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Environmental Monitoring
in the Black Sea



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Floating marine macro litter monitoring in the Black Sea: EMBLAS II experience

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Sixth International Marine Debris Conference, San Diego, California, USA

March 12-16, 2018



The Black Sea is the most isolated from the World Ocean - connected to the Oceans via the Marmara and Mediterranean Seas.

The drainage area exceeds it's surface many times that's why it is very vulnerable to pressure from land based human activities.

The Black Sea



Black Sea drainage basin and a list of twenty two basin countries – potential contributors to Black Sea ML pollution via their river run-off
(after Zaitsev and Mamaev, 1997).



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EMBLAS Project: Improving Environmental Monitoring in the Black Sea

The overall objective of the project is to improve the protection of the Black Sea environment. The project is addressing the overall need for support in protection and restoring the environmental quality and sustainability of the Black Sea.

The specific objectives: are as follows:

- Improve availability and quality of data on the ecological status of the Black Sea;
- Improve partner countries' ability to perform marine environmental monitoring along Marine Strategy Framework Directive principles.

Project Countries: Georgia, Russian Federation, Ukraine



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Floating Marine Macro Litter (FMML) – direct threat to marine wildlife





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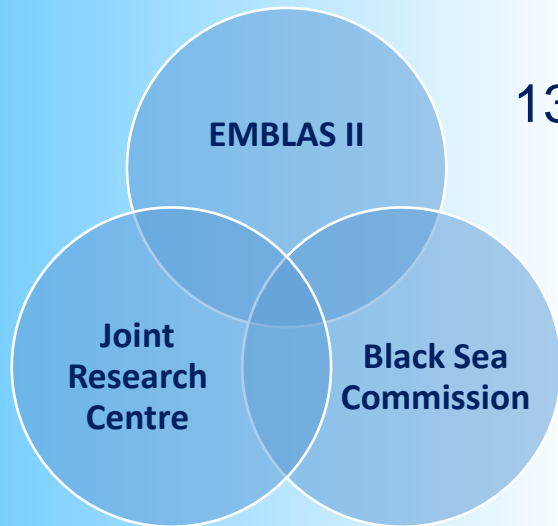


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Marine Litter Workshop 13-14 April 2016, Istanbul, Turkey



Agreement on approaches and monitoring protocols for the acquisition of litter data

To perform ML monitoring according to MSFD, using Guidance on Monitoring of Marine litter in European seas (JRC 2013)

To perform **floating macro litter** monitoring during EMBLAS surveys using the JRC tablet computer application



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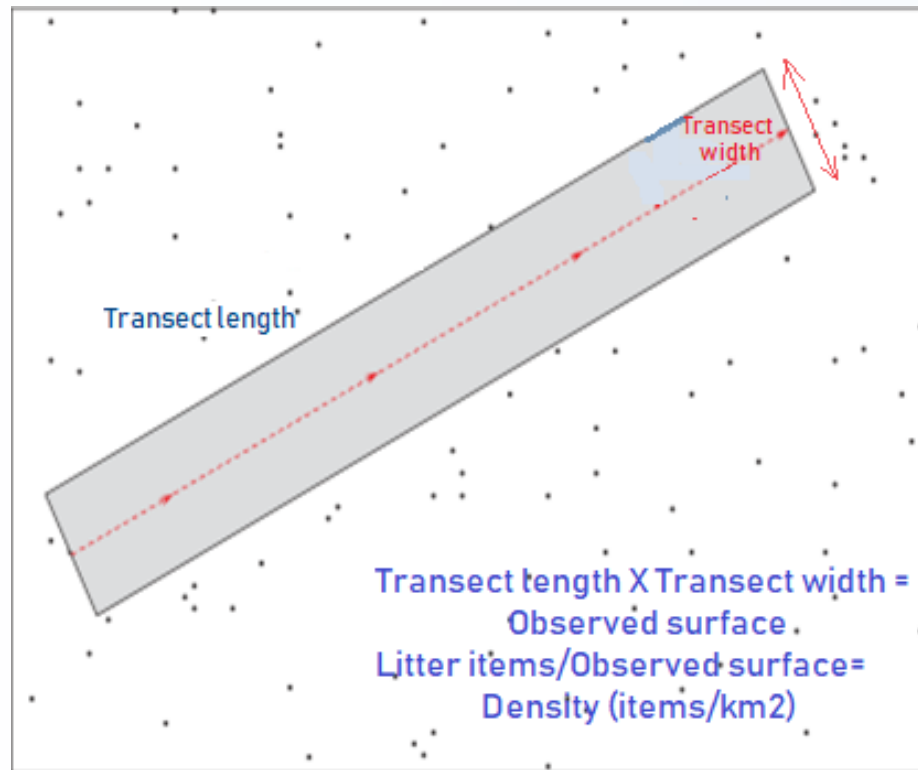


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Observation method

The observer stands on the bow/deck of the ship and records the litter items in a strip with fixed width using a tablet computer.

Lower size limit – **2,5 cm**, transect width depends on the observation platform height, vessel's speed (usually **15-30 m**), transect length – optimal about **1 hour**





MSFD Floating Litter Category Masterlist

Guidance on Monitoring of Marine Litter in European Seas

2013

MSFD Technical Subgroup on Marine Litter

Master List of Categories of Litter Items

TSG_ML General- Code	OSPAR- Code	UNEP- Code	General Name	Level 1 - Materials	Core	Beach	Seafloor	Floating	Biota	Micro
G64			Fenders	Artificial polymer materials		x				
G65	38	PL03	Buckets	Artificial polymer materials		x				
G66	39	PL21	Strapping bands	Artificial polymer materials	x	x	x			
G67	40	PL16	Sheets, industrial packaging, plastic sheeting	Artificial polymer materials		x	x	x		
G68	41	PL22	Fibre glass/fragments	Artificial polymer materials		x				
G69	42		Hard hats/Helmets	Artificial polymer materials		x				
G70	43		Shotgun cartridges	Artificial polymer materials		x				
G71	44	CL01	Shoes/sandals	Artificial polymer materials		x				
G72			Traffic cones	Artificial polymer materials		x				



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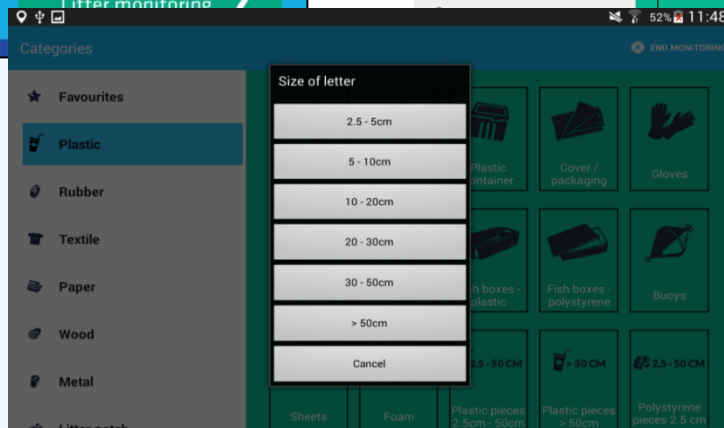
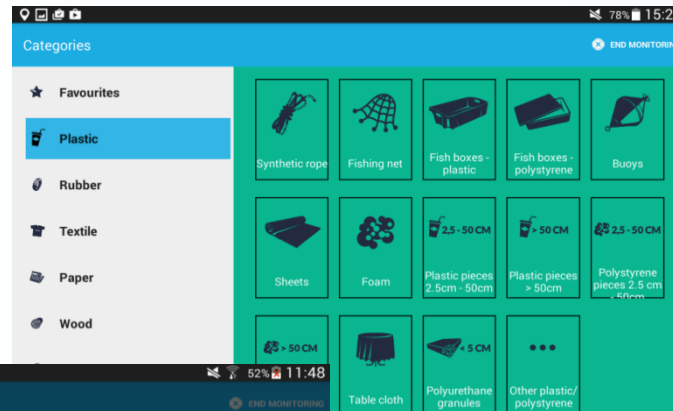
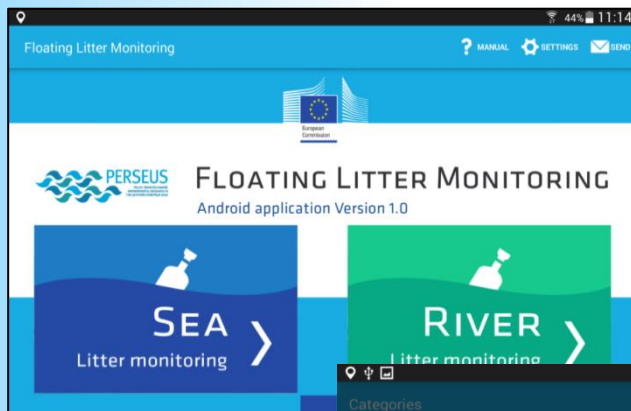


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JRC Mobile application for Floating litter monitoring





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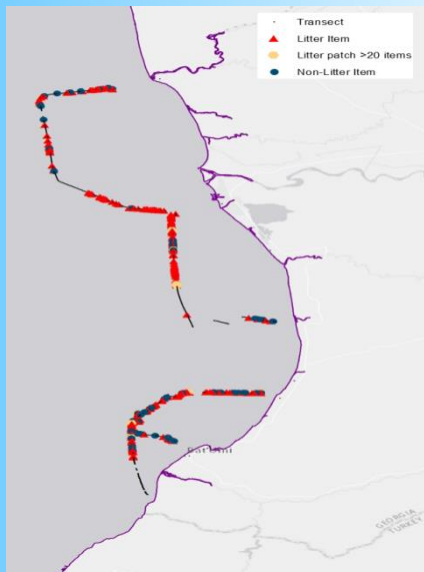
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EMBLAS FMML Surveys 2016

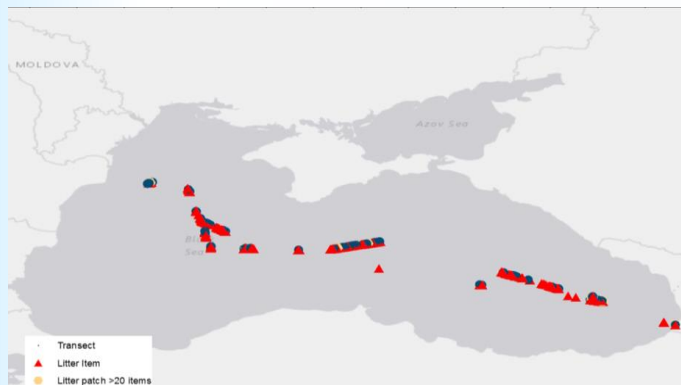
Country	Dates	Region	Research Vessel
Georgia	28 - 31 May 2016	Batumi	Mare Nigrum
	23 - 26 May 2016	Odessa - Batumi	
	1 - 4 June 2016	Batumi - Constanta	
Russia	9-10 May 2016	Anapa-Gelendzhik	Ashamba
	29-30 May 2016	Gelendzhik-sea center	Impuls
	7-9 August 2016	Kerch Strait	Peleng
	23 November -1 December 2016	Sochi-Adler region	Peleng
Ukraine	17-18 May 2016	Odessa	Mare Nigrum
	24 - 27 May 2016	Odessa - Batumi	
	1 - 4 June 2016	Batumi - Constanta	



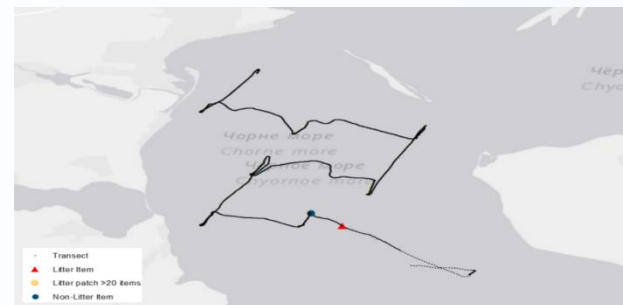
Results 2016



Georgian waters
28-31 May 2016
322 Litter Items/km²



Transects through the sea
24-27 May
810 Litter Items/km²
1-4 June
582 Litter Items/km²



Kerch Strait 7-9 August 2016
0,16 Litter Items/km²



Sochi 23 Nov-1 Dec 2016
3,8 Litter Items/km²



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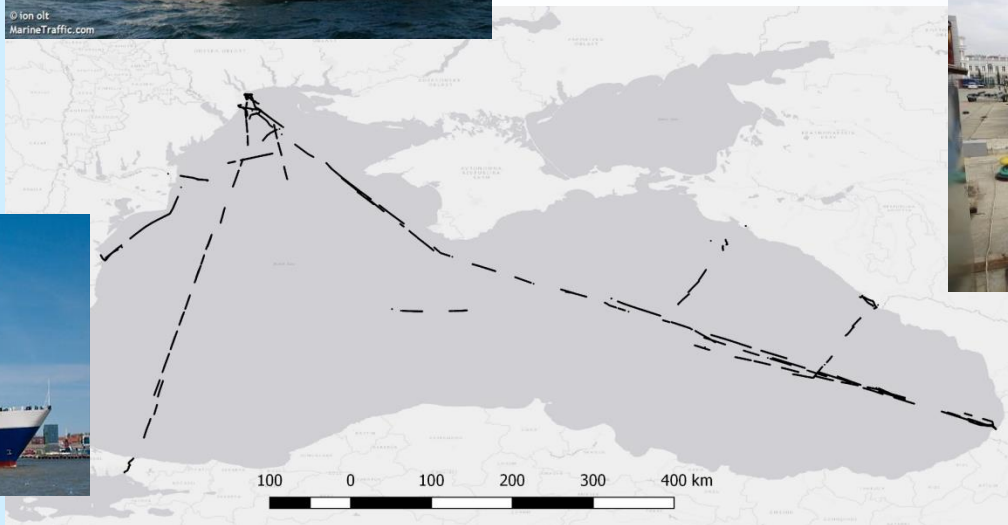
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EMBLAS FMML Surveys 2017

Ships of
opportunity
(ferries) -
through the year



Ukrainian-Georgian
Survey
26.08-7.09.2017

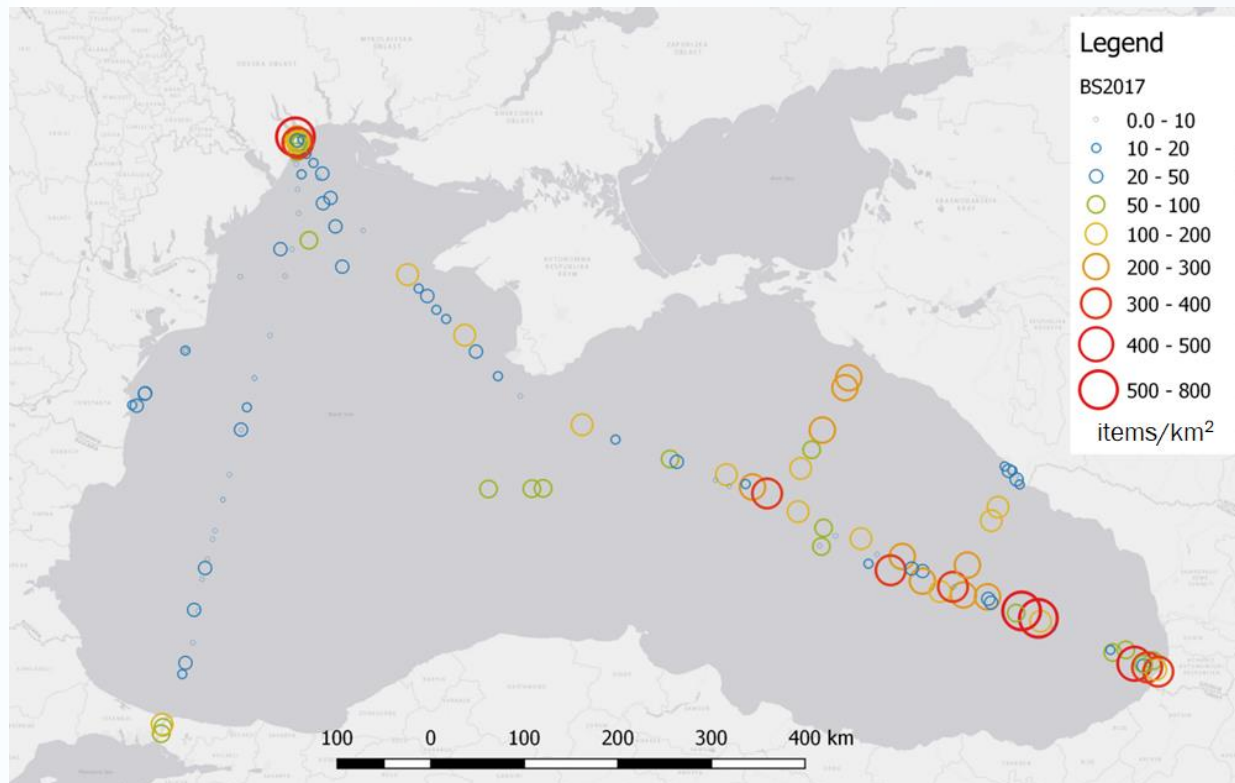
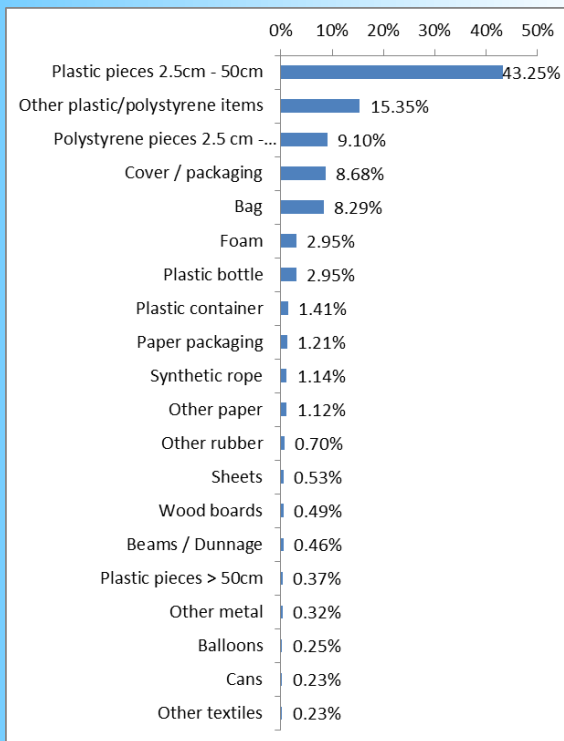


Russian Surveys
24-30.10.2017
14-16.11.2017

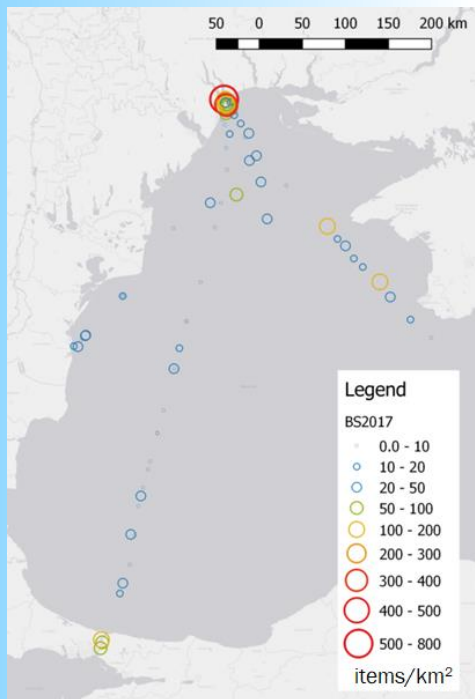


Results 2017

Top Items

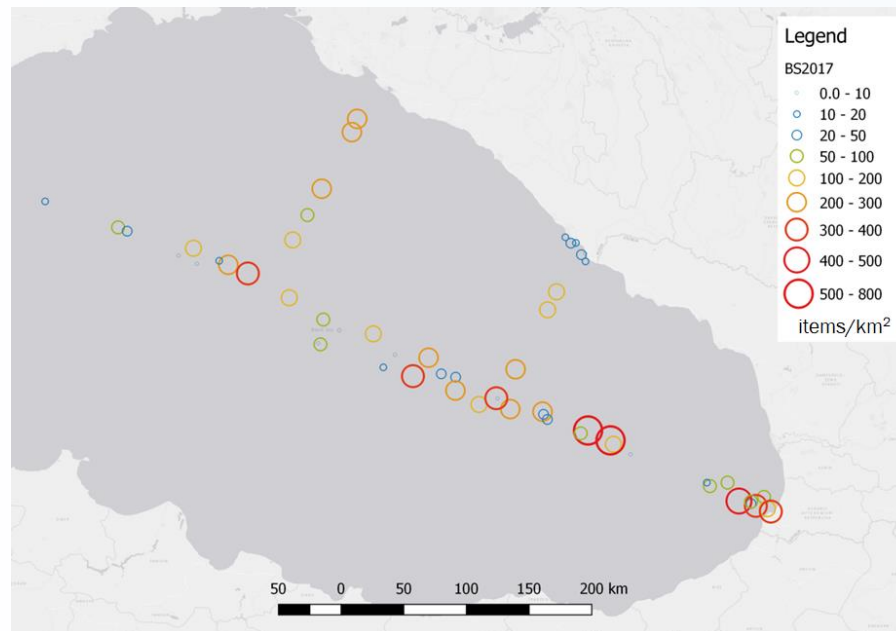


West



West Open sea:
23.0 items/km² (63 transects)

East



East Open sea:
138.6 items/km² (54 transects)



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Details of floating marine litter surveys on the Black Sea 2017

**144 transects
(3140 km)**

**88 km² of
surveyed
surface**

**5338 litter
items identified**

**Maximum litter
density= 810.2
items/km²**

**Average litter
density = 90.5
items/km²**

**8 Transects with
0 items/km²**

**Avg. transect
length = 22 km**

**Avg. transect
area = 0.61 km²**



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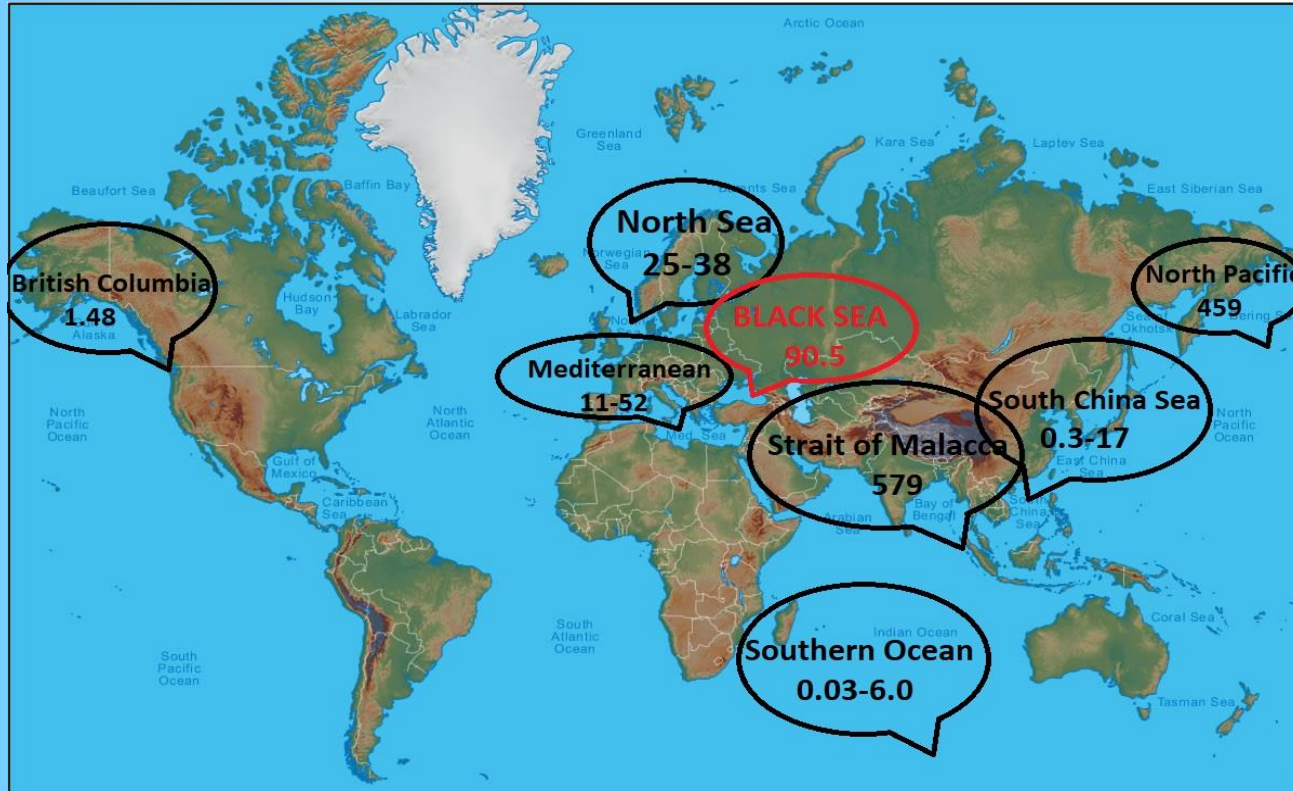


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Comparison with other areas



Mean litter densities on the sea surface from worldwide data (Litter Items/km²).*

* "Marine Anthropogenic Litter"
Bergmann M., Gutow L., Klages M., 2009



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Conclusions

- Marine litter, in particular plastic litter, is present in all Black Sea areas
- Concentrations on the sea surface are very variable: 0 – 810 items/km²
- Concentrations of litter in some areas were extremely high, confirmed on multiple transects
- Monitoring organization, protocol implementation and reporting still needs to be improved
- Need to improve spatial and time coverage, identification of hot spots and source areas



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Thank you for your attention!

