
CAMQUA

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Integrated Land-Sea Lithostratigraphic Correlation Workshop Utrecht, 9-11 April 2003

The opening of the striking new headquarters for the Netherlands Institute of Applied Geoscience (NITG-TNO) - the national geological survey on the University of Utrecht campus in the central Netherlands - is being celebrated this year by a series of workshops and symposia. The first, the Workshop on Integrated Land-Sea lithostratigraphic correlation, was held on 3 days in April, for invited participants from 7 European countries. Great Britain was represented by Jim Rose (Royal Holloway College), Andrew McMillan, Richard Hamblin (both from the British Geological Survey) and Phil Gibbard.

The theme of the meeting, integrated lithostratigraphy, was selected because when the NITG-TNO was formed there were three markedly-different lithostratigraphical schemes in use in the Netherlands; two on the land areas (namely the shallow and deep subsurface) and the third used for mapping the North Sea floor. The former two were developed over 100 years, principally based upon the classic work of heavy-mineral assemblages, supported by sediment sequence description. The North Sea divisions were based almost exclusively on seismostratigraphy, supported by some limited borehole control, developed over the last 30 years or so. The decision to develop a unifying stratigraphy was taken about 2 years ago and since then a new scheme has emerged, through the labours of a small dedicated NITG group. The scheme is now being progressively applied to all new mapping projects in the Netherlands. Full details of this work, with examples of unit descriptions etc., will soon be available on the NITG website (<http://www.nitg.tno.nl>).

The initial presentations at the meeting by Jan Ebbing and Henk Weerts, two of the prime-movers in the development of the new scheme, illustrated how it evolved, its basic philosophy and how it would be

applied. The need to develop a new approach to lithostratigraphy is not only felt in the Netherlands, however, but also in neighbouring countries. In particular, the British Geological Survey have developed a scheme closely allied to that in the Netherlands. The scheme, outlined by Andrew McMillan, for the first time in the Quaternary mapping of Britain introduces large-scale units above formation level, including group and even super group. These schemes, whilst being essentially lithologically-determined, still retain an element of genesis in their definitions. Purists might criticise this approach, yet it remains eminently practical for mapping, applied geoscience and related purposes; the primary concerns of geological surveys as well as much of the user community.



Following discussion of the detail of the application of these schemes, the meeting moved on to consider lithological and sequence-stratigraphical successions in the Late Cretaceous and Tertiary of Belgium (Noël Vandenberghe), Denmark (Jan Ansbjerg & Peter Konradi), the southern Baltic region (Regina Kramaska), Britain (Phil Gibbard) and the Netherlands offshore (Iwan de Lugt). The first-day's presentations ended on a somewhat different theme with Jaap van der Meer discussing the detailed microsedimentological interpretation achievable using micromorphological examination of sediments.

On the second day the theme shifted to the Quaternary, Jim Rose beginning the proceedings with a spirited presentation of his somewhat controversial combined lithostratigraphical/event stratigraphical interpretation of the Pleistocene sequence in eastern England. Some of his views are already known to GIQR members following his QDG presentation in 2002. However, one point he expressed was that biostratigraphy could not be used for the subdivision of Quaternary

chronosequences; a view that raised discussion and a little unease in some members of the audience. He was followed by a highly interesting re-evaluation of the classical Early Pleistocene sequence of the Netherlands presented by Wim Westerhoff (NITG). The new results, arising from modern integrated studies, are causing some modification of the earlier ideas of former colleagues in the precursor to the NITG, the Rijks Geologische Dienst (RGD).

The remaining presentations focussed again on case-studies of regional stratigraphical schemes or key sequences in neighbouring areas; Andrzej Ber (PGI) presented the Polish sequence, Laerke Andersen, Jørgen Leth and Birger Larsen (GEUS) presented evidence for large-scale offshore glaciotectonics, morphology and sequences in the Danish North Sea area, and Richard Hamblin (BGS) discussed the results of the reinterpretations of the northern East Anglian glacial sequence. This last work will again be familiar to some in the GIQR as the latest version in an evolving scheme in which Dr Hamblin and colleagues currently identify as many as 6 glacial advances, ranging in age from early Middle Pleistocene (?MIS 16) to Devensian (MIS 2). The apparent conflict of these interpretations with those from the Netherlands' offshore sector were stressed by NITG colleagues.

These lithostratigraphically-orientated discussions were, however, somewhat overshadowed by the final superbly clear talk by Wim Hoek (Utrecht University) on the INTIMATE-group project results from the Last Termination in the North Atlantic region. This detailed work, with which most of us will already be familiar, emphasises the sheer quality of high-resolution correlation, across a range of environments, that can be achieved in the latest Quaternary when one has solid

chronologies from the ice-cores, ^{14}C from lake sediments and cross-correlation using tephra and identified events. It is unfortunate, however, that this quality of correlative resolution is likely to remain unattainable for the foreseeable future for the bulk of Quaternary time.

The meeting was closed by Phil Gibbard who summarised the spirit of the discussions by emphasising that lithostratigraphy provides the ultimate foundation of all geological history. He also encouraged delegates to consider the need for a unified, Europe-wide lithostratigraphical scheme, based on the NITG concepts, to replace the older national schemes for each country. But he also reminded colleagues of the lessons from history concerning the desire to force local lithologically-based stratigraphical terrestrial and shelf sequences into global timescales, particularly those developed for the ocean-basin sediments, based on comparison rather than rigorously-based correlation.

The evening was completed by a reception to celebrate the retirement of Dr Ruud Schüttenhelm who was among the half dozen people in the British and Dutch Geological Surveys who devised the international stratigraphical scheme for the Quaternary of the southern North Sea in the 1970s.

This was an excellent meeting to initiate the series of symposia and workshops at the NITG-TNO Utrecht centre as well as celebrating 150 years of geological research in the Netherlands. It was attended by over 50 people and organised expertly by Cees Laban and his NITG-TNO colleagues at Utrecht all of whom should be warmly thanked for organising such a stimulating and pleasantly informal event.

Phil Gibbard

QRA Short Field Meeting
Nene Valley, Northamptonshire
3rd-6th September, 2003

Organisers: Harry Langford, Steve Godby (Anglia Polytechnic University, Cambridge)

Themes to be discussed:

- a) Thrussington and Lowestoft ice advances into the present Nene catchment;
- b) pre-Anglian (Milton Sands), Anglian and post-Anglian drainage networks associated with the catchment;
- c) records of Middle to Late Pleistocene and Holocene sea-level change in the lower part of the catchment;
- d) Holocene palaeoenvironments and human occupation of the Nene catchment.

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Registration form available on the QRA website at: <http://www.qra.org.uk/nene.htm>

Early-Middle Pleistocene Transitions: the Land-Ocean Evidence

Cambridge, 4 April 2003

A one-day international conference on the “Early-Middle Pleistocene transitions: the land-ocean evidence” was held in the Department of Geography, University of Cambridge on April 4, 2003. The scientific programme comprised nine invited talks and six posters. The meeting was sponsored by the Godwin Institute for Quaternary Research, INQUA Commission on Stratigraphy and INQUA Subcommittee for European Quaternary Stratigraphy, The Quaternary Research Association, and the ICS Subcommittee on Quaternary Stratigraphy. It was organised by Dr Martin J. Head and Dr Philip L. Gibbard. About 50 participants from England, France, Germany, Italy, Norway, Russia, and The Netherlands made this a truly international event.

The transition from Early to Middle Pleistocene is marked by fundamental changes in Earth’s climatic cyclicity. Orbital obliquity at 41 ka cycles which had dominated the earlier part of the Pleistocene was superseded progressively about a million years ago by a 100 ka rhythm of climate change and increased-amplitude climatic oscillations. This change has become known as the Mid-Pleistocene Revolution. The glacial–interglacial world in which we now live is the result of these changes, and the impact on terrestrial and marine biota has been profound and manifold. However, the timing and correlation of events during this transition has been problematic, leading to uncertainties over cause and effect. The purpose of this meeting was to explore the biotic responses to climatic and physical changes that characterized the Early–Middle Pleistocene transition in both the marine and terrestrial realms. In doing so we hoped to explore the very origins of our present biota.

The first talk, by Mark Maslin (UCL, London), addressed the Mid-Pleistocene Revolution from an Earth orbital perspective and questioned the assumption that eccentricity was responsible for 100 ka cyclicity in the Middle Pleistocene. Disabused of this notion, we were told that the more likely driving force was non-linear responses to orbital obliquity paced by every fourth or fifth precessional cycle. Precession is therefore the key to understanding 100 ka cyclicity in the Middle Pleistocene. And precession makes sense to some paleontologists who regard seasonality as a key to understanding their records.

Helga Flesche (“Kikki”) Kleiven (Bergen) talked about her research on deep-sea cores in the northern and southern hemispheres that is aimed at assessing climate change at sub-orbital frequencies across the E–M Pleistocene transition. She showed that these sub-orbital changes, which are well known for the past 500 ky, are constantly present throughout the E–M Pleistocene transition. Furthermore, her work has revealed a similar pattern of millennial-scale climate oscillations at both the

northern and southern hemispheres, implying a link in climate variability between both hemispheres.

Erin McClymont (Durham) continued the marine theme by looking at the E–M Pleistocene transition from a lipid biomarker perspective. Her research, based on deep-sea cores in the North and South Atlantic and equatorial Pacific, has allowed a comparison of high- and low-latitude climate change at a resolution of about 5 ky. Results show important fluctuations in carbon inputs to the ocean floor that lead climate changes as observed in published records.

Enno Schefuß (Bremen) went on to discuss his own research on lipid biomarkers from the equatorial Atlantic. Long-term equatorial warming during the transition seems to be explained by a progressive reduction in Atlantic thermohaline circulation that would have led to weakening heat export from the tropical oceans to high latitudes. Although tropical sea surface temperature was found to closely match the pattern of high-latitude ice-volume changes, tropical warming at the end of glacial periods occurred significantly earlier than decreases in global ice volume. This underscores the role of the tropics in amplifying global climate changes.

Jean-Pierre Suc (Lyon) took us away from the deep-sea realm and into world of Mediterranean pollen analysis, where 14 localities allow the documentation of Late Pliocene to Middle Pleistocene climate cycles. Filtering out the influences of latitude and altitude, an understanding of the temporal changes in vegetational development is now emerging. In southern Italy, for example, interglacials of the earliest Plio-Pleistocene are signaled by Taxodiaceae, whereas those of the earliest Middle Pleistocene are characterized by deciduous oak. The need continues, however, to perform parallel analyses of oxygen isotopes and pollen on coastal marine sediments.

After lunch, we were treated to two talks on human evolution and adaptation across the E–M Pleistocene transition. The first, by John McNabb (Southampton), discussed the spread of hominins from Africa into Europe. The importance was stressed of understanding why it was not until the middle of the Middle Pleistocene in Europe that a strong hominin signal emerges. The second talk, by Mike Petraglia (Cambridge), shed new light on hominid adaptations by reviewing current field investigations in the Arabian Peninsula and Indian Subcontinent. Mike concluded that the transition marks an increasing ability of hominids to transcend environmental controls through greater behavioural flexibility and innovation.

The final talk, by Thijs van Kolfschoten (Leiden), dealt with the European record of mammals across the transition. Notable features are the End-Villafranchian “Event” representing a faunal turnover that is mainly

caused by the migration of a number of larger mammals, and the evolutionary radiation of middle sized voles (e.g. *Microtus*). We were shown that a number of *Microtus* species have sufficiently wide geographic ranges to facilitate correlation between western and eastern Europe and even with Asia across the Urals. The stratigraphic utility of these fossils should therefore be taken into account when deciding where formally to place the boundary between Early and Middle Pleistocene.

The presentations also included a report of the ICS working group on the Early–Middle Pleistocene boundary (compiled by Davide Castradori and presented by Martin Head) and a round-table discussion on the boundary chaired by Charles Turner (Open University & Cambridge).

A poster session ran throughout the day and comprised presentations on the vegetational history from the Croton Basin in southern Italy (L. Capraro and colleagues), the loess record of northern Eurasia (Andrey Dodonov), orbital and suborbital variability in North Atlantic deep-water circulation (P. Ferretti and colleagues), aminostratigraphy and integrated land-sea correlations in the North Sea basin (two posters by T. Meijer and P. Cleveringa), and floral evolution of the Colombian Andes (Torres and Hooghiemstra).

The conference provided an excellent overview of research developments from both marine and terrestrial realms. It is perhaps not greatly overstated to regard the E–M Pleistocene transition as one of the major ‘events’ in Earth history, and the high quality of all the presentations did justice to its importance. A volume on the E–M Pleistocene transition is being prepared and will include many of the presentations at this conference.

Martin Head

QRA Postgraduate Symposium 2003

**10th–12th September,
Queen Mary,
University of London**

The symposium will cover the broad spectrum of Quaternary science and will provide an opportunity for post-grads to discuss their work with their peers in a relaxed environment.

Further details, costs and registration form can be found online at -

<http://www.geog.qmul.ac.uk/qra/symposium.htm>

E-mail: **QRA2003@hotmail.com**

Quaternary Discussion Group

Friday, 16th May

Gulf stream variability and its impact on climate during the last 150 years

*Maryline Vautravers
(Godwin Laboratory, Cambridge)*

Friday, 30th May

Millennial-scale sea-level fluctuations during the last glacial cycle

*Mark Siddall
(Southampton)*

**Talks will be held in West Court,
Clare Hall, Hershel Road at 8.30pm.
Everyone welcome.**

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Deadlines:

Copy for the next issue of CAMQUA should be submitted to the editors by the end of the academic year.

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