



# Blue-Cloud

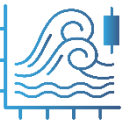
Piloting innovative services for Marine Research & the Blue Economy

## Demonstrator Prototype and Initial Marine Indicators

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# Objective

## Development of the service Marine Environmental Indicators


- To calculate and distribute online information and indicators on the environmental quality of the marine area
- Obtain new added value data applying big data analysis and machine learning methods on the multi-source data sets
- Enable users to perform on line and on the fly operations such as selecting portion of a dataset, to perform statistical analysis or display the data

# Target Audience

## EU Marine Strategy Framework Directive

 *criteria, target and monitoring activity*



 *Conserve and sustainably use the oceans*

 *Goals in 14 targets*



Blue-Cloud

Demonstrator 3 - Version 1

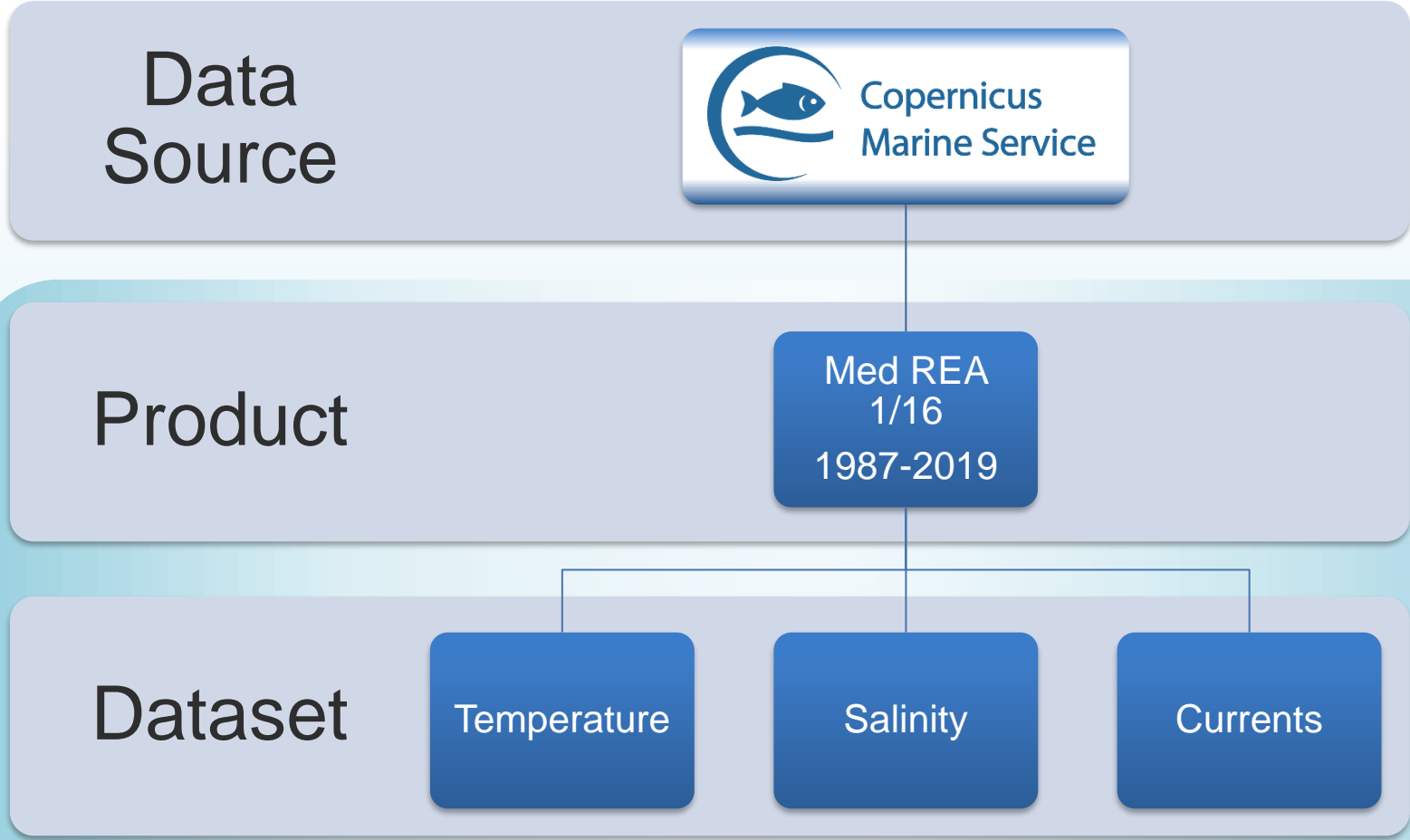
Demonstrator 3 – Version 2

# Marine Environmental Indicators VLab

- design based on requirements indicated by Environmental Agencies
- Bringing innovation, data, resources and expertise, into a unique service
- Prototype Web User Interface allows the user to :
  - select a portion of input data for a specific area and period of time
  - Generate new added value data
  - displaying the generated added value data by tables, map and graphics visualizations

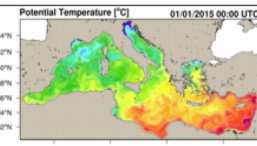


# Data Source

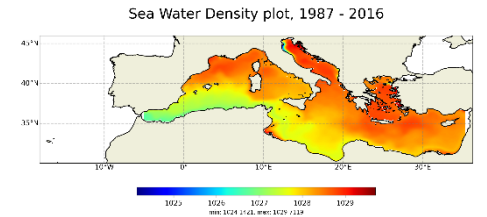
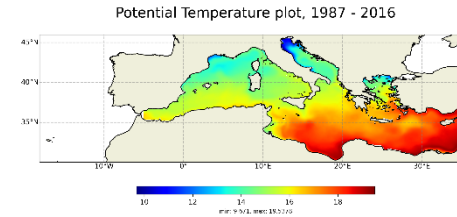
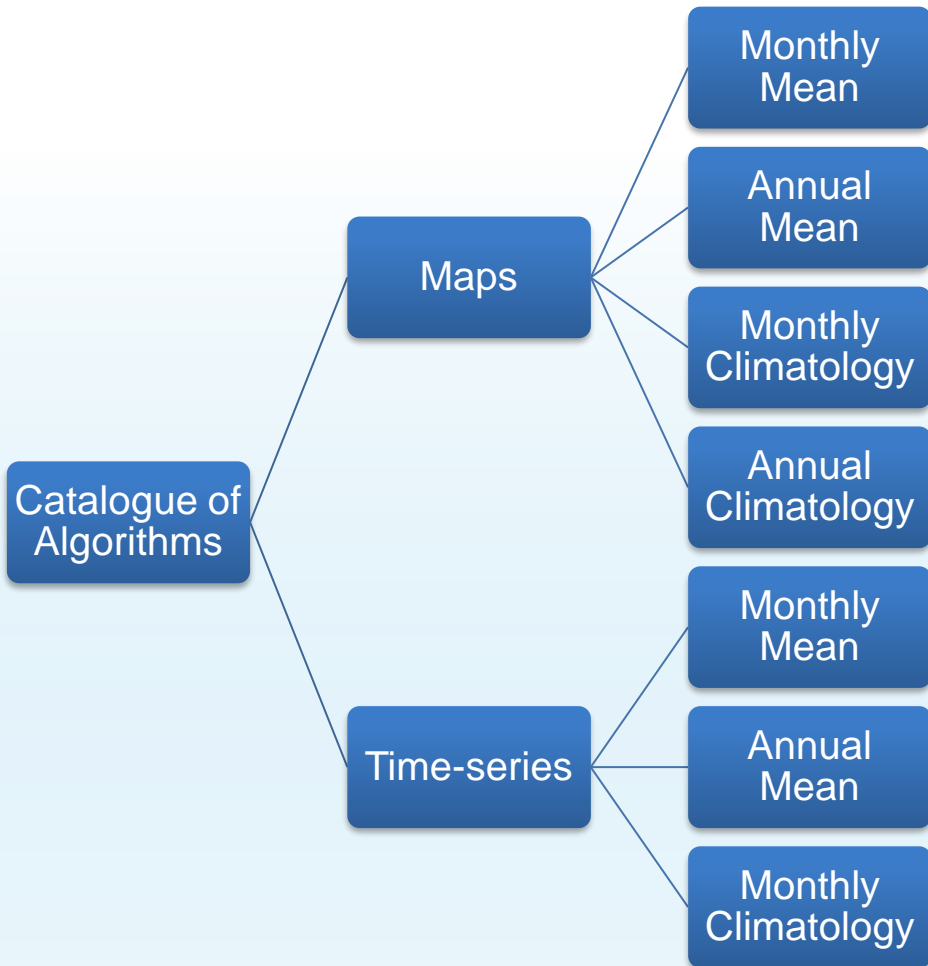


In the available prototype a sample input dataset is available for the period 1987-1989 – same data format of the CMEMS data source

<b>MEDSEA_REANALYSIS_PHYS_006_004</b>	
<b>MEDITERRANEAN SEA PHYSICS REANALYSIS</b>	
MODEL	• • • X
T S SSH 3DUV	①
0.063 degree x 0.063 degree (72 depth levels)	
From 1987-01-01 to 2018-12-31	
daily-mean,monthly-mean	
MORE INFO	ADD TO CART
WMS	Sub-setting

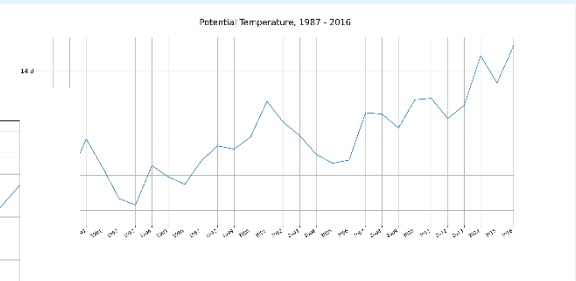
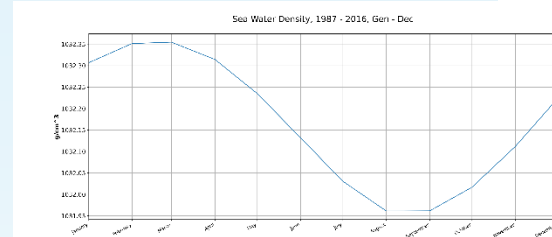


# Generated Added Value Data

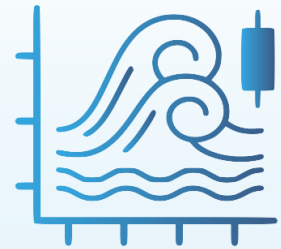


## Output Environmental Fields

-  Temperature
-  Salinity
-  Water Density
-  Kinetic Energy
-  Currents



# Access to the VLab



## Marine Environmental Indicators

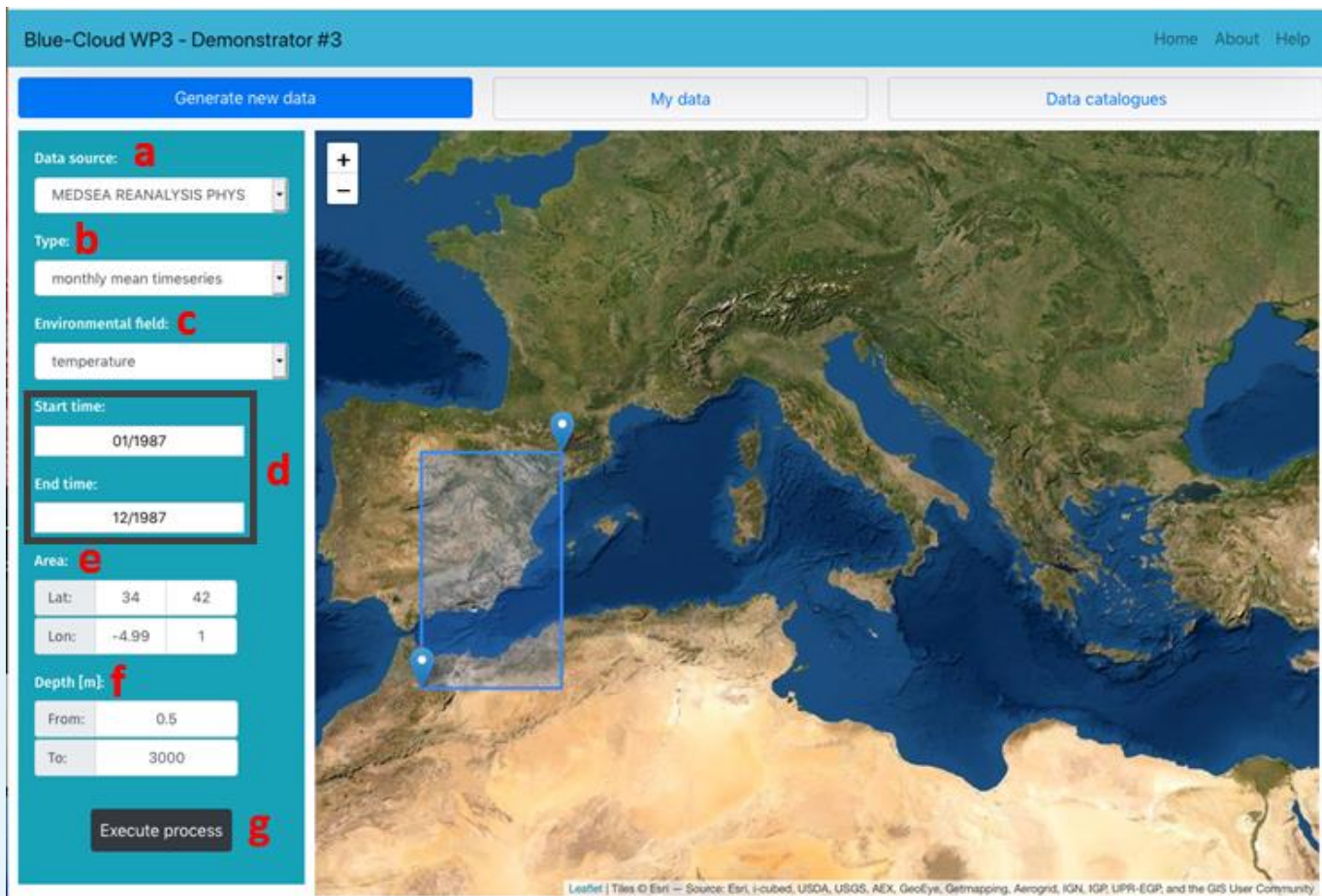
<https://blue-cloud.d4science.org/web/marineenvironmentalindicators/>



# Selection of the Data Source

- Available data source are selectable in [a]

In this version the available data source is the product MEDSEA\_REANALYSIS\_PHYS\_006\_004 from CMESM catalogue. A local copy of a 3-year (1987-1989) sample input dataset is available inside the VRE



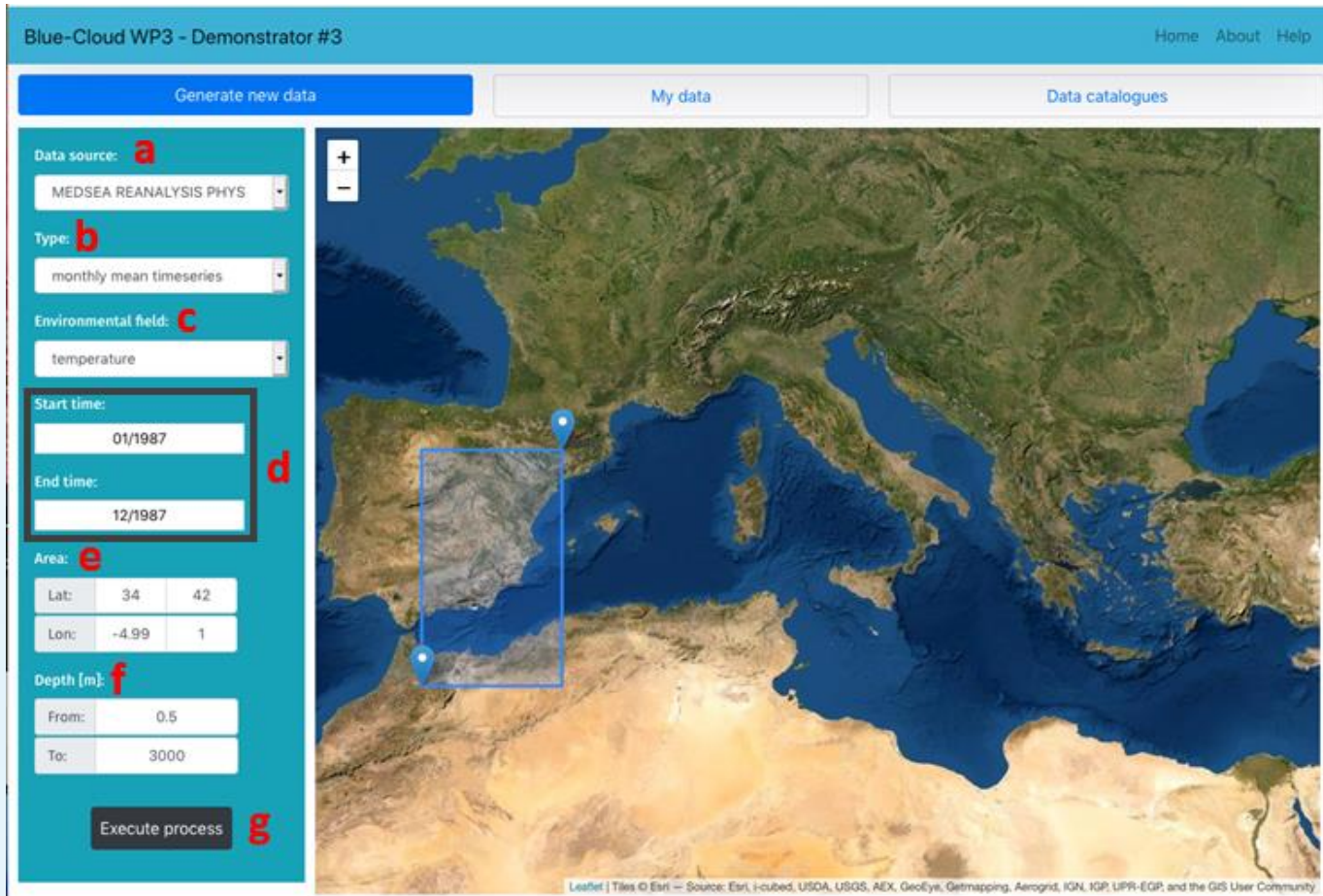
The screenshot displays the Blue-Cloud WP3 - Demonstrator #3 interface. The top navigation bar includes 'Home', 'About', and 'Help'. Below the navigation bar are three tabs: 'Generate new data' (active), 'My data', and 'Data catalogues'. The main interface is divided into a left sidebar and a central map area. The sidebar contains several input fields and buttons, each labeled with a letter in red:

- a**: Data source dropdown menu, currently set to 'MEDSEA REANALYSIS PHYS'.
- b**: Type dropdown menu, currently set to 'monthly mean timeseries'.
- c**: Environmental field dropdown menu, currently set to 'temperature'.
- d**: Start time and End time input fields, both set to '12/1987'.
- e**: Area input fields for Latitude (34, 42) and Longitude (-4.99, 1).
- f**: Depth [m] input fields for From (0.5) and To (3000).
- g**: 'Execute process' button.

The central map area shows a satellite-style view of the Mediterranean Sea region. A blue rectangular box highlights a specific area in the sea, with a blue location pin at its top-right corner. The map includes zoom in (+) and zoom out (-) controls.



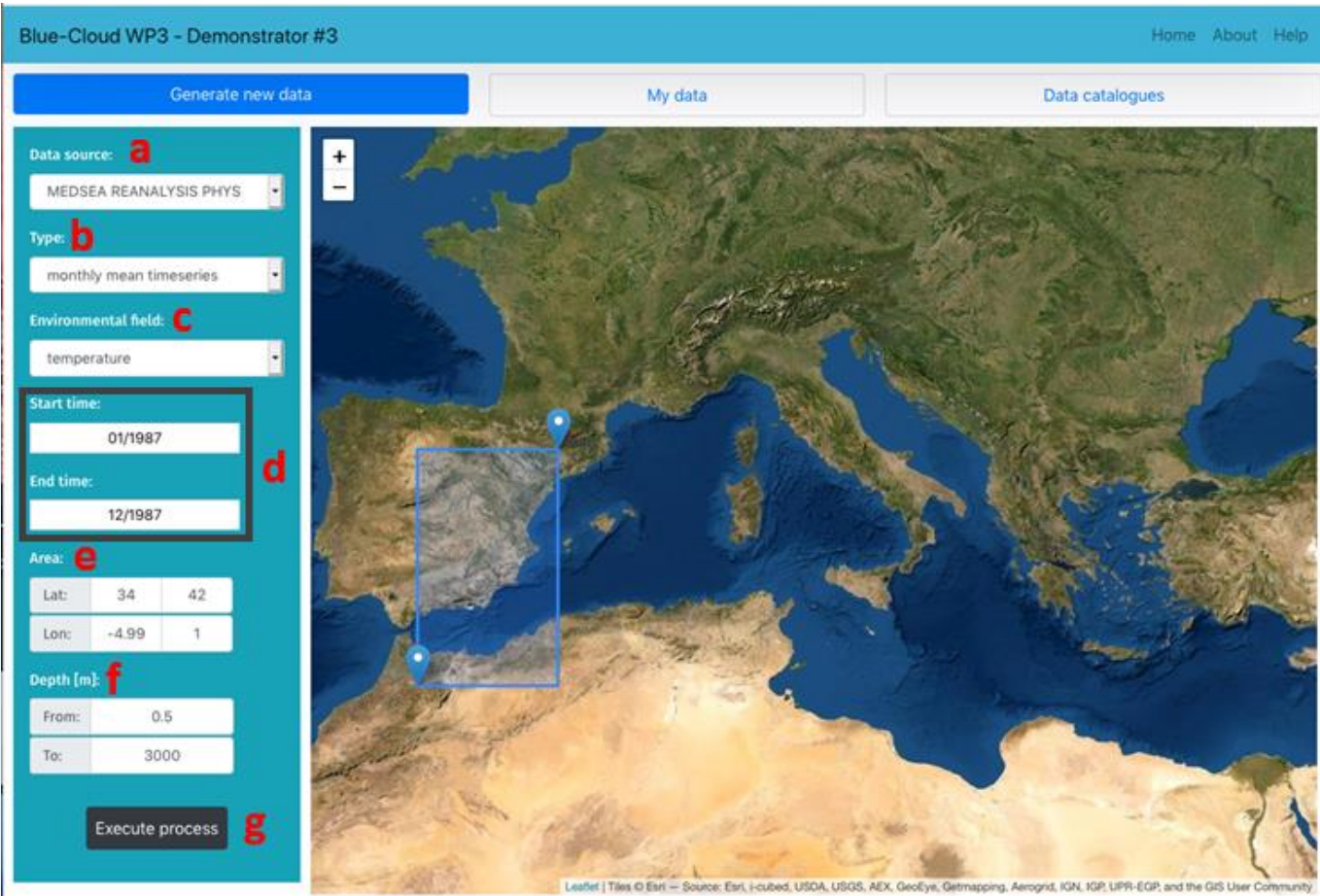
# Selection of the Output Data



Several output types are selectable in [b], while [c] presents the applicable output fields

The user can choose the type among the several possible mean maps, time-series and climatologies, and the field of interest

# Selection of the Time



The screenshot shows the Blue-Cloud WP3 - Demonstrator #3 interface. The top navigation bar includes 'Home', 'About', and 'Help'. Below the navigation bar are three tabs: 'Generate new data' (active), 'My data', and 'Data catalogues'. The main interface is divided into a left sidebar and a central map area. The sidebar contains the following fields:

- Data source:** MEDSEA REANALYSIS PHYS (labeled 'a')
- Type:** monthly mean timeseries (labeled 'b')
- Environmental field:** temperature (labeled 'c')
- Start time:** 01/1987 (labeled 'd')
- End time:** 12/1987 (labeled 'd')
- Area:** Lat: 34, 42; Lon: -4.99, 1 (labeled 'e')
- Depth [m]:** From: 0.5, To: 3000 (labeled 'f')
- Execute process** button (labeled 'g')

The central map area shows a satellite view of the Mediterranean region, with a blue rectangular box highlighting the area of interest. The map includes zoom in (+) and zoom out (-) controls.

Depending on the selected output type, the interface will require the insertion of specific information to define the time of interest in [d]

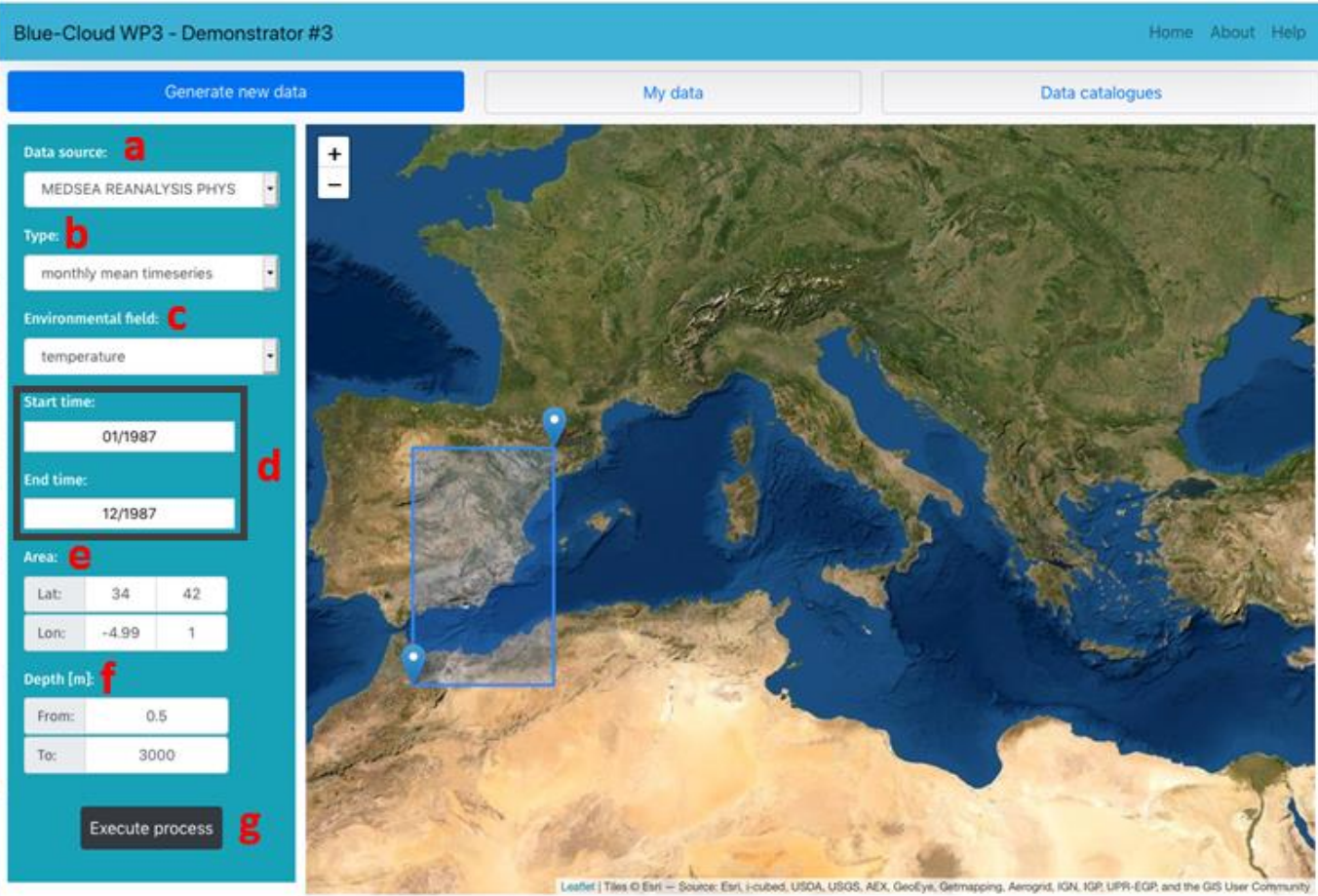
The example in this slide reports the insertion of a starting month/year and a final month/year

# Time Specification

	Month	Year	Time Range	
			MM/YYYY – MM/YYYY	YYYY - YYYY
Monthly Mean Map	January	1987	n.a.	n.a.
Annual Mean Map	n.a.	1989	n.a.	n.a.
Monthly Climatology Map	February	n.a.	n.a.	1987 - 1989
Annual Climatology Map	n.a.	n.a.	n.a.	1987 - 1989
<b>Monthly Mean Time-series</b>	n.a.	n.a.	01/1987 – 12/1988	n.a.
Annual Mean Time-series	n.a.	n.a.	n.a.	1987 - 1989
Monthly Climatology Time-series	n.a.	n.a.	n.a.	1987 - 1989



# Selection of the Geographical Domain



The screenshot shows the Blue-Cloud WP3 - Demonstrator #3 interface. On the left, there are several input fields and a map. The 'Data source' is set to 'MEDSEA REANALYSIS PHYS' (a). The 'Type' is 'monthly mean timeseries' (b). The 'Environmental field' is 'temperature' (c). The 'Start time' is '01/1987' and the 'End time' is '12/1987' (d). The 'Area' is defined by latitude (34 to 42) and longitude (-4.99 to 1) (e). The 'Depth [m]' is set from '0.5' to '3000' (f). An 'Execute process' button (g) is at the bottom left. The map on the right shows the Mediterranean region with a blue box indicating the selected area.

- Always possible to select the lon/lat area [e] and the depth layer [f] of interest
- Submission of the job [g]

# My Data Section



## Presented Information

Blue-Cloud WP3 - Demonstrator #3 Home About Help





Generate new data My data Data catalogues

Creation time <b>a</b>	Status <b>b</b>	Outputs <b>c</b>	Data source <b>d</b>	Type <b>e</b>	Area [lat,lon] <b>f</b>	Depth [m] <b>g</b>	Time range <b>h</b>
2020-10-10T10:30:00	started	No results yet	MEDSEA_REANALYSIS_PHYS_006_004	annual mean timeseries - salinity	[34,-4.99] - [42,1]	[0,5,3000]	1988 - 1989
2020-10-11T12:05:00	completed	<span>Show</span> <b>i</b>	MEDSEA_REANALYSIS_PHYS_006_004	monthly mean timeseries - temperature	[34,-4.99] - [42,1]	[0,5,3000]	1987-01 - 1987-06
2020-10-12T15:20:00	completed	<span>Show</span>	MEDSEA_REANALYSIS_PHYS_006_004	monthly climatologic timeseries - density	[34,-4.99] - [42,1]	[0,5,3000]	1988 - 1989
2020-10-10T10:30:00	error	<span>Log</span>	MEDSEA_REANALYSIS_PHYS_006_004	annual mean timeseries - salinity	[34,-4.99] - [42,1]	[0,5,3000]	1987 - 1989

## Related the Job

-  Creation time
-  Status
-  Output

## Related the Output Data

-  Data Source
-  Type and Env. Field
-  Area and Depth Layer
-  Time Range

Each User has a private MyData Section in which the submitted jobs are available. When a job execution is complete, from here [i] it is possible to access the new available data

# Access to the Data

When the execution is successful completed, it is possible to :

- See a static plot [a] of a map or a time-series
- Download the data as file in NetCDF format [b]
- Download the log information related the execution [c]





# Conclusion

- Data from existing EU data sources are integrated into a unique service
- An online flexible analysis tool is facilitating the users to display and generate new added-value data to assess the environmental quality of marine areas

## Perspective

- New data sources will be made available
- Additional scientific based algorithms will be developed and made available
- Further development of the interface for the user interaction and visualization of data