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Black Sea SIERRA – Project 101124670

Training Courses

Science for the Black Sea: Marine Pollution, Biodiversity, and Recovery

**Fatsa Faculty of Marine Sciences
ORDU (Turkey)**





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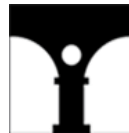
Ukraine



P2

E.M. ASSOCIAZIONE A.R.C.E.S. - ARCES

Italy



P5

ACADEMIA NAVALA MIRCEA CEL BATRAN
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Black Sea SIERRA – Project 101124670

Training Courses

Prof.Dr Mehmet AYDIN

Prof.Dr Özkan UĞURLU

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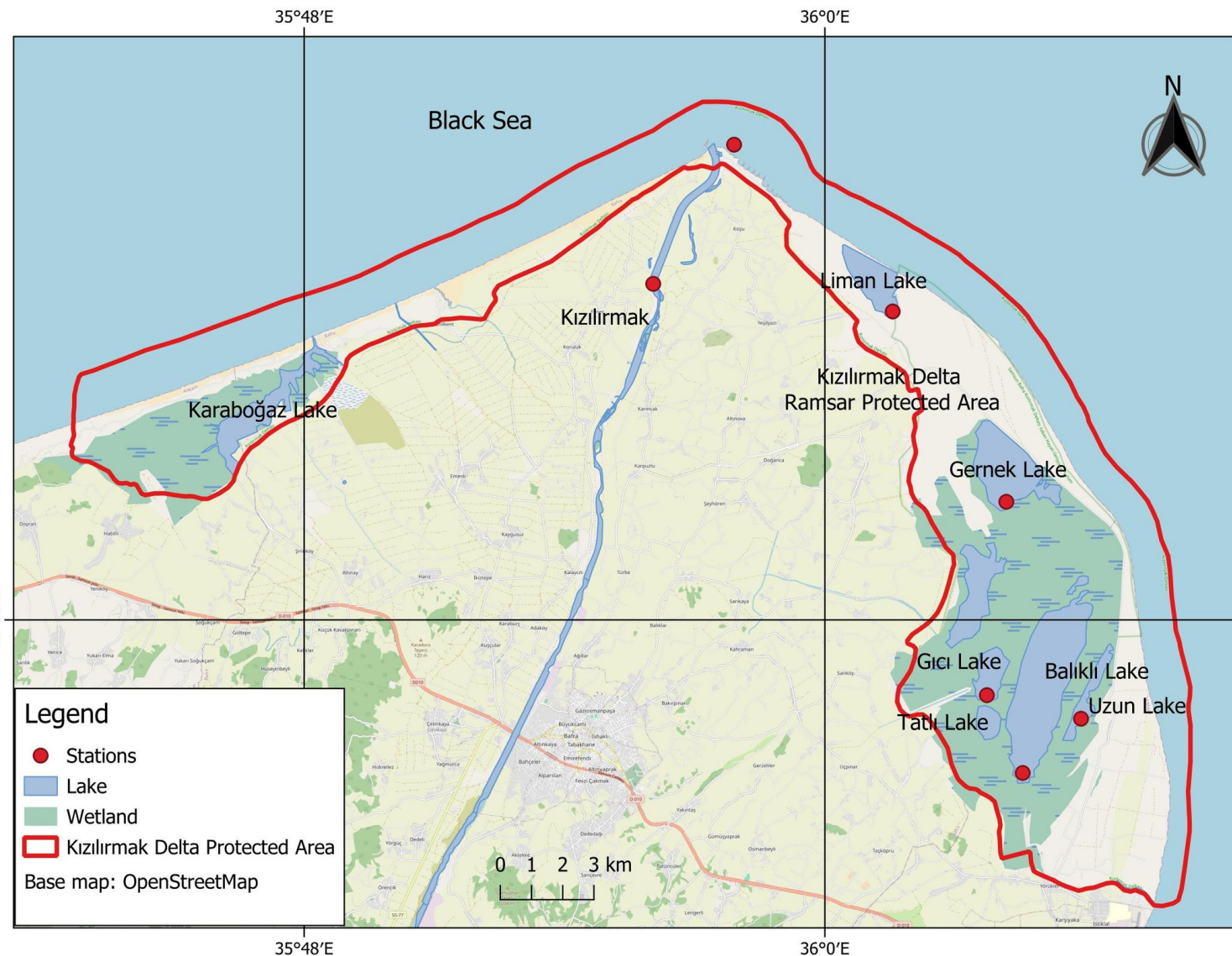
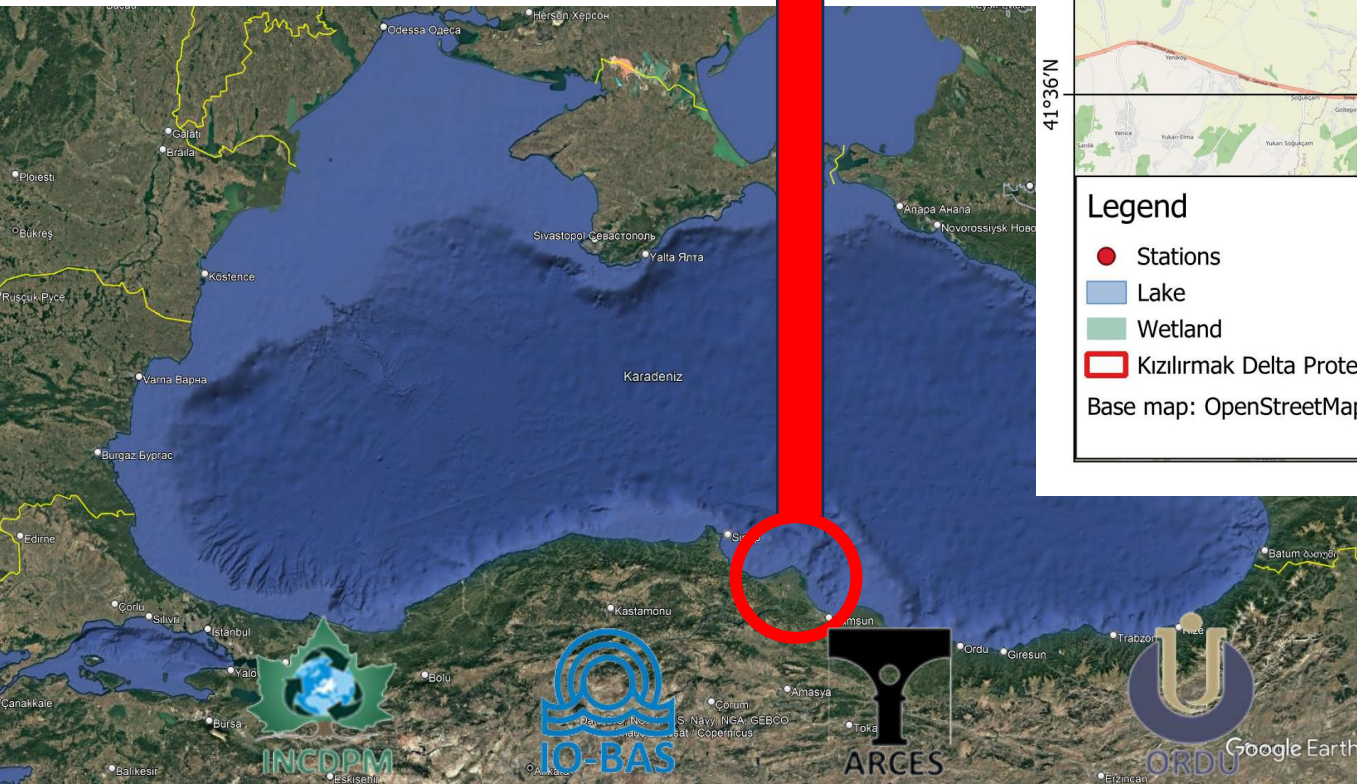
Ordu University
Fatsa Faculty of Marine Sciences





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Field Study April 2025



WP4- Remedial measures and long-term reaction plans for particular contaminants in the Black Sea region associated with armed conflict (Contributor)



Heavy Metal Analysis for Water

5 lagoon + 1 river + 1 marine = 7 samples



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WP4- Remedial measures and long-term reaction plans for particular contaminants in the Black Sea region associated with armed conflict (Contributor)



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Heavy Metal Analysis for Sediment

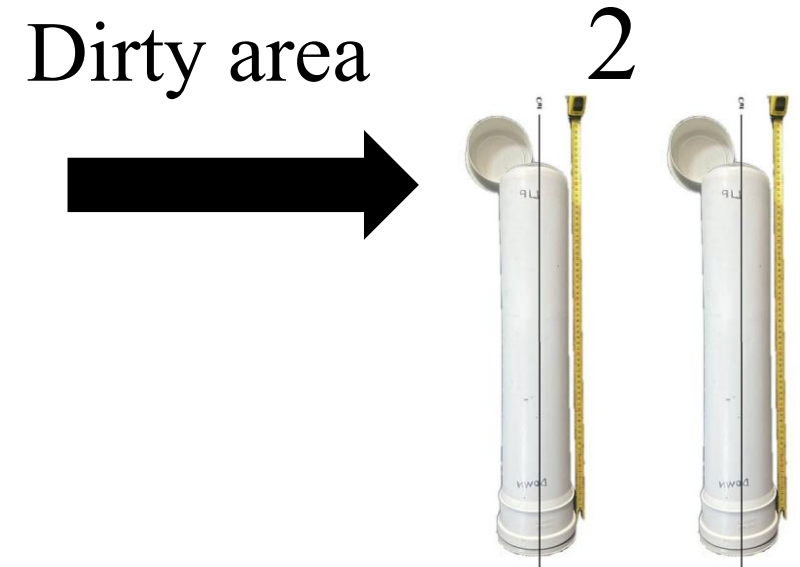
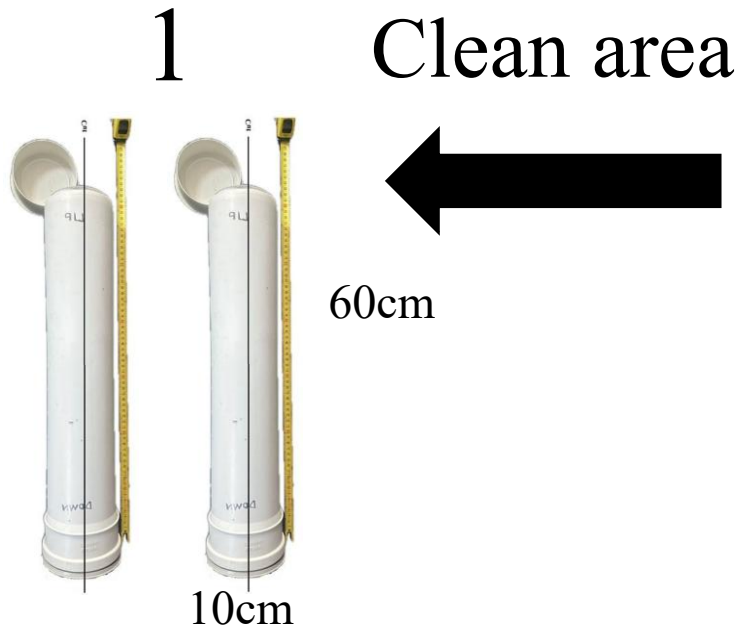
5 lagoon + 1 river + 1 marine = 7 samples



WP4- Remedial measures and long-term reaction plans for particular contaminants in the Black Sea region associated with armed conflict (Contributor)



4 Sediment core (Balık lagoon)



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WP4- Remedial measures and long-term reaction plans for particular contaminants in the Black Sea region associated with armed conflict (Contributor)



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Sediment core process



WP4- Remedial measures and long-term reaction plans for particular contaminants in the Black Sea region associated with armed conflict (Contributor)



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15 g of dry weight for each 1 cm sediment



118 samples

Cargo to Palermo





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Bioaccumulation

34 Samples



Balık Lagoon

Fish

Cyprinus carpio
Carassius gibelio

Macroalgae

Mollusk

Kızılırmak River

Fish

Carassius gibelio
Alburnus sp.

Macroalgae

Marine

Fish

Mullus barbatus
Alosa immaculata
Merlangius merlangus

Macroalgae

Mollusk

Rapana venosa
Scapharca inaequivalvis

WP 3-Identifying major biodiversity components threatened by pollution (bioaccumulation) in the coastal zone, tributary rivers, and lagoons of the Black Sea (Contributor)

Macroalgae



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Project No: 101124670

Black Sea SIERRA

EMFAF-2023-PIA-FLAGSHIP

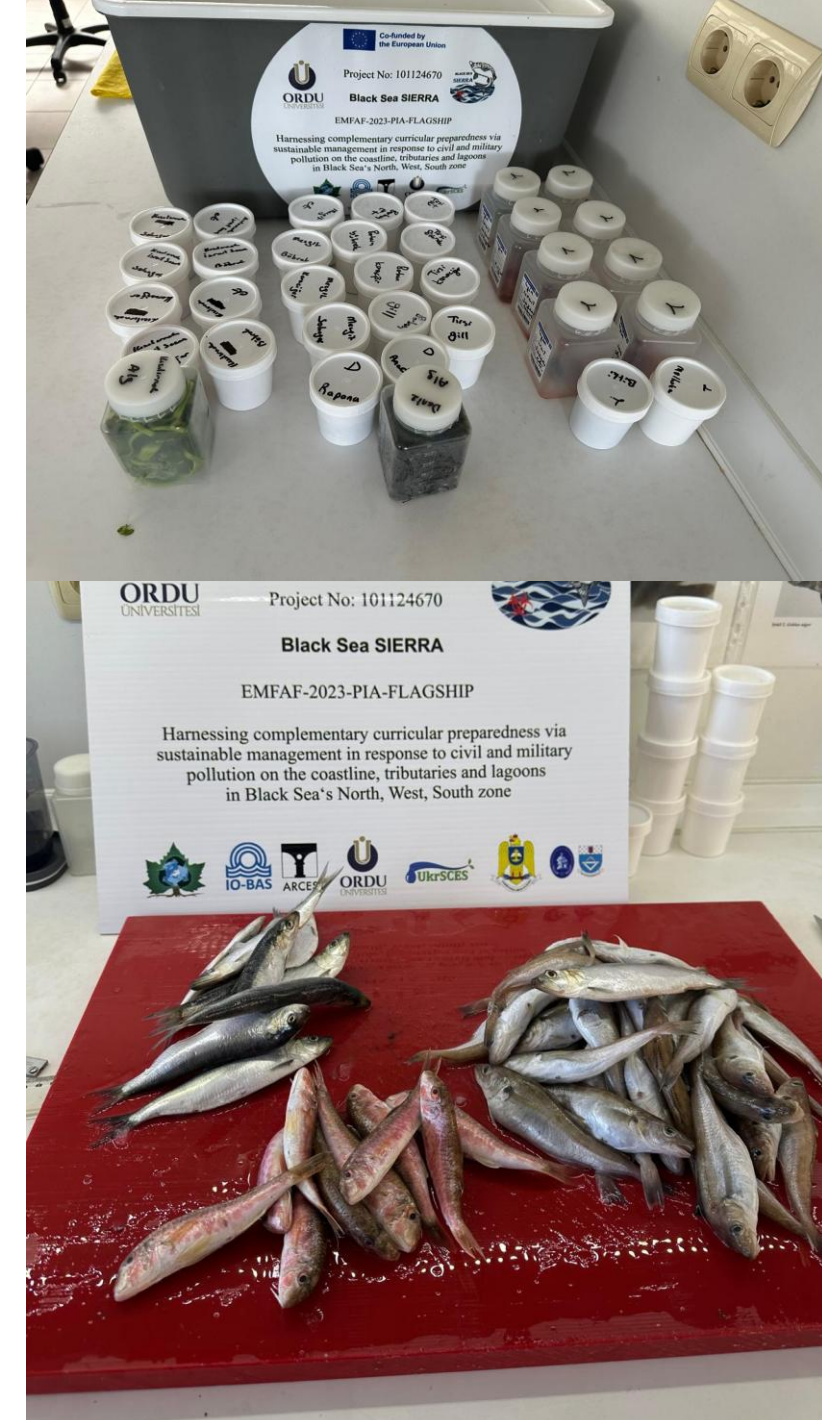
Harnessing complementary curricular preparedness via sustainable management in response to civil and military pollution on the coastline, tributaries and lagoons in Black Sea's North, West, South zone



WP 3-Identifying major biodiversity components threatened by pollution (bioaccumulation) in the coastal zone, tributary rivers, and lagoons of the Black Sea (Contributor)

Fish Gill-kidney-liver-meat for each species



WP 3-Identifying major biodiversity components threatened by pollution (bioaccumulation) in the coastal zone, tributary rivers, and lagoons of the Black Sea (Contributor)

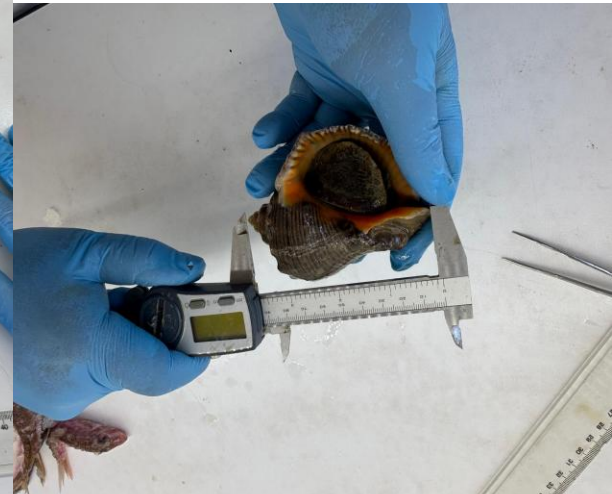
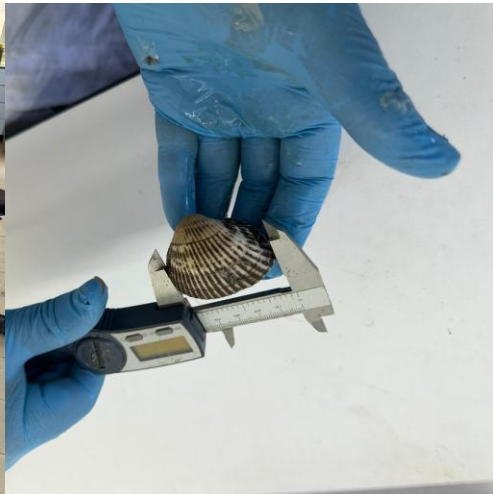
Scapharca inaequivalvis



Mollusk



Rapana venosa





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Water parameters

Locality	Coordinate	Season	Deep (cm)	Temp.(°C)	Salinity (g/L)	Ph	Disolved O2 (mg/L)	Conductivity (µS/cm)	Total suspended solid matter (mg/L)	Ammonium ion (mg/lt)	Nitrite ion (mg/lt)	Nitrate ion (mg/lt)	Chemical Oxygen Demand (mg O2/L)
Balık	41, 55350 N 36, 08067 E	April 2025	250	16,7	0,94	8,36	10,3	2,99	10	0,04	0,01	0,01	66,00
Uzun	41, 54600 N 36, 08091 E	April 2025	185	14,7	0,92	8,41	9,05	3,21	8	0,07	0,02	0,02	71,00
Liman	41, 68928 N 36, 01958 E	April 2025	150	18	1,01	8,44	9,24	10,25	11	0,14	0,01	1,62	17,00
Cernek	41, 64316 N 36, 05909 E	April 2025	200	16,1	0,9	8,12	9,63	3,45	14	0,05	0,38	1,48	81,00
Kızılırmak	41, 67895 N 35, 93093 E	April 2025	100	13,8	0,03	8,32	10,1	2,38	9	0,06	0,01	0,01	98,00

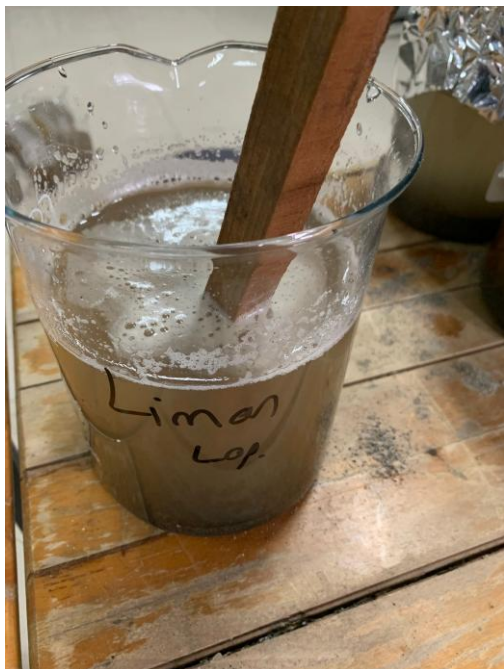
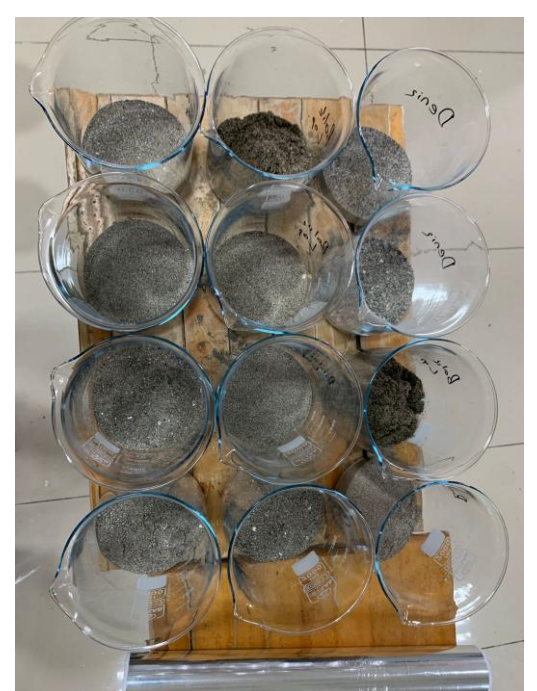
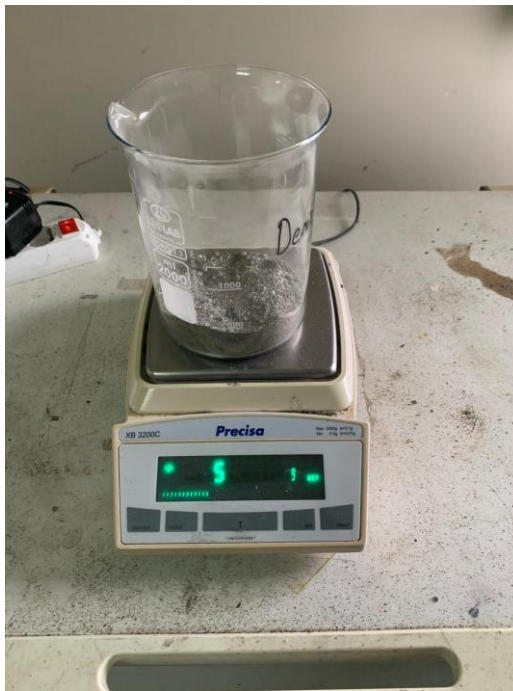
Microplastic Study

5 lagoon

River X 5 repetitions = 35 samples

Marine





- Water depth
- Hydrophone depth
- Distance between noise source and hydrophone
- Nature of seabed
- CTD values
- GPS coordinates (both for hydrophone and noise source if possible)

Noise pollution



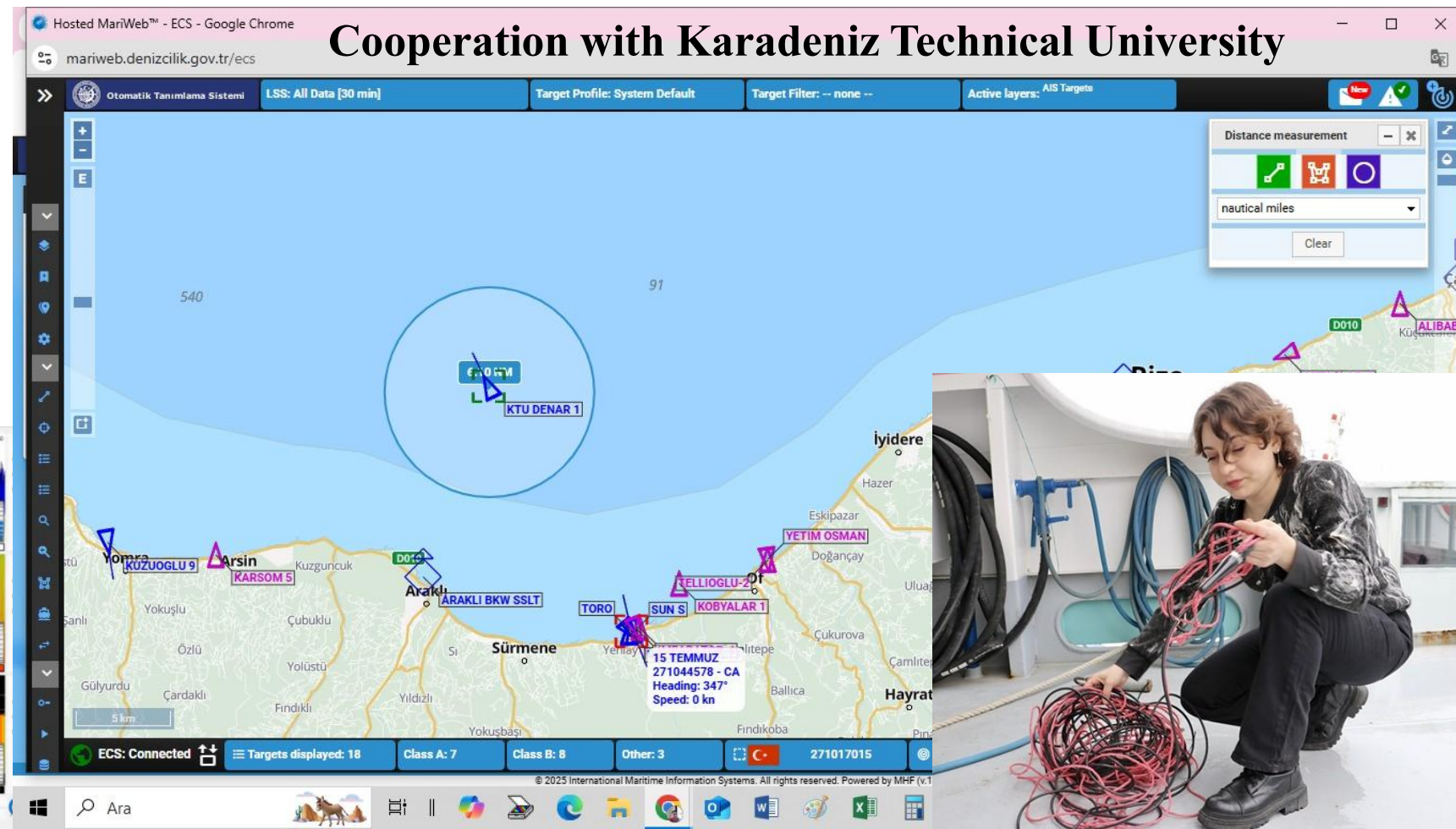
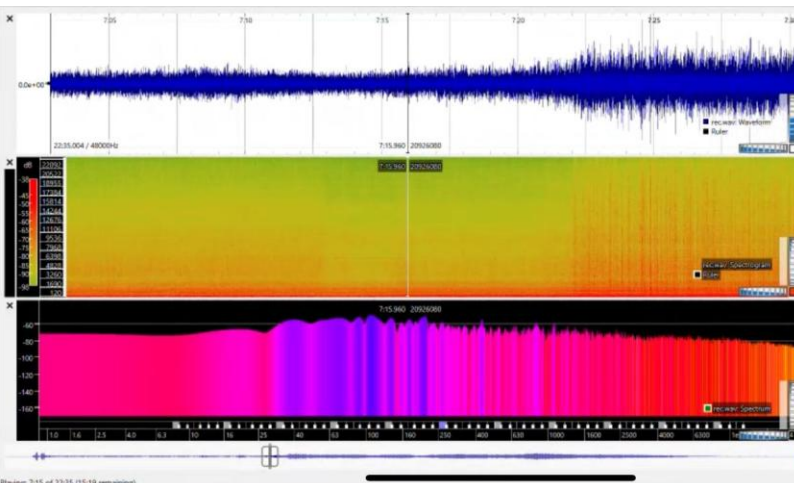
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8 May 2025

Mr Tiberiu Pazara

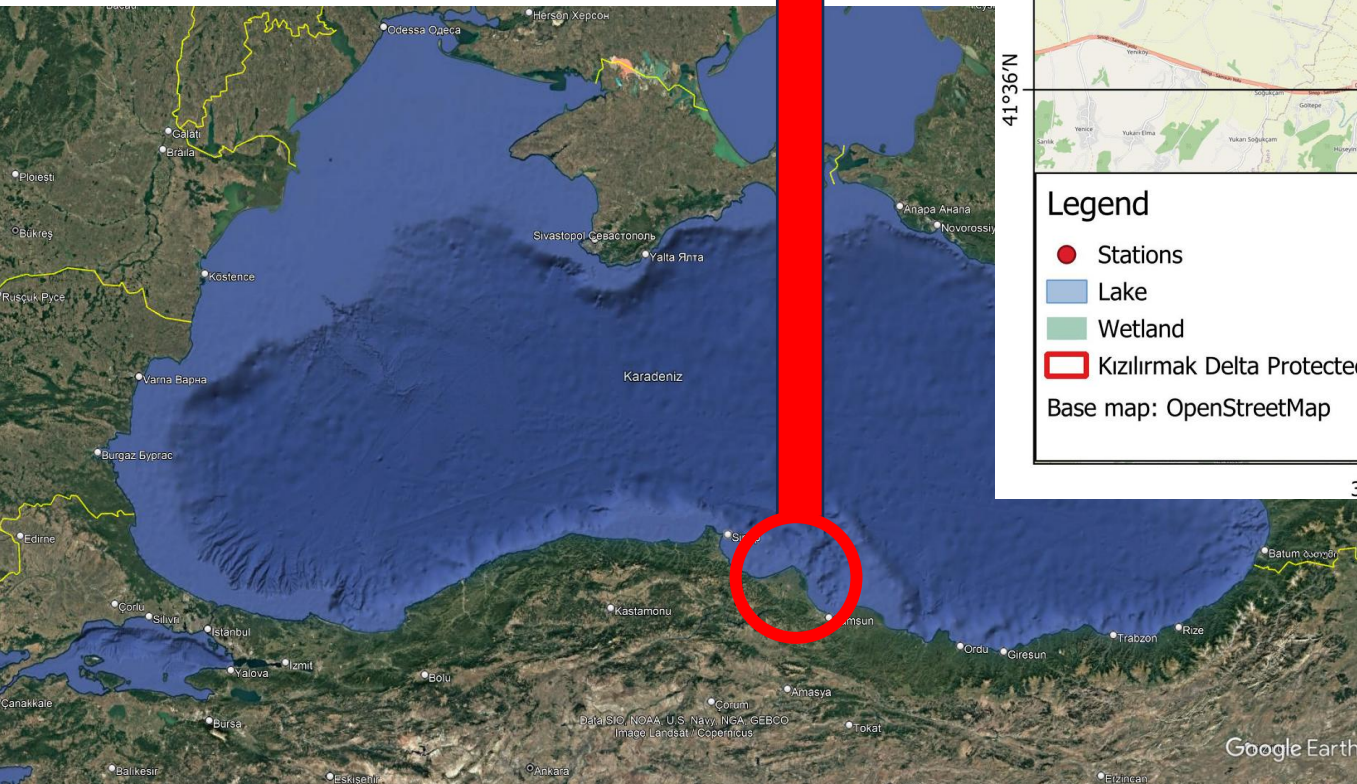
KTÜ/DENAR





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Field Study July 2025





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Project No: 101124670

Black Sea SIERRA

EMFAF-2023-PIA-FLAGSHIP

Harnessing complementary curricular preparedness via
sustainable management in response to civil and military
pollution on the coastline, tributaries and lagoons
in Black Sea's North, West, South zone



7 Sediment

7 Water



Heavy Metal Analysis for **Water**



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5 lagoon + 1 river + 1 marine = 7 samples





Heavy Metal Analysis for **Sediment**



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5 lagoon + 1 river + 1 marine = 7 samples





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Sampling organization	Sample ID	Sampling season	Sampling							Laboratory analysis					Nitrites content N-NO2- (mg/L)	Nitrates N-NO3 [mg/L]	Ammonium N-NH4 (mg/L)	Chlorides (ppm)	TPH (mg/L)	Chlorophyll a (µg/L)	Phosphat (PO ₄ mg/L)		
			Sampling country	Sampling area	Sample area type	Sample type	Sampling depth [m]	Sampling point coordinate x (longitude E)	Sampling point coordinate y (latitude N)	Laboratory analysis organization	pH	Dissolved Oxygen (mg/L)	Temperature (°C)	Conductivity (mS/cm)								Turbidity (NTU)	
Ordu	221104202506	11-April-25 (Floating)	TR	Gıcı	lagoon	Sediment	0,5	36.06111° E	41.58183° N	Ordu University	Water results(Floating)												
Ordu	231204202510	12-April-25 (Floating)	TR	Black Sea	Coastal area	Sediment	0,5	35.06111° E	41.73505° N	Ordu University													
Ordu	221204202514	12-April-25 (Floating)	TR	Cerneke	lagoon	Sediment	0,5	36.06241° E	41.65814° N	Ordu University													
Ordu	221104202502	11-April-25 (Floating)	TR	Balıke	lagoon	Sediment	0,5	36.08147° E	41.55274° N	Ordu University													
Ordu	211204202508	12-April-25 (Floating)	TR	Kızılırmak	River	Sediment	0,5	35.91447° E	41.63037° N	Ordu University													
Ordu	221204202512	12-April-25 (Floating)	TR	Liman	lagoon	Sediment	0,5	36.01937° E	41.68683° N	Ordu University													
Ordu	221104202504	11-April-25 (Floating)	TR	Uzun	lagoon	Sediment	0,5	36.08135° E	41.55209° N	Ordu University													
Ordu	121104202505	11-April-25 (Floating)	TR	Gıcı	lagoon	Water	0,2	36.06111° E	41.58183° N	Ordu University													
Ordu	131204202509	12-April-25 (Floating)	TR	Black Sea	Coastal area	Water	0,2	35.06111° E	41.73505° N	Ordu University													
Ordu	121204202513	12-April-25 (Floating)	TR	Cerneke	lagoon	Water	0,2	36.06241° E	41.65814° N	Ordu University		8,36	8,8	17,2	23,55								
Ordu	121104202501	11-April-25 (Floating)	TR	Balıke	lagoon	Water	0,2	36.08147° E	41.55274° N	Ordu University	8,45	9,6	17,3	2,47	9	0,1	1,26	0		521		40,3	0,03
Ordu	111204202507	12-April-25 (Floating)	TR	Kızılırmak	River	Water	0,2	35.91447° E	41.63037° N	Ordu University	7,9	9,8	12,7	1,6	72	0,18	2,8	0,04		415		25,21	0,018
Ordu	121204202511	12-April-25 (Floating)	TR	Liman	lagoon	Water	0,2	36.01937° E	41.68683° N	Ordu University	7,98	7,74	21,9	28,8	33	0,1	2,8	0		536		35,61	0,032
Ordu	121104202503	11-April-25 (Floating)	TR	Uzun	lagoon	Water	0,2	36.08135° E	41.55209° N	Ordu University	8,1	9,36	16,5	2,29	18	0,08	1,18	0		428		48,7	0,029
Ordu	220607202515	06-July-25 (Dry)	TR	Gıcı	lagoon	Sediment	0,5	36.06111° E	41.58183° N	Ordu University	Water results(Dry)												
Ordu	230507202516	05-July-25 (Dry)	TR	Black Sea	Coastal area	Sediment	0,5	35.06111° E	41.73505° N	Ordu University													
Ordu	220607202517	06-July-25 (Dry)	TR	Cerneke	lagoon	Sediment	0,5	36.06241° E	41.65814° N	Ordu University													
Ordu	220607202518	06-July-25 (Dry)	TR	Balıke	lagoon	Sediment	0,5	36.08147° E	41.55274° N	Ordu University													
Ordu	210507202519	05-July-25 (Dry)	TR	Kızılırmak	River	Sediment	0,5	35.91447° E	41.63037° N	Ordu University													
Ordu	220507202520	05-July-25 (Dry)	TR	Liman	lagoon	Sediment	0,5	36.01937° E	41.68683° N	Ordu University													
Ordu	220607202521	06-July-25 (Dry)	TR	Uzun	lagoon	Sediment	0,5	36.08135° E	41.55209° N	Ordu University													
Ordu	120607202522	06-July-25 (Dry)	TR	Gıcı	lagoon	Water	0,2	36.06111° E	41.58183° N	Ordu University													
Ordu	130507202523	05-July-25 (Dry)	TR	Black Sea	Coastal area	Water	0,2	35.06111° E	41.73505° N	Ordu University													
Ordu	120607202524	06-July-25 (Dry)	TR	Cerneke	lagoon	Water	0,2	36.06241° E	41.65814° N	Ordu University		8,39	5,78	18,85	26,85								
Ordu	120607202525	06-July-25 (Dry)	TR	Balıke	lagoon	Water	0,2	36.08147° E	41.55274° N	Ordu University	8,44	7,83	26,2	4,56	103	0,14	1,68	0,06		536		45,84	0,02
Ordu	110507202526	05-July-25 (Dry)	TR	Kızılırmak	River	Water	0,2	35.91447° E	41.63037° N	Ordu University	7,98	8,5	24,5	2,32	148	0,015	0	0,09		602		48,86	0,035
Ordu	120507202527	05-July-25 (Dry)	TR	Liman	lagoon	Water	0,2	36.01937° E	41.68683° N	Ordu University	8,05	6,15	26,6	1,936	0	0,21	2,05	0,22		454		28,9	0,022
Ordu	120607202528	06-July-25 (Dry)	TR	Uzun	lagoon	Water	0,2	36.08135° E	41.55209° N	Ordu University	8,05	6,17	26,2	8,87	52	0,07	1,1	0,15		584		55,78	0,038
											8,55	7,23	24,5	5,09	99	0,12	1,53	0,06		598		58,9	0,034

Water results(Floating)

Water results(Dry)





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Sediment Results

Cd (mg/kg dry mass)	Cu (µg/L)	Cu (mg/kg dry mass)	Ni (µg/L)	Ni (mg/kg dry mass)	Pb (µg/L)	Pb (mg/kg dry mass)	Zn (µg/L)	Zn (mg/kg dry mass)	Fe (µg/L)	Fe (mg/kg dry mass)	Cr (µg/L)	Cr (mg/kg dry mass)	V (µg/L)	V (mg/kg dry mass)	Sb (µg/L)	Sb (mg/kg dry mass)	Al (µg/L)	Al (mg/kg dry mass)	Mn (µg/L)	Mn (mg/kg dry mass)	Co (µg/L)	Co (mg/kg dry mass)	As (µg/L)	As (mg/kg dry mass)	Mo (µg/L)	Mo (mg/kg dry mass)	Hg (µg/L)	Hg (mg/kg dry mass)
622		52231		90642		28899		88456		34869041		126129		150953		834		89771236		872151		21912		14906		339		51
166		30069		100586		30411		47715		25261068		192400		93322		477		37160533		696440		15122		8261		281		46
286		35150		107086		27329		60752		32532933		174431		119474		702		46271743		837474		17936		19084		251		71
382		49780		106487		591405		148578		35354966		152059		133338		823		68957194		545660		19252		11907		581		83
316		83715		83450		22984		99569		24529488		81518		84711		617		49715565		775661		15882		10270		515		69
158		23067		125592		28801		84218		62808782		1067220		339951		681		34061962		962654		27333		9725		324		21
198		30413		102773		35271		137725		21597557		154566		71398		648		30672080		584886		14939		6509		273		51
	5,83		5,83		0,61		32,25		199,61		5,83		4,22		0,47		194,58		6		0,16		2,36		0,39		0,1	
	19,67		0,53		3,24		392,99		30,87		<0.000		2,28		3,2		38,96		0,12		<0.000		<0.000		2,02		0,67	
	3,48		5,5		0,52		26,84		95,49		0,13		1,5		0,59		9,52		25,26		0,11		2,94		1,5		0,08	
	3,78		3,58		0,51		35,65		67,45		0,14		3,31		0,53		28,19		12,99		0,14		2,14		0,97		0,07	
	3,25		1,1		0,39		32,14		13,44		0		0,83		0,48		16,57		1,04		<0.000		2,04		1,2		0,07	
	19,89		0,91		4,4		313,02		27,81		<0.000		0,15		3,51		18,35		0,23		<0.000		<0.000		1,86		0,65	
	2,92		3,32		0,5		32,21		53,33		0,08		2,89		0,52		11,41		12,42		0,15		2,28		0,9		0,06	
453		55844		77364		20635		112205		26988753		97451		111400		917		58170851		798453		17638		11425		447		8
185		20654		109253		18911		64534		46560111		580264		212593		848		20636401		848546		19828		7494		660		41
248		20697		106845		15019		47830		22010629		260453		88047		502		32185977		661242		15803		9042		423		61
378		34724		115918		51435		95894		31956464		183110		118245		717		53911267		571155		18704		9183		477		12
422		61363		102916		32893		111391		23971514		112951		92313		906		45972807		751373		17765		9151		538		11
288		43302		151149		15388		62753		29953242		154035		115125		735		57114727		732687		22737		11990		573		61
422		42851		125705		46106		115049		29085128		145028		114418		1106		49258696		417317		18728		13322		937		96
	6,62		5,59		0,95		95,94		142,49		<0.000		4,6		0,75		13,78		8,19		0,62		3,53		1,43		0,11	
	73,89		4,7		9,58		1595,7		905,02		9,18		<0.000		5,26		307,48		11,19		2,06		<0.000		3,29		1,21	
	5,17		4,37		0,98		141,16		154,77		0,04		7,37		1,04		36,61		23,89		1,1		6,76		1,86		0,11	
	6,78		3,36		1,09		125,62		138,85		<0.000		7,55		0,76		18,86		14,9		0,85		2,37		1,64		0,11	
	5,23		3,02		0,94		97,58		103,29		<0.000		0,1		0,87		12,62		1,58		0,5		2,84		1,23		0,12	
	8,35		3,39		1		107,06		158,06		0,09		3,15		0,71		10,82		2,47		0,57		3,19		1,69		0,12	
	4,89		2,84		0,85		133,1		161,41		0,41		7,19		0,89		20,95		10,85		0,75		4,19		1,37		0,11	





Bioaccumulation Results (34 samples)		
Laggon	River	Marine
<i>Cyprinus carpio</i> <i>Carassius gibelio</i>	<i>Cyprinus carpio</i> <i>Alburnus sp.</i>	<i>Mullus barbatus</i> <i>Alosa immaculata</i> <i>Merlangius merlangus</i>
Macrolagae	Macrolagae	Macrolagae
Mollusk		Mollusk <i>Rapana venosa</i> <i>Scapharca inaequalvis</i>



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									Laboratory analysis																
Sampling organization	Sample ID	Sampling date	Sampling country	Sampling area	Sample area type	Sample type	Sampling point coordinate x (longitude E)	Sampling point coordinate y (latitude N)	Laboratory analysis organization	Biota sample type	Cd (mg/kg dry mass)	Cu (mg/kg dry mass)	Ni (mg/kg dry mass)	Pb (mg/kg dry mass)	Zn (mg/kg dry mass)	Fe (mg/kg dry mass)	Cr (mg/kg dry mass)	V (mg/kg dry mass)	Sb (mg/kg dry mass)	Al (mg/kg dry mass)	Mn (mg/kg dry mass)	Co (mg/kg dry mass)	As (mg/kg dry mass)	Mo (mg/kg dry mass)	Hg (mg/kg dry mass)
ORDU	331004202501	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Alosa immaculata</i> /Muscle tissue	38,41	856,36	34,14	24,56	10245,02	11301,65	62,87	7,39	14,57	3883,18	736,68	3,13	2058,32	14,52	31,39
ORDU	331004202502	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Alosa immaculata</i> /Kidney	112,74	1760,67	89,22	40,2	20074,68	180019,22	145,52	32,62	14,7	9909,8	1061,98	200,28	1242,11	81,97	22,58
ORDU	331004202503	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Alosa immaculata</i> /Liver	71,49	2033,07	31,78	33,89	23061,22	138873,35	22,21	16,31	13,23	6260,5	1276,1	21,81	1869,71	114,94	40,7
ORDU	331004202504	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Alosa immaculata</i> /Gills	30,06	840,63	1764,89	315,36	20955,44	404092,23	1432,98	1054,12	15,78	323221,51	15173,4	239,29	899,54	<0.000	12,77
ORDU	331004202505	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Merlangius merlangus</i> /Muscle tissue	22,08	231,02	<0.000	18,1	3815,57	3141,46	13,24	8,5	14,95	1927,1	207,03	<0.000	302,86	<0.000	19,87
ORDU	331004202506	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Merlangius merlangus</i> /Kidney	30,01	1041,78	128,24	22,62	20175,7	72966,59	90,44	88,55	14,23	15352,06	1034,72	39,59	1445,4	65,69	13,51
ORDU	331004202507	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Merlangius merlangus</i> /Liver	123,21	2395,56	37,12	14,71	14862,86	15070,41	19,73	43,49	13,26	4402,35	1336,38	14,9	2084,98	42,02	10,26
ORDU	331004202508	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Merlangius merlangus</i> /Gills	22,22	661,99	933,58	109,54	14412,42	207585,36	773,58	563,75	15,38	160919,09	6304,4	128,04	587,14	<0.000	7,16
ORDU	331004202509	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Mullus barbatus</i> /Muscle tissue	12,05	454,55	0,52	16,58	6096,32	4609,63	27,33	3,44	12,93	835,16	259,44	11,21	2159,33	<0.000	24,64
ORDU	331004202510	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Mullus barbatus</i> /Kidney	40,17	1247,78	405,73	33,57	23665,87	121852,94	94,43	97,88	14,23	7442,46	970,58	238,39	4033,54	26,73	25,43
ORDU	331004202511	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Mullus barbatus</i> /Liver	231,25	14895,84	240,38	25,01	19951,46	150181,53	3,95	124,38	13,81	1092,77	691,79	805,96	6717,61	94,33	18,48
ORDU	331004202512	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Mullus barbatus</i> /Gills	11,43	632,56	600,68	233,89	15988,11	153703,54	409,22	618,56	16,38	88375,5	5634,92	143,86	1512,42	<0.000	5,87
ORDU	331004202513	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Rapana venosa</i>	3725,75	25771,85	285,31	62,53	23317,86	27656,68	111	74,71	16,84	9287,91	1342,45	80,31	4552,48	49,17	59,77
ORDU	331004202514	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	<i>Anadara</i>	2115,02	956,64	458,91	212,91	18386,7	140288,78	182,79	262,44	16,5	103586,45	3514,07	179,33	1265,58	60,24	11,22
ORDU	331004202515	10-April-25	TR	Black Sea	Sea	biota	35.95841° E	41.73505° N	ORDU Univ.	Macro Alg	420	4215	6949	838	22873	1285270	5344	4883	48	1139137	42789	805	14694	552	23
ORDU	321104202516	11-April-25	TR	Balı� Lag	Lagoon	biota	36.08147° E	41.55274° N	ORDU Univ.	<i>Carassius gibelio</i> /Muscle tissue	4,27	236,55	<0.000	22,53	5568,02	4846,01	12,88	7,28	15,95	576,92	425,52	<0.000	12,28	<0.000	23,29
ORDU	321104202517	11-April-25	TR	Balı� Lag	Lagoon	biota	36.08147° E	41.55274° N	ORDU Univ.	<i>Carassius gibelio</i> /Kidney	104,75	1295,49	206,94	42,97	42418,9	95726,85	11,26	629,02	26,69	3721,4	1484,5	140,43	30,88	140,82	12,57
ORDU	321104202518	11-April-25	TR	Balı� Lag	Lagoon	biota	36.08147° E	41.55274° N	ORDU Univ.	<i>Carassius gibelio</i> /Liver	29,42	5742,46	122,26	56,52	47752,84	214079,56	115,4	244,89	18,45	46552,85	3812,41	50,77	51,75	45,61	12,12
ORDU	321104202519	11-April-25	TR	Balı� Lag	Lagoon	biota	36.08147° E	41.55274° N	ORDU Univ.	<i>Carassius gibelio</i> /Gills	2,51	426,96	38,42	51,39	39570,8	37849,26	24,13	412,38	12,18	13716,88	17623,03	27,83	23,67	<0.000	2,01
ORDU	321104202520	11-April-25	TR	Balı� Lag	Lagoon	biota	36.08147° E	41.55274° N	ORDU Univ.	<i>Cyprinus carpio</i> /Muscle Tissue	2,07	303,04	<0.000	16,62	6634,26	5798,4	0,18	2,67	12,29	353,76	323,33	<0.000	22,39	<0.000	18,11
ORDU	321104202521	11-April-25	TR	Balı� Lag	Lagoon	biota	36.08147° E	41.55274° N	ORDU Univ.	<i>Cyprinus carpio</i> /Kidney	63,11	1185,52	76,59	50,34	151964,11	166252,66	13,11	753,7	14,83	213,04	611,28	327,18	231,02	169,96	19,49
ORDU	321104202522	11-April-25	TR	Balı� Lag	Lagoon	biota	36.08147° E	41.55274° N	ORDU Univ.	<i>Cyprinus carpio</i> /Liver	3,51	288,82	137,15	70,44	17843,05	10426,22	317,98	8,15	16,16	1002	348,42	3,75	0,56	12,71	3,64
ORDU	321104202523	11-April-25	TR	Balı� Lag	Lagoon	biota	36.08147° E	41.55274° N	ORDU Univ.	<i>Cyprinus carpio</i> /Gills	2,83	275,21	39,75	25,79	45013,32	35939,22	45,9	30,61	13	3962,72	166,92	6,07	4,66	<0.000	5,22
ORDU	321104202524	11-April-25	TR	Balı� Lag	Lagoon	biota	36.08147° E	41.55274° N	ORDU Univ.	<i>Molucca</i>	47,16	5276,42	722,32	173,94	10770,38	170193,01	1258,19	593,17	17,24	138642,54	32173,27	138,18	644,8	40,90	6,88
ORDU	321104202525	11-April-25	TR	Balı� Lag	Lagoon	biota	36.08147° E	41.55274° N	ORDU Univ.	Macro Alg	207	10586	21895	11945	36188	7376701	25204	26172	74	7446607	2956479	13394	4401	599	27
ORDU	311104202526	11-April-25	TR	Kizilirm�	River	biota	35.91447° E	41.63037° N	ORDU Univ.	<i>Carassius gibelio</i> /Muscle tissue	4,29	274,26	<0.000	16,77	6439,22	3968,49	21,85	<0.000	12,43	123,49	251,87	<0.000	32,96	<0.000	99,56
ORDU	311104202527	11-April-25	TR	Kizilirm�	River	biota	35.91447° E	41.63037° N	ORDU Univ.	<i>Carassius gibelio</i> /Kidney	170,47	1158,09	285,12	29,09	38284,16	98247,89	1,98	195,79	13,56	173,41	1349,94	77,24	249,5	117,56	29,58
ORDU	311104202528	11-April-25	TR	Kizilirm�	River	biota	35.91447° E	41.63037° N	ORDU Univ.	<i>Carassius gibelio</i> /Liver	12,62	23943,69	8,35	27,45	28242,7	257171,09	<0.000	35,87	15,06	181,1	870,59	4,63	145,54	29,84	17,25
ORDU	311104202529	11-April-25	TR	Kizilirm�	River	biota	35.91447° E	41.63037° N	ORDU Univ.	<i>Carassius gibelio</i> /Gills	3,46	269	15,75	58,91	9496,07	23730,65	17,74	15,39	15,37	3568,91	654,2	2,59	37,07	<0.000	6,76
ORDU	311104202530	11-April-25	TR	Kizilirm�	River	biota	35.91447° E	41.63037° N	ORDU Univ.	<i>Alburnus Sp.</i> /Muscle tissue	2,41	379,05	104,79	17,12	5201,9	4945,16	296,11	1,57	14,39	368,5	904,49	<0.000	23,28	<0.000	219,16
ORDU	311104202531	11-April-25	TR	Kizilirm�	River	biota	35.91447° E	41.63037° N	ORDU Univ.	<i>Alburnus Sp.</i> /Kidney	48,01	881,64	137,75	33,26	15191,63	100335,94	12,41	63,86	14,39	4559,5	1641,03	236,93	175,5	60,34	99,94
ORDU	311104202531	11-April-25	TR	Kizilirm�	River	biota	35.91447° E	41.63037° N	ORDU Univ.	<i>Alburnus Sp.</i> /Liver	7,64	2250,12	42,66	23,51	15268,97	83037,7	27,94	50,61	15,3	11411,13	3329,98	27,71	281,42	124,63	103,93
ORDU	311104202533	11-April-25	TR	Kizilirm�	River	biota	35.91447° E	41.63037° N	ORDU Univ.	<i>Alburnus Sp.</i> /Gills	3,22	467,48	80,03	81,61	18445,83	49578,23	47,46	52,26	14,91	11199,15	10228,12	19,75	73,84	<0.000	98,93
ORDU	311104202534	11-April-25	TR	Kizilirm�	River	biota	35.91447° E	41.63037° N	ORDU Univ.	Macro Alg	38	19074	8224	1412	77076	2396372	6488	5782	52	2238432	171121	1776	1217	1303	20

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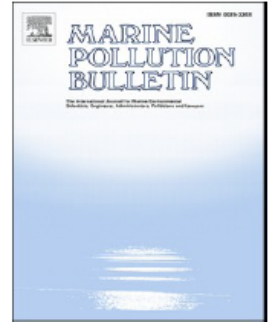
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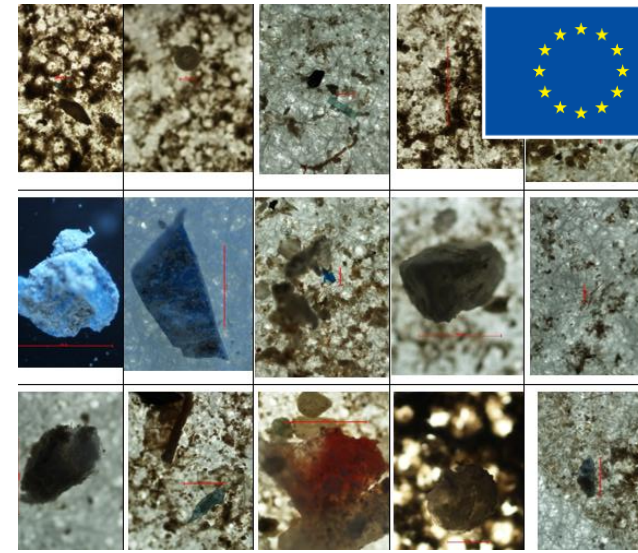
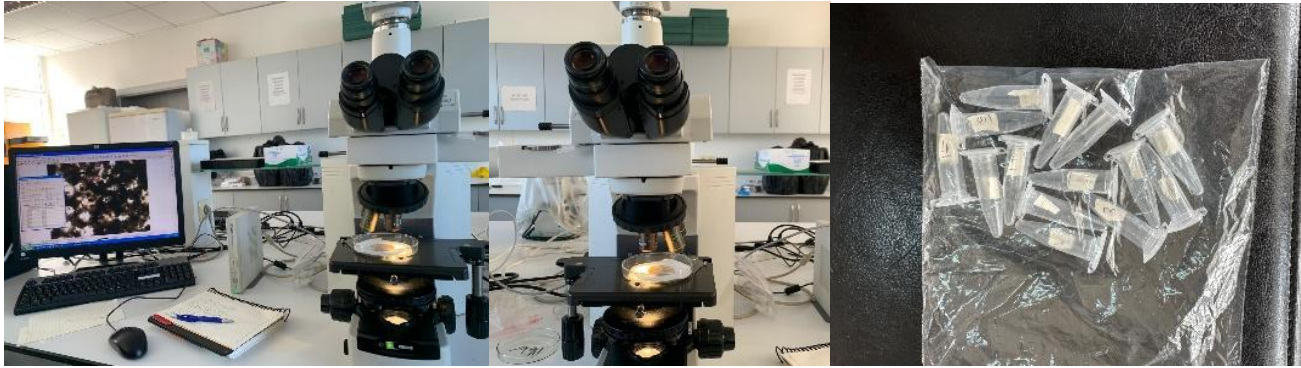
Decoupling environmental contamination from human health risk through selective bioaccumulation: The role of analytical spectrum and physiological modulation

Evren Tunca^{a,*}, Özkan Uğurlu^a, Georgeta Tudor^b, Mehmet Aydın^a

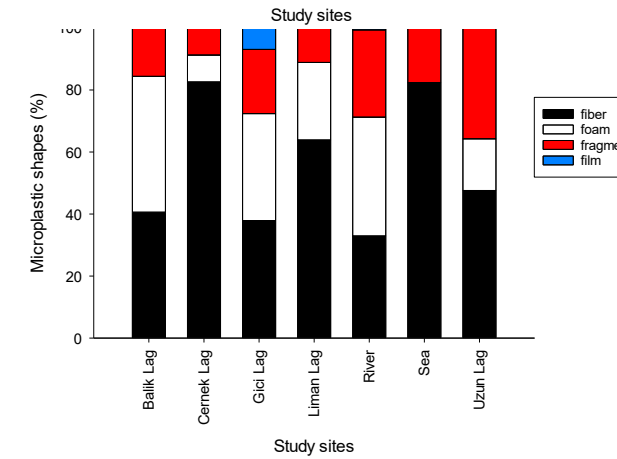
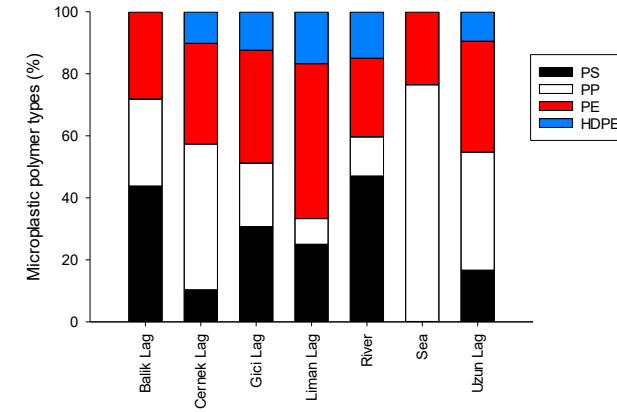
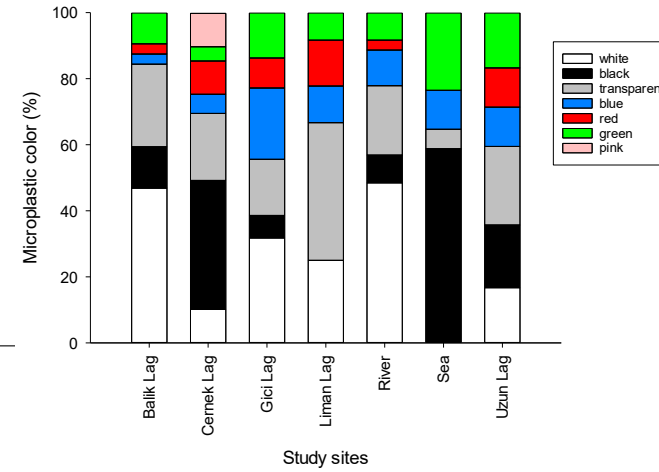
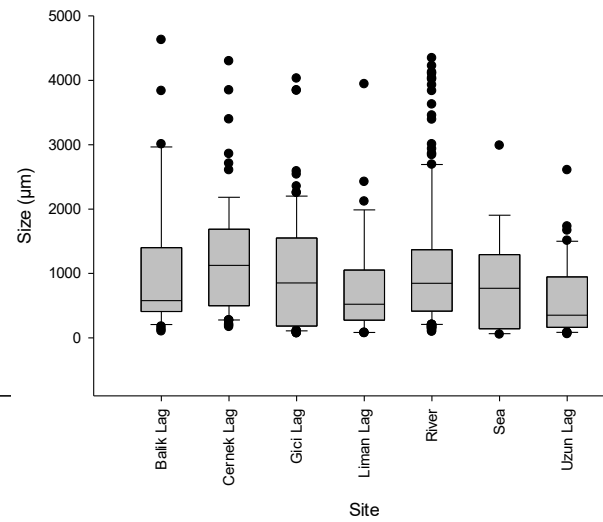
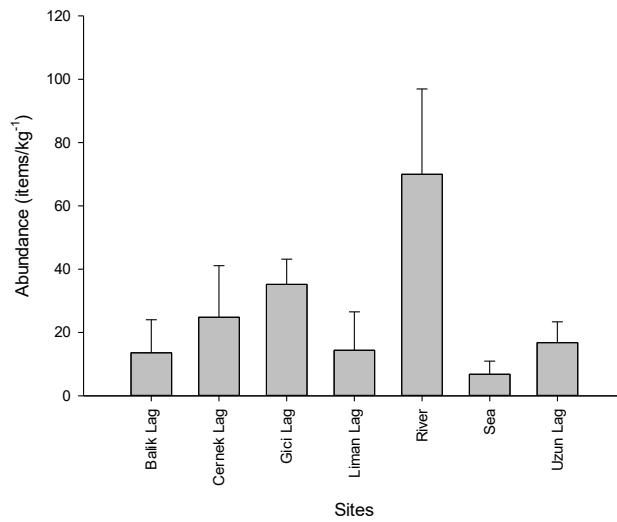
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Nests of storks

Thousands of buffalos live in the Kızılırmak delta





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