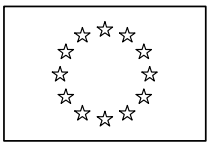

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COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

MARINE KNOWLEDGE 2020
marine data and observation for smart and sustainable growth

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COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

MARINE KNOWLEDGE 2020
marine data and observation for smart and sustainable growth

1. CONTEXT

Knowledge is an engine for sustainable growth in the interconnected global economy and therefore a key element to achieve smart growth in the European Union in line with the "Europe 2020" strategy[1]. Improving knowledge of the seas and oceans that make up 71% of our planet's surface is one of the three cross-cutting tools of the EU's integrated maritime policy[2]. Indeed marine knowledge can also help achieve the other two tools – better spatial planning and integrated maritime surveillance. The magnitude of future changes in oceanic systems, their impact on human activity and the feedbacks on the ocean from these changes in human behaviour cannot be forecast without understanding the way the system works now and how it worked in the past. Knowledge is necessary to achieve good environmental status of marine waters, in accordance with the Marine Strategy Framework Directive, the environmental pillar of the integrated maritime policy. Knowledge is a key component of the EU's plan to integrate marine and maritime research[3] and a contribution to the Digital Agenda[4].

The creation of marine knowledge begins with observation of the sea and oceans. Data from these observations are assembled, then analysed to create information and knowledge. Subsequently the knowledge can be applied to deliver smart sustainable growth, to assess the health of the marine ecosystem or to protect coastal communities.

This Communication is largely concerned with the first two stages of the process chain - i.e. data collection and assembly – on the basis that public information is fundamentally a public good that can benefit a wide body of stakeholders whereas applications are more specialist and can be dealt with either through the market or through targetted policy initiatives. Data collection is mostly, for subsidiarity reasons, the responsibility of Member States. The EU has the potential to add value in the assembly phase because of the need to ensure coherence across borders and between different user communities.

The Council conclusions on integrated maritime policy of 16 November 2009[5] encouraged the Commission to make proposals on improving the use of scientific knowledge. This Communication responds to this request by outlining the case for a more coordinated approach to marine data collection and assembly

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1 Europe 2020, A European Strategy for smart, sustainable and inclusive growth, 03.03.2010 COM(2010) 2020

2 An Integrated Maritime Policy for the European Union Brussels, 10.10.2007 COM(2007) 575 final

3 A European Strategy for Marine and Maritime Research A coherent European Research Area framework in support of a sustainable use of oceans and seas Brussels, 3.9.2008, COM(2008) 534 final

4 A Digital Agenda for Europe 19.05.2010 COM(2010) 245

5 Council conclusions on integrated maritime policy 2973rd General Affairs Council meeting Brussels, 16 November 2009

and describes an action plan whereby the different EU policy measures are contributing pieces to an overall jigsaw that will achieve this aim.

2. CURRENT CHALLENGES

At present the majority of marine data collected by public institutions in EU Member States, individually or collectively, at a cost of more than €1 billion annually[6], are largely collected with a specific purpose in mind – for instance to exploit marine resources, to ensure safe navigation, to monitor compliance with regulations or to test a scientific hypothesis. However, as was confirmed in a public consultation[7], those processing or applying these data face a number of obstacles. Users find it hard to discover what data already exists. There are restrictions on access, use and re-use. Fragmented standards, formats and nomenclature, lack of information on precision and accuracy, the pricing policy of some providers and insufficient temporal or spatial resolution are further barriers. The opportunity to develop innovative new products and services based on these data is therefore lost[8].

3. OBJECTIVES

In the context of this Communication, three objectives to improve marine knowledge are established:

1. reducing operational costs and delays for those who use marine data and therefore:
   - helping private industry compete in the global economy and meet the challenge of sustainability;
   - improving the quality of public decision-making at all levels;
   - strengthening marine scientific research
2. increasing competition and innovation amongst users and re-users of marine data by providing wider access to quality-checked, rapidly-available coherent marine data;
3. reducing uncertainty in knowledge of the oceans and the seas and so providing a sounder basis for managing future changes

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6 Estimate made in the impact assessment for this Communication.

7 Commission Staff Working Document, "Marine Data Infrastructure Outcome of Public Consultation", 22.1.2010, SEC(2010)73 final

8 For instance bioprospecting for new products in medicine or the process industry would benefit from better knowledge of sea-bed habitats.

These objectives contribute directly to some of the flagship initiatives announced in the Europe 2020 strategy such as an 'Innovation Union', a 'Resource efficient Europe' and 'an industrial policy for the globalisation era'.

A conservative estimate of the benefits of creating an integrated network to replace the present fragmented marine observation system suggests a figure of €300 million per annum[9]. Beyond this, a more rational use of marine data will not only improve the efficiency of existing users of marine data but will also open up new opportunities for innovation and growth.

4. DEVELOPING EXISTING EU INSTRUMENTS

Member States already collect much data and in some cases are legally obliged to do so. Furthermore various EU instruments and actions endeavour to further the availability of a coherent set of data and observations within the EU.

These actions include both obligations and enabling measures. The distinction between the two is not always clear-cut but in general obligations are those where EU legislation obliges Member States to collect, assemble or grant access to data and enabling measures are those where the EU provides some support**.**

4.1. EU Directives

The Marine Strategy Framework Directive[10], obliges Member States to "*establish and implement coordinated monitoring programmes for the ongoing assessment of the environmental status of their marine waters.*" Assembling sea-basin and pan-European-sea pictures requires collaboration across borders and across disciplines. Experience so far demonstrates that the sharing of data across sectors and across Member States does not take place uniformly, adequately, efficiently or rapidly. Unless the European Union takes or facilitates actions in this field it is unlikely to happen.

The INSPIRE Directive[11] obliges Member States to adopt measures for the sharing of data sets and services between public authorities for the purposes of public tasks and the Environmental Information Directive[12] requires them to release the data when asked. The Directive on the re-use of public sector information[13] facilitates the re-use of public data by establishing a common legislative framework regulating how public sector bodies should make their information available for re-use in order to remove barriers such as discriminatory practices, monopoly markets and a lack of transparency.

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9 The impact assessment estimates approximately €100 million for science, €56 million for public authorities and €150 million for the private sector

10 Directive 2008/56/EC

11 Directive 2007/2/EC establishing an Infrastructure for Spatial Information in the European Community.

12 Directive 2003/4/EC

13 Directive 2003/98/EC

These Directives provide the necessary legal foundations for a better use of marine data and, in the case of INSPIRE, for common standards. But they are not in themselves sufficient. They do not necessarily apply to those bodies not exercising public authority that hold much marine data - for instance scientific and academic institutions - and they do not override intellectual property rights. They do not deal with near-real time observations or historic archives of data.

In a review of the Public Sector Information Directive[14], Re-users in the geographical and meteorological sectors signalled high prices, restrictive licensing conditions and discrimination as barriers to fully unlock the potential of PSI re-use. Access to foreground data from EU Framework Programme marine research projects is only mandatory for Community Institutions and Bodies who intend to use the data for developing, implementing and monitoring environmental policies.

4.2. *Data Collection Framework for fisheries (DCF)*

The new Data Collection Framework adopted in 2008[15] obliges Member States to collect, manage and provide high quality fisheries data for the purpose of scientific advice, mainly for appropriate fisheries management decisions. These activities are executed in the framework of multi-annual national programmes which are co-financed by the Union. The new framework obliges Member States to provide access to these data for fisheries management advice, scientific publication, public debate and stakeholder participation in policy development. Beyond these purposes, access to data, their assembly on a sea-basin level and re-use of assembled data currently requires the consent of all data owners concerned.

4.3. Global Monitoring for Environment and Security Initiative (GMES)

GMES is a broad programme, covering land and the atmosphere as well as the marine environment. It aims to deliver services in the environmental and security fields and is largely focused on measurements from satellites and on products based on these measurements. Options for the marine core service of GMES are being tested through the MyOcean project. Products are available for any kind of use, including commercial (downstream activities) but excluding "uncontrolled redistribution (dissemination, e.g. broadcasting, web posting…)".

4.4. Shared Environmental Information System SEIS and WISE-marine

The Shared Environmental Information System SEIS[16], an approach being encouraged by the European Commission and the European Environment Agency (EEA), aims to modernise and simplify the availability, exchange and use of the data and information required for the design and implementation of

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14 Re-use of Public Sector Information – Review of Directive 2003/98/EC, Brussels, 7.5.2009, COM(2009) 212 final,

15 Council Regulation (EC) N° 199/2008 of 25 February 2008

16 Towards a Shared Environmental Information System (SEIS) COM(2008) 46 final Brussels, 1 February 2008

environmental policy, according to which the current, mostly centralised systems for reporting are progressively replaced by systems based on access, sharing and interoperability.

WISE-marine is the marine environmental component of SEIS intended to fulfil the requirements of implementation of the reporting obligations of the Marine Strategy Framework Directive 2008/56/EC and to inform the European public on implementation of marine strategies. It will be an extension of the current Water Information System for Europe (WISE) system, which covers near coastal waters, towards the marine environment.

4.5. ur-EMODnet

The "ur-EMODnet" financed through maritime policy preparatory actions[17] is a prototype EMODnet[18] that should itself be useful to marine and maritime professionals but which is primarily designed to test the design concept and promote feedback. Thematic groups[19] are assembling existing data from different sources, measuring their quality, ensuring that they are complete with descriptors (metadata) such as time and place of measurement and making them available through thematic portals. Many of the insights and technologies used by these groups were developed under EU research programmes[20]. The themes assembled so far are summarised in Table 1. Their interoperability is strengthened through identical standards and six-monthly coordination meetings. Data layers produced through ur-EMODnet are available without restriction. It is intended to launch an interim evaluation of the results in 2011 and a final evaluation in 2013 that will guide further action.

However the current ur-EMODnet will not in itself provide sufficient information for a full evaluation in 2013. The sample is too small. The number of parameters and sea-basins covered are fewer than would be needed to satisfy the needs of the marine and maritime community. The resolution is too coarse. It would be too great a jump and too risky a venture to move directly from the preparatory-action-based ur-EMODnet to a full-blown EMODnet of the scale that current estimates indicate will be necessary[21]. A Regulation will be proposed to finance the further development of an Integrated Maritime Policy in the period 2011-2013. Enrichment of EMODnet will be amongst the actions to be financed under this Regulation.

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17 A financial mechanism designed to prepare proposals with a view to the adoption of future actions

18 European Marine Observation and Data Network

19 Thematic groups are consortia of laboratories that have taken on the responsibility of assembling data of a particular type and making them available through single gateways. There are currently four groups – for hydrography/bathymetry, for geology, for biology and for chemistry (see table 1). One for physical data is in the pipeline.

20 Decision 1982/2006/EC on the 7th Research Framework Programme is the latest in a series of programmes funding the production and use of marine data.

21 Impact Assessment for EMODnet

4.6. EU and national agencies

In addition to the activities of the European Environment Agency, the Community Fisheries Control Agency and the European Maritime Safety Agency are mandated to assist the European Commission and the Member States in the application of EU relevant legislation. In the course of their duties they collect relevant data[22] which could have a wider use for other purposes. Provided that suitable safeguards regarding confidentiality were observed, these data might, in an appropriate aggregated form, be disseminated more widely.

A wide range of Member States government bodies are also involved in collecting data.

4.7. Coastal data

Coastal authorities need to gather, use and share information to underpin decision-making and public engagement. The framework for coastal information systems is provided by the EU integrated coastal zone management recommendation[23].

Coastal regions have been defined by Eurostat as standard statistical regions (NUTS[24] level 3), which have at least half of their population within 50 km of the coast[25]. This represents 446 regions, 372 of which have a coastline. Socio economic parameters such as population indicators or GDP are freely available through the Eurostat web-site for the majority of these regions. For some countries, such as Poland, Sweden or UK, these regions are so large that they also cover populations living far inland and so cannot capture the particular features that characterise coastal communities. Attempts to collect finer resolution data have not been successful because of prohibitive charges from some national statistical offices, because some national statistical offices do not have a systematic way of dealing with requests for data and because, for confidentiality reasons, data cannot be provided for regions with only one or two enterprises in a particular sector.

Economic data – income, costs, employment - from fisheries, aquaculture and fish processing are also collected as part of the Data Collection Framework. Economic data of European fishing fleets are summarised in an annual economic report[26] at the national level and increasingly at a sea basin level[27].

A number of regional authorities are building coastal information systems in order to manage and plan activities. The INSPIRE Directive and different

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22 Such as oil-spills, ship movements and fishing activity

23 2002/413/EC

24 For description of statistical regions see http://ec.europa.eu/eurostat/ramon/nuts/basicnuts_regions_en.html

25 Hamburg was added to the list even though it does not satisfy the above criteria.

26 Scientific, Technical and Economic Committee for Fisheries (STECF) The 2009 annual economic report on the European fishing fleet EUR 24069 –ISBN 978-92-79-13867-6

27 The sea-basin being the basin where the fishing takes place. This is not always the one on whose coast the fish are landed or where the home port of the vessels concerned is sited.

Interreg[28] projects are beginning to ensure some interoperability between these systems.

Table 1 How EU initiatives contribute to a marine data infrastructure Research projects and national initiatives are not included. Neither are "obligations' such as INSPIRE. The table only covers "enabling measures" financed in part by the EU budget.

Parameters	**collection**	**assembling**	**application**
Bathymetry		ur-EMODnet	WISE marine
Geology		ur-EMODnet	
Physics	GMES (space)	GMES (except near coast) , ur-EMODnet[29]	GMES,
Fisheries (including fisheries economy)	Data Collection Framework[15]	Joint Research Centre (and other users)	ICES[30], STECF[31], GFCM[32],
Chemistry		ur-EMODnet	WISE-Marine
Biology		ur-EMODnet, GMES[33]	WISE Marine
Human activity (other than fisheries)[34]		ur-EMODnet[37]	WISE Marine
Coastal data		Eurostat	

4.8. Proposals to improve existing instruments

In order to enhance the effects of the above instruments and actions the Commission proposes a number of improvements:

– *The Commission will take the necessary steps to ensure that data from EU-supported regional development and marine and maritime research programmes are more available for re-use.*

– *The Commission will examine what further measures are needed to promote coastal information systems in its follow-up to the EU Recommendation on Integrated Coastal Zone Management[35].*

28 a Community initiative which aims to stimulate interregional cooperation in the European Union. It started in 1989, and is financed under the European Regional Development Fund (ERDF).

29 Not including measurements from space so GMES does not feed ur-EMODnet

30 International Council for Exploration of the Sea

31 Scientific Technical and Economic Committee for Fisheries set up under Article 33 of Council Regulation EC 2371/2002)

32 General Fisheries Commission for the Mediterranean

33 Chlorophyll measurements from space as a proxy for phytoplankton

34 Offshore energy, shipping routes, gravel extraction etc

35 The PEGASO project, supported by the 7th Framework Programme is examining options.

– *Demonstrations of GMES marine services will be supported through the space theme of the Seventh Framework Programme until 2014. Follow-ups are being considered.*

– *In the short-term the Commission will make sure that the new access rules for fisheries data are fully enforced by Member States. In the mid- and long-term, ways to widen the scope for accessing data will be explored.*

– *To optimize use of resources WISE-Marine and EMODnet will be coupled in the context of the implementation of the Marine Strategy Framework Directive. WISE-Marine is scheduled to be set up by mid 2012 and will collect and visualize Member States data on the marine environment and human activities. As well as EMODnet, WISE-marine will build on WISE, the existing reporting system already used by Member States to report their assessments for the Water Framework Directive.*

– *The Commission intends to launch a further set of actions to improve the coverage of data, resolution and range of assembled parameters*[36,37].

– *The Commission will ensure that its Agencies regularly release data.*

– *The Commission encourages Member States in the same spirit to release data gathered for a specific purpose, if necessary aggregated in time and space.*

– *Eurostat will study detailed population and area parameters in order to provide better parameterization of the coastal influence in territorial regions for statistics.*

Initiatives to remedy deficiencies in Europe's marine data system will thus progress along a number of avenues. The principal purposes of these initiatives are similar but not identical. Further action is therefore required to create synergies between the various developments.

The Commission will take the necessary measure to bring these initiatives together in order to ensure a smooth and seamless provision of marine data and at the same time to avoid redundancies in data collection efforts. This will involve:

– *ensuring common standards*[38]

[36] such as: extending the geology map to the Mediterranean and Iberian Atlantic Coast; resolution of bathymetry from a quarter of a minute to at least a tenth of a minute; include further pesticides.

[37] financed through the proposed financial regulation for integrated maritime policy

– *progressive alignment of data policies. The ultimate aim is to provide free access without restriction of use*

– *ensuring that the data assembled in initiatives such as ur-EMODnet or the Data Collection Framework are appropriate for the needs of the Marine Strategy Framework Directive*

– *specific ur-EMODnet action in 2010*[37] *to assemble physical in-situ data as input for GMES, to validate GMES model results and to cover the near-coast waters*[39] *not dealt with by GMES*

– *In 2012-2013, once results from ur-EMODnet and prototype GMES marine core service actions become available, to assess gaps in the monitoring network.*

– *beginning a dialogue with partner countries and international organisations in order to ensure that the EU's effort contributes towards an interoperable global marine knowledge system.*

5. TOWARDS AN OPERATIONAL MARINE DATA ARCHITECTURE

While the instruments and action mentioned above have their merit, the integration of marine knowledge requires a more robust step. A coherent set of data, crossing Member States' borders needs a targeted operational architecture. The final shape will depend on operational experience gained in projects and initiatives such as ur-EMODnet and MyOcean. It is however appropriate already at this stage to signal some of the elements that should be incorporated:

1. Europe's marine data are presently collected for a specific purpose – for instance safe navigation or fisheries management – but the aim is to move towards a paradigm where, from the outset, a multi-purpose use is envisaged.

2. Data should be maintained as close to the sources as possible. These data should be under proper guardianship in accredited data centres. Any processing of data which constitute personal data as defined in the Data Protection Directive[40] must comply with the provisions of the Directive.

3. An effective European marine data infrastructure should include a number of thematic assembly groups[41] entrusted with "assembling" data. A

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38 including nomenclature, formats and units This will ensure that data flowing from the different initiatives can be compared and combined. INSPIRE provides the basic framework. INSPIRE is itself fully consistent with international standards.

39 near-coast waters is a scientific term used to define those waters where shallow water, complex coastal topography and tidal streams mean that physical modelling requires a much more detailed approach than is presently envisaged within the GMES marine core service.

40 Directive 95/46/EC

41 This covers (1) access to all raw observations held at data centres of a certain type (2) production and dissemination of data layers indicating density of observation, quality of data, (3) seamless (gridded or polygon) data layers over and across whole sea basins.

thematic assembly group is a consortium of organizations that assembles data on a specific theme such as geological layers or chemical contaminants.

4. In order to achieve sustainable operation of marine observations systems and identification of critical gaps in these systems an integrated viewpoint at sea-basin level is needed. Existing organisations with a sea-basin mandate such as the Regional Sea Conventions[42], Regional Advisory Councils for fisheries and EuroGOOS[43] would be expected to contribute.

5. In a limited number of cases it may be appropriate that the EU support to the marine data and observation infrastructure move beyond the assembly of data to the analysis and application of these data; for instance to support the provision of indicators for the state of the marine environment.

6. The knowledge architecture requires a decision making process that decides what data is going to be collected and how it should be assembled. It also requires a secretariat to administer the process.

In order to work towards such an infrastructure the Commission proposes that:

– *Knowledge is not only the responsibility of Government. European industry should dedicate adequate resources to ensure adequate safeguarding of knowledge and, when it is no longer commercially valuable, its wider dissemination.*

– *The Commission will encourage communication amongst national data centres through regular discussions in its marine observation and data expert groups and its maritime internet forum in order to promote good practice in data curation and dissemination.*

– *To ensure an integrated view of monitoring needs, the Commission will explore how a sea-basin checkpoint[44] might work by setting up pilots[37] in the period 2011-2013.*

– *The Commission, on the basis of advice from Member States, from sea-basin checkpoints and its own experts will continue to define priorities for assembling data in ur-EMODnet but in the period 2011-2013 will develop a proposal for more permanent governance.*

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42 OSPAR, HELCOM, Barcelona, Bucharest Conventions

43 EuroGOOS is an association of national governmental agencies and research organisations, committed to European-scale operational oceanography

44 Checkpoints would independently check data layers from each thematic assembly group, ensure that the data from different groups are mutually compatible and define priorities for further observations based on interaction with local stakeholders. These checkpoints should act on behalf of all users of marine data within that sea-basin and cover all EU initiatives on marine data – EMODnet, GMES, Data Collection Framework etc

– *The Commission will set up a prototype secretariat[37] to manage the ur-EMODnet process - preparing meetings, assessing the output of thematic assembly groups and sea-basin checkpoints, ensuring deadlines are met and preparing an annual report of activity.*

6. STEERING THE PROCESS

The greater access to marine data and observation has been monitored by an independent group of experts in the collection, assembly and application of marine data. The support of this group has assisted the Commission in making its choices on thematic priorities and working methods. The group will assist in a formal mid-term assessment beginning in 2011 and reporting in early 2012. This assessment will include quantitative indicators that measure the uptake of data from the prototype ur-EMODnet by scientists, authorities and industry. It will report on progress made in achieving the objectives set out in this Communication.

The Commission will also establish a Member States Expert Group to ensure coherence with ongoing work in Member States.

7. TIMING

The proposals set out in this Communication describe actions to be taken by the Commission in the period 2011-2013. At the end of this period a further impact assessment will be made to guide the next steps. The Commission invites reactions to this plan.