

Ecological observation systems Structures and perspectives for national and European strategies for biodiversity

CNR ISMAR | Mauro Bastianini

Mediterranean Sea Infrastructures

Oceanographic Tower

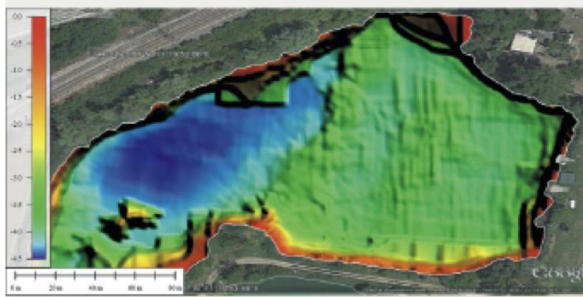
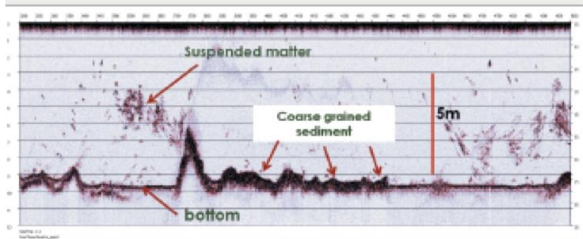


ODAS Oceanographic buoy



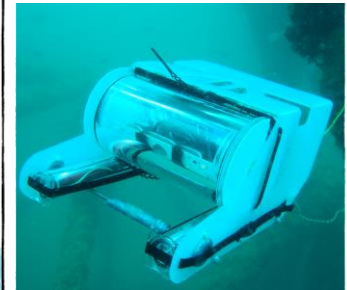
Gaia Blu



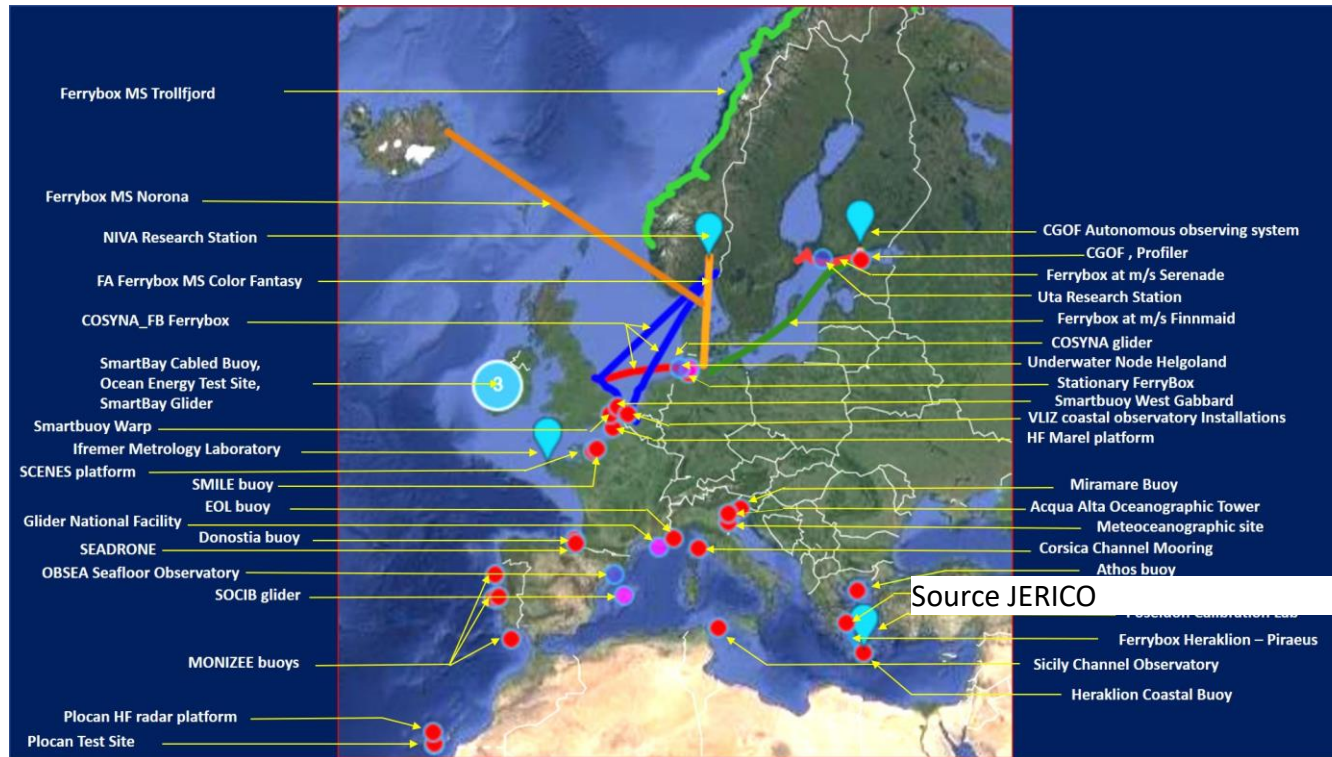


Open ROV

- * based on arduino nano and beaglebone
- * battery operating
- * HD video
- * no need of controller (web based interface)
- * LOW COST!

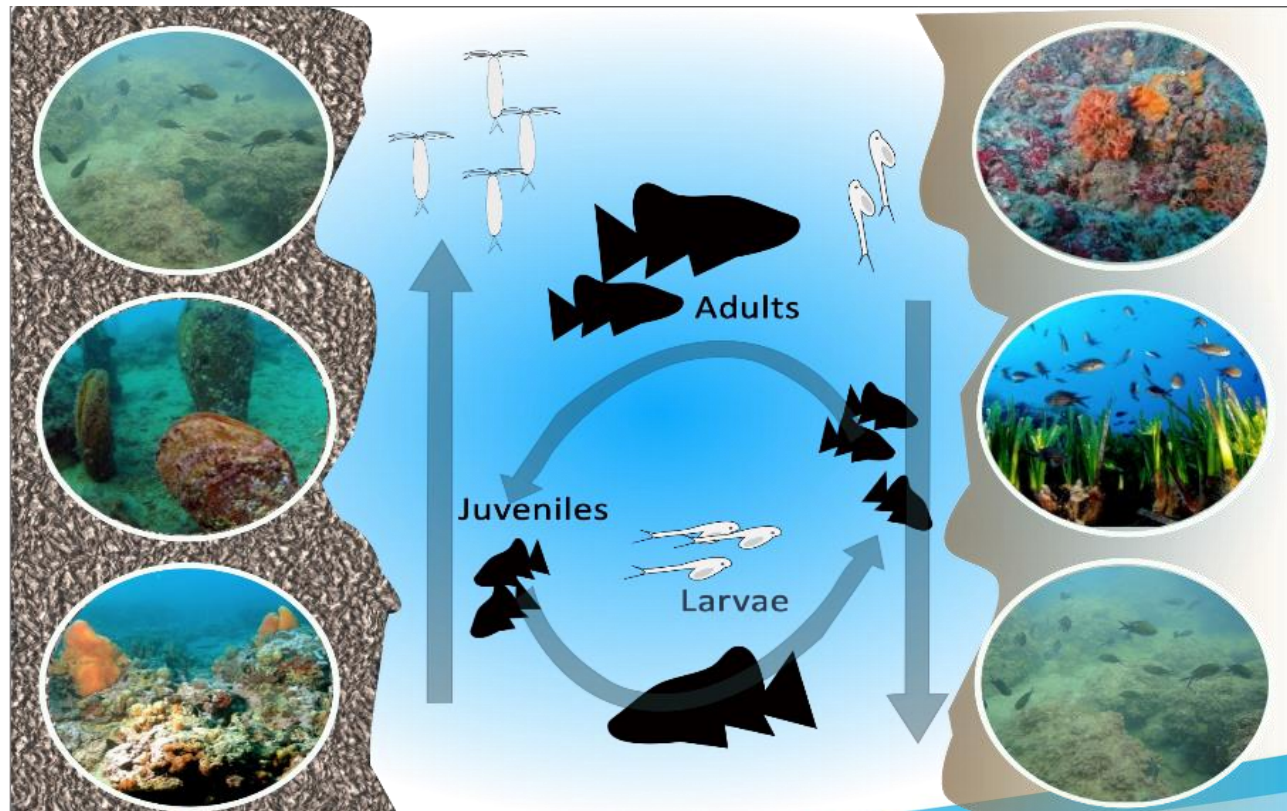


Marie Observation Systems



Sea Ecological Observatories

- They link oceanographic and ecological research making effective conservation and recovery measures for ecosystems



3. ECOADS WEB PORTAL <https://ecoads.eu/>

ECOAdS

ECOLOGICAL OBSERVING SYSTEM IN THE ADRIATIC SEA

ECOAdS RESOURCES

- All ECOAdS sites
- ECOAdS Natura 2000 sites
- ECOAdS LTER sites
- Fixed-point observing systems
- Information Resources

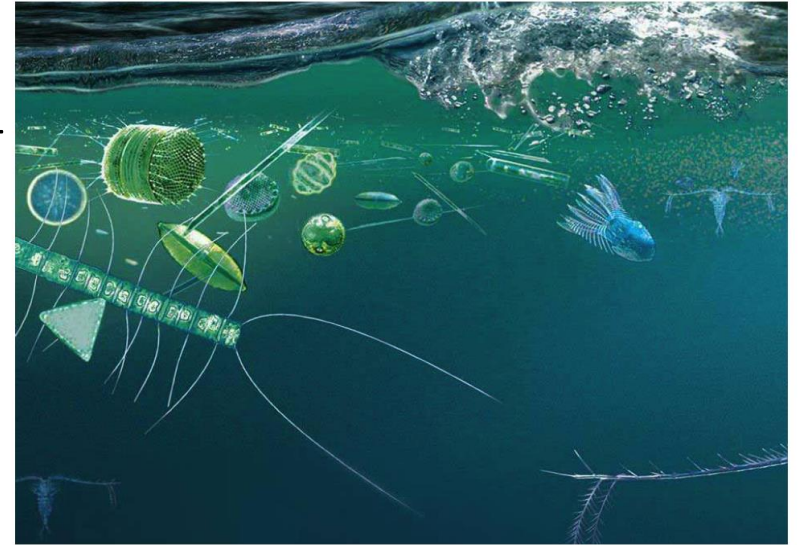
Legend:

- ECOAdS Natura 2000 sites
- ECOAdS LTER sites
- Other LTER Sites
- Fixed-Point Observing Systems

Leaflet | Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under ODbL, EMODnet Bathymetry

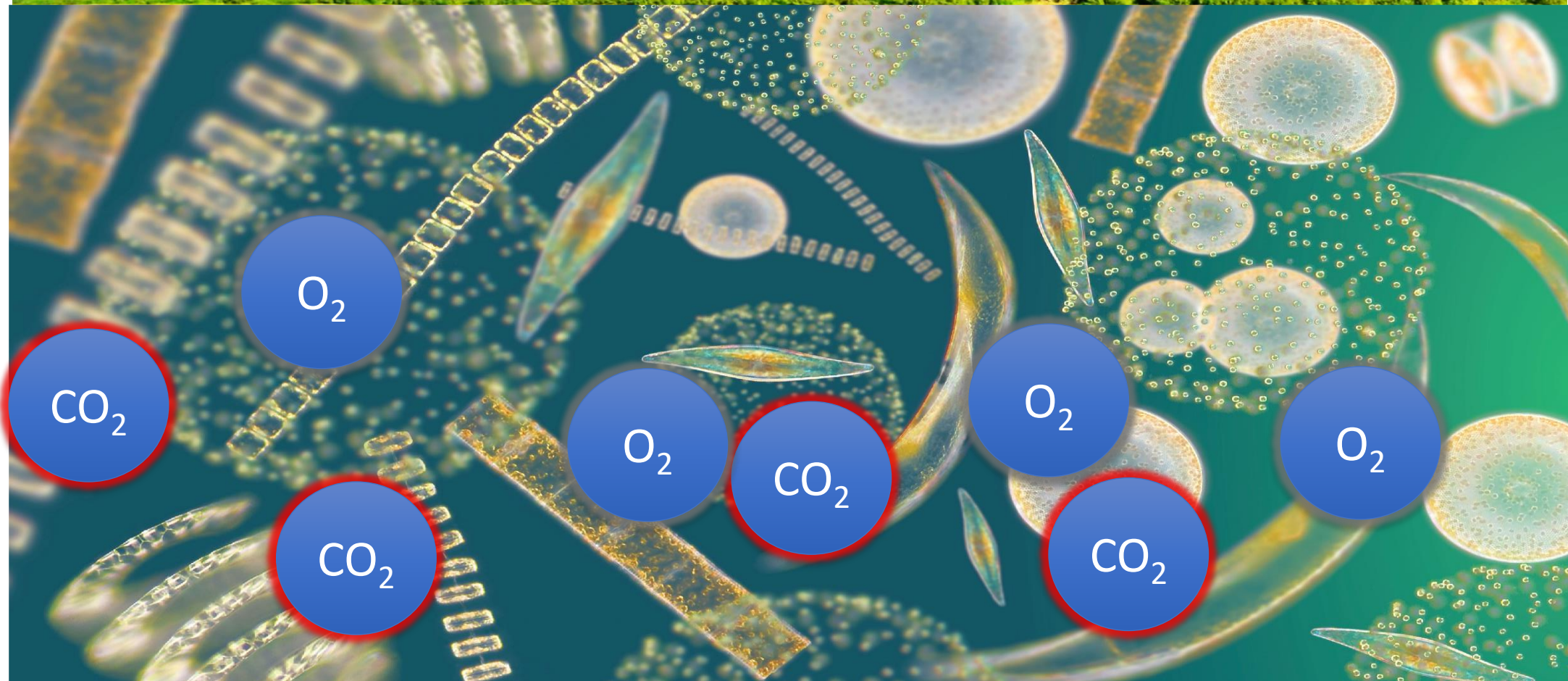
IL PLANCTON

- ✓ Organisms smaller than 1 mm with a large range of dimensional variation: 0.1 mm - 1 mm
- ✓ Prokaryotes and eukaryotes
- ✓ Autotrophs, heterotrophs, mixotrophs,
- ✓ Unicellular and multicellular



- ✓ Regulation of CO₂ exchanges between the atmosphere and the sea (global C cycle)
- ✓ Export of organic carbon to the deeper layers
- ✓ Transfer of organic carbon to renewable marine resources.

Fitoplancton – The invisible forest



Trans-ecodomain analysis of the responses of plankton to environmental and climatic variations

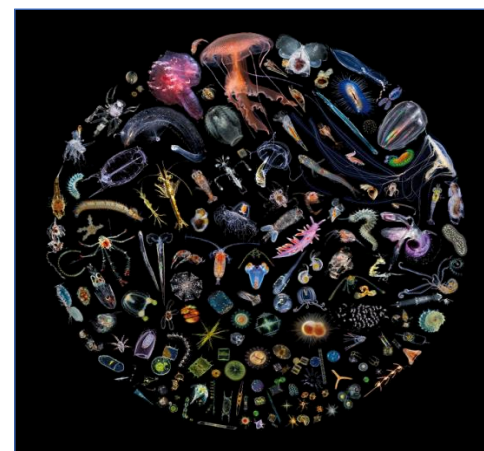


22 aquatic sites:

11 lake

11 transition and marine

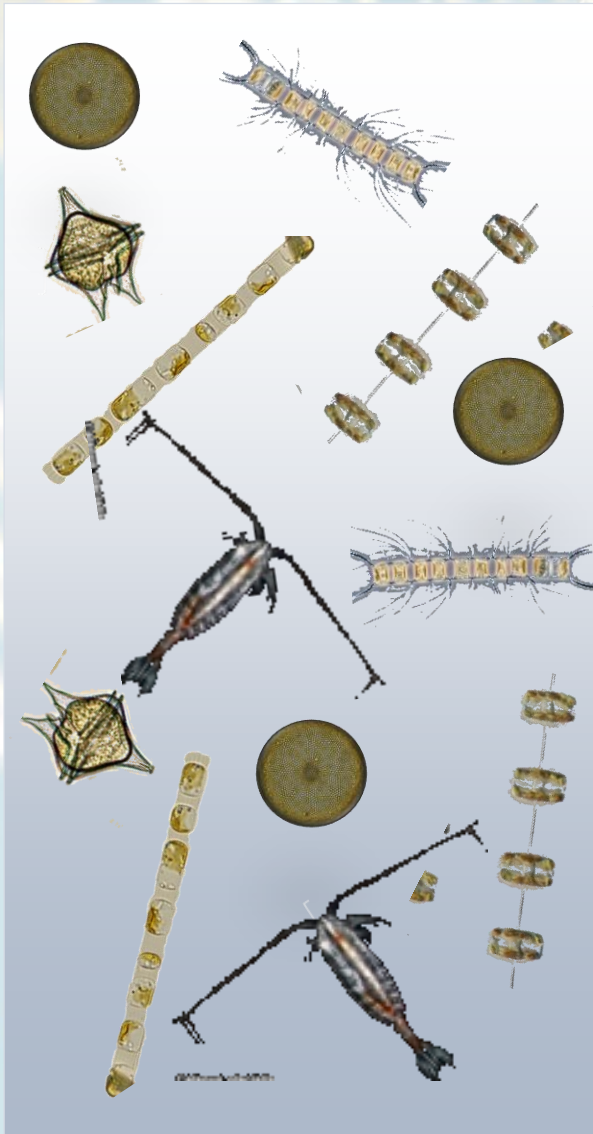
13 study phyto and zooplankton
6 only phytoplankton are studied
3 only zooplankton are studied



Morabito et al. STOTEN (Accepted)

Like a sentry

Nutrients



Upwelling

Turbidity

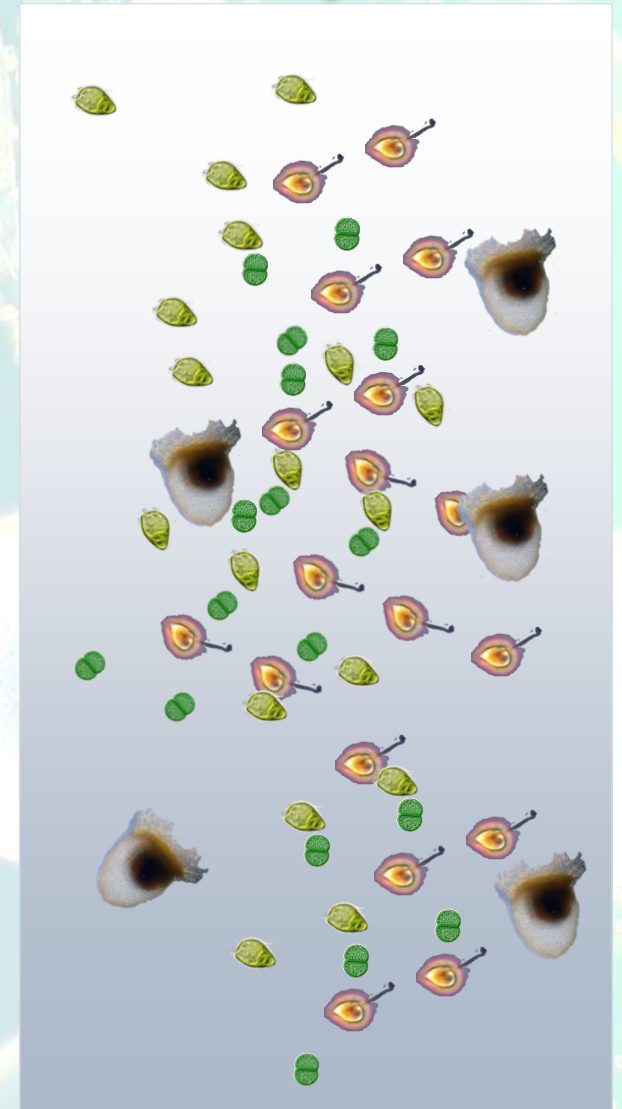
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Light

Temperature

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Nutrients



Main Objectives

- *What are the main types of seasonal patterns in different types of environments?*

- *Are there any long-term trends?*

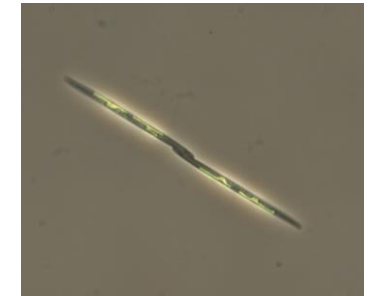
Variations in the model (s)?

Variations in abundances / biomass?

Variations in the specific composition?

Annual seasonal trend of phytoplankton and zooplankton

LTER-Italy site	Main annual Pattern - phytoplankton	Main annual Pattern - zooplankton
Lake Orta	2 - spring and summer	1 - spring
Lake Maggiore	2 - spring and summer	1 - spring
Lake Como	2 - spring and summer	1 - spring
Lake Iseo	2 - spring and summer	1 - spring
Lake Garda	2 - spring and summer	1 - spring
Lake Tovel	1 - summer or autumn	1 - summer or autumn
Lake Santo Parmense	2 - early and late summer or autumn	1 - summer
Lake Scuro Parmense	2 - early and late summer or autumn	1 - summer
Lake Trasimeno	1 - late summer or early autumn	1 - summer
Lake Bidighinzu	1 - summer or autumn	-
Lake Sos-Canales	Unstable	-
Gulf of Trieste	2 - spring and autumn	1 - summer
Gulf of Venice	Several peaks per year	1 - summer
Senigallia	Several peaks per year	-
Portofino Promontory	-	1 - spring
Gulf of Olbia	1 - summer	-
Marechiara	2 - spring and late summer	1 - summer
Lagoon of Venice	1 - summer	1 - summer
Lagoon of Cabras	Unstable	-
Mar Piccolo Taranto	Unstable	1 - autumn
Alimini	Unstable	-
Acquatina	-	1 - summer



LTER-Italy site	Water temperature	Trophic State (nutrients)	Chl	Mesozooplankton abundance
Lake Maggiore	+	-	-	+
Lake Como	+	-	-	NA
Lake Iseo	+	N	N	Y
Lake Garda	+	-	-	+
Lake Tovel	+	NA	NA	NA
Lake Santo Parmense	N	N	N	N
Lake Scuro Parmense	N	N	N	N
Lake Trasimeno	+	N	N	NA
Lake Bidighinzu	N	-	-/+	NA
Lake Sos- Canales	NA	-	+/-	NA
Gulf of Trieste	+	-/+	-/+	-/+
Gulf of Venice	+	-/+	-/+	+/-
Senigallia	+	-/+	-/+	NA
Portofino Promontory	+	NA	-/+	+
Gulf of Olbia	+	+	-	NA
Marechiara	+	-/+	-/+	+
Lagoon of Venice	N	-	-	-
Lagoon of Cabras	N	-	-	NA
Mar Piccolo Taranto	N	Y	Y	Y
Alimini	N	N	N	NA
Acquatina	N	N	NA	N

T + in large lakes

Variations of nutrients

Variations of Chl

Impacts on biota?

NA: Not Available; + and – unidirectional increase or decrease across the years; +/- and -/+: increase followed by decrease (or viceversa) across the years; N=No change; Y: irregular changes occurred



CNR
www.cnr.it

DSSTTA
www.dta.cnr.it

ISMAR - IAS - IRBIM
www.ricercamarina.it

Thank you!



And...View the “Acqua Alta” platform



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