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Radionuclide dating (210Pb, 137Cs) of short core sediments from Lake Iznik (NW Turkey)

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This study is focussed on sedimentological and geochemical investigations of several short sediment cores taken from Lake Iznik, the biggest lake in the Marmara region (40°26'N, 29°32'E). The tectonic fresh water lake has a surface area of 313 km^2 and maximum depth of 80 m. Its non-varved sediments are marked by distinct variations in geochemical and mineralogical proxies, which mostly due to climate and environmental changes. Therefore the creation of a 210Pb and 137Cs geochronology is an important tool to date these changes and to recognize the human impact, historical intense rain and earthquake events. In addition, high resolution data sets (magnetic susceptibility, chemical data from XRF scanning) allow the correlation of the cores and the improvement of the generated age models.

210Pb and 137Cs geochronology is now available for six selected cores from different locations in the lake. Different 210Pb dating models were tested to ascertain the most appropriate model for sediment ages of Lake Iznik cores. The best fit for 210Pb and 137Cs activities was obtained with the Constant Flux Constant sedimentation model (CF:CS) for cores IZN05/1AB and IZN05/10 and with Segmented CF:CS for cores IZN05/4E and IZN05/13. However, for cores IZN05/7 and IZN05/9, the best results derive from the Constant Initial Concentrations model (CIC). The 137Cs activities profiles show the first occurrence of 137Cs in the atmosphere at around 1954. From there the 137Cs activities increase continuously up to the maximum at around 1963 after the nuclear test-ban treaty. A second peak, which corresponds to the Chernobyl reactor accident from 1986, was only recognized in the core IZN05/10 with the highest Mass accumulation rates (MAR). In the other cores this peak is only visible as

a plateau. This feature may due to the sampling interval (2 cm) and/or migration of 137Cs within the core.

The cores (IZN05/1AB, 7) from the northern lake area and the core (IZN05/4E) from the ridge in the middle of the lake show relatively lower sedimentation rates due to gentle slope of the lakes margins (0,25 and 0,35 cm year -1). The core close to Sölöz river outlet IZN05/9 have higher sedimentation rates (0,49 cm year -1) because of the river input. In the southern part of the lake where the branch of North Anatolian Fault passes the lake margins has steep slopes. Therefore cores (IZN05/10 and 13) from the southern basin has highest sedimentation rates (0,70 and 0,65 cm year -1).

In logarithmic MAR- 210Pb activity profiles of IZN05/9 and 10 these event deposits were documented by non linearity's in the profile. In sedimentological description of the core IZN05/9 two event deposits were recognized with high continental derived plant fragments and thicker grain sizes. The imprints of these deposits were also seen in dry bulk density and magnetic susceptibility with higher values in both cores. For cores IZN05/9 and 10 210Pb ages were calculated removing disturbed layers.