

Supplementary Information

Spatiotemporal Distribution, Bioaccumulation, and Ecological and Human Health Risks of PAHs in Surface Water: A Comprehensive Review

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Table S1. PAHs concentration in water (ng/L), sediment (ug/kg dw), and biota (ug/kg dw) in ports worldwide, and the classification of the reviewed ports according to size, structure, river flowing to the ports and category. All the data above are sourced from **(Tulcan et al. 2024)**.

References:

Tulcan, R.X.S., Liu, L., Lu, X., Ge, Z., Fernández Rojas, D.Y., Mora Silva, D., 2024. PAHs contamination in ports: Status, sources and risks. Journal of Hazardous Materials 475, 134937.

1. Tables

Table S1. PAHs concentration in water (ng/L), sediment (ug/kg dw), and biota (ug/kg dw) in ports worldwide, and the classification of the reviewed ports according to size, structure, river flowing to the ports and category.

Media	Port	Country	Size	Structure	River	Port Category	Sampling Year	Mean	Standard Deviation	Minimum	Maximum	Reference
Water	Vlora Port	Albania	Small	Open	No	Fuel	2022	5500	NA	NA	NA	Halo et al., 2022
Water	Durres Port	Albania	Small	Semi-enclosed	No	Transport	2022	4000	NA	NA	NA	Halo et al., 2022
Water	Durres Port	Albania	Small	Semi-enclosed	No	Transport	2022	1200	NA	NA	NA	Halo et al., 2022
Water	Vlora Port	Albania	Small	Open	No	Fuel	2022	200	NA	NA	NA	Halo et al., 2022
Water	Jifenjiao Port	China	Large	Semi-enclosed	No	Commercial	NA	2345.64	2139.8	626	6827	Li et al., 2015
Water	Jifenjiao Port	China	Large	Semi-enclosed	No	Commercial	2016	54.64	6.24	48.4	60.88	Li et al., 2019
Water	Romano Port	Albania	Large	Semi-enclosed	No	Commercial	2018-2019	5445000	1576904	3690000	7600000	Nuro et al., 2020
Water	Barcelona Port	Spain	Large	Semi-enclosed	No	Commercial	2009	694	NA	NA	NA	Sanchez Avila et al., 2012
Water	Castellon Port	Spain	Small	Semi-enclosed	No	Cargo	2009	25	NA	NA	NA	Sanchez Avila et al., 2012
Water	Tarragona Port	Spain	Small	Semi-enclosed	No	Fuel	2009	30	NA	NA	NA	Sanchez Avila et al., 2012
Water	Waigaoqiao Port	China	Large	Semi-enclosed	No	Commercial	2020	482.13	154.01	276.6	647.3	Zhang et al., 2023
Water	Huangpujian Port	China	Medium	Semi-enclosed	Yes	Fuel	2020	236.1	38.6	197.5	274.7	Zhang et al., 2023
Water	Jifenjiao Port	China	Large	Open	No	Cargo	2020	254.63	46.35	202.8	315.3	Zhang et al., 2023
Water	Longmen Port	China	Large	Open	No	Transport	2017	44.44	6.32	33.5	48.24	Zheng et al., 2022
Water	Islamic Jeddah Port	Saudi Arabia	Medium	Open	No	Commercial	NA	350	114.89	190	520	El Maradny et al., 2023
Water	Vlora Port	Albania	Small	Open	No	Fuel	NA	13000	NA	3.7	NA	Halo et al., 2023
Water	Guangli Port	China	Small	Open	Yes	Fishing	2018	303.88	NA	NA	NA	Li et al., 2022

Water	Guangli Port	China	Small	Open	Yes	Fishing	2018	339.8	NA	NA	NA	Li et al., 2022
Water	Guangli Port	China	Small	Open	Yes	Fishing	2018	386.8	NA	NA	NA	Li et al., 2022
Water	Guangli Port	China	Small	Open	Yes	Fishing	2018	382.46	NA	NA	NA	Li et al., 2022
Water	Paotere Port	Indonesia	Small	Semi-enclosed	No	Fishing	NA	2412	1180.43	1217	4019	Marzuki et al., 2021
Water	Paranagua Port	Brazil	Medium	Open	No	Commercial	2012	162.29	NA	NA	NA	Froehner et al., 2018
Water	Nemrut Port	Turkey	Large	Open	No	Commercial	2009	NA	NA	100	294.62	Odabasi et al., 2017
Water	Geona Port	Italy	Large	Semi-enclosed	No	Commercial	2009	25.4	4.22	18	35	Vagge et al., 2018
Water	Geona Port	Italy	Large	Semi-enclosed	No	Commercial	2010	NA	NA	NA	NA	Vagge et al., 2018
Water	Geona Port	Italy	Large	Semi-enclosed	No	Commercial	2010	NA	NA	NA	NA	Vagge et al., 2018
Water	Genoa Port	Italy	Large	Semi-enclosed	No	Commercial	2012	100	200	10	1620	Cutroneo et al., 2015
Water	Xiamen Port	China	Super-Large	Open	Yes	Commercial	2005	280	NA	NA	NA	Ya et al., 2014
Water	Bouc Port	France	Large	Semi-enclosed	No	Commercial	2009	1750	650	1100	2400	Sauret et al., 2016
Water	Vieux Marina	France	Large	Semi-enclosed	No	Transport	2009	132.5	50.68	100	220	Sauret et al., 2016
Water	Saumaty Port	France	Small	Semi-enclosed	No	Fishing	2009	460	546.4	90	1400	Sauret et al., 2016
Water	Bouc Port	France	Large	Semi-enclosed	No	Commercial	2010	140	8.16	130	150	Sauret et al., 2016
Water	Vieux Marina	France	Large	Semi-enclosed	No	Transport	2010	148.33	51.04	105	220	Sauret et al., 2016
Water	Saumaty Port	France	Small	Semi-enclosed	No	Fishing	2010	107.5	42.06	80	180	Sauret et al., 2016
Water	Xiamen Port	China	Super-Large	Open	Yes	Commercial	2008	28.6	NA	NA	NA	Wu et al., 2017
Water	Bouc Port	France	Small	Semi-enclosed	Yes	Fuel	2011	78	20.31	NA	NA	Guigue et al., 2014
Water	Bouc Port	France	Small	Semi-enclosed	Yes	Fuel	2011	24.33	3.86	NA	NA	Guigue et al., 2014
Water	Bouc Port	France	Small	Semi-enclosed	Yes	Fuel	2011	30.86	22.5	NA	NA	Guigue et al., 2014
Water	Bouc Port	France	Small	Semi-enclosed	Yes	Fuel	2011	10.08	3.86	NA	NA	Guigue et al., 2014

Water	Bouc Port	France	Small	Semi-enclosed	Yes	Fuel	2012	65.5	47.01	NA	NA	Guigue et al., 2014 Dhananjayan et al., 2012 Shreadah et al., 2013 Shreadah et al., 2013
Water	Sewri Port	India	Large	Open	Yes	Commercial	NA	46740	NA	NA	NA	
Water	Eastern Port	Egypt	Medium	Semi-enclosed	No	Fishing	2010	419.44	466.22	177.47	1460.65	
Water	Western Port	Egypt	Medium	Semi-enclosed	No	Commercial	2010	145.6	76.67	64.13	310.7	
Water	Bouc Marina	France	Large	Semi-enclosed	No	Transport	2009	150	NA	NA	NA	Guigue et al., 2011
Water	Bouc Marina	France	Large	Semi-enclosed	No	Transport	2009	36	NA	NA	NA	Guigue et al., 2011
Water	Bouc Marina	France	Large	Semi-enclosed	No	Transport	2010	53.25	NA	NA	NA	Guigue et al., 2011
Water	Saumaty Port	France	Small	Semi-enclosed	No	Fishing	2009	97.5	NA	NA	NA	Guigue et al., 2011
Water	Saumaty Port	France	Small	Semi-enclosed	No	Fishing	2010	48.5	NA	NA	NA	Guigue et al., 2011
Water	Vieux Marina	France	Large	Semi-enclosed	No	Transport	2009	41.5	NA	NA	NA	Guigue et al., 2011
Water	Vieux Marina	France	Large	Semi-enclosed	No	Transport	2010	86.5	NA	NA	NA	Guigue et al., 2011
Water	Neendakara Port	India	Small	Semi-enclosed	Yes	Fishing	NA	697.18	1.2	NA	NA	Yahiya et al., 2021
Water	Sfax Port	Tunisia	Medium	Open	Yes	Commercial	2015	19.52	NA	NA	NA	Fourati et al., 2018
Water	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2019	102.67	98.4	23.4	268	Huang et al., 2020
Water	Alesund Marina	Norway	Small	Open	No	Transport	2016	40.4	NA	NA	NA	Ademollo et al., 2021
Water	Alesund Marina	Norway	Small	Open	No	Transport	2017	36.7	NA	NA	NA	Ademollo et al., 2021
Sediment	Khomeini Port	Iran	Large	Open	No	Cargo	2010	4031.61	937.84	2885.74	5482.17	Abdollahi et al., 2013a
Sediment	Ulsan Port	South Korea	Large	Semi-enclosed	Yes	Cargo	2017	967.96	1513	43.83	3954.8	An et al., 2020
Sediment	Koper Port	Slovenia	Large	Open	No	Cargo	NA	423.75	16.25	407.5	440	Bajt et al., 2012
Sediment	Ribogojnica Marina	Slovenia	Small	Semi-enclosed	Yes	Cargo	NA	1082	NA	NA	NA	Bajt et al., 2012
Sediment	Koper Port	Slovenia	Large	Open	No	Cargo	NA	328	NA	NA	NA	Bajt et al., 2014

Sediment	Koper Marina	Slovenia	Medium	Semi-enclosed	No	Minerals	NA	3506	NA	NA	NA	Bajt et al., 2014
Sediment	Izola Marina	Slovenia	Large	Semi-enclosed	No	Transport	NA	4416	NA	NA	NA	Bajt et al., 2014
Sediment	Portoroz Marina	Slovenia	Small	Open	No	Transport	NA	664	NA	NA	NA	Bajt et al., 2014
Sediment	Ribogojnica Marina	Slovenia	Small	Semi-enclosed	Yes	Cargo	2003-2013	1083	NA	NA	NA	Bajt et al., 2022
Sediment	Koper Port	Slovenia	Large	Open	No	Cargo	2003-2013	578	NA	NA	NA	Bajt et al., 2022
Sediment	Tema Marina	Ghana	Small	Semi-enclosed	No	Transport	2014	4228.4	612.72	3015	4667	Botwe et al., 2017
Sediment	Tema Port	Ghana	Small	Semi-enclosed	No	Fishing	2014	4229	49	4180	4278	Botwe et al., 2017
Sediment	Tema Port	Ghana	Medium	Semi-enclosed	No	Cargo	2014	2941.64	466.08	2487	4537	Botwe et al., 2017
Sediment	Quilombo Port	Brazil	Small	Semi-enclosed	No	Minerals	2007	4803.62	NA	NA	NA	Buruaem et al., 2013
Sediment	Travessia Marina	Brazil	Small	Open	Yes	Transport	2007	1248.64	NA	NA	NA	Buruaem et al., 2013
Sediment	Pecem Port	Brazil	Small	Open	No	Minerals	2008	217.95	74.05	143.9	292	Buruaem et al., 2016
Sediment	Mucuripe Port	Brazil	Small	Open	No	Fishing	2007	92.85	14.95	77.9	107.8	Buruaem et al., 2016
Sediment	Cagliari Marina	Italy	Small	Semi-enclosed	Yes	Transport	2012	2406.6	NA	NA	NA	Chatzinikolaou et al., 2018
Sediment	Cagliari Port	Italy	Small	Semi-enclosed	No	Transport	2012	10739.5	14745.6	1640.2	36258.2	Chatzinikolaou et al., 2018
Sediment	Herakloin Marina	Greece	Medium	Semi-enclosed	No	Transport	2012	2098.1	NA	NA	NA	Chatzinikolaou et al., 2018
Sediment	Herakloin Port	Greece	Small	Semi-enclosed	No	Transport	2012	737.77	625.96	201.7	1615.9	Chatzinikolaou et al., 2018
Sediment	Kantaoui Marina	Tunisia	Medium	Semi-enclosed	No	Transport	2012	339.1	88.8	250.3	427.9	Chatzinikolaou et al., 2018
Sediment	Kaohsiung Marina	Taiwan, China	Small	Semi-enclosed	Yes	Transport	2019	557.3	NA	NA	NA	Chen et al., 2020
Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2019	1654.4	1167.46	360.7	3595.4	Chen et al., 2020

Sediment	Keelung Port	Taiwan, China	Large	Semi-enclosed	Yes	Cargo	2021	277.99	25.72	252.27	303.71	Chen et al., 2022a
Sediment	Hualien Port	Taiwan, China	Small	Semi-enclosed	No	Transport	2021	216.48	188.67	27.81	405.14	Chen et al., 2022a
Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2021	222.66	204.02	48.22	551.69	Chen et al., 2022a
Sediment	Taichung Port	Taiwan, China	Super-Large	Semi-enclosed	No	Cargo	2021	98.52	13.01	86.72	120.31	Chen et al., 2022a
Sediment	Suao Port	Taiwan, China	Small	Semi-enclosed	Yes	Cargo	2021	87.87	2.04	85.82	89.91	Chen et al., 2022a
Sediment	Anping Port	Taiwan, China	Small	Semi-enclosed	Yes	Fishing	2021	50.87	16.66	34.21	67.53	Chen et al., 2022a
Sediment	Taipei Port	Taiwan, China	Medium	Semi-enclosed	Yes	Cargo	2021	46.89	6.34	40.54	53.23	Chen et al., 2022a
Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2007	20956.5	12715.99	4425	51261	Dong et al., 2012
Sediment	Navlakhi Port	India	Large	Open	No	Minerals	2016	15819.1	NA	NA	NA	Gosai et al., 2018
Sediment	Alang Port	India	Small	Open	No	Fuel	2016	54240.45	NA	NA	NA	Gosai et al., 2018
Sediment	Alang Port	India	Small	Open	No	Fuel	2015	39290.9	NA	NA	NA	Gosai et al., 2018
Sediment	Navlakhi Port	India	Large	Open	No	Minerals	2015	30396.25	NA	NA	NA	Gosai et al., 2018
Sediment	Navlakhi Port	India	Large	Open	No	Minerals	2015	19878.05	NA	NA	NA	Gosai et al., 2018
Sediment	Alang Port	India	Small	Open	No	Fuel	2015	8078.95	NA	NA	NA	Gosai et al., 2018
Sediment	Alang Port	India	Small	Open	No	Fuel	2015	1309.65	NA	NA	NA	Gosai et al., 2018
Sediment	Navlakhi Port	India	Large	Open	No	Minerals	2015	734.83	NA	NA	NA	Gosai et al., 2018
Sediment	Busan Port	South Korea	Super-Large	Semi-enclosed	Yes	Cargo	2014	1402	1904.73	110	5200	Han et al., 2016
Sediment	Dadaepo Port	South Korea	Small	Semi-enclosed	No	Transport	2014	610	NA	NA	NA	Han et al., 2016
Sediment	Jangpyeong Port	South Korea	Medium	Open	No	Cargo	2010-2012	350	40	NA	NA	Hong et al., 2014

Sediment	Asaluyeh Port	Iran	Medium	Semi-enclosed	No	Fuel	2016	82.1	NA	NA	NA	Keshavarzifard et al., 2018
Sediment	Nakhl Marina	Iran	Small	Semi-enclosed	No	Transport	2016	53	NA	NA	NA	Keshavarzifard et al., 2018
Sediment	Mohang Port	South Korea	Small	Semi-enclosed	No	Fishing	2009	213.27	30.27	168.84	257.81	Kim et al., 2014
Sediment	Mar del Plata Marina	Argentina	Small	Semi-enclosed	No	Transport	2012	4900.9	NA	NA	NA	Laitano et al., 2015
Sediment	Mar del Plata Port	Argentina	Small	Semi-enclosed	No	Fishing	2012	11871.42	5222.3	6649.12	17093.72	Laitano et al., 2015
Sediment	Jifenjiao Port	China	Large	Semi-enclosed	No	Commercial	NA	378.43	207.49	118	779	Li et al., 2015
Sediment	Jifenjiao Port	China	Large	Semi-enclosed	No	Commercial	2016	172.3	0.5	171.8	172.8	Li et al., 2019
Sediment	Bari Port	Italy	Large	Semi-enclosed	No	Commercial	2010-2011	5071.87	3863.48	691.06	18046.88	Mali et al., 2022
Sediment	Monopoli Port	Italy	Medium	Semi-enclosed	No	Commercial	2010-2011	4659.3	5035.12	153.5	23148	Mali et al., 2022
Sediment	Tripoli Port	Lebanon	Large	Semi-enclosed	No	Commercial	2013	1456.42	737.54	627.63	2726.4	Merhaby et al., 2015
Sediment	Tripoli Marina	Lebanon	Large	Semi-enclosed	No	Commercial	2013	1554.67	1035.44	507.5	2964.7	Merhaby et al., 2015
Sediment	Jiyeh Port	Lebanon	Large	Semi-enclosed	No	Commercial	2014	552.3	NA	NA	NA	Merhaby et al., 2020
Sediment	Beirut Port	Lebanon	Large	Semi-enclosed	No	Commercial	2014	3772.6	NA	NA	NA	Merhaby et al., 2020
Sediment	Vado Ligure Port	Italy	Large	Semi-enclosed	No	Commercial	2009	4.7	1.78	2.51	7.72	Paladino et al., 2015
Sediment	Xiagong Port	China	Large	Semi-enclosed	No	Commercial	2020	100	NA	NA	NA	Peng et al., 2022
Sediment	Klaipeda Port	Lithuania	Large	Semi-enclosed	Yes	Cargo	2013-2014	528.4	NA	NA	NA	Stakeniene et al., 2019
Sediment	Cagliari Marina	Italy	Medium	Semi-enclosed	Yes	Transport	2012	1879.53	665.82	1209.5	2787.5	Vitali et al., 2019
Sediment	Cagliari Port	Italy	Medium	Semi-enclosed	No	Transport	2012	1852.68	763.69	1068.8	3033	Vitali et al., 2019
Sediment	Kantaoui Marina	Tunisia	Medium	Semi-enclosed	Yes	Transport	2012	213.02	84.04	95.9	367.3	Vitali et al., 2019
Sediment	Herakloin Port	Greece	Medium	Semi-enclosed	No	Transport	2012	1586.9	211.11	1417.5	1884.5	Vitali et al., 2019

Sediment	Herakloin Port	Greece	Small	Semi-enclosed	No	Transport	2012	479.31	563.96	88.6	1987.1	Vitali et al., 2019
Sediment	Huangpujian Port	China	Medium	Semi-enclosed	Yes	Fuel	2020	123.4	NA	NA	NA	Zhang et al., 2023
Sediment	Waigaoqiao Port	China	Large	Semi-enclosed	No	Commercial	2020	16.55	3.85	12.7	20.4	Zhang et al., 2023
Sediment	Jifenjiao Port	China	Large	Open	No	Cargo	2020	573.2	NA	NA	NA	Zhang et al., 2023
Sediment	Qianzhen Port	China	Small	Semi-enclosed	No	Fishing	NA	791.7	405.46	258.2	1508.1	Chen et al., 2023
Sediment	Oostende Port	Belgium	Small	Semi-enclosed	Yes	Fishing	NA	511.8	NA	NA	NA	Vanavermaete et al., 2023
Sediment	Nieuwpoort Marina	Belgium	Medium	Semi-enclosed	Yes	Transport	NA	815	NA	NA	NA	Vanavermaete et al., 2023
Sediment	Zeebrugge Port	Belgium	Super-Large	Semi-enclosed	Yes	Commercial	NA	1179.6	NA	NA	NA	Vanavermaete et al., 2023
Sediment	Mucuripe Port	Brazil	Small	Open	No	Fishing	NA	448.47	NA	NA	NA	Moreira et al., 2020a
Sediment	Mucuripe Port	Brazil	Small	Open	No	Fishing	NA	218.38	NA	NA	NA	Moreira et al., 2020a
Sediment	Muuga Port	Estonia	Small	Semi-enclosed	No	Fuel	NA	7380	NA	NA	NA	Kuprijanov et al., 2021
Sediment	Kunda Port	Estonia	Small	Open	No	Cargo	NA	62.15	1.95	60.2	64.1	Kuprijanov et al., 2021
Sediment	Sillamae Port	Estonia	Small	Open	No	Fuel	NA	678	NA	NA	NA	Kuprijanov et al., 2021
Sediment	Lomonosov Port	Russia	Small	Semi-enclosed	No	Fishing	NA	4030	NA	NA	NA	Kuprijanov et al., 2021
Sediment	Guangli Port	China	Small	Open	Yes	Fishing	2018	548.08	NA	NA	NA	Li et al., 2022
Sediment	Guangli Port	China	Small	Open	Yes	Fishing	2018	538.14	NA	NA	NA	Li et al., 2022
Sediment	Guangli Port	China	Small	Open	Yes	Fishing	2018	555.71	NA	NA	NA	Li et al., 2022
Sediment	Guangli Port	China	Small	Open	Yes	Fishing	2018	575.73	NA	NA	NA	Li et al., 2022
Sediment	Santana Port	Brazil	Small	Open	No	Fuel	NA	105.62	NA	NA	NA	Lima et al., 2021
Sediment	Conde Port	Brazil	Small	Open	No	Fuel	NA	23267.99	NA	NA	NA	Lima et al., 2021
Sediment	Belem Marina	Brazil	Small	Open	No	Transport	NA	114.7	NA	NA	NA	Lima et al., 2021

Sediment	Napels Port	Italy	Large	Semi-enclosed	No	Commercial	NA	4440	11290	80	65500	Sciarrillo et al., 2020a
Sediment	Xinying Port	China	Small	Open	No	Fuel	2015	1970	NA	NA	NA	Li et al., 2020a
Sediment	Paranagua Port	Brazil	Medium	Open	No	Commercial	2012	69.72	NA	NA	NA	Froehner et al., 2018
Sediment	Vado Port	Italy	Medium	Semi-enclosed	No	Commercial	2012	434	246	188	680	Paladino et al., 2017a
Sediment	Nemrut Port	Turkey	Large	Open	No	Commercial	2009	NA	NA	501	49682	Odabasi et al., 2017
Sediment	Palase Marina	Italy	Small	Open	No	Transport	2011	0.43	0.23	0.04	0.72	Mali et al., 2017a
Sediment	Torre a Mare Marina	Italy	Medium	Semi-enclosed	No	Transport	2011	1.53	0.66	0.51	2.48	Mali et al., 2017a
Sediment	Monopoli Port	Italy	Small	Semi-enclosed	No	Transport	2011	13.85	10.16	4.72	41.6	Mali et al., 2017a
Sediment	Manopoli Marina	Italy	Medium	Semi-enclosed	No	Transport	2011	6.27	3.21	3.27	11.3	Mali et al., 2017a
Sediment	Itajai Harbor	Brazil	Medium	Semi-enclosed	No	Transport	2011	1237.2	27.3	NA	NA	Frena et al., 2016
Sediment	Portonave Port	Brazil	Medium	Open	Yes	Commercial	2011	441.9	24.3	NA	NA	Frena et al., 2016
Sediment	Tees Port	UK	Super-Large	Semi-enclosed	Yes	Commercial	2008	NA	NA	21900	360000	Rumney et al., 2015
Sediment	Tees Port	UK	Super-Large	Semi-enclosed	Yes	Commercial	2009	NA	NA	627	156000	Rumney et al., 2015
Sediment	Tees Port	UK	Super-Large	Semi-enclosed	Yes	Commercial	2010	NA	NA	7650	87500	Rumney et al., 2015
Sediment	Tees Port	UK	Super-Large	Semi-enclosed	Yes	Commercial	2011	NA	NA	8540	132000	Rumney et al., 2015
Sediment	Tees Port	UK	Super-Large	Semi-enclosed	Yes	Commercial	2012	NA	NA	22300	92200	Rumney et al., 2015
Sediment	Tees Port	UK	Super-Large	Semi-enclosed	Yes	Commercial	2013	NA	NA	10100	116000	Rumney et al., 2015
Sediment	West Port	Malaysia	Super-Large	Semi-enclosed	Yes	Commercial	NA	3545.9	NA	NA	NA	TavakolySany et al., 2014

Sediment	Santos Port	Brazil	Large	Semi-enclosed	Yes	Commercial	NA	263.44	33.08	230.35	296.52	Torres et al., 2010
Sediment	Ushuai Port	Argentina	Small	Open	No	Fuel	2006	262	NA	NA	NA	Commendatore et al., 2012
Sediment	Ushuai Port	Argentina	Small	Open	No	Transport	2006	307	NA	NA	NA	Commendatore et al., 2012
Sediment	MDP Marina	Argentina	Small	Semi-enclosed	No	Transport	2009	698.49	NA	NA	NA	Albano et al., 2013
Sediment	Paranagua Port	Brazil	Medium	Open	No	Commercial	NA	63.38	NA	NA	NA	Froehner et al., 2011
Sediment	West Port	Malaysia	Super-Large	Semi-enclosed	Yes	Commercial	2007	25.5	NA	NA	NA	Sakari et al., 2010
Sediment	Gaslini Port	Italy	Medium	Semi-enclosed	No	Commercial	2009	150	NA	NA	NA	Moschino et al., 2016
Sediment	Gaslini Port	Italy	Medium	Semi-enclosed	No	Commercial	2010	550	NA	NA	NA	Moschino et al., 2016
Sediment	Gaslini Port	Italy	Medium	Semi-enclosed	No	Commercial	2011	3870	NA	NA	NA	Moschino et al., 2016
Sediment	Gaslini Port	Italy	Medium	Semi-enclosed	No	Commercial	2012	4670	NA	NA	NA	Moschino et al., 2016
Sediment	Gaslini Port	Italy	Medium	Semi-enclosed	No	Commercial	2013	2880	NA	NA	NA	Moschino et al., 2016
Sediment	Bjorlanda Marina	Sweden	Large	Semi-enclosed	No	Transport	2010	640	NA	NA	NA	Eklund et al., 2016
Sediment	Eriksberg Marina	Sweden	Small	Semi-enclosed	Yes	Transport	2010	1220	NA	NA	NA	Eklund et al., 2016
Sediment	Hinsholmskilen Marina	Sweden	Large	Semi-enclosed	No	Transport	2010	830	NA	NA	NA	Eklund et al., 2016
Sediment	Hjuvik Marina	Sweden	Small	Open	No	Transport	2010	1130	NA	NA	NA	Eklund et al., 2016
Sediment	Kebal Marina	Sweden	Medium	Open	No	Transport	2010	7470	NA	NA	NA	Eklund et al., 2016
Sediment	Kungshamn Marina	Sweden	Medium	Semi-enclosed	No	Transport	2010	2310	NA	NA	NA	Eklund et al., 2016
Sediment	Marstrand Marina	Sweden	Medium	Semi-enclosed	No	Transport	2010	1490	NA	NA	NA	Eklund et al., 2016
Sediment	Alesund Marina	Norway	Small	Open	No	Transport	2013	1630	859	476	2550	VanDenHeuvel et al., 2016

Sediment	Augusta Port	Italy	Large	Semi-enclosed	No	Fuel	2008	8000	NA	NA	NA	Romano et al., 2016
Sediment	Recife Port	Brazil	Small	Semi-enclosed	Yes	Cargo	2011	138.5	30.3	108.2	168.8	Maciel et al., 2015
Sediment	Hualien Port	China	Medium	Semi-enclosed	No	Fishing	2013	810	407.68	450	1380	Kao et al., 2015
Sediment	Hualien Port	China	Medium	Semi-enclosed	No	Fishing	2013	460	117.76	300	580	Kao et al., 2015
Sediment	Hualien Port	China	Medium	Semi-enclosed	No	Fishing	2014	800	163.3	600	1000	Kao et al., 2015
Sediment	Hualien Port	China	Medium	Semi-enclosed	No	Fishing	2014	2475	2721.17	400	6800	Kao et al., 2015
Sediment	Chengkung Port	China	Large	Semi-enclosed	No	Fishing	2013	2662.5	632.33	2000	3500	Kao et al., 2015
Sediment	Chengkung Port	China	Large	Semi-enclosed	No	Fishing	2013	2487.5	1235.35	1200	4800	Kao et al., 2015
Sediment	Chengkung Port	China	Large	Semi-enclosed	No	Fishing	2014	3450	1028.35	2000	5400	Kao et al., 2015
Sediment	Chengkung Port	China	Large	Semi-enclosed	No	Fishing	2014	3737.5	1514.05	1800	6500	Kao et al., 2015
Sediment	Fugang Port	China	Medium	Semi-enclosed	No	Fishing	2014	640	258.07	310	940	Kao et al., 2015
Sediment	Hammerfest Port	Norway	Small	Open	No	Transport	NA	6200	1900	NA	NA	Pedersen et al., 2015
Sediment	Sisimiut Marina	Greenland	Small	Semi-enclosed	No	Transport	NA	10000	3000	NA	NA	Pedersen et al., 2015
Sediment	AlKakrah Port	Qatar	Medium	Open	No	Fishing	NA	265.1	NA	NA	NA	Soliman et al., 2014
Sediment	Mytilene Harbor	Turkey	Small	Semi-enclosed	No	Transport	NA	410	50	NA	NA	Kostopoulou et al., 2013
Sediment	Alsancak Harbor	Turkey	Medium	Open	No	Commercial	NA	1010	320	NA	NA	Kostopoulou et al., 2013
Sediment	Syney Port	Canada	Small	Open	Yes	Fuel	2012	60600	16055.74	38000	73800	Walker et al., 2013
Sediment	Tagus Port	Portugal	Small	Semi-enclosed	No	Transport	NA	1307.6	NA	NA	NA	Martins et al., 2012
Sediment	Syney Port	Canada	Small	Open	Yes	Fuel	2012	61666.67	16779.62	38000	75000	Walker et al., 2013b
Sediment	Boulogne Port	France	Small	Semi-enclosed	No	Fishing	NA	4220	NA	NA	NA	Kerambrun et al., 2012
Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2006	3125.22	4658.21	535.8	16700.4	Chen et al., 2013

Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2006	1120.99	2152.81	33.8	8785.6	Chen et al., 2013
Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2006	1157.89	1120.68	219.4	3984.6	Chen et al., 2013
Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2006	1598.11	2864.49	44.5	11607.5	Chen et al., 2013
Sediment	Kaohsiung Marina	Taiwan, China	Small	Semi-enclosed	Yes	Transport	2006	2571.9	NA	NA	NA	Chen et al., 2013
Sediment	Kaohsiung Marina	Taiwan, China	Small	Semi-enclosed	Yes	Transport	2006	2029.4	NA	NA	NA	Chen et al., 2013
Sediment	Kaohsiung Marina	Taiwan, China	Small	Semi-enclosed	Yes	Transport	2006	1178.8	NA	NA	NA	Chen et al., 2013
Sediment	Kaohsiung Marina	Taiwan, China	Small	Semi-enclosed	Yes	Transport	2006	2598	NA	NA	NA	Chen et al., 2013
Sediment	Kaohsiung Marina	Taiwan, China	Small	Semi-enclosed	Yes	Transport	2009	1049.64	333.6	783.5	1891	Chen et al., 2012a
Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2009	5205.37	8876.33	39	30521	Chen et al., 2012a
Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2009	15480.5	8785.3	6157	28575	Chen et al., 2012
Sediment	Eastern Port	Egypt	Medium	Semi-enclosed	No	Fishing	2010	4851	6540.14	180	14100	Barakat et al., 2011
Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2006	6051.55	6094.61	460	15741	Chen et al., 2011
Sediment	Kaohsiung Marina	Taiwan, China	Small	Semi-enclosed	Yes	Transport	2006	992.6	NA	NA	NA	Chen et al., 2011
Sediment	Heping Port	Taiwan, China	Small	Semi-enclosed	No	Fuel	2005	60.12	3.22	56.9	63.34	Kuo et al., 2012
Sediment	Heping Port	Taiwan, China	Small	Semi-enclosed	No	Fuel	2006	101.84	2.83	99.01	104.66	Kuo et al., 2012
Sediment	Heping Port	Taiwan, China	Small	Semi-enclosed	No	Fuel	2006	199.27	112.38	86.89	311.65	Kuo et al., 2012
Sediment	Heping Port	Taiwan, China	Small	Semi-enclosed	No	Fuel	2006	72.36	17.32	55.05	89.68	Kuo et al., 2012

Sediment	Eastern Port	Egypt	Medium	Semi-enclosed	No	Fishing	2010	225.93	206.56	36.42	886.01	Shreadah et al., 2011
Sediment	Western Port	Egypt	Medium	Semi-enclosed	No	Commercial	2010	273.71	193.18	47.78	719	Shreadah et al., 2011
Sediment	Napels Port	Italy	Large	Semi-enclosed	No	Commercial	2004	5027	3470	12	21740	Feo et al., 2011
Sediment	Caldera Port	Chile	Small	Open	No	Fuel	2019	2015	NA	NA	NA	Tovar Salvador et al., 2023
Sediment	Ancona Marina	Italy	Small	Semi-enclosed	No	Transport	2015	111.36	NA	NA	NA	Baldrighi et al., 2023
Sediment	Ancona Port	Italy	Medium	Semi-enclosed	No	Commercial	2015	59.12	16.61	42.51	75.73	Baldrighi et al., 2023
Sediment	Mucuripe Port	Brazil	Small	Open	No	Fishing	2013	273.77	204.24	128	562.6	DeOliveira et al., 2023
Sediment	Rovinj Marina	Croatia	Medium	Open	No	Transport	2011	10238.2	371.1	9867.1	10609.3	Pelikan et al., 2022
Sediment	Itaguaí Port	Brazil	Small	Open	No	Commercial	2019	58.2	NA	NA	NA	Carvalho et al., 2022
Sediment	Tromsø Marina	Norway	Small	Open	No	Transport	2018	NA	NA	250	400	Morgunova et al., 2021
Sediment	Tromsø Port	Norway	Small	Open	No	Fuel	2018	860	NA	NA	NA	Morgunova et al., 2021
Sediment	Grau Marina	France	Small	Semi-enclosed	Yes	Transport	NA	491	80	NA	NA	Usanase et al., 2021
Sediment	Mohang Port	South Korea	Small	Semi-enclosed	No	Fishing	NA	360.14	NA	NA	NA	Roy et al., 2021
Sediment	Neendakara Port	India	Small	Semi-enclosed	Yes	Fishing	NA	21913.25	8.1	NA	NA	Yahiya et al., 2021
Sediment	Grande Port	Brazil	Small	Semi-enclosed	Yes	Minerals	2019	1171.35	71.42	1099.93	1242.77	Pinheiro Sousa et al., 2021
Sediment	Seldovia Marina	US	Small	Semi-enclosed	No	Transport	NA	19939.47	12333.2	5058.5	35259	Hartwell et al., 2019
Sediment	Homer Marina	Us	Large	Semi-enclosed	No	Transport	NA	2124.77	485.74	1689.3	2802.6	Hartwell et al., 2019
Sediment	Kaohsiung Marina	Taiwan, China	Small	Semi-enclosed	Yes	Transport	NA	688.4	NA	NA	NA	Ju et al., 2019

Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	NA	8368.97	11309.58	315.4	24363	Ju et al., 2019
Sediment	AlKakrah Port	Qatar	Medium	Open	No	Fishing	NA	60	15.5	4	148	Soliman et al., 2019
Sediment	Alwakra Marina	Qatar	Large	Semi-enclosed	No	Transport	NA	149	33	71	229	Soliman et al., 2019
Sediment	Doha Marina	Qatar	Large	Semi-enclosed	No	Transport	2015	778	227	69	1560	Soliman et al., 2019
Sediment	Aden Port	Yemen	Medium	Semi-enclosed	No	Fuel	2015	9900	NA	NA	NA	Al et al., 2019
Sediment	Piedrabuena Port	Argentina	Small	Open	No	Transport	NA	270	NA	NA	NA	Akhaly Primost et al., 2018
Sediment	Sul Port	Brazil	Small	Semi-enclosed	No	Fuel	2012	768.9	NA	NA	NA	Dauner et al., 2018
Sediment	Guajara Port	Brazil	Medium	Open	Yes	Fuel	NA	1732.12	639.24	1145.3	2812.6	Sodre et al., 2017
Sediment	Vilagarcia Port	Portugal	Small	Semi-enclosed	No	Transport	2011	820.56	NA	NA	NA	Perez Fernandez et al., 2018
Sediment	Zhanjiang Port	China	Medium	Open	Yes	Commercial	2013	453	NA	NA	NA	Sun et al., 2018
Sediment	Sibenik Port	Croatia	Medium	Semi-enclosed	No	Commercial	2013	17138.67	1201.1	16024	18806	Mandic et al., 2018
Sediment	Sibenik Marina	Croatia	Large	Semi-enclosed	No	Transport	2013	6485	NA	NA	NA	Mandic et al., 2018
Sediment	Kastela Port	Croatia	Large	Semi-enclosed	No	Commercial	2013	838	NA	NA	NA	Mandic et al., 2018
Sediment	Pemba Port	Mozambique	Small	Semi-enclosed	No	Commercial	2018	2522	NA	NA	NA	Boitsov et al., 2021
Sediment	Kaohsiung Port	Taiwan, China	Super-Large	Semi-enclosed	Yes	Cargo	2006	NA	NA	880	2018	Huang et al., 2011
Sediment	Karachi Port	Pakistan	Super-Large	Semi-enclosed	Yes	Commercial	2014	426.3	146.51	257.3	707.6	Kahkashan et al., 2019
Sediment	Saint Port	Canada	Small	Semi-enclosed	Yes	Minerals	2018	5650	NA	NA	NA	Diesbourg et al., 2023
Sediment	John Port	Canada	Small	Semi-enclosed	Yes	Minerals	2018	22360	NA	NA	NA	Diesbourg et al., 2023

Sediment	Barrack Port	Canada	Small	Semi-enclosed	Yes	Fuel	2018	5290	NA	NA	NA	Diesbourg et al., 2023
Sediment	Saint Port	Canada	Small	Semi-enclosed	Yes	Minerals	2019	331.67	30.64	310	375	Diesbourg et al., 2023
Sediment	John Port	Canada	Small	Semi-enclosed	Yes	Minerals	2019	1010	837.42	190	2160	Diesbourg et al., 2023
Sediment	Barrack Port	Canada	Small	Semi-enclosed	Yes	Fuel	2019	1818.33	734.67	1240	2855	Diesbourg et al., 2023
Sediment	Saint Port	Canada	Small	Semi-enclosed	Yes	Minerals	2020	371.67	81.79	295	485	Diesbourg et al., 2023
Sediment	John Port	Canada	Small	Semi-enclosed	Yes	Minerals	2020	1838.33	1620.77	385	4100	Diesbourg et al., 2023
Sediment	Barrack Port	Canada	Small	Semi-enclosed	Yes	Fuel	2020	2233.33	1328.06	975	4070	Diesbourg et al., 2023
Sediment	Saint Port	Canada	Small	Semi-enclosed	Yes	Minerals	2021	1029.17	966.42	130	2790	Diesbourg et al., 2023
Sediment	John Port	Canada	Small	Semi-enclosed	Yes	Minerals	2021	2586.25	1586.09	345	4180	Diesbourg et al., 2023
Sediment	Barrack Port	Canada	Small	Semi-enclosed	Yes	Fuel	2021	2901.25	3176.24	120	8300	Diesbourg et al., 2023
Sediment	Saint Port	Canada	Small	Semi-enclosed	Yes	Minerals	2022	1503.75	1695.56	155	4390	Diesbourg et al., 2023
Sediment	John Port	Canada	Small	Semi-enclosed	Yes	Minerals	2022	1465	1345	120	2810	Diesbourg et al., 2023
Sediment	Barrack Port	Canada	Small	Semi-enclosed	Yes	Fuel	2022	3040	1155	1885	4195	Diesbourg et al., 2023
Sediment	Nova Scotia	Canada	NA	NA	NA	NA	NA	6007	25686	37	336770	Davis et al., 2018
Biota	Elmina Port	Ghana	Large	Semi-enclosed	Yes	Fishing	2010	183	NA	NA	NA	Bandowe et al., 2014
Biota	Takoradi Port	Ghana	Small	Semi-enclosed	No	Cargo	2010	165	NA	NA	NA	Bandowe et al., 2014
Biota	Tema Port	Ghana	Medium	Semi-enclosed	No	Cargo	2010	143	32	NA	NA	Bandowe et al., 2014
Biota	Sagunto Port	Spain	Medium	Semi-enclosed	No	Cargo	2006-2007	39.57	5.19	197.84	197.84	Bouzas et al., 2011
Biota	Gandia Port	Spain	Small	Semi-enclosed	Yes	Transport	2006-	14.08	4.07	70.39	70.39	Bouzas et al., 2011

Biota	Valencia Port	Spain	Large	Semi-enclosed	No	Cargo	2007	9.94	4.07	49.67	49.67	Bouzas et al., 2011
Biota	Castellon Port	Spain	Medium	Semi-enclosed	No	Cargo	2006-2007	3.96	2.34	19.79	19.79	Bouzas et al., 2011
Biota	Saint-Florent Port	France	Large	Semi-enclosed	Yes	Transport	2020	75.62	54.03	378.12	378.12	Castrec et al., 2023
Biota	Ile Rousse Port	France	Small	Open	No	Transport	2020	36	14.84	180	180	Castrec et al., 2023
Biota	Calvi Marina	France	Medium	Semi-enclosed	No	Transport	2020	37.5	16.07	187.5	187.5	Castrec et al., 2023
Biota	Mohang Port	South Korea	Small	Semi-enclosed	No	Fishing	2009	726.5	NA	NA	NA	Kim et al., 2014
Biota	Brest Port	France	Small	Semi-enclosed	Yes	Cargo	2012	507	32	NA	NA	Lacroix et al., 2015
Biota	Barcelona Port	Spain	Large	Semi-enclosed	No	Commercial	2004	246.2	19	NA	NA	Leon et al., 2013
Biota	Barcelona Port	Spain	Large	Semi-enclosed	No	Commercial	2005	161	11.6	NA	NA	Leon et al., 2013
Biota	Barcelona Port	Spain	Large	Semi-enclosed	No	Commercial	2006	227.4	5.8	NA	NA	Leon et al., 2013
Biota	Barcelona Port	Spain	Large	Semi-enclosed	No	Commercial	2007	148.2	13.9	NA	NA	Leon et al., 2013
Biota	Barcelona Port	Spain	Large	Semi-enclosed	No	Commercial	2008	320.4	37.4	NA	NA	Leon et al., 2013
Biota	Barcelona Port	Spain	Large	Semi-enclosed	No	Commercial	2009	301.7	36.2	NA	NA	Leon et al., 2013
Biota	Tarragona Port	Spain	Small	Semi-enclosed	No	Fuel	2004	215.6	39.4	NA	NA	Leon et al., 2013
Biota	Tarragona Port	Spain	Small	Semi-enclosed	No	Fuel	2005	155.1	4.7	NA	NA	Leon et al., 2013
Biota	Tarragona Port	Spain	Small	Semi-enclosed	No	Fuel	2006	71.7	24.3	NA	NA	Leon et al., 2013
Biota	Tarragona Port	Spain	Small	Semi-enclosed	No	Fuel	2007	389.5	53.2	NA	NA	Leon et al., 2013
Biota	Tarragona Port	Spain	Small	Semi-enclosed	No	Fuel	2008	225.3	27.5	NA	NA	Leon et al., 2013
Biota	Tarragona Port	Spain	Small	Semi-enclosed	No	Fuel	2009	128.8	9.1	NA	NA	Leon et al., 2013
Biota	Valencia Port	Spain	Large	Semi-enclosed	No	Commercial	2004	83.8	8.8	NA	NA	Leon et al., 2013
Biota	Valencia Port	Spain	Large	Semi-enclosed	No	Commercial	2005	74.3	4	NA	NA	Leon et al., 2013

Biota	Valencia Port	Spain	Large	Semi-enclosed	No	Commercial	2006	65.3	14.8	NA	NA	Leon et al., 2013
Biota	Valencia Port	Spain	Large	Semi-enclosed	No	Commercial	2007	115.2	12.9	NA	NA	Leon et al., 2013
Biota	Valencia Port	Spain	Large	Semi-enclosed	No	Commercial	2008	212.4	5.4	NA	NA	Leon et al., 2013
Biota	Valencia Port	Spain	Large	Semi-enclosed	No	Commercial	2009	134.3	12.1	NA	NA	Leon et al., 2013
Biota	Jifenjiao Port	China	Large	Semi-enclosed	No	Commercial	NA	1194.14	781.5	192	2663	Li et al., 2015
Biota	Jifenjiao Port	China	Large	Semi-enclosed	No	Commercial	2016	661.2	395	71.01	1643	Li et al., 2019
Biota	Paranagua Port	Brazil	Medium	Open	No	Commercial	2012	723.38	NA	NA	NA	Froehner et al., 2018
Biota	Oran Port	Algeria	Large	Semi-enclosed	No	Commercial	2014	2736.3	NA	NA	NA	Benali et al., 2017
Biota	Mostaganem Port	Algeria	Small	Semi-enclosed	No	Fishing	2014	177.5	NA	NA	NA	Benali et al., 2017
Biota	Jiazi Marina	China	Small	Open	Yes	Transport	2010	442.06	NA	NA	NA	Yu et al., 2016
Biota	Jiazi Marina	China	Small	Open	Yes	Transport	2011	487.67	NA	NA	NA	Yu et al., 2016
Biota	Jiazi Marina	China	Small	Open	Yes	Transport	2012	861.72	NA	NA	NA	Yu et al., 2016
Biota	Jiazi Marina	China	Small	Open	Yes	Transport	2013	506.38	NA	NA	NA	Yu et al., 2016
Biota	Jiazi Marina	China	Small	Open	Yes	Transport	2014	975.78	NA	NA	NA	Yu et al., 2016
Biota	Gaslini Port	Italy	Medium	Semi-enclosed	No	Commercial	2009	215	NA	NA	NA	Moschino et al., 2016
Biota	Gaslini Port	Italy	Medium	Semi-enclosed	No	Commercial	2010	200	NA	NA	NA	Moschino et al., 2016
Biota	Gaslini Port	Italy	Medium	Semi-enclosed	No	Commercial	2011	3225	NA	NA	NA	Moschino et al., 2016
Biota	Gaslini Port	Italy	Medium	Semi-enclosed	No	Commercial	2012	1820	NA	NA	NA	Moschino et al., 2016
Biota	Gaslini Port	Italy	Medium	Semi-enclosed	No	Commercial	2013	475	NA	NA	NA	Moschino et al., 2016
Biota	Syney Port	Canada	Small	Open	Yes	Fuel	2012	140	NA	NA	NA	Walker et al., 2013a
Biota	Sewri Port	India	Large	Open	Yes	Commercial	NA	246.77	82.59	1233.87	1233.87	Dhananjayan et al., 2012a

Biota	Tagus Port	Portugal	Small	Semi-enclosed	No	Transport	NA	452	NA	NA	NA	Martins et al., 2012
Biota	Piedrabuena Port	Argentina	Small	Open	No	Transport	NA	560	NA	NA	NA	Primost et al., 2018
Biota	Brattorkaia Marina	Norway	Small	Semi-enclosed	No	Transport	NA	177.71	44.57	134.37	250.68	Hansen et al., 2022
Biota	Havet Marinina	Norway	Small	Semi-enclosed	No	Transport	NA	98.41	19.59	74.68	119.68	Hansen et al., 2022

Biota species including: *Pomadasy peroteti*, *Cynoglossus senegalensis*, *Mytilus galloprovincialis*, *Donax trunculus*, *Paracentrotus lividus*, *Asterina pectinifera*, *Diapterus rhombeus*, *Bardiella ranchus*, *Isopisthus parvipinnis*, *Cathorops spixii*, *Menthicirrhus americanus*, *Genidens genidens*, *Genidens genidens*, *Eucinostomus argenteus*, *Crassostrea rivularis*, *Carcinus maenas*, *Eleutheronema tetradactylum*, *Coilia dussumieri*, *Otolithes ruber*, *Sardinella longiceps*, *Mystus seenghala*, *Cyclopterus lumpus*, *Buccinanops globulosus*, *M. edulis*, *A. amurensis*, *S. cucullata*, and *H. tubulosa*.

References

- Abdollahi, S., Raoufi, Z., Faghiri, I., Savari, A., Nikpour, Y., Mansouri, A., 2013. Contamination levels and spatial distributions of heavy metals and PAHs in surface sediment of Imam Khomeini Port, Persian Gulf, Iran. *Marine Pollution Bulletin* 71, 336–345. <https://doi.org/10.1016/j.marpolbul.2013.01.025>
- Ademollo, N., Spataro, F., Rauseo, J., Pescatore, T., Fattorini, N., Valsecchi, S., Polesello, S., Patrolecco, L., 2021. Occurrence, distribution and pollution pattern of legacy and emerging organic pollutants in surface water of the Kongsfjorden (Svalbard, Norway): Environmental contamination, seasonal trend and climate change. *Marine Pollution Bulletin* 163, 111900. <https://doi.org/10.1016/j.marpolbul.2020.111900>
- Al-Akhaly, I., Al-Shwafi, N., Al-Matari, B., I.Siam, E., 2019. Petroleum Hydrocarbon Residues in Surficial Sediment Samples from Aden City Coasts, Yemen. *SQU Journal for Science* 24, 47–56. <https://doi.org/10.24200/squjs.vol24iss1pp47-56>
- Albano, M.J., da Cunha Lana, P., Bremec, C., Elías, R., Martins, C.C., Venturini, N., Muniz, P., Rivero, S., Vallarino, E.A., Obenat, S., 2013. Macrobenthos and multi-molecular markers as indicators of environmental contamination in a South American port (Mar del Plata, Southwest Atlantic). *Marine Pollution Bulletin* 73, 102–114. <https://doi.org/10.1016/j.marpolbul.2013.05.032>
- An, Y., Hong, S., Yoon, S.J., Cha, J., Shin, K.-H., Khim, J.S., 2020. Current contamination status of traditional and emerging persistent toxic substances in the sediments of Ulsan Bay, South Korea. *Marine Pollution Bulletin* 160, 111560. <https://doi.org/10.1016/j.marpolbul.2020.111560>
- Bajt, O., 2022. Sedimentary Record of Polycyclic Aromatic Hydrocarbons in the Gulf of Trieste (Northern Adriatic Sea) - Distribution, Origin and Temporal Trends. *Frontiers in Marine Science* 9.
- Bajt, O., 2014. Aliphatic and Polycyclic Aromatic Hydrocarbons in Gulf of Trieste Sediments (Northern Adriatic): Potential Impacts of Maritime Traffic. *Bull Environ Contam Toxicol* 93, 299–305. <https://doi.org/10.1007/s00128-014-1321-7>
- Bajt, O., 2012. Aliphatic and polycyclic aromatic hydrocarbons in sediments of the Slovenian coastal area (Gulf of Trieste, northern Adriatic). *Environ Monit Assess* 184, 7439–7452. <https://doi.org/10.1007/s10661-011-2511-y>
- Baldrighi, E., Pizzini, S., Punzo, E., Santelli, A., Strafella, P., Scirocco, T., Manini, E., Fattorini, D., Vasapollo, C., 2023. Multi-benthic size approach to unveil different environmental conditions in a Mediterranean harbor area (Ancona, Adriatic Sea, Italy). *PeerJ* 11, e15541. <https://doi.org/10.7717/peerj.15541>
- Bandowe, B.A.M., Bigalke, M., Boamah, L., Nyarko, E., Saalia, F.K., Wilcke, W., 2014. Polycyclic aromatic compounds (PAHs and oxygenated PAHs) and trace metals in fish species from Ghana (West Africa): Bioaccumulation and health risk assessment. *Environment International* 65, 135–146. <https://doi.org/10.1016/j.envint.2013.12.018>

- Barakat, A.O., Mostafa, A., Wade, T.L., Sweet, S.T., El Sayed, N.B., 2011. Distribution and characteristics of PAHs in sediments from the Mediterranean coastal environment of Egypt. *Marine Pollution Bulletin* 62, 1969–1978. <https://doi.org/10.1016/j.marpolbul.2011.06.024>
- Benali, I., Boutiba, Z., Grandjean, D., de Alencastro, L.F., Rouane-Hacene, O., Chèvre, N., 2017. Spatial distribution and biological effects of trace metals (Cu, Zn, Pb, Cd) and organic micropollutants (PCBs, PAHs) in mussels *Mytilus galloprovincialis* along the Algerian west coast. *Marine Pollution Bulletin* 115, 539–550. <https://doi.org/10.1016/j.marpolbul.2016.12.028>
- Boitsov, S., Newman, B.K., Muiambo, H.F., Chaúque, E.F.C., Serigstad, B., Malauene, B.S., 2021. Distribution and possible sources of polycyclic aromatic hydrocarbons (PAHs) and metals in marine surface sediments off northern Mozambique. *Marine Pollution Bulletin* 163, 111952. <https://doi.org/10.1016/j.marpolbul.2020.111952>
- Botwe, B.O., Kelderman, P., Nyarko, E., Lens, P.N.L., 2017. Assessment of DDT, HCH and PAH contamination and associated ecotoxicological risks in surface sediments of coastal Tema Harbour (Ghana). *Marine Pollution Bulletin* 115, 480–488. <https://doi.org/10.1016/j.marpolbul.2016.11.054>
- Bouzas, A., Aguado, D., Martí, N., Pastor, J.M., Herráez, R., Campins, P., Seco, A., 2011. Alkylphenols and polycyclic aromatic hydrocarbons in eastern Mediterranean Spanish coastal marine bivalves. *Environ Monit Assess* 176, 169–181. <https://doi.org/10.1007/s10661-010-1574-5>
- Buruaem, L.M., de Castro, Í.B., Hortellani, M.A., Taniguchi, S., Fillmann, G., Sasaki, S.T., Varella Petti, M.A., Sarkis, J.E. de S., Bícigo, M.C., Maranhão, L.A., Davanzo, M.B., Nonato, E.F., Cesar, A., Costa-Lotufo, L.V., Abessa, D.M. de S., 2013. Integrated quality assessment of sediments from harbour areas in Santos-São Vicente Estuarine System, Southern Brazil. *Estuarine, Coastal and Shelf Science, Pressures, Stresses, Shocks and Trends in Estuarine Ecosystems* 130, 179–189. <https://doi.org/10.1016/j.ecss.2013.06.006>
- Buruaem, L.M., Taniguchi, S., Sasaki, S.T., Bícigo, M.C., Costa-Lotufo, L.V., Abessa, D.M.S., 2016. Hydrocarbons in surface sediments of harbor areas in a tropical region (Ceará state, northeast Brazil). *Environ Earth Sci* 75, 642. <https://doi.org/10.1007/s12665-016-5453-4>
- Carvalho, A.C.B., Moreira, V.A., Vicente, M. de C., Bidone, E.D., Bernardes, M.C., Sabadini-Santos, E., 2022. Sterol and PAHs fingerprint analysis of organic matter at Southeast Brazilian Bay. *Marine Pollution Bulletin* 181, 113899. <https://doi.org/10.1016/j.marpolbul.2022.113899>
- Castrec, J., Pillet, M., Receveur, J., Fontaine, Q., Le Floch, S., Churlaud, C., Lejeune, P., Gobert, S., Thomas, H., Marengo, M., 2023. Active and passive biomonitoring of trace elements, polycyclic aromatic hydrocarbons, and polychlorinated biphenyls in small Mediterranean harbours. *Marine Pollution Bulletin* 187, 114578. <https://doi.org/10.1016/j.marpolbul.2023.114578>

- Chatzinikolaou, E., Mandalakis, M., Damianidis, P., Dailianis, T., Gambineri, S., Rossano, C., Scapini, F., Carucci, A., Arvanitidis, C., 2018. Spatio-temporal benthic biodiversity patterns and pollution pressure in three Mediterranean touristic ports. *Science of The Total Environment* 624, 648–660. <https://doi.org/10.1016/j.scitotenv.2017.12.111>
- Chen, C.-F., Chen, C.-W., Dong, C.-D., Kao, C.-M., 2013. Assessment of toxicity of polycyclic aromatic hydrocarbons in sediments of Kaohsiung Harbor, Taiwan. *Science of The Total Environment* 463–464, 1174–1181. <https://doi.org/10.1016/j.scitotenv.2012.06.101>
- Chen, C.-F., Ju, Y.-R., Lim, Y.C., Hsu, N.-H., Lu, K.-T., Hsieh, S.-L., Dong, C.-D., Chen, C.-W., 2020. Microplastics and their affiliated PAHs in the sea surface connected to the southwest coast of Taiwan. *Chemosphere* 254, 126818. <https://doi.org/10.1016/j.chemosphere.2020.126818>
- Chen, C.-F., Ju, Y.-R., Lim, Y.C., Wang, M.-H., Albarico, F.P.J.B., Chen, C.-W., Dong, C.-D., 2022. Potential sources and toxicity risks of polycyclic aromatic hydrocarbons in surface sediments of commercial ports in Taiwan. *Marine Pollution Bulletin* 181, 113924. <https://doi.org/10.1016/j.marpolbul.2022.113924>
- Chen, C.-F., Lee, S.-H., Ju, Y.-R., Chen, C.-W., Dong, C.-D., 2023. Comprehensive assessment of metals and organic pollutants in pelagic fishing port sediments. *Marine Pollution Bulletin* 193, 115119. <https://doi.org/10.1016/j.marpolbul.2023.115119>
- Chen, C.-W., Chen, C.-F., 2011. Distribution, origin, and potential toxicological significance of polycyclic aromatic hydrocarbons (PAHs) in sediments of Kaohsiung Harbor, Taiwan. *Marine Pollution Bulletin*, 6th International Conference on Marine Pollution and Ecotoxicology 63, 417–423. <https://doi.org/10.1016/j.marpolbul.2011.04.047>
- Chen, C.-W., Chen, C.-F., Dong, C.-D., 2012a. Distribution and Source of Polycyclic Aromatic Hydrocarbons in Surface Sediments of Salt River Mouth, in: 2012 International Conference on Computer Distributed Control and Intelligent Environmental Monitoring. Presented at the 2012 International Conference on Computer Distributed Control and Intelligent Environmental Monitoring, pp. 257–260. <https://doi.org/10.1109/CDCIEM.2012.67>
- Chen, C.-W., Chen, C.-F., Dong, C.-D., Tu, Y.-T., 2012b. Composition and source apportionment of PAHs in sediments at river mouths and channel in Kaohsiung Harbor, Taiwan. *J. Environ. Monit.* 14, 105–115. <https://doi.org/10.1039/C1EM10557D>
- Commendatore, M.G., Nievas, M.L., Amin, O., Esteves, J.L., 2012. Sources and distribution of aliphatic and polyaromatic hydrocarbons in coastal sediments from the Ushuaia Bay (Tierra del Fuego, Patagonia, Argentina). *Marine Environmental Research* 74, 20–31. <https://doi.org/10.1016/j.marenvres.2011.11.010>
- Cutroneo, L., Castellano, M., Carbone, C., Consani, S., Gaino, F., Tucci, S., Magrì, S., Povero, P., Bertolotto, R.M., Canepa, G., Capello, M., 2015. Evaluation of the boundary condition influence on PAH concentrations in the water column during the sediment dredging of a port. *Marine Pollution Bulletin* 101, 583–593. <https://doi.org/10.1016/j.marpolbul.2015.10.055>

- Dauner, A.L.L., Dias, T.H., Ishii, F.K., Libardoni, B.G., Parizzi, R.A., Martins, C.C., 2018. Ecological risk assessment of sedimentary hydrocarbons in a subtropical estuary as tools to select priority areas for environmental management. *Journal of Environmental Management* 223, 417–425. <https://doi.org/10.1016/j.jenvman.2018.06.024>
- Davis, E., Walker, T.R., Adams, M., Willis, R., 2018. Characterization of polycyclic aromatic hydrocarbons (PAHs) in small craft harbour (SCH) sediments in Nova Scotia, Canada. *Marine Pollution Bulletin* 137, 285–294. <https://doi.org/10.1016/j.marpolbul.2018.10.043>
- de Oliveira, A.H.B., Fernandes, G.M., dos Santos, F.R., de Almeida, N.M., Nogueira, T.R., de Quadros Melo, D., Martins, L.L., Cavalcante, R.M., do Nascimento, R.F., Reddy, C.M., 2023. Insights about levels and source appointment of petroleum hydrocarbons in Brazilian semi-arid coastal: baseline status assessment for ocean decade targets. *Environ Sci Pollut Res* 30, 58002–58018. <https://doi.org/10.1007/s11356-023-26600-6>
- Dhananjayan, V., Muralidharan, S., 2012. Polycyclic Aromatic Hydrocarbons in Various Species of Fishes from Mumbai Harbour, India, and Their Dietary Intake Concentration to Human. *International Journal of Oceanography* 2012, e645178. <https://doi.org/10.1155/2012/645178>
- Dhananjayan, V., Muralidharan, S., Peter, V.R., 2012. Occurrence and Distribution of Polycyclic Aromatic Hydrocarbons in Water and Sediment Collected along the Harbour Line, Mumbai, India. *International Journal of Oceanography* 2012, e403615. <https://doi.org/10.1155/2012/403615>
- Diesbourg, E., MacDonald, M., Reid, H.B., MacKinnon, R., Reinhart, B., Mercer, A., Crémazy, A., 2023. State of polycyclic aromatic hydrocarbon (PAH) contamination in the Saint John Harbour, New Brunswick, Canada. *Marine Pollution Bulletin* 189, 114760. <https://doi.org/10.1016/j.marpolbul.2023.114760>
- Dong, C.-D., Chen, C.-F., Chen, C.-W., 2012. Determination of Polycyclic Aromatic Hydrocarbons in Industrial Harbor Sediments by GC-MS. *International Journal of Environmental Research and Public Health* 9, 2175–2188. <https://doi.org/10.3390/ijerph9062175>
- Eklund, B., Hansson, T., Bengtsson, H., Eriksson Wiklund, A.-K., 2016. Pollutant Concentrations and Toxic Effects on the Red Alga *Ceramium tenuicorne* of Sediments from Natural Harbors and Small Boat Harbors on the West Coast of Sweden. *Arch Environ Contam Toxicol* 70, 583–594. <https://doi.org/10.1007/s00244-016-0262-z>
- El-Maradny, A., Orif, M., AlKobati, A., Ghandourah, M., Al-Farawati, R., 2023. Polycyclic aromatic hydrocarbons in the water column of three hot spot areas, Jeddah coast, eastern of Red Sea. *Regional Studies in Marine Science* 64, 103047. <https://doi.org/10.1016/j.rsma.2023.103047>
- Feo, M.L., Sprovieri, M., Gherardi, S., Sammartino, S., Marsella, E., 2011. Polycyclic aromatic hydrocarbons and polychlorinated biphenyls in the harbour of Naples (Southern Italy): time and spatial distribution patterns. *Environ Monit Assess* 174, 445–459. <https://doi.org/10.1007/s10661-010-1469-5>

- Fourati, R., Tedetti, M., Guigue, C., Goutx, M., Garcia, N., Zaghdien, H., Sayadi, S., Elleuch, B., 2018. Sources and spatial distribution of dissolved aliphatic and polycyclic aromatic hydrocarbons in surface coastal waters of the Gulf of Gabès (Tunisia, Southern Mediterranean Sea). *Progress in Oceanography*, Special issue of MERMEX project: Recent advances in the oceanography of the Mediterranean Sea 163, 232–247. <https://doi.org/10.1016/j.pocean.2017.02.001>
- Frena, M., Bataglion, G.A., Sandini, S.S., Kuroshima, K.N., Eberlin, M.N., Madureira, L.A.S., 2016. Distribution and Sources of Aliphatic and Polycyclic Aromatic Hydrocarbons in Surface Sediments of Itajaí-Açu Estuarine System in Brazil. *Journal of the Brazilian Chemical Society* 28, 603–614. <https://doi.org/10.21577/0103-5053.20160205>
- Froehner, S., Maceno, M., Machado, K.S., 2011. Predicting bioaccumulation of PAHs in the trophic chain in the estuary region of Paranaguá, Brazil. *Environ Monit Assess* 174, 135–145. <https://doi.org/10.1007/s10661-010-1444-1>
- Froehner, S., Rizzi, J., Vieira, L.M., Sanes, J., 2018. PAHs in Water, Sediment and Biota in an Area with Port Activities. *Arch Environ Contam Toxicol* 75, 236–246. <https://doi.org/10.1007/s00244-018-0538-6>
- Gosai, H.B., Sachaniya, B.K., Dudhagara, D.R., Rajpara, R.K., Dave, B.P., 2018. Concentrations, input prediction and probabilistic biological risk assessment of polycyclic aromatic hydrocarbons (PAHs) along Gujarat coastline. *Environ Geochem Health* 40, 653–665. <https://doi.org/10.1007/s10653-017-0011-x>
- Guigue, C., Tedetti, M., Ferretto, N., Garcia, N., Méjanelle, L., Goutx, M., 2014. Spatial and seasonal variabilities of dissolved hydrocarbons in surface waters from the Northwestern Mediterranean Sea: Results from one year intensive sampling. *Science of The Total Environment* 466–467, 650–662. <https://doi.org/10.1016/j.scitotenv.2013.07.082>
- Guigue, C., Tedetti, M., Giorgi, S., Goutx, M., 2011. Occurrence and distribution of hydrocarbons in the surface microlayer and subsurface water from the urban coastal marine area off Marseilles, Northwestern Mediterranean Sea. *Marine Pollution Bulletin* 62, 2741–2752. <https://doi.org/10.1016/j.marpolbul.2011.09.013>
- Halo, E., Murtaç, B., Nuro, A., 2022. Priority Substances in Waters of Albanian Ports, in: *International Scientific Conference ITEMA 2022: Vol 6. Conference Proceedings*. pp. 423–434. <https://doi.org/10.31410/itema.2022.423>
- Halo, E., Tahiraj, J., Murtaç, B., Kane, S., Marku, E., Nuro, A., 2023. Analyzes of hydrocarbons (PAH, alkanes and BTEX) in marine water of Vlora's port. *Zaštita materijala* 64, 153–160. <https://doi.org/10.5937/zasmat2302153H>
- Han, G.M., Hong, S.H., Shim, W.J., Ra, K.T., Kim, K.T., Ha, S.Y., Jang, M., Kim, G.B., 2016. Assessment of Persistent Organic and Heavy Metal Contamination in Busan Coast: Application of Sediment Quality Index. *Ocean and Polar Research* 38, 171–184. <https://doi.org/10.4217/OPR.2016.38.3.171>

- Hansen, B.H., Nordtug, T., Øverjordet, I.B., Sørensen, L., Kvæstad, B., Davies, E.J., Meier, S., Gomes, T., Brooks, S., Farkas, J., 2022. Monitoring ocean water quality by deployment of lumpfish (*Cyclopterus lumpus*) eggs: In situ bioaccumulation and toxicity in embryos. *Ecotoxicology and Environmental Safety* 245, 114074. <https://doi.org/10.1016/j.ecoenv.2022.114074>
- Hartwell, S.I., Dasher, D., Lomax, T., 2019. Characterization of organic contaminants in fjords and bays on the Kenai Peninsula Alaska. *Environ Monit Assess* 191, 427. <https://doi.org/10.1007/s10661-019-7530-0>
- Hong, S.H., Han, G.M., Yim, U.H., Lim, D., Ha, S.Y., Kim, N.S., Shim, W.J., 2014. Integrative assessment of sediment quality in terms of chemical contamination in Jinhae Bay, South Korea. *Ocean Sci. J.* 49, 265–278. <https://doi.org/10.1007/s12601-014-0027-4>
- Huang, Y.-J., Lee, C.-L., Fang, M.-D., 2011. Distribution and source differentiation of PAHs and PCBs among size and density fractions in contaminated harbor sediment particles and their implications in toxicological assessment. *Marine Pollution Bulletin* 62, 432–439. <https://doi.org/10.1016/j.marpolbul.2010.11.022>
- Huang, Y.-J., Lin, B.-S., Lee, C.-L., Brimblecombe, P., 2020. Enrichment behavior of contemporary PAHs and legacy PCBs at the sea-surface microlayer in harbor water. *Chemosphere* 245, 125647. <https://doi.org/10.1016/j.chemosphere.2019.125647>
- Ju, Y.-R., Chen, C.-F., Chen, C.-W., Tsai, M.-L., Wu, J.-C., Dong, C.-D., 2019. An integrative assessment to determine the sediment toxicity of Kaohsiung Harbor in Taiwan: combining chemical analysis and cytotoxicity assay. *Environ Sci Pollut Res* 26, 34321–34331. <https://doi.org/10.1007/s11356-019-04840-9>
- Kahkashan, S., Wang, X., Ya, M., Chen, J., Wu, Y., Cai, Y., Saleem, M., Inam, A., Aftab, J., 2019. Evaluation of marine sediment contamination by polycyclic aromatic hydrocarbons along the Karachi coast, Pakistan, 11 years after the Tasman Spirit oil spill. *Chemosphere* 233, 652–659. <https://doi.org/10.1016/j.chemosphere.2019.05.217>
- Kao, N.-H., Su, M.-C., Fan, J.-R., Yen, C.-C., 2015. Investigation of polycyclic aromatic hydrocarbons (PAHs) and cyclic terpenoid biomarkers in the sediments of fishing harbors in Taiwan. *Marine Pollution Bulletin* 97, 319–332. <https://doi.org/10.1016/j.marpolbul.2015.05.070>
- Kerambrun, E., Henry, F., Courcot, L., Gevaert, F., Amara, R., 2012. Biological responses of caged juvenile sea bass (*Dicentrarchus labrax*) and turbot (*Scophthalmus maximus*) in a polluted harbour. *Ecological Indicators, Assessing ecological quality in estuarine and coastal ecosystems* 19, 161–171. <https://doi.org/10.1016/j.ecolind.2011.06.035>
- Keshavarzifard, M., Moore, F., Keshavarzi, B., Sharifi, R., 2018. Distribution, source apportionment and health risk assessment of polycyclic aromatic hydrocarbons (PAHs) in intertidal sediment of Asaluyeh, Persian Gulf. *Environ Geochem Health* 40, 721–735. <https://doi.org/10.1007/s10653-017-0019-2>
- Kim, C.J., Hong, G.H., Kim, H.E., Yang, D.B., 2014. Polycyclic aromatic hydrocarbons (PAHs) in starfish body and bottom sediments in Mohang Harbor (Taeon), South Korea. *Environ Monit Assess* 186, 4343–4356. <https://doi.org/10.1007/s10661-014-3703-z>

- Kostopoulou, M., Guida, M., Nikolaou, A., Oral, R., Trifuoggi, M., Borriello, I., Vagi, M., D'Ambra, A., Meric, S., Pagano, G., 2013. Inorganic and organic contamination in sediment from Izmir bay (Turkey) and Mytilene harbor (Greece). *GlobalNEST International Journal* 15, 57–68.
- Kuo, J.-Y., Ko, F.-C., Cheng, J.-O., Meng, P.-J., Li, J.-J., Hung, C.-C., 2012. Environmental assessment of polycyclic aromatic hydrocarbons in the surface sediments of a remote region on the eastern coast, Taiwan. *Environ Monit Assess* 184, 2967–2979. <https://doi.org/10.1007/s10661-011-2164-x>
- Kuprijanov, I., Väli, G., Sharov, A., Berezina, N., Liblik, T., Lips, U., Kolesova, N., Maanio, J., Junttila, V., Lips, I., 2021. Hazardous substances in the sediments and their pathways from potential sources in the eastern Gulf of Finland. *Marine Pollution Bulletin* 170, 112642. <https://doi.org/10.1016/j.marpolbul.2021.112642>
- Lacroix, C., Richard, G., Segueineau, C., Guyomarch, J., Moraga, D., Auffret, M., 2015. Active and passive biomonitoring suggest metabolic adaptation in blue mussels (*Mytilus* spp.) chronically exposed to a moderate contamination in Brest harbor (France). *Aquatic Toxicology* 162, 126–137. <https://doi.org/10.1016/j.aquatox.2015.03.008>
- Laitano, M.V., Castro, Í.B., Costa, P.G., Fillmann, G., Cledón, M., 2015. Butyltin and PAH Contamination of Mar del Plata Port (Argentina) Sediments and Their Influence on Adjacent Coastal Regions. *Bull Environ Contam Toxicol* 95, 513–520. <https://doi.org/10.1007/s00128-015-1637-y>
- León, V.M., Martínez-Gómez, C., García, I., Campillo, J.A., Benedicto, J., 2013. Spatial distribution and temporal trends of polycyclic aromatic hydrocarbons in *Mytilus galloprovincialis* from the Iberian Mediterranean coast. *Environ Monit Assess* 185, 1055–1070. <https://doi.org/10.1007/s10661-012-2614-0>
- Li, J.-Y., Cui, Y., Su, L., Chen, Y., Jin, L., 2015. Polycyclic aromatic hydrocarbons in the largest deepwater port of East China Sea: impact of port construction and operation. *Environ Sci Pollut Res* 22, 12355–12365. <https://doi.org/10.1007/s11356-015-4402-1>
- Li, J.-Y., Yu, W., Yin, J., Chen, Y., Wang, Q., Jin, L., 2019. Reduced bioavailability and ecological risks of polycyclic aromatic hydrocarbons in Yangshan port of East China Sea: Remediation effectiveness in the transition from construction to operation. *Science of The Total Environment* 687, 679–686. <https://doi.org/10.1016/j.scitotenv.2019.06.040>
- Li, P., Dsikowitzky, L., Diao, X., Yang, F., Li, Q.X., Schwarzbauer, J., 2020. Unusual tin organics, DDX and PAHs as specific pollutants from dockyard work in an industrialized port area in China. *Chemosphere* 243, 125284. <https://doi.org/10.1016/j.chemosphere.2019.125284>
- Li, Z., Cao, Y., Qin, H., Ma, Y., Pan, L., Sun, J., 2022. Integration of chemical and biological methods: A case study of polycyclic aromatic hydrocarbons pollution monitoring in Shandong Peninsula, China. *Journal of Environmental Sciences* 111, 24–37. <https://doi.org/10.1016/j.jes.2021.02.025>

- Lima, E.A.R., Neves, P.A., Patchineelam, S.R., da Silva, J.F.B.R., Takiyama, L.R., Martins, C.C., Lourenço, R.A., Taniguchi, S., Elias, V.O., Bícigo, M.C., 2021. Anthropogenic and natural inputs of polycyclic aromatic hydrocarbons in the sediment of three coastal systems of the Brazilian Amazon. *Environ Sci Pollut Res* 28, 19485–19496. <https://doi.org/10.1007/s11356-020-12010-5>
- Maciel, D.C., de Souza, J.R.B., Taniguchi, S., Bícigo, M.C., Zanardi-Lamardo, E., 2015. Sources and distribution of polycyclic aromatic hydrocarbons in a an urbanized tropical estuary and adjacent shelf, Northeast of Brazil. *Marine Pollution Bulletin* 101, 429–433. <https://doi.org/10.1016/j.marpolbul.2015.09.051>
- Mali, M., Dell’Anna, M.M., Mastroiilli, P., Damiani, L., Piccinni, A.F., 2017. Assessment and source identification of pollution risk for touristic ports: Heavy metals and polycyclic aromatic hydrocarbons in sediments of 4 marinas of the Apulia region (Italy). *Marine Pollution Bulletin* 114, 768–777. <https://doi.org/10.1016/j.marpolbul.2016.10.063>
- Mali, M., Ragone, R., Dell’Anna, M.M., Romanazzi, G., Damiani, L., Mastroiilli, P., 2022. Improved identification of pollution source attribution by using PAH ratios combined with multivariate statistics. *Sci Rep* 12, 19298. <https://doi.org/10.1038/s41598-022-23966-4>
- Mandić, J., Tronczyński, J., Kušpilić, G., 2018. Polycyclic aromatic hydrocarbons in surface sediments of the mid-Adriatic and along the Croatian coast: Levels, distributions and sources. *Environmental Pollution* 242, 519–527. <https://doi.org/10.1016/j.envpol.2018.06.095>
- Martins, M., Costa, P.M., Raimundo, J., Vale, C., Ferreira, A.M., Costa, M.H., 2012. Impact of remobilized contaminants in *Mytilus edulis* during dredging operations in a harbour area: Bioaccumulation and biomarker responses. *Ecotoxicology and Environmental Safety* 85, 96–103. <https://doi.org/10.1016/j.ecoenv.2012.08.008>
- Marzuki, I., Pratama, I., Ismail, H.E., Paserangi, I., Kamaruddin, M., Chaerul, M., Ahmad, R., 2021. The Identification and Distribution Components of Polycyclic Aromatic Hydrocarbon Contaminants at the Port of Paotere, Makassar, South Sulawesi. *IOP Conf. Ser.: Earth Environ. Sci.* 679, 012017. <https://doi.org/10.1088/1755-1315/679/1/012017>
- Merhaby, D., Net, S., Halwani, J., Ouddane, B., 2015. Organic pollution in surficial sediments of Tripoli harbour, Lebanon. *Marine Pollution Bulletin* 93, 284–293. <https://doi.org/10.1016/j.marpolbul.2015.01.004>
- Merhaby, D., Ouddane, B., Net, S., Halwani, J., 2020. Assessment of persistent organic pollutants in surface sediments along Lebanese coastal zone. *Marine Pollution Bulletin* 153, 110947. <https://doi.org/10.1016/j.marpolbul.2020.110947>
- Moreira, L.B., Sasaki, S.T., Taniguchi, S., Peres, T.F., Figueira, R.C.L., Bícigo, M.C., Marins, R.V., Costa-Lotufo, L.V., Abessa, D.M.S., 2020. Biomarkers responses of the clam *Anomalocardia flexuosa* in sediment toxicity bioassays using dredged materials from a semi-arid coastal system. *Heliyon* 6. <https://doi.org/10.1016/j.heliyon.2020.e04030>

- Morgunova, I.P., Kursheva, A.V., Petrova, V.I., Litvinenko, I.V., Batova, G.I., Renaud, P.E., Maltseva, A.L., Granovitch, A.I., 2021. Natural and anthropogenic organic matter inputs to intertidal deposits of the urbanized Arctic region: A multi-proxy approach. *Marine Chemistry* 234, 104001. <https://doi.org/10.1016/j.marchem.2021.104001>
- Moschino, V., Del Negro, P., De Vittor, C., Da Ros, L., 2016. Biomonitoring of a polluted coastal area (Bay of Muggia, Northern Adriatic Sea): A five-year study using transplanted mussels. *Ecotoxicology and Environmental Safety* 128, 1–10. <https://doi.org/10.1016/j.ecoenv.2016.02.006>
- Nuro, A., Murtaç, B., Marku, E., 2020. Levels of some organic pollutants in water samples of Adriatic Sea: Case study: Hot-spot of Porto-Romano, Albania. *Zaštita Materijala* 61, 306–312. <https://doi.org/10.5937/zasmat2004306n>
- Odabasi, M., Dumanoglu, Y., Kara, M., Altioğ, H., Elbir, T., Bayram, A., 2017. Spatial variation of PAHs and PCBs in coastal air, seawater, and sediments in a heavily industrialized region. *Environ Sci Pollut Res* 24, 13749–13759. <https://doi.org/10.1007/s11356-017-8991-8>
- Paladino, O., Massabò, M., Fissore, F., Moranda, A., 2015. Assessment of sediment contamination and sampling design in Savona Harbour, Italy. *Marine Pollution Bulletin* 91, 54–64. <https://doi.org/10.1016/j.marpolbul.2014.12.028>
- Paladino, O., Moranda, A., Seyedsalehi, M., 2017. A Method for Identifying Pollution Sources of Heavy Metals and PAH for a Risk-Based Management of a Mediterranean Harbour. *Scientifica* 2017, e4690715. <https://doi.org/10.1155/2017/4690715>
- Pedersen, K.B., Lejon, T., Jensen, P.E., Ottosen, L.M., 2015. Chemometric Analysis for Pollution Source Assessment of Harbour Sediments in Arctic Locations. *Water Air Soil Pollut* 226, 150. <https://doi.org/10.1007/s11270-015-2416-4>
- Pelikan, J., Majnarić, N., Maurić Maljković, M., Pikelj, K., Hamer, B., 2022. Physico-Chemical and Ecotoxicological Evaluation of Marine Sediments Contamination: A Case Study of Rovinj Coastal Area, NE Adriatic Sea, Croatia. *Toxics* 10, 478. <https://doi.org/10.3390/toxics10080478>
- Peng, B., Hossain, K.B., Lin, Y., Zhang, M., Zheng, H., Yu, J., Meng, X., Wang, J., Cui, Y., Wu, B., Lou, L., Cai, M., 2022. Assessment and sources identification of microplastics, PAHs and OCPs in the Luoyuan Bay, China: Based on multi-statistical analysis. *Marine Pollution Bulletin* 175, 113351. <https://doi.org/10.1016/j.marpolbul.2022.113351>
- Pérez-Fernández, B., Viñas, L., Bargiela, J., 2018. Occurrence and toxicological assessment of polycyclic aromatic hydrocarbons (PAHs) in marine sediments under mussel farming influence. *Environ Sci Pollut Res* 25, 15862–15872. <https://doi.org/10.1007/s11356-018-1737-4>
- Pinheiro-Sousa, D.B., da Costa Soares, S.H., Torres, H.S., de Jesus, W.B., de Oliveira, S.R.S., Bastos, W.R., de Oliveira Ribeiro, C.A., Carvalho-Neta, R.N.F., 2021. Sediment contaminant levels and multibiomarker approach to assess the health of catfish *Sciades*

herzbergii in a harbor from the northern Brazilian Amazon. *Ecotoxicology and Environmental Safety* 208, 111540. <https://doi.org/10.1016/j.ecoenv.2020.111540>

Primost, M.A., Commendatore, M., Torres, P.J., Bigatti, G., 2018. PAHs contamination in edible gastropods from north Patagonian harbor areas. *Marine Pollution Bulletin* 135, 828–831. <https://doi.org/10.1016/j.marpolbul.2018.08.021>

Romano, E., Bergamin, L., Ausili, A., Celia Magno, M., Gabellini, M., 2016. Evolution of the anthropogenic impact in the Augusta Harbor (Eastern Sicily, Italy) in the last decades: benthic foraminifera as indicators of environmental status. *Environ Sci Pollut Res* 23, 10514–10528. <https://doi.org/10.1007/s11356-015-5783-x>

Roy, D., Jung, W., Kim, J., Lee, M., Park, J., 2021. Cancer Risk Levels for Sediment- and Soil-Bound Polycyclic Aromatic Hydrocarbons in Coastal Areas of South Korea. *Frontiers in Environmental Science* 9.

Rumney, H.S., Bolam, S.G., Law, R.J., 2015. Polycyclic aromatic hydrocarbons in sediments at dredged material disposal sites around England: Concentrations in 2013 and time trend information at selected sites 2008–2013. *Marine Pollution Bulletin* 92, 180–185. <https://doi.org/10.1016/j.marpolbul.2014.12.039>

Sakari, M., Zakaria, M.P., Mohamed, C.A.R., Lajis, N.H., Chandru, K., Bahry, P.S., Shahbazi, A., Anita, S., 2010. Historical profiles of Polycyclic Aromatic Hydrocarbons (PAHs), sources and origins in dated sediment cores from Port Klang, Straits of Malacca, Malaysia. *Coastal marine science* 34, 140–155. <https://doi.org/10.15083/00040685>

Sánchez-Avila, J., Tauler, R., Lacorte, S., 2012. Organic micropollutants in coastal waters from NW Mediterranean Sea: Sources distribution and potential risk. *Environment International* 46, 50–62. <https://doi.org/10.1016/j.envint.2012.04.013>

Sauret, C., Tedetti, M., Guigue, C., Dumas, C., Lami, R., Pujo-Pay, M., Conan, P., Goutx, M., Ghiglione, J.-F., 2016. Influence of PAHs among other coastal environmental variables on total and PAH-degrading bacterial communities. *Environ Sci Pollut Res* 23, 4242–4256. <https://doi.org/10.1007/s11356-015-4768-0>

Sciarrillo, R., Zuzolo, D., Cicchella, D., Iannone, F., Cammino, G., Guarino, C., 2020. Contamination and ecological risk assessment of the seaport of Naples (Italy): Insights from marine sediments. *Journal of Geochemical Exploration* 210, 106449. <https://doi.org/10.1016/j.gexplo.2019.106449>

Shreadah, M.A., Moneim, M.I.A., Said, T.O., Fathallah, E.M.I., Mahmoud, M.E., 2013. PAHs in Seawater of the Semi-Closed Areas along the Alexandria Coast of Egyptian Mediterranean Sea. *Journal of Environmental Protection* 4, 1307–1317. <https://doi.org/10.4236/jep.2013.411152>

Shreadah, M.A., Said, T.O., Monem, M.I.A.E., Fathallah, E.M.I., Mahmoud, M.E., 2011. PAHs in Sediments along the Semi-Closed Areas of Alexandria, Egypt. *Journal of Environmental Protection* 2, 700–709. <https://doi.org/10.4236/jep.2011.26081>

- Sodré, S. do S.V., Rodrigues, C.C. dos S., Correa, J.A.M., Damasceno, F.C., Cavalcante, R.M., 2017. Preliminary assessment of Miramar Petrochemical Harbor as PAH source to Guajará bay (Belém-PA-Brazil) surface sediments. *REM, Int. Eng. J.* 70, 415–420. <https://doi.org/10.1590/0370-44672016700082>
- Soliman, Y.S., Al Ansari, E.M.S., Wade, T.L., 2014. Concentration, composition and sources of PAHs in the coastal sediments of the exclusive economic zone (EEZ) of Qatar, Arabian Gulf. *Marine Pollution Bulletin*, 7th International Conference on Marine Pollution and Ecotoxicology 85, 542–548. <https://doi.org/10.1016/j.marpolbul.2014.04.027>
- Soliman, Y.S., Alansari, E.M.A., Sericano, J.L., Wade, T.L., 2019. Spatio-temporal distribution and sources identifications of polycyclic aromatic hydrocarbons and their alkyl homolog in surface sediments in the central Arabian Gulf. *Science of The Total Environment* 658, 787–797. <https://doi.org/10.1016/j.scitotenv.2018.12.093>
- Stakénienė, R., Jokšas, K., Galkus, A., Raudonytė-Svirbutavičienė, E., 2019. Polycyclic aromatic hydrocarbons in surface sediments from the Curonian Lagoon and the Nemunas River Delta (Lithuania, Baltic Sea): distribution, origin, and suggestions for the monitoring program. *Environ Monit Assess* 191, 212. <https://doi.org/10.1007/s10661-019-7367-6>
- Sullivan, J.H., Warkentin, M., Wallace, L., 2021. So many ways for assessing outliers: What really works and does it matter? *Journal of Business Research* 132, 530–543. <https://doi.org/10.1016/j.jbusres.2021.03.066>
- Sun, R., Sun, Y., Li, Q.X., Zheng, X., Luo, X., Mai, B., 2018. Polycyclic aromatic hydrocarbons in sediments and marine organisms: Implications of anthropogenic effects on the coastal environment. *Science of The Total Environment* 640–641, 264–272. <https://doi.org/10.1016/j.scitotenv.2018.05.320>
- Tavakoly Sany, S.B., Hashim, R., Salleh, A., Safari, O., Mehdiinia, A., Rezayi, M., 2014. Risk assessment of polycyclic aromatic hydrocarbons in the West Port semi-enclosed basin (Malaysia). *Environ Earth Sci* 71, 4319–4332. <https://doi.org/10.1007/s12665-013-2826-9>
- Torres, R.J., Abessa, D.M.S., Santos, F.C., Maranhão, L.A., Davanzo, M.B., do Nascimento, M.R.L., Mozeto, A.A., 2009. Effects of dredging operations on sediment quality: contaminant mobilization in dredged sediments from the Port of Santos, SP, Brazil. *J Soils Sediments* 9, 420–432. <https://doi.org/10.1007/s11368-009-0121-x>
- Tovar-Salvador, M.L., Pintado-Herrera, M.G., Lara-Martín, P.A., Bonnail, E., 2023. Occurrence, sources and environmental risk assessment of organic micropollutants in coastal sediments from the Atacama Region (Chile). *Science of The Total Environment* 900, 165871. <https://doi.org/10.1016/j.scitotenv.2023.165871>
- Usanase, G., Azema, N., Bitouri, Y.E., Souche, J.-C., Gonzalez, C., 2021. Contribution of settling measurements to the study of polycyclic aromatic hydrocarbons' (PAHs) mobilisation during resuspension of PAHs-associated sediment. *Environ Sci Pollut Res* 28, 68349–68363. <https://doi.org/10.1007/s11356-021-15236-z>

- Vagge, G., Cutroneo, L., Castellano, M., Canepa, G., Bertolotto, R.M., Capello, M., 2018. The effects of dredging and environmental conditions on concentrations of polycyclic aromatic hydrocarbons in the water column. *Marine Pollution Bulletin* 135, 704–713. <https://doi.org/10.1016/j.marpolbul.2018.08.006>
- van den Heuvel-Greve, M.J., Szczybelski, A.S., van den Brink, N.W., Kotterman, M.J.J., Kwadijk, C.J.A.F., Evenset, A., Murk, A.J., 2016. Low organotin contamination of harbour sediment in Svalbard. *Polar Biol* 39, 1699–1709. <https://doi.org/10.1007/s00300-016-1907-0>
- Vanavermaete, D., Hostens, K., Le, H.M., Lessuise, A., Ruttens, A., Waegeneers, N., De Witte, B., 2023. Short- and long-term assessment of PAH, PCB, and metal contamination in the Belgian part of the North Sea. *Chemosphere* 310, 136905. <https://doi.org/10.1016/j.chemosphere.2022.136905>
- Vitali, F., Mandalakis, M., Chatzinikolaou, E., Dailianis, T., Senatore, G., Casalone, E., Mastromei, G., Sergi, S., Lussu, R., Arvanitidis, C., Tamburini, E., 2019. Benthic Prokaryotic Community Response to Polycyclic Aromatic Hydrocarbon Chronic Exposure: Importance of Emission Sources in Mediterranean Ports. *Frontiers in Marine Science* 6.
- Walker, T.R., MacAskill, D., Rushton, T., Thalheimer, A., Weaver, P., 2013a. Monitoring effects of remediation on natural sediment recovery in Sydney Harbour, Nova Scotia. *Environ Monit Assess* 185, 8089–8107. <https://doi.org/10.1007/s10661-013-3157-8>
- Walker, T.R., MacAskill, D., Weaver, P., 2013b. Legacy contaminant bioaccumulation in rock crabs in Sydney Harbour during remediation of the Sydney Tar Ponds, Nova Scotia, Canada. *Marine Pollution Bulletin* 77, 412–417. <https://doi.org/10.1016/j.marpolbul.2013.09.036>
- Walker, T.R., MacAskill, D., Weaver, P., 2013c. Environmental recovery in Sydney Harbour, Nova Scotia: Evidence of natural and anthropogenic sediment capping. *Marine Pollution Bulletin* 74, 446–452. <https://doi.org/10.1016/j.marpolbul.2013.06.013>
- Wu, Y., Wang, X., Li, Y., Ya, M., Luo, H., Hong, H., 2017. Polybrominated diphenyl ethers, organochlorine pesticides, and polycyclic aromatic hydrocarbons in water from the Jiulong River Estuary, China: levels, distributions, influencing factors, and risk assessment. *Environ Sci Pollut Res* 24, 8933–8945. <https://doi.org/10.1007/s11356-015-4782-2>
- Ya, M.-L., Wang, X.-H., Wu, Y.-L., Ye, C.-X., Li, Y.-Y., 2014. Enrichment and partitioning of polycyclic aromatic hydrocarbons in the sea surface microlayer and subsurface water along the coast of Xiamen Island, China. *Marine Pollution Bulletin* 78, 110–117. <https://doi.org/10.1016/j.marpolbul.2013.10.053>
- Yahiya, M., Teresa P Miranda, M., 2021. Distribution, sources and potential toxicological significance of polycyclic aromatic hydrocarbons (PAHs) in the south west coast of Kerala, India. *Materials Today: Proceedings, International Conference on Energy and Environment* 41, 736–743. <https://doi.org/10.1016/j.matpr.2020.07.440>

- Yu, Z.-L., Lin, Q., Gu, Y.-G., Ke, C.-L., Sun, R.-X., 2016. Spatial–temporal trend and health implications of polycyclic aromatic hydrocarbons (PAHs) in resident oysters, South China Sea: A case study of Eastern Guangdong coast. *Marine Pollution Bulletin* 110, 203–211. <https://doi.org/10.1016/j.marpolbul.2016.06.061>
- Zhang, H., Yuan, L., Xue, J., Wu, H., 2023. Polycyclic aromatic hydrocarbons in surface water and sediment from Shanghai port, China: spatial distribution, source apportionment, and potential risk assessment. *Environ Sci Pollut Res* 30, 7973–7986. <https://doi.org/10.1007/s11356-022-22706-5>
- Zheng, R., Fang, C., Hong, F., Kuang, W., Jiang, Y., Chen, J., Zhang, Y., Bo, J., 2022. Applying a fish expert system for ranking the biological effects of polycyclic aromatic hydrocarbons on the rockfish *Sebastiscus marmoratus* in the Maowei Sea, China. *Acta Oceanol. Sin.* 41, 105–114. <https://doi.org/10.1007/s13131-022-2033-1>
- Bakke, T., Källqvist, T., Ruus, A., Breedveld, G.D., Hylland, K., 2010. Development of sediment quality criteria in Norway. *J Soils Sediments* 10, 172–178. <https://doi.org/10.1007/s11368-009-0173-y>
- CCME (Canadian Council of Ministers of the Environment), 1999. Canadian Environmental Quality Guideline for the Protection of Aquatic Life. Winnipeg.
- European Union, 2013. Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy (No. L226/1–L226/17), Official Journal of the European Union.
- Long, E.R., Macdonald, D.D., Smith, S.L., Calder, F.D., 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environmental Management* 19, 81–97. <https://doi.org/10.1007/BF02472006>
- NJDEP (New Jersey Department of Environmental Protection), 1998. Guidance for Sediment Quality Evaluations, Sediment Screening Values for Use in the Baseline Ecological Evaluation. NJDEP, Bureau of Air Monitoring, Trenton, NJ.
- Peters, C.A., Knightes, C.D., Brown, D.G., 1999. Long-Term Composition Dynamics of PAH-Containing NAPLs and Implications for Risk Assessment. *Environ. Sci. Technol.* 33, 4499–4507. <https://doi.org/10.1021/es981203e>
- TEPA, 2016. Sediment Quality Guidelines (2016) [WWW Document]. Taiwan Environmental Protection Administration (TEPA). URL www.epa.gov.tw (accessed 12.12.23).
- Meng, Y., Liu, X., Lu, S., Zhang, T., Jin, B., Wang, Q., Tang, Z., Liu, Y., Guo, X., Zhou, J., Xi, B., 2019. A review on occurrence and risk of polycyclic aromatic hydrocarbons (PAHs) in lakes of China. *Science of The Total Environment* 651, 2497–2506. <https://doi.org/10.1016/j.scitotenv.2018.10.162>

- Yu, H., Liu, Y., Han, C., Fang, H., Weng, J., Shu, X., Pan, Y., Ma, L., 2021. Polycyclic aromatic hydrocarbons in surface waters from the seven main river basins of China: Spatial distribution, source apportionment, and potential risk assessment. *Science of The Total Environment* 752, 141764. <https://doi.org/10.1016/j.scitotenv.2020.141764>
- Tepe, Y., Tunç Dede, Ö., 2020. Concentrations of PAH Pollution in the Seawaters of Turkey, in: *The Handbook of Environmental Chemistry*. Springer, Berlin, Heidelberg, pp. 1–22. https://doi.org/10.1007/698_2020_502
- Lin, Y., Cai, M., Chen, Min, Huang, P., Lei, R., Chen, Meng, Gui, D., Ke, H., 2022. Evidence for the growing importance of Eurasian local source to PAHs in the Arctic central basin. *Science of The Total Environment* 851, 158373. <https://doi.org/10.1016/j.scitotenv.2022.158373>
- Lohmann, R., Gioia, R., Jones, K.C., Nizzetto, L., Temme, C., Xie, Z., Schulz-Bull, D., Hand, I., Morgan, E., Jantunen, L., 2009. Organochlorine Pesticides and PAHs in the Surface Water and Atmosphere of the North Atlantic and Arctic Ocean. *Environ. Sci. Technol.* 43, 5633–5639. <https://doi.org/10.1021/es901229k>
- Dai, C., Han, Y., Duan, Y., Lai, X., Fu, R., Liu, S., Leong, K.H., Tu, Y., Zhou, L., 2022. Review on the contamination and remediation of polycyclic aromatic hydrocarbons (PAHs) in coastal soil and sediments. *Environmental Research* 205, 112423. <https://doi.org/10.1016/j.envres.2021.112423>
- Uddin, S., Fowler, S.W., Saeed, T., Jupp, B., Faizuddin, M., 2021. Petroleum hydrocarbon pollution in sediments from the Gulf and Omani waters: Status and review. *Marine Pollution Bulletin* 173, 112913. <https://doi.org/10.1016/j.marpolbul.2021.112913>
- Du, J., Jing, C., 2018. Anthropogenic PAHs in lake sediments: a literature review (2002–2018). *Environ. Sci.: Processes Impacts* 20, 1649–1666. <https://doi.org/10.1039/C8EM00195B>
- Ferrante, M., Zanghì, G., Cristaldi, A., Copat, C., Grasso, A., Fiore, M., Signorelli, S.S., Zuccarello, P., Oliveri Conti, G., 2018. PAHs in seafood from the Mediterranean Sea: An exposure risk assessment. *Food and Chemical Toxicology* 115, 385–390. <https://doi.org/10.1016/j.fct.2018.03.024>
- Ramdine, G., Fichet, D., Louis, M., Lemoine, S., 2012. Polycyclic aromatic hydrocarbons (PAHs) in surface sediment and oysters (*Crassostrea rhizophorae*) from mangrove of Guadeloupe: Levels, bioavailability, and effects. *Ecotoxicology and Environmental Safety* 79, 80–89. <https://doi.org/10.1016/j.ecoenv.2011.12.005>
- El-Kady, A.A., Wade, T.L., Sweet, S.T., 2018. Assessment and ecological indicators of total and polycyclic aromatic hydrocarbons in the aquatic environment of lake Manzala, Egypt. *Journal of Environmental Science and Health, Part A* 53, 854–865. <https://doi.org/10.1080/10934529.2018.1455376>