



Context:

- Geographical focus: Adriatic-Ionian Seas
- Policy focus: MSFD and the Barcelona Convention **require data** to assess environmental status
- Specific focus: Good Environmental Status (GES) - "Concentrations of **contaminants** at levels not giving rise to pollution effects"
- Problem: Data on marine contaminants are very **heterogeneous** in the region
 - Large and increasing number of **pollutants**
 - Data: **low** spatial and temporal coverage and uncertain quality assurance
 - Complexity** due to different analytical techniques, different matrices, organisms, target tissues, size classes and measurement units

Goals:

- Assemble, archive and Quality Control data from different sources according to **harmonized protocols**
- Make **data accessible** through a common infrastructure
- Allow accessing to complete **information** needed to evaluate **data comparability** and fitness for use
- Provide synthetic and scientifically meaningful data **visualizations** useful for end users

Outcomes:

- Pollution data heterogeneity makes comparability among areas extremely challenging
- Easy **access to metadata** (e.g. information on monitoring stations, parameters measured, matrix,...) is **crucial** to evaluate data comparability and fitness for use
- GIS geoprocessing is useful to build interoperable visualisation products that provide **meaningful information for end users**

Monitoring

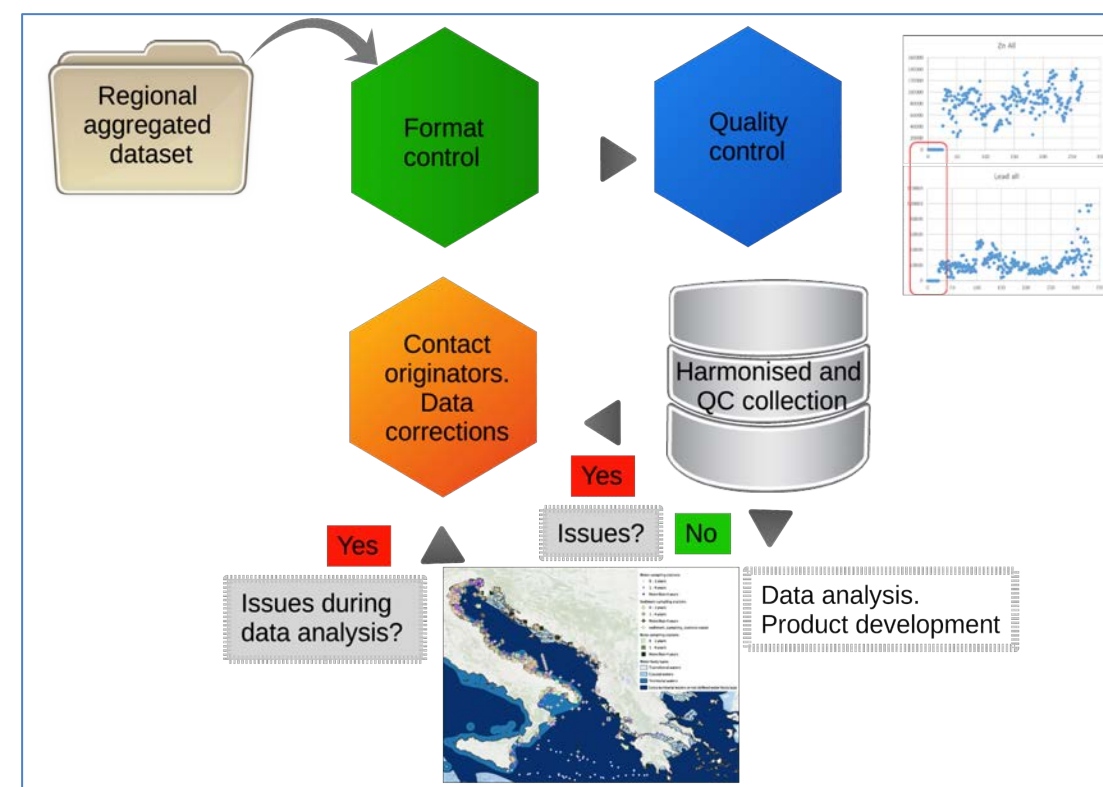
Data management

Information

Pollutants are monitored in **water, sediment** and several **organisms**



Chemical substance	P01 code	P01 description
Lead in the sediment	CONPBS01	Concentration of lead {Pb CAS 7439-92-1} per unit dry weight of sediment < 2000 um
	CONPBS02	Concentration of lead {Pb CAS 7439-92-1} per unit dry weight of sediment < 63 um
	IC000041	Concentration of lead {Pb CAS 7439-92-1} per unit dry weight of sediment < 500 um
	MPBSP012	Concentration of lead {Pb CAS 7439-92-1} per unit dry weight of sediment
	MTSDM004	Concentration of lead {Pb CAS 7439-92-1} per unit dry weight of sediment < 63 um by inductively-coupled plasma mass spectrometry
	PBCNAAWF	Concentration of lead {Pb CAS 7439-92-1} per unit dry weight of sediment < 63 um by wet sieving, acid digestion and atomic absorption spectroscopy
	PBCNICXT	Concentration of lead {Pb CAS 7439-92-1} per unit dry weight of sediment by inductively-coupled plasma mass spectrometry
	PBCNPEXT	Concentration of lead {Pb CAS 7439-92-1} per unit dry weight of sediment by acid digestion and inductively-coupled plasma atomic emission spectroscopy
PBCNXTXT	Concentration of lead {Pb CAS 7439-92-1} per unit dry weight of sediment by compression into pellets and X-ray fluorescence	

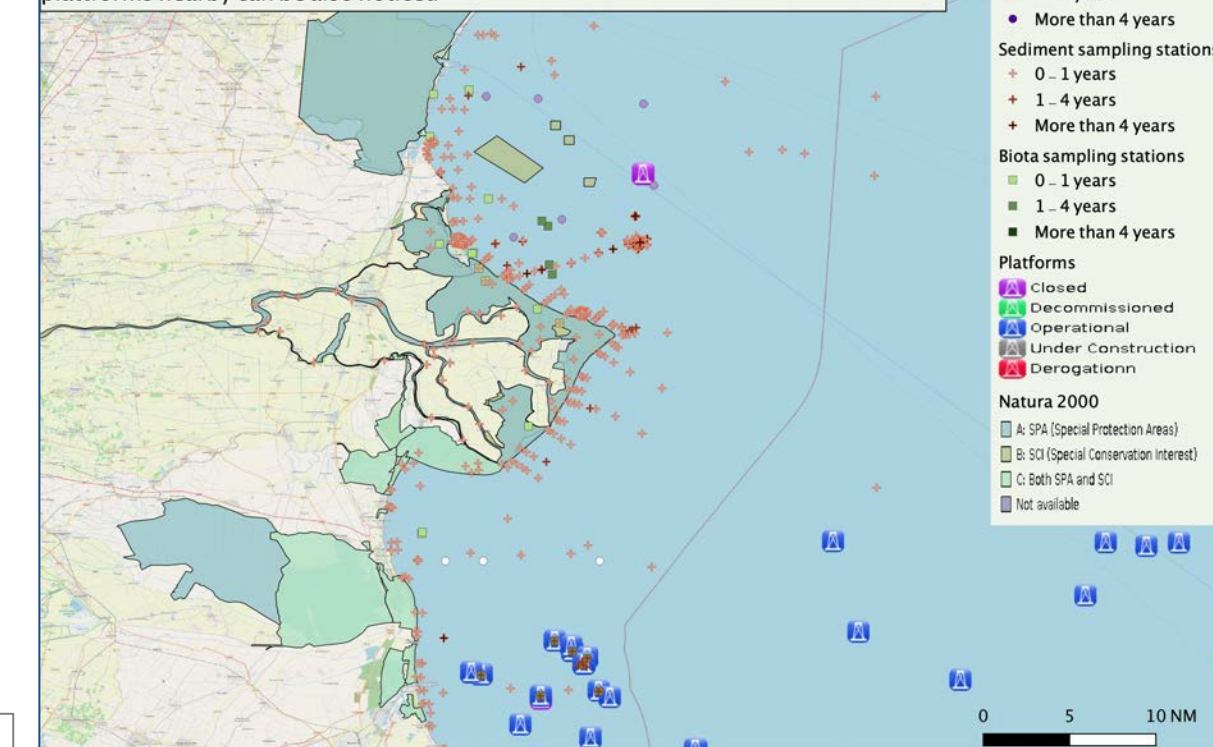


Data and metadata are managed according to standards developed by consolidated data infrastructures (SeaDataNet, EMODnet Chemistry) and are used to produce user-driven outputs.

- Originator
- Station ID
- Latitude
- Longitude
- Country
- Start Date
- End Date
- Duration
- Bottom depth
- Sampling depths
- Matrix
- Species (if biota)
- Groups of Parameters
- Monitoring
- Water type
- Name of water body and ID of water body

Upon agreement of key **metadata** required, data were post-processed to obtain detailed information on: **what** is measured in each station, **where** and for **how long**.

Distribution of monitoring efforts on contaminants around the Po Delta (Italy) area where environmental protection figures are established. The presence of active platforms nearby can be also noticed



Combined information to support pollution management: GIS geoprocessing techniques used to display distribution of monitoring efforts regarding pollution and to aggregate additional geo-information to evaluate how relevant areas (protected areas, offshore platforms, ...) are being monitored. These visualization products are interoperable and free to use creating OGC compliant webservice: <https://nodc.inogs.it/geoserver/HarmonIA/wms>

Large number of monitored variables, different matrix types, heterogeneous sampling/analytical protocols lead to a high number of terms indicating the concentration of a specific substance, which are not always comparable.

Further information:

- <https://harmonia.adrioninterreg.eu/>; <http://harmonia.maris2.nl/search>; <https://vrtlac.izor.hr/harmonia/index.html>
- Molina Jack ME, Bakiu R, Castelli A, Čermelj B, Fafandel M, Georgopoulou C, Giorgi G, Iona A, Ivankovic D, Kralj M, Partescano E, Rotini A, Velikonja M and Lipizer M (2020) Heavy Metals in the Adriatic-Ionian Seas: A Case Study to Illustrate the Challenges in Data Management When Dealing With Regional Datasets. *Front. Mar. Sci.* 7:571365. doi: [10.3389/fmars.2020.571365](https://doi.org/10.3389/fmars.2020.571365)