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A Mediterranean drifters' dataset

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The CNR realised 138 experiments in the Mediterranean basin with surface Lagrangian drifters in 12 years, not continuously, between July 1998 and April 2022 (month of the last recovery), at coastal and offshore level. Lagrangian drifters produced and sold by 4 different enterprises have been used in the years, with different characteristics in data transmission, structure, repeatability of the experiments, dimensions, batteries, management of the experiments. The four drifters were used in different periods:

- in 1998-1999 the Coastal Lagrangian Drifter (CLD), by Italian company InnoTech S.c.r.l., designed just for coastal use with GPS transmission of its position, by a Trimble Lassen™ SK8, at a frequency of 5 minutes by a GSM mobile phone. The CLD had a housing in PVC with electronic unit, rechargeable battery pack and antennas at its top. Its dimensions were 140 cm high x 27 cm in diameter with a weight of 12.5 Kg. A drogue was used below the CLD;
- in 2009-2010 the ArgoDrifter or CODE drifter by Technocean (FL, USA) consisting in a cylinder of 100 cm height x 10 cm in diameter with four sails placed at 90°, for a total area of about 2 m2. Its not rechargeable batteries permitted transmissions till a year by an ARGOS satellite transmitter, a GPS for its localisation and a temperature sensor. Its position at sea was given by both satellite triangulation and GPS;
- in 2014 the Iridium Ocean Drifters (ODi) by the Spanish Albatros Marine Technology SA were small, low-cost, and compact surface buoys localised by a GPS module based on Iridium satellite data transmission system (Short Burst Data – SBD). Its housing were two identical halves of a spherical drifter, sealed with an O-ring of 20 cm in diameter and 3 Kg of weight. Drogues were used below drifters;
- in 2015-2022 coastal and offshore Nomad drifters by the Spanish SouthTEK Sensing Technologies S.L. were coastal GPRS, namely the Coastal Nomad, and offshore satellite, namely the Offshore Nomad. Both types were made in plastic, yellow colour, 72 cm in height x 22 cm in diameter and 2.895 Kg of weight. The lithium rechargeable batteries allowed operations up to 7 days to the GPRS and several

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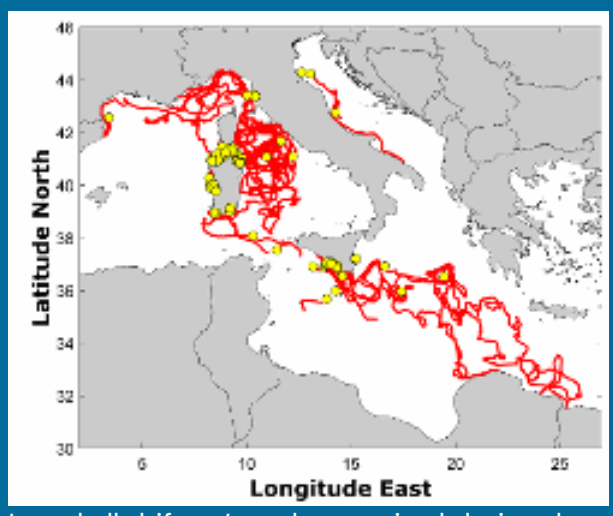
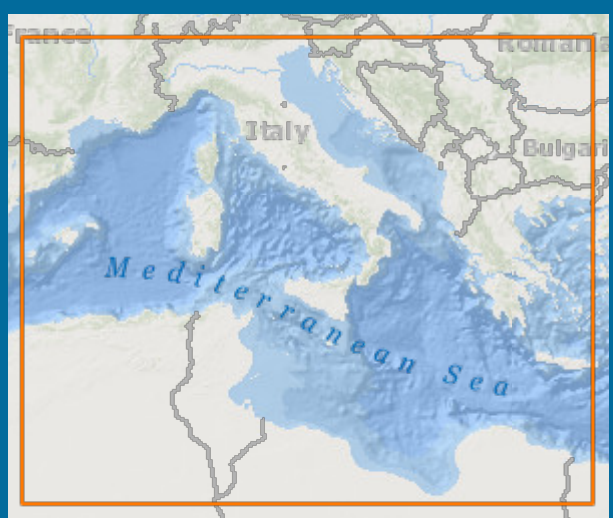


In red all drifters' tracks acquired during the experiments between 1998 and 2022 (yellow dots represent the position of the deployment)



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months to the satellite drifters. In the water, only 16 cm of the cylindrical head were over the sea surface. The Nomad drifters were of different types: LCA (GPRS), LCE (satellite), LCH (hybrid, GPRS and satellite), LCF (satellite with temperature sensor).

Drifter data were pre-processed and repeated positions or wrong date/time, usually a failure of GPS receiver and visible on plotted tracks, were manually deleted. This was followed by an editing procedure implemented at OGS (Gerin and Bussani, 2011; Menna et al., 2017) starting with the retrieve of the deployment information then filled into the OGS PostgreSQL database, enriched with other important metadata as the type and characteristics of the instruments, the owner, the principal investigator. Here location errors were also replaced with NaNs based on the evaluation of different potential origins of error like positions outside the Mediterranean or on land, duplicated data or data acquired outside the date/time of the experiment or wrong velocities.

Further remained erroneous data were then manually removed through a visual check. In some cases, the drifter trajectory was considered as two different deployments and split into more segments due to important temporal gaps or acquisition frequency modifications during the experiment. A new recovery/deployment information were included in the database and the automatic editing procedure is relaunched.

A following step was the interpolation of edited data at uniform intervals using a kriging optimal interpolation method (Hansen and Poulain, 1996): at 1-hour intervals data with a frequency in acquisition between a few minutes and 2 hours; at 3-h intervals with frequency till 6 hours; at 6-h intervals with frequency higher than 6 hours. The velocities were calculated as finite differences of the interpolated position.

At the end, a final dataset of 158 interpolated drifter tracks was generated.

The presented datasets are available in two formats: Copernicus and NASA/NOAA-like (manageable by Panoply, a NASA-developed data viewer). They are both composed of the interpolated data in NetCDF files which include time, latitude, longitude, zonal and meridional speed, and metadata. Ancillary data like temperature, battery level or drogue presence were not considered as not available for all platforms. The dataset includes drifters' data with subsurface drogue (in the first metres) apart from a few experiments when the drogue was at 14 or 20 m depth. These experiments correspond to the files arib_LCE234 and brib_LCE234 (20 m), arib_LCE236 and arib_LCE354 (14 m) of the dataset. The dataset is publicly available also at the SeaDataNet infrastructure at https://cdi.seadatanet.org/search/welcome.php?query=2610&query_code={9F00DF80-1881-42DD-9DF1-B9BD0282F2B0}.

DISCIPLINES	Environment
KEYWORDS	drifter tracks, dynamics, Mediterranean, surface currents
LOCATION	46N, 30S, 26E, 1W
LICENCE	CC BY
UTILISATION	These data are published without any warranty: the user assumes all risk arising from his/her use of these data. These data are intended to be quality controlled, but it is possible that they contain errors. It is the unique responsibility of the user to assess if the data are appropriate for his/her use, and to interpret them accordingly. We welcome users to ask questions and report problems to the contact addresses listed in the data files
ACKNOWLEDGEMENTS	The data in this dataset have been collected in the framework of several national and European projects, i.e the Italian MATTM project SOS-BONIFACIO (prot. DPN-2009-0001027 of 20/01/2009), the Italian MIUR project PON TESSA (agreement PON01_02823), the Italian MIUR flagship project RITMARE (under the NRP 2011-2013, approved by the CIPE Resolution 2/2011 of 23.03.2011), the Italian MATTM project SOS-Piattaforme & Impatti offshore (Reg. Uff. U. 0000939.17-01-2017), 2014 - 2020 INTERREG V-A Italy - France (Maritime) project SICOMAR plus (IAS CNR Prot. 0001156/2018 of 12/12/2018).

Devices

MetaVariable which include several information among all (for both formats):

- Drifter type,
- Drifter characteristics,
- Funding project,
- Owner,
- Principal investigator.

DataVariable (for both formats):

- Time in days from 1 January 1950,
- Longitude [degrees_east],
- Latitude [degrees_north],
- Zonal speed (m/s; scale factor 0.001),
- Meridional speed (m/s; scale factor 0.001).

Data

ALTERNATIVE ACCESS TO DATA SeaDataNet (standardized data)

FILE	SIZE	FORMAT	PROCESSING	ACCESS	
Dataset of 158 files containg the interpolated drifters' tracks with time, latitude, longitude, zonal and meridional speed, and metadata - Copernicus format	705 Ko	NetCDF	Quality controlled data	Open access	Download
Dataset of 158 files containing the interpolated drifters' tracks with time, latitude, longitude, zonal and meridional speed, and metadata – usable with Panoply NetCDF viewer NASA/NOAA - like format	841 Ko	NetCDF	Quality controlled data	Open access	Download

How to cite

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Ribotti Alberto, Bussani Antonio, Menna Milena, Satta Andrea, Sorgente Roberto, Cucco Andrea, Gerin Riccardo (2023). **A Mediterranean drifter dataset.** *Earth System Science Data,* 15 (10). https://doi.org/10.5194/essd-15-4651-2023

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Ribotti Alberto, Bussani Antonio, Menna Milena, Satta Andrea, Sorgente Roberto, Cucco Andrea, Gerin Riccardo (2023). **A Mediterranean drifter dataset.** *Earth System Science Data,* 15 (10). https://doi.org/10.5194/essd-15-4651-2023

Ribotti A., A. Cucco, A. Olita, M. Sinerchia, L. Fazioli, A. Satta, M. Borghini, K. Schroeder,

A. Perilli, B. Sorgente, R. Sorgente (2013). **An integrated operational system for the Coast Guard management of oil spill emergencies in the Strait of Bonifacio.** *In: Sustainable Operational Oceanography, Proceedings of the Sixth International Conference on EuroGOOS, 4–6 October 2011, Sopot, Poland, (eds. H. Dahlin, N.C. Flemming, S.E. Petersson and Polska Akademia Nauk. Instytut Oceanologii Eds.; EuroGOOS AISBL), ISBN 9197482897 - 9789197482899,* 308-320. https://eurogoos.eu/download/proceedings-of-the-6th-international-conference-on-eurogoos-2011/

Cucco A., Sinerchia M., Ribotti A., Olita A., Fazioli L., Perilli A., Sorgente B., Borghini M., Schroeder K., Sorgente R. (2012). **A high-resolution real-time forecasting system for predicting the fate of oil spills in the Strait of Bonifacio (western Mediterranean Sea).** *Marine Pollution Bulletin,* 64 (6), 1186-1200. https://doi.org/10.1016/j.marpolbul.2012.03.019

Ribotti A, M. Borghini, K. Schroeder, A. Satta, B. Sorgente, R. Sorgente, R. Gerin, A. Cucco, A. Olita, L. Fazioli (2011). **Current Measurements in the Bonifacio Mouths and La Maddalena Archipelago: first analyses.** *In: Marine research at CNR, eds. E. Brugnoli, Cavarretta G., Mazzola S., Trincardi F., Ravaioli M., Santoleri R.), Rome, ISSN: 2239-5172,* Volume DTA/06, 2662. https://dta.cnr.it/category/marine-research-at-cnr/