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*SAtellIte Near Real Time MOnitoring
Network of the Eutrophication Risk for the marine waters over the
Greek-Albanian crossborder area*

Specifications – Technical details of the In Situ campaign for data Collection

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Eutrophication #1

Eutrophication is the phenomenon of aquatic ecosystem enrichment due to increased nutrient loading and is often caused by human activities such as the additional input of fertilizers from agriculture farming, food for aquaculture, untreated and/or treated sewage as well as industrial wastewater inputs.
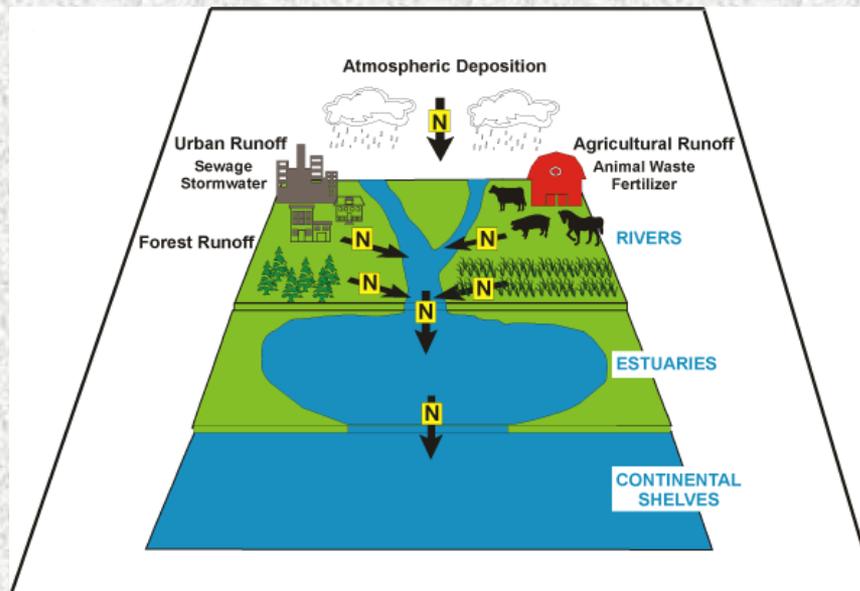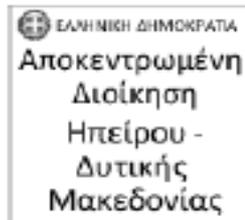

Causes of eutrophication- N and P deposition

Eutrophication #2

The Framework Directive on Water
2000/60/EC, depicts Eutrophication as one of the major threats to the marine coastal ecosystems.
It sets some clear objectives for the characterization of waters, and requires the continuous monitoring of marine waters.

There are several indicators presently used to assess eutrophication in aquatic systems, that can be collected and measured:
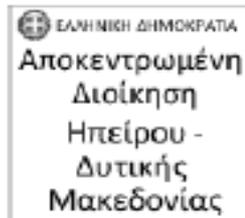➢ Chlorophyll-a (Chl-a)
➢ Turbidity
➢ Sea Surface Temperature

All these indicators can be measured directly through ship-based water sampling...*but is often costly and provides data limited in space and time.*

Satellite Remote Sensing and Eutrophication

Recent advancements in remote sensing have allowed for the collection of information on Chl-a concentration, SS, phytoplankton primary productivity, and sea surface temperature (SST).
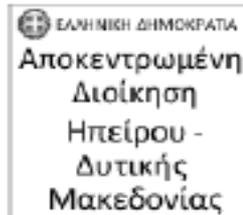
Satellite remote sensing:
- ✓ can cover large areas (up to global)
- ✓ with relatively high resolution (250 m - 1 km) and
- ✓ without restriction of national boundaries

To maximize the usefulness of satellite data for the monitoring of eutrophication it is essential to obtain in situ data, that will be used for the calibration and validation of satellite data.

Monitoring parameters #1

a. Chlorophyll-a concentration:
is a good indicator of eutrophication and correlates with measures of organic pollution.

Example of sensor for measuring chlorophyll

b. Sea Surface Temperature:
is a good indicator of water mass type and the condition of vertical mixing. It can also be used to estimate phytoplankton growth rate or primary production
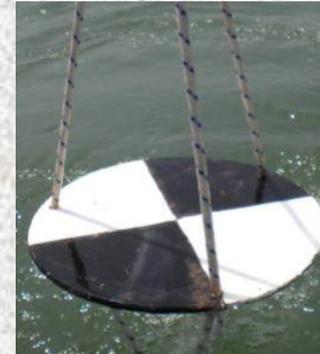
Monitoring parameters #2

c. Turbidity:
determines the quality of the water and is a good indicator of eutrophication and water acidity.

Example of digital turbidity meter

d. Water Transparency:
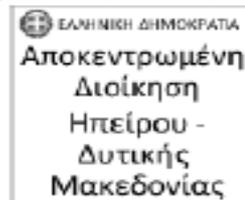can be used to determine the average turbidity levels in surface waters. It is measured with the Secchi disc.

Secchi disc

Monitoring parameters #3

e. Bottom depth:
the data provided by the satellites, mostly relate to the sea surface.
For this reason, measurements are made up to 1 m.

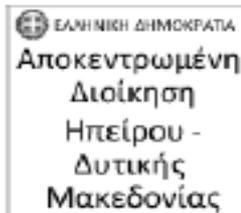Example of a multiparameter sensor used for the measurement of depth, temperature etc.

f. Distance from the coastline:
the spatial distribution of in situ data, as well as their distance from
the coastline is very important.

Determination of sampling points #1

The correct determination of sampling points is a vital aspect for the proper correlation and validation of the satellite data.

➢ The distance from each measurement should be between 1km-5km.
➢ The total number of point should be 35-40 points.
➢ The minimum distance from the coast is 500m.
➢ The depth of the measurements: a) on surface, b) on 50cm and c) at 1m depth.
➢ 1/5 of the measurements should be taken as a transect perpendicular to the coast at distances of 500m, 1km and 1.5km from the coast itself.

Determination of sampling points #2

LAND

Sampling stations
1/5 is located in a transect perpendicular
to the coast with 500m pace

500m   500m   500m   500m

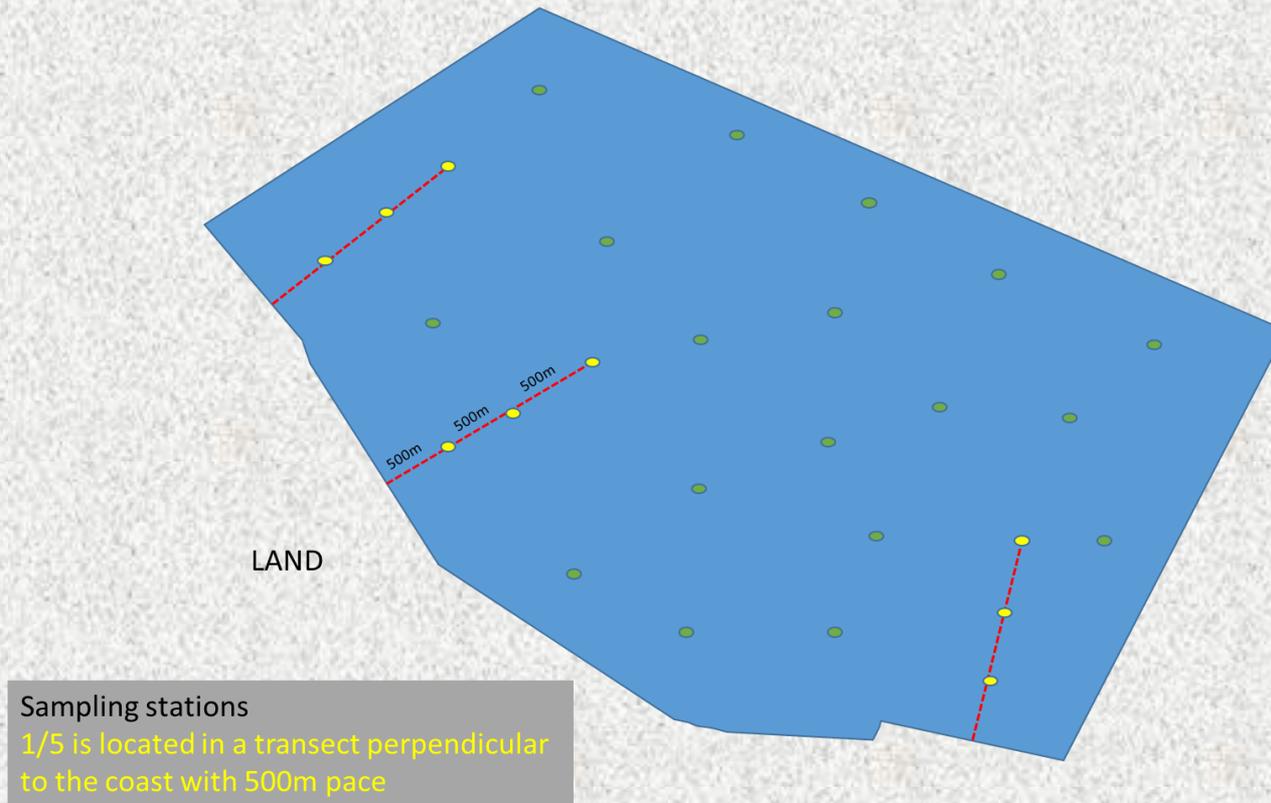Diagram of the in situ sampling points.

Timeline of the In Situ campaign

The collection of field data, depends to a large extent on the climatic and oceanographic conditions. Very important factor is the *cloud cover* and *wave undulation.*

➢ During the sampling there should be none to little clouds.
➢ The Sea condition: no or minimum waves. In measurable units, this translates to a limit of the air speed to 5 knots and wave heights less than 0.5 m.
➢ Best period: September-October and April-June.
➢ Day Time: 10:00-14:00 (with half an hour deviation).
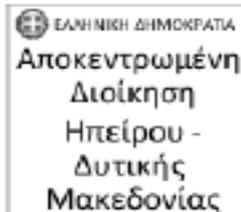
Overview of the Specifications for the in situ data collection campaign

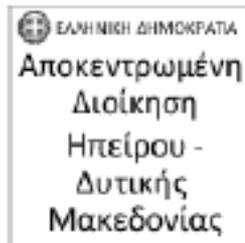| Specifications for the implementation of the field collection program	
Parameters to be measured:	• Chlorophyll-a concentration • Turbidity • Sea Surface Temperature • Water Transparency (Secchi Disk) • Bottom depth • Distance from the coastline
Distance from each measurement:	1-5 km
Distance from the coast	minimum 500 m
Number of sampling stations:	35-40 points in total
For the 1/5 of the measurements	They should be taken as a transect perpendicular to the coast at distances of 500m, 1km and 1.5km from the coast itself
Depth of the measurements:	1. on the surface, 2. at 50cm and 3. at 1m depth
Best period:	September-October and April-June
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Thank You