantitative composition of past vegetation from the pollen record from wetland habitats

Chair: Jane Bunting

O209. BINNEY, H.A., ARMITAGE, R., BUNTING, M.J. & WALLER, M.

University College London, UK

Modern pollen/vegetation relationships in the Norfolk Broads, UK.

The Holocene environmental history of southern Britain is known largely from pollen records from fen and fen carr peat deposits, but reconstructing the composition and distribution of past vegetation communities is problematic. We present results from an investigation of modern pollen/vegetation relationships in East Anglian fen and fen carr communities.

O113. HUGGINS, T.S., HUGHES, P.D.M. & JONES, P.

University of Southampton & Countryside Council for Wales, UK

The resilience, stability and successional history of rich-fen plant communities at Cors Goch, North Wales, UK.

This paper aims to characterise the long-term dynamics, stability and resilience of rich-fen plant communities, to understand the principle mechanisms driving early and late Holocene succession at Cors Goch. This will provide a systematic palaeoecological study of fen development that is then applied directly to fen management.

HASLAM, S.M.

University of Cambridge, UK

Long-term competition in Wetland fens

Calcium dominated nutrient medium and rich fens with a range of dominance from *Schoenus nigricans* to tall rich herb communities were studied. The competition mechanisms were primarily shade (and root toxins) with the outcome dependent on the external circumstances on fen use and neglect and changes in water regimes. Either cespitose or rhizomatous species can become dominant dependent on conditions.

O152. FINKELSTEIN, S.A.

University of Toronto, Canada

Paleoecological approaches to identifying recent changes in wetlands: *Typha* species in the North American Great Lakes region.

It has been noted that *Typha angustifolia* L. has recently been expanding into wetlands of the Great Lakes region although its origin and status as 'invasive' are debated. This species is rarely distinguished in pollen records from *Sparganium* and other *Typha* species. This study shows that it is possible to separate *T. angustifolia* palynologically based on size and shape at a known level of statistical confidence. Using this approach, pollen records from wetland sediment cores in the region

document the recent arrival and rise of *T. angustifolia*, confirming that this species has not been present until the last century. Community changes associated with the arrival of ***T. angustifolia*** are also discussed.

O33. FRASER, L.H., FEINSTEIN, L.M. & SKERL, K.L.

University of Akron, UK

Landscape indicators of plant invasion in 1215 wetlands of the Cuyahoga Valley National Park in Ohio, USA.

A large-scale investigation was done relating relative plant invasion with respect to wetland type, wetland size and proximity to potential anthropogenic disturbance. 1215 wetlands within the 13,350 hectare Cuyahoga Valley National Park (Ohio, USA), ranging in size from < 1/10 to > 45 hectares, were visited; plant invasive species and abundance were scored, and the wetland size was mapped in GIS. The results show little evidence for the correlation of any landscape indicators to the susceptibility of a wetland to invasion. It is suggested that the stochastic complexity of real landscapes make it difficult to predict invasive patterns at the landscape scale.

Chair: Lisa Belyea

O167. CHAMBERS, F.M.

University of Gloucestershire, UK

Palaeoecological insights into recent vegetational change.

Case studies of blanket mire communities in Britain will be used as exemplars to show how the present status and future management of 'degraded' plant communities can in some instances be informed by detailed palaeoecological investigation of past long-term and recent vegetational changes.

O78. CUNDILL, P.R.

University of St. Andrews, UK

Pollen-vegetation variations between two cores from Loch Rossie, Fife.

Pollen analysis was carried out on cores from two basins within the drained Loch Rossie site. The results revealed significant differences between the pollen/vegetation history of each of the basins, and factors such as sediment focussing and local pollen sources may have strongly influenced the palaeoenvironmental records.

O68. DINNIN, M.H.

University of Exeter, UK

Conservation management of wetland landscapes: lessons from fossil insect records.

Fossil beetles preserved in mires provide a spatial-temporal record of changes in community composition and distribution during the Holocene (last 10,000 years). This temporal perspective provides information about the impact of past climate change and human disturbance on wetland ecosystems that is relevant to the conservation management of wetland landscapes.

O7. FEDOR, P.J., MAJZLAN, O.

Comenius University, Bratislava, Slovakia

Bioindication Importance of Orthopterous Insects (Ensifera et Caelifera) under the Changed Conditions in the Slovakian Danube Region.

The ecological interactions between orthopterous insect communities and a stage, changes and developmental dynamics of the Slovakian Danube region ecosystems have been defined. Main coenological variables together with PCA - analysis have proved a bioindication potential of insects to reflect anthropogenic impact.

O126. MALMER, N. & WALLÉN, B.

Lund University, Sweden

Effects of the increased nitrogen deposition on mire plants and carbon accumulation rate in South Swedish Sphagnum mires.

Fifty years with increasing nitrogen deposition increased nitrogen concentrations in Sphagnum but not in vascular plants. Growth increased in vascular plants while Sphagnum productivity became too low to support a net carbon accumulation in bogs. The processes behind these developments will be discussed in the light of a fertilization experiment.

WEISS, D.

Imperial College London, UK

Peat bogs as archives of atmospheric trace and dust deposition and the effects of humans and climate on the global geochemical cycles

Peat bogs preserve a geochemical record of past atmospheric aerosol deposition for the entire Holocene, allowing us to use them as powerful archives of environmental change. Using the trace element distribution in two peat bog profiles in Switzerland and Indonesia, we will show how climate and anthropogenic activities changed the entire global trace element cycling.

To be moved to other sessions:

O52. BELYEA, L.R.¹ & MALMER, N.²

1 University of Edinburgh, UK & 2 Lund University, Sweden

A functional explanation for millennial-scale changes in peat accumulation rate.

A model relating peat accumulation and peatland surface structure to climate and internal hydrology explains qualitative changes observed over 5000 years at Store Mosse, southern Sweden. Climatic change induces rapid responses, followed by gradual development toward new steady states in surface structure, peat accumulation rate and internal hydrology.

***O9. BAIRD, A.J., WALDRON, S. & BECKWITH, C.W.**

University of Sheffield, UK

The role of gas bubbles in acrotelm hydraulics: the case of two lowland raised mires.

Acrotelm peat below the water table is rarely water-saturated. Initially, this under-saturation is due to entrapment of air as the water table rises. It is then due to the production of biogenic gas bubbles. Trapped gas bubbles can reduce the hydraulic conductivity of the acrotelm typically by a factor of five.

O192. MISS.HOURIA MELLAH

Department of Geography. Institute of earth sciences. University of Sciences and Technology oh Houari Boumediene, Algeria The Environmental Crisis in Algeria.

We observe, everywhere in the world, a rise in the concerns related to the environment. Air, water, and soils pollution, destruction of the ozone layer, climatic warming, exhaustion of resources (water, fuels), accumulation of wastes, disappearance of the forests and the biodiversity. By its geographical, climatic and ecological position, by the vulnerability of its natural resources and by the accelerated urbanisation, the demographic growth, Algeria saw a several ecological crisis, (pollution air, solid waste, pollution of water resources, disappearance of the forests and the biodiversity desertification, ...).

* I am in the process of getting agreement from the suggested chairs