Purchase Order no. D.B944521 - Tender No. JRC/IPR/2023/NP/0018

Ship Support in the Western Mediterranean Sea to the European Commission´s Joint Research Centre

Cruise Report

Within the framework of the EU Copernicus program, the European Commission´s Joint Research Centre (JRC) is committed to the continuous validation of Sentinel-3 marine data products (e.g., satellite primary data such as the water leaving radiance and derived data products such as the phytoplankton concentration). In view of supporting such an effort, a bio-optical oceanographic campaign was performed in the Western Mediterranean Sea from September 7 till September 17, 2023.

Assistance to the oceanographic campaign was given by the ICM through the JRC Tender no. JRC/IPR/2023/NP/0018.

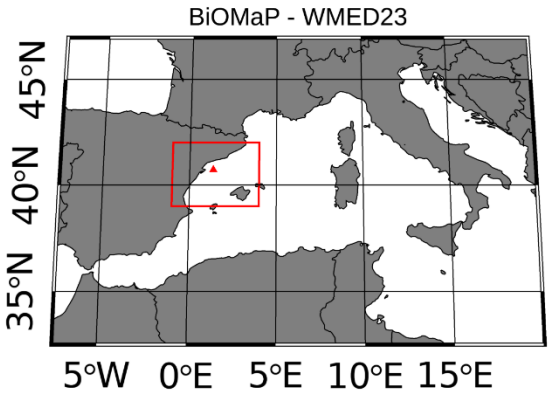
The main objective of the oceanographic activity was the production of in situ bio-optical validation data over a region representative of the Western Mediterranean Sea waters. The campaign has also provided the unique opportunity for an extensive investigation of the biological and optical features of the area around the CASABLANCA Platform, location of a JRC-ICM co-directed AERONET-OC site.

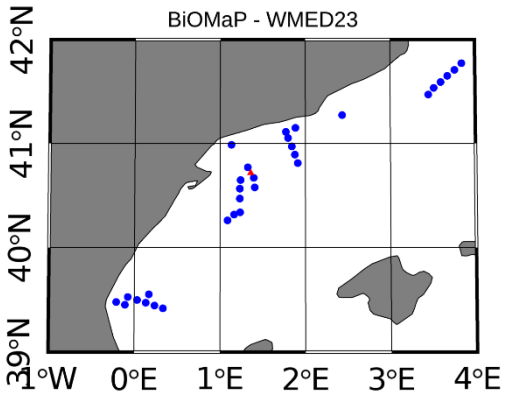
The oceanographic campaign developed into a single leg of 10 days on board the B/O García del Cid, and saw the participation of Spanish, Italian and French scientists.

Measurements at each station included the direct or indirect (through successive laboratory analysis to be performed on field samples) measurement of:

- Profiles of underwater radiometry for the determination of apparent optical properties (specifically measurement of upwelling nadir radiance Lu, downwelling irradiance Ed and upwelling irradiance Eu, in addition to above water total Ed and diffuse sky Ei irradiances, taken with free-fall optical profilers from Satlantic (Halifax, Canada));
- Direct sun irradiance Es, performed with a MICROTOPS sun-photometer from SolarLight (Glenside, USA), for the determination of the atmospheric aerosol optical thickness;
- Profiles of seawater beam attenuation c and absorption a coefficients performed with a WET Labs (Philomath, Oregon) AC-9, and of backscattering bb with an HOBI Labs (Tucson, Arizona) HydroScat-6;
- Ancillary field data (i.e., profiles of seawater temperature Tw(z) and salinity Sw(z), Secchi disk Sd, tide level Tl, atmospheric pressure Pa, relative humidity RH, air temperature Ta, wind speed Ws, wind direction Wd, cloud cover C, and sea state M).
- In-vivo particulate matter absorption coefficient ap separated in its two components aph for the pigmented and adp for the non pigmented matter, obtained from spectrometric analysis of particles retained on filters;
- Colored dissolved organic matter (CDOM) absorption coefficient ays obtained from spectrometric analysis of filtered water;
- Pigments concentration from High Performance Liquid Chromatography (HPLC);
- Total suspended matter concentration TSM through the dry weighting technique.

A summary of the measurement stations performed is shown in the following maps and table. The CASABLANCA Platform is indicated in the maps with a red triangle.





Station Number	Day	Hour (UTC)	Supported Activities
1	08/09/2023	7:18	Radiometry, IOPs, Water sampling
2	08/09/2023	9:05	Radiometry, IOPs, Water sampling
3	08/09/2023	11:00	Radiometry, IOPs, Water sampling
4	08/09/2023	16:30	Radiometry, IOPs, Water sampling
5	09/09/2023	7:31	Radiometry, IOPs, Water sampling
6	09/09/2023	9:19	Radiometry, IOPs, Water sampling
7	09/09/2023	10:52	Radiometry, IOPs, Water sampling
8	09/09/2023	12:30	Radiometry, IOPs, Water sampling
9	09/09/2023	13:40	Radiometry, IOPs, Water sampling
10	09/09/2023	15:18	Radiometry, IOPs, Water sampling
11	13/09/2023	12:48	Radiometry, IOPs, Water sampling
12	13/09/2023	15:36	Radiometry, IOPs, Water sampling
13	14/09/2023	7:26	Radiometry, IOPs, Water sampling
14	14/09/2023	9:09	Radiometry, IOPs, Water sampling
15	14/09/2023	10:38	Radiometry, IOPs, Water sampling
16	14/09/2023	11:58	Radiometry, IOPs, Water sampling
17	14/09/2023	12:30	Radiometry, IOPs, Water sampling
18	14/09/2023	15:03	Radiometry, IOPs, Water sampling
19	15/09/2023	7:34	Radiometry, IOPs, Water sampling
20	15/09/2023	9:10	Radiometry, IOPs, Water sampling
21	15/09/2023	10:33	Radiometry, IOPs, Water sampling
22	15/09/2023	11:46	Radiometry, IOPs, Water sampling
23	15/09/2023	13:05	Radiometry, IOPs, Water sampling
24	15/09/2023	14:29	Radiometry, IOPs, Water sampling
25	16/09/2023	7:43	Radiometry, IOPs, Water sampling
26	16/09/2023	9:13	Radiometry, IOPs, Water sampling
27	16/09/2023	10:50	Radiometry, IOPs, Water sampling
28	16/09/2023	12:13	Radiometry, IOPs, Water sampling
29	16/09/2023	13:44	Radiometry, IOPs, Water sampling

30	16/09/2023	15:12	Radiometry, IOPs, Water sampling
31	17/09/2023	7:34	Radiometry, IOPs, Water sampling

Final Remark

We duly acknowledge UTM personnel for their diligent support to the preparation and execution of the campaign, and specifically the ship's crew for their patience and utmost professionality.

Principal Investigator of the Project

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Chief Scientist of the Campaign

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