Earth Observation Data for Science and Innovation in the Black Sea

ESA Express Procurement Plus - [EXPRO+] Black Sea and Danube Regional Initiative – Science.

D2.4: Dataset user manual v1 providing a detailed description of the available historical and new datasets.

Workpackage:	2	In-situ data sets collection and archiving	
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Document Log

Date	Author	Changes	Version	Status
11.02.2020	Luminita Buga George Sarbu	First draft	1	completed
28.02.2020	Luminita Buga	- Update *Chapter 2, 4, 5*	Draft v02	completed
19.03.2020	Luminita Buga George Sarbu	- Update *Chapter 2/2.6* - Data from Monitoring oceanographic cruises	V1	completed
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25.09.2020	Luminita Buga George Sarbu	- Update: *Chapter 4/4.5* - Data from Romanian Monitoring oceanographic cruises: added TS data on Romanian Black Sea Shelf, August 2019 *Chapter 5/5.1* - EMODnet Chemistry aggregated dataset: added Black Sea Nutrients data *Chapter 5/5.6* - Data from Romanian Monitoring oceanographic cruises: added Nutrients data on Romanian Black Sea Shelf	V1.2	completed
28.12.2020	Sorin Constantin Luminita Buga	- Update: *Chapter 2/2.6* - Data from Romanian Monitoring oceanographic cruises: added Turbidity and Suspended Particulate Matter data in front of Danube Delta “Sfântu Gheorghe” branch	V1.3	completed

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1. Introduction

In the framework of WP2: In-situ data sets collection and archiving, task 2.1 aims at 1) gathering the historical datasets necessary for supporting 1) the development and validation of the algorithms developed in WP3-5 for producing ocean color, altimetry and Sea Surface Salinity (SSS) products and 2) the production of new products in WP6 (e.g. mapping of the mesoscale circulation, oxygen dynamics). The in-situ data requirements are summarized in Table 1.

The present document describes the in-situ datasets that are currently available for EO4SIBS and overviews the requirements in terms of data for algorithms development and products validation and proposes options for new data collection.

Table 1: In-situ Data requirements

WP	Targeted Data (parameters)	Temporal Coverage	Spatial Coverage	EO4SIBS Use
WP3 Ocean colour Products	water reflectance	2010-present	Black Sea surface	- to establish a regional blue-to-green Rrs vs. Chla algorithm to complete the list of tested algorithms. - to develop algorithms for Chla retrieval development and validation. - to test consistency between HPLC and spectrophotometric methods (EO4SIBS) - to validate of the atmospheric correction algorithms.
	chlorophyll-a concentrations (HPLC and spectrophotometric analyses)			
	total suspended matter concentrations			
	turbidity			
	attenuation			
	particulate backscattering			
	absorption coefficients			
	AERONET-OC L2 products (Water Leaving Radiances)			
WP4 Altimetry products	tide gauges Sea Surface Heights (SSH) measurements (precise GPS positioning associated if available)	1993-present (at least Cryosat-2 period 2011-present) * ideally hourly measurements	Black Sea surface	- comparison of the variability of the SLA retrieved by altimetry (20 Hz and 1 Hz)
WP5 Sea Surface Salinity Product	Salinity (&Temperature)	2010-present	Black Sea/up to 10 m depth	- validation and forcing of SSS algorithm.
	CDOM			- product validation

WP6 Science cases and added-value products	oxygen	1950-present	Black Sea In particular Black Sea shelf	Model Validation
	nutrients			Model Validation
	primary production	If any!		
	In-situ velocities from surface drifters	all can be found	Black Sea surface	Validation of the mesoscale circulation reconstructed with eddy tracking techniques

Various datasets are gathered in a database (EO4SIBS Data Access) in order to develop and assess the performances of the new developed algorithms and model simulation. Freely available (open access), quality controlled and validated datasets from reliable providers which hold Black Sea data were targeted to support ocean color, altimetry and sea surface salinity products and model development and validation. Access to restricted datasets was required from identified sources (like national databases). In case of gaps in terms of data availability, the in-situ data collected within the framework of the Romanian Monitoring oceanographic cruises complement these gaps.

2. In situ data sets in support of ocean color product development and validation

Table 2: Inventories of in-situ data sets available for the development of ocean color products

Identified Provider / Data Source	Identified Targeted Data (parameters)
1. MERMAID database: PANGAEA database BIO-OPT Cruises	- water reflectance - chlorophyll-a concentrations (HPLC) - total suspended matter concentrations - attenuation - particulate backscattering - absorption coefficients
2. EMODnet Chemsitry aggregated Chlorophyll-a data	- chlorophyll-a concentration
3. SeaDataNet total suspended matter data	- total suspended matter concentrations
4. Bio-optical Cruise 2016 (HPLC and spectrophotometric methods) (Data provided by JRC and NIMRD) [1]	- chlorophyll concentration - (HPLC analyses) - chlorophyll-a concentration - (spectrophotometric analyses)
5. AERONET-OC L2 products (spectral radiation) Galata Platform; Gloria Platform	- normalized Water Leaving Radiances
6. Chlorophyll-a (HPLC and spectrophotometric methods)[2], Turbidity,Total suspended matter, AOP data from Romanian Monitoring oceanographic cruises (Data provided by NIMRD and TERRASIGNA to cover gaps in terms of temporal coverage)	- chlorophyll-a concentration (spectrophotometric HPLC analyses) - turbidity - total suspended matter concentrations - water reflectance

[1] HPLC analyses done at DHI (Denmark) and spectrophotometric analyses at NIMRD (Romania)

[2] HPLC analyses done at SU/LOV, (France) and spectrophotometric analyses at NIMRD (Romania)

2.1 MERMAID database: PANGAEA database BIO-OPT Cruises

Dataset name:

Bio-Optic_2011.zip

Restriction:

Unrestricted

Provider / Data Source:

MERMAID database: PANGAEA database BIO-OPT Cruises

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ In_situ_Historical_Datasets/ BIO_OPTIC_2011/

Dataset description:

Bio_Optical data from Black Sea Bio_Optic cruise 2011. Mermaid database downloaded from Pangea (https://doi.org/10.1594/PANGAEA.898188)

Dataset format:

7 excel files (each file has 2 worksheets: one with all Mermaid data and the second one with selected Black Sea data), zip archived.

Parameters (and units):

1. *insitudb_chla_MERMAID_BS_2011.xlsx*:
   - Chlorophyll a [mg/m^3] (Chl a) * METHOD: Chlorophyll a, High Performance Liquid Chromatography (HPLC) determination

2. insitudb_iopskdtsm_MERMAID_BS_2011.xlsx:
   - Algal pigment absorption coefficient at given wavelength [1/m] (APH)
   - Absorption coefficient of colored dissolved organic matter at given wavelength [1/m] (acCDOM)
   - Backscattering coefficient of particles at given wavelength [1/m] (BBP)
   - Irradiance coefficient, diffuse downwelling at given wavelength [1/m] (KD)
   - Suspended matter, total [mg/l] (TSS)

3. insitudb_iopskdtsm_satbands2_MERMAID_BS_2011.xlsx and

4. insitudb_iopskdtsm_satbands6_MERMAID_BS_2011.xlsx
   - Spectral data of the main tables (i.e. "*insitudb_iopskdtsm_MERMAID_BS_2011.xlsx* ") aggregated within ±2 nm and ±6 nm, respectively, of SeaWiFS, MODIS AQUA, MERIS, VIIRS and OLCI sensor bands

5. insitudb_rrs_MERMAID_BS_2011.xlsx
   - Remote sensing reflectance at given wavelength [1/sr] (RRS)

6. insitudb_rrs_satbands2_MERMAID_BS_2011.xlsx and

7. insitudb_rrs_satbands6_MERMAID_BS_2011.xlsx
   - Spectral data of the main tables (i.e. " *insitudb_rrs_MERMAID_BS_2011.xlsx* ") aggregated within ±2 nm and ±6 nm, respectively, of SeaWiFS, MODIS AQUA, MERIS, VIIRS and OLCI sensor bands

Temporal coverage:

July 2011

Spatial coverage:

33 stations on Romanian and Bulgarian waters (Figure 1)

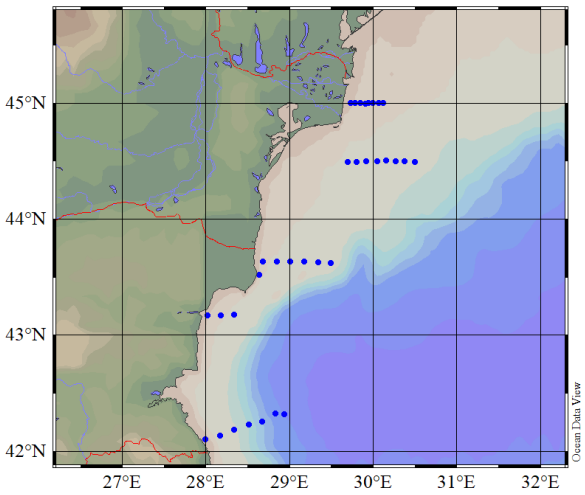

Figure 1. Spatial coverage for BIO-OPT Cruises, July 2011

Additional information:

A_compilation_of_global_bio-optical_in_situ_data.pdf

Valente, A.; (2019): *A compilation of global bio-optical in situ data for ocean-colour satellite applications* - version two. PANGAEA, https://doi.org/10.1594/PANGAEA.898188

- Data compilation for the validation of the ocean-colour products from the ESA Ocean Colour Climate Change Initiative (OC-CCI), the methodologies used to harmonize and integrate all data, as well as a description of individual data sets acquired are provided.

Citations

1. insitudb_chla_MERMAID_BS_2011.xlsx

Valente, André; Sathyendranath, Shubha; Brotas, Vanda; Groom, Steve; Grant, Michael; Taberner, Malcolm; Antoine, David; Arnone, Robert; Balch, William M; Barker, Kathryn; Barlow, Raymond G; Bélanger, Simon; Berthon, Jean-François; Besiktepe, Sukru; Borsheim, Knut Yngve; Bracher, Astrid; Brando, Vittorio E; Canuti, Elisabetta; Chavez, Francisco P; Cianca, Andres; Claustre, Hervé; Clementson, Lesley; Crout, Richard; Frouin, Robert; García-Soto, Carlos; Gibb, S W; Gould, Richard; Hooker, Stanford B; Kahru, Mati; Kampel, Milton; Klein, Holger; Kratzer, Susanne; Kudela, R M; Ledesma, Santiago; Loisel, Hubert; Matrai, Patricia A; McKee, David; Mitchell, Brian Greg; Moisan, Tiffany; Muller-Karger, Frank E; O'Dowd, Leonie; Ondrusek, Michael; Platt, Trevor; Poulton, Alex J; Repecaud, Michel; Schroeder, Thomas; Smyth, Timothy J; Smythe-Wright, Denise; Sosik, Heidi; Twardowski, Michael S; Vellucci, Vincenzo; Voss, Kenneth; Werdell, P Jeremy; Wernand, Marcel R; Wright, Simon; Zibordi, Giuseppe (2019): ***Chlorophyll a concentration obtained by HPLC and fluorometric/spectrophotometric determination***.

PANGAEA, https://doi.org/10.1594/PANGAEA.898200, In: Valente, A et al. (2019): A compilation of global bio-optical in situ data for ocean-colour satellite applications - version two. PANGAEA, https://doi.org/10.1594/PANGAEA.898188

2. insitudb_iopskdtsm_MERMAID_BS_2011.xlsx

Valente, André; Sathyendranath, Shubha; Brotas, Vanda; Groom, Steve; Grant, Michael; Taberner, Malcolm; Antoine, David; Arnone, Robert; Balch, William M; Barker, Kathryn; Barlow, Raymond G; Bélanger, Simon; Berthon, Jean-François; Besiktepe, Sukru; Borsheim, Knut Yngve; Bracher, Astrid; Brando, Vittorio E; Canuti, Elisabetta; Chavez, Francisco P; Cianca, Andres; Claustre, Hervé; Clementson, Lesley; Crout, Richard; Frouin, Robert; García-Soto, Carlos; Gibb, S W; Gould, Richard; Hooker, Stanford B; Kahru, Mati; Kampel, Milton; Klein, Holger; Kratzer, Susanne; Kudela, R M; Ledesma, Santiago; Loisel, Hubert; Matrai, Patricia A; McKee, David; Mitchell, Brian Greg; Moisan, Tiffany; Muller-Karger, Frank E; O'Dowd, Leonie; Ondrusek, Michael; Platt, Trevor; Poulton, Alex J; Repecaud, Michel; Schroeder, Thomas; Smyth, Timothy J; Smythe-Wright, Denise; Sosik, Heidi; Twardowski, Michael S; Vellucci, Vincenzo; Voss, Kenneth; Werdell, P Jeremy; Wernand, Marcel R; Wright, Simon; Zibordi, Giuseppe (2019): ***Inherent optical properties and diffuse attenuation coefficient at different wavelengths.*** PANGAEA, https://doi.org/10.1594/PANGAEA.898187, In: Valente, A et al. (2019): A compilation of global bio-optical in situ data for ocean-colour satellite applications - version two. PANGAEA, https://doi.org/10.1594/PANGAEA.898188

3. insitudb_iopskdtsm_satbands2_MERMAID_BS_2011.xlsx

Valente, André; Sathyendranath, Shubha; Brotas, Vanda; Groom, Steve; Grant, Michael; Taberner, Malcolm; Antoine, David; Arnone, Robert; Balch, William M; Barker, Kathryn; Barlow, Raymond G; Bélanger, Simon; Berthon, Jean-François; Besiktepe, Sukru; Borsheim, Knut Yngve; Bracher, Astrid; Brando, Vittorio E; Canuti, Elisabetta; Chavez, Francisco P; Cianca, Andres; Claustre, Hervé; Clementson, Lesley; Crout, Richard; Frouin, Robert; García-Soto, Carlos; Gibb, S W; Gould, Richard; Hooker, Stanford B; Kahru, Mati; Kampel, Milton; Klein, Holger; Kratzer, Susanne; Kudela, R M; Ledesma, Santiago; Loisel, Hubert; Matrai, Patricia A; McKee, David; Mitchell, Brian Greg; Moisan, Tiffany; Muller-Karger, Frank E; O'Dowd, Leonie; Ondrusek, Michael; Platt, Trevor; Poulton, Alex J; Repecaud, Michel; Schroeder, Thomas; Smyth, Timothy J; Smythe-Wright, Denise; Sosik, Heidi; Twardowski, Michael S; Vellucci, Vincenzo; Voss, Kenneth; Werdell, P Jeremy; Wernand, Marcel R; Wright, Simon; Zibordi, Giuseppe (2019): ***Inherent optical properties and diffuse attenuation coefficient aggregated within +/-2 nm of SeaWiFS, MODIS-AQUA, VIIRS, OLCI and MERIS bands***. PANGAEA, https://doi.org/10.1594/PANGAEA.898184, In: Valente, A et al. (2019): A compilation of global bio-optical in situ data for ocean-colour satellite applications - version two. PANGAEA, https://doi.org/10.1594/PANGAEA.898188

4. insitudb_iopskdtsm_satbands6_MERMAID_BS_2011.xlsx

Valente, André; Sathyendranath, Shubha; Brotas, Vanda; Groom, Steve; Grant, Michael; Taberner, Malcolm; Antoine, David; Arnone, Robert; Balch, William M; Barker, Kathryn; Barlow, Raymond G; Bélanger, Simon; Berthon, Jean-François; Besiktepe, Sukru; Borsheim, Knut Yngve; Bracher, Astrid; Brando, Vittorio E; Canuti, Elisabetta; Chavez, Francisco P; Cianca, Andres; Claustre, Hervé; Clementson, Lesley; Crout, Richard; Frouin, Robert; García-Soto,

Carlos; Gibb, S W; Gould, Richard; Hooker, Stanford B; Kahru, Mati; Kampel, Milton; Klein, Holger; Kratzer, Susanne; Kudela, R M; Ledesma, Santiago; Loisel, Hubert; Matrai, Patricia A; McKee, David; Mitchell, Brian Greg; Moisan, Tiffany; Muller-Karger, Frank E; O'Dowd, Leonie; Ondrusek, Michael; Platt, Trevor; Poulton, Alex J; Repecaud, Michel; Schroeder, Thomas; Smyth, Timothy J; Smythe-Wright, Denise; Sosik, Heidi; Twardowski, Michael S; Vellucci, Vincenzo; Voss, Kenneth; Werdell, P Jeremy; Wernand, Marcel R; Wright, Simon; Zibordi, Giuseppe (2019): ***Inherent optical properties and diffuse attenuation coefficient aggregated within +/-6 nm of SeaWiFS, MODIS-AQUA, VIIRS, OLCI and MERIS bands***. PANGAEA, https://doi.org/10.1594/PANGAEA.898185, In: Valente, A et al. (2019): A compilation of global bio-optical in situ data for ocean-colour satellite applications - version two. PANGAEA, https://doi.org/10.1594/PANGAEA.898188

5. insitudb_rrs_MERMAID_BS_2011.xlsx

Valente, André; Sathyendranath, Shubha; Brotas, Vanda; Groom, Steve; Grant, Michael; Taberner, Malcolm; Antoine, David; Arnone, Robert; Balch, William M; Barker, Kathryn; Barlow, Raymond G; Bélanger, Simon; Berthon, Jean-François; Besiktepe, Sukru; Borsheim, Knut Yngve; Bracher, Astrid; Brando, Vittorio E; Canuti, Elisabetta; Chavez, Francisco P; Cianca, Andres; Claustre, Hervé; Clementson, Lesley; Crout, Richard; Frouin, Robert; García-Soto, Carlos; Gibb, S W; Gould, Richard; Hooker, Stanford B; Kahru, Mati; Kampel, Milton; Klein, Holger; Kratzer, Susanne; Kudela, R M; Ledesma, Santiago; Loisel, Hubert; Matrai, Patricia A; McKee, David; Mitchell, Brian Greg; Moisan, Tiffany; Muller-Karger, Frank E; O'Dowd, Leonie; Ondrusek, Michael; Platt, Trevor; Poulton, Alex J; Repecaud, Michel; Schroeder, Thomas; Smyth, Timothy J; Smythe-Wright, Denise; Sosik, Heidi; Twardowski, Michael S; Vellucci, Vincenzo; Voss, Kenneth; Werdell, P Jeremy; Wernand, Marcel R; Wright, Simon; Zibordi, Giuseppe (2019): ***Remote sensing reflectance at different wavelengths***. PANGAEA, https://doi.org/10.1594/PANGAEA.898194, In: Valente, A et al. (2019): A compilation of global bio-optical in situ data for ocean-colour satellite applications - version two. PANGAEA, https://doi.org/10.1594/PANGAEA.898188

6. insitudb_rrs_satbands2_MERMAID_BS_2011.xlsx

Valente, André; Sathyendranath, Shubha; Brotas, Vanda; Groom, Steve; Grant, Michael; Taberner, Malcolm; Antoine, David; Arnone, Robert; Balch, William M; Barker, Kathryn; Barlow, Raymond G; Bélanger, Simon; Berthon, Jean-François; Besiktepe, Sukru; Borsheim, Knut Yngve; Bracher, Astrid; Brando, Vittorio E; Canuti, Elisabetta; Chavez, Francisco P; Cianca, Andres; Claustre, Hervé; Clementson, Lesley; Crout, Richard; Frouin, Robert; García-Soto, Carlos; Gibb, S W; Gould, Richard; Hooker, Stanford B; Kahru, Mati; Kampel, Milton; Klein, Holger; Kratzer, Susanne; Kudela, R M; Ledesma, Santiago; Loisel, Hubert; Matrai, Patricia A; McKee, David; Mitchell, Brian Greg; Moisan, Tiffany; Muller-Karger, Frank E; O'Dowd, Leonie; Ondrusek, Michael; Platt, Trevor; Poulton, Alex J; Repecaud, Michel; Schroeder, Thomas; Smyth, Timothy J; Smythe-Wright, Denise; Sosik, Heidi; Twardowski, Michael S; Vellucci, Vincenzo; Voss, Kenneth; Werdell, P Jeremy; Wernand, Marcel R; Wright, Simon; Zibordi, Giuseppe (2019): ***Remote sensing reflectance aggregated within +/-2 nm of SeaWiFS, MODIS-AQUA, VIIRS, OLCI and MERIS bands***. PANGAEA,

https://doi.org/10.1594/PANGAEA.898195, In: Valente, A et al. (2019): A compilation of global bio-optical in situ data for ocean-colour satellite applications - version two. PANGAEA, https://doi.org/10.1594/PANGAEA.898188

7. insitudb_rrs_satbands6_MERMAID_BS_2011.xlsx

Valente, André; Sathyendranath, Shubha; Brotas, Vanda; Groom, Steve; Grant, Michael; Taberner, Malcolm; Antoine, David; Arnone, Robert; Balch, William M; Barker, Kathryn; Barlow, Raymond G; Bélanger, Simon; Berthon, Jean-François; Besiktepe, Sukru; Borsheim, Knut Yngve; Bracher, Astrid; Brando, Vittorio E; Canuti, Elisabetta; Chavez, Francisco P; Cianca, Andres; Claustre, Hervé; Clementson, Lesley; Crout, Richard; Frouin, Robert; García-Soto, Carlos; Gibb, S W; Gould, Richard; Hooker, Stanford B; Kahru, Mati; Kampel, Milton; Klein, Holger; Kratzer, Susanne; Kudela, R M; Ledesma, Santiago; Loisel, Hubert; Matrai, Patricia A; McKee, David; Mitchell, Brian Greg; Moisan, Tiffany; Muller-Karger, Frank E; O'Dowd, Leonie; Ondrusek, Michael; Platt, Trevor; Poulton, Alex J; Repecaud, Michel; Schroeder, Thomas; Smyth, Timothy J; Smythe-Wright, Denise; Sosik, Heidi; Twardowski, Michael S; Vellucci, Vincenzo; Voss, Kenneth; Werdell, P Jeremy; Wernand, Marcel R; Wright, Simon; Zibordi, Giuseppe (2019): ***Remote sensing reflectance aggregated within +/-6 nm of SeaWiFS, MODIS-AQUA, VIIRS, OLCI and MERIS bands***. PANGAEA, https://doi.org/10.1594/PANGAEA.898197, In: Valente, A et al. (2019): A compilation of global bio-optical in situ data for ocean-colour satellite applications - version two. PANGAEA, https://doi.org/10.1594/PANGAEA.898188

2.2 EMODnet Chemsitry Chlorophyll-a dataset

Dataset name:

BS_Chl-a_EMODnet Chemistry_2013-2014_dataset.txt

Restriction:

Unrestricted

Provider / Data Source:

EMODnet Chemistry Black Sea - Eutrophication and Ocean Acidification aggregated datasets 1935/2016 v2018.
https://www.emodnet-chemistry.eu/products/catalogue#/metadata/19839515-f32d-4a6c-8f3f-dcc7e75671ae
https://www.emodnet-chemistry.eu/products/doi;jsessionid=B962C6A89FDF3B98174A0D829962AA84?0&doi=10.6092/80466a9d-1b90-4ca8-a95f-ac78723ce10a

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ In_situ_Historical_Datasets/ EMODNET_Chemistry_Chl_a

Dataset description:

Chlorophyll a (2013-2014) – data from *EMODnet Chemistry Black Sea - Eutrophication and Ocean Acidification aggregated datasets 1935/2016 v2018* (https://doi.org/10.6092/80466A9D-1B90-4CA8-A95F-AC78723CE10A)

Full description at:
https://www.emodnet-chemistry.eu/products/catalogue#/metadata/19839515-f32d-4a6c-8f3f-dcc7e75671ae
Data aggregated and quality controlled following EMODnet Chemistry common methodology for all European Seas (https://doi.org/10.6092/9f75ad8a-ca32-4a72-bf69-167119b2cc12)

Dataset format:

ODV spreadsheet composed of metadata header followed by tab separated values. The spreadsheet can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Water body chlorophyll-a [mg/m^3]

Temporal coverage:

2013-2014

Spatial coverage:

132 stations on Bulgarian coastal waters (Figure 2)

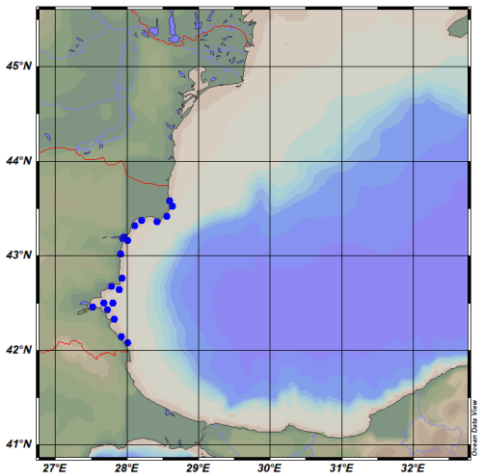

Figure 2. Spatial coverage for BS_Chl-a_EMODnet Chemistry dataset

Citations

National Institute for Marine Research and Development "Grigore Antipa" (2018). Black Sea - Eutrophication and Ocean Acidification aggregated datasets 1935/2016 v2018. Aggregated datasets were generated in the framework of EMODnet Chemistry III, under the support of DG MARE Call for Tender EASME/EMFF/2016/006 - lot4. https://doi.org/10.6092/80466A9D-1B90-4CA8-A95F-AC78723CE10A

Dataset name:

NIMRD_Chl-a_EMODnet Chemistry_2010-2016_dataset.txt

Restriction:

Restricted (dataset download upon request)

Provider / Data Source:

National Institute for Marine Research and Development “Grigore Antipa” (NIMRD).

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ In_situ_Historical_Datasets/EMODNET_Chemistry_Chl_a /

Dataset description:

Chlorophyll a (2010-2016) – NIMRD data aggregated and quality controlled following EMODnet Chemistry common methodology for all European Seas (https://doi.org/10.6092/9f75ad8a-ca32-4a72-bf69-167119b2cc12)

Dataset format:

ODV spreadsheet composed of metadata header followed by tab separated values. The spreadsheet can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Water body chlorophyll-a [mg/m^3]

Temporal coverage:

2010-2016

Spatial coverage:

449 stations on Romanian Shelf (Figure 3)

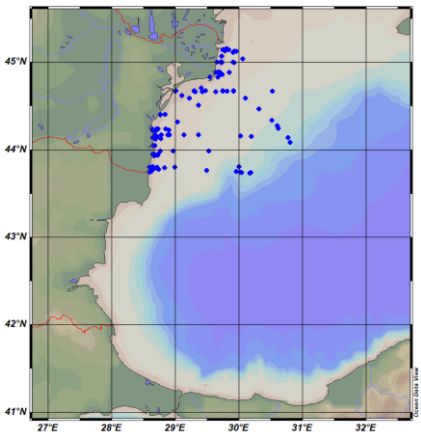

Figure 3. Spatial coverage for NIMRD_Chl-a_EMODnet Chemistry dataset

Additional information:

SDN_Quality_Control_Flags.xlsx

- SeaDataNet measurand qualifier flags applied to data (http://seadatanet.maris2.nl/v_bodc_vocab_v2/search.asp?lib=L20)

Citations

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD). Data obtained in the framework of "The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements" and funded by Romanian Ministry of Environment, Water and Forests.

2.3 SeaDataNet - Total suspended material dataset

Dataset name:

BS_SPM_SDN_2010-2016_dataset.txt

Restriction:

Unrestricted (SeaDataNet License)

Provider / Data Source:

SeaDataNet https://www.seadatanet.org/

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ In_situ_Historical_Datasets/SDN_SPM /

Dataset description:

Suspended particulate material data queried and downloaded from SeaDataNet (https://cdi.seadatanet.org/search).

The data centers apply standard data quality control procedures on all data that the centres manage.

Dataset format:

ODV spreadsheet composed of metadata header followed by tab separated values. The spreadsheet can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Concentration of suspended particulate material (suspended matter) [mg/l]

Temporal coverage:

2010-2016

Spatial coverage:

290 stations on Ukrainian shelf (Figure 4)

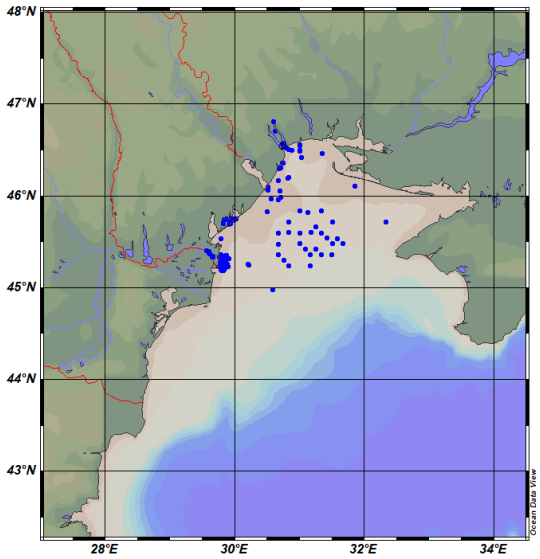

Figure 4. Spatial coverage for BS_SPM_SDN_2010-2016_dataset

Citations

Acknowledgments: Data were provided through SeaDataNet Pan-European infrastructure for ocean and marine data management (http://www.seadatanet.org)

Dataset name:

NIMRD_SPM_2013-2015_dataset.txt

Restriction:

Restricted (dataset download upon request)

Provider / Data Source:

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD).

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ In_situ_Historical_Datasets/SDN_SPM /

Dataset description:

Suspended particulate material data queried and downloaded from SeaDataNet (https://cdi.seadatanet.org/search).

The data center applies standard data quality control procedures on all data that the center manage.

Dataset format:

ODV spreadsheet composed of metadata header followed by tab separated values. The spreadsheet can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Concentration of suspended particulate material (suspended matter) [mg/l]

Temporal coverage:

2013-2015

Spatial coverage:

115 stations on Romanian Shelf (Figure 5)

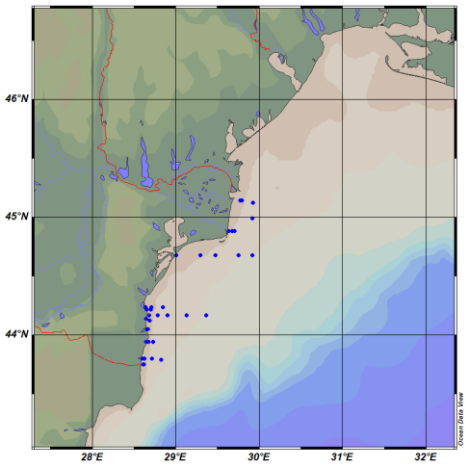

Figure 5. Spatial coverage for NIMRD_SPM_2013-2015_dataset

Additional information:

SDN_Quality_Control_Flags.xlsx

- SeaDataNet measurand qualifier flags applied to data (http://seadatanet.maris2.nl/v_bodc_vocab_v2/search.asp?lib=L20)

Citations

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD). Data obtained in the framework of "*The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements*" and funded by Romanian Ministry of Environment, Water and Forests.

2.4 Bio-optical Cruise 2016 dataset

Dataset name:

Bio-Optic_2016_Chl_HPLC.xlsx

Restriction:

Unrestricted

Provider / Data Source:

Data obtained during EUROFLEETS2: bio-optics for ocean color remote sensing of the BlackSsea, BIO-OPT, Research Vessel Akademik, 02-06-2016 – 11-06-2016.

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ In_situ_Historical_Datasets/BIO_OPTIC_2016/

Dataset description:

HPLC Chlorophyll data obtained during Black Sea Bio-Optic cruise 2016. Data provide by JRC (HPLC analyses done at DHI, Denmark)

Dataset format:

excel

Parameters (and units):

Total and size fractionated Chlorophyll a [µg//] * METHOD: Chlorophyll, HPLC determination

Temporal coverage:

June 2016

Spatial coverage:

123 stations on the Western part of Black Sea (Figure 6)

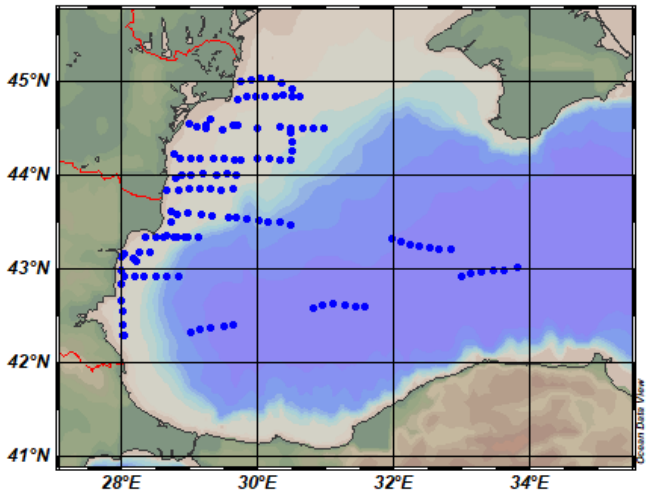

Figure 6. Spatial coverage for Bio_Optic_2016_Chl_HPLC dataset

Dataset name:

Bio-Optic_2016_Chl-a_spectrophometric.xlsx

Restriction:

Unrestricted

Provider / Data Source:

Data obtained during EUROFLEETS2: bio-optics for ocean color remote sensing of the BlackSsea, BIO-OPT, Research Vessel Akademik, 02-06-2016 – 11-06-2016.

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ In_situ_Historical_Datasets/BIO_OPTIC_2016/

Dataset description:

Chlorophyll a data obtained during Black Sea Bio-Optic cruise 2016. Data provide by NIMRD (spectrophotometric analyses)

Dataset format:

excel

Parameters (and units):

Chlorophyll a (chla) [µg//] * METHOD: Chlorophyll a, spectrophotometric determination

Temporal coverage:

June 2016

Spatial coverage:

- 56 stations on the Romanian Black Sea waters (Figure 7)

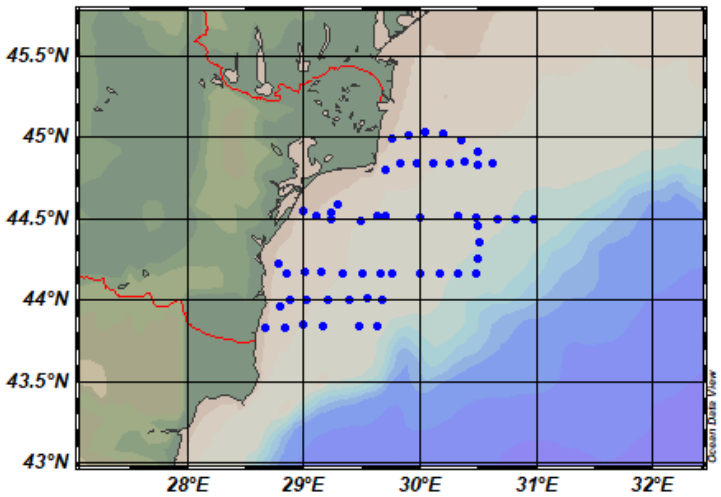

Figure 7. Spatial coverage for Bio-Optic_2016_Chl-a_spectrophometric dataset

2.5 AERONET-OC L2 products dataset

Dataset name:

Gloria_L2.xlsx

Galata_L2.xlsx

Restriction:

Unrestricted

Provider / Data Source:

AERONET Ocean Color (https://aeronet.gsfc.nasa.gov/new_web/ocean_color.html)

- https://aeronet.gsfc.nasa.gov/cgi-bin/type_one_station_seaprism_new?site=Gloria&nachal=2&level=3&place_code=10
- https://aeronet.gsfc.nasa.gov/cgi-bin/type_one_station_seaprism_new?site=Galata_Platform&nachal=2&level=3&place_code=10

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ In_situ_Historical_Datasets/AERONET_OC/

Dataset description:

AERONET-Ocean Color Level 2.0. Quality Assured Data. The data are pre and post field calibrated, automatically cloud cleared and manually inspected.

Dataset format:

excel

Parameters (and units):

Each data type and associated units are listed in Table 3.

Table 3. List of units for each AERONET OC data type

Data Type	Column Header	Column Header Units	Data Units
Final Data Product			
Normalized Water-Leaving Radiance determined from Lw_Q corrected for the effects of the non-isotropic distribution of the in-water radiance field (i.e., f/Q Corrected)	Lwn_f/Q(wavelength)	wavelength in nm	mW/(cm^2 sr um)
Preliminary Data Products			
Water-Leaving Radiance	Lw(wavelength)	wavelength in nm	mW/(cm^2 sr um)
Water-Leaving Radiance corrected for viewing angle dependence	Lw_Q(wavelength)	wavelength in nm	mW/(cm^2 sr um)

Normalized Water-Leaving Radiance determined from Lw (i.e., not corrected for the viewing angle dependence and for the effects of the non-isotropic distribution of the in-water light field	Lwn(wavelength)	wavelength in nm	mW/(cm^2 sr um)
Ancillary Algorithm Parameters			
Solar Zenith Angle	Solar_Zenith(wavelength)	wavelength in nm	Degrees
Solar Azimuth Angle	Solar_Azimuth(wavelength)	wavelength in nm	Degrees
Mean of 11 Above-Water Total Radiance Measurements	Lt_mean(wavelength)	wavelength in nm	mW/(cm^2 sr um)
Standard Deviation of 11 Above-Water Total Radiance Measurements	Lt_stddev(wavelength)	wavelength in nm	mW/(cm^2 sr um)
Mean of Lowest Two of 11 Above-Water Total Radiance Measurements	Lt_min_rel(wavelength)	wavelength in nm	mW/(cm^2 sr um)
Mean of Three Sky Radiance Measurements	Li_mean_val(wavelength)	wavelength in nm	mW/(cm^2 sr um)
Standard Deviation of Three Sky Radiance Measurements	Li_stddev(wavelength)	wavelength in nm	mW/(cm^2 sr um)
Aerosol Optical Thickness	AOT(wavelength)	wavelength in nm	None
Ozone Optical Thickness	OOT(wavelength)	wavelength in nm	None
Rayleigh Optical Thickness	ROT(wavelength)	wavelength in nm	None
Atmospheric Pressure	Pressure	None	hPa
Wind Speed	Wind_Speed	None	m/s
Chlorophyll-a	Chlorophyll-a	None	ug/L or mg/m^3
Ozone	Ozone	None	Dobson Units
Sea Surface Reflectance	Reflectance	None	None

Temporal coverage:

Gloria: January 2011 – March 2018

Galata: April 2014 – October 2018

Spatial coverage:

Romanian and Bulgarian waters (Figure 8)

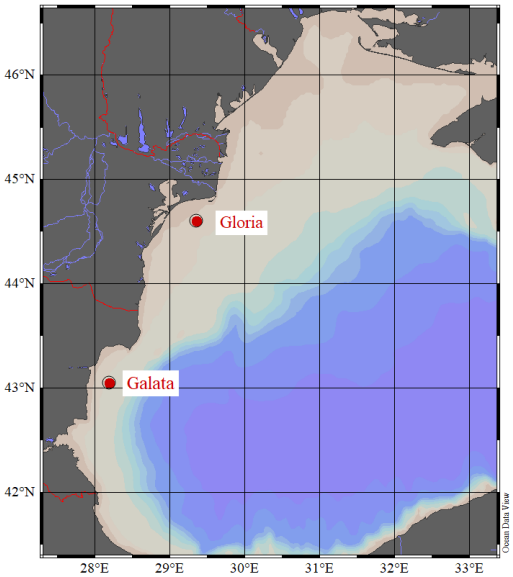

Figure 8. Location of Black Sea AERONET OC stations

Station	Longitude	Latitude
Gloria	29.36	44.6
Galata	28.193	43.045

Citations

Acknowledgments: Data were provided through AERONET Ocean Color (https://aeronet.gsfc.nasa.gov/new_web/ocean_color.html), Principal Investigator: Giuseppe Zibordi

2.6 Chlorophyll-a, Turbidity, Total suspended matter, AOP data from Monitoring oceanographic cruises

Dataset name:

Romanian_BS_Shelf_Chl-a_2017-2018.txt

Restriction:

Restricted (dataset download upon request)

Provider / Data Source:

National Institute for Marine research and Development "Grigore Antipa"

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ Cruises Datasets/

Dataset description:

Chlorophyll a (2017-2018) – data obtained in the framework of: "The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements" and funded by Romanian Ministry of Environment, Water and Forests. NIMRD standard data quality control procedures are applied to data.

Dataset format:

ODV tabular text. The file can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Chlorophyll-a [µg/l], spectrophotometric determination

Temporal coverage:

2017-2018

Spatial coverage:

58 stations on Romanian Black Sea shelf (Figure 9)

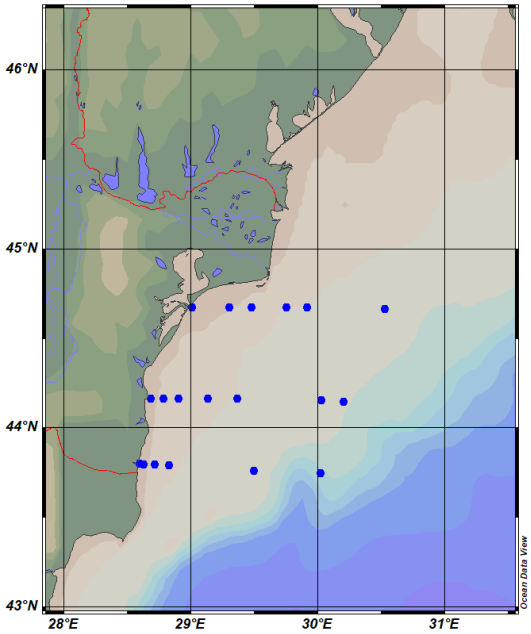

Figure 9. Spatial coverage for Romanian_BS_Shelf_Chl-a_2017-2018 dataset

Citations

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD). Data obtained in the framework of "*The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements*" and funded by Romanian Ministry of Environment, Water and Forests.

Dataset name:

Romanian_BS_Shelf_Chl-a&TSM_August2019.txt

Restriction:

Restricted (dataset download upon request)

Provider / Data Source:

National Institute for Marine Research and Development "Grigore Antipa"

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ Cruises Datasets/

Dataset description:

Chlorophyll a & TSM (2019) – data obtained during the Monitoring Cruise, August 2019, in the framework of: "The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements" and funded by the Romanian Ministry of Environment, Water and Forests. NIMRD standard data quality control procedures are applied to data.

Dataset format:

ODV tabular text. The file can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Water body chlorophyll-a [µg/l]; spectrophotometric determination
Total suspended matter [mg/l]

Temporal coverage:

August 2019

Spatial coverage:

41 stations on Romanian Black Sea shelf (Figure 10)

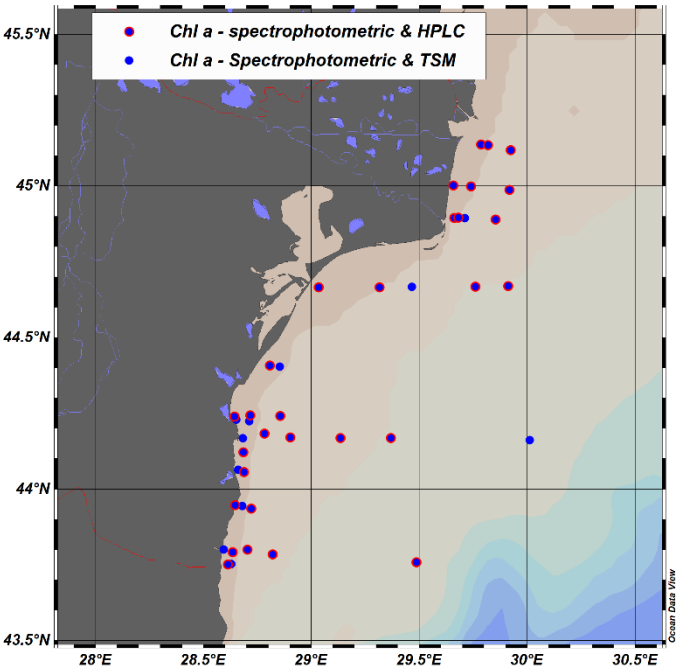

Figure 10. Spatial coverage for chlorophyll-a (spectrophotometric and HPLC determinations) & TSM data, Romanian Monitoring Cruise, August, 2019

Citations

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD). Data obtained in the framework of "*The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements*" and funded by Romanian Ministry of Environment, Water and Forests.

Dataset name:

Romanian_BS_Shelf_Chl_HPLC_August2019.xlsx

Restriction:

Restricted (dataset download upon request)

Provider / Data Source:

Sorbonne University/Villefranche Oceanographic Laboratory
National Institute for Marine Research and Development "Grigore Antipa"

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ Cruises Datasets/

Dataset description:

HPLC Chlorophyll a & other pigments, August 2019 - Romanian Black Sea Shelf

HPLC analyses: Sorbonne University/Villefranche Oceanographic Laboratory, contacts: Julia Uitz (uitz@obs-vlfr.fr), Joséphine Ras (jras@obs-vlfr.fr), Celine Dimier (celine.dimier@obs-vlfr.fr); sampling: NIMRD, Constanta: Monitoring Cruise, August 2019; with support of EO4SIBS project.

Dataset format:

Excel.

Parameters (and units):

Total chlorophyll-a [mg/m^3]; HPLC determination

Other pigments [mg/m^3]; HPLC determination

Temporal coverage:

August 2019

Spatial coverage:

30 stations on Romanian Black Sea shelf (see Figure 10)

Citations

Acknowledgments: Data obtained with EO4SIBS project support (*ESA AO/1-9487/18/I-EF / ESA-IPL-POE-EF-cb-LE-2018-588)*

Dataset name:

Danube_Delta_Turb_SPM_data_2019-2020.csv

Restriction:

Restricted (data to be used only for EO4SIBS project purposes)

Provider / Data Source:

TERRASIGNA

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ Cruises Datasets/

Dataset description:

Turbidity and SPM data obtained in the frameworks of (1) regular in-situ data sampling campaigns organized by TERRASIGNA in collaboration with the "Sfântu Gheorghe" Marine and Fluvial Research Station (University of Bucharest) and (2) the work supported by a grant of the Romanian Ministry of Education and Research, CNCS - UEFISCDI, project number PN-III-P1-1.1-PD-2019-0894, within PNCDI III.

Dataset format:

Comma-separated value (CSV)

Parameters (and units):

Turbidity [NTU], handheld turbidimeter determination

Suspended Particulate Matter [mg/l], gravimetric determination (filtration)

Temporal coverage:

2019-2020

Spatial coverage:

16 stations on Romanian Black Sea shelf, in front of Sfântu Gheorghe arm river mouth (Figure 11).

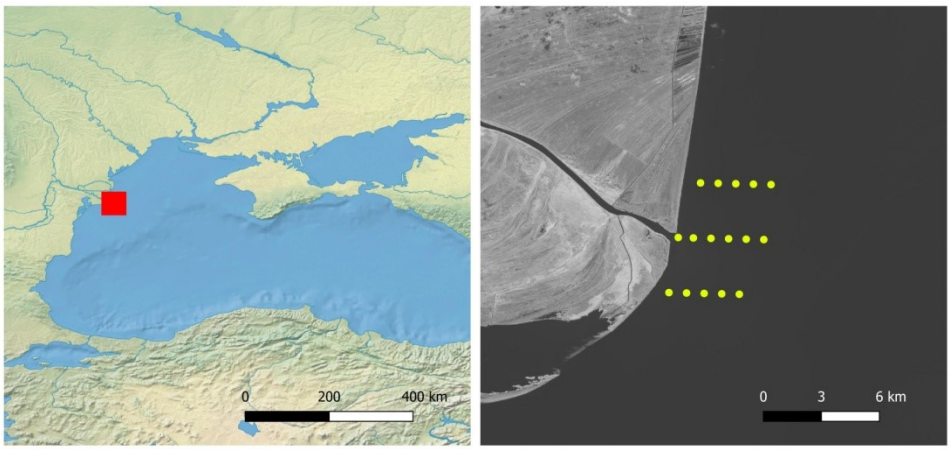

Figure 11. Spatial coverage for Danube_Delta_Turb_SPM_data_2019-2020 dataset

Citations

TERRASIGNA & University of Bucharest. Data obtained during regular in-situ data sampling campaigns and in the framework of the work supported by a grant of the Romanian Ministry of Education and Research, CNCS - UEFISCDI, project number PN-III-P1-1.1-PD-2019-0894, within PNCDI III (PD65/2020).

Dataset name:

rrs_NIMRD_August2019.xlsx

Restriction:

Unrestricted

Provider / Data Source:

National Institute for Marine research and Development "Grigore Antipa"

EO4SIBS DATA ACCESS Dataset path:

WP3-OceanColor/ Cruises Datasets/

Dataset description:

Remote sensing reflectance at given wavelengths (2019). August 2019, AOP measurements, Romanian Black Sea Shelf, with support of EO4SIBS project.

Dataset format:

Excel

Parameters (and units):

Remote sensing reflectance at given wavelengths [1/sr]

Temporal coverage:

August 2019

Spatial coverage:

20 stations on Romanian Black Sea shelf (Figure 12)

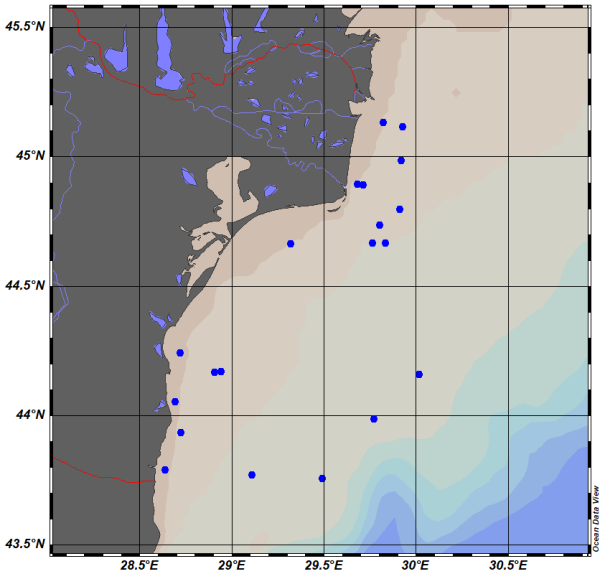

Figure 12. Spatial coverage for rrs_NIMRD_August2019 dataset

Citations

Acknowledgments: Data obtained with EO4SIBS project support (*ESA AO/1-9487/18/I-EF / ESA-IPL-POE-EF-cb-LE-2018-588)*

3. In situ data sets in support of Altimetry products

Table 4: Inventories of in-situ data sets available for the development of altimetry products

Identified Provider / Data Source	**Identified Targeted Data (parameters)**
1. PSMSL database	Tide gauges Sea Surface Heights (SSH) measurements
2. NIMRD Database	Tide gauges Sea Surface Heights (SSH) measurements
3. Turkish National Sea Level Monitoring System (TUDES)	Tide gauges Sea Surface Heights (SSH) measurements

3.1 PSMSL database

Dataset name:

SDC_BLS_DATA_TS_2010-onward_0-10.5m.nc

Restriction:

Unrestricted

Provider / Data Source:

Permanent Service for Mean Sea Level (PSMSL) (https://www.psmsl.org/)

EO4SIBS DATA ACCESS Dataset path:

WP4-Altimetry/In_situ_Historical_Datasets/PSMSL/

Dataset description:

Monthly Revised Local Reference (RLR) PSMSL Black Sea dataset downloaded from https://www.psmsl.org/data/obtaining/complete.php / RLR Monthly. The zip file contains all Black Sea Tide Gauges (TGs) monthly sea level data and associated information.

List of PSMSL folders (country_ *stationID*_location):

- Bulgaria_317_Bourgas
- Bulgaria_318_Varna
- Georgia_41_Poti
- Georgia_51_Batumi
- Romania_379_Constanta
- Russia_2015_Tuapse
- Turkey_1919_Amasra
- Turkey_1926_Igneada
- Turkey_1927_Trabzon II
- Ukraine_42_Sevastopol

The files in each TG folder are as follow:

- *stationID*.rlrdata: metric monthly data for the respective TG (data in year-month decimal, sea level in mm)
- *stationID*.txt: all information for the respective TG
- *stationID*.png: Revised Local Reference (RLR) Diagram for the respective TG
- *stationID*_auth.txt: the organisation/Institute who submitted the data

Dataset format:

application/zip

text, semicolon separated values

Parameters (and units):

Metric sea level data (mm)

Temporal coverage:

Table 5. Time span of PSMSL Revised Local Reference data

TG	Period	TG	Period
BOURGAS	1929 – 1996	TUAPSE	1917 – 2017
VARNA	1929 – 1996	AMASRA	2001 – 2009
POTI	1929 – 1996	IGNEDA	2002 – 2009
BATUMI	1882 – 2015	TRABZON	2002 – 2009
CONSTANTZA	1933 – 1997	SEVASTOPOL	1875 – 1994

Spatial coverage:

Locations of the PSMSL Black Sea TGs are shown in Figure 13.

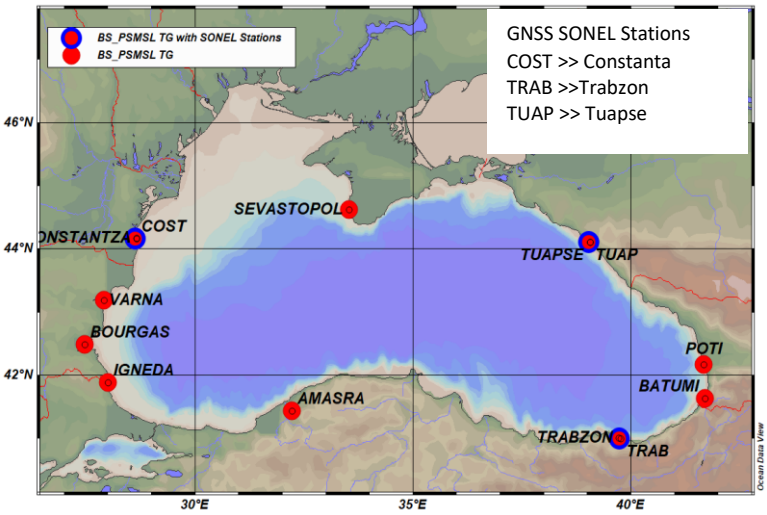

Figure 13. Black Sea PSMSL TGs and Sonel stations

Additional information:

CATALOGUE_OF_DATA_HELD_BY_PSMSL.xlsx

- The list of all PSMSL RLR data with Black Sea selection

Documentation_PSMSL.docx

- Description of PSMSL 'RLR' and 'METRIC' datasets

Individual_Station_Data.docx

- Description of stationID.rlrdata files format

Citations

Permanent Service for Mean Sea Level (PSMSL), 2019, "Tide Gauge Data",
Retrieved 29 Jul 2019 from http://www.psmsl.org/data/obtaining/

Simon J. Holgate, Andrew Matthews, Philip L. Woodworth, Lesley J. Rickards, Mark E. Tamisiea, Elizabeth Bradshaw, Peter R. Foden, Kathleen M. Gordon, Svetlana Jevrejeva, and Jeff Pugh (2013) *New Data Systems and Products at the Permanent Service for Mean Sea Level.* Journal of Coastal Research: Volume 29, Issue 3: pp. 493 – 504. doi:10.2112/JCOASTRES-D-12-00175.1.

Dataset name:

BlackSea_SONEL_Stations.zip

Restriction:

Unrestricted

Provider / Data Source:

SONEL (https://www.sonel.org/)

EO4SIBS DATA ACCESS Dataset path:

WP4-Altimetry/In_situ_Historical_Datasets/PSMSL/

Dataset description:

Data from SONEL Black Sea stations (permanent GPS stations which are close to tide gauges (up to approximately 10-15 km)

Dataset format:

application/zip

text, composed of metadata header followed by space separated values

Parameters (and units):

Hights (m)

Temporal coverage:

COST (Constanta): 2006 – 2019 (files updating periodically on SONEL)
TUAP (Tuapse): 2015- 2019 (files updating periodically on SONEL)
TRAB (Trabzon): 1999 – 2007 (decommissioned)

Spatial coverage:

Coordinates of Black Sea SONEL Stations (see Figure 13)

SONEL Station	Latitude	Longitude
COST	44.1615	28.6575
TUAP	44.0996	39.0656
TRAB	40.9947	39.7755

3.2 NIMRD database

Dataset name:

NIMRD_Constanta_SeaLevel.zip

Restriction:

Restricted (download upon request)

Provider / Data Source:

National Institute for Marine Research and Development "Grigore Antipa"

EO4SIBS DATA ACCESS Dataset path:

WP4-Altimetry/In_situ_Historical_Datasets/NIMRD/

Dataset description:

Monthly and daily TG sea level data (RLR applied) recorded at Constanta, Romania.
The data are continuation of PSMSL data for the same TG (ID 379). The offsets from 1933 Local Datum resulting from national leveling measurements (done by National Cadastral Agency) were took into consideration for RLR calculation.

Dataset format:

application/zip

csv, composed of metadata header followed by comma separated values

Parameters (and units):

Revised Local Reference sea level data (mm)

Temporal coverage:

Monthly data: 1998-2018
Daily data: 2007-2018

Spatial coverage:

Location Constanta TG (see Figure 13).
Latitude: 44.166667
Longitude: 28.666667

Citations

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD). Sea level data, Constanta TG, Romania

3.3 Turkish National Sea Level Monitoring System

Dataset name:

TURKEY_TUDES.zip

Restriction:

Unrestricted

Provider / Data Source:

Turkish National Sea Level Monitoring System (TUDES):
https://tudes.harita.gov.tr/?lang=us

EO4SIBS DATA ACCESS Dataset path:

WP4-Altimetry/In_situ_Historical_Datasets/TR_TUDES/

Dataset description:

TG Sea level data at local datum from Turkish National Sea Level Monitoring System (TUDES). Hourly and 15 minute (radar) data.

Dataset format:

application/zip
csv, composed of metadata header followed by comma separated values

Parameters (and units):

Sea level data (m)

Temporal coverage:

TG Name	Time period
Sinop_60min	2005-2011
Sinop_R_15min	2016-2019
Trabzon_60min	2002-2019
Trabzon_R_15min	2019-2019
Igneada	2002-2019
Amasra	2001-2019

Spatial coverage:

See Figure. 14

TG Name	Longitude [degrees_east]	Latitude [degrees_north]
Sinop_60min	35.151	42.022
Sinop_R_15min	35.140	42.020
Trabzon_60min	39.745	41.001
Trabzon_R_15min	39.744	41.000
Igneada	28.026	41.890
Amasra	32.391	41.744

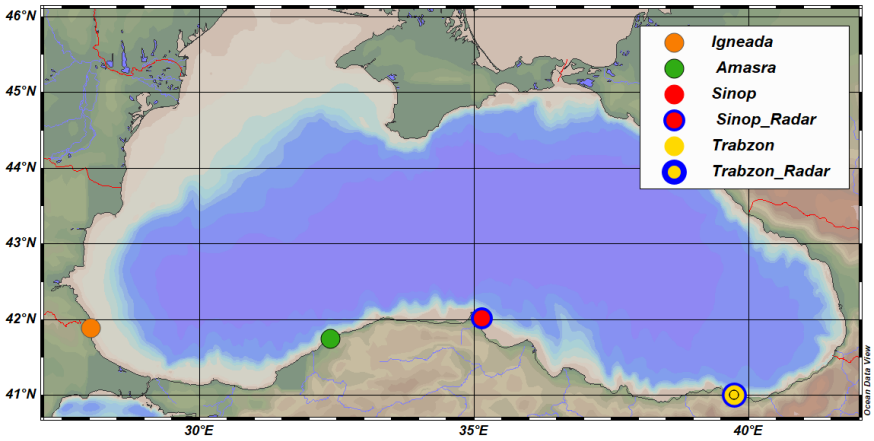

Figure 14. TUDES TGs - hourly and 15 min (radar) locations

Additional information:

e4a93f0332b2519.pdf

- National Report of Turkey to EUREF Symposium 2018

4. In situ data sets in support of Sea Surface Salinity products

Table 6. Inventories of in-situ data sets available for the development of SSS products

Identified Provider / Data Source	**Identified Targeted Data (parameters)**
1. SeaDataNet Dataset	Sea water Salinity and Temperature) up to 10 m depth
2. ARGO dataset	Sea water Salinity and Temperature
3. CMEMS dataset (INSITU_BS_TS_REP_OBSERVATIONS_013_042)	Sea water Salinity and Temperature
4. MERMAID database: PANGAEA database BIO-OPT Cruises[3]	CDOM
5. Sea Water Salinity and Temperature data from Romanian Monitoring oceanographic cruises (Data provided by NIMRD to cover gaps in terms of temporal coverage)	Sea water Salinity and Temperature

[3] Full description of CDOM from MERMAID database at chapter: 2.1. MERMAID database: PANGAEA database BIO-OPT Cruises / insitudb_iopskdtsm_MERMAID_BS_2011.xlsx /

4.1 SeaDataNet Dataset

Dataset name:

SDC_BLS_DATA_TS_2010-onward_0-10.5m.nc

Restriction:

Unrestricted

Provider / Data Source:

1. SeaDataNet Pan-European infrastructure for ocean and marine data management
Black Sea - Temperature and salinity Historical Data Collection SeaDataCloud V1
https://www.seadatanet.org/Products#/metadata/2287615d-1977-479f-8d5b-439960bcb21a
https://doi.org/10.12770/2287615d-1977-479f-8d5b-439960bcb21a
2. National Institute for Marine Research and Development "Grigore Antipa"

EO4SIBS DATA ACCESS Dataset path:

WP5-Salinity/In_situ_Historical_Datasets/SeaDataNet/

Dataset description:

1. Aggregated Sea Water Salinity and Temperature data extracted from *Black Sea - Temperature and salinity Historical Data Collection SeaDataCloud V1* (SDC_BLS_DATA_TS_V1) for the time period 2010 – onward and up to 10m depth.
SDC_BLS_DATA_TS_V1 includes GOSUD (GLOBAL OCEAN SURFACE UNDERWAY DATA) and ARGO data (9 floats)
Data aggregated and Quality Controlled following "Product Information Document (PIDoc)"
https://doi.org/10.13155/56683
2. NIMRD data, aggregated and quality controlled following the same methodology as in "Product Information Document (PIDoc)", were integrated in SDC_BLS_DATA_TS_V1

Dataset format:

Netcdf

Parameters (and units):

Depth	m
ITS-90 water temperature	degrees C
Water body salinity	per mille

Full description of metadata and data in *SDC_BLS_DATA_TS_2010-onward_0-10.5m_nc_variables.txt*

Temporal coverage:

2010-01-04 - 2017-09-04

Spatial coverage:

14850 station on Black Sea basin (Figure 15)

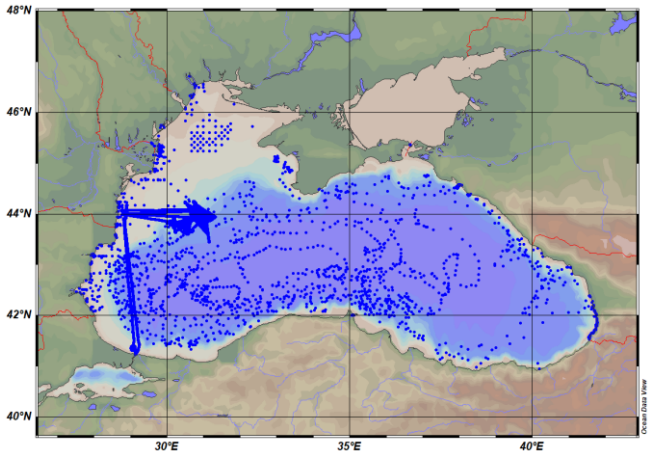

Figure 15. Spatial coverage for SDC_BLS_DATA_TS_2010-onward_0-10.5m dataset

Additional information:

Product Information Document (PIDoc).pdf

- Main characteristics, the methodology applied to generate it, and its usability of SDC_BLS_DATA_TS_V1

SDC_BLS_DATA_TS_2010-onward_0-10.5m_nc_variables.txt

- Full description of metadata and data of SDC_BLS_DATA_TS_2010-onward_0-10.5m.nc

Citations

- Volodymyr Myroshnychenko, Dick Schaap, Reiner Schlitzer (2018). *Black Sea - Temperature and salinity Historical Data Collection SeaDataCloud V1*. https://doi.org/10.12770/2287615d-1977-479f-8d5b-439960bcb21a
- Myroshnychenko Volodymyr, Simoncelli Simona (2018). *SeaDataCloud Temperature and Salinity Historical Data Collection for the Black Sea (Version 1).* Product Information Document (PIDoc). https://doi.org/10.13155/56683

Acknowledgements: Data were provided through SeaDataNet Pan-European infrastructure for ocean and marine data management (https://www.seadatanet.org)

4.2 ARGO dataset

Dataset name:

BlackSea_ARGO_profiles_2010-onward.zip

Restriction:

Unrestricted

Provider / Data Source:

Argo Data Management/ Argo data selection
http://www.argodatamgt.org/Access-to-data/Argo-data-selection

EO4SIBS DATA ACCESS Dataset path:

WP5-Salinity/In_situ_Historical_Datasets/BlackSea_ARGO/

Dataset description:

ARGO data (Salinity and temperature) from ARGO floats which are not already included in, or out of temporal coverage of SDC_BLS_DATA_TS_2010-onward_0-10.5m.nc dataset. Data downloaded from Argo Data Management/ Argo data selection (in July 2019) with the Quality option "Good Data Only"

Dataset format:

application/zip

NetCDF-3 (Full description of the formats and files produced by the Argo Data Assembly Centres (DACs) in: *Argo user's manual, version 3.3, November 28th 2019*) http://dx.doi.org/10.13155/29825)

Parameters (and units):

Pressure (decibar)

Temperature (degrees_Celsius)

Practical Salinity (psu)

Temporal coverage:

2010-2019

Spatial coverage:

27 ARGO floats, Black Sea basin (Figure 16)

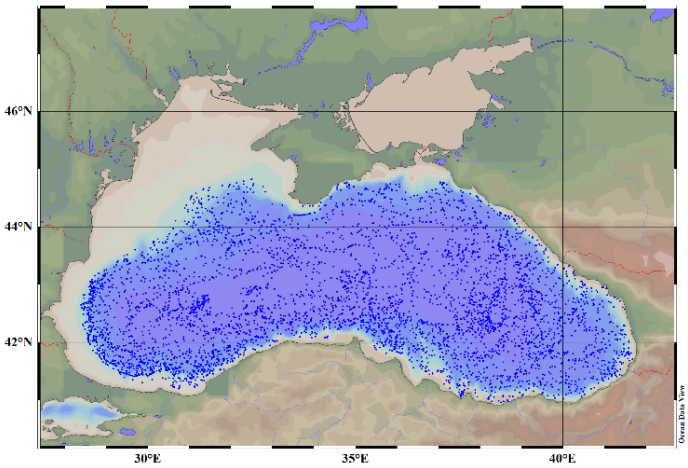

Figure 16. Spatial coverage for BlackSea_ARGO_profiles_2010-onward.zip dataset

Additional information:

Argo user's manual V3.3.pdf

- Argo user's manual, version 3.3, November 28th 2019

Citations

Argo Data Management Team (2019). **Argo user's manual V3.3**. https://doi.org/10.13155/29825

Acknowledgements: These data were collected and made freely available by the International Argo Program and the national programs that contribute to it. (http://www.argo.ucsd.edu, http://argo.jcommops.org) . The Argo Program is part of the Global Ocean Observing System.

4.3 CMEMS dataset

Dataset name:

BlackSea_CMEMS_REP_OBSEVATIONS_013_042.zip

Restriction:

Unrestricted

Provider / Data Source:

CMEMS - Black Sea REPROCESSED IN SITU Temperature and Salinity Product
INSITU_BS_TS_REP_OBSERVATIONS_013_042
http://marine.copernicus.eu/services-portfolio/access-to-products/?option=com_csw&view=details&product_id=INSITU_BS_TS_REP_OBSERVATIONS_013_042

EO4SIBS DATA ACCESS Dataset path:

WP5-Salinity/In_situ_Historical_Datasets/CMEMS/

Dataset description:

Salinity and Temperature product data, (as per July 2019) from 8 buoys in the black Sea.
Data Quality Control and Validation in "QUALITY INFORMATION DOCUMENT"
(http://marine.copernicus.eu/documents/QUID/CMEMS-INS-QUID-013-042.pdf)

Dataset format:

application/zip
NetCDF-3 (Full Data files format and content description in: "PRODUCT USER MANUAL For In Situ Products" (http://marine.copernicus.eu/documents/PUM/CMEMS-INS-PUM-013.pdf)

Parameters (and units):

Depth [m]
Sea Temperature [degrees_Celsius]
Practical Salinity -PSAL [0.001]

Temporal coverage:

Mooring name	Temporal coverage
BS_TS_MO_Balchik	2011-03-17 - 2017-07-31
BS_TS_MO_Pomorie	2011-03-09 - 2017-04-26
BS_TS_MO_VarnaBuoySURF	2016-03-09 - 2018-01-31
BS_TS_MO_BurgasBuoySURF	2016-02-15 - 2017-01-18
BS_TS_MO_BurgasSouth	2015-05-18 - 2016-08-30
BS_TS_MO_EUXRo01	2014-01-01 - 2019-03-31
BS_TS_MO_EUXRo02	2014-01-01 - 2019-03-31
BS_TS_MO_EUXRo03	2014-01-01 - 2019-03-31

Spatial coverage:

8 Moored buoys Black Sea basin (Figure 17)

Mooring name	Longitude	Latitude
BS_TS_MO_Balchik	28.165	43.404
BS_TS_MO_Pomorie	27.639	42.551
BS_TS_MO_VarnaBuoySURF	27.998	43.185
BS_TS_MO_BurgasBuoySURF	27.6	42.507
BS_TS_MO_BurgasSouth	27.535	42.454
BS_TS_MO_EUXRo01	30.779	44.7
BS_TS_MO_EUXRo02	30.417	44.318
BS_TS_MO_EUXRo03	29.936	43.98

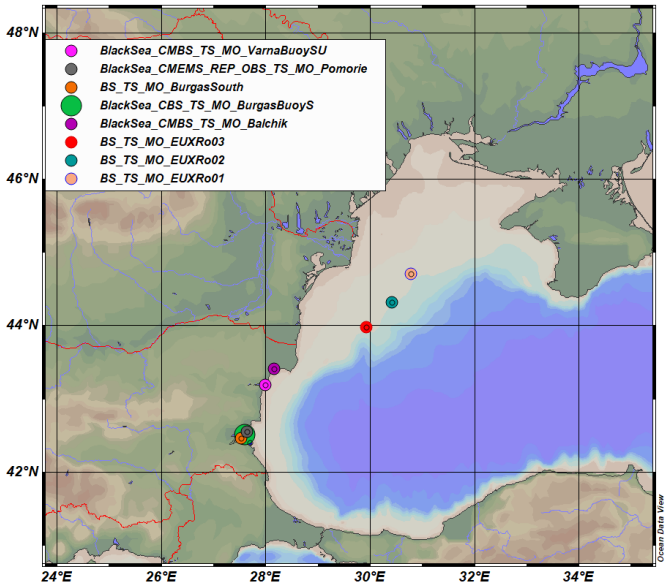

Figure 17. Locations of CMEMS Black Sea Moored buoys

Additional information:

CMEMS-INS-PUM-013.pdf

- Product User Manual For In Situ Products

CMEMS-INS-QUID-013-042.pdf

- Quality information document For Black Sea REPROCESSED IN SITU Temperature and Salinity Product

4.5 Sea Water Salinity and Temperature data from Monitoring oceanographic cruises

Dataset name:

Romanian_BS_Shelf_TS_2017-2018.txt

Restriction:

Restricted (dataset download upon request)

Provider / Data Source:

National Institute for Marine research and Development "Grigore Antipa"

EO4SIBS DATA ACCESS Dataset path:

WP5-Salinity/Cruises Datasets/

Dataset description:

Sea water Salinity and Temperature (2017-2018) – data obtained in the framework of: "The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements" and funded by Romanian Ministry of Environment, Water and Forests. NIMRD standard data quality control procedures are applied to data.

Dataset format:

ODV tabular text. The file can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Sea Temperature [degrees_Celsius]
Salinity [PSU]

Temporal coverage:

2017-2018

Spatial coverage:

57 stations on Romanian Black Sea shelf (Figure 18)

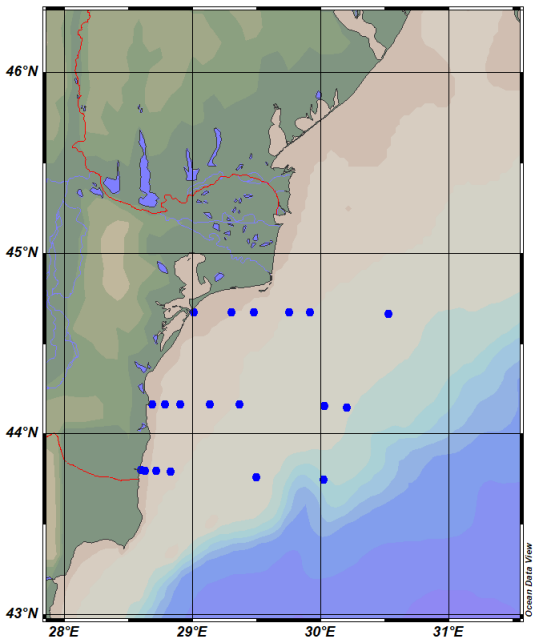

Figure 18. Spatial coverage for Romanian_BS_Shelf_TS_2017-2018 dataset

Citations

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD). Data obtained in the framework of "*The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements*" and funded by Romanian Ministry of Environment, Water and Forests.

Dataset name:

Romanian_BS_Shelf_TS_August2019.txt

Restriction:

Restricted (dataset download upon request)

Provider / Data Source:

National Institute for Marine research and Development "Grigore Antipa"

EO4SIBS DATA ACCESS Dataset path:

WP5-Salinity/Cruises Datasets/

Dataset description:

Sea water Salinity and Temperature (August 2019) – data obtained in the framework of: "The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements" and funded by Romanian Ministry of Environment, Water and Forests. NIMRD standard data quality control procedures are applied to data.

Dataset format:

ODV tabular text. The file can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Sea Temperature [degrees_Celsius]
Salinity [PSU]

Temporal coverage:

2017-2018

Spatial coverage:

38 stations on Romanian Black Sea shelf (Figure 19)

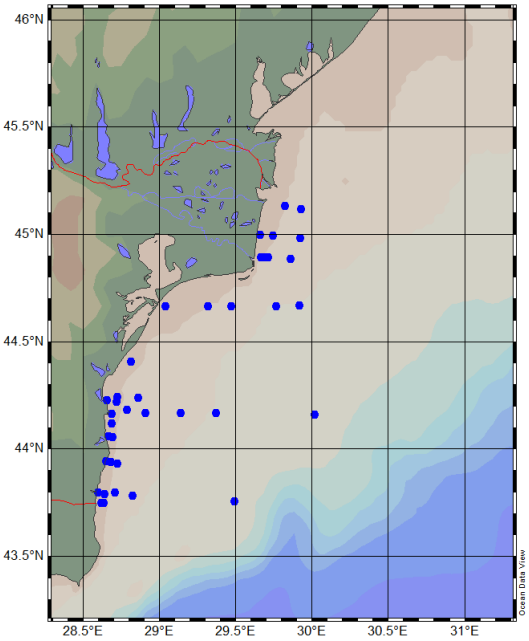

Figure 19. Spatial coverage for Romanian_BS_Shelf_TS_August2019 dataset

Citations

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD). Data obtained in the framework of "*The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements*" and funded by Romanian Ministry of Environment, Water and Forests.

5. In situ data sets in support of Science cases and added-value products

Table 7. Inventories of in-situ data sets available for Science cases and added-value products

Identified Provider / Data Source	**Identified Targeted Data (parameters)**
1. EMODnet Chemistry aggregated dataset	Oxygen Nutrients
2. WOD2018 Black Sea BGC-ARGO dataset	Oxygen
3. Word Ocean Data (WOD2018) dataset	Oxygen
4. Drifters dataset Mediterranean Surface Velocity Programme: Surface currents and temperature data in the Black and Marmara seas	In-situ velocities from surface drifters
5. ADCP dataset NIMRD Cruise August 2019: currents measured on Romanian Black Sea shelf	In-situ velocities

6. Data from Romanian Monitoring oceanographic cruises (Data provided by NIMRD to cover gaps in terms of temporal coverage)	Oxygen Nutrients

5.1 EMODnet Chemsitry aggregated dataset

Dataset name:

O2_EMODnet_Chemistry_dataset.txt

Restriction:

Unrestricted

Provider / Data Source:

EMODnet Chemistry Black Sea - Eutrophication and Ocean Acidification aggregated datasets 1935/2016 v2018.
https://www.emodnet-chemistry.eu/products/catalogue#/metadata/19839515-f32d-4a6c-8f3f-dcc7e75671ae
https://www.emodnet-chemistry.eu/products/doi;jsessionid=B962C6A89FDF3B98174A0D829962AA84?0&doi=10.6092/80466a9d-1b90-4ca8-a95f-ac78723ce10a

EO4SIBS DATA ACCESS Dataset path:

WP6-SeaState/ In_situ_Historical_Datasets/O2/EMODNET_Chemistry_O2

Dataset description:

Dissolved Oxygen – data from *EMODnet Chemistry Black Sea - Eutrophication and Ocean Acidification aggregated datasets 1935/2016 v2018* (https://doi.org/10.6092/80466A9D-1B90-4CA8-A95F-AC78723CE10A) ; data only with quality flag "good".
Full description at:
https://www.emodnet-chemistry.eu/products/catalogue#/metadata/19839515-f32d-4a6c-8f3f-dcc7e75671ae
Data aggregated and quality controlled following EMODnet Chemistry common methodology for all European Seas (https://doi.org/10.6092/9f75ad8a-ca32-4a72-bf69-167119b2cc12)

Dataset format:

ODV spreadsheet composed of metadata header followed by tab separated values. The spreadsheet can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Water body dissolved oxygen concentration [µmol/l]

Temporal coverage:

1960-2016

Spatial coverage:

31694 station on the Black Sea, Sea of Marmara and Sea of Azov (Figure 20)

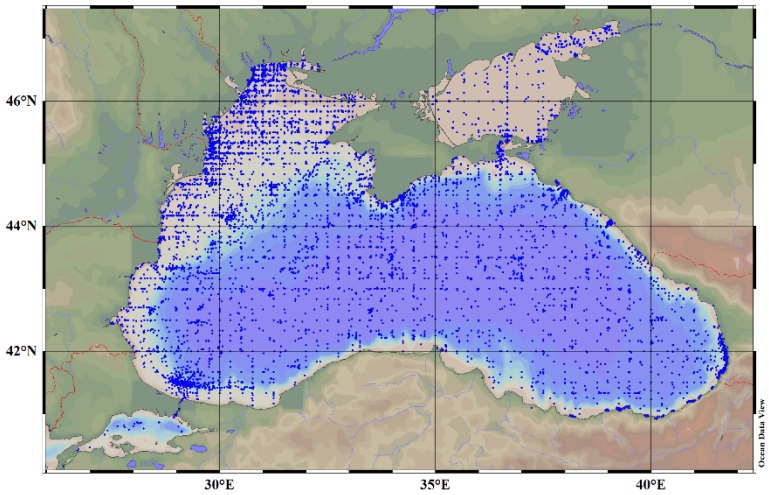

Figure 20. Spatial coverage for O2_EMODnet_Chemistry_dataset

Citations

National Institute for Marine Research and Development "Grigore Antipa" (2018). Black Sea - Eutrophication and Ocean Acidification aggregated datasets 1935/2016 v2018. Aggregated datasets were generated in the framework of EMODnet Chemistry III, under the support of DG MARE Call for Tender EASME/EMFF/2016/006 - lot4.
https://doi.org/10.6092/80466A9D-1B90-4CA8-A95F-AC78723CE10A

Dataset name:

NIMRD_O2_EMODnet_Chemistry_dataset.txt

Restriction:

Restricted (dataset download upon request)

Provider / Data Source:

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD).

EO4SIBS DATA ACCESS Dataset path:

WP6-SeaState/ In_situ_Historical_Datasets/ O2/EMODNET_Chemistry_O2 /

Dataset description:

Dissolved Oxygen – NIMRD data aggregated and quality controlled following EMODnet Chemistry common methodology for all European Seas (https://doi.org/10.6092/9f75ad8a-ca32-4a72-bf69-167119b2cc12)

Dataset format:

ODV spreadsheet composed of metadata header followed by tab separated values. The spreadsheet can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Water body dissolved oxygen concentration [µmol/l]

Temporal coverage:

2010-2016

Spatial coverage:

1160 stations on Romanian Shelf (Figure 21)

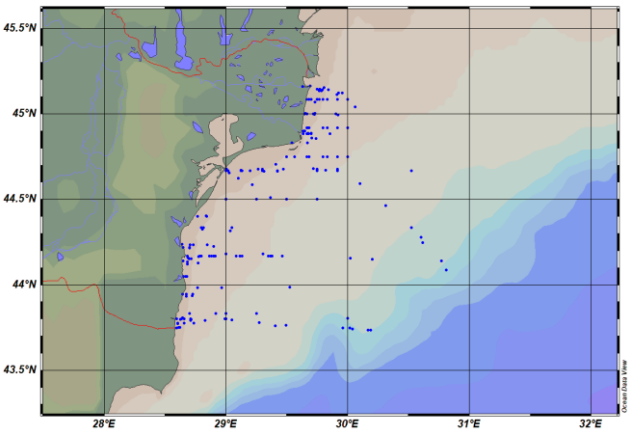

Figure 21. Spatial coverage for NIMRD_O2_EMODnet_Chemistry dataset

Additional information:

SDN_Quality_Control_Flags.xlsx

- SeaDataNet measurand qualifier flags applied to data (http://seadatanet.maris2.nl/v_bodc_vocab_v2/search.asp?lib=L20)

Citations

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD). Data obtained in the framework of "The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements" and funded by Romanian Ministry of Environment, Water and Forests

Dataset name:

Nutrients_EMODnet_Chemistry_dataset.txt

Restriction:

Unrestricted

Provider / Data Source:

EMODnet Chemistry (https://www.emodnet-chemistry.eu/data)

EO4SIBS DATA ACCESS Dataset path:

WP6-SeaState/ In_situ_Historical_Datasets/NUTRIENTS/ EMODNET_Chemistry_Nutrients

Dataset description:

Nutrients – data from *EMODnet Chemistry*

Data aggregated and quality controlled following EMODnet Chemistry common methodology for all European Seas (https://doi.org/10.6092/9f75ad8a-ca32-4a72-bf69-167119b2cc12)

Dataset format:

ODV spreadsheet composed of metadata header followed by tab separated values. The spreadsheet can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Water body Phosphate [µmol/l]

Water body total phosphorus [µmol/l]

Water body nitrate [µmol/l]

Water body nitrite [µmol/l]
Water body total nitrogen [µmol/l]
Water body ammonium [µmol/l]
Water body silicate [µmol/l]

Temporal coverage:

1980-2017

Spatial coverage:

20745 station on the Black Sea and Sea of Azov (Figure 22)

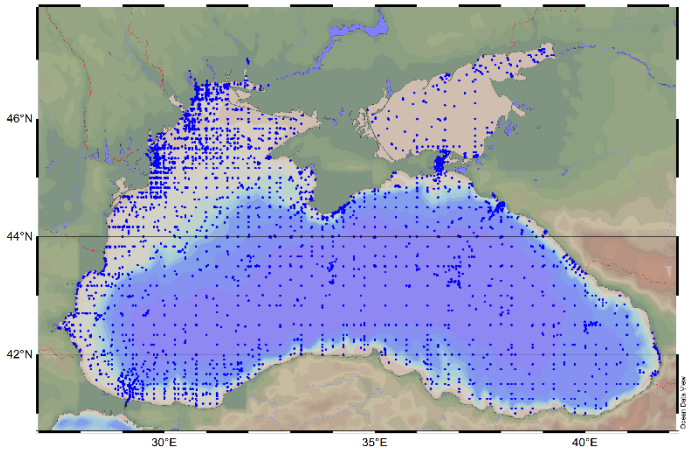

Figure 22. Spatial coverage for Nutrients_EMODnet_Chemistry_dataset

Citations

Data and metadata are provided by EMODnet Chemistry under the support of DG MARE Call for Tenders MARE/2008/03-lot3, MARE/2012/10-lot4,EASME/EMFF/2016/006-lot4, EASME/2019/OP/0003-lot4.

Dataset name:

NIMRD_Nutrients_EMODnet_Chemistry_dataset.txt

Restriction:

Restricted (dataset download upon request)

Provider / Data Source:

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD).

EO4SIBS DATA ACCESS Dataset path:

WP6-SeaState/ In_situ_Historical_Datasets/ NUTRIENTS/ EMODNET_Chemistry_Nutrients

Dataset description:

Nutrients – NIMRD data aggregated and quality controlled following EMODnet Chemistry common methodology for all European Seas (https://doi.org/10.6092/9f75ad8a-ca32-4a72-bf69-167119b2cc12)

Dataset format:

ODV spreadsheet composed of metadata header followed by tab separated values. The spreadsheet can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Water body Phosphate [µmol/l]
Water body total phosphorus [µmol/l]
Water body nitrate [µmol/l]
Water body nitrite [µmol/l]
Water body ammonium [µmol/l]
Water body silicate [µmol/l]

Temporal coverage:

2010-2016

Spatial coverage:

1161 stations on Romanian Shelf (Figure 23)

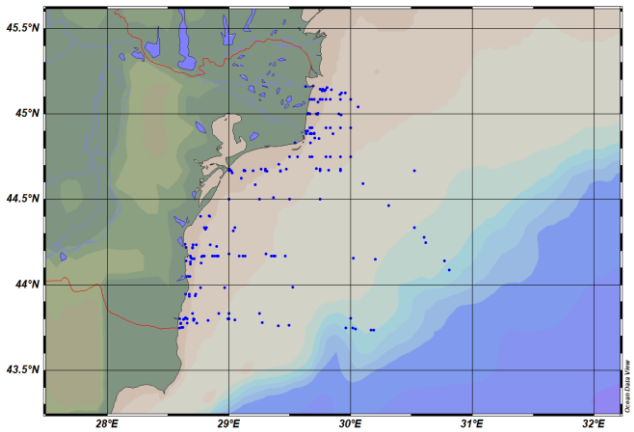

Figure 23. Spatial coverage for NIMRD_Nutrients_EMODnet_Chemistry dataset

Additional information:

SDN_Quality_Control_Flags.xlsx

- SeaDataNet measurand qualifier flags applied to data (http://seadatanet.maris2.nl/v_bodc_vocab_v2/search.asp?lib=L20)

Citations

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD). Data obtained in the framework of "The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements" and funded by Romanian Ministry of Environment, Water and Forests

5.2 WOD2018 Black Sea BGC-ARGO dataset

Dataset name:

BS_WOD_BGC-ARGO_Aggregated_O2.txt

Restriction:

Unrestricted

Provider / Data Source:

World Ocean Database WOD2018 (https://www.nodc.noaa.gov/OC5/WOD/pr_wod.html)

EO4SIBS DATA ACCESS Dataset path:

WP6-SeaState/ In_situ_Historical_Datasets/ O2/ BGC-ARGO(WOD)

Dataset description:

Black Sea BGC-ARGO Oxygen data extracted from WOD2018. The dataset contains Oxygen data in original WOD units WOD (µmol/kg) as well as aggregated unit data (µmol/l). Units aggregation was done with ODV software. Oxygen data in original units WOD (µmol/kg) have WOD Quality Flags; aggregated Oxygen data have corresponding ODV Quality Flags (see Oceanographic_quality_flag_schemes_and_mappings_between_them.pdf). Data are quality controlled following WOD Quality Control procedures (see WOD2018-User_Manual.pdf, chapter III. Quality Control Procedures).
(https://data.nodc.noaa.gov/woa/WOD/DOC/wodreadme.pdf)

Dataset format:

ODV spreadsheet composed of metadata header followed by tab separated values. The spreadsheet can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Oxygen [µmol/kg]
Aggregated Oxygen [µmol/l]

Temporal coverage:

2010-2019

Spatial coverage:

13 ARGO Floats (2211 vertical profiles) station on the Black Sea (Figure 24)

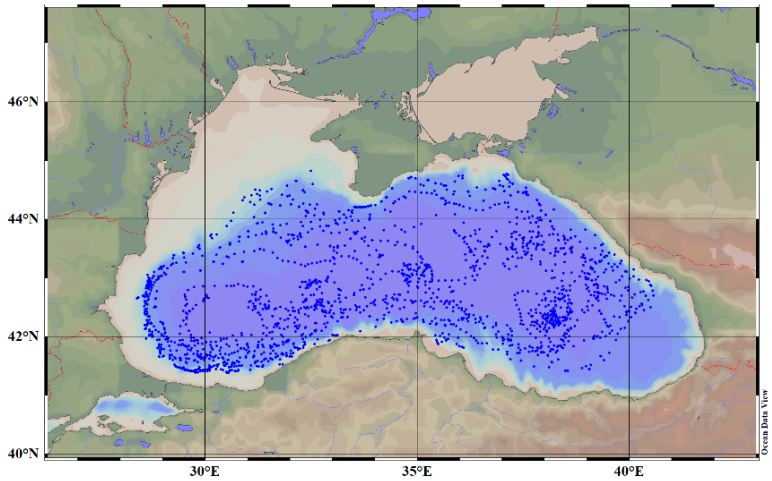

Figure 24. Spatial coverage for BS_WOD_BGC-ARGO_Aggregated_O2 dataset

Additional information:

Oceanographic_quality_flag_schemes.pdf

- Quality flag code definitions of 16 widely used oceanographic flagging schemes (in black) as well as the mappings between them (in gray), as implemented in the Ocean Data View software.
  (https://odv.awi.de/fileadmin/user_upload/odv/misc/ODV4_QualityFlagSets.pdf)

WOD2018-Users_Manual.pdf

- Full documentation for accessing, reading, and using WOD data

Citations

Boyer, T. P., O. K. Baranova, C. Coleman, H. E. Garcia, A. Grodsky, R. A. Locarnini, A. V. Mishonov, C. R. Paver, J. R. Reagan, D. Seidov, I. V. Smolyar, K. Weathers, M. M. Zweng,(2019): World Ocean Database 2018. A. V. Mishonov, Technical Editor, NOAA Atlas NESDIS 87.

5.3 Word Ocean Data (WOD2018) dataset

Dataset name:

BS_WOD_Aggregated_O2.txt

Restriction:

Unrestricted

Provider / Data Source:

World Ocean Database WOD2018 (https://www.nodc.noaa.gov/OC5/WOD/pr_wod.html)

EO4SIBS DATA ACCESS Dataset path:

WP6-SeaState/ In_situ_Historical_Datasets/ O2/ WOD

Dataset description:

Black Sea Oxygen data extracted from WOD2018. The ARGO Oxygen data are not included this dataset. The dataset contains Oxygen data in original WOD units WOD (µmol/kg) as well as aggregated unit data (µmol/l). Units aggregation was done with ODV software. Oxygen data in original units WOD (µmol/kg) have WOD Quality Flags; aggregated Oxygen data have corresponding ODV Quality Flags (see Oceanographic_quality_flag_schemes_and_mappings_between_them.pdf). Data are quality controlled following WOD Quality Control procedures (see WOD2018-User_Manual.pdf, chapter III. Quality Control Procedures).
(https://data.nodc.noaa.gov/woa/WOD/DOC/wodreadme.pdf)

Dataset format:

ODV spreadsheet composed of metadata header followed by tab separated values. The spreadsheet can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Oxygen [µmol/kg]
Aggregated Oxygen [µmol/l]

Temporal coverage:

1920-2006

Spatial coverage:

29547 vertical profiles station on the Black Sea (Figure 25)

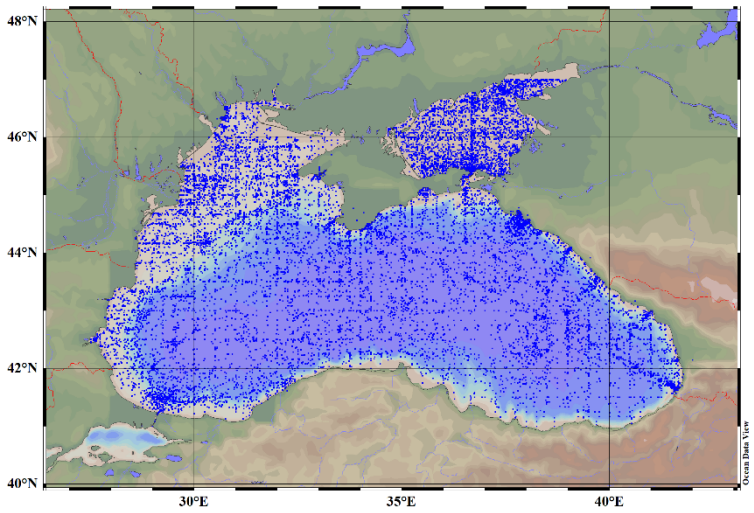

Figure 25. Spatial coverage for BS_WOD_Aggregated_O2 dataset

Additional information:

Oceanographic_quality_flag_schemes.pdf

- Quality flag code definitions of 16 widely used oceanographic flagging schemes (in black) as well as the mappings between them (in gray), as implemented in the Ocean Data View software.
  (https://odv.awi.de/fileadmin/user_upload/odv/misc/ODV4_QualityFlagSets.pdf)

WOD2018-Users_Manual.pdf

- Full documentation for accessing, reading, and using WOD data

Citations

Boyer, T. P., O. K. Baranova, C. Coleman, H. E. Garcia, A. Grodsky, R. A. Locarnini, A. V. Mishonov, C. R. Paver, J. R. Reagan, D. Seidov, I. V. Smolyar, K. Weathers, M. M. Zweng,(2019): World Ocean Database 2018. A. V. Mishonov, Technical Editor, NOAA Atlas NESDIS 87.

5.4 Drifters dataset

Dataset name:

Drifter_Black_Marmara.zip

Restriction:

Unrestricted

Provider / Data Source:

OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale), Oceanographic Section https://nodc.inogs.it/nodc/metadata/doidetails?doi=10.6092/b40cd642-9555-44fa-8b91-3cd88b6c225b

EO4SIBS DATA ACCESS Dataset path:

WP6-SeaState /In_situ_Historical_Datasets/DRIFTERS_DATA/

Dataset description:

Surface currents and temperature data in the Black and Marmara seas. Satellite-tracked surface drifting buoy (or drifter) observations of currents and sea surface temperature in the Black and Marmara seas during the period 1999-2009. Two kinds of drifter data are available: interpolated at 6h (black_sea_20191111_kri6h_nc) and interpolated at 6h and low-pass filtered with a hamming filter (cut-off period at 36h; black_sea_20191111_kri6hF_nc).

Dataset format:

application/zip
NetCDF-3

Parameters (and units):

variables	comment	units
Volt	Interpolated Voltage	
SST	Interpolated Sea Surface Temperature	
Drogue	0=No 1=Yes 0.5=? NaN=Not applicab	
Time	Interpolated Time	days since 1950-01-01T00:00:00Z
Lon	Interpolated Longitude	
Lat	Interpolated Latitude	
Lon_e	Interpolation Error	
Lat_e	Interpolation Error	
dt	Min time interval interp-meas time	
u	Zonal speed	cm/s
v	Meridional speed	cm/s
u_e	Error of speed component	cm/s
v_e	Error of speed component	cm/s

Temporal coverage:

1999-2009

Spatial coverage:

Black and Marmara Seas

Additional information:

report_Menna et al 2017_Drifter_database.pdf

- technical report about the data processing and managing the flag_lost_drogue parameter

5.5 ADCP data

Dataset name:

Romanian_BS_Shelf_Currents_August2019.zip

Restriction:

Unrestricted

Provider / Data Source:

National Institute for Marine research and Development "Grigore Antipa"

EO4SIBS DATA ACCESS Dataset path:

WP6-SeaState /Cruises Datasets/

Dataset description:

ADCP measurements on Romanian Black Sea Shelf, August 2019.

Dataset format:

application/zip

ODV, tabular text

Parameters (and units):

variables	comment	units
depth	Measurement depth	m
u	Zonal speed	mm/s
v	Meridional speed	mm/s

Temporal coverage:

August 2019

Spatial coverage:

33 stations on Romanian Black Sea shelf (Figure 26)

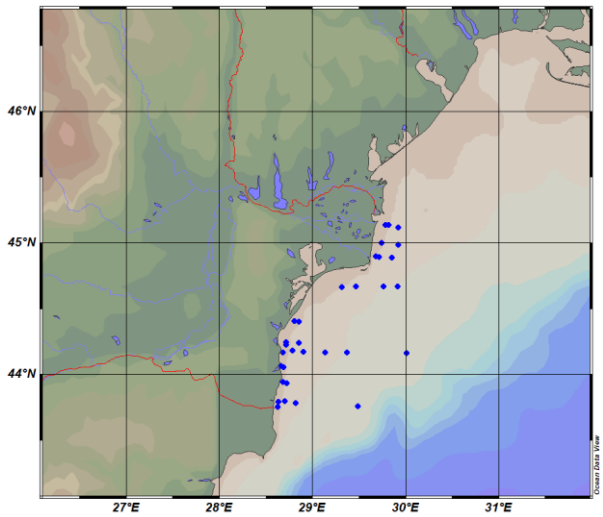

Figure 26. Spatial coverage for Romanian_BS_Shelf_Currents_August2019 dataset

5.6 Data from Romanian Monitoring oceanographic cruises

Dataset name:

Romanian_BS_Shelf_Oxygen_2017-2019.txt

Restriction:

Restricted (dataset download upon request)

Provider / Data Source:

National Institute for Marine research and Development "Grigore Antipa"

EO4SIBS DATA ACCESS Dataset path:

WP6-SeaState /Cruises Datasets/

Dataset description:

Dissolved Oxygen (2017-2019) – data obtained in the framework of: "The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements" and funded by the Romanian Ministry of Environment, Water and Forests. NIMRD standard data quality control procedures are applied to data.

Dataset format:

ODV tabular text. The file can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Oxygen [µmol/l]

Temporal coverage:

2017-2019

Spatial coverage:

99 stations on Romanian Black Sea shelf (Figure 27)

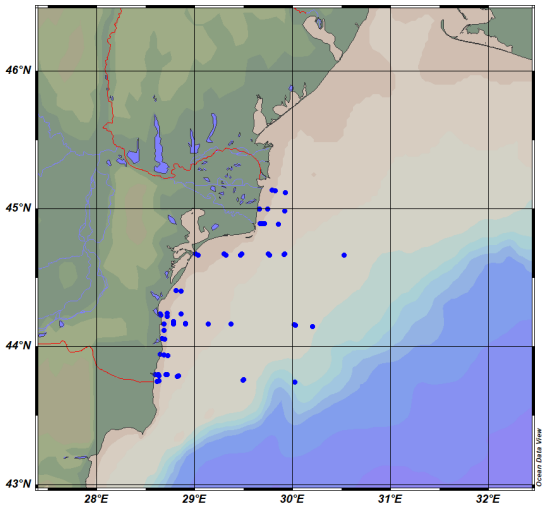

Figure 27. Spatial coverage for Romanian_BS_Shelf_Oxygen_2017-2019 dataset

Citations

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD). Data obtained in the framework of "*The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements*" and funded by Romanian Ministry of Environment, Water and Forests.

Dataset name:

Romanian_BS_Shelf_Nutrients_2017-2019.txt

Restriction:

Restricted (dataset download upon request)

Provider / Data Source:

National Institute for Marine research and Development "Grigore Antipa"

EO4SIBS DATA ACCESS Dataset path:

WP6-SeaState /Cruises Datasets/

Dataset description:

Nutrients (2017-2019) – data obtained in the framework of: "The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements" and funded by the Romanian Ministry of Environment, Water and Forests. NIMRD standard data quality control procedures are applied to data.

Dataset format:

ODV tabular text. The file can be imported to ODV Software for visualization (More information can be found at: https://www.seadatanet.org/Software/ODV).

Parameters (and units):

Phosphates (PO4) [µmol/l]
Nitrates (NO3) [µmol/l]
Nitrites (NO2) [µmol/l]
Ammonium (NH4) [µmol/l]
Silicates (SiO4) [µmol/l]

Temporal coverage:

2017-2019

Spatial coverage:

99 stations on Romanian Black Sea shelf (Figure 28)

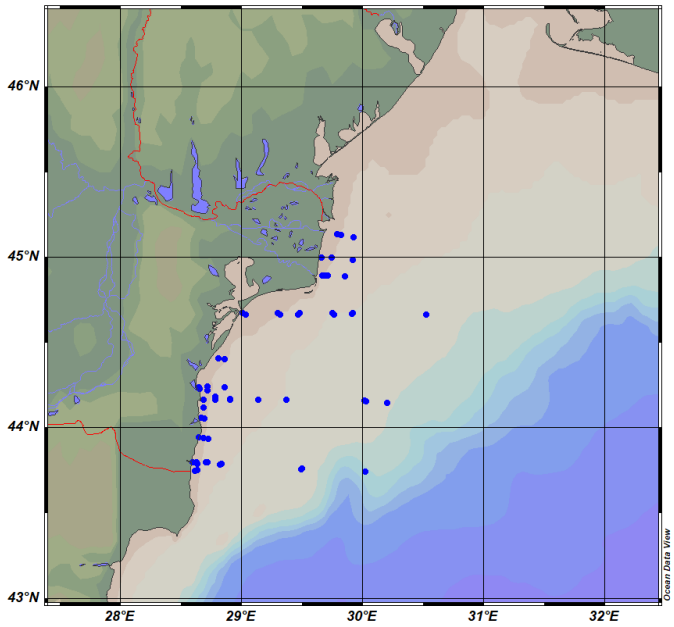

Figure 28. Spatial coverage for Romanian_BS_Shelf_Nutrients_2017-2019 dataset

Citations

National Institute for Marine Research and Development “Grigore Antipa” (NIMRD). Data obtained in the framework of "*The study on the integrated Monitoring Program of the Black Sea marine ecosystem according to the of the MSFD (2008/56 / EC) requirements*" and funded by Romanian Ministry of Environment, Water and Forests.