



CYMS V2

EUR: End-User Requirements



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1 Introduction

This document aims at presenting the end-user requirements gathered as part of the second edition of CYMS (CYclone Monitoring with Sentinel-1) project. It is based on the results from the questionnaire that was prepared in collaboration with Mercator Ocean international (MOi).

It was circulated to a selection of their users (~8000) which corresponds to those who used their account to access at least one dataset through the Marine Copernicus services. The audience was not restricted to direct wind data users since there can be many various indirect uses of this type of data.

The survey was written in collaboration with MOi and made available through Copernicus Marine Service from 14th December 2021 to 31st January 2022.

2 Questionnaire description

The present section describes the questionnaire. It is untitled: “General survey for high-resolution wind product needs”.

None of the answers was mandatory, most could accept multiple choices.

Introduction:

Mercator Ocean, as the entrusted entity by the European Commission for implementing a user-driven Copernicus Marine Service, is regularly sending surveys to collect your feedback and needs for new marine products. We are conducting this survey to collect your feedback and needs for high-resolution winds from spaceborne observations.

This questionnaire contains short multiple-choice questions, and will take 5 minutes of your time.

Please answer this questionnaire before xxx 2022.

Today, ocean surface wind observations derived from spaceborne radar instruments could provide unique high-resolution (~1km) description and wide swath coverage (several hundred kms) of extreme phenomena such as tropical cyclones, extra-tropical cyclones, polar lows, medicanes and more. Such high-resolution spaceborne wind products could be provided including close to the coast (1km), within short time latency (< 3 hours after data acquisition) and with wind processings adapted to intense winds (including >20 m/s, up to 80 m/s).

The present survey proposes to better understand your interest in such products

Q1: Have you ever **visualized** or **used** wind measurements from high-resolution spaceborne radar instruments...

	Yes	No
... in general?		
... over extremes?		

Q2: In terms of **spatial resolution**...

	What spatial resolution are you currently using for wind data (e.g. modeling or measurements) ?	What spatial resolution could you be using if higher resolution measurements were available?
100 m		
500 m		
1 km		
5 km		
10 km		
Others...		

Q3: What is your **region** of interest?

Coastal regions	
Open ocean	
European waters	
Tropical regions	
Other (please detail)	

Q4: In which economic sector are you working?

Maritime transport	
Oil & Gas	
Fish and aquaculture	
Tourism	
Port services	
Ship building	
Maritime security & defense	
Meteorological services	
Science (please detail)	

Q5: Do you think these measurements could **improve your service** in terms of ...

	Yes	No	Maybe
Business development? (e.g. bring new customers & services)?			
Operation planning? (e.g. secure operations at sea)			
Risks management? (e.g. better assess weather <i>warnings</i>)			
Other (please detail)			

Q6: What would be your time requirements in terms of...

	Analysis					Re-analysis	
	30 min	1h	3h	6h	1 day	1 month	1 year
Time latency (time between input data acquisition and							



wind availability)	product							
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	6h	1 day	3 days
Time sampling (frequency at which wind observations are sampled)			

Q7: Can you explain for **which** application and **how** you would use such measurements in the present and/or in the future?

E.g.: Operational forecasts of meteorological conditions, assimilation into numerical models, assessment of dangerous maritime transport conditions, better natural hazards characterization for insurance or other scientific/operational applications (please detail).

Q8: Would you like to be contacted as a **beta-tester** for the **evaluation** of these wind measurements from spaceborne radar instruments? If yes, please provide your email.

Q9: Do you have any additional comments to make about your interest in these wind measurements?



3 Questionnaire results

3.1 1st level analysis

298 answers were gathered. This corresponds to an average response rate of 3.75% which is judged nominal by MOI who is used to this type of questionnaire.

A first-level analysis is automatically produced for questions requiring no free-text answers. It is available at the following URL:

<https://servicedesk725361.typeform.com/report/nTjM4Pip/hShRz9U5J8YhQcjj>

The following screenshots are summarizing it down below:

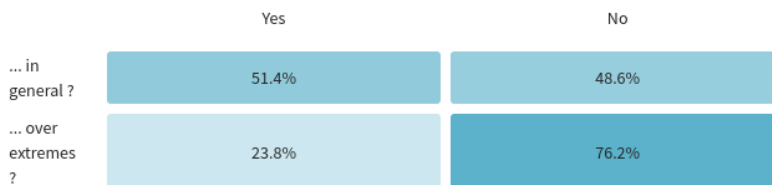
General survey for high-resolution wind product needs

298 responses



Have you ever visualized or used wind measurements from high-resolution spaceborne radar instruments...

292 out of 298 answered

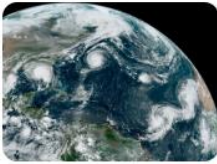




What type of wind data and spatial resolution are you currently using ?
When used, could you please tick the correct resolution ?

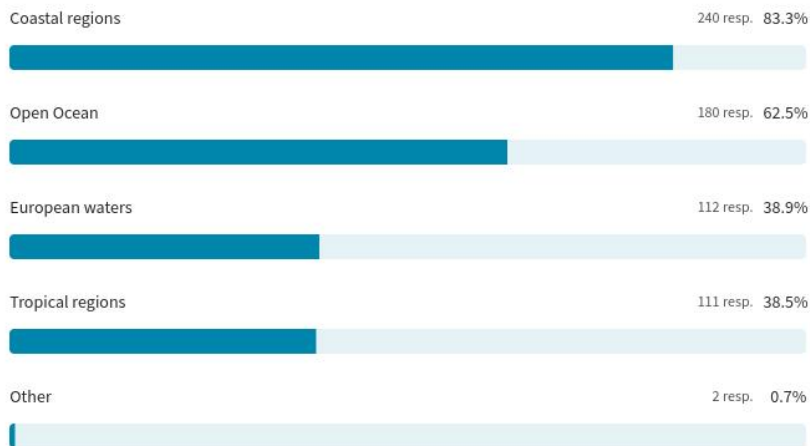
177 out of 298 answered

	Satellite observations	Numerical models	InSitu measurements
< 1km	28.5%	43.9%	67.5%
1km	39.6%	61.5%	33%
1-5 km	34.4%	76.2%	18.5%
5-20 km	48.6%	70.6%	11.9%
> 20 km	51%	58.7%	23.9%



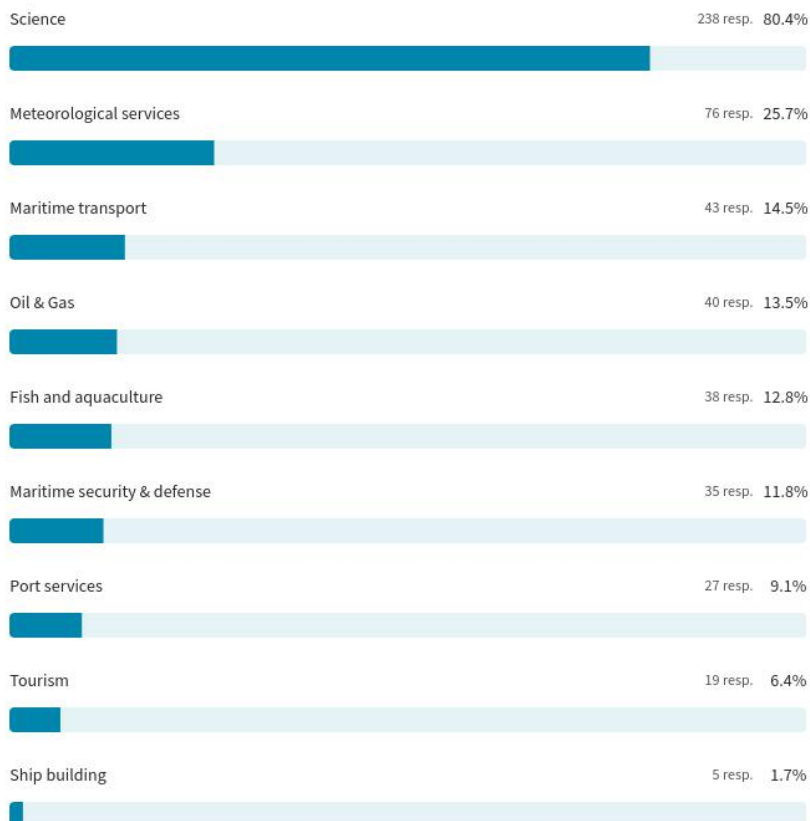
What is your region of interest ?

288 out of 298 answered



In which economic sector are you working ?

296 out of 298 answered





Do you think these measurements could improve your service in terms of ...

270 out of 298 answered

	Yes	No	Maybe
Business development? (e.g. bring...	41%	19.7%	39.4%
Operation planning? (e.g. secure...	66.2%	11.7%	22.2%
Risks management? (e.g. better...	72.6%	5.9%	21.5%



Do you think these measurements could improve your service in another way ?

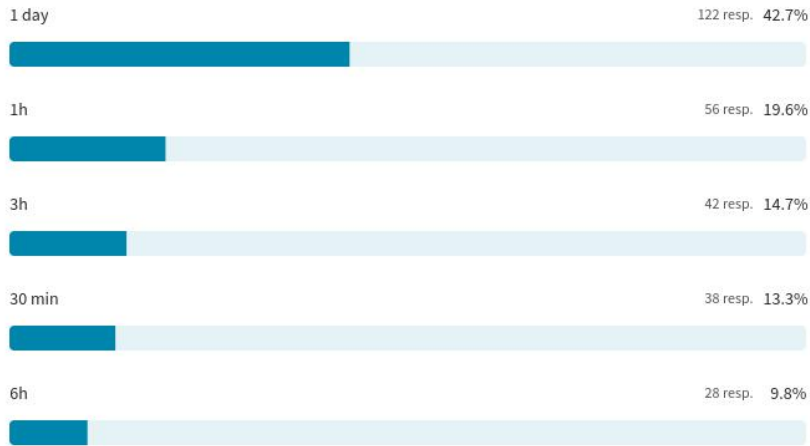
294 out of 298 answered





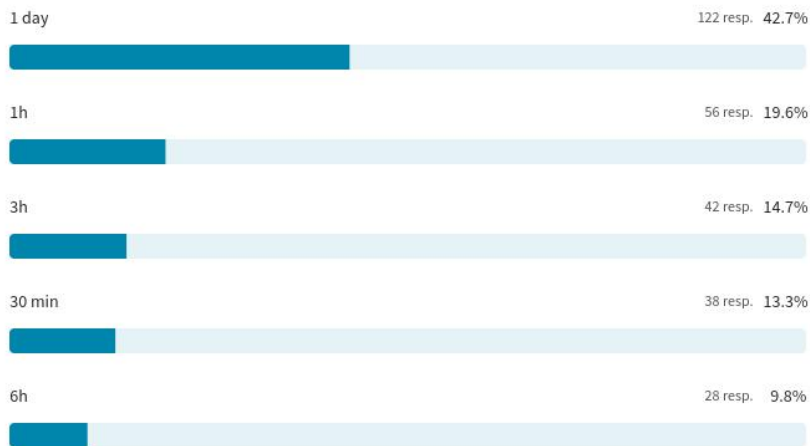
... **Time latency** (time between input data acquisition and wind product availability) for **Analysis** ?

286 out of 298 answered



... **Time latency** (time between input data acquisition and wind product availability) for **Analysis** ?

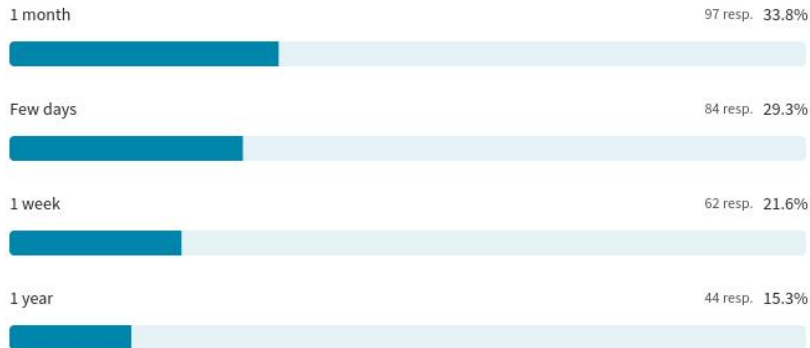
286 out of 298 answered





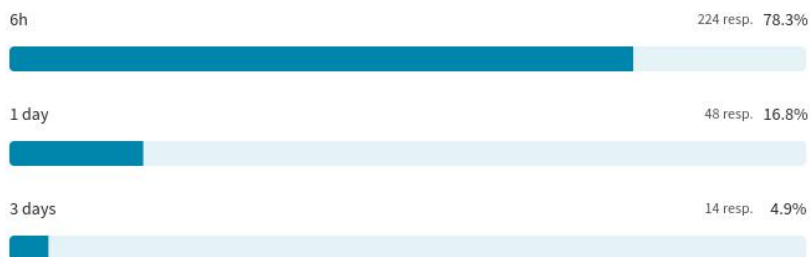
... **Time latency** (time between input data acquisition and wind product availability) for **Re-analysis** ?

287 out of 298 answered



... **Time sampling** (frequency at which wind observations are sampled over your area of interest) ?

286 out of 298 answered



during the first 6 months. It gathers end-user requirements on the most suitable way to operate the service and deliver them with the data produced by the project as well as some first example of data usage by end-users. This section was populated thanks to the discussion with end-users at the beginning and ahead of the project. The feedbacks on the provided service will be collected in another document.

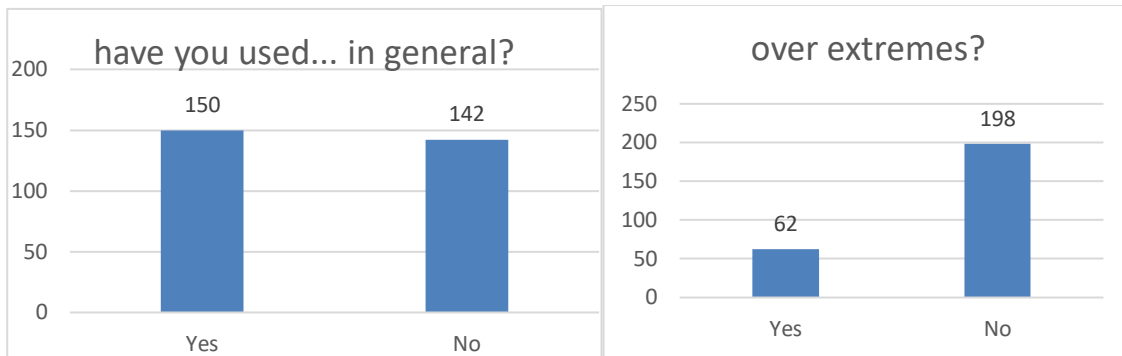
This document is organized in two main sections: In part one, all user requirements are gathered to present the broadest view on data and service usage, expected or experienced. In part two, the answers from each entity participating in the user requirements is provided, in order to understand and separate the needs for each of them.

3.2 In depth analysis

3.2.1 Use of high-resolution wind data

About half the users answering have used High-resolution wind data from radar satellites. They might mean different things by this)

Most not over extreme events.

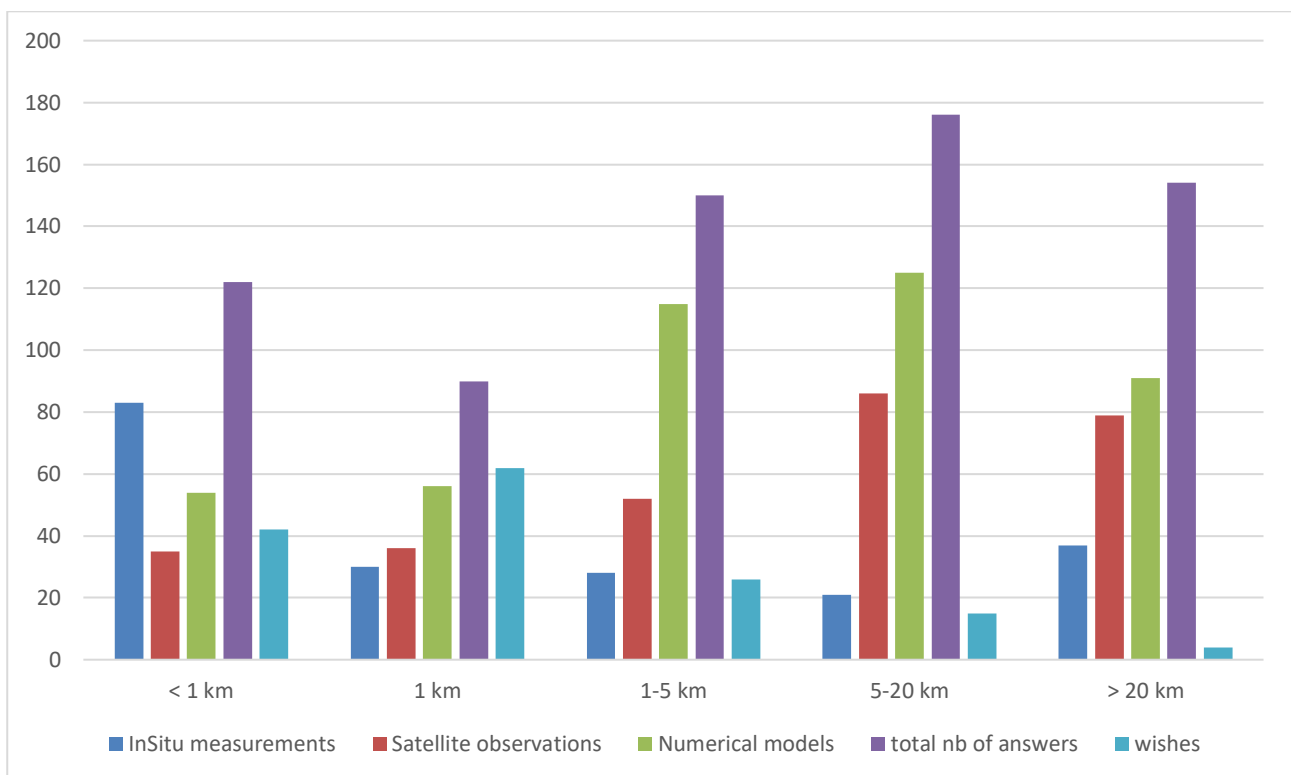


3.2.2 Data source vs resolution

This is extracted from the multiple choices questions ; The “wishes” statistics are compiled from free-text box.

Except for resolutions under 1 km (*in situ*), models are the most frequent data sources. Satellites are coming second best at all resolutions 1 km and above.

Satellites are used in addition to one or both other source(s) in about half the cases.



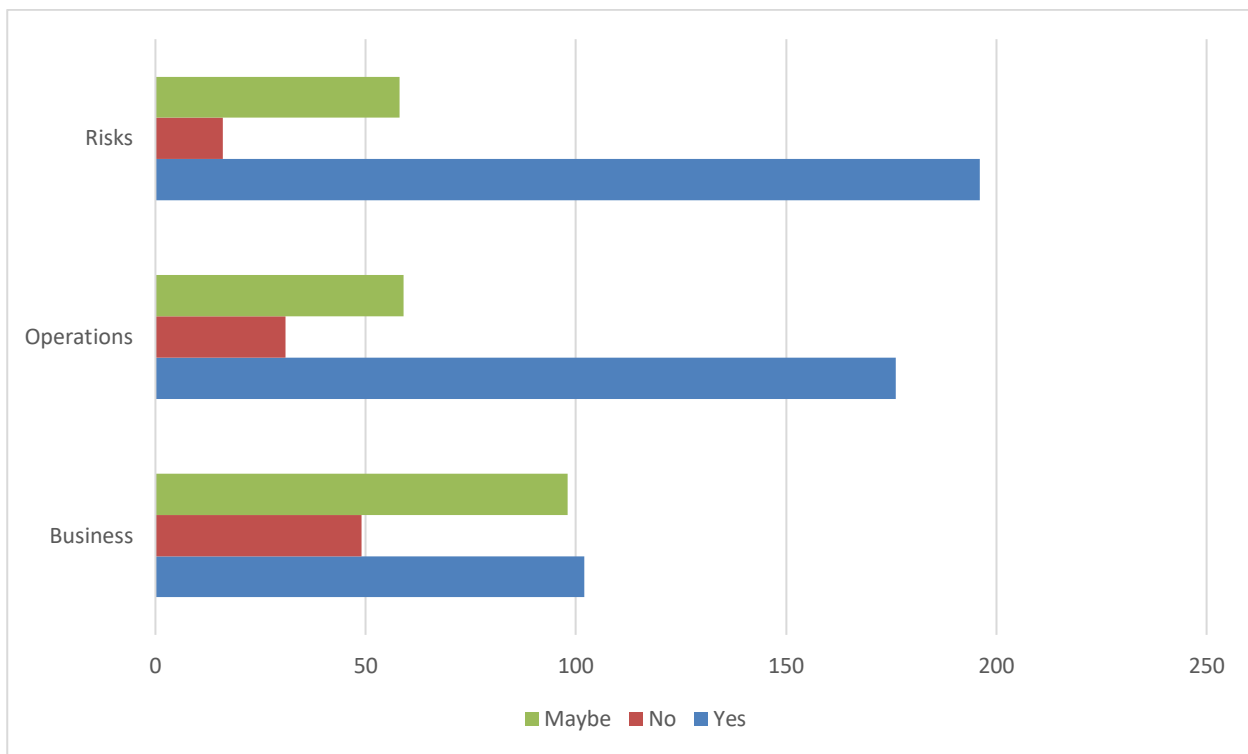
3.2.3 Expecting improvements & “regions”

Few users are expecting no improvement from the use of wind measurements from high-resolution spaceborne radar instruments. The highest expectation is for risk management.

Most users (71%) are also expecting improvement in other ways.

European waters well represented (in comparison with tropical regions). Most are interested in coastal regions, which does not preclude them to be also interested in the open ocean.

Coastal regions	Open Ocean	European waters	Tropical regions
240	180	112	111
81%	60%	38%	37%



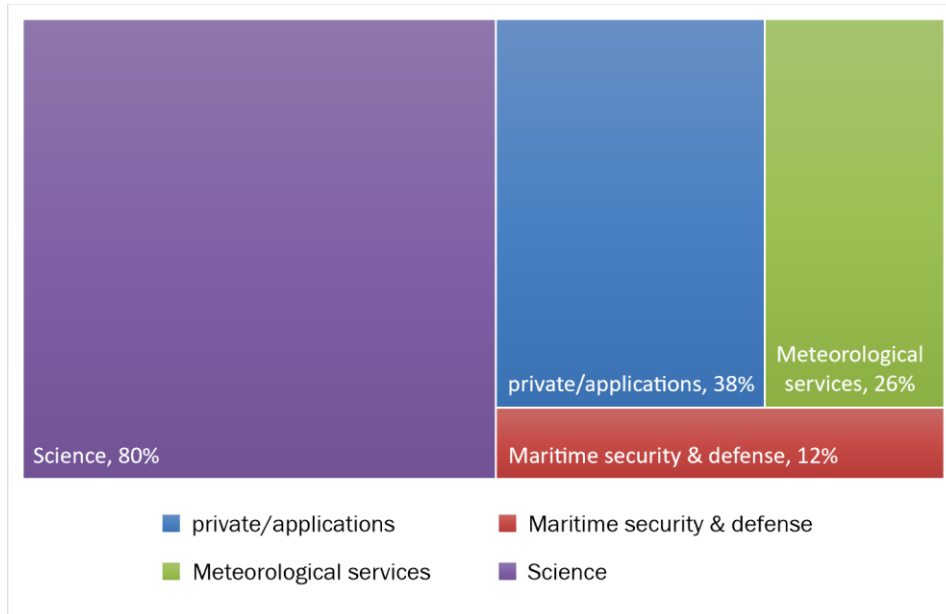
3.2.4 Field of work

This is extracted from multiple answers and only if the first question was answered “Yes” (Have you ever visualized or used wind measurements from high-resolution spaceborne radar instruments).

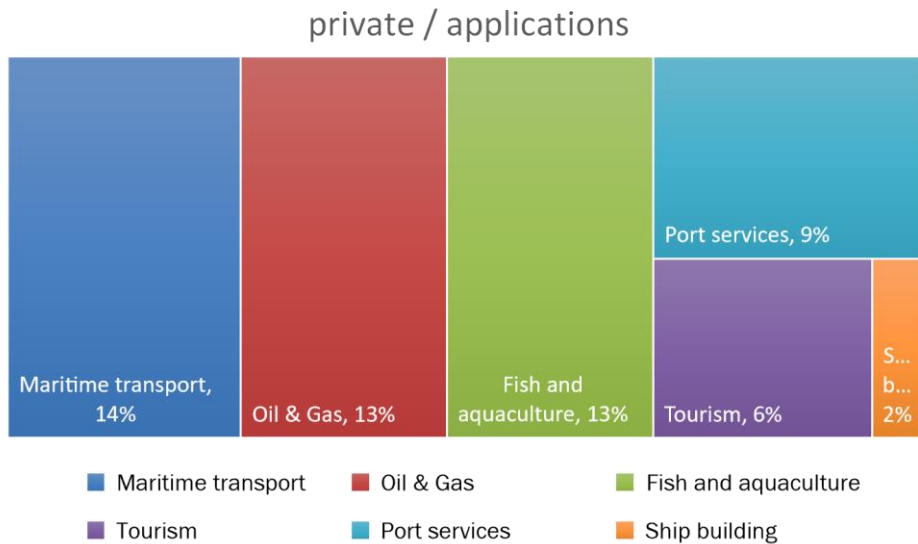
Most people (80%) ticked “Science”, even if more than a third (38%) also ticked one or several rather applicative field(s) of work.

Meteorological services was also often cited (26%).





About the same proportion (14 - 13%) of answers for Maritime transport, for Oil & Gas, Fish and for aquaculture (sometimes multiple answers).



3.2.5 Latency and sampling

The preferred latencies for receiving CYMS products after the data acquisition are:

- 1 day for analysis,
- 1 month / few days for reanalysis

The preferred time sampling (how often data is sampled) is 6 h.

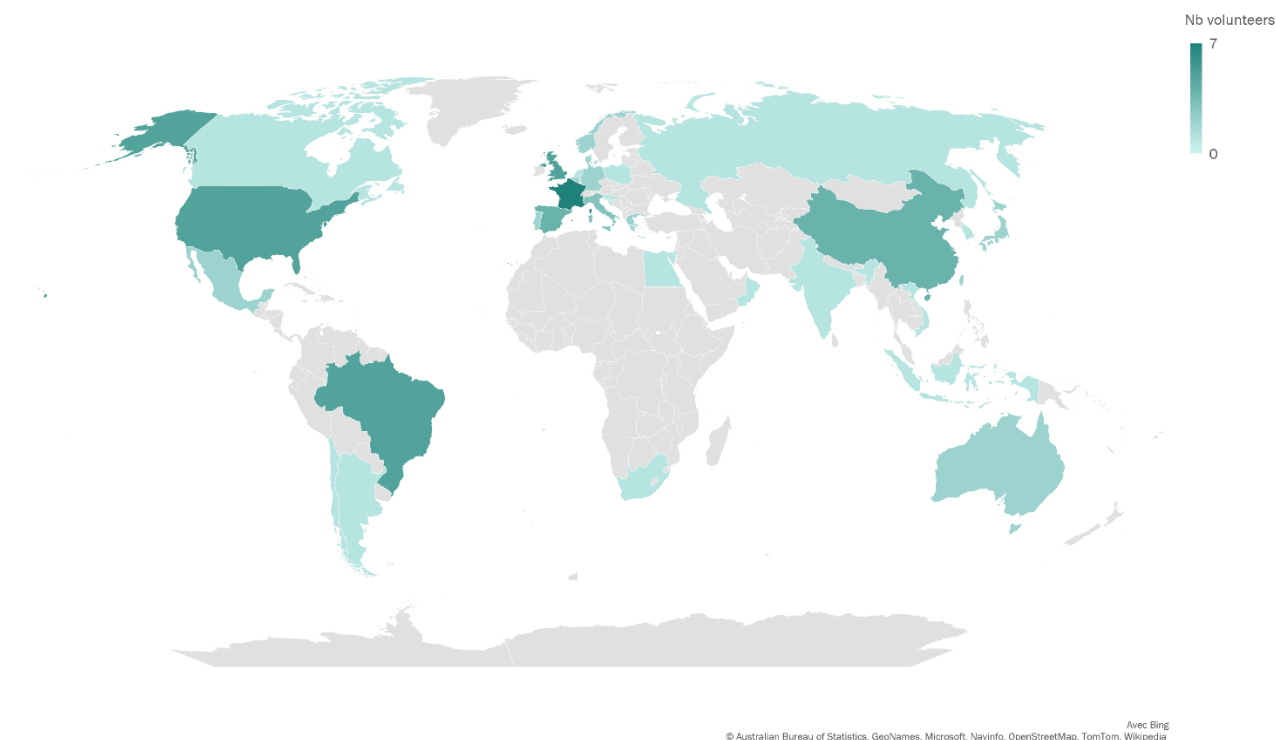
Time latency (analysis)		Time latency (reanalysis)		Time sampling	
30 min	38	1 week	62	6h	224
1h	56	Few days	84	1 day	48
3h	42	1 year	44	3 days	14
6h	28	1 month	97		
1 day	122				

3.2.6 Beta testers

127 people volunteered to become beta-testing (43%). Their distribution by countries was differentiated thanks to their email address and is indicated below:

- Europe (continent): 39
- European Union: 30
- Asia: 16
- North America: 8
- South America: 7
- Oceania: 2
- Africa: 2
- .com: 53

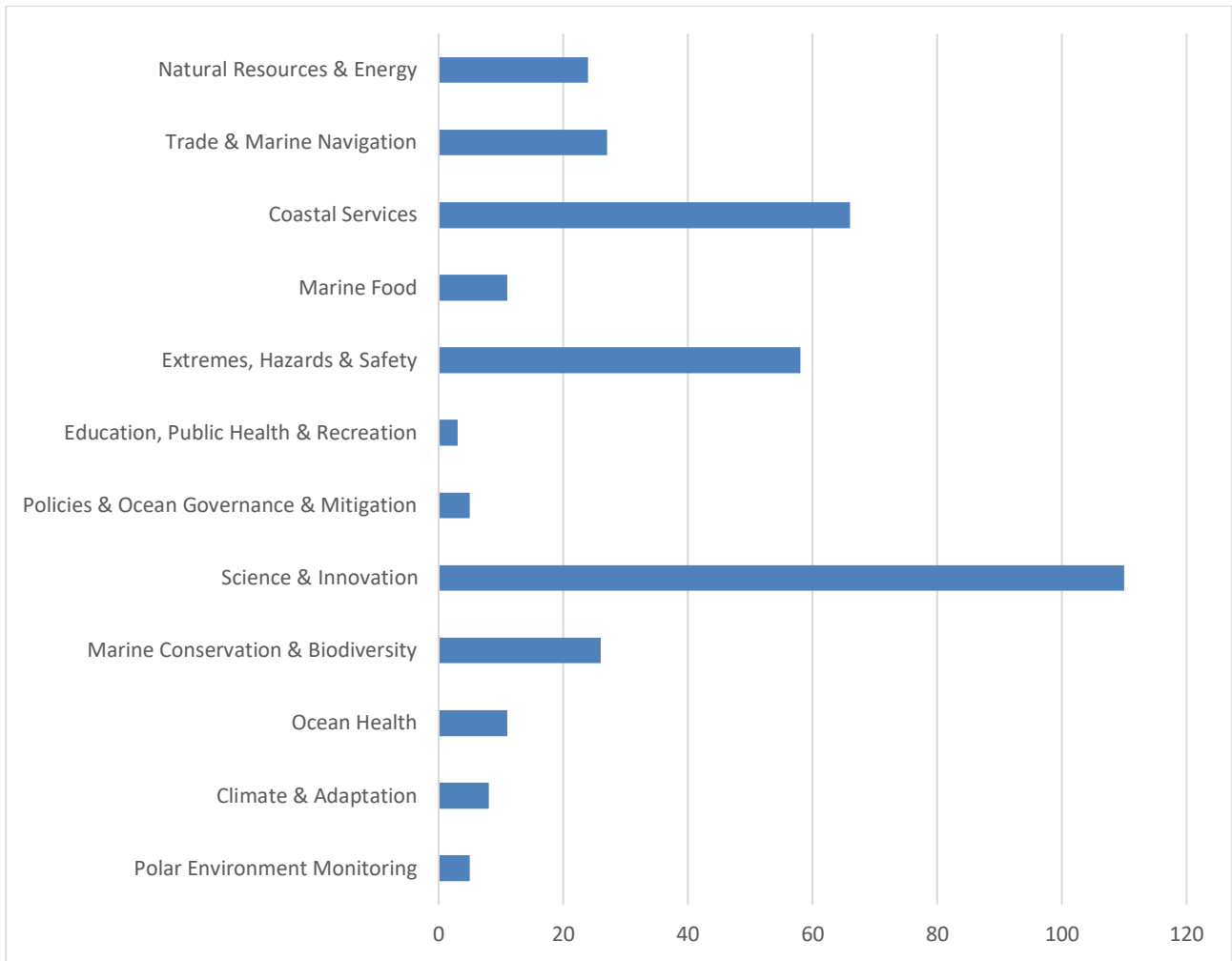
volunteers for Beta-testing (+ 53 .com, 2 .eu)



3.2.7 Free-text fields

Three free-text questions were proposed in the questionnaire. They have been analyzed and grouped in the following comments to provide information on the applications for the use of the CYMS data:

- 50 “green” applications (from plankton to whales, either fisheries or conservation) (227 “blue”, 6 polar)
- 24 renewable energy
- 58 on safety & extreme events
- a lot of numerical modelling (wave, currents, ChIA...)
- at least 64 “operational” use mentioned
- 66 ‘coastal’ uses mentioned
- a few pollution (oil, plastic)



4 Conclusion

To be done