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Lake Baikal: some topical aspects of current research*

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In the past ten years international interest in the palaeolimnology of Lake Baikal has grown markedly. This is partly because of the lake's great potential for palaeoenvironmental studies, particularly for long term palaeoclimatic research, and partly because of the political changes in the Former Soviet Union that have allowed greater opportunities for international research. There are currently several international projects focused on sediment record research and this workshop was convened to briefly review and report on some aspects of these initiatives.

The session was chaired by Rick Battarbee and began with an introduction to Lake Baikal by Roger Flower (ECRC, London). The exceptional characteristics of the lake (great size, long sedimentary record and remarkable endemic biota) were briefly described and related to some past and present lines of research. The contribution by Russian research during the 1920s to the 1980s was noted and the success of BICER (Baikal International Centre of Ecological Research) in promoting international joint sedimentological research in particular was emphasised. BICER is a Russian initiative begun in 1989 by Dr M. Grachev (Director of the Limnological Institute, Irkutsk) and colleagues in conjunction with 'founder member' countries including Britain, USA, Belgium and Japan. One particular early avenue of research opend up by BICER was use of palaeoenvironmental records in the upper sediment record to test hypothesis about recent environmental changes in the lake. The main conclusion from this project which ran between 1992 and 1995 was that the lake as a whole is much less contaminated and ecologically disturbed that was commonly thought at the time. The results of interrelated studies carried out during this period are published in a suite of papers published in a special issue of the Journal of Paleolimnology (1998, vol. 20).

In the past two years, work on recent sediments has taken a new turn and joint Swiss-British-Russian projects began in 1995/96. The aim is to understand more about modern sediment forming and depositing processes in the lake using linked studies on diatom phytoplankton, sedimenting material and recent sediments. One aim of this work is to improve interpretation of longer term palaeoclimatic records (GEOPASS) in the lake. New long-term records are already becomming available from Lake Baikal, largely as a result of the American-Russian-Japanese-German Baikal Drilling Programme (BDP) that began in 1993.

Following the introduction, three more themed presentations were given. Modern sedimentological processes are currently being investigated using a variety of techniques and Michael Sturm (EAWAG, Duebendorf) gave an outline account of the GEOPASS project. As part of GEOPASS, about 100 short sediment cores have been collected from several parts of the lake during the 1996 and 1997 field seasons. This project also includes the deployment and operation of a complex sediment trap array in the south basin of Lake Baikal. The trapping programme began in December 1995 and is aimed at measuring particle flux rates with an emphasis of diatom sedimentation by using both simple open tube traps and automatic sequence sampling traps placed at various depths. The focus on diatom deposition was continued by David Ryves (ECRC, London) who used plankton, sediment trap, and sediment core data to give a preliminary account of how diatom preservation changed during sinking and sedi-

*The minutes of a workshop held during the 7th International Palaeolimnology Symposium in Heiligkreuztal, Germany on 29 August 1997.

ment formation. The potential for further long term palaeoenvironmental studies on Baikal sediments shown by Johannes Mueller (AWI, Potsdam). He briefly reviewed the achievements so far of the BDP and explained some research aims of the Potsdam group. These entail using long cores taken from Academicians Ridge region of Baikal for geochemical (oxygen isotope analysis of diatom remains), sedimentological (clay mineralogy) and for palynological analyses.

After the themed presentations, a more general discussion ensued. Progessor Negendank (GFZ, Potsdam) mentioned the newly formed International Continental Drilling Project (ICDP) and its funding by G7 countries. ICDP involves ocean drilling techniques and Dr D. Williams (USA) is a contact person for ICDP applications. However, Russia has not signed up to the ICDP but other funding initiatives for long core work in Baikal are on-going. Michael Sturm suggested that there are two ways of proceeding with sediment record research in Baikal, to continue collecting deeper cores from the same location, or to try to obtain shorter sedimentary sequences from different parts of the lake for assessment of sedimentological problems. Since it is logistically difficult to obtain good Holocene records from Lake Baikal, the issue was raised as to why not study other lakes instead. Rick Battarbee responding by emphasizing that Lake Baikal was special because it offered the potential for establishing links between climate and endemic diatom plankton abundances that do not exist elsewhere. Furthermore, knowledge about the control mechanisms of the year-to-year variations in diatom crops was improving as a result of work by Dr David Jewson (Ulster) and colleagues. The link between endemism and climate, and the co-evolution of diatoms over the Quarternary Period were mentioned as other promising lines of palaeoenvironmental research.

Professor Horie (GFZ, Potsdam) pointed out that Japanese researchers had been working on Baikal since 1967. They were now working on both the 1993 and 1996 BDP cores from the lake and that the emphasis was now on biostratigraphic rather than geochemical evidence of past climates. The need for additional information about modern sedimentary environments within Lake Baikal was also noted and Michael Sturm reported that plans for further seismic work including sub-bottom profiling were being drawn up by Dr de Batiste (Belgium). He went on to announce that the next international BICER workshop was to be held in Zurich (30-31 October 1997) and in Novosibirsk (first half of December 1997). More information on these workshops may be obtained from the BICER coordinator Rolf Kipfer (kipfer@eawag.ch).

Rick Battarbee concluded the meeting with an optimistic prognosis for furture palaeoenvironmental research in Lake Baikal. Involvement of Baikal in other international initiatives such as the Pole-Equator-Pole Transect II programme within PAGES should also stimulate future research. However, as international projects proliferate, there is an increasing need for quality controls on the data generated and one way to do this is to establish more multinational workshops to co-ordinate focused research. In particular, diatom biostratigraphies generated by different laboratories need to employ common taxonomic concepts and one aim of the ECRC group is to organise future workshops for this purpose (workshop information may be obtained from Anson Mackay, amackay@geog.ucl.ac.uk).

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Notes added in proof: Since this workshop was convened, the BICER secretary has changed and Rolf Kipfer has been replaced by Anson Mackay for the year 1998–1999. The GEOPASS Project is described in some detail elsewhere (see Flower et al., 1998, Freshwater Forum, 11, 16–29) but the sediment trapping programmed was terminated in December 1997. Results will soon be submitted for publication. Following on from the last point in the above minutes, a taxonomic workshop for Baikalian benthic diatoms is planned for late 1999 and will be held in London (UK). It is jointly organized by the Natural History Museum and the Environmental Change Research Centre. Further details can be obtained from David Williams, dm@nhm.ac.uk.

R.J.F., January 1999