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COMMISSION STAFF WORKING DOCUMENT

Green Paper.

**Marine Knowledge 2020: from seabed mapping to ocean forecasting
Outcome of Public Consultation**

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Table of Contents

1.	Executive summary	3
2.	Process.....	5
3.	Who replied.....	5
4.	Answers to questions.....	6
4.1.	Exceptions to the rule of free access	6
4.2.	Maintenance of data	8
4.3.	Thematic groups.....	9
4.4.	Balance between data and data products.....	11
4.5.	Common platform for GMES and EMODnet.....	12
4.6.	Copernicus climate service	14
4.7.	Re-use of fisheries data	15
4.8.	A fisheries portal for EMODnet.....	18
4.9.	VMS data	19
4.10.	Observation technology	21
4.11.	Data from research projects	22
4.12.	Environmental data	24
4.13.	Climate change.....	25
4.14.	International aspects.....	26
4.15.	Support to observation programmes	28
4.16.	Governance of EMODnet and GMES.....	29
4.17.	Joint Research Centre and the European Environment Agency	30
4.18.	Coordination at a sea-basin level	31
4.19.	Priorities for EU support	32
4.20.	Data from licensing.....	33
4.21.	Monitoring by private bodies	35
4.22.	Public-private partnerships.....	36
4.23.	Other business	37
5.	Next steps	39

1. EXECUTIVE SUMMARY

On 29 August 2012, the European Commission launched a Green Paper consultation¹ on its "Marine Knowledge 2020" initiative. The purpose was to learn more about stakeholders' opinions on options for future governance of the initiative and on the possible involvement of the private sector. The consultation was closed on 15 December 2012.

A total of 244 replies were received (29 from civil society, 43 from the private sector, 95 from the public sector and 77 from the research community) from 30 countries, including some from outside the EU whose waters touch those of Member States. Many of the submissions, especially those from national governments, had endured an extensive internal consultation process and, therefore, represented the balanced views of many organisations. This was considered a representative sample.

The consultation provided many detailed nuances on legal and technical issues that will be extremely useful for the next phase of "Marine Knowledge 2020" but the main messages were:

- (1) All user groups agreed on the need for open access to marine data, in both its raw and aggregated forms. The civil society consortium believes that the oceans are a common resource and, therefore, marine data should be made available without restriction, especially if collected using public funds. The private sector was largely in favour of free access except where commercial sensitivities could be exposed or the incentive to collect data in the first place destroyed. Public authorities felt it would lower the cost of monitoring the state of the environment. In particular, nearly all believed that it should be easier to obtain data from research projects.
- (2) A few exceptions were noted relating to: national security; damage to heritage sites and endangered ecosystems; commercial sensitivity; the need to allow scientists time to publish; and safety and liability issues due to data misinterpretation.
- (3) The general consensus was that a shared platform for disseminating fisheries data with other marine data, including that distributed through the EU's Copernicus space programme, should be a long-term aim. The eventual integration of these systems should enable seamless mapping of cross-cutting themes over different timescales. Interoperability of data and implementation of adequate quality control measures are key to achieving this.
- (4) The architecture of the current European Marine Observation and Data Network (EMODnet) - in particular the division into seven thematic groups – geology, bathymetry, physics, chemistry, biology, physical habitats and human activity – was considered sound.
- (5) The potential for the EMODnet initiative to assist with environmental or fisheries reporting was highlighted. Over time, the "push" process, whereby marine environment or fisheries reports are delivered by public authorities to satisfy a legal obligation, could be replaced by a "pull" process, whereby data are made available through the internet and harvested by the competent authority using common technology. This would reduce administrative burden.

¹ Green Paper "Marine Knowledge 2020: from seabed mapping to ocean forecasting", 29 August COM(2012) 473

- (6) There was overwhelming consensus on the need for mechanism to advise Member States and the EU on the most cost-effective sampling, surveying and observation programme for each sea-basin. The participation of science bodies, regional sea conventions, regional hydrographic commissions and those collecting the data was suggested. A regular process should take into account evolving needs and technology.
- (7) The private sector is keen to become more involved with data sharing initiatives such as EMODnet. Representatives of industrial sectors were broadly in favour of using their offshore facilities or vessels for wider monitoring of the oceans. However, they would prefer a non-legislative approach.
- (8) A number of observation technologies were suggested as requiring further research. Of these, novel sensors that can measure parameters automatically without the need to bring samples back to the laboratory were considered as being of high priority

All the replies are available through DG-MARE's website, as well as a summary report. Respondents were asked to check that the draft summary accurately reflected their views. Based on their feedback, a small number of minor corrections have been made. The final report will be the primary input for an impact assessment to determine how best to move forward and achieve the "Marine Knowledge 2020" of increased productivity for public authorities, private bodies and the research community, more innovation and reduced uncertainty in knowledge of the behaviour of the sea.

2. PROCESS

On 29 August 2012, the European Commission launched a Green Paper consultation² on its "Marine Knowledge 2020" initiative. The purpose of the consultation was to learn more about stakeholders' opinions on options for future governance of the initiative and on the possible involvement of the private sector.

The consultation was closed on 15 December 2012.

On 4 January 2013, all the individual replies were posted on DG-MARE's web-site together with a question-by-question analysis.

On 26 March 2013, a first draft of this document was circulated to those who had replied to the consultation, in order to check whether the summary accurately reflected their views. On the basis of the feedback, a small number of modifications were made but nearly all respondents agreed that the summary accurately reflected their views.

3. WHO REPLIED

244 replies were received to the consultation. Of these, approximately 60% were officially made on behalf of organisations. The rest were from individuals. The replies were then classified according to whether the organisation was a civil society³, a private company, a public authority or a research organisation. The individual replies were grouped together with the official replies on the basis that, whilst they may not have been officially endorsed, their views on average reflect their working experience and the values of their workplace.

In the absence of a suitable weighting mechanism, individual replies have been given the same weight as collective replies from organisations. However, it is accepted that some replies reflect a consolidated view taking into account internal consultations within a whole country or within an industry. So when these views will be considered as part of the subsequent impact assessment, some contributions will carry more weight than others.

As shown in Figure 1, the respondents were diverse in nature and geographical origin. International organisations were allocated to the country of their headquarters. The sample was considered satisfactory.

² Green Paper "Marine Knowledge 2020: from seabed mapping to ocean forecasting", 29 August COM(2012) 473

³ Environmental lobbyists, trade unionists etc.

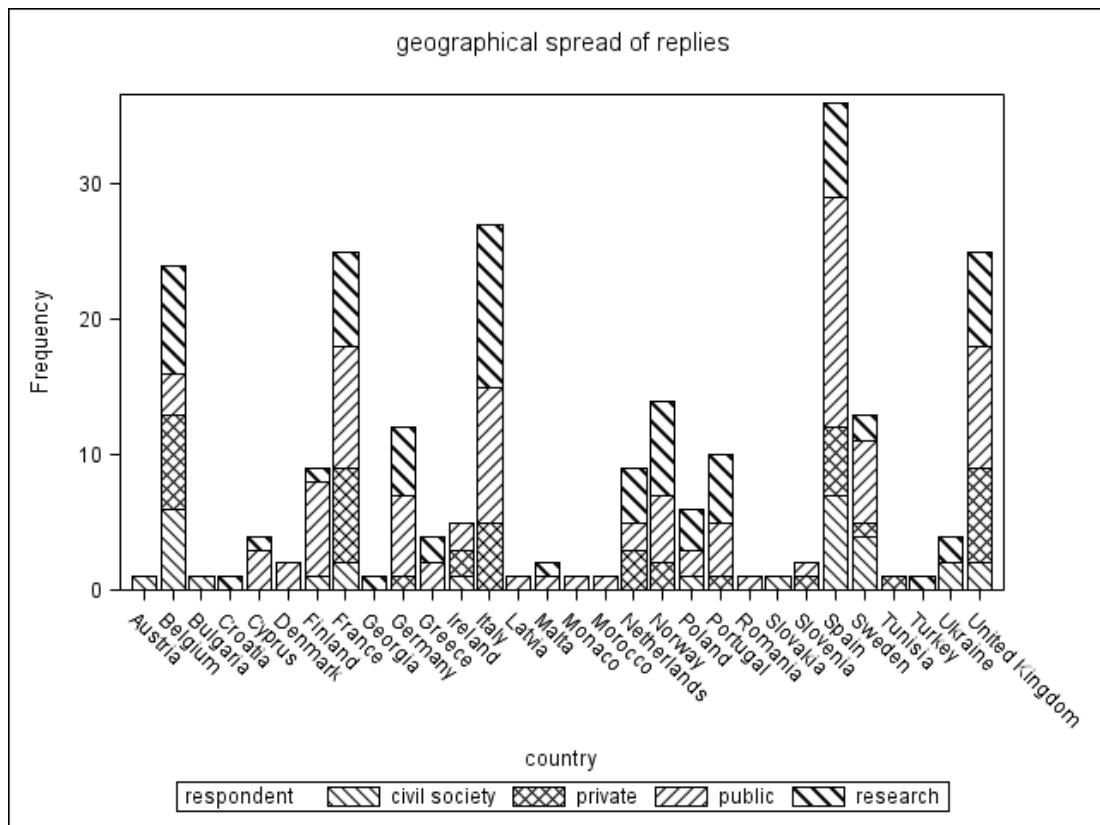


Figure 1: Geographical distribution of respondents

4. ANSWERS TO QUESTIONS

4.1. Exceptions to the rule of free access

Respondents were asked if they knew of any reasons why there should be exceptions – other than those related to personal privacy – to the Commission's policy of making marine data freely available and interoperable. Figure 2 summarises the responses.

Respondents agreed to the principle that marine data should be freely accessible, especially for data held by public bodies. The European Wind Energy Association, the coastal engineering group HR Wallingford and others from the private sector felt that this should be extended to data held by private businesses provided that the right to withhold access in certain cases is safeguarded. Particular exceptions indicated by respondents are:

- (1) where knowledge of special archaeological sites or habitats of endangered species could lead to their damage.
- (2) for reasons of "national security". In effect this means where knowledge of underwater topography could help the enemy locate friendly submarines or approach with their own submarines or invasion forces.
- (3) for commercial reasons, for instance where knowledge of movements of particular ships could lead to identification of those ships, and hence compromise commercially sensitive information. The Comité National des Pêches Maritimes et des Elevages Marins (National Committee on Marine Fisheries and Marine Aquaculture, France) felt that this could be the case for fishing vessels.

- (4) to give time for scientists who collected these data to have the first opportunity to publish the results. The Marine Research Division of AZTI Tecnalia (Spain) suggested a moratorium of two years. The French authorities suggested two to five years. Others, including SINTEF Fisheries and Aquaculture, felt that this holding back of data was detrimental because it means that the data are obsolete by the time they are published. The Geological Survey of the Netherlands believe that moratoria should be as short as possible.
- (5) The French authorities highlighted the need to clarify responsibilities. This is particularly the case for bathymetric data where inaccuracies could compromise safety. The Finnish hydrographic office felt that data used for safety of navigation purposes should be distributed only through hydrographic offices via well-established procedures.

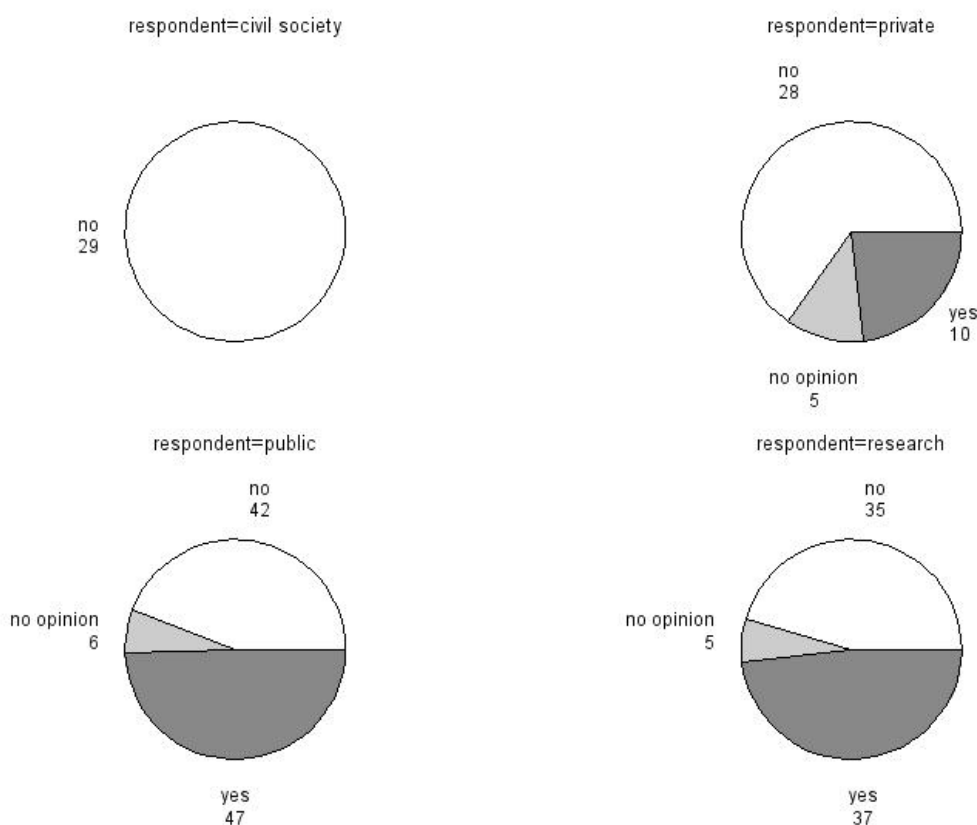


Figure 2: Are there any reasons why there should be exceptions, other than those related to personal privacy, to the Commission's policy of making marine data freely available and interoperable?

None of these exceptions to the general rule, if applied carefully and in moderation, violate the essential right to public access as enshrined in such legislation as the Public Sector Information Directive⁴. However, certain other possible reasons for non-disclosure are more nuanced and need a more careful assessment. For instance:

- (6) The UK government would not want any general rule on access to data to compromise the viability of publicly-owned Trading Funds⁵, which rely on sales of services. The national hydrographic offices of France, Greece, Italy, Sweden and Portugal also highlighted this potential threat to their income: the

⁴ Directive 2003/98/EC of 17 November 2003 on the re-use of public sector information
⁵ Such as the UK meteorological office and the hydrographic office

arrangement of who (the taxpayer versus the end-user) bears what cost is dictated by the national policies under which the organisations are required to operate and not by the organisations themselves. Moreover, Marine South East (UK) stressed the importance of a market for data to incentivise data collection in the first instance.

- (7) The Countryside Council of Wales was concerned about "*incorrect interpretation of [environmental] data.*" This would be contrary to the wish for a more open debate on environmental matters. All 29 civil society representatives were unanimous in declaring that there should be no access restrictions.

4.2. Maintenance of data

Respondents were asked to suggest how Member States might ensure that the data they hold are safely stored, available, and interoperable.

The central thesis of "Marine Knowledge 2020", that data should be gathered once and used many times, was endorsed by the UK government and others. A number of civil society organisations – Coalition Clean Baltic, Fundacja Nasza Ziemia (Our Earth Foundation), Oceana, Sea-Changers, The Pew Charitable Trusts, Ecologistas en Acción (Ecologists in Action) and the New Economics Foundation – delivered a consolidated reply on this and other questions. This was also found to be the case for Seas At Risk and the North Sea Foundation.

Particular points made were:

- (1) the need for common standards. This was stressed by practically everybody. The INSPIRE Directive⁶ (based on ISO 19115 and implemented by the Open Geospatial Consortium) was cited by the French authorities, Thetis SpA, HR Wallingford, Mainstream Renewable Power, the Danish Cadastre, the Latvian Transport Ministry and others. The International Council for the Exploration of the Sea (ICES), who have considerable experience of the matter, agreed but pointed out that "*the landscape is complex and there will be much data not in the scope of such directives so it should not be viewed as the entire solution, only a partial answer.*" The National Hellenic Research Centre and others recognised the role that EU efforts such as SeaDataNet and EMODnet have played. Hydrographic offices use the newly developed S-100⁷, which ensures compatibility with the international standard for geographic information (ISO-19100). The civil society grouping argued for documentation in "*major EU languages (and at least English).*"
- (2) the use of national databases. The European Wind Energy Association felt that having just one might aid standardisation. The Geological Survey of Ireland advocated "National Marine Data Centres". These could be hubs of a distributed system. A number of respondents, including Mainstream Renewable Power, the Countryside Council for Wales, English Heritage and the Scottish government, cited the UK's MEDIN (Marine Environmental Data & Information Network) system as an example to follow. The Netherlands is creating a national subsurface database for land and sea and the Schleswig

⁶ Directive 2007/2/EC of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community

⁷ International Hydrographic Organisation geospatial standard for modelling marine data and information, introduced in January 2010

Holstein Economic Ministry (Germany) referred to the German MaNIDA (Marine Network for Integrated Data Access) Portal and MDI-DE (Marine Daten Infrastruktur Deutschland) initiative.

- (3) the need to publish data in machine-readable formats. The practice of some Member States of publishing fisheries funding in portable document format was criticised by numerous civil society organisations.
- (4) The civil society grouping forcefully argued for the need to access raw data so that they can check aggregated indicators and understand the uncertainties.
- (5) The usefulness of machine-to-machine communications through web services to increase reactivity was emphasised by the Swedish Meteorological and Hydrological Institute.
- (6) A private consultancy recommended that handover of data to national data centres should be a condition of public contracts, including those for research.
- (7) The European Marine Board considered that Member States could also consider establishing a national platform to ensure certification and quality control at the Member State level. National hydrographic offices have undertaken to be ISO-9001 certified and the International Hydrographic Organisation recommends that a certified quality management system be in place for the production and maintenance of Electronic Navigational Charts. The IHO Data Centre for Digital Bathymetry and the IHO co-sponsorship and management, with UNESCO-IOC, of the GEBCO programme were further mentioned as current examples of good practice. This is particularly important for applications such as navigation where human life and issuers of liability are at stake.
- (8) Many public and private organisations, including the Flanders Marine Institute, the European Wind Energy Association, Thetis SpA and the Comité de Liaison des Géomètres Européens (Liaison Committee of European Surveyors), expressed concern over data traceability and quality control. It is generally expected that data providers should assume responsibility for the data that they are sharing according to a set of pre-defined protocols. The Prime Minister's Office, Finland, highlighted the need for data traceability via standardised metadata descriptions.
- (9) A private consultant thought that Member States need to cooperate on a regional level to agree on sampling procedures, data collection routines, and storage mechanisms. The European Marine Board, the Geological Survey of Ireland, the Netherlands Ministry of Infrastructure and Environment and others suggested the EuroGOOS⁸ (European Global Ocean Observing System) regional system as a starting point for enabling cooperation at a regional level. The marine convention responsible for the north east Atlantic, OSPAR, is currently undertaking a review of the management arrangements in place for its data streams to ensure that they are safely stored, available and interoperable.

4.3. Thematic groups

The European Marine Observation and Data Network, EMODnet, is built on seven thematic groups. These are hydrography, geology, physical habitats, physics, chemistry, biology and human activity. The distinction between these groups is, on

⁸ EuroGOOS is a partner in the physical parameters group of EMODnet.

the whole, clear but there are some grey areas. For instance hydrographers and geologists use multibeam echosounders to survey the seabed. The Green Paper asked whether these groups were appropriate or whether an alternative grouping would be more efficient. Figure 3 summarises the responses.

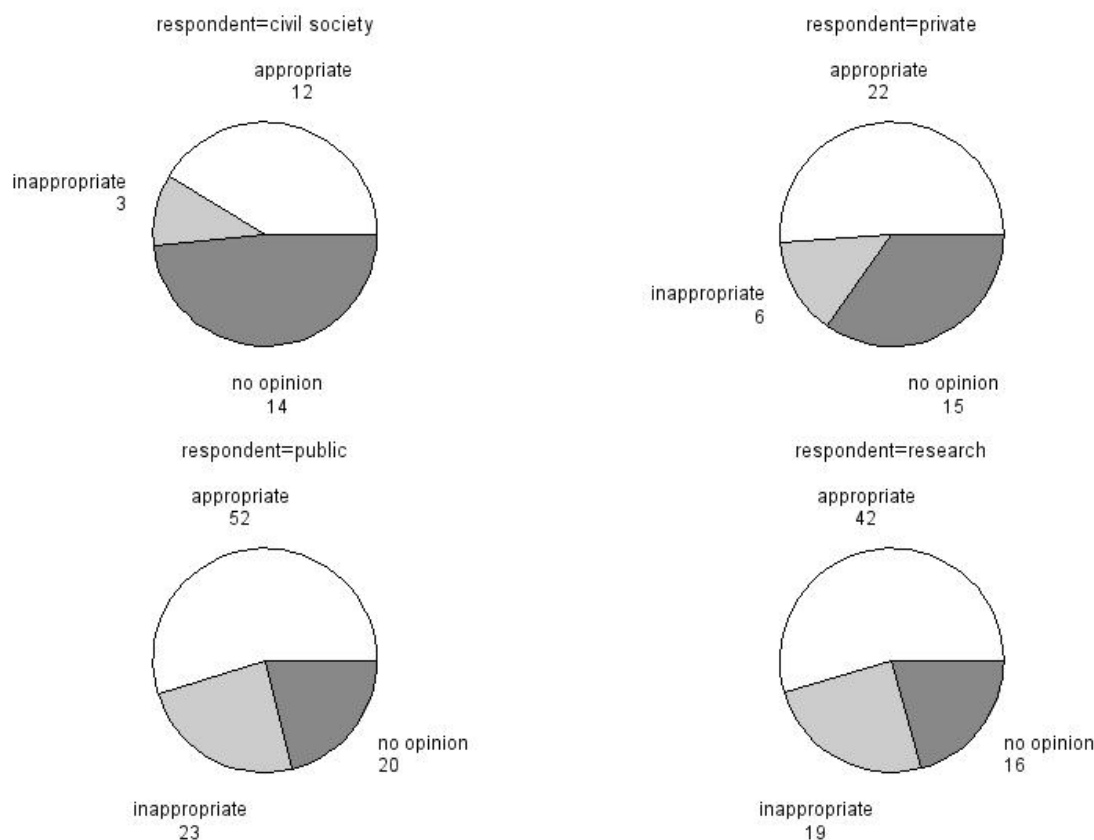


Figure 3: Are the seven thematic groups of the European Marine Observation and Data Network the most appropriate? Should some be combined (e.g. geology and hydrography) or should some be divided?

Those who replied to this question, including representatives of the hydrographic and geological communities, largely agreed that the seven groups were the best compromise, at least for the next phase of EMODnet that starts in 2014. The need to ensure that the groups meet regularly to avoid divergence and to provide a portal giving access to data and data products from all groups was emphasised. This is already being taken care of. Regular six-monthly meetings allow the groups to exchange information. An entry portal for EMODnet will begin operations in 2013.

The Comité de Liaison des Géomètres Européens and the Ordre des Géomètres Experts (Order of Surveyors, France) provided a consolidated response, advocating the addition of two further thematic groups, namely Law and Climate Change. The Netherlands Ministry of Infrastructure and Environment and SeaDataNet Research Infrastructure both suggested Fisheries as a further option. Both public and private organisations have expressed doubt over the broadness of the Human Activities theme. Heritage groups, including the Association of German State Archaeologists, English Heritage and the Flanders Heritage Agency, felt that underwater cultural heritage was not adequately represented by the thematic groups.

4.4. Balance between data and data products

Respondents were asked what should be the balance between providing access to raw data and developing digital map layers derived from the raw data across sea-basins. Figure 4 summarises the responses.

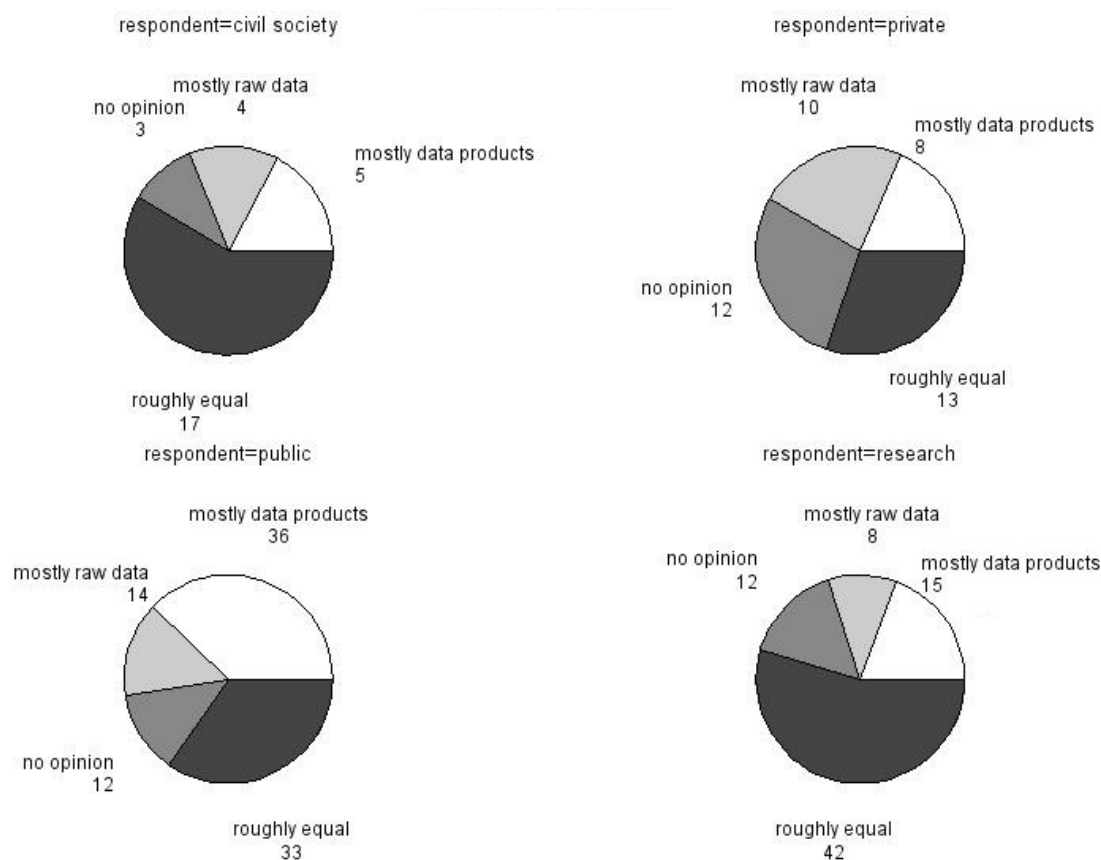


Figure 4: What should be the balance in EMODnet between providing access to raw data and developing digital map layers derived from the raw data across sea basins?

EMODnet delivers access to raw data and data products such as digital terrain models and geological maps. A number of arguments were presented indicating that both are needed but that careful thought needs to be given to the right balance.

- (1) The French authorities felt that the answer depends on the degree of complexity of the raw data. Users can handle simple measurements such as salinity or temperature but not more complex ones such as ecosystem, indicators. The Geological Survey of the Netherlands stressed the importance of providing useful and comprehensible data and associated products as opposed to "access for the sake of access." The Geological Survey of Finland gave a response along the same lines, emphasising the difficulties in using raw geological data, a "mosaic of different echosounding, seismic and sidescan profiles, together with multibeam echosounder data, ground truth data (...) as well as diver or sometimes even submersible observation, [which] alone do not give very much of relevant information to someone who is not an expert on (the local) geology."
- (2) The Regione Emilia Romagna (DG ENV) and Marine Scotland felt that the decision to provide raw data or its associated products depends on the scale.

- (3) The hydrography community felt that *"the characteristics of hydrographic surveys preclude open access to the raw data due to the volume and the complexity of the parameters involved. The development of standardized products (including high resolution digital terrain models when applicable) should be preferred."* These data products should be based on the newly developed S-100 standard. Similar sentiments were shared by the geological representation.
- (4) Some respondents, such as Ifremer, OSPAR and the civil society consortium, emphasised the importance of raw data in order to provide users with the maximum knowledge of the quality and applicability of the data. HR Wallingford felt that EMODnet should focus its efforts on providing quality assured raw data, instead of overburdening itself with data processing concerns. Many respondents indicated the need to convert raw data to usable units prior to sharing.
- (5) The need to leave room for the private sector to develop value-added products was frequently emphasised. Marine South East indicated that *"EMODnet should provide the data access infrastructure, but value-added services will be developed more by entrepreneurial activity."* Marine Scotland made the point that EMODnet should not go too far with data products and *"must not take away the ability of the commercial sector to deliver derived products."* The Norwegian Fisheries Directorate made a similar point: *"providing mostly raw data should not exclude EMODnet from providing data products where a societal need cannot be expected to be met by applications from industry at a reasonable cost."* The Geological Survey of Ireland indicated that *"if EMODnet could ensure the core suites of data in the thematic areas are available, the production of local products should be done by individual institutes and companies rather than by EMODnet."* The Netherlands Ministry of Infrastructure and Environment suggested a hierarchy of data products, in which commercial data providers share restricted data via an intermediate data product. This would give them the *"opportunity to advertise their data and skills for more detailed and precise data products."*
- (6) Many respondents indicated that raw data should remain with Member States. EMODnet would provide access to these data as required and also deliver its own data products.
- (7) The Countryside Council for Wales indicated that the effort of producing data products is only worthwhile if they are fit for purpose: *"before starting a programme of data interpretation, the end users must be identified and their requirements carefully considered."*

4.5. Common platform for GMES and EMODnet

Those involved with the construction of EMODnet and the Copernicus marine service (formerly known as GMES) are well aware of the distinct nature of the two initiatives. However, for those whose knowledge is not so intimate, the difference between the two is not entirely obvious and can be confusing. There is, therefore, behind the scenes an ongoing effort to share systems for data storage and communication. It is intended that this work should progressively lead to further integration. Respondents to the Green Paper were asked how this collaboration should continue in the future. Figure 5 summarises the responses.

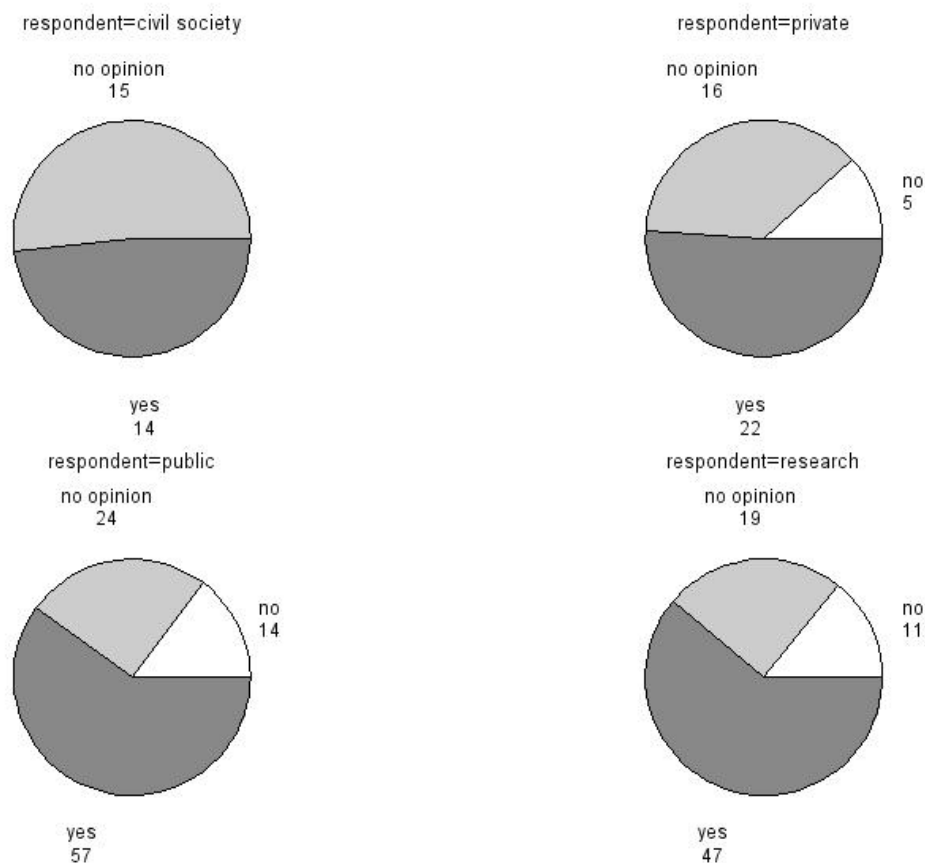


Figure 5: Should a common platform be set up to deliver products from both GMES and EMODnet?

The responses revealed a broad wish for the two initiatives to continue to explore all possibilities to share facilities. Different views were expressed as to how far the two initiatives could converge.

- (1) The need to share was expressed in various ways – MRAG argued for "cross delivery". The Netherlands Ministry of Infrastructure and Environment was aware of the ongoing convergence work and pointed out that a *"common platform is not required in case interoperability principles are adopted."* This point about interoperability was echoed by the University of Liege and the International Association of Oil and Gas Producers.
- (2) The ideal of a "one-stop shop" as a long-term aim was expressed by the HELCOM secretariat, amongst others.
- (3) However, many respondents adopted a cautious "one step at a time" approach. The UK government said *"in the short term it may be preferable to retain separate access to products from GMES and EMODnet as GMES is more tightly focused and tailored to existing customer needs. GMES and EMODnet should eventually become part of one coherent information system, but the sources that deliver products need to be clearly labelled as being from EMODnet or MyOcean."* A public research body put it in another way: *"complex data portals tend to become very difficult to search and handle. This could be done in a future development when the basic structure of each is in place."*

- (4) A large number of respondents thought that Copernicus was distinguishable by the delivery of real-time data, although EMODnet too is moving in this direction. As such, Ifremer recommended *"to keep separated these two infrastructures while securing and maintaining an interactive mechanism between them through specific tools."* Similarly, the European Marine Board emphasised the requirement for interoperability between the platforms, saying *"this does not necessarily dictate that GMES and EMODnet platforms need to be fully merged, particularly if merging delayed-mode and real-time data streams causes technical problems."*
- (5) The French authorities thought it useful to distinguish between measured parameters and those derived from models. This distinction is not absolute - many data products, such as geological sediment maps, require some sort of interpolation between the measurement points. Moreover, the Geological Survey of Ireland pointed out that *"GMES marine products and services increasingly use historical time-series datasets for calibration and validation."* There are no plans for EMODnet to deliver forecasts whereas oceanographic forecasts are the flagship products of the Copernicus marine service.
- (6) A number of respondents were in favour of a shared platform to improve cost-effectiveness brought about by operational synergies.

4.6. Copernicus climate service

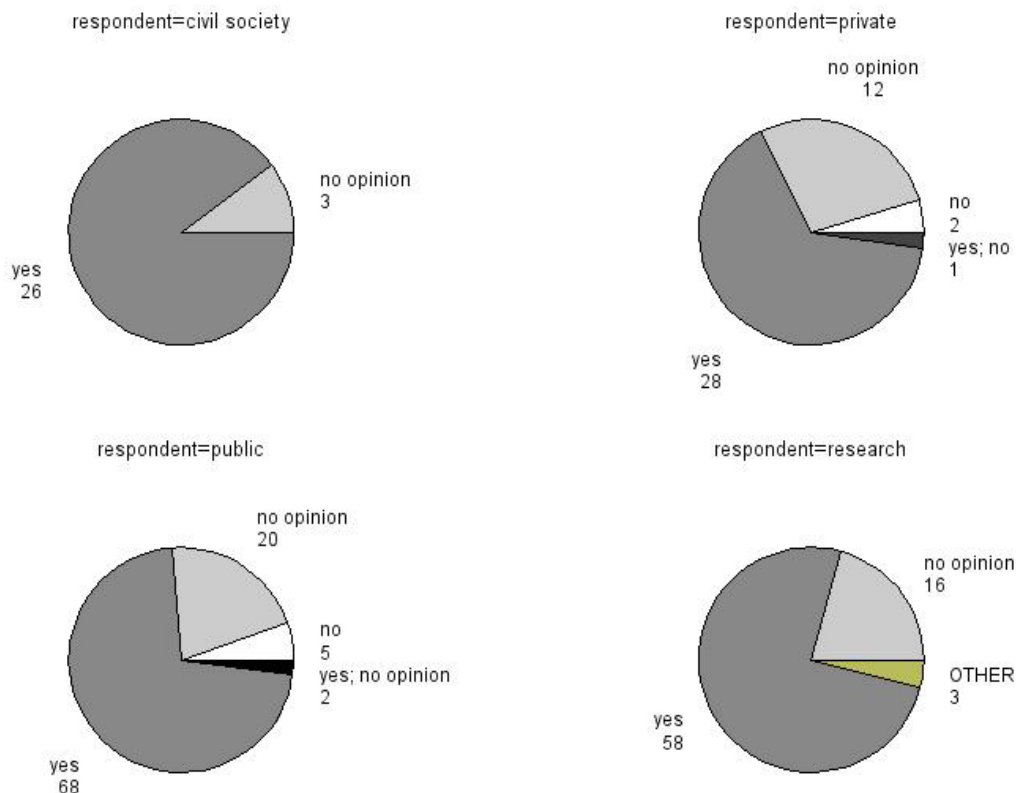


Figure 6: Should the GMES marine products and service also be tailored for use by those studying climate change and environmental protection as well as those needing a near-real-time operational service?

The products offered by the Copernicus marine service have been progressively defined, developed and tested in the two MyOcean prototypes. This will be joined by a new climate service, which should deliver essential climate variables, climate

analyses and projections. The back office infrastructure needed to provide these climate services for the 71% of the planet's surface that is ocean – an easy-to-access structured database of measurements – is practically identical to that required to prepare an accurate forecasting service. The Green Paper asked to what extent the current marine service could be tailored to meet the needs of those interested in climate change. Figure 6 summarises the responses.

Points to note include:

- (1) Some pointed out that the Copernicus marine service is already moving in this direction. The Gruppo Nazionale di Oceanografia Operativa (National Group of Operational Oceanographers, Italy) asserted that "*this production of climate change and environmental protection products (MSFD) is already an act in MyOcean2.*" The French authorities made the same point.
- (2) The Geological Survey of Finland and others highlighted the need to make use of investments already made: "*GMES historical data would be good at least in interpretation of recent environmental change which is important in future climate change predictions.*" The Azores Regional Directorate for Sea Affairs was in favour of "*greater use of an existing system, without need of too much extra effort and investment.*"
- (3) A public research organisation warned against artificial barriers between different applications: "*the data should be made available for as wide a range of uses and users as possible. Frequently the unexpected and unforeseen use may be the most valuable.*"
- (4) Some respondents questioned the ability of GMES to do provide both real-time information and undertake historical analysis well. Marine Scotland said that it would prefer for GMES "*to do one thing well (near real-time operational services) rather than multiple things poorly.*" Prioritisation of real-time operational analyses was advocated by many respondents who answered "yes" to the question.

4.7. Re-use of fisheries data

Assessment or management of a fishery requires assembly of data from all the flag states that participate in that fishery. However, others wishing to check the analysis must request authorisation from each individual flag state. This is so complicated that nobody does it. One consultant likened the Data Collection Framework (DCF) to a black hole where data go in but do not come out. The Green Paper asked whether the current rules and practices are reasonable. Figure 7 summarises the responses.

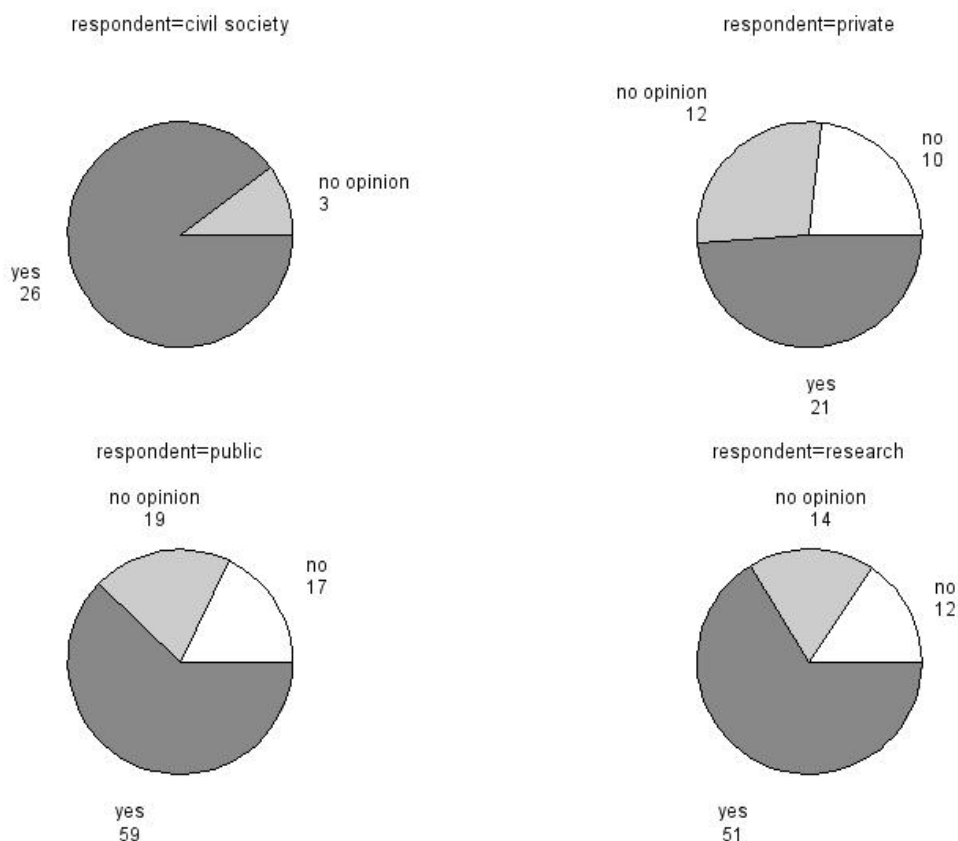


Figure 7: Should data that are assembled under the Data Collection Framework for a particular purpose such as a fish stock assessment be available for re-use without the requirement to obtain authorisation from the original providers of these data?

Points of interest include:

- (1) The civil society respondents were unanimous in requesting unfettered public access to these data. They argued that EU fisheries are not required to compensate the public for the opportunity to exploit a public resource and that the taxpayer pays for the management of fish stocks. The public, therefore, should at least have the right to know what is going on. In the same vein, the European Marine Board pointed out that many marine and maritime sectors (e.g. gravel extraction, offshore energy producers) are already required to make data openly available, particularly as a condition for obtaining a licence for commercial operations, and there is no reason why fisheries should be different.
- (2) A large proportion of civil society respondents (in answer to question 22) also indicated that Member States persistently denying access to data should have their EU funding for data collection reduced. Alternatively, The Pew Charitable Trusts proposed that offending Member States should have funding for projects other than data collection (e.g. for modernisation of fishing fleets) withheld, since funding for data collection is already limited.
- (3) Some public authorities and research establishments, such as OGS (Italy), the Swedish Maritime and Hydrographic Agency and the Portuguese Hydrographic Institute, were comfortable with the maxim that re-use of data should require authorisation from the original providers.

- (4) Others, such as the Azores Regional Directorate for Sea Affairs, felt that the high level of EU support to data collection justified a greater openness. The Prime Minister's Office, Finland, thought that authorisations reduced efficiency. The Countryside Council of Wales agreed and indicated that they could cause a logjam. The Thünen-Institute of Sea Fisheries (Germany) asserted that *"it is most difficult to obtain permission from all member states to use e.g. international log book or VMS data, although the data is available in a common format and theoretically easy to access."*
- (5) The geological survey for the Netherlands pointed out that *"greater openness will encourage the use of such data in multi- and interdisciplinary studies and by non-experts. When data are assessed from a broader or outside perspective, new relationships are often found and quantified."* The Flanders Marine Institute agreed. They felt that *"data sharing gives everybody the possibility to do their own data assessments."* The Netherlands Ministry of Infrastructure and Environment thought that fisheries could be an eighth EMODnet theme, as did the SeaDataNet Research Infrastructure. Marine Scotland felt that greater openness could help reporting under the Marine Strategy Framework Directive⁹ (MSFD). Region Västra Götaland, Sweden, thought that greater openness was feasible.
- (6) OSPAR was keen to have access to fisheries data and data products to support its efforts in the establishment of marine biodiversity indicators in a cost-effective manner: *"(...) raw data from fisheries surveys and other, that are used for stock assessment, would be useful to assess biodiversity for mobile species (fish and cephalopods)."* It added that *"data on pressures on the marine environment for the Marine Strategy Framework Directive at the appropriate scale is an additional important use of data which could be facilitated with an appropriate data access and reuse policy."*
- (7) Others argued that the data are so special that only properly qualified experts are capable of interpreting them "correctly". The Geological Survey of Ireland argued that *"these data sets require experts who know the data and its origins to analyse it properly. Open access will lead to misinterpretation and additional (and alternative) forms of advice."* Moreover, the Comité National des Pêches Maritimes et des Elevages Marins questioned the re-use of data that was originally collected for a purpose other than that for which it is subsequently required. A number of research bodies concurred, with one saying *"it is crucial to involve the data collectors in any further analysis."*
- (8) There was mixed reaction from organisations that are directly involved with fisheries management and scientific advice. Ifremer were cautious. They thought that only aggregated data should be released in order to preserve the confidentiality of fishermen. The Norwegian Fisheries Directorate thought that it would be possible to facilitate access provided concerns about individual privacy were met. The Consejería de Agricultura Pesca y Medio Ambiente Andalucía (Ministry of Agriculture, Fisheries and Environment, Andalucía) felt that it would be possible to be more open whilst respecting personal privacy and commercial confidentiality. ICES was in favour of this suggestion, but felt that where there were existing legal/distribution agreements between data

⁹ Directive 2008/56/EC of 17 June 2008 on the protection of the marine environment across Europe

provider and data disseminator, these should be honoured when re-distributing data that is not owned by the disseminator.

- (9) The French Authorities and the UK government were concerned about possible losses of income to organisations holding data that might result from freer access. The Romanian Parliament also made this point. The Poland Ministry of Transport and Maritime Economy thought it sufficient that ICES has unrestricted access to fisheries data.

4.8. A fisheries portal for EMODnet

The portals of EMODnet offer access to data, metadata and data products. Since fisheries data is already funded separately under the Data Collection Regulation the EMODnet biology portal does not include fisheries. Respondents were asked if an internet portal similar to those used for EMODnet should be set up to provide access to fisheries data held by Member States and how this could be linked to EMODnet. Figure 8 summarises the responses.

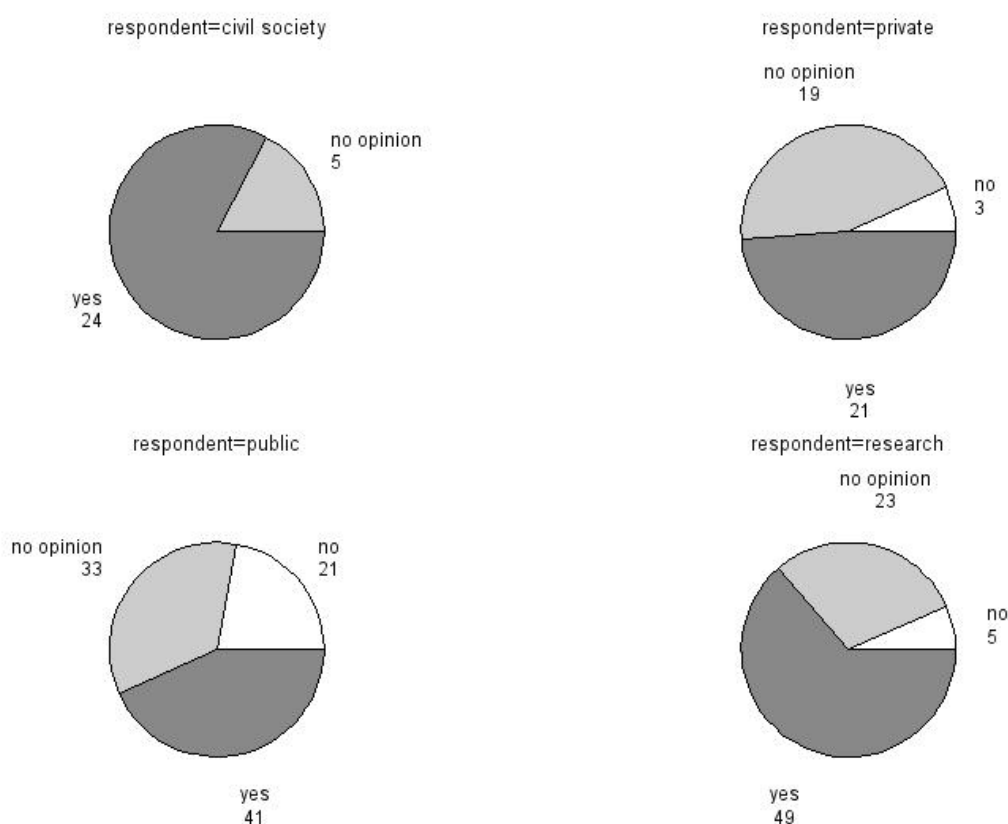


Figure 8: Should an internet portal similar to those for EMODnet be set up to provide access to fisheries data held by Member States, as well as data assembled for particular stocks, particular fleet segments or particular fishing areas? If so, how should it be linked to EMODnet?

Particular points made were:

- (1) Most respondents agreed that EMODnet should provide better access to fisheries data. This was overwhelmingly the case for civil society, private bodies and researchers. The European Marine Board was in favour of access to fisheries data via the EMODnet portal because "*open access to fisheries data could also encourage cross-sector partnerships between the fisheries sector and the marine research community, including the use of fishing vessels as ships of opportunity, to act as data gatherers for the multiple oceanographic*

parameters." The UK National Oceanography Centre was of the same school of thought: *"fishing vessels have good potential to act as data gatherers for several oceanographic and biodiversity parameters and actions to encourage closer liaison between the fisheries sector and the marine research community would be welcome and beneficial to both sides."*

- (2) There was a substantial minority of public authorities who did not agree. The French authorities thought that individual privacy needed to be respected and that too liberal a data policy would risk a loss of commitment from the public bodies that collect the data.
- (3) Some respondents, including the Geological Survey of Ireland, the UK Government, IMARES, Seas At Risk and the Norwegian Marine Institute, pointed out the existence of a number of ongoing efforts: the Joint Research Centre provides access to data assembled for the Annual Economic Report; Member States upload survey data to the ICES DATRAS portal; and a regional database, FISHFRAME, has been built by ICES that could do the job. These efforts could and should pipe data to the EMODnet biology portal or possibly the human activities portal.
- (4) The civil society consortium again made the point that fish are a public resource and, therefore, the public need maximum access to information on what is going on. HELCOM felt that better access would simplify the work of regional seas conventions. Keen Marine appealed for better monitoring and policing of fisheries to combat *"the fear that publication [of fisheries data] would lead to rogue exploitation."*
- (5) The Netherlands Ministry of Infrastructure and Environment, the Prime Minister's Office, Finland, and SeaDataNet Research Infrastructure suggested the inclusion of an eighth EMODnet theme to cover fisheries data. The Flanders Marine Institute thought that *"a logical link can be made with the biology thematic group of EMODnet."* Conversely, the Countryside Council of Wales suggested incorporating it into the new human activities thematic group.

4.9. VMS data

It is notoriously difficult for interested parties to access the hourly or two-hourly reports of fishing vessel positions as reported under the Vessel Monitoring System. Respondents were asked if access should be more open. Figure 9 summarises the responses.

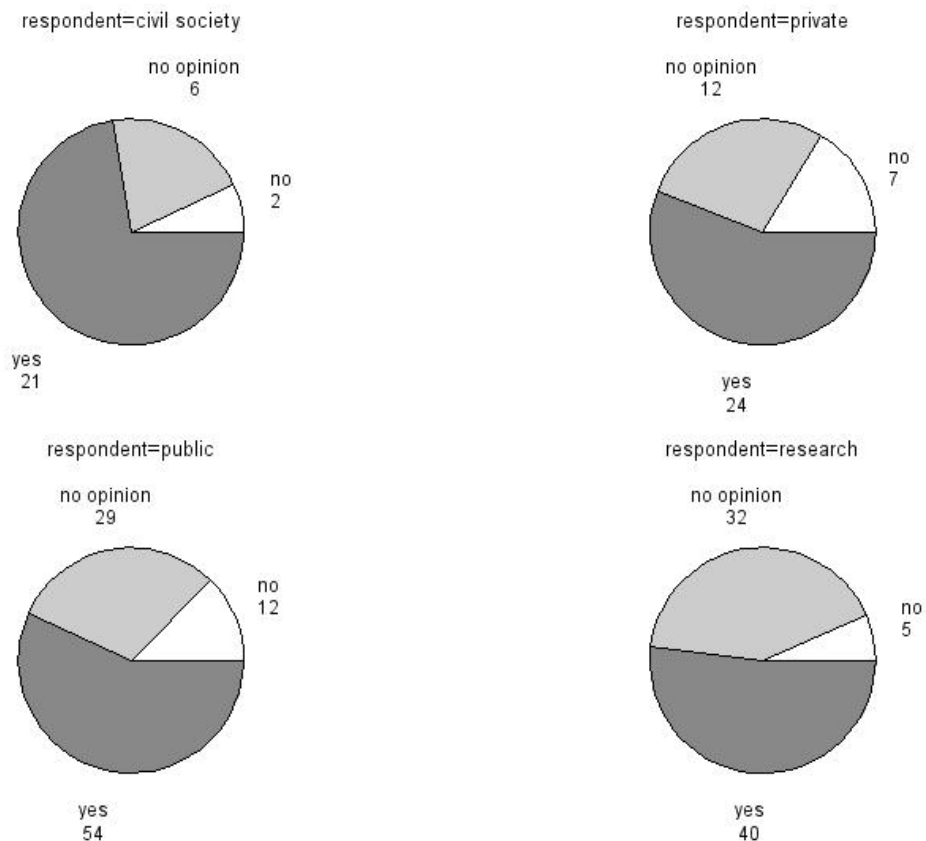


Figure 9: Should control data, such as that derived from the Vessel Monitoring System that tracks fishing vessels, be made more available?

It is important to note that:

- (1) The majority of respondents were in favour of better access. The civil society representatives reiterated their opinion that the public has a right to know who is benefiting from particular stocks and fishing areas. Oceana felt that transparency on activities such as bottom trawling "*can better help understand fisheries impacts and consequently adapt planning/management,*" whilst Seas At Risk suggested that "*better scientific models on fishing patterns could be developed on a larger scale that includes the movement of vessels.*"
- (2) Representatives of fishermen, such as the Comité National des Pêches Maritimes et des Elevages Marins, were amongst the minority who were against the proposal. They thought it against the principle of commercial secrecy.
- (3) Among the public authorities, only the Argyll and Bute Council thought that the public had no need for such information. Others such as the French, German, Latvian and Maltese governments were more open to the idea although they did point out that it might require a change in the law.
- (4) MRAG questioned the rationale behind resisting publication of VMS data given the ease of access to vessels' Automatic Identification Systems (AIS).
- (5) The Marine Board of the European Science Foundation felt that better access was essential for assessing the status of the Marine Environment and implementing the ecosystem approach to resource management.

- (6) A number of respondents, such as the County Administrative Board of Vasterbotten (Sweden), Marine Scotland and the Countryside Council for Wales, felt that removing the vessel name from the data would ease confidentiality concerns. Others (UN Group of Experts of the Regular Process, Ifremer, and OGS to name a few) suggested the use of aggregate data to preserve confidentiality. The Netherlands Ministry of Infrastructure and Environment thought that applying a time delay to VMS data such that it is not immediately available could overcome safety issues. The Azores Regional Directorate for Sea Affairs suggested a grace period of one year. The Alfred Wegener Institute thought four to six months appropriate.
- (7) The Countryside Council for Wales felt that the data should be accompanied by detailed "usage guidelines".

4.10. Observation technology

The tenth question was in effect three questions rolled into one. What should be the focus of EU support to new marine observation technologies? How can we extend ocean monitoring and its cost effectiveness? How can the EU strengthen its scientific and industrial position in this area? The respondents' answers were similarly diverse. Points raised include:

- (1) The European Wind Energy Association insisted that it is the quality of observations, not quantity, that counts. Mainstream Renewable Power echoed this. They thought the focus should be on the use rather than the collection of data. The Netherlands Ministry of Infrastructure and Environment was on the same lines: innovation is all well and good but let us make best use of what we have already. This was also the opinion of the UK's General Lighthouse Authorities. Region Västra Götaland, Sweden, mentioned that we still have not ensured interoperability between different Member States. The need to standardise data collection and management was highlighted by both public and private bodies to improve cost-effectiveness, whilst the International Hydrographic Organisation felt that priority setting for surveys at the regional level using available assets could reduce costs.
- (2) The Norwegian Hydrographic Service and the European Marine Board advocated focusing on novel sensors that can measure parameters automatically without the need to bring samples back to the laboratory. Marine Scotland, the University of Gdansk and SINTEF Fisheries and Aquaculture shared this view. The Finnish Meteorological Institute thought that these could be mounted on buoys, floats and gliders. Keen Marine proposed that the EU support emerging technologies. Magic Instinct Software and Plataforma Oceánica de Canarias (Canary Islands Oceanic Platform) emphasised the need to support small companies.
- (3) Seas At Risk considered that the MSFD provides a useful framework for EU monitoring efforts. The Maltese government, the Azores Regional Directorate for Sea Affairs and HELCOM, amongst others, supported this. The Alfred Wegener Institute felt that there was a need to focus on cross-border practical use of data by "*encouraging collaboration and the adoption of Open Standards and supporting long-term international e-infrastructures.*" This would require "*close alignment of EU funding regulations and EU data policies with national funding bodies.*"

- (4) The French and Portuguese hydrographic agencies wanted support for hydrographic surveys. The International Hydrographic Organisation advised that "*research and development activities concerning remote sensing (LIDAR and hyper-spectral technology), unmanned underwater or surface survey vehicles, automatic data logging systems to be deployed on ships of opportunity, and monitoring of sea-bottom changes would all be useful.*" Proteus Europe recommended the use of satellite bathymetry and seabed classification to meet the EMODnet project aims.
- (5) The UK Government pointed out that Europe lags behind the US where funding is available to develop new technologies and to take them through to market. Ifremer and the Geological Survey of Ireland both suggested that the EU follow the example of the US with regard to operating as a core facility, as opposed to a collection of Member States with their own data buoys and infrastructures.
- (6) The International Association of Oil & Gas Producers pointed out that the EU should build on past experiences such as the SIMORC (System of Industry Metocean data for the Offshore and Research Communities) project, which is now supported by the International Association of Oil & Gas Producers and other data providers.
- (7) Eurogeosurveys, Brussels, Argyll and Bute Council and the German government, amongst others, suggested making use of fishing vessels as observation platforms. Many respondents advocated the use of multipurpose technology.
- (8) The European Marine Board identified marine acoustics as "*a promising and emerging field for marine observation that will advance ecosystem-based management.*" The Norwegian Hydrographic Service used multibeam echosounder systems (MBES) as an example of a technology that may require more investment. UBO / France Marine Universities Network and the Poland Ministry of Transport & Maritime Economy also highlighted hydroacoustics as having the potential to greatly improve marine observation.
- (9) Abdelmalek Essadi University in Morocco asked that southern countries not be forgotten.
- (10) Observatorio Ambiental Granadilla (Granadilla Environmental Observatory, Italy) made the point that monitoring should be considered separately from research or ocean management. EuroGOOS thought that increased support was needed for both operational observation and research. The Alfred Wegener Institute thought that national long-term monitoring efforts should be supported.
- (11) The French authorities urged the Commission to concentrate on technologies that do not immediately encourage industrial investment. This could include telemetry, LIDAR and hyperspectral imaging. The Danish Cadastre also mentioned LIDAR as requiring further development.

4.11. Data from research projects

Respondents were asked if there should be an obligation for research projects to include a provision ensuring the archiving and access to observations collected during the research project. Figure 10 summarises the responses.

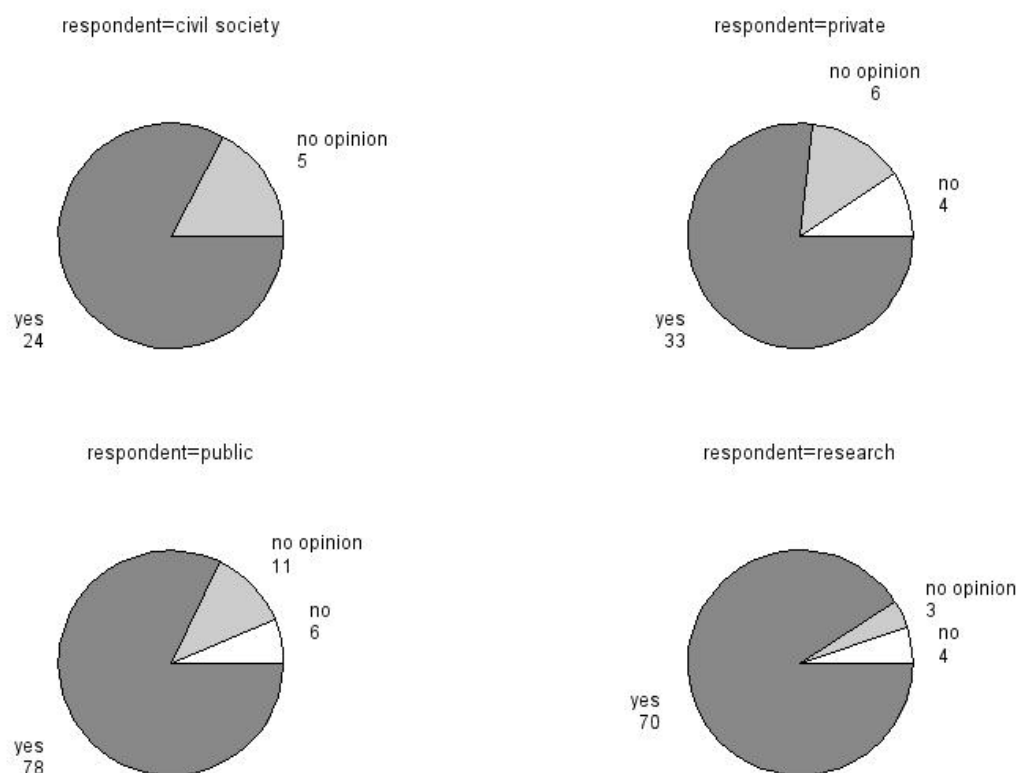


Figure 10: Should there be an obligation for research projects to include a provision ensuring the archiving and access to observations collected during the research project?

Respondents were nearly unanimous in their view that data collected under publicly-funded research projects should be made publicly available. Those that answered "no", such as the UK government and Marine Scotland, agreed with the principle but felt that it should not be a legal obligation. Points raised include:

- (1) EuroGOOS argued that *"this should be done with the minimum possible delay in order to maximise the benefits and impacts of these observations."* Others agreed that a moratorium be enforced to allow for publication of results, in accordance with Horizon 2020¹⁰. The European Marine Board, OGS and the German government suggested making timely delivery of datasets a prerequisite for receiving final funding.
- (2) The Intergovernmental Oceanographic Commission felt that *"a cultural change is required in the academic environment that makes researchers appreciate the importance of data management, storage and dissemination beyond their own immediate benefit."*
- (3) Eurogeosurveys and the Geological Survey of the Netherlands thought that routine data dissemination would improve cost-effectiveness and reduce the risk of scientific fraud. A number of individuals from the shipping and research communities felt that the obligation to provide access to research data would improve the authenticity of published work.

¹⁰ EU framework programme for research and innovation, superseding FP7

- (4) The Alfred Wegener Institute was concerned that "*open access to primary data acquired in non-European territorial waters may cause withdrawal of local research permits.*"

4.12. Environmental data

Respondents were asked whether the process whereby obligations to report the state of the environment could be replaced by a process whereby the recipient, for instance a regional seas conventions or the European Environment Agency, pulls the relevant data from accessible on-line sources. Figure 11 summarises the responses.

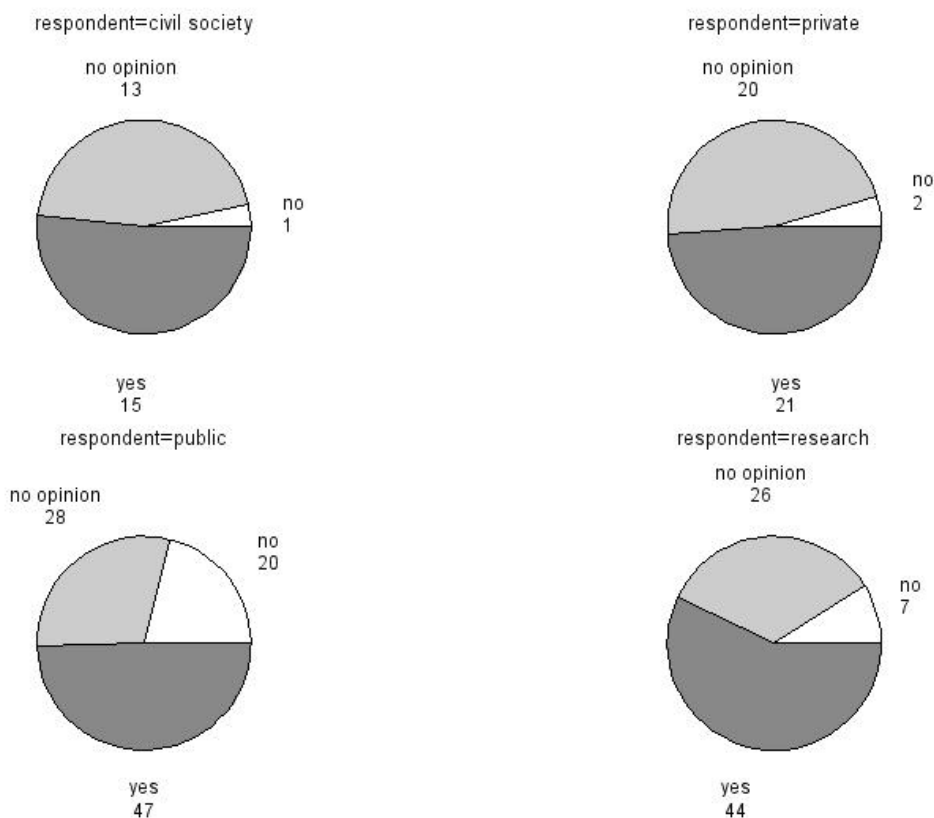


Figure 11: Should the ‘push’ process whereby marine environment reports are delivered be progressively replaced by a ‘pull’ process, whereby data are made available through the internet and harvested by the competent authority using technology developed through EMODnet?

Issues raised include:

- (1) The general reaction was that this was a good long-term aim but it is not going to happen overnight. PANGAEA (Germany) pointed out that "*effectively "pulling" the necessary quality assessed information via web services from metadata and distributed data requires clearly defined and steered data flows from sampling to dissemination via responsible data repositories and a standardized e-infrastructure throughout the European Community.*" The Portuguese hydrographic office echoed the position of many: "*[it] needs to be evaluated on a case by case basis.*" Seas At Risk thought that "*in principle this would be a very good development, reducing reporting burden and increasing data availability. However, it requires good standardization and depends on which authority will take over the examination and verification of the raw data.*"

- (2) Some hydrographic bodies felt that the "push" process ensures that the national body providing the data can vouch for the accuracy. Similarly, the Government of Malta thought that the national competent authority should be the authorised body to vet and evaluate the marine environment reports submitted.
- (3) The main advantages of the "pull" process are efficiency and speed. Ifremer pointed out that the *"pull process will ensure data users get quick and useful access to updated (real time) data through EMODnet."* The Gruppo Nazionale di Oceanografia Operativa's response was along the same lines: *"the "pull" ensures, if conditions are favorable, a near real time availability of data and there will be a more transparent, controllable system."*
- (4) The French and Italian hydrographic offices, the International Hydrographic Office, and the French and UK governments, amongst others, thought that a balance between the "push" of reports and the "pull" of data was necessary.
- (5) Marine South East said that the *"pull process will allow investment to be focused on areas of demand for data."* However, a number of respondents from the academic research community were concerned that the "pull" process might lead to simplistic or false interpretations in the absence of the relevant experts.

4.13. Climate change

The respondents were asked *"what information on the behaviour of our seas and coasts can best help business and public authorities adapt to climate change?"* *"Almost everything"* was the answer. Nevertheless, there were certain common features.

- (1) Pole Mer Bretagne and Ifremer, amongst others, both considered coastal monitoring a priority. The Countryside Council for Wales felt that coastal habitats *"need to be considered an integral part of the coastal defence and valued as such."* The UK National Oceanography Centre identified coastal flooding as the main threat to businesses and public authorities, particularly due to extreme events. These are expected to become more common in a warmer world and are much more difficult to respond to. An individual from the public research domain added that coastal zones are *"more strongly affected by anthropogenic and other local factors, which could bias the climatic signal."* OGS specifically mentioned coastal pollution, marine litter, habitat modification, overfishing, ballast water release and oil spills as anthropogenic pressures.
- (2) Sea level rise was cited by many respondents. The Ordre des Géomètres-Experts thought it the most important. The French hydrographic service, SHOM, and other hydrographic services emphasised the requirement for *"long term tide observations (...), in conjunction with satellite altimetry, to assess trends in sea level changes."* The International Hydrographic Organisation thought *"high resolution bathymetry [was] essential to model the impact of rising sea level caused by climate change as well as by accidental events such as storm surges or tsunamis."* The Netherlands Ministry of Infrastructure and Environment thought that *"for the North Sea, sea level rise and (trends in) climate extremes are most important, including the potential effects on society."*
- (3) The German government proposed sea level, water temperature, and alien species, amongst other parameters, as important for adapting to climate change.

The European Straits Initiative, which considers the special needs of eight straits, also listed wave forecasts, sediment transport and coastal erosion. The Gruppo Nazionale di Oceanografia Operativa also mentioned chemical species contributing to eutrophication.

- (4) Oceana thought that we need to look at globally important parameters such as CO₂ fluxes and acidification levels (pH), ocean circulations and currents, salinity levels, thermic absorption of seas, sea level rise, ice cover, photosynthetic behaviour and algae masses. The Intergovernmental Oceanographic Commission highlighted the need to monitor large storms, saying "*whether these storms will increase in frequency and strength is not a local but global question that needs to be addressed at the global scale.*" This view was shared by the European Marine Board, which also referred to earthquakes in its response.
- (5) The civil society group was most interested in fish behaviour – migration, distribution and demographics.
- (6) An individual from the field of public research felt that it was not possible to rank marine information in terms of how it can be useful to businesses and public authorities because "*all processes, from the dynamics of the oceans to the ecosystem responses, are interrelated.*"

4.14. International aspects

The Commission is also aware that there are a number of ongoing efforts to do at an international level what "Marine Knowledge 2020" is doing at an EU level. The EU's ongoing efforts contribute to this by making the most significant parameters collected by more than a hundred European partners accessible through a limited number of gateways. Respondents were asked if additional measures are needed. Figure 12 summarises the responses.

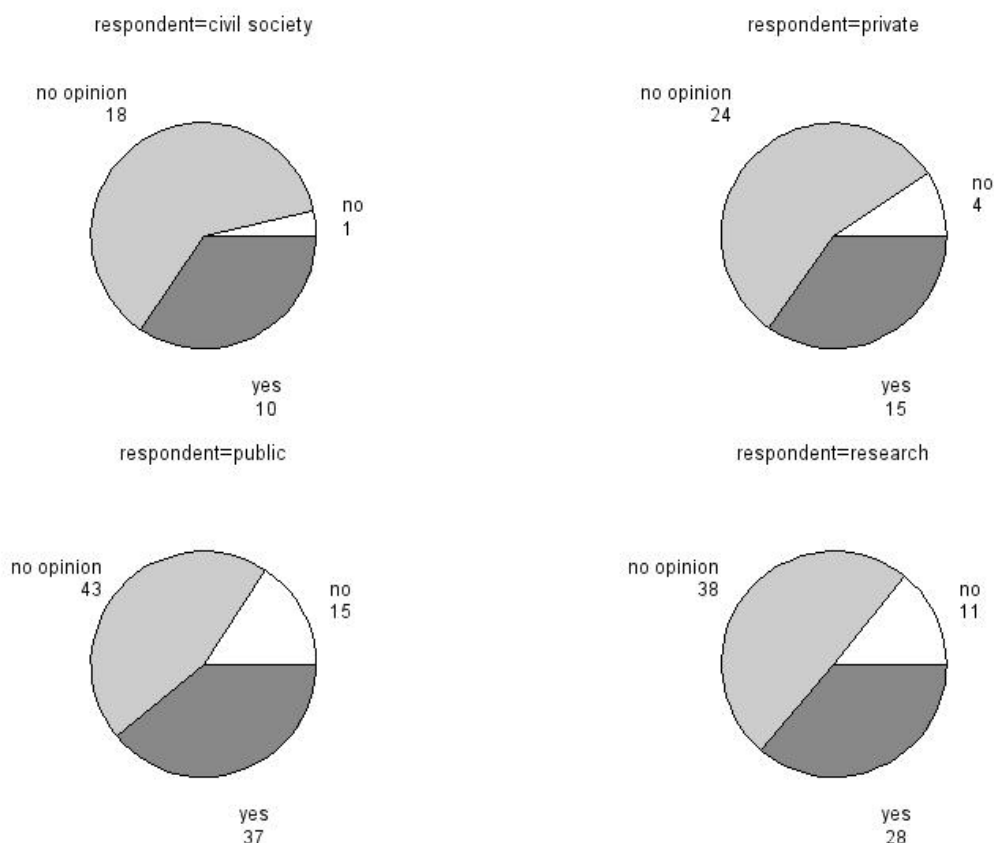


Figure 12: Are any additional measures required, over and above existing initiatives such as EMODnet and GMES, to enable Europe to support international initiatives on ocean data such as GOOS and GEOSS?

The consensus was that they are necessary but not sufficient.

- (1) Most of the respondents who answered "no" to this question were concerned that introducing a new dimension to the Marine Knowledge 2020 initiative would overcomplicate and overburden present attempts to improve access to data.
- (2) The International Oceanographic Commission urged greater engagement of EMODnet and GMES in the global GOOS (Global Ocean Observing System) and GEOSS (Global Earth Observation System of Systems) efforts, saying that *"interoperability [with a global system] will bring benefits to Europe through the provision of non-European data that may impact on forecasts or the health of European seas."* The International Hydrographic Organisation urged coherence between regional, national and global endeavours and highlighted the need to improve coordination with ocean mapping projects such as GEBCO (General Bathymetric Chart of the Oceans)¹¹. It also emphasised the importance of hydrography as a "foundation layer" and felt that survey data coverage could be improved. OGS thought that it would be profitable to engage with World Meteorological Collection and Production Centres. The Geological Survey of Ireland considered that Europe needs to tap into the International Oceanographic Commission JCOMM structure. The Flanders

¹¹ This collaboration is already ongoing. EMODnet is already providing its quarter of a minute digital terrain model to GEBCO.

Marine Institute wanted stronger links with OBIS (Ocean Biogeographic Information System) and WORMS (World Register of Marine Species).

- (3) The French and German authorities and the European Marine Board considered that this could be achieved through the European offshoots of the global programmes – EuroGOOS, EuroGEOSS and EuroArgo. OGS made a similar suggestion.
- (4) The Ministry of Infrastructure and Environment supported the establishment of a European Ocean Observing System (EOOS) supported and operated by Member States. Its reasoning: "*at present, EuroGOOS provides a platform for cooperation and exchange between European operators (to share best practice), but it does not yet provide an integrated system with common output and economies of scale.*" Ifremer and the Geological Survey of Ireland put forward similar views.
- (5) The Romanian Parliament wanted better cooperation with ESFRI (European Strategy Forum on Research Infrastructure) projects such as EuroArgo and EMSO.
- (6) A number of respondents, including the Hellenic Navy Hydrographic Service (HNHS) and Marine South East were in support of participation of member states in global monitoring systems, but were concerned about the availability of funding to achieve this. The Flanders Marine Institute called for a more structured and coordinated contribution by Member States to global observation systems.

4.15. Support to observation programmes

Respondents were asked what criteria should be used to determine EU financial support of observation programmes other than those that it already supports, and whether the Joint Programming Initiative for European Seas and Oceans (JPI-Oceans) could play a role:

- (1) The Ordre des Géomètres Experts thought that support to national programmes could be based on the length of coastline and the population affected. The Poland Ministry of Transport and Maritime Economy thought that funding should be allocated to beneficiaries according to the usefulness of the intended observations.
- (2) The International Hydrographic Organisation considered that the Caribbean Sea, the western and eastern coasts of Africa and the Polar Regions are poorly surveyed and that EU-supported survey programmes would improve the safety of European shipping. The Norwegian Hydrographic Service also mentioned the Arctic. EuroGOOS mentioned the importance of marine observation in areas beyond Member States' territorial waters and EEZs. This was reiterated by the French authorities.
- (3) The Geological Survey of Ireland suggested that relevance to European initiatives should be the criterion - blue growth, adaptation to climate change, ESMMR, EUSA, MSFD, etc. EuroGOOS and the Swedish Agency for Marine and Water Management specifically cited the MSFD. The Sir Alister Hardy Foundation for Ocean Science was along the same lines and noted that the Continuous Plankton Recorder was a good example. Deltares also considered this a worthwhile EU investment.

- (4) The Prime Minister's Office, Finland, and the Scottish Fishermen suggested that those who share data should be rewarded with EU support. The Scottish Fishermen proposed that those who do not should have their support withdrawn. The civil society consortium was in favour of prioritising funding for observation programmes that simultaneously provide data to different thematic groups.
- (5) MedPAN mentioned the monitoring of Marine Protected Areas as a priority.
- (6) SINTEF Fisheries and Aquaculture suggested support to instruments that are cost-effective, both to install and operate, and that ensure a continuous collection of observations. An example is development and support for installing instruments and systems for capturing data on-board vessels. Investment and operating costs for the common capture of data should not be charged to the private vessel.
- (7) Keen Marine felt that *"the EU should always keep part of its funding for "blue skies" research that tests new ideas and assumptions."*
- (8) A number of respondents from the public sector, including the Prime Minister's Office, Finland, asserted that beneficiaries could be ranked according to their history of sharing high-quality data.
- (9) PANGAEA believe that support should depend on strong alignment with existing data initiatives (ICSU World Data System, EMODnet, SeaDataNet etc.).
- (10) The UK government proposed that JPI-Oceans play a role in deciding which observation programmes have priority. The Flanders Marine Institute and IMARES, amongst others, agreed. The Geological Survey of Ireland was in favour of receiving assistance from JPI Oceans; however, it also noted that *"some countries may find it hard in the current economic climate to contribute research funds to the JPI."* A reply from JPI-Oceans itself indicated a willingness to take up this role.

4.16. Governance of EMODnet and GMES

Respondents were asked how the governance of EMODnet and GMES could better accommodate the need for long-term sustainability. A number of constructive suggestions were made:

- (1) Nearly everybody agreed on the need for long-term stable funding for the whole initiative. SeaDataNet Research Infrastructure said that Directives such as INSPIRE, on their own, are not enough. Some considered that this should extend to the partnerships themselves. EuroGOOS and the UK National Oceanography Centre felt that long-term funding should replace financial support through research programmes. The Geological Survey of Ireland suggested the establishment of a European Project Office comprising seconded experts from Member State data centres. In contrast, the Netherlands Ministry of Infrastructure and Environment strongly opposed the creation of a new EU agency.
- (2) The Geological Survey of Finland considered that a model with national data archives/data centres, which are operated by national agencies/organisations, is the most sustainable. ICES thought that regional data centres could also play in an important role in governance and management. Ifremer mentioned

SeaDataNet as a source of experience for coordinating national oceanographic data centres (NODCs).

- (3) The need to ensure that the partnerships are not closed to new entrants was stressed by the Romanian Parliament. In particular, the Senate would like to maintain the current system of competitions at regular intervals and with variable consortia, so that only the best quality data is retained.
- (4) HR Wallingford and Mainstream Renewable Power provided a consolidated response. They suggested a "governance board" excluding anyone delivering a GMES / EMODnet service, but rather including those with a vested interest in ensuring the services persist because of what they deliver: *"this board would contain (...) data providers and data end-users; these may be individual organisations [or] communities. The key point is that these types of organisations have businesses reliant on EMODnet outputs and can articulate the value EMODnet delivers to justify its long term operation."*
- (5) Marine Scotland believe that the governance needs to take into account the views of both Member States policy representatives and scientific experts.
- (6) Gruppo Nazionale di Oceanografia Operativa suggested shared governance for GMES and EMODnet.

4.17. Joint Research Centre and the European Environment Agency

Respondents were asked if they thought there was a role for the Joint Research Centre (JRC) and/or the European Environment Agency (EEA) in the Marine Knowledge 2020 initiative going forward. Most respondents believed that the JRC and EEA could have some role in the improvement of the EU's Marine Knowledge infrastructure.

- (1) Many thought that with their detailed knowledge of needs at an EU level, both the JRC and the EEA could play an important role in defining products and services. The UK government responded *"both JRC and EEA could help develop tools and systems. JRC could bid for work, but as a general principle all work should be tendered openly on the market. EEA would be a customer for products from such a system that support its mandated role of providing independent information on the environment. JRC may also have a customer role in using outputs from the system. Both can therefore play a role in evaluating current capabilities and suggest future improvements."* EuroGOOS took a similar view. Deltares suggested a quality control role for the JRC. Vitrociset SpA thought they could help define user requirements.
- (2) The French authorities considered that JRC could consolidate its role as a repository for fisheries information. The Comité de Liaison des Géomètres Européens felt that the JRC and EEA could assume regulatory roles, *"to control the reception and evaluation of data, but also to develop standards for openness and interoperability."*
- (3) The European Straits Initiative, Mainstream Renewable Power and HR Wallingford all advocated a missionary role to encourage data providers to increase access.
- (4) The Geological Survey of Ireland considered that *"either the EEA or the JRC, as legal EU entities and with responsibilities for the MSFD and GMES respectively, could host the European Project Office as proposed above."*

However, it must be clear that this is a hosting arrangement as the key players are the Member State organisations responsible for the collection and management of marine data." The Countryside Council for Wales and the Azores Regional Directorate for Sea Affairs saw a central and organisational role for EEA.

- (5) The Gruppo Nazionale di Oceanografia Operativa suggested that both the JRC and EEA forge strong links with EMODnet and GMES infrastructures to develop tailored products for their stakeholders. The Prime Minister's Office, Finland, felt that stronger roles for the JRC and EEA within the EMODnet infrastructure could improve overall benefits of the network. The Flanders Marine Institute earmarked the EEA as being best placed to act as a science-policy interface.

4.18. Coordination at a sea-basin level

Respondents were asked if a regular process is needed to evaluate the effectiveness of the observation and sampling strategy for each sea-basin. Their responses are summarised in Figure 13.

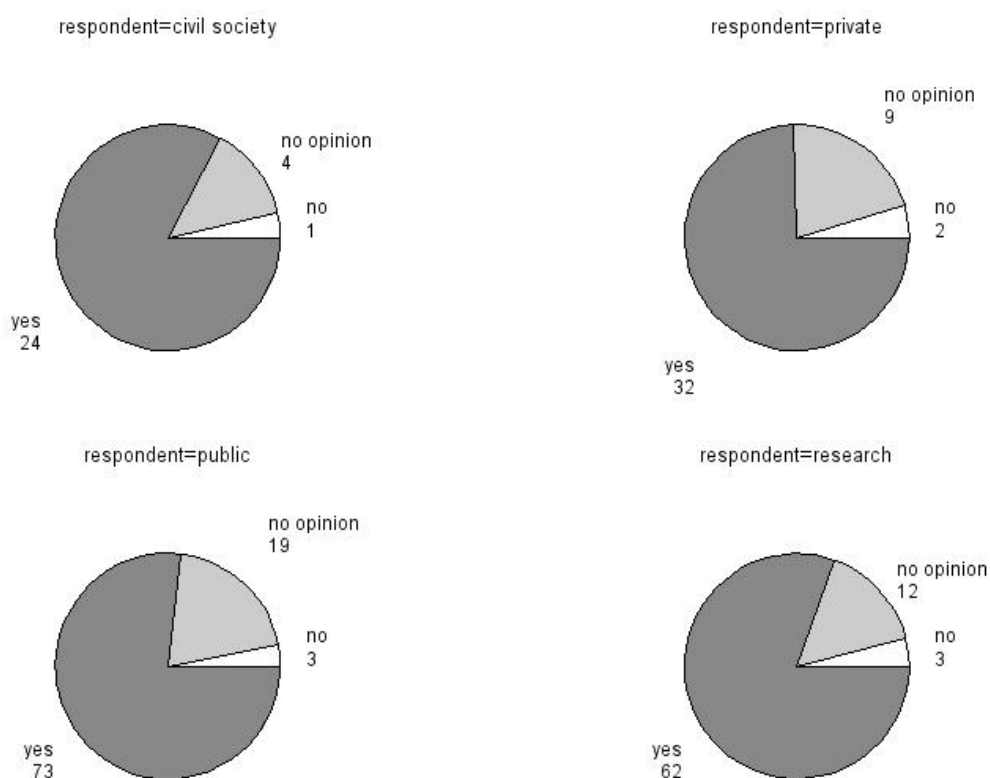


Figure 13: Is a regular process needed to evaluate the effectiveness of the observation and sampling strategy for each sea-basin?

Only a very small number of respondents disagreed with the premise that some mechanism is needed at a sea-basin level to evaluate the effectiveness of the observation and sampling strategy.

- (1) The Association of German State Archaeologists said that the diversity of national regulations and systems means that some coordination is necessary. The Alfred Wegener Institute replied that "a controlling process and guidance

by the EC is necessary to balance national and commercial interests as well as institutional and individual research interests."

- (2) The Swedish Meteorological and Hydrological Service and the UK Government highlighted the need to incorporate the existing systems in OSPAR and HELCOM. The Prime Minister's Office, Finland, said that these organisations already have a role within the MSFD.
- (3) EuroGOOS considered that observation requirements and strategies are rapidly evolving, and offered to provide support for evaluating these through its regional capacities (ROOS). The Intergovernmental Oceanographic Commission, Ifremer and OGS also advocated GOOS as a suitable framework for guiding observation programmes. The UK Government also thought that there was a role for "science bodies".
- (4) The hydrographic community and the French authorities reminded the Commission of the important role of Regional Hydrographic Commissions that perform this task, including but not restricted to safety of navigation, coastal zone management, disaster prevention and mitigation.
- (5) The University of Liege felt that such a process could aid progression towards the use of new technologies. The Institute of Marine Research in Norway made the same point: *"new observational technologies and new models are continuously developed and must regularly be considered in the framework of existing monitoring programs."* Keen Marine suggested a certain degree of conservatism in the adoption of new technologies for obtaining marine data to prevent the process from becoming a *"slave to the next new thing."*
- (6) Deltares felt that it could contribute to adaptive management to cope with changing realities.
- (7) The suggested time interval between reviews varied between one year (as recommended by the Romanian Senate) and six years (as recommended by the Swedish Agency for Marine and Water Management). The Government of Malta recommended an ad hoc approach to the review process.
- (8) Eurogeosurveys, Brussels, the European Marine Board, the Geological Survey of Ireland, the Netherlands Ministry of Infrastructure and Environment, Marine Scotland and the Geological Survey of Finland all suggested involvement of the regional seas conventions in the strategy evaluation procedure.

4.19. Priorities for EU support

Respondents were asked what mechanism could be envisaged to manage the evaluation and assessments needed to inform the Commission, Member States and Parliament on priorities for EU support?

- (1) The International Oceanographic Commission reported that at a European level, EuroGOOS performed such a function. EuroGOOS themselves recommended a *"combination of external expertise and a permanent "Users" or "Implementation" committee."*
- (2) Mainstream Renewable Power advocated *"a strong governance council with membership drawn from Academia, Public Bodies and Commercial Organisations with clear targets and metrics linking funding to EU objectives for Blue Economy, Climate Change, Energy and Regional Development."* The Alfred Wegener Institute's reply was almost identical, as was that from the

European Marine Board. The hydrographic community was unanimously in favour of the involvement of regional hydrographic commissions to monitor users' needs, assess the state of knowledge and compare the quality of products available with the resources allocated.

- (3) The UN Group of Experts on the Regular Process thought that *"a two-tier management structure would be helpful. This could have an executive board consisting of representatives of organisations most directly involved, and a supervisory body with representation from a wider range of interests, including those from outside Europe."* The government of Malta suggested the Member States Expert Group as a good starting point.
- (4) The Geological Survey of the Netherlands replied *"checks and balances are essential. It is important that evaluation committees are not dominated by members of one or two disciplines but ensure equal opportunity for proposals from all disciplines and represent both the supply and the demand side."* The Prime Minister's Office, Finland, warned against focussing too narrowly on the technical and scientific aspects of monitoring when making assessments.
- (5) It was pointed out by some, including the French Authorities and the Netherlands Ministry of Infrastructure and Environment, that the MSFD provides a suitable process for evaluating needs for environmental, societal and economic assessments.
- (6) Oceana, Ifremer and SeaDataNet Research Infrastructure advocated the involvement of JRC and EEA in this regard.
- (7) The European Marine Board, the Geological Survey of Ireland and the Flanders Marine Institute all raised the issue of maintaining a global perspective to ensure that Europe contributes to a wider, integrated international effort.

4.20. Data from licensing

Respondents were asked if data provided by private companies for licensing purposes should be made publicly available. Their responses are summarised in Figure 14.

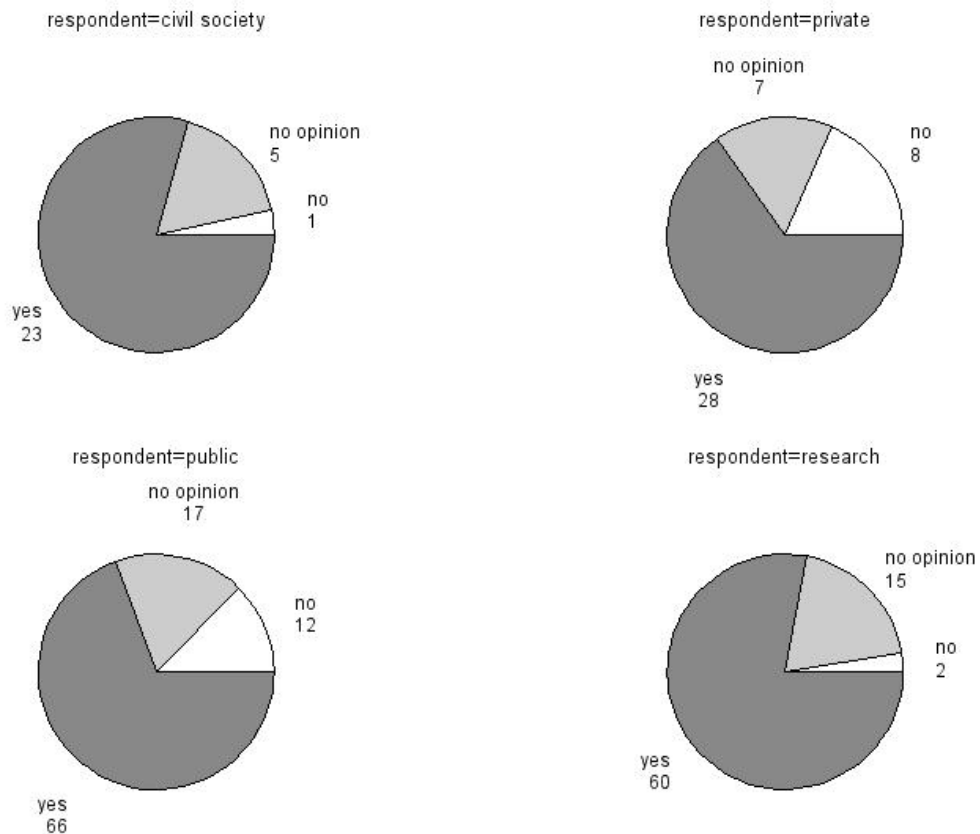


Figure 14: Should data provided by private companies for licensing purposes be made publicly available?

Again, a clear majority of those consulted thought that, in principle, data that had been used to obtain an offshore licence should be made more accessible. However there were certain reservations:

- (1) Civil society organisations were almost all in favour. Seas At Risk and the North Sea Foundation thought that the data should be quality checked. A private law firm also suggested a checking mechanism.
- (2) EuroGOOS felt that the private sector makes significant use of marine observing and forecasting systems run at national and EU level and, therefore, must also contribute to integrated marine observation efforts. Keen Marine made the point that "*data provided by private companies to gain a license is important for setting a baseline against which to judge the effects of their activities, and it is in the public interest (insofar as it is their resource which they are allowing the private company to exploit under license) to have that data available.*" MAREMED and IMARES replied along the same lines.
- (3) The Maltese Government considered that it depends on the nature of the data. The Intergovernmental Oceanographic Commission was of the same view. Many respondents supported the right of private organisations to preserve their commercial advantage by vetoing the release of certain data for an agreed length of time.
- (4) The International Association of Oil & Gas Producers indicated that geophysical surveys are "*critical to our ability to determine the location of hydrocarbon resources and to monitor and optimise the recovery of these*

resources once they are determined to be of economic significance. Clearly, such geophysical data have high commercial value such that companies would resist any moves to be obliged to release them."

- (5) The oil and gas producers also pointed out that wholesale release of data used in the licensing process could be detrimental for the safety and security of oil and gas installation although they did not explain why.
- (6) Proteus Europe was concerned about a possible impact on project budget. The Ocean Energy Group from the Renewable Energy Association felt that "unless private companies have received public funding to support data collection, any data they collect belongs to them and is their Intellectual Property." Abdelmalek Essaâdi University and the Ministry of Economic Affairs Schleswig-Holstein were in agreement.
- (7) Many respondents, including governments and the hydrographic community, insisted that bathymetric data, collected by private bodies and which could impact on navigation safety, be made available to the relevant hydrographic office.

4.21. Monitoring by private bodies

Respondents were asked for their views on whether licensed offshore private sector actors should be obliged to contribute to wider monitoring of the sea where this is feasible. Figure 15 summarises their responses.

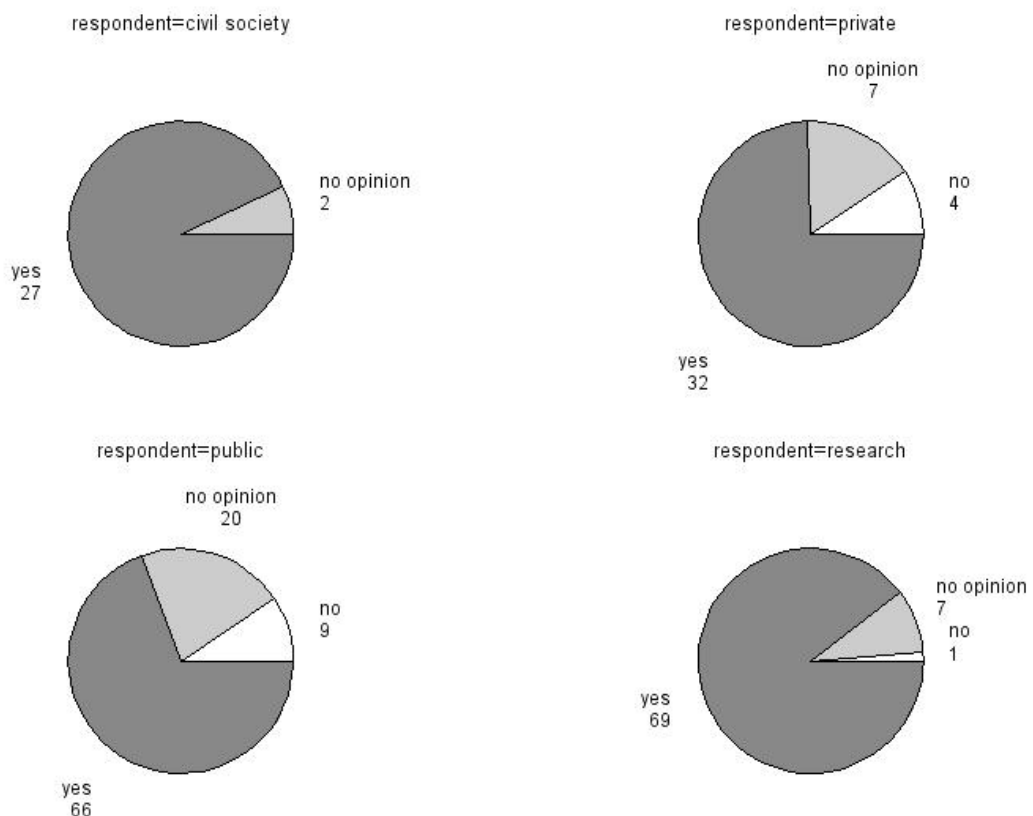


Figure 15: Should licenced offshore private sector actors be obliged to contribute to wider monitoring of the sea where this is feasible?

Rather surprisingly, a larger proportion of respondents indicated their openness for obliging private bodies with offshore facilities to contribute to a wider monitoring of the sea than had responded positively to making data already collected available.

- (1) Ifremer indicated that, since private bodies benefit from marine observations, it would not be unreasonable to expect them to contribute. The French authorities thought that it might help the authorities demonstrate their compliance with environmental impact legislation. The Netherlands have introduced under the Mijnbouwwet (Mining Act) a provision concerning monitoring of meteorological and oceanographic data by the operators of licensed offshore platforms. Moreover, they have noticed "*a cooperative attitude from off shore wind companies to use the turbines as platforms for gathering data.*" As such, an obligation might not be necessary.
- (2) The European Wind Energy Association did not give a blanket "yes" to the idea but indicated that "*the industry nevertheless remains positive in offering its sites if sampling from existing structures can [contribute to wider monitoring of the sea] and if it does not interfere with the function and operation of the structures*".
- (3) The International Association of Oil and Gas Producers, the Geological Survey of the Netherlands, the UK Government, the Observatorio Ambiental Granadilla and Marine Scotland all agreed that any contribution to wider monitoring of the sea must be done on a voluntary basis and not as a legal requirement.
- (4) The Swedish Agency for Marine and Water Management thought it would lower the cost of monitoring. The Region Västra Götaland pointed out that "*the cost of instrumenting offshore platforms to provide continuous information on the state of the sea would be an almost negligible increase in the overall costs of the installation.*" Many more respondents, including Nexans Norway, Thetis SpA and the Swedish Agency for Marine and Water Management shared this view. Corporacion Maritime was concerned about who would assume the cost of installing the equipment. The German authorities thought the cost should not be borne by private operators of offshore platforms.
- (5) The Countryside Council for Wales thought that a strategic environmental assessment programme "*or some form of collective approach involving developers*" might provide a framework. The Netherlands Ministry of Infrastructure and Environment suggested a study to establish what parameters might be monitored.
- (6) The UK National Oceanography Centre suggested a list of possible parameters that might be measured: "*temperature, salinity, nutrients, oxygen, CO2 levels, chlorophyll, pH, wind speed and direction, atmospheric pressure, air temperature, ultra violet radiation.*" A private company suggested PH, CO₂, CH₄, NO_x, SO_x, VOCs and turbidity. The Spanish Ministry of Agriculture, Food and Environment proposed biodiversity, contaminants, marine litter, noise and oceanographic characteristics. The Flanders Heritage Agency, amongst others, supported monitoring of protected underwater archaeological heritage sites.

4.22. Public-private partnerships

Respondents were asked how public-private partnership models can maximise incentives for industry to share data and investments in data as well as benefits to all stakeholders.

- (1) According to the UK government *"work to develop evidence relevant for marine planning and the development of new offshore industries provides particular opportunities for public-private collaboration. The Marine Environment Data and Information Network in the UK is open to private and public sector organisations. It supports organisations from both sectors in the adoption of common standards through the provision of tools and workshops, and provides Data Archiving Capabilities which are available to all."* The Ocean Energy Group of the Renewable Energy Association pointed to a *"joint Industry Project (JIP) between offshore wind farm developers and interested regulators facilitated by the Crown Estate in England. The project funds generic research that will benefit the whole sector."*
- (2) The Netherlands Ministry of Infrastructure and Environment believes that *"a very profitable public-private partnership will develop on the [back of] free and sustainable availability of environmental data. There are opportunities for (...) different groups to promote their businesses by using these data while raising public awareness of the beauty of the seas and their vulnerability."*
- (3) The French authorities were cautiously in favour of the principle of giving the private sector a greater say.
- (4) The Alfred Wegener Institute thought that this should not preclude public support, particularly in the early phases of the initiative.
- (5) Nexans Norway thought that a scheme that showcased the private sector's participation in order to foster their public image could help. The Swedish Agency for Marine and Water Management and the Geological Survey of the Netherlands also made this point.
- (6) Seas At Risk and the North Sea Foundation were rather negative, delivering a consolidated response: *"Public Private Partnerships (PPP) have increasingly been proven unsatisfactory for public authorities, especially in financial terms. To include PPP in this initiative should be critically reconsidered. The [proposal] mentioned under point 7 of the Green Paper ("(...) companies share the expenses of running the European Marine Observation and Data Network in return for a say in the setting of priorities") should not be considered at all."*
- (7) The International Hydrographic Organisation agreed, saying *"regulatory or basic services such as hydrographic services (...) should not rely on private initiatives."*
- (8) The Prime Minister's Office in Finland wanted more information on successful schemes and suggested a study.

4.23. Other business

Upon completion of the questionnaire, respondents were given the opportunity to raise other points not covered by the preceding questions. Many respondents reiterated their views from previous sections. However, a number of further suggestions were put forward. These are summarised below:

- (1) BKM (Germany), the Association of German State Archaeologists, the Flanders Marine Institute, English Heritage, and the Flanders Heritage Agency all expressed concern over the exclusion of protection and preservation of cultural heritage sites in the Green Paper. Three important reasons to support underwater cultural heritage in the context of blue growth are:

- (a) Data on former coastlines and settlements is paramount for understanding sea level changes.
 - (b) High quality information on the past behaviour of the human race is a key factor in leisure and tourism related industries. Many small enterprises are developing products for tourists, divers, etc.
 - (c) High quality data on archaeological sites (location, types of objects present, etc.) will lower the risk of deploying activities on the affected seabed.
- (2) The International Hydrographic Organisation, the French and UK governments, the Hellenic Navy Hydrographic Services, and the French and Finnish Hydrographic Offices were concerned that the needs of shipping for Marine Knowledge had been overlooked in the Green Paper. The quality of hydrographic data is still insufficient to ensure safety of navigation beyond the principal shipping lanes in European waters and elsewhere, and for extremely large vessels.
 - (3) OSPAR, Ifremer, and the Netherlands Ministry of Infrastructure and Environment welcomed the Commission's efforts to maximise synergies between EMODnet and the reporting and data sharing arrangements for the MSFD. The Danish cadastre referred to the Public Sector Information Directive⁴ to inform data access decisions.
 - (4) OSPAR is in the process of *"revising its data and information management and is examining options for elaborating a new OSPAR Information System that would be adequate for present and future needs and that would take account of, and if possible contribute to, the EU data and information exchange developments."*
 - (5) The International Forum for Sustainable Underwater Activities suggested the use of EMODnet to encourage adherence to the DCF. The Asociacion Plataforma El Chorlitojo (Spain) also mentioned good fishing practice and control of imports as one of their primary concerns.
 - (6) PANGAEA and the Alfred Wegener Institute felt that *"strong support and coordination of certified data centres will be the key success to feed large scale e-infrastructures in Europe like EMODnet, SeaDataNet, GMES, etc. in the long-run."*
 - (7) The National Oceanography Centre, UK, were concerned that surveying the sea-bed in high resolution might divert funds from research that should be carried out primarily by mapping/hydrographic agencies and/or the private sector, rather than by primarily research performing organisations: *"if funding to perform routine mapping were to be extracted from national and EU science budgets, it would severely impact on the quantity of research money available for other purposes."*
 - (8) The Netherlands Ministry of Infrastructure and Environment is opposed to additional legislation if not necessary for realising the objectives of the Green Paper. It also felt that European initiatives (e.g. EPSON, OurCoast/OurOcean, JPI Oceans) and regional initiatives (e.g. OSPAR) should be clustered. The European Straits Initiative suggested changes be made to cumbersome national legislation regarding secrecy.

- (9) The UK government expects the Commission to "*bring forward much more detailed proposals for scrutiny by Member States if it seeks to take forward any of the suggested lines of action as part of the next phase of Marine Knowledge 2020. Any such proposals will need to clearly set out the proposed use of EU budgets, anticipated commitment from Member States and governance mechanisms, especially where there is a reliance on EU legislation.*" The Maltese government felt that more freedom should be given to Member States to specify which data is made publicly available.
- (10) The Prime Minister's Office, Finland, would like to engage in further discussion on "*the links between the issues highlighted in the Green Paper and previous/upcoming Commission initiatives on IMP, including the EMFF instrument.*" It also felt that the Green Paper should elaborate more on the benefits of data sharing and on where the EU stands compared to other marine regions of the world concerning its marine data policy.
- (11) Ifremer felt that the Commission should minimise confusion to Member States by avoiding: the duplication of tasks; the emergence of different decision making processes; and the "non-alignment" of different funding streams.
- (12) The Geological Survey of Ireland made reference to the recent Nicosia declaration¹² calling for the establishment of a long-term strategic partnership agreement and a separate legal entity – a European Centre for Ocean Monitoring and Forecasting. This might be useful in the context of establishing a European Project Office to oversee governance of the EMODnet/GMES portals.
- (13) The CoNISMa (University of Rome) Magic Project thought that the Green Paper underestimates the specific settings of the Mediterranean Sea as far as geohazards (volcanoes, submarine landslides, etc.) are concerned.
- (14) MAREMED insisted that EMODnet take into account data produced and used for the management of coastal zones by local governments in the 11 Mediterranean regions that it represents.
- (15) The Institute of Marine Research, Norway, asserted the importance of models in quantifying the past, present and future state of the oceans.
- (16) A consultant in the field of sustainable marine development felt that there is a need for derived indicators based upon marine data (e.g. the system used by OSPAR) to help policy makers.
- (17) An individual from the public research domain emphasised the need to identify reference levels for pollution monitoring.

5. NEXT STEPS

This consultation has delivered a clear signal to the Commission that it should press ahead with the "Marine Knowledge 2020" agenda.

However, whilst the broad objectives are clear – increasing access to data, better interoperability between different systems, guaranteed long-term sustainability, more private sector involvement – choices need to be made on how to achieve them. Questions include the best incentives for encouraging more involvement or the most

¹² Nicosia declaration for an ECOMF Strategic Partnership, 10 October 2012

appropriate process for defining priorities. The consultation provided a wide range of suggestions on these and other issues that will feed into the impact assessment that will guide the implementation of the next phase of "Marine Knowledge 2020".