ANTHROPOGENIC INFLUENCE ON THE ^{14}C ACTIVITY OF RECENT LAKE SEDIMENTS: A CASE STUDY[1]

DUŠAN SRDOČ[2], NADA HORVATINČIĆ[2], MARIJAN AHEL[2], WALTER GIGER[3] CHRISTIAN SCHAFFNER[3], DONAT PETRICIOLI[2], JOŽE PEZDIČ[4], ELENA MARČENKO[2] and ANDJELKA PLENKOVIĆ-MORAJ[5]

Anthropogenic activities that introduce excess of nutrients and other pollutants into rivers and lakes are causing significant changes in aquatic environments. The excess of nutrients greatly accelerate the process of eutrophication. Lake marl formed in the period of eutrophication differs in several aspects from that formed in oligotrophic water.

Recent sediment cores, 30 cm long, from Prošće and Kozjak lakes located in Plitvice National Park, central Croatia, Yugoslavia, were analyzed for ^{14}C activity of lake marl and organic carbon in the sediment, the ratio of stable isotopes (^{13}C, ^{18}O) and the distribution of diatoms. The abrupt increase of a population of diatom species, *Cyclotella operculata unipuctata* and *Achnanthes clevei rostrata*, in the uppermost 5 cm layer was attributed to eutrophication of the lake water. ^{14}C activity measurements helped to determine the time period of an increased input of nutrients into lakes. The increase of the ^{14}C activity in lake sediment due to the bomb effect was used for age determination of the depth profiles.

A molecular characterization of the hydrocarbons isolated from the sediment was performed. Computer-assisted high-resolution gas chromatography/mass spectrometry was applied to estimate contributions of biogenic, fossil and pyrolytic hydrocarbons.

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[2]Rudjer Bošković Institute, 41001 Zagreb, Yugoslavia
[3]Swiss Federal Institute for Water Resources and Water Pollution Control, 8600 Dübendorf, Switzerland
[4]Jožef Stefan Institute, 61000 Ljubljana, Yugoslavia
[5]Faculty of Natural Sciences, Department of Botany, University of Zagreb, Zagreb, Yugoslavia

ENVIRONMENTS OF THE PAST 20,000 YEARS BASED ON AMS ^{14}C, $\delta^{13}C$ AND $\delta^{15}N$ VALUES ON PROTEINS AND INDIVIDUAL AMINO ACIDS

THOMAS W STAFFORD, JR

Center for Geochronological Research, INSTAAR, University of Colorado, Boulder, Colorado 80309-0450 USA

Climate change is described by comparing modern to ancient environmental conditions. Analysis of past climatic conditions and predictions for future change are improved by 1) better time control for climatic changes, and 2) developing new proxies of past climates. Fossil mammals are suited for paleoecology because they are datable by ^{14}C AMS - bone contains isotopic signatures of animal diets, species associations reflect paleoenvironments and extinctions, and biome changes represent environmental control.

AMS ^{14}C research includes dating of megafaunal species, such as Holocene "remnants" and species never dated. Extinction of the Late Pleistocene megafauna is estimated as 10,900 ± 100 yr BP. Fossil associations of micromammals (rodents and insectivores) no longer living together (disharmonious faunas) imply equable climates from 18,000–10,000 BP. Direct dating of disharmonious fossil rodent species confirmed the equability model because the fossil micromammals were contemporaneous in Great Plains faunas. Information on paleovegetation is