



Guidelines on Open Knowledge

Improving the societal benefit of climate research activities

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Alexis SANCHO REINOSO, University of natural Resources and Life Sciences, Vienna

Sebastian HELGENBERGER, Institute for Advanced Sustainability Studies, Potsdam

Executive summary

This document provides a set of guidelines dealing with the JPI Climate's Open Knowledge policy at both internal (i.e. network governance) and external (i.e. network activities) level. They are mainly focused on accessibility issues (i.e. Open Access to research publications and data), keeping in mind the wider context of the so-called "Open Knowledge" approach, i.e. emphasizing the need to make (climate) knowledge creation, transfer and exchange more transparent and interactive in order to contribute to narrow the gap between climate research communities and societal actors. The *Guidelines* are conceived to serve not only the network of research funders and other actors taking part in this JPI, but also to provide practical guidance and examples to the scientific community in a wide sense, including non-academic stakeholders (i.e. practitioners, policy makers and the civil society) dealing with the various societal challenges Europe is facing.



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Preface

A demand on more openness¹ in many aspects of public life (politics, economics, culture, and also science and research) is growing in our societies. This demand has gained momentum in the last years as several governmental institutions have also accepted the relevance, which had previously been claimed by a number of non-governmental actors. It is therefore not in vain that the number of initiatives fostering Open Access in research activities has increased in a remarkable manner. Significantly, in the “Voluntary Guidelines on Framework Conditions for Joint Programming in Research 2010” by the European Research Area Committee-Group de Programmation Conjointe (ERAC-GPC) a chapter is devoted to defining an optimum of dissemination and use of research findings. This might have an extremely relevant effect upon the Joint Programming Community. And JPI Climate as an initiative with an enormous transformative potential is pre-determined to become pioneer in such issue.

This document provides a set of guidelines setting down the JPI Climate’s policy on Open Knowledge. This is summarised in a group of policy recommendations formulated in a very concise manner (further detailed explanation is provided at the end of the document). These Guidelines are not just thought for the network of research funders and other actors taking part of JPI Climate; rather, they are also conceived to provide practical examples to scientific communities in the widest sense as well as other actors tackling the challenges of climate change.

In order to support the set of policy recommendations, explanation on the topics of Open Access and Open Knowledge is provided. To do so, this document consists of 6 chapters and 1 appendix. Chapter 1 presents the rationale of the guidelines and their aim, while in chapter 2 the connections between Open Knowledge and climate research are outlined. Chapters 3 and 4 provide information related to publishing and sharing knowledge output. First, Open Access, Open Data and specific intellectual property rights management tools are presented and their relevance for JPI Climate is highlighted. Second, selected examples of institutions, best practices and lessons learnt are presented. In chapter 5 a debate on comprehensive policies focusing on the whole research cycle (i.e. beyond accessibility issues) is raised. Chapter 6 underpins the initial Guidelines by providing clarification. Finally, the appendix contains a selection of links to key documents on Open Knowledge and Open Access, focusing on those relevant regulations for the JPI Climate community (being either consolidated or potentially useful tools).

In a nutshell, these *Guidelines on Open Climate Knowledge* are conceived to foster the debate on how to increase climate (change) research activities’ societal impact and credibility by making them more transparent, and how international research funding alliances can contribute to such a goal.

¹ Here the definition of “openness” by the Open Knowledge Foundation is used: “Knowledge is open if anyone is free to access, use, modify, and share it — subject, at most, to measures that preserve provenance and openness” (source: <http://opendefinition.org/od/>). From that it follows that accessibility is a key issue of openness, although not the only one —see *Figure 1 in chapter 2*).

Policy Recommendations on Open Climate Knowledge

JPI Climate establishes the following set of guidelines to boost a more effective knowledge management policy in terms of openness (and particularly accessibility –see *chapter 2, p. 8*). These guidelines are divided into two sections, according to their recipient. The first section addresses both the JPI Climate “internal” (i.e. network governance) and “external” (i.e. network activities) operations. The second provides thought for external actors which might not be related to climate research.

Please note: Further clarification, including concrete suggestions and examples for each recommendation is provided in chapter 6 (p. 22 to 28).

JPI Climate internal policy guidelines on Open Knowledge

1. **Internal accessibility.** According to the “transparency principle” included in the Governance paper,² working documents of general concern should be accessible for all JPI Climate members and partners.
2. **Open licensing.** The use of the Creative Commons (CC) “public domain” license (CC0) when publishing any kind of internal document foster the proper management of intellectual property and the broad distribution and use of information.
3. **Open formats.** The use of open formats, i.e. ODF (e.g. *.odt, *.ods, *.odp) for working documents is encouraged to allow for broad compatibility.
4. **Open Access publishing.** Research results being funded in the context of JPI Climate will be published either through (i) Open Access journals, books or proceedings (i.e. “gold” Open Access) or (ii) self-archiving of subscription-based formats incl. embargos (i.e. “green” Open Access). Other possibilities offering restrictive Open Access rights through e.g. national contracts with given publishers are explicitly discouraged.
5. **Open Data.** Research data and meta-data derived from any funded activity in the context of JPI Climate will be freely available in an existing certified repository under the CC0 license (see *point 2*). The publication, storage and preservation strategy should be detailed in a Data Management Plan (DMP) to be submitted in the proposal and to be evaluated as a part of it.
6. **Publishing costs.** Costs related to Open Access and Open Data will be foreseen in the budgets of activities launched in the context of JPI Climate, such as joint calls. Fostering “gold” Open Access will mean financially covering the so-called “Author Processing Charges” (APCs).

² See <http://www.jpi-climate.eu/programme/governance/governance-principles> for further information.

7. **Open Access publishing compliance.** JPI Climate will establish over-mandate incentives and control mechanisms that are required to assure a successful implementation of these recommendations.
8. **National rules.** These recommendations (1 to 7) will be actively used and disseminated when coordinating research activities in the context of JPI Climate, including workshops, summer schools, symposia and so forth. When funding transnational calls, each funder is explicitly called upon to include these recommendations into their national annex.

Recommendations for funders, researchers and stakeholders³ in the climate research system

1. **Open licensing.** In order to reconcile the proper management of intellectual property and the broad distribution and use of information and knowledge, the use of the Creative Commons “Attribution” license (CC-BY) and the “public domain” license (CC0) is recommended when dealing with research results and data (including meta-data), respectively.
2. **Open formats.** The use of open formats i.e. ODF (e.g. *.odt, *.ods, *.odp) in any working document, at least for internal purposes is to be born in mind.
3. **Open Access publishing.** JPI Climate encourages the publication of research results in Open Access journals, books or proceedings (i.e. “gold” Open Access) and/or self-archiving of subscription-based formats incl. embargos (i.e. “green” Open Access). Other possibilities offering restrictive Open Access rights through e.g. national contracts with given publishers are explicitly discouraged.
4. **Publishing costs.** JPI Climate encourages policy makers and funding agencies to assume in their budgets those costs related to open access data managing and research results publication, including the so-called Author Processing Charges (APCs), if any.
5. **Open Data.** Establishing Data Management Plans (DMP) as a required criterion for any publicly funded research activity is explicitly recommended. The DMP should be submitted in the proposal and can be evaluated as a part of it.
6. **Open Access and Open Knowledge in the Joint Programming “community”.** JPI Climate will promote the use of these guidelines in the European Research Area (ERA) by cooperating with those initiatives promoting common framework conditions in the public-to-public (P2P) community.

³ The term “stakeholder” refers here to organizations and individuals outside the scientific community in terms of change agents and knowledge partners such as policy makers, regulators, citizens, NGOs, municipalities / local authorities or business and industry sectors (see JPI CLIMATE Governance leaflet on www.jpi-climate.eu).

7. **Open Knowledge in the climate research community.** By means of this set of Guidelines (and particularly chapter 5), JPI Climate invites those actors involved in the climate research community to actively promote, design and implement comprehensive open knowledge policies in order to enhance research activities' societal benefit.

1. Rationale: Why this Set of Guidelines?

JPI Climate commits to openness by connecting climate knowledge

One of the five governing principles adopted by the JPI Climate Governing Board (GB) refers to “transparency”, i.e. the need and benefits of information sharing for knowledge co-production and communication. This set of guidelines is nothing less than the operationalisation of such a principle, which is in line with the recommendations to establish “knowledge management systems” coming from the Joint Programming “community”.⁴

Being “public-public partnerships” (PPP), JPIs are funded by tax payers. Thus, it seems reasonable that this money ends up in an output that can benefit society in an immediate or even in an indirect way (for instance, quite often data and software that are produced for a specific purpose can be re-used for other things, provided they are publicly available). Following the idea of openness, this means that resulting activities should reach a target audience as large as possible in order to achieve a maximum diffusion and, therefore, to make the contribution of funded research activities more effective.

In other words: this document summarises JPI Climate’s two interconnected purposes. First, both knowledge exchange among researchers and knowledge co-production with further actors is fostered as a way to trigger innovation. Second, such innovation should serve a more open society and going beyond the strictly scientific dimension of climate change. Only combining both purposes JPI Climate will be able to tackle the Joint Programming Initiatives’ ultimate goal: to address major societal challenges.

Target users

The target users of these Guidelines are:

- 1) The JPI Climate Governing Board members and partners;
- 2) Research Funding Organisations (RFO), both at the international and national levels;
- 3) Research Performing Organisations (RPO) and researchers, particularly those involved in climate-related research (regardless of their affiliation);
- 4) climate data and climate services managers and users in general; and
- 5) (non-academic) stakeholders (*see definition in footnote no. 3, p. 5*).

⁴ The “JPIs to co work” project set down a list of recommendations in this respect: see Technical Annex, p. 26: <http://www.jpis2cowork.eu/images/pdf/Technical-Annex.pdf> .

2. Open Knowledge and its Potential in Climate Research

What is Open Knowledge?

According to the *Open Knowledge Foundation*, openness consists of 3 “key features” (see figure 1): (1) Availability and access; (2) Reuse and redistribution; (3) Universal participation.⁵ These Guidelines are mainly focused on the first issue, and precisely to what is called “Open Access” to publications and data (represented in figure 1 with the “Open Access” logo). However, being operational in such a field should not make us forget that scientific literature is just a tiny piece of the whole knowledge cake. For this reason the term “Access to Knowledge” (referring to “a movement that aims to create more equitable public access to the products of human culture and learning”⁶) is of great importance.



Figure 1: Open Access is considered one dimension within the Access to Knowledge and the Open Knowledge approaches.

Likewise, going beyond availability and accessibility and giving due attention to the other 2 fields in figure 1 (“reuse and redistribution” and “universal participation”) is key to enhance climate research activities’ societal benefit. Designing and supporting society-oriented ways to manage intellectual property rights, implementing the concept of Knowledge Mobilization⁷ or reinforcing knowledge co-design, co-production, co-dissemination and co-evaluation are some strategies on

⁵ Source: <https://okfn.org/opendata/>.

⁶ Source: *Access to Knowledge: A guide for everyone*, p. 2 (see Appendix).

⁷ A definition of Knowledge Mobilization is available under http://en.wikipedia.org/wiki/Knowledge_mobilization#See_also

how such fields could be fostered. This document contains concrete examples on these issues in chapter 4 as well as in chapter 5. They will be presented as tools that may be used in future operations in the context of JPI Climate.

Why should Open Knowledge be relevant for climate research?

Generally speaking, Open Knowledge strategies might have a huge impact in climate research, like closing the gap between climate change and its public perception⁸ or between scientific evidence and practitioners' work.⁹ Hereafter some potential benefits for JPI Climate are mentioned based on the JPI Climate 4 thematic modules:

- 1) *Moving towards reliable decadal climate projections.* Free access to published data and publications as well as to certain shared research infrastructure will strengthen researchers' collaboration and will eventually lead to a more accurate modelling and, thus, to enhanced climate information and climate prediction capacities for Europe. Smart intellectual property rights management could fuel knowledge exchange in this field and might contribute to better distinguish between commercial and non-commercial approaches.
- 2) *Researching and advancing climate service development.* Given that many requests for Climate Services need to be tackled with the involvement of stakeholders, the product is necessarily a kind of two-way exchange. Such a "reversible" nature can be decisively supported by repositories and other kind of platforms putting climate information and knowledge at the disposal of any kind of users (both public and private, and regardless of the important differences in goals and perspectives between such users) and, therefore, providing opportunities for co-design, co-production and co-delivery of climate services with the involvement of users, providers/purveyors and researchers. In the end, there is a need for a strong climate service market based on a balance between demand and supply-driven considerations and an informed climate service community.
- 3) *Sustainable transformations of society in the face of climate change.* Societal challenges that are already assumed by part of the scientific community are also to be embraced by social actors and stakeholders. This will be possible only if information flows, i.e. can be obtained, shared, interpreted and discussed without barriers. Thus, Open Knowledge is a cornerstone in fostering transdisciplinarity. Besides, this approach is also a matter of fairness against some current regulations in the field of intellectual property, which in some cases do not completely guarantee users' rights.
- 4) *Improving tools for decision making under climate change.* Since the aim's feasibility of this module mainly depends upon successful communication strategies, Open Knowledge clearly plays a crucial role by reaching out to non-scientific stakeholders and decision makers, particularly at the political level, since it plays a central role in every decision-making process.

⁸ See for example: <http://blogs.plos.org/thestudentblog/2013/08/08/climate-change-closing-the-knowledge-gap-by-opening-access-to-research/>

⁹ See, for instance: <http://www.nature.com/nclimate/journal/v4/n10/full/nclimate2362.html>. See, for instance: <http://www.nature.com/nclimate/journal/v4/n10/full/nclimate2362.html>.

3. Open Access in Detail

The so-called Budapest Open Access Initiative (BOAI) defines Open Access as the “free availability [of peer-reviewed research literature] on the public internet, permitting any users to read, download, copy, distribute, print, search (...) or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited”.¹⁰ More than ten years later, the appropriateness of such an approach is no longer discussed nor put in question, even in the very official arenas.¹¹ This is particularly true for those research activities and results being funded by public funds.

Yet, how this idea is implemented in reality may change depending on what approach is adopted. In general, there exist two main routes towards Open Access:

- a) Self-archiving (also referred to as “green” open access), meaning that the published article or the final peer-reviewed manuscript is archived (deposited) by the author or a representative in an online repository before, alongside or after its publication. Repositories usually allow authors to delay access to the article (the so-called “embargo period”).
- b) Open access publishing (also referred to as “gold” open access), meaning that an article is immediately provided in Open Access mode when published.¹² At this point it is worthwhile to mention that in order to be classified as “gold” open access, the access needs to be free for everyone. What is definitely not the case in certain bilateral agreements or contracts between national authorities (e.g. national research funders) and a given publisher providing restricted (e.g. at the national level) free access to publications.¹³

As pointed out in chapter 2, “Open Access” is not exclusive to scientific literature, but also refers to any other kind of information meant to be publicly available. Thus, the “open agenda” also affects an array of data and materials, including open educational resources, software or public data from governments.¹⁴ All these kinds of data play a crucial role in climate research and, therefore, are of interest for JPI Climate.

¹⁰ Source: <http://www.budapestopenaccessinitiative.org/read> .

¹¹ In this sense it is highly illustrative that the former European Commissioner for Digital Agenda, Neelie Kroes, stated that the main question in Open Access is not “whether or not”, but “how” and “in what conditions” (source: http://europa.eu/rapid/press-release_SPEECH-10-716_en.htm).

¹² Source (for both definitions): http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf.

¹³ One example of such contracts is the one between Elsevier and the French Research Council (CNRS) (source: https://lejournal.cnrs.fr/sites/default/files/numerous_papier/jdc_275_complet_bd2_0.pdf).

¹⁴ For further information see UNESCO Guidelines on Open Access’ section 3.3 (see *Appendix*).

It's not just about publications (I): Open Data

Openness does not just affect research results, but also their “raw material”, i.e. data. Generally speaking, the Open Data discourse argues that scientific data and meta-data, maps and statistical information “should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control”.¹⁵ In order to succeed, an Open Data approach should guarantee that issues regarding confidentiality of personal information are respected.¹⁶ In the academic world, this is particularly relevant for data deriving from social sciences and humanities, but also from medicine.

Regardless of this, what becomes apparent is that the need for fostering scientific Open Data is not up for debate, since it plays a critical role by allowing data sharing in scientific and human progress and, thus, eliminating superfluous efforts and at the same time enhancing efficiency.¹⁷ In order to face complex societal challenges like climate change, a smart, shared and transparent data management is critical to improve society's resilience, and, thus, make it climate-proof, as the “Open Data for Resilience Initiative” points out.¹⁸

At the same time, there is a need to understand why data availability is being restricted and to explore the potential for eliminating those restrictions. There are already positive examples in this sense, like the EU Directive 2013/37 on the re-use of public sector information¹⁹ (whose principle is being implemented e.g. in the Dutch national legislation) and the US government free available climate data website.²⁰

But beyond confidentiality there are a number of huge challenges that should be addressed. First, since data is something very dynamic (i.e. in continuous state of evolution, e.g. models being refined, new models running, and so forth), solid quality standards are required to determine e.g. when data should be released in a repository and also how its integrity should look like. This leads to further dimensions like data formats and publication protocols, but also infrastructure (see *chapter 5*). Second, one usually hears about a general reluctance within researchers to disclose what is often considered the core of research.²¹ Therefore, incentives have to be created in order to persuade holders share their data, including those of “economic” nature. Third, legal aspects are also to be born in mind (see *this chapter's last section*). And fourth, it is apparent that there are several groups of interest involved with data production and management, and they usually pursue

¹⁵ Source: http://en.wikipedia.org/wiki/Open_data#cite_ref-1

¹⁶ A concise, yet rich analysis of the possible trade-offs of open data can be read at <http://chance.amstat.org/2012/11/privacy25-4/>.

¹⁷ See some examples on how enhancing accessibility may reduce waste in medical research: <http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2813%2962296-5/abstract>.

¹⁸ Source: <https://www.gfdrr.org/opensdri>.

¹⁹ Source: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:175:0001:0008:EN:PDF>.

²⁰ <http://www.data.gov/climate/>.

²¹ Even when this might be true, recent studies suggest that a more transparent, i.e. open data management would be welcomed by many researchers. See, in this regard, a recent study for Norway (http://www.forskningsradet.no/en/Newsarticle/Norwegian_researchers_willing_to_share_research_data/1253996461347?m=t).

different, even divergent objectives. These challenges are identified (and strategies to address them are proposed) in the “RECODE” Project final report titled “Policy recommendations for open access to research data” (*see appendix*).

It’s not just about publications (II): Methods

Methodological tools are a cornerstone in every research activity, since they e.g. determine results like data do, and for this reason their relevance is unquestioned. An Open Knowledge policy should therefore include methods in its scope by facilitating the access to techniques and tools, which can vary from post-processing tools (statistics, visualization) to full computer models or decision support systems. By doing so, they might be improved in an accelerated way, yet this would require carefully designed procedures.

At the same time, it is paramount to recognise that the issue on methods may entail difficult aspects as usually raises technological/domain aspects that are not completely solved. For instance, the fact that a search engine will be forced to share their code for the sake of transparency does not necessarily lead to more transparency if it keeps its cataloguing methods patented. This is extremely relevant for searching, albeit it is more true for certain disciplines than for others.

How to manage Intellectual Property Rights under the Open Access approach?

Any Open Knowledge related policy strongly depends upon certain legal aspects and particularly by the way intellectual property and usage rights are managed. This issue is highly complex because its implications, possibilities and barriers are extremely divergent depending on the kind of activity one undertakes. Whereas a comprehensive approach for Joint Programming is available at the results of the “JPIs to co work” project (*see chapter 6*), here certain tools that pave the way to overcome possible barriers in climate related research are highlighted.

The Creative Commons licenses are a pretty useful tool in this respect. They “give everyone from individual creators to large companies and institutions a simple, standardised way to grant copyright permissions to their creative work.”²² Strictly speaking, the licences are not a complete alternative to copyright, although they do manage authors and users’ rights. There are six different licences tailored for the array of needs of every user.²³ Due to this wide range of possibilities, establishing a strong and concrete policy on this issue is often of utmost importance, e.g. by determining which license is recommended/mandatory. Creative Commons also deals with Open Data through the so-called Science Commons. There are some Open Data-suited Creative Commons licenses available at its website.

²² Source: <http://creativecommons.org/licenses/?lang=en>

²³ A detailed explanation about how these licenses work is available here: <http://creativecommons.org/licenses/?lang=en>

Also other ways to provide wide rights to users over intellectual works do exist. The *Copyleft* Initiative is close related with the “share-alike” Creative Commons license, since it uses the copyright law “to offer the right to distribute copies and modified versions of a work and requiring that the same rights be preserved in modified versions of the work. In other words, *copyleft* is a general method for marking creative work as freely available to be modified, and requiring all modified and extended versions of the creative work to be free as well.”²⁴ It is a practice which is profusely used in software, like e.g. the GNU operating system licences.²⁵

²⁴ Source: <http://www.gnu.org/copyleft/copyleft.en.html>.

²⁵ Source: <http://www.gnu.org/licenses/licenses.en.html>.

4. Open Access in Practice: Selected Actors & Experiences

Institutional framework

As pointed out above, some relevant international institutions have already incorporated the issue on Open Access in their agendas. At the European level, the following strategic documents have been published by their respective bodies and are in force (*see also Appendix*):

- The EC introduced the “Special Clause 39” in FP7, establishing that grant recipients are expected to deposit peer-reviewed research articles or final manuscripts resulting from their FP7 projects into an online repository; and also make their best effort to ensure Open Access to these articles within 6 or 12 months after publication;
- The same institution has adopted the *Guidelines on Open Access to Scientific Publications and Research Data* in the context of Horizon 2020;
- and in February 2012 it issued an official Recommendation on access to and preservation of scientific information.
- In its turn, the European Research Council (ERC) published already in 2007 its Guidelines on Open Access, which have been updated last in 2013.

On the international arena, two organisations have published guiding documents in this thematic area (*see also Appendix*):

- The UNESCO published in 2012 the *UNESCO Policy Guidelines for the Development and Promotion of Open Access*.
- The OECD issued in 2007 its *OECD Principles and Guidelines for Access to Research Data from Public Funding* as a soft-law tool.

At the national level, many governmental and/or research institutions have recently shaped or are currently shaping their own Open Access policy, including national platforms, Open Access and Open Data repositories data bases and, in some cases, ad-hoc legislation. Some countries (like the Netherlands, Sweden, Denmark or the UK) have already defined timelines towards 100% Open Access within the next ten years (*see Appendix*).

Initiatives providing free and open access to scientific knowledge

The number of initiatives related to Open Access, including policy guidelines, platforms, archives, databases and journals has been increasing exponentially during the last years and therefore offering an up-to-date selection is not straightforward. However, the following examples (both of

an institutional and non-institutional nature) are presented according to their potential relevance for JPI Climate. They have been selected according to the following criteria:

- a) In the case of those **institutional initiatives** (i.e. driven or supported by governmental actors), their potential relevance for funders has been taken into account. Platforms, databases and support tools are included.
- b) In the case of those **non-institutional initiatives**, their non-profit nature as well as their innovative character have been particularly observed. The selected initiatives include open access platforms and editorial projects.

Institution-driven initiatives

- Science Europe is an association that promotes the collective interests of the European Research Funding Organisations (RFO) and Research Performing Organisations (RPO). In 2013 it adopted a set of Principles for the Transition to Open Access to Research Publications (see chapter 6).
- The Research Data Alliance (RDA) is an initiative launched by the EC, the American NSF and the Department of Innovation of the Australian Government. It seeks to overcome the disciplinary fragmentation by offering a platform to share common data infrastructures.
- Europe PubMed Central is part of a network of PMC International (PMCI) repositories. It is supported by 26 funders of life sciences and biomedical research, including charities and government organisations across Europe, led by the Wellcome Trust.
- The EC platform “OpenAIRE” (Open Access Infrastructure for Research in Europe) is an e-Infrastructure based gateway to all user-level services (including access to scientific publications) providing technical support for principal investigators and repository managers.
- The UNESCO has launched the “Global Open Access Portal” (GOAP) with Colombian, Danish, Norwegian and U.S. funding in order to become the first reference when searching for any information about Open Access. It is not an inventory of repositories, but rather a common point for research funders *inter alia*.
- The Australian Commonwealth Department of Education, Employment and Workplace Relations financially supported the Open Access to Knowledge Law Project (“The OAK Law Project”) seeking to facilitate access to knowledge in order to improve the social, economic and cultural outcomes from public sector investments in education and research.
- “Phaidra” (Permanent Hosting, Archiving and Indexing of Digital Resources and Assets) is an international network of academic institutions offering a comprehensive Digital Asset Management System with long-term archiving functions. It was launched as a project by the University of Vienna.

Non-institution-driven initiatives

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- The Wellcome Trust, a global charitable foundation dedicated to improving health by supporting bright minds in science, the humanities and social sciences, and public engagement, has a very progressive Open Access policy.
 - The arXiv is an online repository of electronic preprints, known as e-prints, of scientific papers in the fields of mathematics, physics, astronomy, computer science, quantitative biology, statistics, and quantitative finance.
 - The Public Library of Science (PLOS) is a non-profit publisher and advocacy organization founded in 2000 to accelerate progress in science and medicine by leading a transformation in research communication.
 - The Open Library of Humanities (OLH) was created partially based on the PLOS model to offer a platform for Open Access publishing in a field like social sciences and humanities, which might not have the same consolidated tradition of open repositories as other disciplines (like Physics or Medicine).
 - The Open Access Week is a yearly global online event aiming to raise awareness within the academic community about the advantages of Open Access. It takes place globally during the last October week.

Where can climate research outputs be Open Access available?

In the following some examples of open access journals and/or data platforms that are relevant for climate research (and, therefore, for JPI Climate) are presented. Some of them will be mentioned in the next chapter, since they are innovative knowledge management tools that go beyond merely offering free access to information. More information can be found in the Appendix.

- The European Geosciences Union (EGU) currently issues 16 open access scientific journals. Many of them are highly prestigious publication platforms for those research topics related to biophysical aspects of climate.
- Another relevant open access journal for the climate research community is called *Interdisciplinary Climate Studies* and is one of the journals issued by “Frontiers”, an open access publisher and network.
- The open access journal *Ecology and Society* is an interesting possibility for publishing inter and transdisciplinary climate-related research.
- MDPI is a publisher of peer-reviewed, open access journals since its establishment in 1996. It currently publishes an open access journal specific for climate research: “Climate”.
- PANGAEA is an information system operated as an Open Access library aiming to archive, publish and distribute georeferenced data from earth system research. It is hosted by both the Alfred Wegener Institute (Helmholtz Centre for Polar and Marine Research) and the

Centre for Marine Environmental Sciences (University of Bremen), flagship institutions related to Earth Sciences.

- The GEOSS data portal is a first order sharing point to Earth observation data at global level. It is hosted by GEO (Group on Earth Observations), a non-legally binding international alliance.

5. Towards Comprehensive Open Knowledge Policies

Fostering Open Access to publications and data can be a good means to achieve a more transparent knowledge production, sharing and usage. Yet, what becomes apparent is that the mere fact of putting research results at the disposal of “intended audiences” will not automatically lead to progress in those fields in which societies need better expertise and solutions. Addressing a discussion on policies tackling the way (climate) research activities are conceived, assessed and communicated (an exercise which is being tackled by the European Commission)²⁶ is therefore needed. Such discussion should deal with those ways to co-design, co-produce and co-disseminate knowledge.

Issue no. 1: Data quality

Recognising the value of high-quality empirical data. Producing, archiving (with meta-data) and distributing data sets are resource consuming and is seldom merited as such. There is therefore a need to develop good standards for attributing (and “citing” data sets and also for developing metrics so that the “producers” of data are encouraged to make data accessible.²⁷ Two examples are to promote the usage of DOIs (Digital Object Identifier) and to define “searchable” metadata. To do so, data citation and data impact factor should be actively fostered (*see issue no. 2*). One could even talk about “traceability” of information, i.e. enabling to trace back to the workflow/data used to produce the knowledge. This might in turn relate to the concept of “linked data” and would also make possible the reproducibility of results.

Free software, open source. Traceability and connectivity should not be just born in mind when dealing with research data, but also with data sources (like e.g. software), since nearly all scientific data analysis relies on it. Yet such analysis can only meet the scientific community's standards of verifiability and replicability if other researchers can review the functioning of the software that was used to produce the analysis. A given computer program is nothing more and nothing less than a method of analysis, and should be treated as such. The computer programs used to generate research results need to be made available to the scientific community, including in source code form, and on terms that allow further modification and distribution. Distributing the programs under a Free Software (open source) license is the best available way of doing so.²⁸

²⁶ The European Commission undertook a consultation on the so-called “Science 2.0” (source: <http://ec.europa.eu/research/consultations/science-2.0/background.pdf>) and the preliminary results are available here: http://www.oana.at/fileadmin/user_upload/p_oana/oana/Open_Science_-_RJS_uniko_Austria_15_Jan_2015_-_final.pdf.

²⁷ A pretty useful document for such purpose may be the GEOSS Data Quality Guidelines (*see Appendix*).

²⁸ The European Free Software Foundation (FSFE) offers support regarding all those questions about software licensing (more info at <http://fsfe.org/activities/ftf/ftf.en.html>).

There are already some concrete examples showing that making data sources freely accessible is feasible. An illustrative example is the well-known journal *Nature Methods*, which has recently begun requiring that authors should publish source code along with their articles.²⁹ However, further steps towards reassuring the right to modify the software need to be made in order to e.g. make possible to replicate someone else's results and test them (and, therefore, allowing infinite redistribution, which is in line with the idea of open knowledge). It becomes pretty apparent that this issue would play a central role in climate research activities (e.g. modeller communities) and, therefore, should be particularly born in mind by JPI Climate.

Issue no. 2: Research impact

Open (peer) review. Classical peer-review processes have been quite effective and reliable in the “pre-Internet” era, but nowadays may place constraints on knowledge creation and sharing and it cannot eventually guarantee that a paper is properly evaluated.³⁰ Opening up reviewing might be an innovative way towards smarter research impact, as the example of the European Geosciences Union’s open access scientific journals highlight (see chapter 4). They publish under the so-called “interactive open access publishing”, consisting of public peer-review processes and interactive public discussion during the whole process. The journals, most of which are high-ranked, are published by Copernicus Publications, a member of the not-for-profit organisation Copernicus Gesellschaft, on behalf of the EGU. Moreover, since 2013 the EGU offers article-level metrics (see below) for the papers published in its journals.

Alternative metrics. A further controversial issue concerning research impact is metrics. Indeed, it has been argued that conventional bibliographic metrics, “are narrow; they neglect impact outside academia, and also ignore the context and reasons for citation.”³¹ For this reason, both the Budapest Open Access Initiative and the San Francisco Declaration on Research Assessment advocate for using article-level metrics (i.e., those ones measuring the usage and impact of individual research articles) instead of journal-level metrics when measuring the quality and the impact of a given article.

Two initiatives (“Altmetrics” and “Plum Analytics”) provide alternative metric indicators which may facilitate a more holistic view of an article’s societal impact, including new media (like blogs and social networks) that have gained great relevance. That this approach is rapidly gaining momentum is demonstrated by the fact that the world’s leading provider of scientific literature, “Elsevier”, collaborates with “Altmetrics”³². The *Journal of Experimental Social Psychology* (an Open Access journal) is a first attempt to apply this new review logic in a consolidated scientific journal.

²⁹ Source: <http://opensource.com/life/14/6/respected-journal-makes-transition-open-science>

³⁰ The J. Bohannon’s “experiment” shows to what extent scientific journals might be relaxed by assuring quality standards in the peer-review process: <http://www.sciencemag.org/content/342/6154/60.full>.

³¹ Source: <http://altmetrics.org/manifesto/>

³² Source: <http://www.elsevier.com/connect/altmetric-pilots-help-elsevier-authors-understand-the-impact-of-their-articles> (consulted on 26 February 2014).

Issue no. 3: Knowledge Transfer

Beyond scientific journals. There are positions arguing that scientific journals' hegemonic role may change in the future and, therefore, deep changes in the way research activities are funded may happen. According to this narrative, the coverage of costs for publishing in Open Access media will be naturalised, especially when journal subscription costs (which represent a large budget item for university libraries) will gradually drop from the budgets as they may lose relevance. Currently there are organisations working to facilitate this transition from the current journal subscription business model to the future Open Access publishing model, like the UK's Open Access Implementation Group (see Appendix) or the programme "Stand-alone Publication" by the Austrian Science Fund (FWF)³³.

What appears certain is that in the age of the *network society*, the Internet can offer feasible, complementary tools to the classic scientific journals, even when the latter are presented in an online version. There already exist several initiatives that simply seek completely free publishing, i.e. outside the academic (or commercial-oriented) ways of publishing. Two examples are:

- The online platform *Science Open*, which offers a place where research results can be freely shared in network, i.e. be published, reviewed, and connected to a repository or research data.
- The Electronic Journal of Academic and Special Librarianship (E-JASL), which is an independent scholarly journal publishing project outside of the commercial mainstream, which is often identified with "platinum Open Access"³⁴ or "diamond Open Access".³⁵

Issue no. 4: Active and smart involvement from civil society

Non-academic stakeholders as active participants in research activities. In a society marked by transdisciplinarity, information and knowledge flows cannot be anymore of unidirectional character (i.e. from "holders" –scientists and researchers- to "recipients" –the public), but rather network-based. As such, public powers, civil society and further actors have to leave their condition of (scientific) knowledge recipients to become decisive participants in the knowledge generation and sharing process.

In this context, JPI Climate already endeavours to involve a broad spectrum of stakeholder organisations in its own internal activities³⁶ and also to foster their active role in funded research activities. In Europe there are some examples on how societal stakeholders can be actively engaged in climate

³³ Source: <https://www.fwf.ac.at/en/research-funding/fwf-programmes/stand-alone-publications/>.

³⁴ This idea of "platinum" should not be confused with other approaches like the above mentioned national contracts providing restricted open access to scientific literature, some of them also using the expression "platinum", yet with a completely different connotation.

³⁵ Source: <http://www.triple-c.at/index.php/tripleC/article/view/502>

³⁶ The so-called "Transdisciplinary Advisory Board" (TAB) is an example in this sense (further details on <http://www.jpi-climate.eu/programme/governance>).

research, like the Knowledge for Climate project in the Netherlands³⁷ or the “Klimzug” programme in Germany.³⁸ They demonstrate that classical barriers (like e.g. involving the private sector) are not necessarily unsurmountable. Beyond climate research there are also several experiences that can contribute to make steps towards transdisciplinary research, like the so-called translational science in Medicine, which aims to break with the classical dichotomy between basic and applied research, or the so-called “citizen science” initiative.³⁹

³⁷ Source: <http://www.knowledgeforclimate.nl/>.

³⁸ Source: <http://www.klimzug.de/en/index.php>.

³⁹ Further information can be found here: <http://www.citizensciencealliance.org/>,
<https://www.zooniverse.org/projects#climate>

6. JPI Climate Open Knowledge Policy in Detail

In this chapter further clarification for the set of guidelines on Access to Knowledge presented at the beginning of this document (p. 4 to 6) is provided. In order to facilitate its interpretation, this recommendation sample follows the same order as the guidelines themselves.

1. Internal accessibility in JPI Climate

The JPI Climate website intranet is the appropriate platform to share information of internal character.

In order to avoid possible conflicts of interest within the JPI Climate GB on the nature of the information that will be available for any JPI Climate Governing Board (GB) member and partner, the following clause will be used for those documents needing a permanent or temporary confidential character:

“Due to the nature of the information it contains, this document is exempt from the policy guideline no. 1 on internal accessibility and therefore remains confidential.”

2. “Gratis” and “libre” Open access: “Open licensing”

“Open licensing” ensures usage rights beyond the issue of having no-cost (online) service to a given piece of information. Open Access is often associated to free access to (scientific) literature; however, a precise definition of “free” is needed. In this respect, two degrees are usually distinguished: *gratis* Open Access, which is no-cost online access, and *libre* Open Access, which implies free accessibility including some additional usage rights (e.g. downloading, copying, distributing, printing) which can be granted by e.g. using a certain Creative Commons license.⁴⁰ Far from being something unreliable at the legal level, the latter are a solid tool whose use has been recently recommended by the European Commission.⁴¹

How to use the Creative Commons licenses? Coping with the Creative Commons licenses is not particularly challenging; there are just a few key aspects that should be taken into account when using them. In order to get familiar with them, JPI Climate recommends the official Creative Commons website, in which a brief set of best practices in attribution is available.⁴² The Open Access Scholarly Publishers Association (OASPA) also has a very valuable “frequent asked questions” section where the issue on licensing is properly tackled.⁴³ Moreover, the *Guidelines on licensing*

⁴⁰ See further information on “gratis” and “libre” here: <http://www.sparc.arl.org/resource/gratis-and-libre-open-access>.

⁴¹ In a recent press release, the EC recommends open licenses by Creative Commons for re-using a wide range of public data, including environmental data (source: http://europa.eu/rapid/press-release_IP-14-840_en.htm).

⁴² Source: http://wiki.creativecommons.org/Best_practices_for_attribution.

⁴³ Source: <http://oaspa.org/information-resources/frequently-asked-questions/>.

public sector information for Australian government agencies show a case of real application in a national context and, thus, might be useful for the JPI community.⁴⁴

What is the most adequate CC license? Following the recommendations from several actors being consulted during the writing process of this set of guidelines, JPI Climate recommends using the CC-BY license for general purposes, as it is the least restrictive one. Having said that, what becomes paramount at this point is to differentiate between scientific literature and data. In the latter case, the “public domain” license (CC0) is recommended (also when dealing with metadata), since it is the only license ensuring unlimited access, re-use and re-dissemination. There are practical examples on how to deal with data inter-operability through the use of CC licenses.⁴⁵

In any case, promoting the development of national guidelines for data licensing is strongly recommended.⁴⁶

3. Open formats

Recognising that the new online possibilities to create and share documents (e.g. “Google Docs”, “Prezi”) might lead to a lessened importance of this issue in the future, JPI Climate will ensure the equal treatment of the most used formats and open formats (ODF), since this is the only way to achieve full interoperability in international-based standards (and not in vendor-based file formats). To do so, commitment from every member and partner in the Governing Board in actively fostering open formats at their respective internal units, trying to overcome possible barriers related to readability and functionality.

4. Open Data

Following the example of many other international institutions,⁴⁷ JPI Climate advocates for Open Data policies based on the principle that any data (including meta-data) that is produced with public funds belongs to the public, and should therefore be released as open data, personal data being an exception. Even in such cases, methods such as anonymising of sensitive research data should enable proper and safe reuse.

⁴⁴ The document (in .doc format) is available here: <http://www.google.at/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&ved=0CEYQFiAD&url=http%3A%2F%2Fwww.ag.gov.au%2FRightsAndProtections%2FIntellectualProperty%2FDocuments%2FGuidelinesforlicensingPSIforAusGovagencies.doc&ei=jCELU9CQKuWu4ASR54CAAg&usg=AFQjCNHy8f6TGSy67Up-DE1KTISGqnIV4Q&sig2=r0--agzll3q7rsanR9UuHQ&bvm=bv.61725948,d.bGE>.

⁴⁵ See, for instance, the “Report on Data Sharing Principles Post-2015 and Mechanisms to Ensure Legal Interoperability of Shared Data” from the Group on Earth Observations (GEO), and precisely the table 1 (“Acknowledgements, Waivers and Common Use Licenses compatible with the GEOSS Data-CORE Requirements”) (source: http://www.earthobservations.org/documents/geo_xi/GEO-XI_08_Report%20on%20Data%20Sharing%20Principles%20Post-2015%20and%20Mechanisms%20to%20Ensure%20Legal%20Interoperability%20of%20Shared%20Data.pdf; p. 23-24).

⁴⁶ There are guidelines available that may become truly helpful when applying licensing to data, like this one: http://discovery.ac.uk/files/pdf/Licensing_Open_Data_A_Practical_Guide.pdf.

⁴⁷ See, for example, the European Environmental Agency (EEA) data policy (see *Appendix*).

Generally speaking, open data should meet certain minimum criteria: full, open, provided with minimum time delay and at the minimum cost. This is precisely what the GEOSS data sharing principles advocate (*see Appendix*). In practice, establishing coherent open data policies requires clearly defining when, under which conditions and where data should be released is to be shared. These issues can be addressed in Data Management Plans (DMP), which allow establishing responsibilities in the data (and metadata) publication and curation (i.e. collection, monitoring, archiving, maintenance and preservation of digital assets). The most innovative open data policies at national⁴⁸ and also EU⁴⁹ level already require DMPs.

There are two issues which may result particularly controversial in this topic, namely the timing of publishing data and the most proper platform to do so. The former issue can be solved in the worst case by establishing retention periods. If funders assure that datasets are not published before the agreed retention period, manuscripts can be handed over to funders immediately after a project is finished. The latter issue is more open, since there are many possibilities to deposit a set of data. For climate-related data, the GEOSS portal is explicitly recommended by the EC for JPI Climate. Besides this, several consolidated data repositories are summarized in the Appendix. All of them are recommendable to preserve scientific data, depending on its nature and discipline.

5. Open Access to publications: ‘green’ or ‘gold’?

Assuming the open debate on what should be the most appropriate strategy for fostering Open Access publishing (either through repositories or through Open Access journals), JPI Climate:

- (i) Adopts the same position as the European Commission (“‘green’ and ‘gold’ can work together”), which is ultimately based on the statement from the Budapest Open Access Initiative (“both paths complementary strategies”).
- (ii) Recognises and actively supports the “Principles for the Transition to Open Access to Research Publications”, which were agreed by the 27 member organisations of “Science Europe” in April 2013 (*see chapter 4 as well as Appendix*).
- (iii) Considers that both ‘green’ and ‘gold’ paths actively contribute to make steps towards the adoption of such Principles.

‘Green’ Open Access mandates seem to be pretty much adequate for research performing organisations, since they are usually able to establish their own repositories. Such a strategy brings more benefits than those exclusively related to open access, including the ability to manage, disseminate and preserve their own research output, as the MEDOANET guidelines argue (*see Appendix*). Another advantage of ‘green’ is that it is more flexible in those cases (probably many) in which funds are not available for covering the so-called “Article Processing Charges” (APCs), i.e. fees charged to an author in order to publish a manuscript in a given journal. In these cases, a ‘green’ mandate cannot be refused by researchers (arguing e.g. reasons of financial nature). Ultimately, funders and international funders’ cooperation platforms might be highly interested in establishing

⁴⁸ Like the Academy of Finland’s September 2014 call (<http://www.aka.fi/en-GB/A/Funding-and-guidance/How-to-apply/Guidelines/Publishing-open-access-and-making-data-available/>) shows.

⁴⁹ See the *Guidelines on Data Management in H2020* (*see Appendix*).

self-archive mandates, since they enhance economic advantages by removing subscription barriers.⁵⁰

By fostering the ‘green’ road it is crucial to specify where research output is to be deposited (see *UNESCO Guidelines, section 9.2.5*). It has even been argued that the only way to make ‘green’ feasible is to formulate a self-archiving mandate.⁵¹ In this respect, JPI Climate (a) recommends using those consolidated and popular repositories (like arXiv and PubMed –see *Appendix*) as well as those included in the EC’s platform OpenAIRE; and (b) encourages their members and partners to enable and empower those research organisations in their home countries that still have not created a repository to do so if they deem it appropriate. Moreover, these Guidelines leave open the possibility to discuss the convenience to establish an own repository for the publications and data from the research activities funded in the context of JPI Climate or even for all JPIs.⁵² A JPI Climate repository might be set up in close collaboration with ESFRI and should lead to a kind of “climate (change) knowledge hub” where climate scientists, modellers, but also social scientists and non-academic stakeholders can co-create knowledge on the basis of such shared data and publications.

The “golden” road seems, in its turn, more difficult to be implemented in the short-term, since it always colludes with financial issues, namely how to cover APCs. While this issue will be addressed in the next point, here the ‘gold’ Open Access’ “transformative” potential concerning the manner in which the research cycle currently works (see *chapter 5*) is highlighted. In other words: ‘gold’ *libre* Open Access, even when more difficult to implement, seems to be the only way to secure “freedom from permission barriers, (...) from delays/embargoes, and (...) from drains in library budgets” (Suber 2012: 65 –see *Appendix*).

As mentioned above, ‘green’ Open Access is currently the only possibility which allows research communities to archive their own results by themselves, preventing private actors (i.e. publishers) to do so. It is therefore often argued that ‘gold’ and ‘green’ are only compatible if the former is provided by institutional editors, i.e. only charging for *true* added value (like citation and consultation indicator tools or enhanced metadata).

In order to take advantage of both roads’ benefits in the short term while minimising their negative trade-offs, JPI Climate encourages fostering policies that require ‘green’ but that only encourage ‘gold’ open access. This position (which is adopted at national level in several JPI Climate governing board members⁵³ as well as in some other international organisations like the UNESCO⁵⁴) might be interpreted as an strategy to ensure free accessibility of research results through repositories and to simultaneously foster a transition from subscription-based journals to the “author pays fees” model (see *next point*).

6. Funding (‘gold’) Open Access

⁵⁰ Source: *Cost-benefit analysis of publishing marine ecosystem research output through Open Access ‘Self-Archiving’* (http://orbit.dtu.dk/fedora/objects/orbit:86573/datastreams/file_5705720/content).

⁵¹ Source: http://erc.europa.eu/sites/default/files/content/events/Stevan_Harnad.pdf.

⁵² As it is recommended in the JPIs to co-work technical annex (source: <http://www.jpis2cowork.eu/images/pdf/Technical-Annex.pdf>).

⁵³ As Belgium, Denmark, Finland, Ireland or Sweden (see *Appendix for specific documents*).

⁵⁴ See Guidelines (section 9.2.4, p. 54).

Assuming that many prestigious Open Access journals require high APCs for publishing (and even when they only represent a minority of the totality of open access journals) it follows that a systematic, i.e. coherent promotion of 'gold' Open Access requires deep changes in the current business model (based on payments by authors). Currently APCs are usually born by the university or research institute to which the researcher is affiliated, or by the funding agency supporting the research, while library subscriptions are being simultaneously paid by the same actors.

Therefore, ambitious Open Access policies going for 'gold' *libre* Open Access in the long run have to actively work towards offering cost neutrality for researchers (i.e. no additional costs to support 'gold' Open Access). To make such strategies operational at the present moment, strategies like e.g. treating APCs as part of institutions' "running costs" are needed.⁵⁵ When organising a transnational call, for instance, every research funding institution should put a certain amount of money at the disposal of the applicants. Only this way the principle "the author pays fees" will become feasible. In this respect, experience has already accumulated in JPI Climate.⁵⁶

Another ambitious possibility that JPI Climate might lead would be to support new Open Access venues and/or switching established subscription journals in climate research to Open Access. There is a concrete experience in Physics: the Sponsoring Consortium for Open Access Publishing in Particle Physics (*SCOAP*³).⁵⁷

In order to make these policies feasible, when providing payments/subsidies for Open Access venues, JPI Climate will meet the following criteria (which are related to point no. 2. 4 and 5 of this chapter):

Indexing

The journal has to be listed in authoritative databases: Directory of Open Access Journals (DOAJ), Web of Science, Scopus or PubMed.⁵⁸

In the case of books, collected volumes, proceedings and other academic publishing venues, basic technical information and peer review procedures have to be transparent on the website of the publishing venue.

Copyright and Re-use (related to point 2 of this chapter)

- a) Authors hold copyright of their publication with no restrictions.

⁵⁵ The *Recommendations for the next 10 years* from the Budapest Open Access Initiative argue that "fundlers should treat publication costs as research costs" (source: <http://www.budapestopenaccessinitiative.org/boai-10-recommendations>).

⁵⁶ In the JPI Climate 1st joint call's call text this principle has been included: "Full proposals (...) will have to include a (...) financial provision for dissemination of research outputs, allowing for open access to research results and produced data (primary and meta data) among the scientific community" (source: <http://www.jpi-climate.eu/joint-actions/calltransnationalcollaborativeresearchprojects/eligibilitycriteria>).

⁵⁷ Source: <http://scoap3.org/>.

⁵⁸ In the case of an Open Access journal that has been founded very recently (in the last 12 months) and is therefore not yet registered in the DOAJ, it has to be clear from the journal's website that the DOAJ criteria are fulfilled.

- b) All publications shall be published under an open license, preferably the Creative Commons Attribution (CC-BY). In any case, the license applied should fulfil the requirements defined by the Berlin Declaration.

Machine Readability (related to point 4 of this chapter)

Publication full text, metadata, supporting data,⁵⁹ citations and the status of the publication as Open Access have to be made available in a machine-readable form via open standards.⁶⁰ Moreover, publishers shall notify authors of any changes occurring in the description of the structure of the data in a transparent way.

Sustainable Archiving (related to point 5 of this chapter)

Publishers have to make copies of the publication automatically available in registered third-party repositories immediately upon publication. Furthermore, authors must be notified by the publisher on how to access archived OA publications.

Sustainable archiving of publications has to be demonstrated by providing a persistent address where the full content of publications can be accessed, read and downloaded for at least ten years.

Authors may archive any version to any registered third-party repository or website with no delay.

7. Open Access publishing compliance

Securing high compliance levels is key to guarantee that a given policy has its desired outcomes. To do so, offering incentives like covering the totality of the publication costs as already argued will be not enough. Establishing controlling measures including monitoring or tracking publications, or reminding grant-holders by letter also have to be implemented.⁶¹

The issue on who is going to be responsible for this has to be discussed previously as *sine qua non* condition for such policies to succeed. There are at least 2 possibilities: either those public bodies representing those interests of each member country may assume these tasks, or the Governing Board (in the case of JPI Climate) can create a mandate to be assumed by an existing body or by an ad-hoc created committee.

8. Fostering debates on Open Knowledge policies at the national and international level

JPI Climate commits to playing a key role by fostering debates within the national authorities (ministries, national funding agencies and research institutions), and particularly by triggering innovation at the national level, regardless of the scientific topic, through:

- Disclosing the whole process after the final funding decision.
- Making the mid-term review event open to everyone.

⁵⁹ Whenever such data is published and its availability is dependent on the research publication publisher.

⁶⁰ That should be done by implementing the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) and/or the standards recommended by NISO - National Information Standards Organization (2015): Access License and Indicators, NISO RP-22-2015.

⁶¹ For concrete examples see UNESCO Guidelines (section 8.2.8)

- Fostering debates on the advantages and disadvantages of using article-level metrics instead of journal-level metrics in evaluation processes.

Here the short recommendations for funders of the already mentioned EC consultation on Science 2.0 (see *chapter 5*) should be born in mind, particularly the following statements:

“Research funding organisations may need to consider new ways of financing and evaluating research acknowledging 'Science 2.0' based research outputs. This could include reviewing the evaluation criteria of research proposals and the procedures of quality assessment.”

“Furthermore, research funding organisations may need to improve the communication of research data from the projects that they fund by recognising those who can maximise usability and good communication of their data. This could be done by including the costs of preparing data and metadata for curation as part of the costs of the research process.”

(Background document. Public Consultation: “Science 2.0: Science in Transition”, page 11).

Appendix

The following presents a collection of documents (with their respective Internet links) that have been mentioned along the text. This appendix also includes a selection of reference documents on Open Access at national level in the JPI Climate Governing Board member and associated countries.

Open Knowledge and Access to Knowledge

The whole definition of *openness* can be read here: <http://opendefinition.org/od/>.

ERA-net policy brief “Productive Science-practice Interactions in Climate Change Adaptation”: [http://www.circle-era.eu/np4/%7B\\$clientServletPath%7D/?newsId=674&fileName=CIRCLE2_ProductiveSciencePracticeInterac.pdf](http://www.circle-era.eu/np4/%7B$clientServletPath%7D/?newsId=674&fileName=CIRCLE2_ProductiveSciencePracticeInterac.pdf)

Probably the most complete set of Guidelines about Access to Knowledge is the Consumers International’s *Access to Knowledge. A Guide for Everyone* (<http://www.consumersinternational.org/>).

The San Francisco Declaration on Research Assessment is available at <http://am.ascb.org/dora/>.

The following master thesis tackles the topic under a theoretical and a practical perspective: <https://fsfe.org/about/gerloff/a2k.netsoc.pdf>

Open Access

The P. Suber’s *Open Access* (MIT, 2012) was cited in these Guidelines an Open Access handbook. The book is online available (in various formats): http://cyber.law.harvard.edu/hoap/Open_Access_%28the_book%29.

Declarations and Statements

- The Budapest Open Access Initiative: <http://www.budapestopenaccessinitiative.org/>.
- Berlin Declaration on Open Access to Knowledge in Sciences and Humanities (English version): http://oa.mpg.de/files/2010/04/berlin_declaration.pdf.
- Bethesda Statement on Open Access Publishing: <http://legacy.earlham.edu/~peters/fos/bethesda.htm>.

Guidelines

- European Commission ‘Open Access Pilot in Framework 7’: <http://ec.europa.eu/research/science-society/index.cfm?fuseaction=public.topic&id=1300&lang=1>.
- European Commission’s Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf.
- European Commission ‘Recommendations on Access to and Preservation of Scientific Information’, July 2012: http://ec.europa.eu/research/science-society/document_library/pdf_06/recommendation-access-and-preservation-scientific-information_en.pdf.
- ERC Guidelines for Open Access : http://erc.europa.eu/sites/default/files/document/file/ERC_Open_Access_Guidelines-revised_2013.pdf
- Science Europe Principles for the Transition to Open Access to Research Publications: http://www.scienceurope.org/uploads/PublicDocumentsAndSpeeches/SE_OA_Pos_Statement.pdf
- The Wellcome Trust Open Access policy: <http://www.wellcome.ac.uk/about-us/policy/spotlight-issues/Open-access/index.htm>.
- UNESCO Guidelines for the development and promotion of Open Access: <http://unesdoc.unesco.org/images/0021/002158/215863e.pdf>.

Platforms and repositories

- Directory of Open Access Journals (DOAJ): <http://www.doaj.org/doi?uiLanguage=en>
- There is a list of repositories available at the “OpenDOAR” (Directory of Open Access Repositories). European countries already have a number of repositories: <http://www.opendoar.org/countrylist.php?cContinent=Europe>
- Europe PubMed Central: <http://europepmc.org/>
- arXiv: <http://arxiv.org/>
- OPENAIRE (Open Access Infrastructure for Research in Europe): <http://www.openaire.eu/>
- Phaidra: <http://phaidra.org/>
- UNESCO Global Open Access Portal: <http://www.unesco.org/new/en/communication-and-information/portals-and-platforms/goap/>
- The Confederation of Open Access Repositories (COAR): <https://www.coar-repositories.org/>
- DART-Europe E-thesis portal: <http://www.dart-europe.eu/About/info.php>
- Mediterranean Open Access Network (MEDOANET): <http://www.medoanet.eu/home>

Some useful links to Open Access institutional policies from the JPI Climate Governing Board members and associated members (no repositories are included)

	Institution/Platform	Link
	Open Access Network Austria (OANA)	http://www.oana.at/
AT	Institute of Science and Technology (IST) OA policy	http://ist.ac.at/open-access/open-access-policy/
	Austrian Science Funds (FWF) OA policy	http://www.fwf.ac.at/en/public_relations/oai/index.html
BE	Open Access portal	http://openaccess.be/
	National policy on Open Access to scientific articles	http://ufm.dk/en/research-and-innovation/cooperation-between-research-and-innovation/open-science/open-access-to-research-publications/engelsk-version-national-strategy-for-open-access.pdf
DK	Open Access policy for public research councils and foundations	http://ufm.dk/en/research-and-innovation/cooperation-between-research-and-innovation/open-science/open-access-policy-for-public-research-councils-and-foundations
	Open Access policy to research publications	http://ufm.dk/en/research-and-innovation/cooperation-between-research-and-innovation/open-science/open-access-to-research-publications
DE	Information platform	http://open-access.net/at_de/startseite/
	Open Science and Research Initiative	http://openscience.fi/
FI	Open Access Working Group	http://www.openaccess.fi/info/english.html
	Academy of Finland’s Guidelines on OA	http://www.aka.fi/en-GB/A/Funding-and-guidance/How-to-apply/Guidelines/Publishing-open-access-and-making-data-available/
	Report on the state of the art	http://www.heal-link.gr/SELL/OA_reports/FranceReport.pdf
FR	Online info from CNRS	http://openaccess.inist.fr/
IE	National Principles for Open Access Policy Statement	http://www.tcd.ie/Library/assets/pdf/National%20Principles%20on%20Open%20Access%20Policy%20Statement%20%28FINAL%2023%20Oct%202012%20v1%203%29.pdf
IT	Non-official report on the	http://eprints.rclis.org/14506/1/Open_Access_in_Italy.pdf

	state of the art	
NO	State of the art on Open Access Current Research Information System In Norway (CRISTin)	http://www.google.at/url?sa=t&rc=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCcQFjAA&url=http%3A%2F%2Fjournals.lub.lu.se%2Findex.php%2Fsciecominfo%2Fartide%2Fdownload%2F244%2F93&ei=lgwsU-n6NlVx0gXhxDgDw&usq=AFOQCNHgfGsQ6OTdRXDijEamHdSbF5FNgg&bvm=bv.62922401.d.d2k http://www.cristin.no/english/open-access-eng/
SI	Open Access Slovenia portal	http://www.openaccess.si/
ES	National Recommendations from the Spanish Government "Recolecta" initiative	http://recolecta.fecyt.es/sites/default/files/contenido/documentos/Implementacion_Art37_AccesoAbierto_INGLES.pdf http://recolecta.fecyt.es
SE	Research Council's policy Open Access portal of the Swedish National Library	http://www.vr.se/inenglish/aboutus/policies/openaccess.4.44482f6612355bb5ee780003075.html http://www.kb.se/OpenAccess_english/
NL	National website on Open Access Official statement from the Dutch Government	http://www.openaccess.nl/ http://www.government.nl/files/documents-and-publications/reports/2014/12/08/2025-vision-for-science-choices-for-the-future/visie-wetenschap-eng-web.pdf (p. 41-43).
UK	The UK Open Access Implementation Group Higher Education Funding Council for England's Open Access Policy	http://open-access.org.uk/ http://www.hefce.ac.uk/whatwedo/rsrch/rinfrastruct/oa/policy/
TR	2 nd National Open Access Workshop Declaration Open Access Report 2010: Turkey	http://www.acikerisim.org/calistay-2013/sonuc-bildirgesi/ http://www.heal-link.gr/SELL/OA_reports/Turkey2009.pdf
EEA	EEA Data Policy	http://www.eea.europa.eu/legal/eea-data-policy

Initiatives and actors

- Public Library of Science: <http://www.plos.org/>
- Open Library of Humanities: <https://www.openlibhums.org/>
- Science Open: <https://www.scienceopen.com/>
- The Australian Open Access to Knowledge Law Project: <http://www.oaklaw.qut.edu.au/>.
- The Open Access Scholarly Publishers Association: <http://oaspa.org/>
- "Climate", Open Access journal edited by MDPI (Multidisciplinary Digital Publishing Institute): <http://www.mdpi.com/journal/climate>.

Open Data

Strategic documents & management tools

- OECD Principles and Guidelines for Access to Research Data from Public Funding as a soft-law: <http://www.oecd.org/science/sci-tech/oecdprinciplesandguidelinesforaccesstoresearchdatafrompublicfunding.htm>.
- “Open Access Strategies in the European Research Area”, by the European Commission: http://www.science-metrix.com/pdf/SM_EC_OA_Policies.pdf.
- RECODE project final report: http://recodeproject.eu/wp-content/uploads/2015/01/recode_guideline_en_web_version_full_FINAL.pdf.
- Guidelines on Data Management in Horizon 2020: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf.

Open Data platforms

- Research Data Alliance: <https://rd-alliance.org/>
- Registry of Research Data Repositories: <http://www.re3data.org/>
- GEO (Group of Earth Observations): http://www.geoportal.org/web/guest/geo_home_stp
- GEOSS Data quality guidelines: https://earthobservations.org/documents/dsp/GEOSS_Data_Quality_Guidelines.pdf
- PANGAEA: <http://www.pangaea.de/>
- CESSDA (Council of European Social Science Data Archives): <http://www.cessda.net/>
- DASISH (Data Service Infrastructure for the Social Science and Humanities): <http://dasish.eu/>
- Open Science Data Cloud: <https://www.opensciencedatacloud.org/>
- Open Data in Nature: <http://www.nature.com/scientificdata/>
- Data Cite: <http://www.datacite.org/>

IPR Management

- Creative Commons (CC): <https://creativecommons.org/>
- The CC licenses: <http://creativecommons.org/licenses/?lang=en>
- Definition of Copyleft (Wikipedia): <http://en.wikipedia.org/wiki/Copyleft>
- GNU project: <http://www.gnu.org/gnu/thegnuproject.en.html>
- The Copyleft Foundation: <http://fundacioncopyleft.org/en>

Free Software

- The European Free Software Foundation (FSFE): <https://fsfe.org/index.en.html>