Distribution of Heavy Metals in Core Sediment at the Montenegrian coast

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INTRODUCTION

With rapid urbanization and industrialization in coastal areas, heavy metals continuously enter the marine environment. Sediments are the main repository and source of heavy metals in the marine environment, and they play a major role in the transport and storage of potentially hazardous metals. Metals are naturally present in the environment.

Therefore, the presence of metals in the sediments of aquatic ecosystems can originate from both both natural and anthropogenic sources. Heavy metal concentrations in core sediments can provide information on heavy metal inputs as well as the pollution history of the aquatic ecosystem.

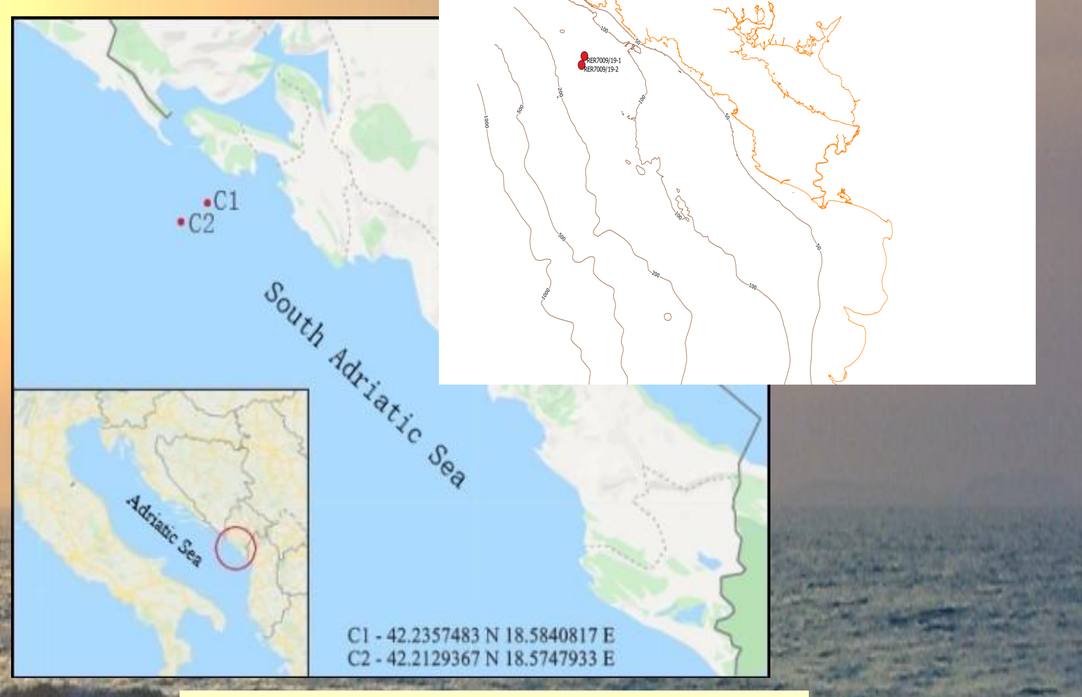
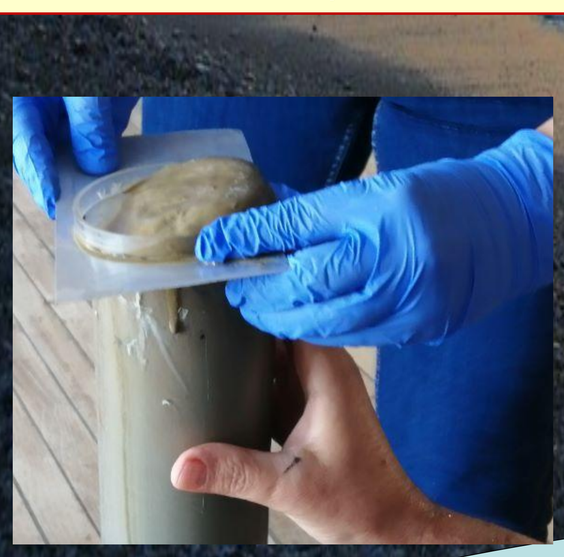


Fig. 1. Map of investigated position

MATERIAL & METHODS

Two core sediment samples were taken with a core sediment-sampler in October 2019 from two locations in Montenegro (South Adriatic Sea), which were selected based on the sedimentation rate (Fig. 1). The sediment cores have been cut into slices of 1 cm and labelled. The samples (each slice of the core) were brought to the laboratory in bags with ice and stored in a deep freezer unit the drying procedure.

Samples were digested in a microwave system, according to the methods described in the Laboratory Procedure Book, IAEA (International Atomic Energy Agency), Marine Environment Laboratory. Determinations of metal contents (Fe, Mn, Zn, Cu, Ni, Pb, Cr, and Hg) in sediments were performed by an atomic absorption spectrometer (Shimadzu AA 7000).



RESULTS & DISCUSSION

Sample		Cu	Zn	Mn	Fe	Cr	Ni	Pb	Hg
	cm	mg/kg							
	0-1	37.95	107.1	2041	41406	333.2	367.1	24.64	0.061
	1-2	38.67	108.3	2166	40914	337.8	384.7	25.89	0.053
	2-3	39.29	110.0	2274	42890	345.6	369.2	27.04	0.048
	3-4	38.42	109.2	1304	43248	352.2	391.4	29.93	0.045
	4-5	37.51	105.0	830.6	42779	341.0	384.7	27.60	0.061
	5-6	39.10	105.5	835.8	43432	366.4	381.5	26.74	0.068
Core 2	6-7	38.37	103.8	817.1	44383	367.4	376.2	32.20	0.048
	7-8	36.67	102.4	812.3	44287	360.9	362.3	32.22	0.042
	8-9	39.54	109.9	763.2	47556	326.5	406.2	26.10	0.086
	9-10	37.36	106.4	757.6	46864	326.6	394.8	26.35	0.058
	10-11	38.52	109.3	771.0	48178	327.9	405.4	28.89	0.047
	11-12	37.22	106.7	715.5	47056	346.9	411.4	29.19	0.047
	12-13	36.71	103.7	766.9	46344	341.5	403.5	27.96	0.057
	13-14	35.91	101.9	744.8	46111	333.6	395.2	30.08	0.047
	14-15	35.85	102.7	763.2	45712	348.5	398.9	31.99	0.051

Sample		Cu	Zn	Mn	Fe	Cr	Ni	Pb	Hg
	cm	mg/kg							
	1-2	35.27	106.0	2637	41848	347.2	353.6	27.38	0.052
	2-3	35.76	104.4	3342	41873	347.0	341.4	28.97	0.048
	3-4	36.33	105.5	1188	41724	342.5	348.4	28.24	0.040
	4-5	38.85	104.9	823.5	42948	350.4	357.4	30.50	0.047
	5-6	36.80	102.2	741.7	41319	335.7	348.1	30.53	0.049
	6-7	37.69	103.4	752.9	43591	268.3	349.9	28.63	0.050
	7-8	38.62	105.6	725.5	43202	273.2	345.3	30.00	0.042
Core 4	8-9	38.95	102.6	737.0	44100	273.5	356.1	27.68	0.060
	9-10	38.00	99.30	758.4	43099	275.7	346.8	28.77	0.032
	10-11	35.83	93.92	728.1	41791	265.2	329.8	27.25	0.031
	11-12	36.26	100.9	745.5	44123	278.2	351.5	24.27	0.044
	12-13	36.70	98.46	721.2	43197	279.5	349.9	23.89	0.027
	13-14	35.59	100.2	748.1	44462	283.3	350.7	25.88	0.040
	14-15	34.25	95.72	760.0	43222	289.7	351.1	26.31	0.052
	15-16	31.38	87.35	684.0	38920	264.2	321.0	25.91	0.047
	16-17	33.56	93.45	757.1	42064	285.3	351.5	29.51	0.039
	17-18	33.11	91.47	725.4	41445	272.7	336.7	30.26	0.043

Discussion: A comparison of the vertical and spatial distributions of metals in sediment cores showed differences associated with many factors, including geochemical and biogeochemical processes, like sedimentation, precipitation and flocculation of particulate substances. Hence, it is challenging to find the principal one.

The possible primary sources of the metal contamination in the sediments are municipal and industrial wastewater discharges (for Cu and Zn), agricultural runoff (for Cu), and atmospheric deposition (for Pb).

ACKNOWLEDGMENTS
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