

SOURCES OF METHANE IN SUBALPINE LAKE BLEED, SLOVENIAMarinka GAMS PETRIŠIČ¹, Nives OGRINC¹, Valentina TURK² and Jadran FAGANELI²¹*Dept. of Environ. Sci. "J. Stefan" Institute, Jamova 39, 1000 Ljubljana, Slovenia*²*Marine Biological Station, National Institute of Biology, Fornače 41, 6330 Piran, Slovenia*

The sources of methane produced in the anoxic part of the Lake Bled in Slovenia were investigated using a combination of chemical and stable isotope analyses. The samples were taken at three different depths: in the upper part, in the thermocline and in the lower, anoxic part in the water column. In addition, sediment samples were taken in order to determine the concentration and isotopic composition of methane in pore water. The carbon dynamics in the sediment was simulated by a numerical model that accounts for all basic processes controlling the formation of dissolved inorganic carbon (DIC). The remineralized carbon (DIC plus CH₄) has mean $\delta^{13}\text{C}$ value of -28.4‰ indicating decomposition of "fresher", more labile sedimentary organic matter (OM) derived from microalgae and deposited phytoplankton. It was also found that lipids were better preserved in anoxic part of the lake since approximate one order of magnitude higher concentration were determined in the part with higher oxygen concentration. The dominant carbon isotope effect expressed during early diagenesis is associated with methanogenesis. Methane in pore water has a measured value of -69‰ , while DIC is enriched in ^{13}C with the highest $\delta^{13}\text{C}$ value of 4.8‰ observed at the depth of 14 cm in the sediment. The calcite dissolution in the anoxic part of the lake is not important process since calcite is generally supersaturated and precipitation is thermodynamically favored.