Lake Sedimentation Induced by the Volcanic Eruption

K. CHIKITA\textsuperscript{1*}, H. UEDA\textsuperscript{2}, K. HIRAYAMA\textsuperscript{1} and N. UMEHARA\textsuperscript{1}

\textsuperscript{1}Division of Earth and Planetary Sciences, Graduate School of Science, Hokkaido University
\textsuperscript{2}Faculty of Fisheries, Hokkaido University
*chikita@ep.sci.hokudai.ac.jp

Usu Volcano, Hokkaido, Japan was erupted on 31 March 2000 after 23 years’ pause. Volcanic mudflows, due to the gushing of magma-heated groundwater, occurred with the peaked discharge of 9 April. The mudflows produced a turbid bottom layer at depths of more than 100 m in caldera Lake Toya (maximum depth, 179.0 m; surface area, 70.44 km$^2$), adjacent to Usu Volcano. The bottom layer decreased water turbidity by deposition of suspended sediment, though the turbidity sometimes increased slightly by relatively small discharge of volcanic ash from rainfalls. We monitored behaviors of the turbid bottom layer by fixing a mooring system of sediment traps and a 3D current meter with sensors of water temperature and turbidity. Time series of 3D velocity, water temperature and turbidity, and grain size and mineralogy of trapped sediment show that sediment-laden underflows, initiated by mudflows, produced and maintained the bottom turbid layer consisting of silt and clay particles.

Key words: volcanic eruption, mudflows, sedimentation, sediment-laden underflows
Evolution of a High-Mountain Thermokarst Lake
A. KÄÄB and W. HAEBERLI
Department of Geography, University of Zurich
kaeaeb@geo.unizh.ch

Thermokarst lakes – characteristic landscape elements of the Arctic – are rarely found in alpine situations. Here, a 30-year photogrammetric monitoring series of a thermokarst lake in the Gruben area, Swiss Alps, is presented. The lake, situated in an environment of dead-ice remains and creeping permafrost, reached a final size of ca. 10,000 m² in area and 50'000 m³ in volume before it had to be drained artificially in 1995. Starting in the mid 1960s it grew with radial rates of ca. 1.5 to 5 meters per year. Non-linear coupling of lake diameter and energy turnover led to accelerated area growth. The development of the lake was presumably driven by thermal convection of water. By a dynamic model of lake growth we show, that a change in climate conditions and/or the lake bottom topography could have significantly influenced the observed lake evolution. The effective energy turnover used for ice-melt and subsequent lake growth was estimated to be in the order $10^4$ J s⁻¹ m⁻².

Key words: thermokarst, thaw, high-mountain, lake, convection
Hydroacoustic and Sedimentological Investigations on two Spitsbergen Lakes
R. MÄUSBACHER1, J. MÜLLER2, K. van der BORG3, G. DAUT4,
D. v. KNORRE1, E. KROEMER2 and J. WALLNER2
1 Physische Geographie, Friedrich Schiller Universität Jena
2 Lehrstuhl für Allg.-, Angew.- und Ingenieur-Geologie, TU München
3 R.J. Van de Graaff laboratorium, Universiteit Utrecht
*crm@geogr.uni-jena.

Two lakes in NW-Spitsbergen were investigated using a 3.5 kHz subbottom profiler and gravity and piston coring devices in order to get new informations on the deglaciation history, isostatic and eustatic sealevel changes and the sediment flux from the catchment area into the lakes. The seismic profiles show three acoustic units that correspond very well with the sedimentological results of the cores. Fine grained red silt and clay with some dropestones and fossils that indicate marine conditions are overlaying the basal moraine. The upper unit shows fine laminated limnic and/or brakish silts and clays without any macrofossils. The radiocarbon data show that the deglaciation started in the lake basins around 11 ky B.P. or even earlier. The lake basins were then part of the marine fjord system until 10 ky B.P. (Varfluesjoen) and 8 ky B.P. (Vogtvadnet). After that Freshwater or brakish conditions established in both lakes. Readvances of the glaciers are not yet detected in the records of these lakes.

Key words: Spitsbergen, deglaciation, lake sediments, sea level change, sediment flux
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Physical Environmental and Geomorphology of Prespa Lakes Basin

NASIP MEÇAJ
Academy of Sciences
Geographic Studies Center
Email: nmecai@abisnet.com.al

Albanian lake coastal line, including the fresh water system of Ohrid and Prespa lakes is 72 km long and is dominated by steep mountains coming down to Ohrid, Big and Small Prespa Lakes. Also, there is found a narrow flood plain opening to the South and Western part of Pogradeci lake. This diverse and dynamic land – lake interface has been for centuries a corridor of intense interaction between natural system and human activities. The rich diversity of lake coastal line and geomorphologic features, including beaches, marshes, wetlands, harbors, rocky cliffs, caves and grottoes, have provided an irreplaceable natural resource base for the people, since Iliric tribes first settled here over 3000 years ago.

The system consists of two parts:
1. Big and Small Prespa lakes, which make the upper part of the system, and
2. Ohrid lake representing the lower part, with a relative difference in altitude of 157 m and separated by the mountain chain of Dry Mountain and Galichitsa with an altitude 2287 m and 1953 m each.

Mailing Address of Corresponding Author:
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Department
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Prof. Dr. Nasip Meçaj
Academy of Sciences
Geographic Studies Center
Str. Murat Toptani No.11
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To reveal recent hydro-geomorphological changes in climatically and tectonically sensitive zone, some sediment cores were taken from three lakes (Fuxian-he, Xingyun-he, Qilu-he) in Yunnan, China. Cs-137 and Pb-210 concentration is used for age scaling. Analytical results for some physical and chemical properties of the sediments show that

1. average sedimentation rate in Qilu-he is the largest among the three lakes, mainly because of large land use area (urban and cultivated area) in the catchment,
2. sedimentation rates are larger after the peak of Cs-137 concentration (1963) than before, especially in Qilu-he, probably because of severe earthquake in 1970 (M7.7; 16,000 people were killed) in addition to increase in urban and cultivated area, population etc. (anthropogenic causes).
3. sedimentation rates studied here are smaller than those in lakes studied in Japan, a little larger than those checked in U.K. (Foster et al, 1990), seemingly related to rainfall intensity.

*Key words: rainfall condition, tectonic condition, sedimentation rate*
Hydro-geomorphological Fluctuation during the Late Quaternary inferred from Lake Baikal Sediment

S. OCHIAI$^1$, H. NAKAGAWA$^1$ and K. KASHIWAYA$^1$

$^1$Department of Earth Sciences, Kanazawa University

*ochiai@nihonkai.kanazawa-u.ac.jp

Physical properties of sediment cores from the Academician Ridge in Lake Baikal have revealed hydro-geomorphological fluctuations during the past 250 kyr. The content of coarse mineral grain (>20 m), which may be related to fluvial process, was high during interglacial periods and low during glacial periods; the maximum mineral grain size was large in the interglacial intervals and small in the glacial intervals. This suggests that erosional and transporting force related to precipitation in the lake catchment area was strong during interglacials and weak during glacials. The mineral grain flux was generally large during glacials although coarse grain content was low, suggesting that fine grain flux was large in the periods.

Key words: Lake Baikal, lake sediment, paleoprecipitation
Recent Limno-geomorphological Environment in Baikal Region inferred from Surficial Lake Sediments

M. SASAKI\textsuperscript{1} and K. KASHIWAYA\textsuperscript{1}

\textsuperscript{1}Department of Earth Sciences, Kanazawa University

\textsuperscript{1}mikis@nihonkai.kanazawa-u.ac.jp

Spatial distribution and changes in physical properties and composition of surficial sediments in Lake Baikal reveal recent limno-geomorphological environment in Baikal region. Sedimentation rate during the past 50 years with artificial radionuclide (Cs-137) varies from 0.032 g/cm\textsuperscript{2}/yr in the Academician Ridge, 0.036 g/cm\textsuperscript{2}/yr in the Northern Basin, 0.04-0.05 g/cm\textsuperscript{2}/yr in the Southern and the Central Basin to 0.163 g/cm\textsuperscript{2}/yr in the Selenga Delta. This corresponds to mineral particle content and/or size. It seems to be related to distance from shore, water depth and corresponding catchment areas. As sampling points are away from river mouth, mineral particle size decreases gradually although it has a low limit. Mineral particle content in the Southern and the Central Basin affected mainly by the Selenga is clearly larger than in the Northern Basin and the Academician Ridge, suggesting difference in environmental conditions of the basins and their surrounding catchment areas.

Key words: Baikal region, surficial sediments, limno-geomorphological environment, physical properties
Erosional Processes and Sedimentation in Small Catchment-Pond Systems in Japan

Y. TSUYA¹, K. KASHIWAYA¹ and T. OKIMURA²
¹Department of Earth Sciences, Kanazawa University
²Research Center for Urban Safety and Security, Kobe University
*tsuya08@nihonkai.kanazawa-u.ac.jp

Tectono- and climato-precipitation related erosional processes have been examined in two catchment-pond systems; one located in Kobe, 1995-Kobe-earthquake-experienced area, another located in Kanazawa where there is more precipitation especially in winter. In Kobe, sedimentation rate before the earthquake was 3.3kg/m²/yr, but after the earthquake it increased rapidly in 1995 at about 30.4kg/m²/yr and decreased afterward; it was 8.4kg/m²/yr in 1998. Sedimentation rate of 1967 extreme heavy rainfall year in the same pond was 43.6kg/m²/yr. Sedimentation rate in Kanazawa pond mainly related to precipitation was about 24.2 kg/m²/yr. These lead that tectono- and climato-environment deeply influenced pond sedimentation.

Key words: erosional process, Kobe earthquake, pond sediment
S 13 : Climato and Tectono-geomorphic changes and lake sediment information.

R. K. DUTTA CHOWDHURY\textsuperscript{1*} and R.K.RAI\textsuperscript{2}

1*, 2 Department of Geography, North Eastern Hill University, Shillong-14, Meghalaya, India, e-mail : 1* rkdappu@onebox.com 2 rkrai30@hotmail.com

Microbial Analysis and Environmental Management of selected water bodies of Guwahati City, Assam, India

Ponds, tanks, wells and rivers are the main source of water in rural India. People depend on these sources for daily use. But in towns and cities, even though there is municipal supply, people have to depend on the natural sources because the municipal supplies are not regular and sufficient. The tanks in the heart of Guwahati city are going through the process of eutrophication. The present study involves the estimation of some water quality analysis, bed sediment analysis and the microbial analysis of the algae population present in some selected tanks taken for study. The environmental management of the tanks has been discussed to improve the conditions of the tanks.

Keywords: eutrophication, water quality, microbial analysis, algae, environmental management.