

# FLAG News

THE NEWSLETTER OF THE FLUVIAL ARCHIVES GROUP  
 A RESEARCH GROUP OF THE QUATERNARY RESEARCH ASSOCIATION

This is the first issue of the FLAG Newsletter and therefore represents only our first attempt to produce an informative record of the Group's activities. The editor would welcome suggestions as to how this Newsletter could be improved and certainly it is hoped that you will submit information for publication and discussion. In the first instance this Newsletter will be produced twice a year in March and October. We would particularly welcome :

- Short Articles / Letters which raise points for discussion on any aspect of fluvial sediments and landforms
- Reports on field meetings and symposia likely to be of interest to FLAG News readers
- Information on forthcoming meetings / seminars which may be of interest to readers of FLAG News
- Annotated bibliographies of recent publications likely to be of interest to FLAG News readers.
- Calls for help in establishing collaborative research proposals
- Information on Grants, Studentships etc.

Deadlines for submission will be the 15<sup>th</sup> February and 15<sup>th</sup> September. Future issues of FLAG News will carry an ISSN to allow contributors to be accredited for contributions.

This is your Newsletter and it can evolve to satisfy its readers. Just let us know what information would help promote cooperation and collaboration both within our discipline and with closely allied disciplines. Although there is presently no membership fee to cover production and distribution of this Newsletter this situation will be reviewed after the first year.

## FIRST MEETING

### FLAG Unfurled!

**D**urham University was the setting for the first meeting of the QRA sponsored FLuvial Archives Group (FLAG). Twenty-five academics representing five European Countries (UK, Netherlands, Germany, Poland and Hungary) braved the cold northern air to meet on December 14<sup>th</sup> to discuss the aims and objectives for this Group.

Following discussion at the Durham meeting the groups activities will initially be channeled into two Themes. **Theme 1** is concerned with **Long Terrestrial Records** spanning the whole Pleistocene; **Theme 2** will address **Fluvial environments and processes** in relation to external and internal forcing.

## WHO'S WHO

### Steering Committee

**A** Steering Committee oversees the activities of FLAG. This committee comprises the initial proposers of the QRA Research Group together with further coordinators chosen to reflect the initial foci of the Group.

**Chief Coordinator :**  
 Dr Darrel Maddy (Cheltenham UK)

**Theme 1 Coordinators**  
 Dr David Bridgland (Durham, UK)  
 Dr Simon Lewis (Cheltenham, UK)  
 Dr Chris Green (RHUL, UK)

Dr Raimo Becker-Haumann  
 (Cologne, Germany)

**Theme 2 Coordinators**  
 Prof. Jef Vandenberghe  
 (Amsterdam, NL)  
 Dr Kees Kasse (Amsterdam, NL)  
 Dr Phil Gibbard (Cambridge, UK)  
 Dr Mark Macklin (Leeds, UK)

**Regional Coordinators**  
 Anyone from central and eastern Europe interested in joining the group should contact Prof. D. Krzyszkowski either in English, Polish, German or Russian.

address: P.O. Box 202, PL-53-350  
 Wroclaw, Poland (email:  
 dk2@poczta).

Further regional coordinators will be appointed shortly.

## GLOBAL MEMBERSHIP

**M**embership of FLAG has already grown exponentially with sixteen countries currently represented. FLAG welcomes membership from across the globe. If you are interested in joining or have colleagues who may be interested please contact any of the coordinators listed above (see

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back page for further contact information).

Membership presently stands at 66 with a breakdown as follows:

Belarus	1	Belgium	1
Canada	1	Czech Rep.	2
France	5	Germany	3
Hungary	1	Japan	2
Moldova	1	Morocco	1
Netherlands	5	Poland	3
Russia	2	UK	33
Ukraine	1	US	4

A directory of the membership giving Names, Contact information and Research Interests will be included with Issue 2. Members are therefore asked to supply a brief summary of their research interests to the News editor (see p8).

Anyone who does not wish to be included in this list please contact one of the coordinators.

#### DURHAM 96

Discussions in Durham were focused around four topics. Selected notes on the discussions which followed each presentation are also provided to give a flavour of the days activities.

### Late Glacial / Early Holocene Fluvial Archives

*Dr Mark Macklin  
Leeds University*

Three key research themes can be identified and are reviewed briefly below, with examples:

1. Relating Late Pleistocene and early Holocene fluvial archives to high-resolution records such as GRIP & GISP

Successful work of this type has been carried out in the Ebro basin (Spain), in the valley of the Guadaloupe tributary. IRSL dating of the terrace system here, which extends back to the Early Pleistocene, has been important. Over the last 50,000 years this river has responded to climatic fluctuation, at a very high resolution. The record increases in complexity downstream within the valley.

2. Controls on Holocene river alluviation and erosion; the relative importance of climate and land-use change

It is now accepted that both climate and land use are important as influences on river activity in the Holocene. Climate is especially important in mountain areas. In areas where the first farming came later than elsewhere, no corresponding delay in alluviation are seen, suggesting the climate is the more important factor.

3. River instability over the last neoglacial cycle (Little Ice Age), with analogues for global warming

A good example of research on this theme comes from Bolivia, where lichenometry has enabled dating of flood events. A second example from NE Britain is the Tyne basin. Instability manifests itself in the form of major incision, in response to significant discharge peaks. Buzzwords in these studies are 'sediment waves' and 'slugs' the subjects of a current project at Leeds.

One question to be answered is whether erosion upstream sparks sedimentation downstream. It seems that sediment waves pulse downstream, temporarily changing the channel system from a single thread to braided pattern.

#### Discussion

The following points arose in discussion:

Dramatic climatic instability over past 30,000 years or so (GRIP/GIST) is a challenge for those interpreting the fluvial record. Are some rivers more sensitive than others? Could there be gradients in rates of response, such as away from Atlantic margins? These might be themes to emphasis in putting together projects for funding.

River sequences are of wider significance in the archaeological record for the last 2000 years (identified under the NERC palaeoclimate programme) than peat bogs, which have received more attention from the palaeoclimate community. Rivers are very significant in terms of changes in flood frequency and magnitude - this can be more

sensitive to palaeoclimate than vegetation.

Very positive results have come from the LOIS programme.

The Fluvial archive is of considerable relevance in the prediction of hazards etc. It is possible to look at short time-scale climatic changes and their influence on flood frequency and flood magnitude.

Note that the FLAG objectives suggested above are discrete from the GLOCOPH agenda.

Note that care is required in taking the Holocene as an analogue for Pleistocene interglacials.

Sequences must be well dated to contribute usefully. Luminescence dating has worked very well in the Ebro, where there is much suitable feldspar around. In northern Britain this technique has not worked well, nor has it in Greece. Mineralogy controls this, plus the failure of complete zeroing in higher latitudes, which might explain poor resolution in northern Britain.

In South America studies are planned to address questions about the impacts of prehistoric populations. Environmental degradation prior to Spanish conquests has been underestimated in the past. There are potential links here with the social sciences/human geography community.

### Fluvial Archives of the Last Glacial Interglacial Cycle

*Prof. Jef Vandenberghe  
Vrije University, Amsterdam  
Dr Philip Gibbard  
Cambridge University*

The thinking behind this theme revolves around a model for explaining river activity in terms of response to climate, as favoured by workers in The Netherlands. Vegetation, which also responds to climate, is seen as very important, and its response to climate is delayed, so that climatic and vegetational influences on rivers are out of phase. This model envisages instability at the beginning of both the cold and warm parts of the climatic cycle. Cyclicity in fluvial sequences is not linearly related to climate, but like vegetation, is delayed.

Intrinsic evolution occurs in systems (e.g. braiding to meandering etc., with transitional phases), especially in the sequence (as seen in Warta and Maas Rivers): last glacial (braiding) - transitional (multiple narrow sinuous channels) - Lateglacial (meandering). Different river systems do not always respond according to the model, nor indeed in the same way as their neighbours. For instance, interglacial river characteristics would be expected from OI Stage 3, but this has not been seen in The Netherlands. The Maas was a braided river in the Younger Dryas, but this is not seen in the Warta. Perhaps this is because the Maas gradient is steeper - or is it related to sediment type? There is no transitional system between the Younger Dryas and the Holocene - the changes at this time are more abrupt than at the Beginning of the Bølling. It is thought that the period of instability within the climatic model can be compressed or even missing.

It should be noted that geology is a moving towards recognizing the sedimentary basin as a fundamental geological unit, with 'sequence stratigraphy' as an important new theme. The coverage of the fluvial record by texts on this theme needs refining. There is usually an emphasis on base level control (sea level), rather than climate, which Quaternary evidence would often refute. Sediment production and responses to climate/vegetation changes are important in the Quaternary. Tectonics may also be of importance in providing 'accommodation space' for sedimentation, which is facilitated by subsidence.

Key themes for future research can be identified:

- Intrinsic evolution and the delay in reaction to climate change. Thresholds are also seen as important. The approach
- should be based on multi-proxy regional variability.
- An assessment of the importance of permafrost periods - the
- effects of active layer thaw on fluvial discharge patterns

## Discussion

Darek Krzyszkowski noted that echoes of the events identified in Britain & Netherlands are seen in Poland & Belarus. Jef Vandenberghe agreed, but emphasized that there are differences, which might hold the key to understanding the mechanisms.

Chris Green suggested that some sort of transect study might be appropriate - perhaps an east to west transect to look at the last glacial-interglacial cycle.

Mark Macklin noted that sensitivity of drainage basins to impacts can vary through time. We need to understand why. There is a need to look at catchments as a whole, not just the valley floor. He also emphasized the importance of long-term uplift, providing accommodation for terrace staircases.

Chris Green considered it important for rivers chosen for study to be close to the thresholds, as then you will get a high-resolution record.

## Rivers during the Pleistocene (evidence for Milankovitch timescale forcing)

*Dr Chris Green  
University of London*

### 1. The long-term record

An important focus of research on Quaternary river systems is the study of their behaviour during the last interglacial/glacial cycle. The reasons for this Late Quaternary focus is that it addresses the most extensive and most complete record upon which to base predictive models of fluvial response to environmental change. It is not obvious however to what extent the last interglacial/glacial cycle is representative of global patterns of change during the Quaternary. There is therefore a need to examine the record of river behaviour throughout the Quaternary. Investigation of the long-term history of river systems during the Quaternary provides the opportunity to examine broad spatial and temporal patterns of change within which the shorter-term, quasi-cyclical changes of

glacial/interglacial and sub-Milankovitch periodicity take place.

### 2. River response to global environmental change

Wherever possible the river behaviour must be evaluated as part of the environmental response to global climatic change. In this was patterns of fluvial response can be related to stages of glaciation and deglaciation, sea level behaviour and biological response; fluvial response models can be developed for each major global cycle; and through comparative studies of successive episodes and across regional landscapes a fuller understanding of the potential behaviour of river systems can be developed. In particular, there is scope for exploring the stability of river systems relative to environmental change, for identifying key factors affecting stability, and for determining the nature of stability thresholds. There is in addition the separate problem of understanding why, when the stability of the system is disturbed, the result is sometimes downcutting, sometimes aggradation and sometimes lateral erosion. An essential starting point in this field of enquiry is the creation of a database through which firstly to evaluate existing records in terms of data quality and spatial or stratigraphic deficiencies, but ultimately to detect spatial and temporal patterns of river behaviour.

### 3. Re-examining the geomorphological evidence

In studies of the long term behaviour of river systems the continuity of river action is particularly clearly expressed in the geomorphological evidence. Geomorphological studies offer the opportunity, employing GIS and new dating techniques, to explore patterns of valley incision and processes of terrace formation, and to relate changes in the relief-forming behaviour of rivers to regional and global environmental records. Comparative studies of valley form are especially relevant for an understanding of the influence of tectonic and sea level behaviour in the development of river systems. An appropriate starting point in this field of enquiry will be a comparative study of the geomorphology of river basins in well documented but contrasting tectonic settings. There is also scope for a wide-ranging

study of the relief-forming role of rivers during the Quaternary with a view to understanding why the dominant mode globally has been incision. Research at this scale has potential significance for the interpretation especially of continental sequences, in the longer term pre-Quaternary geological record.

#### 4. The continuity of the fluvial record

The fluvial record is the most widely encountered record of terrestrial events during the Quaternary. It is well understood that it is a discontinuous record, but what is not at all well-understood is the likely duration of the episodes that shaped the record. This is true both for sedimentary units and for erosional features. An understanding of the timescales represented in the record is particularly important where there is complex juxtaposition of evidence relating to different time periods. These problems highlight the paramount importance of dating techniques for studies of Quaternary river systems.

In summary, the study of the long-term record has the potential to extend significantly our understanding of the cyclical change which are especially characteristic of the Quaternary. At the same time it is the key to understanding the progressive changes upon which cyclicity is superimposed, and the irregular processes that disturb the cyclical rhythms.

#### **Discussion**

Dave Bridgland asked what has caused change from plains in the Tertiary and valleys in Quaternary (with transitional wide valleys in early Pleistocene)? Both he and Chris Green felt that it might be related to changes in climatic cycles.

Phil Gibbard suggested climatic cooling led to production of coarse clastic sediment, important for empowering rivers in respect of erosion. Dave Bridgland agreed, but thought that uplift in response to the erosion thus empowered, causing entrenchment and more frequent rejuvenation, might be important, especially south of the common influence of glacial isostasy.

Chris Green would like to reexamine denudation chronology, perhaps using GIS

Discussion of the role and origin of uplift ensued, related to gorges, incised meanders etc. This debate might be revived at Simmons Yat, on the QRA Annual Field Meeting!

Phil Gibbard emphasized how little of the full time elapsed is represented within fluvial sequences.

Discussion of database possibilities:

Julia Branson suggested that a FLAG database could be part of a larger existing palaeoclimate database, suitable for long-term archiving.

### **The fluvial archive of long Quaternary terrestrial sequences: a context for the history of human evolution and human occupation**

*Dr David Bridgland  
Durham University ~  
Dr S.G. Lewis  
CECQR, Cheltenham*

A large proportion of the evidence for human occupation in prehistory, both in Britain and further afield, comes from artefacts found in fluvial sediments. These range from Lower Palaeolithic flint tools and knapping waste from their manufacture, commonly found in fluvial sediments in NW Europe dating from the Middle Pleistocene, to the record of the latest periods within prehistory that is found within the alluvium that lines modern valley floors. Over the longer timescale direct evidence of human evolution and presence is occasionally encountered in fluvial contexts, in the form of hominid remains. In Britain, the Swanscombe skull, found in Thames terrace deposits, is one of only three Middle Pleistocene hominid fossils, the others being from Boxgrove (raised shoreline deposits) and from Pontnewydd Cave. On the continent there is a greater wealth of hominid fossils, some coming from fluvial contexts (e.g. Mauer, type locality of *Homo heidelbergensis*; Steinheim; Bilzingsleben; Atapeurca).

Non-stone artefacts from the Middle Pleistocene are even rarer than human fossils. The Clacton Spear, from Thames-Medway sediments within the Clacton Channel interglacial sequence, is the only wooden example from Britain; from Schönningen in central Germany several spears and shafts for flint cutting tools represent a rare concentration of wooden artefacts, again in fluvial sediments.

Human fossils and non-stone artefacts are, of course, considerably more common in and beneath the Holocene alluvium, not least because of advances in technology during the Holocene, such as the advent of pottery. Indeed, human activity, in the form of early farming, is held by many to be directly responsible for the accumulation of the thick, fine-grained Holocene alluvium in many river valleys, for which there is no precise pre-Holocene analogue.

A principal aim of this subgroup of FLAG is to archive the evidence for human activity obtained from fluvial sediments. In Britain it will build upon the achievements of the 'Southern Rivers Palaeolithic Project' and 'The English Rivers Palaeolithic Survey', initiatives that have provided an updated database of Palaeolithic find-spots in Britain (now supplemented by the Welsh Palaeolithic Survey). In order to interpret the archaeological record from river deposits it is important that the nature of the fluvial sedimentary record is fully understood. In particular, the relations between sedimentation and climatic change, the evidence for palaeoenvironmental conditions at the time of occupation and the means of dating the fluvial sequences are crucial considerations. Correlation with the globally valid climatostratigraphic template provided by the oceanic oxygen isotope record is an important goal for those studying the Middle Pleistocene record. There are many different lines of evidence that can be used to achieve this, depending on the quality of preservation of biostratigraphical evidence, for example. Radiocarbon dating can provide an important geochronological framework for the late Upper Palaeolithic and post-Palaeolithic record.

Significant events within the history of human occupation of a particular fluvial system can be identified:

- The first appearance of artefacts, marking arrival of hominids
- Evidence for disappearance and reappearance, if any
- The first use of the Levallois technique
- The appearance and disappearance of the Mousterian
- The appearance of Upper Palaeolithic technology

With all the above, evidence for the relations between technology and hominid type is of considerable importance

Valley floor alluvium can yield evidence for the progression in culture and technology during the Holocene, from the Mesolithic to the Iron Age (inclusive)

The following are suggested as objectives for contributors to this subgroup of FLAG:

Production of summary cross section diagrams of particular river systems (in the case of terraced systems, these will be 'staircase diagrams') to show:

- Heights above sea level
- Main sediment types (including interbedded non-fluvial

sediments)

- Suggested correlations with the oceanic record (OIS)
- Important biostratigraphical horizons
- Important horizons with evidence for human occupation

#### **Discussion**

Dave Bridgland, summarizing his views, thought that one aim for this theme would be to assemble comparative data from as many river catchments as possible, perhaps using the staircase diagram as a standard. He felt, though, that a compendium of such data would make for a rather dry monograph.

Phil Gibbard warned (in relation to aspects of dating) of the dangers of jumping to OIS correlations before local sequences are understood

Dave Bridgland said he recognized the problems recognised but thought the correlation exercise to be so important that it should be undertaken where possible, noting the constraints and the the uncertainties that exist.

Jef Vandenberghe asked whether stratigraphic questions such as this were relevant to FLAG. It was widely felt that they were.

Darek Krzyszkowski highlighted pitfalls in terminology, e.g. Saalian

Jef Vandenberghe again asked

whether FLAG is to be involved in purely stratigraphic problems or are fluvial activity problems the key role.

Dave Bridgland thought that rivers can address some problems, e.g. the timing of the 'vole clock', where time transgressive evolution might be detectable in comparison of fluvial records from different areas.

Mark White felt that archaeology offers little but can utilise the geological framework provided. Too many artefact-based schemes have failed, therefore archaeologists are wary of such schemes.

Chris Green would welcome the construction of a database, but this should not become an accepted framework, X-sections are over-simplified, data is not clear

Darrel Maddy asked whether we should recognise two initial themes (1 and 2) The first would consider long records(interesting question could include stratigraphic problems). The second Theme could focus on fluvial processes and responses to changing control variables.

Chris Green felt that there were two approaches: detail and synthesis: both valid - Dave Bridgland is a synthesiser!

The final hour of the day was spent discussing the organisation and structure of FLAG. The fruits of this discussion will become apparent over the following months.

## **FLAG MEETINGS**

**September 7-10<sup>th</sup> 1997**

Field Meeting Germany (7/8<sup>th</sup>)

Symposium Netherlands (9<sup>th</sup>)

Field Meeting Netherlands (10<sup>th</sup>)

*see this issue for further details*

**September 1998**

Cheltenham 3 day International Conference

*Rivers: Archives of Environmental Change*

**August 1999**

Special Session at INQUA, South Africa

(to be confirmed)

for further details see the the next edition of FLAG News or contact Dr Darrel Maddy, CECQR, Francis Close Hall, Seindon Road, Cheltenham UK GL50 4AZ. Dmaddy@chelt.ac.uk

The group discussed the Netherlands meeting which will be organised by Prof. Vandenberghe and Dr Kees Kasse. Dr Manfred Frechen offered to lead an optional additional excursion to the Middle Rhine area in Germany prior to the Dutch meeting.

One major theme which had arisen was the formation of an archive for FLAG data. To this end Julia Branson was asked to convey her experience as coordinator of the GLOCOPH database. Julia kindly agreed to supply a short article for this issue of News in order to open up the debate to a wider audience.

# First steps towards a data strategy for FLAG

Julia Branson

GeoData Institute, University of Southampton, Southampton, S017 1BJ

This article aims to provide a focus for the continuing discussion of a data and information policy for the Fluvial Archive Group (FLAG) following the introduction given at the December 1996 meeting. It does not attempt to provide a data structure or implementation methodology, but rather presents general issues recognised within other palaeoenvironmental data management programmes. It seeks to identify areas where data management may contribute to palaeoscience and its potential role within FLAG activities. Data management is not seen as limited to numeric and textual data, but can be extended to include graphic images, maps and site photographs etc.

## The value of a data strategy to FLAG

The value of digital data management and archiving within palaeoscience is recognised by a number of other global science initiatives, including: PAGES (e.g. PAGES, 1995), GLOCOPH (e.g. Branson *et al.*, 1995, 1996) and World Data Centers. Similar justification for a data management policy may be relevant to FLAG.

The adoption of a data management policy may seem premature when many of the principles behind the science are still hotly debated, but it is important to recognise that data management is not merely an archiving process, but can also contribute to the understanding of scientific problems themselves.

Quaternary fluvial science generates its own range of specific data types, but it is when these data are combined with other palaeoenvironmental evidence that greater utility is gained. Equally, the data and interpretation generated from fluvial environment analysis has a lot to offer cross-disciplinary understanding of environmental change. For example, archaeological investigation may both benefit from an understanding of the fluvial system and contribute to dating of changes. Such multi-disciplinary cross-fertilisation, facilitated by easy identification of studies is a primary benefit of a co-ordinated data management system.

In addition, the collation of data into a central archive provides a resource within which cross-correlation of data from different sites can be undertaken - something which is normally undertaken in the context of a literature review, but can be much quicker and extensive within a centralised system. The compilation of research results is particularly important given the high time and resource requirements of Quaternary fluvial research programmes which means that individual researchers work on only a limited number of sites, but it is particularly important that these sites are put into a wider temporal and spatial context than which they were collected, and a coherent data management strategy may facilitate this.

Such archiving and data management are familiar to the Quaternary fluvial scientist with active use of such systems as the British Geological Survey borehole databases. In much the same way, the fluvial, sediment and morphological data and other information types may be handled in a similar consistent manner to allow for the identification of, and ease of access to, site background datasets. Such background information can be particularly valuable for scientists new to the subject and for scientists investigating new areas.

An efficient management policy would be expected to both archive existing data and contribute to the development of the science. Whilst recording of sites is often not conducted consistently, a database approach would require a basic

minimum consistent dataset. It does not replace understanding the whole study, but helps to identify studies from a wide range of fields which may be relevant. Equally, the establishment of protocols for the recording of new data and the incorporation of existing data with the necessary standardisation or translations of units, terms and languages would contribute to the ease of correlation between datasets. Many such tasks can be automated within the database environment, such as conversion of datums, measurement units etc.

Increasingly, grant awarding bodies now require that the data collected in projects should be archived within the public domain, and electronic data publishing has become an accepted indicator of research activity, for which citation credit is given (e.g. NOAA Paleoclimatology Program, 1996; Overpeck *et al.*, 1996). In these circumstances an effective and authoritative review mechanism becomes essential to ensure data quality. Such validation of data would be an essential part of the incorporation within a FLAG data management system.

## Steps forward

Fundamental to the development of a data management strategy is the long term commitment that may be an appropriate role of FLAG. The success of any such data management strategy inevitably relies heavily on the commitment of the contributory scientists and funding. As a first stage FLAG might consider the establishment of a data working group to identify models for possible data strategies, initially working from those adopted by other palaeoscience information programmes (e.g. GLOCOPH - Branson *et al.*, 1995, 1996; PAGES - PAGES, 1995). Elements of a strategy could be adopted on a number of levels, these are not necessarily exclusive, and many could be run in parallel, but would require different levels of funding and commitment:

- i) Establishment of standards for data collection in the field and recording, including a minimum data requirement. This step is seen as being imperative for an international science programme
- ii) Guidelines regarding which public domain database that data collected

by FLAG scientists should be contributed to.

iii) Development of a FLAG data directory, providing summaries of relevant datasets, including details of researchers, area studied, techniques used, main findings, related publications and location of dataset if available in the public domain.

iv) Development of a FLAG digital database for data storage. This would involve issues such as; design of data structures, agreement of data sharing protocols and determination of data transfer mechanisms.

### Bibliography

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PAGES 1995. Global Palaeoenvironmental Data. *PAGES Workshop Report Series 95-2*, 114 pp.

## Netherlands September 8-10<sup>th</sup> 1997

timetable: arrival: evening of the 8<sup>th</sup>  
paper session: 9<sup>th</sup>  
excursion: 10<sup>th</sup>  
departure: morning of the 11<sup>th</sup>

The **general themes** of the FLAG-meeting are:

- **Long-term river system development in Europe**
- **Fluvial environments and processes in relation to external and internal forcing.**

Paper session on the 9<sup>th</sup>

- half a day with invited oral contributions
- half a day with poster presentations on the general themes.

Excursion on the 10<sup>th</sup>

This excursion will concentrate on the fluvial development of the Maas Valley in the southern Netherlands. The following elements will be demonstrated in the field

- *Quaternary terrace flight of the Maas*
- *Late Glacial and Holocene river development in relation to climate change and human activity*
- *Modern river management: flooding control, gravel exploitation and development of nature resources*
- *Tectonic and climatic control on river activity*

**Registration** : Interested attendants are invited to register directly: Prof. J. Vandenberghe, Faculty of Earth Sciences, Vrije Universiteit De Boelelaan 1085, 1081 HV Amsterdam tel. 31-20-4447368, e-mail. [vanj@geo.vu.nl](mailto:vanj@geo.vu.nl), fax. 31-20-6462457 Additional information concerning accommodation and costs will be provided from March onwards (a special mailing of information will be sent to FLAG members).

## Germany September 6-8<sup>th</sup> 1997

timetable: arrival: evening of the 6<sup>th</sup>  
excursion: 7<sup>th</sup>  
departure: excursion and transfer to Netherlands 8<sup>th</sup>

There is also an option for a pre-Netherlands field excursion in the Lower and Middle Rhine Area. This trip will combine terrace and loess stratigraphy and will include visits to key Pleistocene sections such as Ariendorf and Kaerlich in the Middle Rhine Area and Rheindahlen in the Lower Rhine area.

Volcanic craters of the East Eifel Volcanic Field preserve remarkable records of glacial and interglacial sediments in inter- and intra-crater depressions. This trip will include a visit to the scoria cones at Toenchesberg and Eppelsberg.

The trip will also include a visit to the archaeological excavations in Rheindahlen (loess deposits) and terrace accumulations influenced by Saalian ice glaciotectonic disturbance.

**Registration** : If you are interested in taking part in the pre-Netherlands excursion further details can be obtained from Dr Manfred Frechen, CECQR, Francis Close Hall, Swindon Road, Cheltenham, UK. *email: MFrechen@chelt.ac.uk*

FLAG members from the UK will note that this meeting immediately precedes the QRA short field meeting in Brittany (Sept 12-15<sup>th</sup>). Transport to Brittany from Maastricht may be available for delegates who intend attending the QRA field meeting. Please contact Darrel Maddy for further details (see FLAG Contact List p8)

#### FIRST SUCCESS

## An early funding success for FLAG

David Bridgland has been awarded a three year grant from the Leverhulme Trust for a project entitled 'Middle Pleistocene Mammalian biostratigraphy of NW European rivers'. The grant covers the salary of a research assistant and expenses for field and other work associated with the project, which starts in February 1997. Linkage to FLAG was cited in the application!

#### QRA FIELD MEETING

Desperate for fieldwork? Can't wait for the FLAG field meetings in September? Why not join us on the Annual Quaternary Research Association Field Meeting in Cheltenham, UK, March 24<sup>th</sup>-27<sup>th</sup> 1997.

This meeting offers the opportunity to see important exposures of river sediments in the Severn, Thames and Lugg valleys. Important Middle-Late Pleistocene sequences.

For further details see the QRA Newsletter or contact Darrel Maddy (see below for details)

***If you wish to receive future issues of FLAG News don't forget to register your membership with one of the Contacts listed below.***



## CONTACT INFORMATION

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