



**Project: AdriaClimPlus**

**D.1.2.1**

**Preliminary report on regional and coastal observations**



## Document control

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## 1. Introduction

In the frame of the project Activity 1.2, Assess the quality and advance accessibility of regional and coastal observations (in situ and remote sensing), the deliverable D.1.2.1 reports a preliminary review of the results achieved in evaluating the quality and the accessibility of in situ and satellite data.

The aim of Activity 1.2 is to make a survey of available information, namely measurements, suitable to support AdriaClimPlus in achieving the project objectives. The information flows naturally into the projects from the institutional and operational environmental monitoring carried on by the partners and thanks to the capitalization of the efforts done in previous national and international initiatives.

In addition, the activity foresees the identification of gaps in the available data, which limit the capability to monitor the evolution of the climate in the Adriatic coastal areas and across the whole sea basin too. The identification of those limits is expected to advance the monitoring capacity of the community on the coastal air and sea physical, chemical, biological properties and ecosystem features.

Since in AdriaClimPlus remote sensing information, that are coming from satellite data are integrating the in situ and traditional measurements, Activity 1.2 final aim is to assess the quality of a combined satellite-in situ monitoring system, from the Adriatic basin scale to the coastal areas and to ensure the proper inclusion of those information in the project database.

There are two main points driving the work in the frame of Activity 1.2. The first is the assessment of the information quality, the second one refers to the information accessibility. These two concepts have been brought into practice keeping in mind the main objectives of the project.

According to this purpose, the quality of the measurements and the remote sensing data has been defined as the ability of the information to describe the environmental processes the project is focusing on. So the quality is considered high when the available data allow a satisfactory representation of the reality, thus letting the AdriaClimPlus community to improve the knowledge base for climate change monitoring and to analyze the features of the climate change in the Adriatic area, at all the space and time scales



required by the stakeholder communities, according their needs of awareness increase and adaptation actions planning.

Of course, the classical components of measurement quality, namely precision, accuracy, continuity, etc. are trivial information and they are mandatory included in the survey, whereas the quality indexes characterizing the approach adopted in AdriaClimPlus are process oriented. So, it can happen that a set of measures having low precision, with respect to high quality measurements standards, are of high value in describing a specific environmental process because they are able to resolve the process features and its evolution.

This is the main and innovative job of the AdriaClimPlus Activity 1.2, namely to define and to apply a quality evaluation method, which is suited to support the advancing knowledge of climate change, in each of the seven pilot coastal areas and at the basin scale. It is based on every partner's expertise, knowledge and network from both sides of the Adriatic Sea.

Coming to the data accessibility, the fundamental feature is the efficacy to share the information, both inside the project community and towards the stakeholders and the general public. Also in this case, this document summarizes the strengths and the weaknesses mainly coming from the data formats, volumes and other digital characteristics, software and hardware, of the information each partner potentially can share. Furthermore, there is the evaluation of the opportunities and the threats the AdriaClimPlus project framework has created for the data sharing, with insights on how the opportunities can boost the data accessibility and the threats can be reduced to make the project efforts of AdriaClimPlus durable and ready for further capitalizations.

In agreement with the activity 1.2 work plan, which is characterized by the achievement of preliminary results on which to develop the final findings, this deliverable focuses on the methodology that has been defined to reach the final goal. Furthermore, this document includes the key points characterizing the road map implementing the methodology.



The following sections of this document explain how the partnership has defined the data quality, accessibility and the process that is leading to the assessment of both those two features of the Adriatic regional and coastal monitoring.

## 2. Basic concepts on environmental processes and scales

The environment represents one of the clearest examples of complex reality. To face such complexity, the classical and well-known approach is to classify the environment by applying a hierarchy of scales, both in space and in time.

Scales are defined according to the identification of the processes having the most efficiency in making the environment to evolve. Even if the time evolution of the environment, as a whole, is the contribution of a blend of physical, chemical and biological too actors, it is useful to identify and rank them according to their contribution in the changes of the environment status.

So, it is possible to identify ranges in space and time in which the evolution of the environment is mainly driven by a few processes, certainly having interactions, namely forcing and feedback, with other ones that frequently are dominating the evolution in different ranges. Since the speed of processes taking part at each scale are constrained by fundamental physical limits, space and time scales are highly related; see figure 2.1

In this deliverable of the AdriaClimPlus project, each Project Partner involved in assessing the quality of the coastal observations makes an analysis of the environmental processes, according to their relevance in specific space and time scales.

Thanks to the long and continuous work conducted by the institutes and agencies, which are involved in the AdriaClimPlus project, the knowledge gained by Project Partners partners on those parts of the Adriatic basin where they operate daily, becomes the key factor to create an integrated across the Adriatic and up-to-date view of the coastal processes relevant for the investigation of the global climate change effects at the local scale.



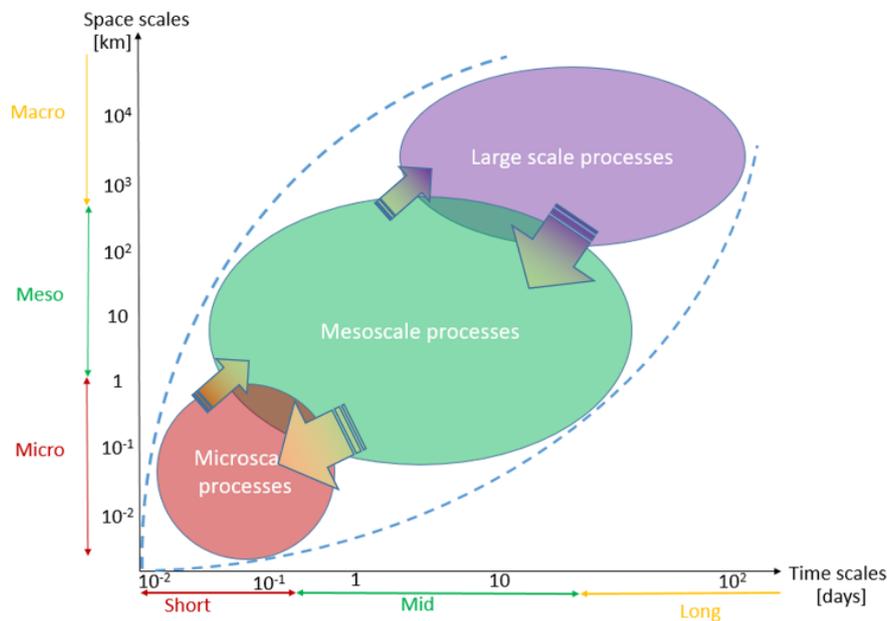


Figure 2.1 A schematic representation of scale definitions in a typical environment such as the sea and the coastal areas.

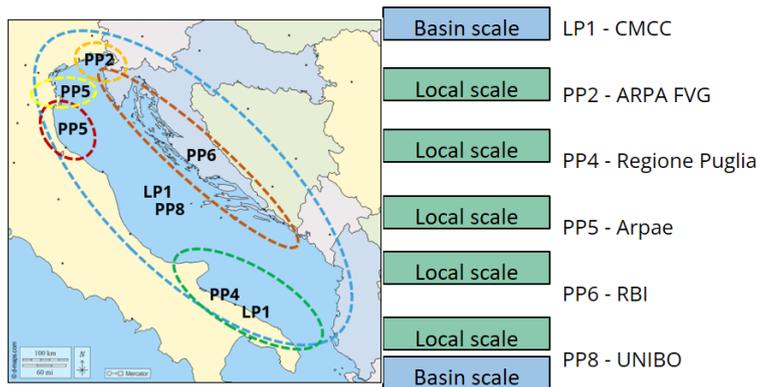
According to the project structure and to exploit the specific insights of each partner, the investigation is conducted starting from the pilot areas; see figure 2.2. In fact, Project Partners are going to focus the project resources there. On the other hand, using a common methodology to identify the relevant processes and corresponding scales, the general view of the Adriatic coastal reality arises spontaneously from the integration of all the contributions.

In addition to the identification of the environmental processes, the survey on the monitoring system available in the pilot area is mandatory information. To achieve the information on the monitoring capability of the identified processes, each Project Partner analyses the procedures driving the conduction of the measurements in the pilot area. Furthermore, information on the ability of the monitoring activity to sample the domain and the time resolution of generated data, together with the devices specific limits



are collected. That information requires an organization, and a format too, suitable for the comparison with that coming from the processes survey.

The project focuses on 7 pilot areas



- Zadar County coastal areas, consisting of many islands and coastal channels,
- Lika - Senj County coast
- Puglia coastal area and specifically the Ofanto river area
- Emilia-Romagna coastal areas with a focus on Po river delta
- Friuli-Venezia Giulia coastal area with a focus on Gulf of Trieste and the lagoon of Grado-Marano
- Marche Region coastal area
- Veneto Region coastal area

Figure 2.2 An overview of the pilot areas defined in the frame of the AdriaClimPlus project with the Project Partners mainly involved in the environmental monitoring and in the identification of the relevant processes.

### 3. Environmental processes relevant in the pilot areas

In the frame of the AdriaClimPlus, the survey on the environmental processes, assumed worth to be considered to achieve the project goals, are reported schematically in a tabular format.

The choice of a tabular format is the straightforward result of the wish to summarize the large amount of details, which are required to describe the environmental processes, in a few classes. Those classes, together with those reporting summary information on the capability of the monitoring, are the inputs of the process conducted by activity 1.2, that aims to assess the quality of a combined satellite-in situ monitoring system from the Adriatic basin scale to the coastal areas.



The table is named the processes table, and it is attached to this document. It is part and parcel of the deliverable D.1.2.1. It is the file D.1.2.1\_Annex\_processes\_table.xlsx, and a piece is reported in Appendix A, as an example.

## The processes table

There is a [processes table](#) for each Project Partner, see Appendix A for an example. Each Project Partner was asked to fill in the table, reporting information on the environmental processes or, in case of further generalization is required, the ecosystem phenomena which are considered relevant for the project activities and characterizing the pilot area the Project Partner focuses on.

The table has the following entries, that are also available on the notes reported in the table columns' header, see attached MS Excel file D.1.2.1\_Annex\_processes\_table.xlsx.

### Process to be considered

Information required to identify the coastal or marine process relevant for the project objectives in the pilot area.

#### ID

The ID of the process. It is composed by Project Partner ID (PPX) and a progressive number (YY) reported with 2 digits, as follows PPX-YY.

#### Short name

A short name to identify the process.

#### Extended description

A summary description of the process, if needed.

#### Extension

The space and time extension characterizing the process.

#### Space (field/point)

For space extension use these two classes only:



**field**, if to describe the process, a field is mandatory because the gradients are relevant and they characterize the process;

**point**, if to describe the process, the information on a geographical point is sufficient;

In case a process has both space characteristics, then it is suggested to use two records with two different IDs, but the same short name. If needed it is possible to change the Extended description.

### **Time (climate/event)**

For time extension, these two classes can be used only:

**climate** if to detect or describe the process it requires a continuous and long time series of information;

**event** if the process can be detected with a very limited set of measurements, regardless of the need to be compared with other events collected during a long (climatic) time range.

### **Resolution**

The space and time resolution characterizing the process.

### **Space H (km)**

The average horizontal space resolution required to detect and describe the process. Units are kilometres [km] and fractions only.

### **Space V (m)**

The average vertical space resolution required to detect and describe the process. Units are meters [m] and fractions only.

### **Time (days)**

The average time resolution required to detect and describe the process. Units are days [day] and fractions only.

### **Pilot**

The pilot area in which the process is considered in the frame of the project activities

### **Pilot Area**



The code identifies the pilot areas defined in the project, according to the Application Form, plus the whole Adriatic Sea basin.

**S0** - Basin scale – whole Adriatic Sea

**S1** - Zadar County coastal areas, consisting of many islands and coastal channels,

**S2** - Lika - Senj County coast

**S3** - Puglia coastal area and specifically the Ofanto river area

**S4** - Emilia-Romagna coastal areas with a focus on Po river delta

**S5** - Friuli-Venezia Giulia coastal area with a focus on Gulf of Trieste and the lagoon of Grado and Marano

**S6** - Marche Region coastal area

**S7** - Veneto Region coastal area

### List of involved variables

The list of variables required to describe the process. They are split in three classes according to their spatial dimension. They are reported as a comma separated list of well-known acronyms or extended names

#### 1D

Variables depending from time only and referring to one point in space.

#### 2D

Fields requiring a range for two spatial coordinates, besides time and referring to a surface, a vertical cross section, a transect, etc.

#### 3D

Fields requiring a range for three spatial coordinates, besides time and referring to a volume.



## 4. Basic concepts on monitoring features description

During the first two AdriaClimPlus project periods, the Activity 1.2 was focused mainly on the environmental processes. The harvesting and the organization of the information on the monitoring in each Pilot Area is going to be the next objective. To this end each Project Partner is involved in contributing to the data collection and its organization in classes is considered suitable also for this purpose. The deliverable D.1.2.2, which is the final report on regional and coastal observations, will bring that information in full detail.

Anyway, in this first project phase the guidelines of the monitoring survey are depicted. In AdriaClimPlus, each PP brings skills, expertise and focuses resources in specific components of the whole potential for pilot area monitoring; see figure 4.1 here below.

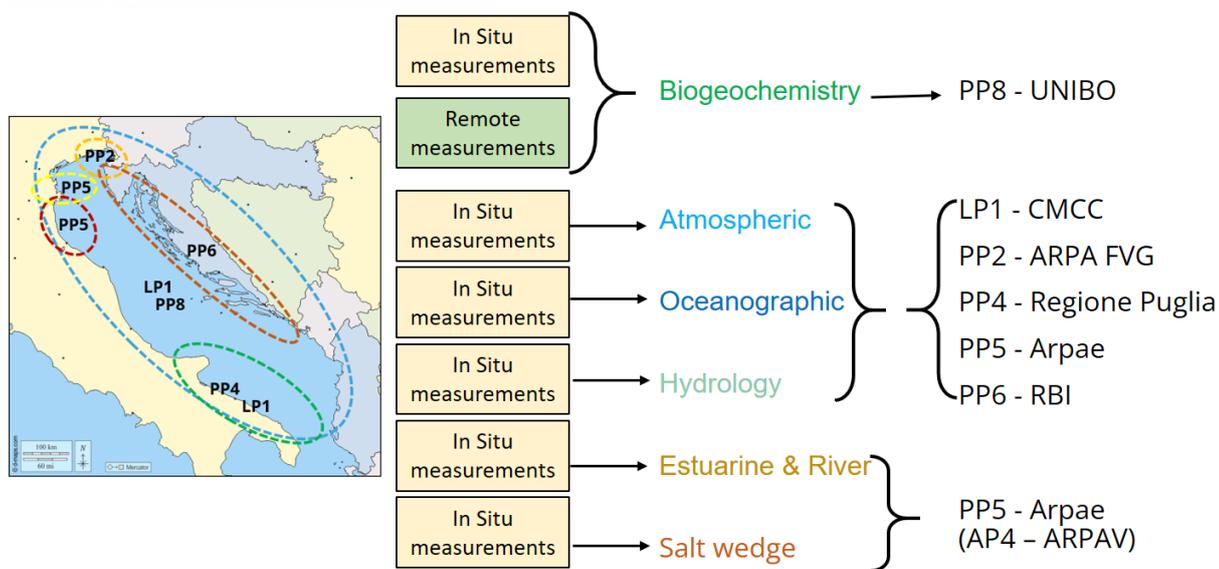


Figure 4.1 An overview of the pilot areas defined in the frame of the AdriaClimPlus project with the Project Partners mainly involved in the environmental monitoring with their specific expertise.



For both remote sensing and in situ monitoring, space and time are two of the mandatory features to be considered in assessing the ability of the monitoring to resolve the environmental processes characterizing the pilot areas. In addition, the instrument accuracy is worth being considered the essential requirement, before the instrument precision.

Briefly recalling the two concepts [4.1], see figure 4.2, accuracy is also referred as trueness [4.2], it is clear that by measuring in a natural environment the physical, and biological quantities with more emphasis, the fluctuations of a set of repeated measures is not the results of statistical fluctuations of the sensor response, to the same environmental condition. In fact, the sensor of a measurement device detects the change in the environment to which it is interacting.

The monitoring taking place in the pilot areas lacks the required repeatability and reproducibility conditions that are necessary for many practical cases. Under repeatability conditions, all factors that influence the measurement are considered constant and do not contribute to the variability, while under reproducibility conditions, some or all influential factors vary and do contribute to the variability of the test results.

Thus, since the natural environment, the pilot area, is continuously changing as a consequence of the many hosted physical and biological processes, the measurement fluctuations that are highlighted by the sensor results from the convolution of both the intrinsic sensor fluctuations and the environmental changes.



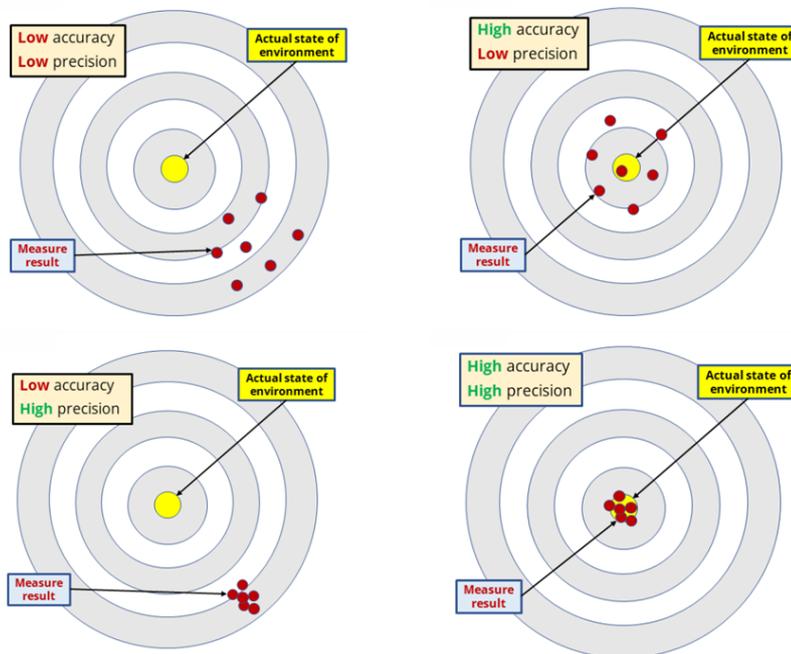


Figure 4.2 A naïf graphical representation of the concepts of accuracy and precision, of a set of measures (red dots) with respect to the actual value of the measure target (yellow central circle). The right column shows the cases in which the accuracy is high.

So the quality assessment for natural environment monitoring has to start from the measurements accuracy. The precision becomes an element to be considered carefully when the sensor generates fluctuations wide enough to cover the environmental ones.

For those reasons, among the features describing the monitoring activity, each Project Partner is conducting in their own pilot areas, will focus on the accuracy of harvested measures. Because the accuracy is strictly tied to the actual state of the environment, there will be an accuracy evaluation for each of the environmental processes pointed out in the Pilot Area and reported in this deliverable (see Appendix A and attached file).

The accuracy indicators and the specific evaluation tasks to be conducted are going to be defined in detail, but it is clear that the calibration frequency of the devices will be considered, since it is required to keep



accuracy at the necessary level to warranty a realistic description of the environment evolution, avoiding significative bias and drifts.

Furthermore, measurement time resolution and gradient resolving monitoring meshes will enter in the assessment, including the continuity of measures, which is another key point to keep in mind. On the other hand, the direct interaction of devices with the environment or the remote sensing is not a discriminating aspect of the monitoring, rather the integration of environmental data coming from those two classes of devices is worth to be valorised, according to the AdriaClimPlus objectives.

## 5. Relevant monitoring activities in the pilot areas

The survey of the monitoring carried on by each Project Partner has been scheduled to start after that of the relevant processes, so it will be reported in detail in the second deliverable of the project activity 1.2. For this second half of information, which is required to assess the quality of regional and coastal observations, classes are going to be used and reported schematically in a tabular format. The table will be named the **monitoring table** and it will be attached to the deliverable D.1.2.2. The filename will be D.1.2.2\_Annex\_minitoring\_table.xlsx.

### The monitoring table

It is expected to have a monitoring table for each Project Partner. Each Project Partner will be asked to fill in the table, reporting information on the monitoring activity that is considered relevant for the measure of the processes characterizing the pilot area the Project Partner focuses on.

It is also considered useful that the data available from the **monitoring table** is accompanied with at least one shape file for each pilot area, by means of which the area and its features could be described by means of a GIS (Geographic Information System) software. Of course, if necessary, more than one shape file may be included in the monitoring area identification. That GIS representation will supplement the information collected in the **processes table** too.



## 6. Methodology for measures quality assessment

The core of the method, which is leading the development of tools specifically defined to assess the quality of measures, is based on the joining of the basic concepts on environmental processes and scales with the concepts on monitoring features description.

In addition to these two key points, the synergy between remote sensing, in situ measurements and the potential contribution coming from the citizen science initiatives, it is considered. So, the methodology deserves particular attention to assess the quality of a combined satellite-in situ monitoring system from the Adriatic basin scale to the coastal areas and ensure the proper inclusion in the project database of the open source in situ data and satellite data, see figure 6.1.

The methodology is schematically summarized in the following points, and the quality assessment indicators are going to be defined with contribution of the expertise of the Project Partners actively involved in the activity 1.2.

- Identification of spatial and time scales of the coastal and estuarine processes we are going to focus on, starting from those characterizing the pilot areas.
- Identification of the time and spatial resolution of in situ and available remote sensing data to resolve the processes we are going to focus on.
- Definition of a set of quality indexes based on time/space capability of measures to monitor the processes, including data from remote sensing
- Compute the quality indexes
- Identify the rich and the poor monitored processes according to the processes/information analyses and the quality indexes
- For each pilot area, identify the estuarine zones with enough information for the project purposes
- Summarize in a few classes the main potential problems of information accessibility, keeping in mind the project aim, that is to ensure the proper inclusion in the project database of the open source in situ and satellite data.



Climate change monitoring is based on continuous, reliable, spatially related measures

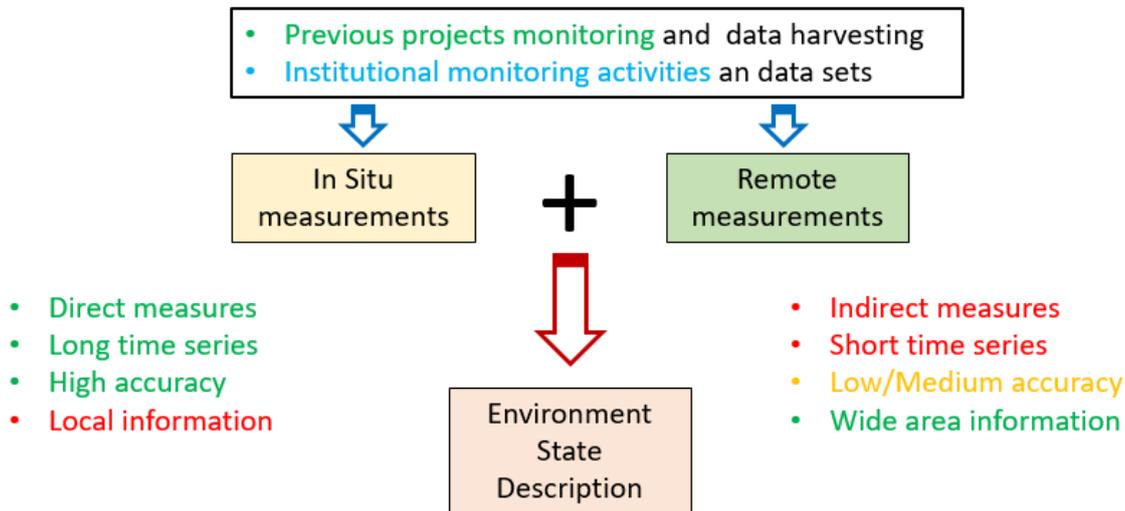


Figure 6.1 Scheme of the synergic action of the combination of in situ and remote sensing measure. Limits and weak aspects of each of them are reported in warm colours, while green colour highlight the strengths.

## 7. Data accessibility

The data accessibility has been analysed according to the perspective of the end users. Those users may be distinct in two sets: the Project Partners working on data during the project lifetime and continuing further thanks to the capitalization of the achieved results; the whole community present in the cooperation area and beyond.

Both those classes share some common perspectives and data access features. In particular, the most important distinction is the data access type or protocol. It is expected to have executions through an interactive procedure or by way of machine-to-machine automatic communication. This poses an important request to the computational infrastructures involved in the project, by each Project Partner. Some partners already support their dataset with hardware and software suitable to respond to both the



data access modes. In particular, the use of ERDDAP [7.1] software is a strength available inside the partnership. Thanks to those resources, AdriaClimPlus is going to test the efficiency of an ERDDAP federation to ensure the proper inclusion in the project database of the open source in situ data and satellite data.

Other key features of data accessibility are coming from the data request frequency and the time delay of data availability. The latter is usually summarized as real time, near real time or delayed data. Activity 1.2 is going to collect information on that, limiting the survey inside the partnership.

Some partners for classes of measures that require several steps of validation revise data and check them more than one time, after the measurement, later on. It is expected that multiple revised data are supported by flags describing the version of data or the quality check test passed by the data.

This is the case of certified data having a measurement or harvesting procedure aiming to remove from the public access potential unreliable data identified as not trustable according to quality checks carried on in the frame of periodical checks on data consistency.

Data covered by copyright or security levels, especially whether they are part of classified information which has a restricted access, are not considered to be present in AdriaClimPlus.

Finally, the data format has been considered and there are no critical points or potential blocking issues if the standards are used, namely: netCDF, GRIB, BUFR, Json, or ASCII CSV. For those data formats not including mandatory metadata, which are required to retrieve all the needed information allowing a correct use and interpretation of data, there is a potential limit in the availability of metadata files. In case of metadata files supporting the data, it is warmly advised to generate them according to ISO standards. That allows easier data sharing.



## 8. Issues on data quality and risks on data accessibility

Thanks to the analysis of the results already achieved in previous projects, AdriaClim was among them, two important topics have been identified, see figure 8.1. Those topics deserve to be considered in proceeding along with the project activity 1.2.

One of them is the possibility that, in spite of the huge amount of measures collected so far and the institutional monitoring plans for the future, the monitoring system collects measures unsuitable to describe the processes relevant to be followed, because they are extremely sensitive to climate change. The second one, is the lack of quality indicators specifically designed to pick up the weakness of the monitoring systems with respect to the global climate change effects on the environment, at the local scale, that is in the pilot areas.

Both these points are going to be investigated in the frame of the project activity 1.2. The quality indicators are expected to identify the rich and the poor monitored processes according to the processes/monitoring analysis. In addition, for each pilot area, there will be a search to identify the estuarine zones with enough information for the project purposes, that is to support the other project activities.



### Open issues

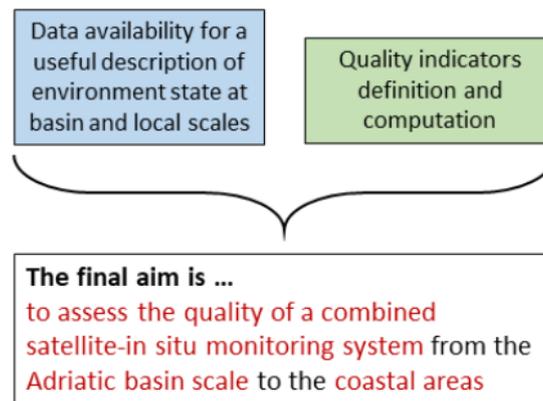


Figure 8.1 A summary of the issues identified thanks to the analysis of the information already available from previous projects, together with the risks on data accessibility

Coming to the risks that could affect the sharing of measurements, see figure 8.2, a few classes of potential problems of information accessibility have been identified. They are the already well-known data volume, data transfer, data continuity, data format, besides legal and agreement restrictions. Keeping in mind the project aim, that is to ensure the proper inclusion in the project database of the open source in situ and satellite data, the Activity 1.2 is going to define a set of accessibility indexes based on problems/limits of information accessibility, listed here above. Thanks to those indexes it will be easy to identify the weakness and the strengths of the whole Adriatic related data management across the cooperation area. One specific point of data accessibility regards the remote sensing data. In fact, the primary sources of information are already publicly accessible, and it is neither useful nor convenient to replicate datasets. AdriaClimPlus considers it valuable and sustainable to store and to share the son products of the parent information which are going to be developed in the frame of the project for the specific purposes of the pilot area.



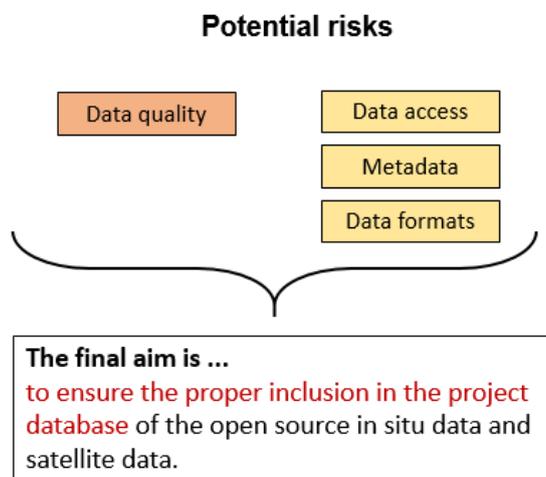


Figure 8.2 A summary of the potential accessibility risks identified thanks to the analysis of the information already available from previous projects



## 9. Appendixes

### Appendix A

**Processes table.** List of identified coastal processes with spatial and temporal resolutions of variables relevant for the pilot areas. Specifically LP (CMCC) and PP4 (Regione Puglia) identified processes relevant for the Pilot PA7 (Apulia Coast with focus on Ofanto Estuary), PP2 (ARPA-FVG ) identified processes relevant for the Pilot PA3 (FVG Coast with focus on Marano and Grado Lagoon), PP5 (Arpae) identified processes relevant for the Pilot PA5 (Emilia-Romagna Coast with focus on Po Delta), PP6 (RBI) identified processes relevant for the Pilots PA1 (Zadar County Coast and Island ) and PA2 (Lika Senj County Coast), PP8 (UNIBO) identified processes relevant for the Adriatic basin.

Process to be considered			Extension		Resolution			Pilot	List of involved variables (comma separated)		
ID	Short name	Extended description	Space (field/point)	Time (climate/event)	Space H (km)	Space V (m)	Time (days)	Pilot Area	1D	2D	3D
LP1-0	Sea level rise	Trend of sea level in the	point	climate and	up to 50km	0	0,13	SO and	water level		
LP1-0	Sea level rise	Trend of sea level in the	field	climate and	up to 50km	0	0,13	SO and		land use, soil types, roughness	
LP1-0	Salt wedge	Intrusion of marine salt	point	climate and	from river	1	1,00	SO and	water level, river runoff at the		
LP1-0	Salt wedge	Intrusion of marine salt	field	climate and	from river	0	1,00	SO and		precipitation, evaporation,	
LP1-0	Salt wedge	Intrusion of marine salt	field	climate and	from river	1	1,00	SO and			
LP1-0	River release	Role of river release on	point	climate and	from river	1	0,04 to	SO and	river runoff, temperature and		
LP1-0	salinization	bouyancy loss/gain,	point	climate	up to 50km	1	1,00	SO and	river runoff, temperature and		
LP1-0	salinization	bouyancy loss/gain,	field	climate	up to 50km	0	1,00	SO and		precipitation, evaporation,	
LP1-0	salinization	bouyancy loss/gain,	field	climate	up to 50km	1	1,00	SO and			water temperature, salinity,
LP1-1	Marine heat	Extreme events of water	point	climate and	up to 50km	1	1,00	SO and	river runoff, temperature and		
LP1-1	Marine heat	Extreme events of water	field	climate and	up to 50km	0	1,00	SO and		precipitation, evaporation,	
LP1-1	Marine heat	Extreme events of water	field	climate and	up to 50km	1	1,00	SO and			water temperature, salinity,
LP1-1	water	past, present and future	point	climate	entire	1	30,00	SO	river runoff, temperature and		
LP1-1	water	past, present and future	field	climate	entire	0	30,00	SO		precipitation, evaporation,	
LP1-1	water	past, present and future	field	climate	entire	1	30,00	SO			water temperature, salinity,
LP1-1	oligotrophicat	past, present and future	point	climate	entire	1	30,00	SO and	river loads in terms of volume,		
LP1-1	oligotrophicat	past, present and future	field	climate	entire	0	30,00	SO		wind stress	
LP1-1	oligotrophicat	past, present and future	field	climate	entire	1	30,00	SO			water temperature, salinity,



<p>Italy - Croatia</p>			<p>AdriaClimPlus: <b>Activity 1.2</b> - Assess the quality and advance accessibility of regional and coastal observations (in situ and remote sensing)</p> <p><b>D.1.2.1</b> Preliminary report on regional and coastal observations</p> <p><b>Coastal processes space and time scales</b></p> <p>To fill in your PP sheet, see example sheet and the notes you find moving the mouse over each column title</p>									
Process to be considered			Extension		Resolution			Pilot	List of involved variables (comma separated)			
ID	Short name	Extended description	Space (field/point)	Time (climate/event)	Space H (km)	Space V (m)	Time (days)	Pilot Area	1D	2D	3D	
PP2-0	Sea Level Rise	Trend of sea level in the	point	climate	50	0	3650	S5	sea level, point of reference			
PP2-0	Sea Level	Frequency of extreme	point	event	10	0	0.42	S5	sea level, point of reference			
PP2-0	Lagoon	Trend of sea	field	climate	0.1	0	3650	S5	sea surface temperature			
PP2-0	Gulf of Trieste	Trend of sea	field	climate	1	1	3650	S5			sea temperature, salinity	
PP2-0	Hypoxia	Event of hypoxia in the	field	event	1	1	30	S5			dissolved oxygen, water	
PP2-0	Hypoxia	Event of hypoxia in the	field	event	1	0	30	S5	water column nutrients			
PP2-0	Hypoxia	Event of hypoxia in the	field	event	5	0	30	S5	air temperature, air pressure,			
PP2-0	Intense water	Frequency of complete	field	event	5	1	0.25	S5			sea temperature, salinity, wind	
PP2-0	Rivers	The discharge rate of	point	climate	1	0	0.25	S5	discharge rate			

<p>Italy - Croatia</p>			<p>AdriaClimPlus: <b>Activity 1.2</b> - Assess the quality and advance accessibility of regional and coastal observations (in situ and remote sensing)</p> <p><b>D.1.2.1</b> Preliminary report on regional and coastal observations</p> <p><b>Coastal processes space and time scales</b></p> <p>To fill in your PP sheet, see example sheet and the notes you find moving the mouse over each column title</p>									
Process to be considered			Extension		Resolution			Pilot	List of involved variables (comma separated)			
ID	Short name	Extended description	Space (field/point)	Time (climate/event)	Space H (km)	Space V (m)	Time (days)	Pilot Area	1D	2D	3D	
PP5-0	Sea Level Rise	Trend of sea level in the	point	climate	point-base	0	0.042	S4	sea level			
PP5-0	Coastal sea	Trend of sea surface	point	climate	point-base	0	0.042	S4	sea surface temperature			
PP5-0	Coastal sea	Trend of sea surface	point	climate	point-base	0	0.042	S4	sea surface temperature			
PP5-0	Coastal sea	Trend of sea surface	point	climate	point-base	0	0.042	S4	sea surface salinity			
PP5-0	Lagoon and	Trend of sea surface	field	climate	Domain	variable	0.042	S4		sea surface temperature from		
PP5-0	Lagoon and	Trend of sea surface	field	climate	Domain	variable	0.042	S4		sea surface salinity from		

<p>Italy - Croatia</p>			<p>AdriaClimPlus: <b>Activity 1.2</b> - Assess the quality and advance accessibility of regional and coastal observations (in situ and remote sensing)</p> <p><b>D.1.2.1</b> Preliminary report on regional and coastal observations</p> <p><b>Coastal processes space and time scales</b></p> <p>To fill in your PP sheet, see example sheet and the notes you find moving the mouse over each column title</p>									
Process to be considered			Extension		Resolution			Pilot	List of involved variables (comma separated)			
ID	Short name	Extended description	Space (field/point)	Time (climate/event)	Space H (km)	Space V (m)	Time (days)	Pilot Area	1D	2D	3D	
PP6-0 1	Sea Level Rise	Trend of sea level in the coastal eastern Adriatic Sea	point	climate	point	0	0,042	S1, S2	water level			
PP6-0 2	Coastal sea warming	Trends of temperature in coastal eastern Adriatic	field	climate	domain-wide	0	1	S1, S2		temperature		
PP6-0 3	Coastal sea saltening	Trends of salinity in coastal eastern Adriatic	field	climate	domain-wide	0	1	S1, S2		salinity		
PP6-0 3	Coastal sea eutrophication	Trends of Chl_a in coastal eastern Adriatic	field	climate	domain-wide	0	1	S1, S2		Chl_a		
PP6-0 4	Freshwater load	Trends in water budget and river discharges in the eastern Adriatic	point	climate	domain-wide	0	1	S1, S2		river discharges, precipitation		





Process to be considered			Extension		Resolution			Pilot	List of involved variables (comma separated)		
ID	Short name	Extended description	Space (field/point)	Time (climate/event)	Space H (km)	Space V (m)	Time (days)	Pilot Area	1D	2D	3D
PP8	Biogeochemistry	assessment of the availability of high-resolution satellite observations related to biogeochemistry	field	climate	< 0.3	NA	< 8	S4		water quality parameters such as chlorophyll-a, total suspended matter, colored dissolved organic matter, salinity, and temperature	



## 10. References

[4.1] Accuracy and Precision in measurement. From Wikipedia The free Encyclopaedia

[https://en.wikipedia.org/wiki/Accuracy\\_and\\_precision](https://en.wikipedia.org/wiki/Accuracy_and_precision)

[4.2] ISO 5725-1:2023(en) Accuracy (trueness and precision) of measurement methods and results —  
Part 1: General principles and definitions

[7.1] ERDDAP scientific data server <https://github.com/ERDDAP/erddap>

