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INVENTORY OF SEDIMENTS OF THE DAMMED LAKE IN KOZŁOWA GÓRA AND FIRST MEASUREMENTS OF ^{210}Pb ACTIVITIES IN THE LAKE DEPOSITS

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Abstract: The dammed lake Kozłowa Góra was created in 1939, and has been utilized as a fresh–water reservoir. The lake is situated in Upper Silesia. The paper describes this artificial water reservoir, its sediments, the probes used and the sediment cores collected for analyses of activities of ^{210}Pb. The cores of sediments have been collected in 13 sites, 6 of them along the dam. Sediment cores were gained by the freezing method.

^{210}Pb method has been widely used in dating of lake sediments. The activity of allochthonous ^{210}Pb decreases according to the law of radioactive decay with the half–life of $T_{½} = 22.26$ yr. Thus its activity can be used to determine the age of sediments within the range of several half–lives (100-150 years). Here we present preliminary ^{210}Pb measurements in sediments of dammed lake Kozłowa Góra.

1. INTRODUCTION

The water reservoir in Kozłowa Góra was being built in 1935 – 1938 as a part of public works programme, and put into operation in 1939. Originally it was intended to serve military purposes.

The reservoir has been created by damming the river Brynica 28 km from its spring, by a dam 7 m high and 1400 m long. The dam was built from locally derived material, and it consisted of 50% of clayey sands and *ca* 40% of debris of sandstone. The dam was sealed by a layer of clay with admixture of fine sand and Triassic silt. During the reconstruction in 1969, the top surface has been hardened to withstand motor traffic, and the sealing was supplemented by a concrete construction. Due to that the volume of the reservoir was distincly increased (by *ca* 80%).

In 1948 – 1951 the reservoir was adapted to civil needs. In frame of that, the iron water pipes of 120 mm in diameter have been plugged into the outlet holes of the dam. These pipes transport water to the water cleaning station which is situated *ca* 400 m away. Besides being a supply of drinking water, the reservoir protects the Brynica river valley against floods.

The main parameters of the water reservoir in Kozłowa Góra have been shown in **Table 1**.

Bedrock and catchment

The Kozłowa Góra reservoir is situated in the Upper Silesian Voievodship, *ca* 3 km from the village Kozłowa Góra and 6 km from the town of Piekary Śląskie (**Fig. 1**). The reservoir of Kozłowa Góra collects water from the upper part of the Brynica river catchment, which encom-

Table 1. *The main parameters of the water reservoir in Kozłowa (Sokół et al., 2001).*

Area [km^2]		Depth [m]		Maximum length [km]	Maximum width [km]	Volume [mln m^3]	Catchment area [km^2]
water surface	islands	max.	mean				
6.3 / 4.6 [1)]	0	5.6	2.3	3.6	2.0	16.8 / 14.31	184

[1] The area and volume of the reservoir depend on setting of the discharge device - the values in Table 1 are given for the maximum water lifting (water table at the elevation of 278.99 m a.s.l.) and the normal water lifting, when the water table elevates at 278.58 m a.s.l.

Fig. 1. The map of vicinity of the Kozłowa Góra reservoir.

passes the north-eastern part of the Upper Silesian Industrial Region. Additionally, the reservoir collects water from melioration trenches, and in one of these trenches, the surplus water may be transferred from the reservoir in Nakło – Chechło.

The complex studies of the reservoir performed in the 70-ties indicated, that the nearby metallurgical plants, the dense net of roads and agricultural activity heavily contaminated water in the resevoir and altered a chemical composition of sediments. It has been proven, that the main source of pollution was the fallout of dust from the contaminated atmospheric air.

According to the monitoring, carried out by the Sanitary-Epidemiological Station in Katowice, the situation has not improved during the following decades. For example, dust emission in the vicinity of Świerklaniec in 1982 reached the level of 150 $\frac{t}{km^2 year}$. Among heavy metals, the dominant fallout was that of zinc - 465 $\frac{kg}{km^2 year}$ on average, and lead – a mean value of 223 $\frac{kg}{km^2 year}$ (Szilman *et al.,* 1995).

The dust is outwashed from the surrounding of the Brynica river and its large part migrates into the reservoir. Some amount of dust falls directly into the reservoir and is accumulated in the bottom sediments.

Identification of contamination sources of the Brynica river held in 1964 indicated, that an extraordinarily danger for the water quality was brought by an untreated household waste and also from numerous small enterprises. This waste sunk into the reservoir beyond any control. In practice, the whole area of densely populated vicinity of the Kozłowa Góra reservoir was devoid of any sewarage and treatment systems till 2000.

Morphology

The bottom of the present Kozłowa Góra basin was formerly covered by wet meadows formed on muds and peats, and by cultivated fields. The surface facies are underlain by layers of sands and gravels.

The reservoir has a shape of elongated irregular ellipse 3.6 km long and 0.8 - 2.0 km wide. Its longer axis has a meridional orientation. The eastern part of the reservoir has a natural character - the shoreline is natural and well developed. In the northern part of the basin (near the inlet), the shoreline has irregular shape, with numerous coves and shallowings. These shallowings are densely covered by vegetation of shallow-water and shore communities. The southern edge of the reservoir is formed by a front dam, with the overflow-discharge facilities and the intake of drinking water. The western shore is formed by a side dam 3 km long. Among others, the fishermen boats are housed there.

The valley of Brynica at the spot of the reservoir is shallow, and only the eastern shore is distinct there.

2. CORING OF THE SEDIMENT MATERIAL

The coring equipment

The sediments of the Kozłowa Góra reservoir were retrieved frozen *in situ*. The applied probes: aluminium probe of a wedge shape (**Fig. 2 A_1 and A_2**) and copper probe in form of tube (**Fig. 2 B**) have been constructed by Walanus (1993) following the desing of Renberg (1981).

The probe was filled each time with a mixture of dry ice and alcohol having a temperature of *ca* -70°C. After gravitational penetration of sediment to the desired depth, the corer was overgrown by a layer of frozen sediments of the thickness up to 1-3 cm. The thickness of frozen layer depended on:

1. *Depth the corer penetrated to* – this is because intensity of heat exchange between corer and the ambient sediment depends on the depth. The most intense exchange occurs between the corer and water above the lake bottom, the exchange between corer and sediments is weaker and it decreases downward the sediments. Due to that, the loss of dry ice is the slowest,

and the frozen sediment the thickest at the lower end of the corer.

2. *Time of freezing* – it is of the order of 10 – 15 min. This time is not strictly determined - it depends on depth of penetration and amount of cooling agent in the corer. The improper setting of time of freezing, makes the amout of retrieved frozen sediments very small, usually without the topmost section. The proper freezing time was determined by obervation of gas bubbles on the water surface, rising from sublimating dry ice.

After retrieving, the sediment cores were cut into depth-specific segments, melted and placed in hermetic plastic boxes. To falicitate removal of sediment segments, the inside of the corer was filled with a warm water.

Description of sediments

The sediments of the Kozłowa Góra reservoir are formed of dark-grey, almost black algal-detrital, carbonateless organic gyttja. The sediment gives a characteristic strong odour of hydrosulfide, produced during decomposition of organic matter. At the top, the sediment is semi-liquid, deeper it is very soft and of somewhat gelly consistence. Dowards the profile the amount of water descreases, so the density of sediment ranges between 1002 and 1450 $\frac{\mathrm{kg}}{\mathrm{m}^3}$. The sediments of such a type occur in the whole basin. In general the sediments along the cores are homogeneous, with only slight variations in colour. In many cores, smaller or bigger fragments of roots and stems were found. Moreover, at different depths one can see traces of sand, silt or gravel. The bottom parts of cores consist of mixture of brown humus, sand, silt and gravel of different granulation, and in some cores large branches of trees were found. Such a composition of underlying deposits has not been a surprise, as the reseroir was formed by flooding agricultural and inhabitet terrain. The density of the bottom material was usually higher than 1450 $\frac{\mathrm{kg}}{\mathrm{m}^3}$.

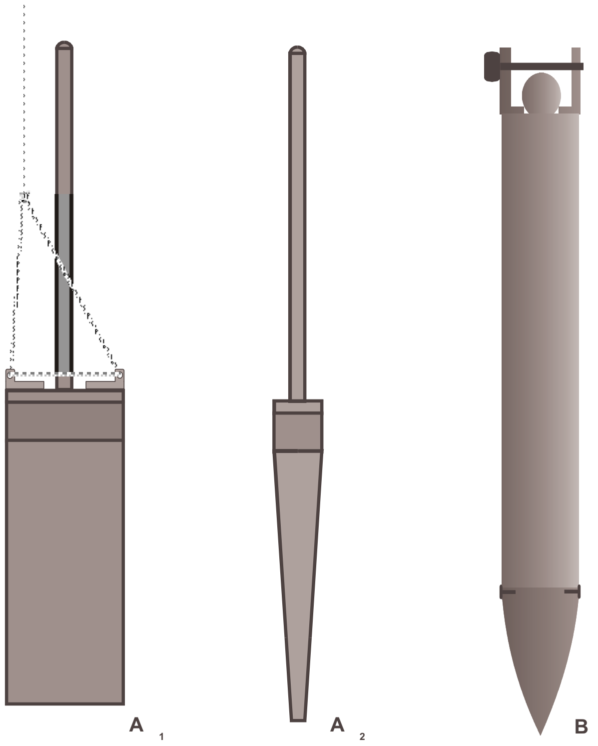

Fig. 2. The probes used for retrieving bottom sediments: A_1, A_2 – a wedge probe (viewed from the front and from the side), B – a tube probe.

An interesting feature of the Kozłowa Góra reservoir sediments is a thickness, distictly different in different parts of the basin. The northern part, inflowed by the Brynica river, is practically barren of sediments (core 8, which consists entirely of sand and silt underlying the basin), while the thickness of sediments increases southward (for example, the cores 5 and 7 at the cetnre of the reservoir contain *ca* 40 cm of sediment). Near the dam, the sediments are thick, and exceeds 1 m (cores 9, 10 and 11). Such differences are certainly connected with a still active former channel of the Brynica river.

In 1999, 16 cores were collected from the sediments of the Kozłowa Góra reservoir. The description of collected cores and their division into samples is given in **Table 2**.

3. ^{210}Pb ACTIVITIES, MEASUREMENTS AND RESULTS

^{210}Pb method has been widely used in dating lake sediments (Krishnaswami *et al.*, 1971; Eakins, 1983; Tobin and Schell, 1988; Liu *et al.*, 1991; Preiss *et al.*, 1996). ^{210}Pb in sediments consists of authigenic ^{210}Pb coming from the decay of ^{226}Ra, which is a natural component of terrestrial rocks, and of allochthonous ^{210}Pb produced from ^{222}Rn, emanated from the lithosphere. The activity of authigenic ^{210}Pb in the layer of sediment is constant on the contrary to the activity of allochthonous ^{210}Pb which decreases according to the law of radioactive decay with the half–life of $T_{1/2}$ = 22.26 yr. Thus its activity can be used to determine the age of sediments within the range of several half–lives (100-150 years). Concentration of ^{210}Pb in the sediment cores was determined by the alpha-spectrometry technique, using the equipment and procedures described by Goslar *et al.* (2000). In such a technique, the number and energy of alpha particles emitted by ^{210}Po are measured. ^{210}Po is formed after two consecutive decays of ^{210}Pb and then ^{210}Bi, and is assumed to be in a secular equilibrium with the parent isotope. ^{210}Po is chemically separated from the sediment material and deposited as a thin source on a silver substrate.

Prior to the chemical treatment leading to ^{210}Po separation and its deposition on a silver disc, the ^{208}Po spike of known radioactivity is added to a precisely weighed out amount of sediment. In this way any changes in the overall efficiency (including chemical treatment, deposition of polonium and alpha particle detection) may be corrected for. Alpha particles ($E_{210\mathrm{Po}}$ = 5.308 MeV, $E_{208\mathrm{Po}}$ = 5.105 MeV) emitted by the two polonium isotopes are detected by a silicon surface barrier detector.

The results of measurements of ^{210}Pb activity in the sediment samples are shown in **Table 3**. For the most of cores, an expected general decrease of ^{210}Pb with depth is revealed (**Fig. 3**). However, application of classical ap-

Table 2. Characteristic of samples collected from the Kozłowa Góra reservoir.

Sample No	Depth [cm]	Mass [g]	Volume [cm³]	Density [g/cm³]	Remarks
Core 1					
KG01/9901	0-8	102	97	1.05	- water depth: 2.20 m - the youngest and the oldest lake sediments collected (together with the underlying deposits)
KG01/9902	8 - 16	368	352	1.05	
KG01/9903	16 - 24	377	356	1.06	
KG01/9904	24 - 32	522	490	1.07	
KG01/9905	32 -40	543	511	1.06	
KG01/9906	40 - 48	560	537	1.04	
KG01/9907	48- 56	539	495	1.09	
KG01/9908	56-64	544	504	1.08	
KG01/9909	bottom 64 -74	514	352	1.46	
Core 2					
KG02/9901	0 -8	221	207	1.07	- water depth: 2.55 m - the youngest and the oldest lake sediments collected (together with the underlying deposits)
KG02/9902	8 - 16	267	248	1.08	
KG02/9903	16 - 24	273	255	1.07	
KG02/9904	24 - 32	256	245	1.05	
KG02/9905	32 - 40	269	245	1.10	
KG02/9906	40 - 48	272	245	1.11	
Core 3					
KG03/9901	0 -8	452	429	1.05	- water depth: 2.35 m - the youngest and the oldest lake sediments collected (together with the underlying deposits)
KG03/9902	8 - 16	278	256	1.09	
KG03/9903	16 - 24	362	332	1.09	
KG03/9904	24 - 32	263	256	1.03	
KG03/9905	32 - 40	278	259	1.07	
KG03/9906	40 - 48	286	257	1.11	
KG03/9907	48 - 56	276	248	1.12	
KG03/9908	56 - 64	275	248	1.11	
Core 4					
KG04/9901	0 - 3.5	285	257	1.11	- water depth: 1.35 m - the youngest and the oldest lake sediments collected (together with the underlying deposits)
KG04/9902	3.5 - 7	281	254	1.11	
KG04/9903	7 - 10.5	146	131	1.12	
KG04/9904	10.5 - 14	291	248	1.17	
Core 5					
KG05/9901	0 - 3.5	111	108	1.03	- water depth: 2.20 m - the youngest and the oldest lake sediments collected (together with the underlying deposits)
KG05/9902	3.5 - 7	117	113	1.04	
KG05/9903	7 - 10.5	139	124	1.12	
KG05/9904	10.5 - 14	134	122	1.10	
KG05/9905	14 - 17.5	412	360	1.14	
KG05/9906	bottom 17.5 - 27.5	325	216	1.50	
KG05/9907	bottom 27.5 - 37.5	401	360	1.11	

Sample No	Depth [cm]	Mass [g]
Core 6		
KG06/9901	0 -4	86
KG06/9902	4- 8	85
KG06/9903	8 -12	125
KG06/9904	12 - 16	104
KG06/9905	16 - 20	154
KG06/9906	20 - 24	158
Core 7		
KG07/9901	0 -4	236
KG07/9902	4- 8	254
KG07/9903	8 -12	267
KG07/9904	12 - 16	250
KG07/9905	16 - 20	260
KG07/9906	20 - 24	263
KG07/9907	bottom 24 - 28	273
KG07/9908	bottom 28 -38	287
Core 8		
KG08/9901	bottom 0 - 10	296
KG08/9902	bottom 10 - 20	464
KG08/9903	bottom 20 - 30	433
Core 9		
KG09/9901	0 - 10	98
KG09/9902	10 - 20	171
KG09/9903	20 - 30	231
KG09/9904	30 - 40	288
KG09/9905	40- 50	290
KG09/9906	50 - 60	245
KG09/9907	60 - 70	280
KG09/9908	70 - 80	295
KG09/9909	80 - 90	293
KG09/9910	90- 100	278
Core 9a		
KG09a/9901	40 -48	134
KG09a/9902	48 - 56	196
KG09a/9903	56 - 64	183
KG09a/9904	64 - 72	109
KG09a/9905	82 - 80	57
KG09a/9906	80 - 88	59

__Table 2.__ continuet

Sample No	**Depth** [cm]	**Mass** [g]	**Volume** [cm³]	**Density** [g/cm³]	**Remarks**
Core 10					
KG10/9901	15 - 25	149	140	1.06	water depth: 2.70 mlack of 15 cm of youngermost sediment, the oldest sediment was colelcted (together with underlying deposits)
KG10/9902	25 - 35	449	403	1.11	
KG10/9903	35 - 45	271	269	1.01	
KG10/9904	45 - 55	282	265	1.07	
KG10/9905	55 - 65	273	251	1.09	
KG10/9906	65 - 75	302	275	1.10	
KG10/9907	75 -85	296	275	1.07	
KG10/9908	85 - 95	288	262	1.10	
KG10/9909	95 - 105	297	172	1.73	
KG10/9910	105 - 115	286	272	1.05	
KG10/9911	115 - 125	267	252	1.06	
Core 10a					
KG10a/9901	40 - 50	30	30	1.00	- water depth: 2.70 m - lack of 40 cm of youngest sediments, and lack of the oldest sediments
KG10a/9902	50 - 60	80	77	1.04	
KG10a/9903	60 - 70	140	135	1.04	
KG10a/9904	70 - 80	172	165	1.04	
KG10a/9905	80- 90	269	251	1.07	
KG10a/9906	90 - 100	265	255	1.04	
KG10a/9907	100 - 110	127	124	1.02	
Core 11					
KG11/9901	10 - 20	194	188	1.03	- water depth: 2.70 m- lack of 10 cm of youngest sediments, the oldest sediments collected (together with the underlying deposits)
KG11/9902	20 - 30	292	268	1.09	
KG11/9903	30 - 40	284	259	1.10	
KG11/9904	40- 50	285	266	1.07	
KG11/9905	50 - 60	283	260	1.09	
KG11/9906	60 - 70	280	258	1.09	
KG11/9907	70 - 80	284	263	1.08	
KG11/9908	bottom 110 -120	329	280	1.17	
KG11/9909	120 - 130	442	260	1.70	

Sample No	**Depth** [cm]	**Mass** [g]
Core 11a		
KG11a/9901	20 - 30	121
KG11a/9902	30 - 40	194
KG11a/9903	40 - 50	292
KG11a/9904	50 - 60	284
KG11a/9905	60- 70	285
KG11a/9906	70 - 80	283
Core 12		
KG12/9901	30 - 38	58
KG12/9902	38 - 46	33
KG12/9903	46 - 54	121
KG12/9904	54 - 62	153
KG12/9905	62 - 70	186
KG12/9906	70 - 80	224
KG12/9907	80 - 90	361
Core 13		
KG13/9901	0 - 7.5	298
KG13/9902	7.5 - 15	237
KG13/9903	15 - 22.5	188
KG13/9904	22.5 - 30	245
KG13/9905	30 -37.5	322
KG13/9906	37.5 - 45	246
KG13/9907	45 - 52.5	284
KG13/9908	52.5 - 60	323
KG13/9909	60- 67.5	320
KG13/9910	67.5- 75	168

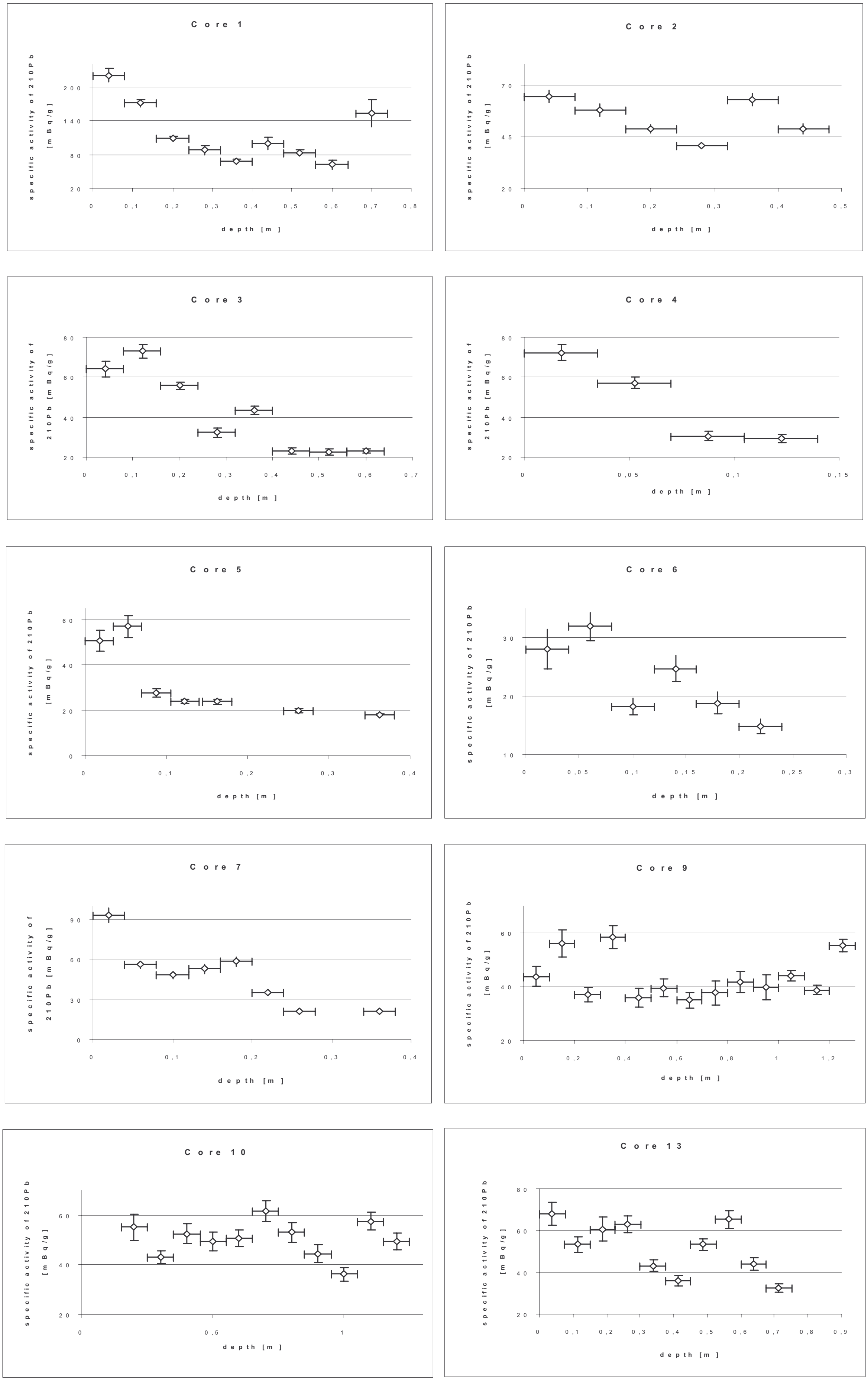

Fig. 3. *Total ^{210}Pb activity in sediment sample vs. depth for cores from Kozłowa Góra.*

Table 3. *Specific activity of ^{210}Pb and its uncertainity u (A) in sediment samples from the Kozłowa Góra reservoir.*

	Position of layer			
Sample No	**Depth** [cm]	**Mass depth** [g/cm^2]	**A** [mBq/g]	**u(A)** [mBq/g]
Core 1				
KG01/9901	4.0	8	220.4	11.3
KG01/9902	12.0	17	171.1	6.9
KG01/9903	20.0	25	108.3	4.7
KG01/9904	28.0	34	87.6	8.9
KG01/9905	36.0	42	67.8	4.5
KG01/9906	44.0	51	99.0	11.3
KG01/9907	52.0	59	83.3	6.0
KG01/9908	60.0	68	61.9	8.8
KG01/9909	70.0	86	152.9	23.7
Core 2				
KG02/9901	4.0	9	64.2	3.1
KG02/9902	12.0	17	57.9	2.9
KG02/9903	20.0	26	48.9	2.1
KG02/9904	28.0	34	40.7	1.0
KG02/9905	36.0	43	62.9	3.2
KG02/9906	44.0	52	48.8	2.6
Core 3				
KG03/9901	4.0	8	64.2	4.0
KG03/9902	12.0	17	73.2	3.4
KG03/9903	20.0	26	55.9	1.8
KG03/9904	28.0	34	32.3	2.3
KG03/9905	36.0	43	43.4	2.1
KG03/9906	44.0	52	23.0	1.6
KG03/9907	52.0	60	22.6	1.4
KG03/9908	60.0	69	23.1	1.2
Core 4				
KG04/9901	1.8	4	72.3	4.0
KG04/9902	5.3	8	57.2	2.9
KG04/9903	8.8	12	30.6	2.5
KG04/9904	12.3	16	29.3	2.1
Core 5				
KG05/9901	1.8	4	50.6	4.7
KG05/9902	5.3	7	57.1	4.9
KG05/9903	8.8	11	27.7	1.7
KG05/9904	12.3	15	24.1	0.9
KG05/9905	15.8	19	23.9	1.1
KG05/9906	22.4	34	19.9	0.8
KG05/9907	32.8	45	17.9	0.7
Core 6				
KG06/9901	2.0	4	28.1	3.4
KG06/9902	6.0	8	31.9	2.4
KG06/9903	10.0	13	18.2	1.4
KG06/9904	14.0	17	24.7	2.2
KG06/9905	18.0	22	18.8	1.9
KG06/9906	22.0	27	14.8	1.2
Core 7				
KG07/9901	2.0	4	92.8	5.3
KG07/9902	6.0	9	56.2	2.7
KG07/9903	10.0	13	48.2	2.5
KG07/9904	14.0	17	52.9	3.6
KG07/9905	18.0	21	58.4	3.4
KG07/9906	22.0	26	35.5	1.2
KG07/9907	26.0	30	20.9	0.9
KG07/9908	34.0	42	20.9	0.9
Core 8				
KG08/9901	5.0	15	24.4	1.9
KG08/9902	15.0	33	25.8	0.8
KG08/9903	25.0	51	23.8	2.0
Core 9				
KG09/9901	5.0	10	43.7	3.7
KG09/9902	15.0	21	56.2	5.0
KG09/9903	25.0	32	37.1	2.8
KG09/9904	35.0	43	58.4	4.2
KG09/9905	45.0	55	35.8	3.4
KG09/9906	55.0	66	39.4	3.3
KG09/9907	65.0	77	35.0	3.0
KG09/9908	75.0	88	37.7	4.5
KG09/9909	85.0	101	41.6	3.9
KG09/9910	95.0	112	39.7	4.6
KG09/9911	105.0	123	44.1	2.0
KG09/9912	115.0	135	38.7	1.7
KG09/9913	125.0	152	55.3	2.2
Core 9a				
KG09a/9901	44.0	8	45.5	3.2
KG09a/9902	52.0	17	44.2	3.4
KG09a/9903	60.0	25	48.4	3.7
KG09a/9904	68.0	34	55.6	3.7
KG09a/9905	76.0	43	45.9	2.8
KG09a/9906	84.0	52	44.1	3.3
Core 10				
KG010/9901	20.0	11	55.1	5.2
KG010/9902	30.0	22	43.2	2.6
KG010/9903	40.0	32	52.4	4.0
KG010/9904	50.0	43	49.5	3.7
KG010/9905	60.0	53	50.6	3.4
KG010/9906	70.0	64	61.7	4.2
KG010/9907	80.0	75	53.0	4.1
KG010/9908	90.0	86	44.5	3.6
KG010/9909	100.0	103	36.2	2.8
KG010/9910	110.0	114	57.5	3.6
KG010/9911	120.0	124	49.4	3.5
Core 10a				
KG10a/9901	45.0	10	45.1	2.7
KG10a/9902	55.0	20	46.5	2.4
KG10a/9903	65.0	31	52.6	1.7
KG10a/9904	75.0	41	51.6	2.3
KG10a/9905	85.0	52	48.7	2.1
KG10a/9906	95.0	62	36.8	1.8
KG10a/9907	105.0	73	51.2	3.3
Core 11				
KG11/9901	15.0	10	78.2	7.0
KG11/9902	25.0	21	51.1	5.5
KG11/9903	35.0	32	51.3	3.1
KG11/9904	45.0	43	58.2	3.9
KG11/9905	55.0	54	57.1	4.3
KG11/9906	65.0	65	53.4	3.7
KG11/9907	75.0	75	28.3	3.1
KG11/9908	115.0	87	34.0	2.8
KG11/9909	125.0	104	28.6	2.0
Core 11a				
KG11a/9901	25.0	10	79.2	6.6
KG11a/9902	35.0	20	55.3	4.4
KG11a/9903	45.0	31	64.0	5.7
KG11a/9904	55.0	42	45.5	3.7
KG11a/9905	65.0	53	55.2	4.0
KG11a/9906	75.0	63	42.9	3.3
Core 12				
KG12/9901	34.0	9	78.8	7.2
KG12/9902	42.0	18	50.2	3.8
KG12/9903	50.0	26	46.1	3.4
KG12/9904	58.0	34	58.3	4.3
KG12/9905	66.0	43	65.3	3.7
KG12/9906	76.0	54	35.9	3.4
KG12/9907	86.0	68	24.4	2.1
Core 13				
KG13/9901	3.8	8	68.2	5.5
KG13/9902	11.3	16	53.3	3.8
KG13/9903	18.8	23	60.7	5.8
KG13/9904	26.3	31	62.8	4.0
KG13/9905	33.8	40	43.2	2.8
KG13/9906	41.3	48	36.1	2.6
KG13/9907	48.8	57	53.3	2.9
KG13/9908	56.3	65	65.3	4.4
KG13/9909	63.8	73	43.8	3.0
KG13/9910	71.3	81	32.4	2.1

proach of ^{210}Pb dating is problematic. The alpha spectrometry gives the total ^{210}Pb activity in the sediment layer (see **Table 3**). In the classical variant of the lead-210 method, the activity of autigenic ^{210}Pb is assumed to be constant along the sediment column and it is determined by measurements on sediments old enough to contain no allochthonous ^{210}Pb. The activity of allochthonous lead is then calculated by subtracting the activity of autigenic lead from the total lead activity. The human–made lake Kozłowa Góra is too young to allow this approach. Therefore the gamma spectrometry has been used to assess the activity of autigenic lead (Sikorski and Bluszcz, 2003).

3. CONCLUSIONS

This paper reports preliminary results of the ^{210}Pb activity in Kozłowa Góra Lake sediments made by means of alpha spectrometry. Application of this method resulted in the values of total (supported and unsupported) activity of ^{210}Pb, which decreases approximately exponentially with the depth of sediment. The young age of this lake makes impossible assessing the activity of autigenic ^{210}Pb and the dating cannot be accomplished in a conventional way. Hence, an alternative method is necessary. As it is shown in another paper (Sikorski and Bluszcz, 2003, this volume), the gamma spectrometry is capable of helping the problem of autigenic ^{210}Pb activity in the case of this lake, and provides the way to complete dating of its sediments.

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