

**EMODnet**  
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Data Network


Your gateway to marine data in Europe

## Sea Basin Checkpoints

### Arctic

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## Introduction

- Still a bit of an 'outsider'
- Work in progress – please check the website every now and then for updates ([www.emodnet-arctic.eu](http://www.emodnet-arctic.eu))



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## Updates on the work so far

- Work done:
  - Literature survey ([link to report](#))
  - Data Adequacy Report (DAR, [link to report](#))
  - Challenges (See [website](#) for latest updates)
  - Expert Panel Meeting ([report](#))
  - Stakeholder Workshop ([report](#))
  - Kick-off Phase II
  - Svalbard visit
  - Challenge leaders meeting

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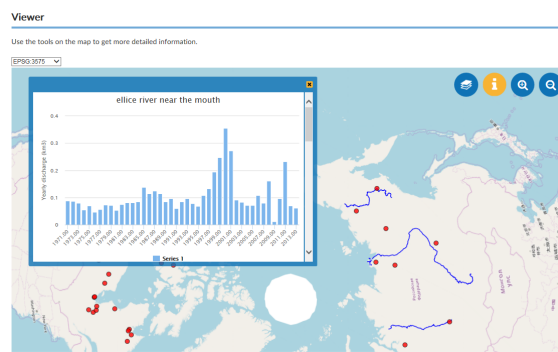
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## Website – Phase II

- Portal is online:  
[www.emodnet-arctic.eu](http://www.emodnet-arctic.eu)
- Challenges are being updated now
- Viewer and databases are online



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**Website examples**

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Home > Challenges > River input

### River input

**Data availability for Rivers Challenge**  
The objective for the River Challenge of the Sea Basin Checkpoint Arctic project is to provide time series of the annual into the Arctic Ocean input of:

- Water volume
- Water temperature
- Sediment
- Total nitrogen and Phosphates
- Salmon and Eel (inwards and outwards)

Here a description is given of the identified data sets that were used to compile this overview of data availability.

**Summary**  
The data availability is very different for the requested parameters. Most data is available for the volume of water discharge. For some large Russian rivers time series are quite long, more than 70 years up to more than 100 years. But many time series are relatively short, a few decades in many cases, and often incomplete. It is worrying that stations have been closed and data are delayed.

The data availability for the other parameters is much worse. Water quality monitoring is expensive, especially at remote sites. Therefore measurements are erratic, time series are short and measurement protocols differ between sites.

Bring and Destouni (2009) have also studied the status of the Arctic monitoring effort. They conclude that especially the water quality monitoring is fragmented and this restricts environmental modellers, policy makers and the public in their ability to integrate accessible data and accurately assess bio-geochemical changes in the Arctic environment. They note that the recent PARTNERS project (now continued as the Arctic-GRO) improves the situation, but large areas remain unmonitored. They show that there is a significant difference between the characteristics of the monitored and unmonitored areas which limits the possibilities to generate hydrological and biogeochemical input measurements based on monitoring data. Even if the quality monitoring were at a level comparable to the quantity monitoring, the short time series still poses a significant problem.

Related information:  
[Advisory Reports](#)  
[Datasets](#)  
[Viewer](#)

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### Water volume from rivers

**River discharge time series**

Time series for the yearly discharge have been created by averaging the monthly averaged discharge over a year. The stations marked as 'downstream station' for all rivers in the ArcticHycoos dataset have been processed. This is the most complete dataset in terms of spatial and temporal coverage and other datasets only contain copies of a subset of this data. Therefore no additional data from other datasets has been used. The datasets for the large Russian rivers typically start early 20<sup>th</sup> century or even late 19<sup>th</sup> century. This makes these rivers interesting for long-term trend detection in climate studies. However, the recent year discharges are missing, observations stop approximately after 2010. This data will probably be delivered by the SHI in the future (Looser BRG, pers. comm. 2016). The record typically starts in the 60's and 70's for the North American rivers and recent observations are available.

**COPPER R AT BILLION DOLLAR BRIDGE**

**Polyana At Ennebelokymok**

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Search by: River input

Free search	Processing of data	Data format	Necessity of data for purpose	Matching of spatial coverage	Matching of temporal coverage
Input string	Processing required (14)	Unknown (14)	Limited necessity (28)	Limited match (data via...) (24)	Limited match (data via...) (30)
	Unknown (9)	Converted format used (13)	Absolute necessity (15)	Match (11)	Match (7)
	Not assessed (7)	Not assessed (7)		Unknown (3)	Unknown (1)
	No processing required (6)	Original format used (2)			

Dataset (38)	Assessment report	Preview
Arctic-GRO Nitrate	SBC Arctic WP10 Rivers Challenge	Preview
Arctic-GRO Nitrate	The fate of riverine nutrients on Arctic shelves	Preview
Arctic-GRO Phosphorous	The fate of riverine nutrients on Arctic shelves	Preview
Arctic-GRO Phosphorous	SBC Arctic WP10 Rivers Challenge	Preview
Arctic-GRO DOC	The fate of riverine nutrients on Arctic shelves	Preview
Arctic-GRO Total nitrogen	The fate of riverine nutrients on Arctic shelves	Preview
Arctic-GRO Particulate carbon	The fate of riverine nutrients on Arctic shelves	Preview
Arctic-GRO Particulate nitrogen	The fate of riverine nutrients on Arctic shelves	Preview
USGS Nitrate	The fate of riverine nutrients on Arctic shelves	Preview
USGS Nitrate	SBC Arctic WP10 Rivers Challenge	Preview
USGS Phosphorous	SBC Arctic WP10 Rivers Challenge	Preview
USGS Phosphorous	The fate of riverine nutrients on Arctic shelves	Preview

**Website examples**

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Home > Maps and services > Dashboard > Dashboard chart


### Adequacy reported for matching of spatial resolution

Number of assessment reports that report a certain value for indicator "matching of spatial resolution". Was the spatial resolution sufficient for the report's purpose. Click on the pie-parts for more details of the assessment reports that report this (list a list - click to details).


Category	Count
Match (28)	28
Limited match (data via) (24)	24
Unknown (15)	15
Not assessed (7)	7
Not applicable (e.g. sea, river) (0)	0
No match (data not available) (2)	2

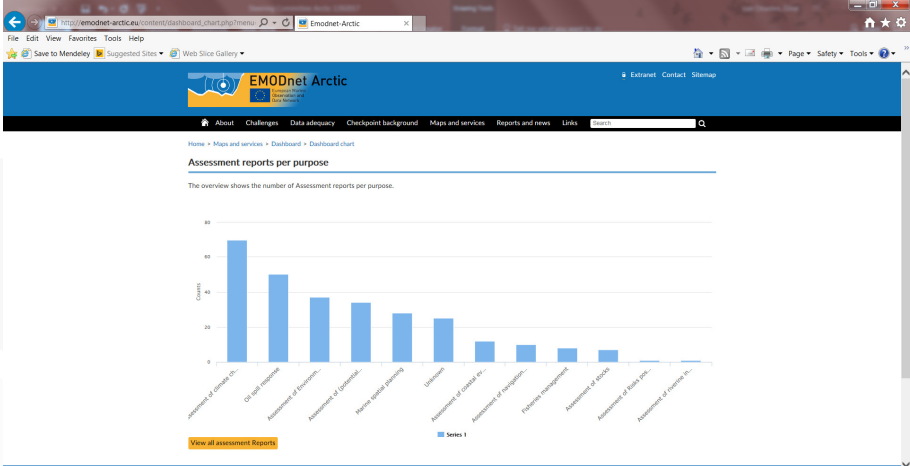
[View all Adequacy Reports](#)

Challenges      Navigation      Visit us on



## Website examples






**Assessment reports per purpose**

The overview shows the number of Assessment reports per purpose.

Purpose	Count (approx.)
Assessment of coastal zone	65
Oil spill response	50
Assessment of fisheries	40
Assessment of ecosystems	35
Marine spatial planning	30
Urbanisation	25
Assessment of coastal erosion	15
Assessment of transportation	10
Assessment of environment	10
Assessment of water quality	10
Assessment of climate change	5
Assessment of marine resources	5

[View all assessment Reports](#)

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## Svalbard visit



- Norwegian Grant
- Field visit
- Workshop (2 days)
- University visit
- Work-sessions



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## Highlights

- Connected to interesting people and projects related to the Arctic.
- All challenges were discussed and expert inputs were given on the topic, as well as recommendations for the future.



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## Example: Fisheries

### Recommendations for science

- Collect information on bycatch of fisheries in the Arctic (on short time series are available and information for Arctic Ocean is lacking)
- Get a better understanding of fisheries in the Arctic Ocean and set up mechanisms how to monitor it (including a current baseline). No statistics on stocks in Arctic Ocean because current fisheries here is close to none. But the ocean is opening up due to climate change. Make sure monitoring is in place to assess current stocks and impacts of fisheries. No knowledge on Russian fisheries. Pinpoint some hot spots in region, because you can provide reliable information on landings, bycatch, and effort in e.g. Barents Sea, eastern Canadian waters (very open in sharing) and Bering Sea.
- Get a better understanding of habitat impacts due to bottom trawling fisheries in the Arctic by combining fisheries effort and habitat characteristics. Both are knowledge gaps. Can the Barents Sea information work as an example? Difficult is proof of impacts of the actual fisheries in the field.

### Recommended action points

- Include shell fish, crab and shrimp fisheries in the challenge as this is the main type of fisheries in some of the parts of the Arctic, for instance in eastern Canada, and also in the Barents Sea.
- Update international databases with national databases. International databases are often lagging 3 years behind and present data in a format that you don't have access to more details. How well do these large international databases perform? ICES data base should be up-to-date, although not all data are readily available from ICES.
- Improve access to existing data. Focus on some areas.

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## Example: SIOS

- Svalbard Integrated Arctic Earth Observing System
- Regional observing system for long-term measurements in and around Svalbard addressing Earth System Science questions
- The SIOS Knowledge Centre includes:
  - Integration and optimization of the observation system
  - Access to the research infrastructure
  - Data management, storing and curating of scientific data, both ground-based and from space
  - Utilization of remote sensing resources
  - Coordination of logistical services
  - Training and education programs

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## Example: field visit



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## Challenge leaders meeting

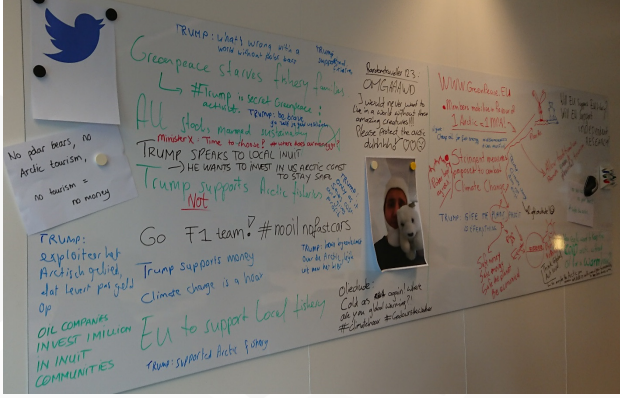
- Challenge walk-through, status updates
- Group exercises: outlook to the future
- Actions and recommendations
- A roleplay game

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## Roleplay game

- “Fresh” view on things
- Playful way to look at serious topics
- Result: List of wishes/ideas/visions for the future



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## Example of future research/actions

<i>wind farms</i>	Further research on impacts on sea level of turbine moorings. Study wind profiles at various levels. Refinement of existing grids.	
<i>Marine Protected Area</i>	Development of Arctic windfurbines.	
	Possibilities and use of MPAs in sea-ice habitats.	Adjust MPAs to new developments and the Arctic area.
<i>oil platform leak</i>	Habitat mapping, including benthic systems.	Create awareness of the MPAs, including the reasons behind them.
	Create overview of protected species in MPAs	Create quantitative targets in MPAs
<i>climate change</i>	Research the sensitivity of relevant species, including seasonality.	Monitor oil and gas development, develop risk analyses and mitigating measures.
	Oil slick behavior in cold regions and sea-ice in models.	
	Study CO <sub>2</sub> and salinity in the Arctic Ocean. Pain-Arctic approach on the study of zooplankton.	Standardization! Illustrate the positive feedback loop of climate change and use this for educational purposes.
<i>coasts</i>	Research of the melting permafrost and the subsequent effects.	
	Study trends in large mammals, ecosystem engineers, birds, etc.	
	Study the impact of climate change on indigenous Arctic cultures.	
	Focus on multi-year research on a select amount of stations instead of looking at many stations inconsequently.	
<i>fisheries management &amp; impact</i>	Standardization of coastal movements.	
	Explore the link between sea-ice and coastal movement. Explore the possibility of monitoring using remote sensing.	
	More information on Arctic fish habitats and benthic fisheries.	Catch and landing data standardization, including bycatch.

<i>river input</i>	Shrimp, shellfish and crab fisheries research. Multiyear monitoring at relevant locations.	Focus on standardization. Focus on the release of international datasources
<i>bathymetry</i>	Effects of changing rivers due to melting permafrost.	
	Focus fish research on relevant local species.	
<i>alien species</i>	Measure the remaining 89% unmapped area of the Arctic with multibeam.	
	Focus on shipping routes and ports.	
	Seabed mapping, including seabed habitats.	
<i>Other</i>	Focus on mapping the presence of invasive species in the Arctic.	Standardization of international methods.
	Develop innovative measurement methods.	Preventive measures
	Studies on the impact of invasive species in the Arctic.	
	Research fishery functions and shipping (use of the ocean). Not only monitoring but analysis and availability	Create alternatives for the Northern shipping routes (e.a. railways etc.)
	Harbor and port monitoring, biotic and abiotic factors.	Release of international data (Russian)


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## And now?

- Finish the challenges
- Update the website
- Expert panel round 2
- Reports



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