SEDIMENTARY RECORD OF MORASKO METEORITE IMPACT IN LAKE SEDIMENTS FROM THE REGION OF POZNAŃ (POLAND) - FIRST RESULTS. K. Pleskot[1,*], W. Szczuciński[1], M. Makohonienko[2], R. Tjallingii[3], K. Apolinarska[1], and M. Woszczyk[2], [1]Institute of Geology, Adam Mickiewicz University in Poznań, Maków Polnych 16, 61-606 Poznań, Poland, [2]Institute of Geoecology and Geoinformation, Adam Mickiewicz University in Poznań, Dzięgielowa 27, 61-680 Poznań, Poland, [3]Section 5.2 Climate Dynamics and Landscape Evolution, GFZ German Research Centre for Geosciences, Telegrafenberg 14473 Potsdam, Germany, e-mail*: krzypl@amu.edu.pl

Introduction: About 5.3 ka BP a largest iron meteorite shower in Central Europe occured nearby contemporary Morasko, Poznań, Poland (fig. 1). The so far documented evidences of the impact include thousands of iron meteorites distributed over an area of approximately 3 x 1 km and at least 7 impact craters with maximum diameter of about 90 m. Internal structure and mineral composition of meteorites were already extensively studied. Current project, in turn, is focused on the influence of the impact on adjacent areas. Our investigations are based on sedimentological archives of lakes located in the vicinity of the craters. Aims of the study include:

1) assessment of the area influenced by the impact,
2) identification of the sedimentological and geochemical signatures of the impact,
3) assessment of the ecosystem consequences of the impact,
4) assessment of the duration of the effects of the impact on the environment.

Study area: Morasko crater field is located in Poznań Lake District. In its close vicinity (< 8 km) there are few lakes from which three were selected for investigations, namely: Glinnowieckie Lake, Strzeszyńskie Lake and Kierskie Lake (fig. 1). All of these are of glacial origin and have been formed after Poznań (Frankfurt) phase of the last glaciation (~18.5 ka BP). The analyses of the lake sediments are focused on middle Holocene (ca. 4.5 – 6.5 ka BP), i.e. in a range of supposed impact age. From each lake from 2 to 4 sediment cores up to 14 m long were collected. Selected cores were analyzed in terms of their sedimentology (grain size distribution, sedimentary structures), magnetic susceptibility, geochemistry (XRF scanning, TC, TOC, totN, $\delta^{15}N$, $\delta^{13}C$) and pollen analysis. The age control was by AMS ^{14}C dating.

Results and interpretation: The sediment core from Strzeszyńskie Lake (located 6 km from the crater field) is mostly built of massive, calcareous gyttja locally interbedded with finely laminated layers. Preliminary results from analysis of the sediments indicate increased soil erosion in catchment of the lake around 6 ka BP, i.e. several hundred years before supposed impact age. The erosion is marked by enrichment in coarser grained sediments and by reversal of time-depth relationships dates. This coincide with likely eutrophication of the lake expressed in higher content of diatomaceous Si and Ca as well as with depletion of oxygen of bottom waters indicated by low Mn/Fe ratio and preserved laminations. Pollen analysis of aforementioned layer shows significant shift in plant composition. Higher content of alder (*Alnus*) indicate changes in lake level while higher content of pioneering birch (*Betula*) and mugwort (*Artemisia*) as well as decrease in deciduous forest component, oak (*Quercus*) indicate disturbances in the catchment. The presence of plantain (*Plantago Lanceolaata*) suggest that these disturbances may be triggered by men. Changes in sediment composition are short lasting and are terminated by sharp transition from elevated to previously measured values. The termination took place before 5 ka BP and coincide with distinct and narrow peak in magnetic susceptibility and Ni. Because of similar age and high concentration of one of the major chemical element of the Morasko meteorite, it is possible that the later minor changes in magnetic susceptibility and nickel content were triggered by meteorite impact. It would suggest that the effects of the event in the catchment of Strzeszyńskie Lake were minor but might be one of possible reasons of men activity cessation in the catchement.

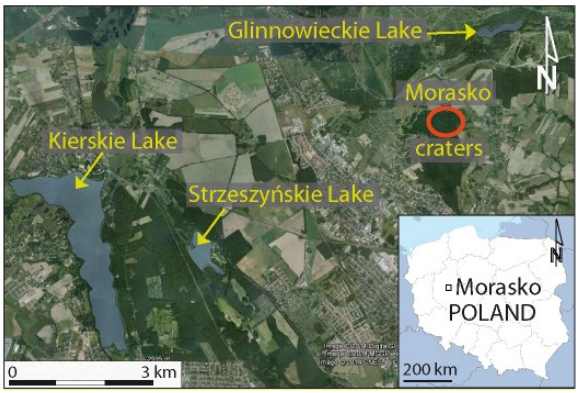

Fig. 1. Location of the study area. Investigated lakes indicated with arrows.

So far analysis of the sediments from next two lakes include macroscopic description, dating and magnetic susceptibility measurements. There are no clear, macroscopic evidences of the meteorite impact

in sediments from Kierskie Lake (located 7.5 km from the crater field). In turn in the cores from Glinnowieckie Lake (located 2 km from the crater field) there were found small gyttja intraclast in mid-Holocene horizon which may be interpreted as the effect of sediment disturbance triggered by impact-related earthquake-generated seiche. However, in both lakes, there were no distinct peaks in magnetic susceptibility in contrast to Strzeszyńskie Lake sediments, which shows that the record of the event in lake sediments is site-specific.

The analysis of sediments from the investigated lakes are still ongoing. Particularly important are analysis of Ir content which allow to state whether particular disturbances of lakes catchment are caused by meteorite impact or another event.

Conclusions: Preliminary results leads to the conclusion that though the Morasko meteorite impact could create few craters of up to 90 m width, the disturbances caused by the event were not far reaching. Nonetheless there are some evidences that allow to suppose that the meteorite impact triggered abandonment of local settlements. However further investigations have to be made to verify this hypothesis.

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