Geo-harmonizer PROJECT REPORTS

Last update: 4th of January 2021

User profiling

Initial use case development

Prepared by: Terrasigna and CTU

https://opendatascience.eu/geoharmonizer-project

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Introduction

Scope of Geo-harmonizer

The overall objective of the Geo-harmonizer project - EU-wide automated mapping system for harmonization of Open Data based on FOSS4G and Machine Learning - is to develop an original, web-based, scalable and modular system for hosting and accessing various thematic geospatial data layers (vector and raster GIS layers) to support cross-border services over “the Geo-harmonizer region”, specifically the European Economic Area and the United Kingdom, Norway, Switzerland, Serbia, B&H, Montenegro, Kosovo, North Macedonia and Albania.

The consortium will create a data portal and a software suite extending a wide variety of free and open-source software solutions for geospatial data (FOSS4G) in combination with state-of-the-art Machine Learning algorithms, and will be made available within EU-supported High Performance Computing (HPC)/Cloud computing infrastructures. The functionality of the system will be demonstrated with a list of new, added-value, pan-EU data sets including seamless continental Europe cover time-series (2000-2020), environmental quality indicators, climate change indicators, potential natural vegetation maps and OpenStreetMap+ (improved continental Europe version of the OpenStreetMap). All datasets generated by Geo-harmonizer will be integrated into the European Data Portal.

The Geo-harmonizer project is financed by the European Commission through the Telecom programme of the Connecting Europe Facility agency.

Purpose of document

The user segmentation report delineates the guidelines for drafting the initial use cases for the Geo-harmonizer map products. It consists of identifying and detailing the main characteristics of a potential user with high consideration to the nature of the aforementioned map products.
It must be mentioned that the Geo-harmonizer initiative was not primarily based on a set of user requirements to comply with, but conversely, it had established a set of high level results with respect to the obtained map products. Furthermore, given their consistency and harmonization across the Geo-harmonizer region, they are perfectly suited as reference layers for various other initiates and projects.

Overview

This report is a reference document that identifies and characterizes potential users of the Geo-harmonizer project's results, delineating also a series of initial use cases to be further extended, provided that the pinpointed users engage with the project team.
The document has two main sections: (1) user profiling and (2) initial use case development. The user profiling is divided into two subsections. The first one is the contextual analysis that positions the Geo-harmonizer activities within its geographical framework. As its name states, significant efforts are invested in harmonization activities, thus this first part of the analysis is geared towards cross regions that could benefit from the results of the project. For a coherent structure, the study was done with consideration to the transnational regions delineated within the Interreg V B 2014-2020. Although there are 12 identified, the analysis of only the Baltic, Danube, Mediterranean and Alpine regions was sufficient, to include all relevant potential users. For each region, partnerships, conventions and other various initiatives such as the ones for monitoring and management of major transnational geographical features, have been recognized as an advantageous context for the use of Geo-harmonizer results. The second part of the user profiling is represented by the classification and characterization of each potential user that has been identified as an active entity in the first subsection. They are divided into: International organizations, national authorities, international commissions, non-governmental organizations and funding programs. The characterisation is considering the following: main scope, geographic coverage, spatial information support and cooperation prospects.

The second main section of this report consists of the outlining of three main use case scenarios with regard to the Geo-harmonizer results and potential users: wetlands evolutions, floods evolution in Europe's river basins and the educational use case.

Contextual analysis

The constant technological progress of data acquisition and storage is leading to a wealth of data to process and analyse. It is safe to say that the current century is intensely data focused. However, the current status brings forward a new set of challenges mostly centered on developing innovative techniques for knowledge extraction in an efficient way. Moreover, more and more valuable prove to be the capabilities of changing the established work paradigm that would allow a meaningful use of the newly added value products into the workflows of existing actors. These can be national authorities, environmental agencies, research institutes, non-governmental organizations, fundations, private companies, or even research projects.
One of the core activities of the Geo-harmonizer project resides in the newly, added value, pan-European map products envisaged:

- Landuse map based on OpenStreetMap dataset and enhanced with EO data and national open datasets (administrative boundaries, transportation infrastructure) - temporal coverage: 2018 - 2020, spatial resolution: 30m;

- Yearly land cover - temporal coverage 2000 - 2020, spatial resolution 30 m;
- Environmental quality maps, climate change indicators, and potential natural vegetation maps that include: air quality maps, maps of soils nutrients, water quality maps, flood events, fires etc.

Yet, with respect to user profiling activity, there are two key aspects to be considered relevant for potential users:

1. **Harmonization**. This is a key principle of the project, leading all datasets production activities. The harmonization processes are divided in the following directions:
    a. Harmonization of geographical entities data so that seamless geographical layers can be produced,
    b. Harmonization of variables coming from different sources to the same standard,
    c. Semantic harmonization allowing for combination of data with different legends and mapping concepts,
    d. Harmonization of the map styling and metadata standards,
    e. Harmonization of data quality i.e. providing close-to-homogenous data quality standards.
2. **Processing level of the data.** Within the Geo-harmonizer, 5 processing levels have been considered, as follows:
    a. Raw data (L0): data sets such as the original L0[1] satellite imagery.
    b. Preprocessed data (L1): data sets where obvious artifacts are removed including any systematic bias.
    c. Analysis-ready data (L2): data (i.e. data products) which contain almost no artifacts and all bias has been removed and hence the data can be directly used for spatial analysis.
    d. Decision-ready data (L3): data products that can be used to support direct unambiguous decisions.
    e. Decisions (L4): data which can directly be used further in automated pipelines (e.g. turn right on the next crossing).

The Geo-harmonizer new added value map products will be of Level 2 - Analysis ready data and Level 3 - Decision-ready data.

The two aspects detailed are crucial for user profiling because, coupled with the data specifications of each map product, they help complete potential users categories.

[1] https://sentinel.esa.int/web/sentinel/technical-guides/sentinel-2-msi/level-0-processing last accessed 15th of June 2020

Harmonization is an invaluable aspect when it comes to data related activities that are cross-boundaries, be these boundaries administrative, linguistic, geographic, scientific, etc. Within the Geo-harmonizer project, extensive efforts will be invested into all harmonization processes, employing cutting-edge technology to obtain new added value map products. In consequence, the user profiling will target international entities (European agencies, non-governmental organizations, research centers/networks, cross-boundaries research projects etc.) that appreciate the importance of harmonized datasets.

Analysis Ready Data (ARD) is a prevalent notion today in the Earth Observation communities. According to the Committee on Earth Observation Satellites, ARD "are satellite data that have been processed to a minimum set of requirements and organized into a form that allows immediate analysis with a minimum of additional user effort and interoperability both through time and with other datasets.". Decision-ready data is yet even more advanced with regard to its readiness to be integrated within decision-making processes, as it excludes any ambiguities with regard to interpretation of the data product.

Given the dimensions highlighted, the contextual analysis of Geo-harmonizer user segmentation will have a focus on the transnational initiatives, agencies, non-governmental organizations etc. To give this analysis a coherent structure, transnational regions delineated within the Interreg V B 2014-2020 have been considered. Although there are 12 regions - Adriatic Ionian, Alpine Space, Atlantic Area, Balkan Mediterranean, Baltic Sea, Central Europe, Danube, Mediterranean, North Sea, North Western Europe, Northern Periphery and the Arctic, South West Europe - the analysis of only the Baltic, Danube, Mediterranean and Alpine regions was sufficient, to include all relevant potential users.
For each of them, there are numerous projects, initiatives and partnerships in the context of which the work produced in the Geo-harmonizer project could be highly valuable. There are also a significant number of partnerships and organizations initiated for the monitorization, management and protection of a geographic major feature, such as the Black Sea Commission, the Carpathian Convention etc. These entities will also be targeted as potential end users.

Geo-harmonizer region

The Geo-harmonizer region is represented by the European Economic Area and the United Kingdom, Norway, Switzerland, Serbia, B&H, Montenegro, Kosovo, North Macedonia and Albania, as depicted in Figure 1.

Figure 1. Map of the Geo-harmonizer region

Open Data Science

Geo-harmonizer: EU-wide automated mapping system for harmonization of Open Data based on FOSS4G and Machine Learning

Geo-harmonizer region

1:20000000

The map presents the Geo-harmonizer region, as agreeded upon by the Geo-harmonizer consortium, strictly based on data availability.

Projection ETRS89 / LAEA Europe
QGIS 3.10 Desktop on osx
2020-08-23

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Co-financed by the Connecting Europe Facility of the European Union

This work has received funding from the European Union's the Innovation and Networks Executive Agency (INEA) under Grant Agreement CEF Telecom project 2018-EU-IA-0095.

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The European Union has implemented a series of directives and regulations that support relevant environmental policies. In some situations, non-EU countries have also adopted a series of reglementations for a seamless collaboration. The following list enumerates the most important agreements, conventions and legislative initiatives that apply in the area of interest for the Geo-harmonizer project:

No.	Official name	Acronym	Description
1	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy	The Water Framework Directive	The Directive aims for 'good status' for all ground and surface waters (rivers, lakes, transitional waters, and coastal waters) in the EU. The WFD introduced the River Basin Districts as management units designated according to the river basin (the spatial catchment area of the river) as a natural geographical and hydrological unit, without any consideration to administrative boundaries. As rivers often cross national borders, representatives from several Member States have to co-operate and work together for the management of the basin (so-called transboundary basins). They are managed according to River Basin Management Plans, which should provide a clear indication of the way the objectives set for the river basin are to be reached within the required timescale. The River Basin Management Plans should be updated every six years.
2	Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks (Text with EEA relevance)	Floods Directive	The Directive requires Member States to assess if all water courses and coast lines are at risk from flooding, to map the flood extent and assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU.
3			
4	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Natura 2000)	The Habitats Directive	The Habitats Directive was adopted in 1992. It ensures the conservation of a wide range of rare, threatened or endemic animal and plant species. Some 200 rare and characteristic habitat types are also targeted for conservation in their own right, taking account of economic, social, cultural and regional requirements. As the EU extended, new annexes have been included.

5	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds	The Birds Directive	Firstly adopted in 1979, the Birds Directive aims to protect all of the 500 wild bird species naturally occurring in the European Union. The Directive places great emphasis on the protection of habitats for endangered and migratory species. It establishes a network of Special Protection Areas (SPAs) including all the most suitable territories for these species. Together with the Habitats Directive, it builds up to Nature 2000 Network.
6	COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU Biodiversity Strategy for 2030 Bringing nature back into our lives	EU Biodiversity Strategy	The strategy represents a long-term plan for protecting nature and reversing the degradation of ecosystems, core part of the Europe Green Deal. As part of this new framework, the Commission will put in place a monitoring and review mechanism. This will include a clear set of agreed indicators and will enable regular progress assessment and set out corrective action if necessary. This mechanism will feed the Environmental Implementation Review and contribute to the European Semester
7	Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information	Open Data Directive	The Directive on open data and the re-use of public sector information provides a common legal framework for a European market for government-held data (public sector information). It also requires the adoption by the Commission (via a future implementing act) of a list of high-value datasets to be provided free of charge. These datasets, to be identified within a thematic range described in the Annex to the Directive, have a high commercial potential and can speed up the emergence of value-added EU-wide information products.
8	Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)	INSPIRE Directive	The INSPIRE Directive is a framework directive that defines 34 themes of spatial data arranged into three annexes to be made readily available to all members, in a seamless and harmonised manner. The spatial data relevant for INSPIRE is the one owned by government bodies or by other institutions for government bodies and spatial data used by government bodies for the completion of their public duties.

Baltic Sea region

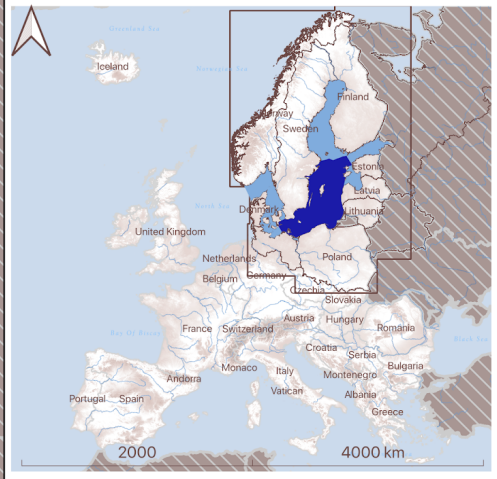
The Baltic Sea region is formed by the following countries: Denmark, Estonia, Finland, Germany (the States (Länder) of Berlin, Brandenburg, Bremen, Hamburg, Mecklenburg-Vorpommern, Schleswig-Holstein and Niedersachsen (only NUTS II area Lüneburg region)), Latvia, Lithuania, Poland and Sweden. The partner countries (NON-EU) are Norway and Russia (St. Petersburg, Arkhangelsk Oblast, Vologda Oblast, Kaliningrad Oblast, Republic of Karelia, Komi Republic, Leningrad Oblast, Murmansk Oblast, Nenetsky Autonomous Okrug, Novgorod Oblast and Pskov Oblast) (Figure 2).
The Geo-harmonizer region does not include Russia.

Figure 2. Map of the Baltic Sea region.

Geo-harmonizer: EU-wide automated mapping system for harmonization of Open Data based on FOSS4G and Machine Learning

Baltic Sea region

The map presents the Baltic Sea transnational region, as defined for the Interreg B Transnational Cooperation Program 2014-2020.



Projection ETRS89 / LAEA Europe
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2020-09-11

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This work has received funding from the European Union's the Innovation and Networks Executive Agency (INEA) under Grant Agreement CEF Telecom project 2018-EU-IA-0095.

A summary list of agreements, conventions and legal frameworks identified in the region is given below:

Nr.	Name	Geographic scope	Thematic scope	Countries
1	European Union Strategy for the Baltic Sea Region (EUSBSR) (2009)	Baltic Sea	Environmental (clean waters, rich and healthy wildlife); connect the region (transport, energy markets).	Sweden, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland.
2	Convention on the Protection of the Marine Environment of the Baltic Sea Area (2000)	Baltic Sea	To promote the ecological restoration of the Baltic Sea Area and the preservation of its ecological balance. Summary of provisions: Parties undertake to prevent and eliminate pollution of the Baltic Sea Area and of its marine environment caused by harmful substances from all sources, including land-based sources, ships and pleasure crafts.	Sweden, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia
3	Baltic Sea Region Energy Cooperation (1998)	Baltic Sea	Analysis of conditions for wind power in the Baltic Sea Region; Energy policy strategies for the post-Kyoto period; Transportation and storage solution for CO2 in the Baltic Sea Region; Study on Energy Efficiency investments for Street and other Public outside Lighting; Partnership of the BASREC countries on clean energy.	Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, the Russian Federation, Sweden
4	Council of the Baltic Sea States (1992)	Baltic Sea	It is an overall political forum for regional cooperation. The scope is to translate politically and practically the UN Sustainable Development Goals, the Paris Climate Agreement, the Sendai Framework on Disaster Risk Reduction, the Palermo Protocol and the UN Convention on the Rights of the Child, into regional actions on the ground.	Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, Russia, Sweden

5	B7 Baltic Islands Network (1989)	7 islands in the Baltic Sea	The B7 aims to use its strengths to promote the strategic goals of the islands and serve the interests of its islanders. Their objectives are: to develop the Islands through projects; to lobby to achieve their vision of the islands; and to learn through exchange of experiences and ideas. Their priorities are: 1. Transport, 2. Education, 3. Tourism, 4. Environment and Energy, 5. Business Development, 6. ICT (Information & Communication Technologies), 7. Democracy, inter-regional understanding, networking, 8. Rural and Agro-business Development, 9. Healthcare, 10. Public Service Effectiveness and 11. Common History	Bornholm (Denmark), Gotland (Sweden), Hiiumaa (Estonia), Rügen (Germany), Saaremaa (Estonia), Åland Islands (autonomous part of Finland, Öland (Sweden)
6	Nordic-Balitc Wetlands Initiative (2005)	Nordic-Balitc region	NorBalWet serves as a communication network to exchange information and experiences, thereby enhancing multilateral and transboundary cooperation by embracing a problem-oriented and practical approach to improve wise use and conservation of wetlands, in particular the network of Ramsar sites and other protected areas.	Denmark, Greenland, Faroe Islands, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, weden, Russian Federation

Danube Basin region

The Danube Transnational area encloses 9 EU countries: Austria, Bulgaria, Croatia, the Czech Republic, Germany– Baden-Württemberg and Bavaria, Hungary, Romania, Slovakia, Slovenia) and 5 non-EU countries: Bosnia and Herzegovina, the Republic of Moldova, Montenegro, Serbia, Ukraine–four provinces: Chernivetska Oblast, Ivano-Frankiviska Oblast, Zakarpatska Oblast and Odessa Oblast) (Figure. 3). Unfortunately, due to lack of LUCAS data for Republic of Moldova and Ukraine, we had to exclude them from the Geo-harmonizer region.
In the Danube Area, there are several important geographical features that led to the evolution of various agreements, commissions and organizations, such as the Danube Basin, Black Sea, Carpathian Mountains, Balkan Mountains.

Figure 3. Map of the Danube region.

A summary list of agreements, conventions and legal frameworks identified in the region is given below:

Nr.	Name	Geographic scope	Thematic scope	Countries
1	Black Sea Environmental Partnership (2007)	Black Sea	Scopes: jointly promote business and entrepreneurship in the tourism and cultural sectors; increase cross-border trade opportunities and modernisation in the agricultural and connected sectors; improve joint environmental monitoring; promote common awareness-raising and joint actions to reduce river and marine litter	Bulgaria, Greece, Georgia, Romania, Armenia, Turkey, Ukraine, Rep. Moldova
2	Convention on the Protection of the Black Sea Against Pollution (1994)	Black Sea	To provide a framework for cooperation in the protection of the marine environment of the Black Sea, the conservation of its living resources, and the enhancement of its amenities. Topics: Waste & hazardous substances, Wild species & ecosystems, Air & atmosphere, Sea	Bulgaria, Georgia, Romania, Russia, Turkey, Ukraine
3	Convention on Cooperation for the Protection and Sustainable Use of the Danube River (1994)	Danube River Basin	To ensure sustainable and equitable water management of the Danube River, including the conservation, improvement and the rational use of surface waters and groundwater in the catchment area; to control the hazards originating from accidents; and to contribute to reducing the pollution loads of the Black Sea from sources in the catchment area.	Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Republic of Moldova, Montenegro, Slovakia, Slovenia, Serbia and Ukraine
4	Declaration concerning common approaches to water management, flood protection, hydropower utilization and nature and biodiversity conservation in the Drava River Basin (2008)	Drava River Basin	Declaration concerning common approaches to water management, flood protection, hydropower utilization and nature and biodiversity conservation in the Drava River Basin.	Austria, Croatia, Hungary and Slovenia and Italy.

5	Convention on the International Commission for the protection of the Elbe (1990)	Elbe River	The Contracting Parties undertake to cooperate with the International Commission on the Protection of the Elbe to prevent the pollution of the Elbe and its drainage area (art. 1.1). They are to endeavour to enable the use of the river (in particular for drinking water and agriculture), to achieve as natural an ecosystem as possible and to reduce substantially the pollution of the North Sea from the Elbe area (art. 1.2). The Parties agree to determine the tasks to be carried out as a priority in the form of work programmes with timetables (art.2.3). Article 2 lists the Commission s undertakings which include inter alia proposing specific quality objectives and protective measures to prevent water pollution resulting from accidents and providing evidence regarding the ecological importance of the various biotope elements of the water. Finally, the Contracting Parties undertake to inform the Commission about all the basic matters required for it to fulfil its tasks (art.4). The Commission is to evaluate reports of the Parties and may submit proposals for improvements (art. 4)	Germany, Czech Republic
6	Convention on the International Commission for the Protection of the River Oder against pollution (1996)	Oder River	An Agreement between Germany, Poland and the Czech Republic to curb the pollution of the river Oder. The contracting parties agree to set up a Commission empowered to make suggestions as to the pollution control. Dealt with in particular are issues such as the quality of drinking water, exchange of information and implementing programmes. The Agreement consists of 20 articles.	Czech Republic, Germany, Poland
7	The Dinaric Arc Initiative (2004)	Dinaric Mountain Range	It is supported by the “Big Win” commitment made by the governments of the Dinaric Arc countries at the 9th Conference of the Parties to the Convention on Biological Diversity (CBD COP 9). The initiative has been created by the following international organizations: WWF, UNESCO, UNDP, IUCN, the Council of Europe, FAO, Euronatur and SNV;	n/a

8	The Framework Convention on the Protection and Sustainable Development of the Carpathians (Carpathian Convention) (2006)	Carpathian Mountain Range	To pursue a comprehensive policy and cooperate for the protection of sustainable development of the Carpathians with a view to improving the quality of life, strengthening local economies and communities and conserving natural values and cultural heritage.	Czech Republic, Hungary, Poland, Romania, Serbia, Slovak Republic, Ukraine

Mediterranean region

The Mediterranean region is defined in the context of the Interreg Europe as the European countries at the northern shore of the Mediterranean Sea: Croatia, Cyprus, France (Corse, Languedoc-Roussillon, Midi-Pyrénées, Provence Alpes Côte d'Azur, Rhône-Alpes), Greece, Italy (Abruzzo, Apulia, Basilicata, Calabria, Campania, Emilia-Romagna, Friuli-Venezia Giulia, Lazio, Liguria, Lombardy, Marche, Molise, Piedmonte, Sardinia, Sicily, Tuscany, Umbria, Valle D'Aoste, Veneto), Malta, Portugal (Algarve, Alentejo, Lisbonne), Slovenia, Spain (Andalusia, Aragon, Catalonia, Balearic islands, Murcia, Valencia – and the two autonomous cities – Ceuta and Melilla), United Kingdom (Gibraltar), Albania, Bosnia and Herzegovina, Montenegro (Figure 4).

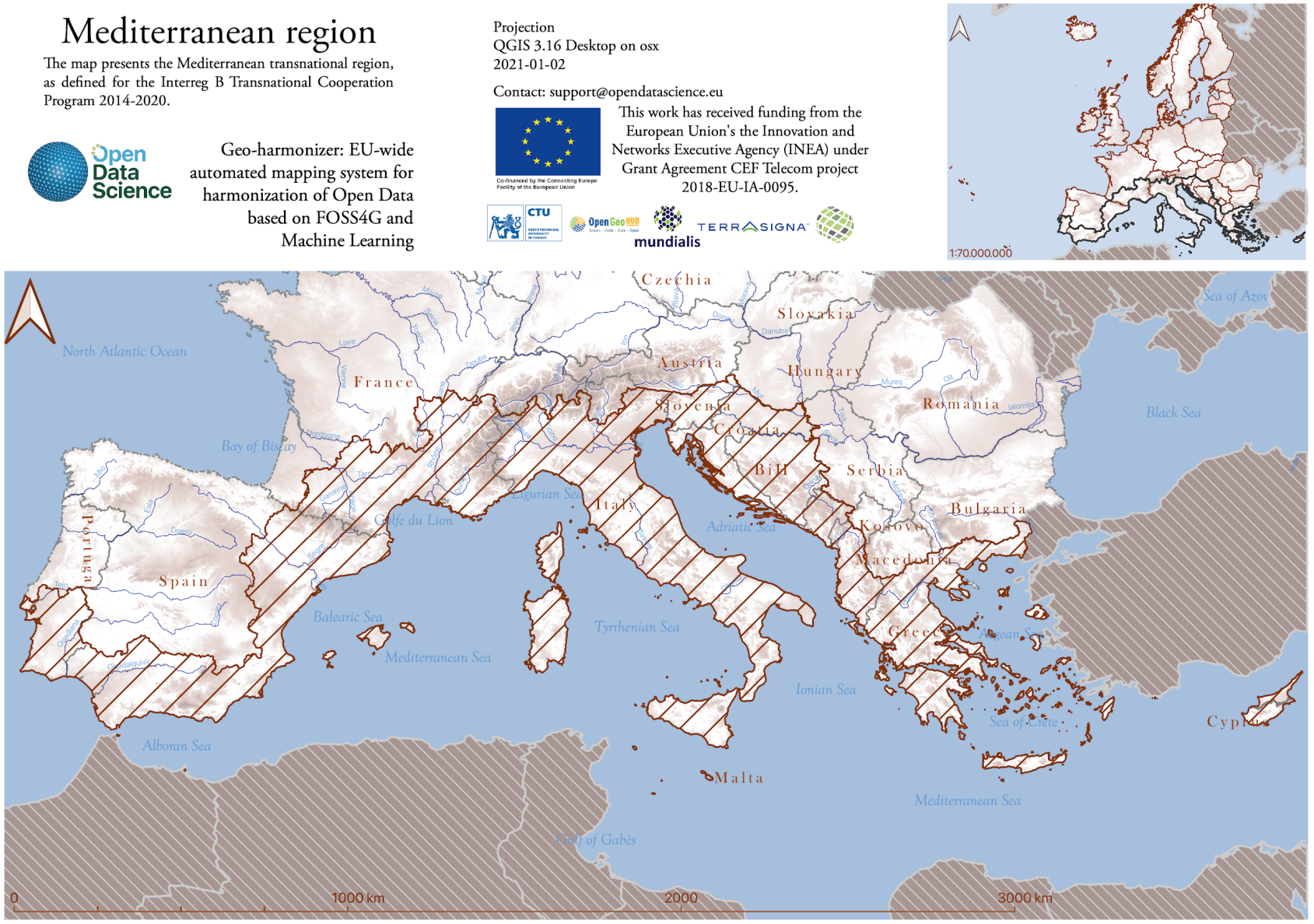

Figure 4. Map of the Mediterranean region.

A summary list of agreements, conventions and legal frameworks identified in the region is given below:

Nr.	Name	Geographic scope	Thematic scope	Countries
1	Convention for the Establishment of the European and Mediterranean Plant Protection Organisation (1951)	Mediterranean Sea	A European and Mediterranean Plant Protection Organisation is established (art. 1). The Organisation is to act, with FAO, as a regional plant protection organisation under article 8 of the International Plant Protection Convention, 1951. It is to advise, assist and coordinate Government measures to prevent the introduction and. spread of plant pests and diseases (art. 5), and to obtain, exchange, study and publish information relating to the same.	52 member countries (including nearly every country in the European and Mediterranean region, as well as Asian countries which were previously part of USSR)
2	Cooperation across borders in the Mediterranean	Mediterranean Sea	The general objective of the Programme is to foster fair, equitable and sustainable economic, social and territorial development, which may advance cross-border integration and valorise participating countries' territories and values. The strategy is based on the following two overall objectives: promote economic and social development; address common challenges in the environment	Portugal (Algarve), Spain (Andalucia, Catalunia, Comunidad Valenciana, Murcia, Islas Baleares, Ceuta, Melilla), Cyprus, Malta, France (Corse, Languedoc-Roussillon , Provence-Alpes-Côte d'Azur), Greece (Anatoliki Makedonia - Thraki, Kentriki Makedonia, Thessalia, Ipeiros, Ionia Nisia, Dytiki Ellada, Sterea Ellada, Peloponnisos, Attiki, Voreio Aigaio, Notio Aigaio, Kriti), Italy (Basilicata, Calabria, Campania, Lazio, Liguria, Puglia, Sardegna, Sicilia, Toscana)

3	Mediterranean Commission on Sustainable Development (2016-2025)	Mediterranean Sea	It provides a strategic policy framework, built upon a broad consultation process, for securing a sustainable future for the Mediterranean region consistent with Sustainable Development Goals. It aims to harmonise the interactions between socio-economic and environmental goals, adapt international commitments to regional conditions, guide national strategies for sustainable development, and stimulate regional cooperation between stakeholders in the implementation of sustainable development.	n/a
4	Mediterranean Action Plan (MAP) - Barcelona Convention System (1975)	Mediterranean Sea	It is a platform for regional cooperation in protecting and enhancing the marine and coastal environment while promoting sustainable development in the Mediterranean region.	Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syrian Arab Republic, Tunisia, Turkey
5	Mediterranean Wetlands Initiative (1991)	Mediterranean Sea	The MedWet mission is to ensure and support the effective conservation of the functions and values of Mediterranean wetlands and the sustainable use of their resources and services. it is part of the Ramsar Regional Initiative.	Albania, Algeria, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Jordan, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Portugal, Serbia, Slovenia, Spain, Syrian Arab Republic, The former Yugoslav Republic of Macedonia, Tunisia and Turkey.

Alpine region

The Alpine region encloses the following complete EU-countries: Austria, Liechtenstein, Switzerland and Slovenia and regions from the following: France, Germany and Italy (Figure 5).

Figure 5. Map of the Alpine region.

The most important legal framework implemented in the region is represented by the Convention on the Protection of the Alps, entering into force in 1995 and signed by the following countries: Austria, France, Germany, Italy, Liechtenstein, Slovenia, Switzerland.

Projects relevant for the region

Climate-ADAPT

The platform is a collaboration between the European Commission and the European Environmental Agency that is meant to support European states to tackle climate change by making available relevant information and quality checked datasets. The platform is maintained by EEA, with the help of the European Topic Centre on Climate Change Impacts, Vulnerability and Adaptation (ETC/CCA).
According to Climate-ADAPT, there is the possibility to share relevant information as an external provider[2] under the section of *Information portals*. In order to do so, one must request an account on the platform.

The Geo-harmonizer team will contact the Climate-ADAPT team and request an account in order to list the results of the project under the Information portals.

User segmentation

The following chapter details the Geo-harmonizer potential user segmentation considering the envisioned results of the project, with an emphasis on the map products: seamless continental Europe cover time-series (2000-2020), environmental quality indicators, climate change indicators, potential natural vegetation maps and an improved continental Europe version of the OpenStreetMap.

The software package developed during the Geo-harmonizer is also a significant result, therefore important efforts will also be invested for its dissemination with the scope of reuse, given the open license chosen.

In the following, we will look at each type of user and outline the potential specificities of their activities that can indicate their requirements.

International organizations

In the scope of this report, we define an international organization as an organisation established by a treaty - which is a legal agreement - or other instrument governed by

[2] https://climate-adapt.eea.europa.eu/help/share-your-info/information-portals last accessed 16th of July 2020

international law and possessing its own international legal personality. Its purpose is to support establishing an agenda dedicated to a specific set of goals (such as the abolishment of hunger), define, coordinate and measure the activities of its member states to reach the aforementioned goals.

Given the results envisioned for the Geo-harmonizer project, there is a significant number of international organizations for which these results could be considered relevant.

The European Environmental Agency (EEA)

Main scope. Geographic coverage. Spatial information support

The European Environmental Agency is an agency of the European Union, governed by a Management Board and Bureau, with a Scientific Committee in an advisory capacity. The agency was established in 1993 and started operations in 1994.
EEA has 32 member states and it is cooperating with 6 more. The geographical coverage of EEA fully encloses the Geo-harmonizer region.

The specific role of the EEA is to support policymaking at the EU level and build capacity in countries, using the European Environment Information and Observation Network (Eionet) as its unique partner to generate two-way flows of quality-assured environmental data and information. Thus, with respect to spatial information support, EEA is collecting official environmental data from its members, some of which is publicly available under an open license and on which EEA is supporting its environmental reports.

EEA has strong connections with international relevant organizations, such as United Nations Environment Programme (UNEP), United Nations Environment Assembly (UNEA), World Health Organization (WHO), United Nations Development Programme, United Nations Statistical Division, Food and Agriculture Organization of the United Nations, World Meteorological Organization and the
secretariats of global conventions, such as the Convention on Biological Diversity (CBD), UN Framework Convention on Climate Change (UNFCCC) and UN Convention to Combat Desertification. Additionally, EEA has engagements with the Global Earth Observation System of Systems (GEOSS) of the Group on Earth Observations (GEO) and with the UN Initiative on Global Geospatial Information Management.

EEA is also responsible, together with the Joint Research Center (JRC), of one of the Copernicus Program Services: the Copernicus Land Service (CLMS), through which important data and products are provided at global, pan-European and even regional level, such as Corine land Cover, the high resolution layers (tree cover density, imperviousness etc.). In the future, EEA will also be responsible for the European Ground Motion Service.[3]

[3] https://land.copernicus.eu/user-corner/technical-library/european-ground-motion-service last accessed 25th of June 2020.

Cooperation prospects

According to the Data Policy[4], EEA is open to include into their databases datasets that come from external sources, including "e.g. European Commission, Copernicus services, R&D projects, other public authorities". Furthermore, it is stated that "Data will be provided through discovery, view and, as far as possible, through download services which are compliant with established standards from ISO, OGC, INSPIRE and other relevant standardisation bodies. EEA will hold the data where it sees fit and EEA will aim to provide meta-information for all data. Unless indicated otherwise, dataset will be distributed under an open standard license ODC-by license or similar."

Therefore, the Geo-harmonizer consortium will engage with EEA with the scope of becoming a data provider.

European Topic Centre on Urban, Land and Soil Systems (ETC/ULS)

Main scope. Geographic coverage. Spatial information support

The Urban, Land and Soil Systems is one of the 7 European Topic Centers: ETC on Air Pollution, Transport, Noise and Industrial Pollution (ETC/ATNI), ETC on Biological Diversity (ETC/BD), ETC on Climate Change Impacts, Vulnerability and Adaptation (ETC/CCA), ETC on Climate Change Mitigation and Energy (ETC/CME) ETC on Inland, Coastal and Marine Waters (ETC/ICM), ETC on Urban, Land and Soil Systems (ETC/ULS), ETC on Waste and Materials in Green Economy (ETC/WMGE). An ETC represents a consortium of organisations in EEA member countries with expertise in specific environmental areas, contracted by the EEA to support the implementation of its work programmes.

The ETC/ULS is functioning under a partnership agreement for 2019-2021 and it supports EEA to monitor urban development in Europe. Its stated scope is to create seamless European wide spatial reference data and to develop and analyse various land related indicators.

Cooperation prospects

The ETC/ULS is a consortium led by the Environmental Agency of Austria with 8 members from all 3 sectors: academia, public and private. Given the center's thematic scope and the analysis activities compiled in reports, ETC/ULS is a potential user of the Geo-harmonizer map products, especially the improved land use, the land cover and the potential natural vegetation map products. Thus, during the user case initial development, the consortium will contact the center in an attempt of a productive engagement.

[4] https://www.eea.europa.eu/legal/eea-data-policy#toc-5 last accessed 25th of June 2020.

Joint Research Center (JRC)

Main scope. Geographic coverage. Spatial information support

The Joint Research Center (JRC) is the European Commission's science and knowledge center, with the main scope to support the EU policy making processes through independent research carried out by external scientists. The JRC can also participate in projects with a large number of partners in the Member States and engage with a variety of non-EU and global scientific and standard-setting bodies.
Given its scope, JRC is also a data producer, aggregator and provider, disseminating the obtained results through the EU Science Hub.
The geographic coverage varies depending on the datasets or collection, it may be regional, pan-European or even global.

Cooperation prospects

In this initial user segmentation activity, we have not been able to identify a direct approach for the Geo-harmonizer map products results to be employed in a potential use case by JRC.

The International Union for Conservation of Nature (IUCN)

Main scope. Geographic coverage. Spatial information support

The International Union for Conservation of Nature (IUCN) is an association of governments and civil society organizations from over 160 countries that work in a coordinated manner to conserve nature and to support a faster transition to sustainable development. The Union is divided into 6 Commissions: Commission on Education and Communication Commission on Ecosystem Management, Commission on Environmental, Economic and Social Policy, Species Survival Commission, World Commission on Environmental Law, World Commission on Protected Areas.
Additionally, IUCN coordinates their projects and activities regionally. Given the Geo-harmonizer region, there are three relevant IUCN Centers for Cooperation; however, none of their geographic scope is fully enclosed within the project's region: IUCN Center for Mediterranean Cooperation (IUCN-Med), IUCN in Eastern Europe, North and Central Asia (IUCN ECARO), IUCN European Regional Office.

Cooperation prospects

IUCN is an organization that functions through members' support, donations and volunteers. There is no clear indication on their websites regarding potential interactions with project consortia, such as our own. Additionally, as the Geo-harmonizer region is not a full overlay of any of the association's regional offices, nor it completely encloses one, the obtained map products might not be a convenient approach for the Union. However, given their large network, we will approach the 3 regional offices for dissemination purposes, once the Geo-harmonizer map products will be finalised.

The Food and Agriculture Organization (FAO)

Main scope. Geographic coverage. Spatial information support

The Food and Agriculture Organization - FAO - represents a United Nations Agency that has the main scope of ending hunger worldwide. FAO has 194 member states and is active in 130. FAO is conducting various projects; however, the main geographical scope of those projects are usually under-developed or problematic areas.
FAO has several departments, including the Geospatial Information for Sustainable Systems where a section on Information Portals exists, however it was no longer accessible on the time of writing this report.

Cooperation prospects

FAO is the provider of extensive geospatial datasets - mostly under an open license - that support their activities in the different parts of the world: Harmonized World Soil Database v 1.2, Global Soil Organic Carbon map or regional and national soil maps and databases.
There is no indication of collaboration openness with project teams, such as our own, nor is there any FAO webpage with external resources. Given the dimensions and procedural workflows of the agency, there is little chance for FAO to consider results of Geo-harmonizer.

The Convention on Wetlands

Main scope. Geographic coverage. Spatial information support

The Convention on Wetlands (Ramsar, Iran, 1971) is an intergovernmental treaty whose mission is “the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world”. 169 nations have joined as Contracting Parties, and more than 2220 wetlands around the world, covering over 214 million hectares, have been designated for inclusion in the Ramsar List of Wetlands of International Importance. There are 1011 European Ramsar Sites, amounting to 270k km^2.
Relevant in the geographical context of Geo-harmonizer are several Ramsar regional initiatives: Mediterranean Wetlands Initiative, Nordic-Baltic Wetlands Initiative - both described in the dedicated Contextual analysis sections - Carpathian Wetlands Initiative and the Black Sea Coastal Wetlands Initiative. The latter also includes Georgia, Turkey and Russia, which extends outside the geographical scope of Geo-harmonizer.

With respect to spatial information support, the Ramsar Sites Information Service (RSIS) is the aggregator of data on wetlands, provided and quality assessed by Contracting Parties to the Convention. The available information on the RSIS is the following:

- a searchable database of Ramsar Sites, which holds information on the wetland types, ecology, land uses, threats, hydrological values of each Site as well as spatial information

- downloadable copies of Ramsar Information Sheets (RISs) for each site which have been provided by the Contracting Parties , including maps and supplementary information, Site summaries, and exportable data sets; and
- digital (GIS) boundaries of Sites, where available.

The Ramsar Convention activities are organized through a Strategic Plan adopted by the Contracting parties. The Fourth Strategic Plan is now active and covers the time period of 2016 - 2024. It relies on work done by all 4 bodies of the Ramsar Convention: Conference of the Parties, the Standing Committee, the Secretariat of the Convention on Wetlands and the Scientific and Technical Review Panel (STRP). The STRP was established in 1993 to provide scientific and technical guidance to the other 3 bodies. Thus, the STRP work consolidates in written documents, such as technical reports, briefing notes and factsheets.

Cooperation prospects

The Ramsar Convention does not have financial resources or an integrated central-based assessment or monitoring mechanism, rather it relies on the resources made available by each country (the Contracting Parties). The Convention is however guiding the entities affiliated on how to protect and manage wetlands, capacity building and international collaboration.
There are also technical and scientific guidelines that are prepared by STRP, such as the report no. 10 published in 2018: 'The use of Earth Observation for wetland inventory, assessment and monitoring. An information source for the Ramsar Convention on Wetlands' (Rebelo et al.). The report highlights as one of the key messages: "*Analysis ready datasets can be further analysed to derive wetland related information using freely available software toolboxes (often with open source licenses) produced through ongoing EO initiatives. In addition, an increasing number of thematic products are also being made available (at regional to global levels) which can be used to assess and monitor wetlands directly. The combination of these factors enables a shift in the use of EO for wetland inventory, assessment and monitoring away from experimental to operational.*" The message shows a clear openness to collaborate, thus the Geo-harmonizer team will contact the Ramsar Convention Regional Initiatives relevant for the project's region.

European Centre for Medium-Range Weather Forecasts (ECMWF)

Main scope. Geographic coverage. Spatial information support

ECMWF stands for European Centre for Medium-Range Weather Forecasts. Acting both as a research institution and an operational center, ECMWF implements two services from the EU's Copernicus programme: the Copernicus Atmosphere Monitoring Service (CAMS) and the Copernicus Climate Change Service (C3S), with contributions to the Copernicus Emergency Management Service (CEMS). ECMWF is an independent intergovernmental organisation supported by 34 states (including the Geo-harmonizer region), providing numerical weather prediction to its Member States. It also offers forecast data that can be purchased.

With respect to spatial information support, ECMWF is also in charge with the Climate Data Store (CDS) which is the infrastructure that supports the Copernicus Climate Change Service (C3S). Through the CDS Essential Climate Variables (ECVs), climate analyses, reanalyses, projections and indicators at temporal and spatial scales relevant to adaptation and mitigation strategies for various sectoral and societal benefit areas are provided. There are also several possibilities of requesting data from CDS - through an interface, an API and a toolbox.

Cooperation prospects

No relevant collaboration directions with the ECMWF have been identified from the Geo-harmonizer perspective.

National authorities

This subcategory is dedicated to national public institutions and organizations that work or have a mandate to monitor and assess the environmental parameters considered in Geo-harmonizer, such as environmental agencies.

International Commissions

The International Commission for the Protection of the Danube River (ICPDR)

Main scope. Geographic coverage. Spatial information support

ICPDR is an international organization that has been established to implement the Danube River Protection Convention[5], thus it must collect and provide data that cause or are likely to cause transboundary impacts. Per its mandate, ICPDR is responsible for a sustainable and equitable usage of surface waters and groundwater within the Danube Basin. Furthermore, it is in charge of the implementation in the basin of the EU Water Framework Directive (WFD) and of the EU Floods Directive (FD).

The geographical scope of ICPDR extends beyond the Geo-harmonizer region with areas within the borders of the Republic of Moldova and Ukraine.

With respect to spatial information support, ICPDR has an extensive database widely available through the DanubeGIS platform[6] with maps on the following topics: Danube River Basin district boundaries, surface water bodies, groundwater bodies, protected areas, nitrogen/phosphorus levels of pollution in the basin districts, nitrates vulnerable zones etc. The data is collected from the contracting parties of the ICPDR (14 out of the19

[5] https://www.icpdr.org/main/sites/default/files/DRPC%20English%20ver.pdf last accessed 10th of July 2020
[6] https://www.danubegis.org/ last accessed 10th of July 2020

countries in the Danube Basin), thus it is highly dependent on the geospatial information received from the member states.

ICPRD activity is based on two main pillars: River Basin Management and Flood Management, for both of them contributing to important projects across the region. Furthermore, a key goal stated by ICPDR is to interconnect the two management directions. Following the same idea, ICPDR has also the crucial role of harmonization of data/maps/vocabulary/information across the diversity of management units within the Danube Basin. The ICPRD is doing this through the activities of its expert groups[7]: Flood Protection, Monitoring and Assessment, Pressures and Measures, River Basin Management, Information Management and GIS and Public Participation and Communication.

Cooperation prospects

There is no clear indication that ICPDR is actively collaborating with external providers of map products or datasets, however activities planned within the Geo-harmonizer can be of important assistance to the ICDPR's mandate, from multiple points of view. The documentation prepared for Milestone 1 *Matrix comparison of technology for automated data harmonization* as well as the planned production of the generic package, can be very well employed by the GIS expert group in their activities of data harmonization and map production. Furthermore, teh Geo-harmonizer map products (land use and floods time series) can easily be part of the DanubeGIS.
According to the ICPDR website, in 2021 they will be seeking public input on the next update to the 2 management plans: Danube River Basin Management Plan (DRBMP) last updated in 2015 and the Danube Flood Risk Management Plan (DFRMP) - first edition 2015.

Secretariat of the Carpathian Convention (CC)

Main scope. Geographic coverage. Spatial information support

The Secretariat of the Carpathian Convention[8] is an international organization that represents the contact point for all of the parties (Czech Republic, Hungary, Poland, Romania, Serbia, Slovak Republic, Ukraine) that have signed and adopted the Convention on the Protection and Sustainable Development of the Carpathians. The geographical scope of CC is also extending over the geographical scope of Geo-harmonizer. On the Ukrainian territory there is about 10% of the surface of the Carpathian Range.

The Convention has several topics of interest consistent with the working groups established: Biodiversity, Spatial Development, Water and River Basins, Agriculture and Rural Development, Forests, Tourism, Industry, Energy, Transport and Infrastructure, Cultural Heritage and Traditional Knowledge, Assessment and Monitoring, Awareness Raising, Education and Participation and Climate Change.

[7] https://www.icpdr.org/main/publications/tor-workplans last accessed 10th of July 2020
[8] http://www.carpathianconvention.org/ last accessed 20th of july

Regarding spatial information support, on the official CC website there is no platform/portal for geospatial information, open or otherwise and there is no clear indication of such resources within the CC. The webpage for Resources[9] includes only documentation, various reports, manuals and final publication of projects.

Cooperation prospects

The openness of the Secretariat for the Carpathian Convention for cooperation is stated on their very first page "The Convention provides a framework for cooperation and multi-sectoral policy coordination, a platform for joint strategies for sustainable development, and a forum for dialogue between all stakeholders involved – from the local community and various NGO's up to the regional and national Governments, Institutions of the European Union and the United Nations."
As mentioned before, the CC geographical scope extends over the Geo-harmonizer project geographical region. However, given the valuable results planned within the project - extending from the new added value products to the technical reports and the open source software created - we believe that there is enough ground for a cooperation agreement with the CC. Thus, we will propose a use case to apply for the Geo-harmonizer region.

International Commission for the Protection of the Elbe River (ICPER)

Main scope. Geographic coverage. Spatial information support

The ICPER is working for the following objectives: making the water use possible (drinking, agriculture), achieving the most natural ecosystem possible and a permanent strategy to decrease the burden imposed on the North Sea by the Elbe River basin.
The geographical scope is represented by the Elbe River basin, within the territory of Germany and the Czech Republic.
The ICPER has a Secretariat that coordinates the work of the 3 working groups, which are: WG on the implementation of the WFD in the Elbe River Basin, Flood protection and Accidental Water Pollution. To support the WG, there are 3 expert teams: surface water, groundwater and data management.

With respect to spatial information support, there is no public geoportal/portal on the official website or resources page for geospatial data or maps; however, analysing their publications, such as the Strategy for Nutrient Reduction[10], it is clear that the Commission is employing geospatial information in their analysis.

[9] http://www.carpathianconvention.org/publications-64.html last accessed 20th of July
[10] https://www.ikse-mkol.org/fileadmin/media/user_upload/E/06_Publikationen/01_Wasserrahmenrichtlinie/2019_ICPER-Information_sheet_Strategy_NP%20.pdf last accessed 6th of August, 2020

Cooperation prospects

There is no clear procedure made available on the ICPER website on introducing new collaborations with different entities or connections with external data providers. However, considering the premises (open data vs open source) of the Geo-harmonizer new added value map products development, we consider that a potential cooperation can be established. Thus, the ICPER has been considered a possible user for the second use case scenario, Floods evolution in Europe's river basins.

Non-governmental organizations

The World Wide Fund for Nature (WWF)

The World Wide Fund for Nature (or World Wildlife Fund as it is known in the USA and Canada) is one of the best known non-governmental organizations worldwide working for nature conservation. Founded in 1961, it is today the largest conservation organization active in more than a 100 countries working on different topics, that range from oceans to freshwaters to policy wildlife, climate change and others.

Main scope. Geographic coverage. Spatial information support

The overall scope, as stated by WWF, is the protection of nature and humans alike. Evolving from saving individual species and landscapes, the organization is focusing their strategy towards a more integrated approach, targeting six key thematics: forests, marine, freshwater, wildlife, food and climate.
With regard to geographic coverage, the WWF identifies a series of priority places in Africa, Asia, South America and North America where significant efforts are being invested. The Geo-harmonizer region is not one of these places. Even if WWF operates in the EU, it does so at policy level coordinating a WWF EU Policy Office. Thus there is no indication of interest for geospatial information support - as provided by Geo-harmonizer. On the other hand, WWF employs in a significant manner spatial information support in other geographical areas. Their director of Information Science is invested in working within the Natural Capital Project[11] - a partnership between Chinese Academy of Sciences, the University of Minnesota, the Stockholm Resilience Centre, The Nature Conservancy, and the WWF. Within the project - among other things - an open source software platform InVEST (Integrated Valuation of Ecosystem Services and Tradeoffs) that represents a suite of models used to map and value the goods and services from nature - such as crop production, habitat quality, marine fish aquaculture, urban flood risk mitigation etc.

[11] https://naturalcapitalproject.stanford.edu/ last accessed 7th of August, 2020

Cooperation prospects

WWF is a very large NGO building partnerships with governments, corporations and other entities. Yet, their collaboration directions are well defined: cause marketing, philanthropic giving and sustainable business - and none is suitable with the Geo-harmonizer project's activities and results.

The Land Portal Foundation (LandPortal)

Main scope. Geographic coverage. Spatial information support

The LandPortal was established to create, curate and disseminate land governance information worldwide. The foundation is organizing its work around several adjacent land topics such as: land monitoring, forest tenure, land and corruption, land conflicts, etc. Their platform compiles specialized literature, information on specific news and events, they organize debates, webinars and cultivates a community.
Related to spatial information support, LandPortal has compiled spatial and statistical relevant datasets from various providers, such as the World Bank, Open Data Barometer, Socioeconomic Data and Applications Center, FAO, DLR, Afrobarometer, Global Land Alliance etc. Furthermore, LandPortal has a geoportal with capabilities of data exploration and visualization by topic, region, datasets and basic map creation by adding available layers.

Cooperation prospects

The Land Portal Foundation is open to collaboration and according to the website, it allows contributions of news, information, research and datasets after creating an account. There is no clear indication of any kind of quality control or assessment for the datasets submitted. However, listed as data providers are only important research centers, universities or international organizations.
The Geo-harmonizer team will contact LandPortal as soon as the new added-value map products will be available so that the developments achieved within Geo-harmonizer can be shared with a wider audience.

Funding programs

European Regional Development Fund - Interreg Europe

With consideration to the Geo-harmonizer activities and results, an important fund within the European Union is the European Regional Development Fund that finances the European Territorial Cooperation (ETC) - Interreg Europe. The program has been running since 1990 and it is at its fifth plan 2014 - 2020. The funding activities develop following 3 lines: cross-border (Interreg A), transnational (Interreg B) and interregional (Interreg C).
The projects funded by any of these directions have as centerline the harmonization concept and even if the scope is beyond geospatial analysis - as for example protection of cultural

heritage - the results of the Geo-harmonizer are relevant, as they offer harmonized reference map layers.

Cohesion Fund

The Cohesion Fund finances projects regarding the environment and trans-European transport networks. It applies to member states with a Gross National Income of less than 90% of the EU average. For the 2014-2020 period, the Cohesion Fund concerns Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia.
The Cohesion Fund is supporting the Connecting Europe Facility, thus it has also funded the Geo-harmonizer initiative. Through CEF Telecom Open Data, other relevant projects have been supported, a list is provided in the following table:

Acronym	Name	Objective	Services
HIGHLANDER	(HIGH performance computing to support smart LAND sERvices	to design and implement a framework of multi-thematic, last generation, continuously updated, highly detailed and harmonized data, indicators and tools, from remote and in-situ monitoring, analytical tools, numerical models up to machine learning algorithms.	a National Open Data Portal on climate and climate-related hazards
		to fully exploit the HPC capabilities to generate, post-process, host, distribute and make accessible to and exploitable by multiple users both existing and newly generated data, indicators and tools into HPC-based services	a set of illustrative “downstream applications”, aimed mainly at increasing the users’ awareness about the great potential of the information provided as well as their capacity in further elaborating and using data;
		to ensure the long-term functionality of the created services thanks to the involvement of real users during the project. Huge amount of input data gathered and used in HIGHLANDER will come from geospatial and non-geospatial datasets.	implementation of a chain of operations that directly generate the user-required information through a usercustomized package.
PHIDIAS	Prototype of HPC/Data Infrastructure for On-demand Services	Building a prototype for earth scientific data and high performance computing services.	
		Ensuring open access to standardised HPC services.	

		Deploying data-processing methods as a service for scientific communities, public authorities, private entities and citizen scientists.	
		Deploying data-processing methods as a service for scientific communities, public authorities, private entities and citizen scientists.	
CROSS-Forest	CROSS Harmonization & HPC modelization of FOREST Datasets	Cross-Forest will produce a common shared model of forest data across Academia and Public Administrations from Portugal and Spain. Cross-Forest will also provide a public endpoint exposing Forest Data according to the produced model.	pilot 1 - Forest modelization. Wood Qualtiy. Final products.(whole Spain) pilot 2 - Forest fires - fires propagation and their effects together with fire suppression technics will be addressed at a first scenario. By doing this, Cross-Forest will provide high quality information on severity prediction, possible evolution and useful recommendation on post-events measures, e.g. soil recovery procedures.
CROSS-Nature	CROSS Harmonization & Explotation of Nature Datasets	Development of common Digital Service Infrastructure (DSI) services to provide free and open access to biodiversity data and oriented towards alien invasive species (AIS) control and biodiversity protection - using LOD technologies	Pilot 1 - This pilot is based on the creation of a harmonized data model oriented towards common publication of AIS presence using datasets from Portugal and Spain. Pilot 2 - a game to identify endangered species in Spain and Portugal.
GO-PEG	Generation of cross border Pan European Geospatial Datasets and Services	The main objective of the proposed Action is to provide access to harmonized thematic open dataset(s) and their corresponding metadata in the areas of environment, emergency, and disaster management for the five partnering countries: Belgium, Denmark, Germany, Italy, Spain	Open datasets will be harmonized in terms of data content, level of detail, data structure, vocabularies and license conditions and each dataset will have a cross-border geographical coverage involving five EU Member States (BE, DE, DK, ES and IT). The results will be made available through the European Data Portal and documented through metadata in the appropriate harvested catalogues.

Conclusions

The list of organizations, commissions and authorities analysed above are by far not the only ones; however, they are among the most visible ones. Analysing them allowed outlining the general profile of the different types of the potential users.
The following table summarises their characteristics and what the Geo-harmonizer approach will be with respect to those.

Type of organization	**Main characteristics**
International organizations	- Develop large scale transboundary projects on multiple topics and with multiple partners; - If they address a topic globally, they usually have regional initiatives allowing a more dedicated and applied work on specific regions; - They are usually organized in multiple departments, including a scientific - technical one
National Authorities	- High variations on resources, projects implementations; - Don't employ mechanisms for collaboration with external projects, but usually have a focus on already established workflow to fulfill their mandate - to monitor and assess specific environmental parameters.
International Commissions	- Usually have no significant financial resources, they rely on regional resources for the topic allocated by members (usually) states or national agencies; - They offer guidance and recommendations, including scientific and technical, compiled in reports and documents, but have no mechanisms to enforce specific implementations; - Having a diplomatic profile, they are proficient in fostering international cooperation and transboundary networking between members; - Technical capabilities are not highly prevalent within the departments/bodies; - If they address a topic globally, they usually have regional initiatives allowing a more dedicated and applied work on specific regions (ex. Ramsar Convention).
Non-governmental organizations	- Usually, NGOs engage in policy activities, building partnerships that allows them a voice within policy making entities; - Build consistent networks with other NGOs, local communities and even institutions, participate in projects, yet they are not regularly involved in the scientific and/or technological effort; - Are open to collaborations, however more towards promotion and donations; - Large NGOs, such as WWF, are operating at a high level, with

	significant resources and well established procedures, which make collaborations that don't fall in clear categories unlikely.

Use case initial development

Within the Geo-harmonizer project, there is a comprehensive activity dedicated to the development of newly generated map products based on Earth Observation imagery and improved using a multitude of data sources, such as national open data portals, European datasets etc. Yet, the specifications of each new map product have been drafted with high regard for the improvement of the existent similar available products, through automatic processes using cutting-edge machine learning algorithms. For each map product, the manual processing has been limited to the maximum.

Given that in producing the new map products there were no user requirements involved, the consortium has envisioned a series of potential use cases, including users and general outlines of workflows.

Use cases scenarios prepared in this initial step represent the starting point for a conversation with a potential user, to raise their interest in the Geo-harmonizer results. However, for the second stage use case implementation, the user must be further and more deeply engaged to the level of defining user requirements. To keep track of the interactions the Geo-harmonizer team will keep an engagement log with each user following the template below.

Use case templates

Use case name (optional)	
Number	
Description	
Users	
Geo-harmonizer map product(s)	
Geographical region (AOI)	

Engagement log template

Name of entity	*Full name + acronym*
Country	*Self-explanatory*
Address	*Full address*
Type of entity	*International organization, National authority, International Commission, Non-governmental organization, Funding program*
Entity brief description	*Self-explanatory*
Main activities	*Self-explanatory*
Geographic area of interest	*Self-explanatory - with indication to full or partial overlap with the Geo-harmonizer region*
Contact person (name)	*The name of the person with whom discussions were started*
Contact person (position, please indicate whether she/he is technical)	*Self-explanatory - with indication whether the person is a geospatial/EO expert*
Date of first contact	*Self-explanatory*
User comments	*Self-explanatory*
Engagement status	*Insert date of further conversations (whether had via email, at a conference etc.).*
User feedback	*Insert each user feedback received, linked with the date when it was received*
Geo-harmonizer team member contact	*Name and affiliation of the Geo-harmonizer team member that has been in contact with this potential user.*

Use case scenarios

Wetlands evolution	
Number	1
Description	Wetland ecosystems represent an important part of Europe's, as well as the entire world's biodiversity. The Ramsar Convention (1971) was among the first worldwide treaties for the protection of a natural ecosystem. The

	Wetlands evolution use case will make available for the Ramsar Convention regional initiatives a 20 years time series land use map products highlighting the evolution of wetlands, as well as environmental quality maps and climate change (for ex. the evolution of wildfires spreading across wetlands). These maps can easily be corroborated with changes in policy, inclusion of new wetlands on the Ramsar Convention Sites List etc.
Users	- Mediterranean Wetlands Initiative, - Nordic-Baltic Wetlands Initiative, - Carpathian Wetlands Initiative, - Black Sea Coastal Wetlands Initiative.
Geo-harmonizer map product(s)	EU Land Cover maps 2000 - 2020 Environmental quality maps Climate change indicators
Geographical region (AOI)	Defined by the geographical scopes of the 4 potential users. It is important to highlight that, except for the Nordic-Baltic Wetlands Initiative, all the other 3 have regions of interest that extend over the Geo-harmonizer region.

Floods evolution in Europe's river basins	
Number	2
Description	The ICPDR has a well established geospatial information platform - DanubeGIS[12] - that makes openly available a significant number of maps for the Danube Basin. However, ICPDR is highly dependent on the datasets received from member countries. Additionally, it has the responsibility of data and maps harmonization for the entire Danube Basin. With respect to floods, the DanubeGIS makes available the flood-prone areas and flooding scenarios according to the Danube Flood Risk Management Plan - 2015 edition. The Geo-harmonizer added value map products - flood maps series 2000 - 2020, Land Cover maps 2000 -2020 - (including the EU DEM) can be of great assistance to the ICPDR works, especially in the context of work at the second edition of the Danube Flood Risk Management Plan, for which public comments will be asked for in 2021. Additionally, given the ICPDR harmonization activities, the use case can be extended to include technical workflows using the Geo-harmonizer software generic package.

[12] https://www.danubegis.org/ last accessed 10th of July 2020

Users	- The International Commission for the Protection of the Danube River (ICPDR) - International Commission for the Protection of the Elbe River (ICPER)
Geo-harmonizer map product(s)	Climate change indicators - floods 2000-2020 EU Land Cover maps 2000 - 2020 Environmental quality maps
Geographical region (AOI)	Defined by the geographical scopes of the 2 potential users. It is important to highlight that the IPCDR region of interest extends over the Geo-harmonizer region.

Educational use case	
Number	3
Description	The data sets produced by the Geo-harmonizer project can be a source for application in practical training lessons where students will model and analyze change detection, statistical processing, environment modelling, etc. The products will be also used for scientific projects as input data for many topics.
Users	Teachers, students, and researchers
Geo-harmonizer map product(s)	All produced data sets
Geographical region (AOI)	The geographic region can be various starting from the entire project data coverage for various smaller European areas.

References

Rebelo, L. M., C. M. Finlayson, C. Perennou, and A. Strauch. n.d. "STRP21-4 Draft Ramsar Technical Report on Best Practice Guidelines for the Use of Earth Observation for Wetland Inventory, Assessment and Monitoring: An …." *Ramsar.org*. https://www.ramsar.org/sites/default/files/documents/library/18.12.2017_strp21-4_rtr_eo_sod.docx.