Responses to Comments Received Regarding the GEO Knowledge Hub Implementation Plan

This document is submitted by the Secretariat to the Programme Board for discussion.

1 INTRODUCTION

The GEO Secretariat has collated all of the comments received from GEOSS Infrastructure Development Task Team (GIDTT) members regarding the initial draft of the GEO Knowledge Hub (GKH) implementation plan (version 1). These are provided as Annex A.

Following a page on general remarks, each section in the log contains comments received pertaining to the corresponding section of the implementation plan. Secretariat responses are located next to each input received. Please note that Ivan Petiteville, co-chair of the Programme Board, also provided some initial feedback, to which the Secretariat has also responded.

In light of these comments, the Secretariat will prepare the next version of the GKH implementation plan (version 2) by 7 February 2020.

2 RECOMMENDATIONS

The Programme Board is invited to:

1) Consider the comments and responses in preparation for the discussion on the GKH implementation plan at its 16th meeting on 5-7 February 2020; and

2) Provide comments to the Secretariat on version 2 of the GKH implementation plan by 14 February 2020. The feedback provided will be consolidated and delivered to the GIDTT for discussion during its meeting on 21 February 2020, prior to preparation of the final draft of the GKH implementation plan to be submitted to the 51st meeting of the Executive Committee (19-20 March 2020) for decision.

ANNEX A – COMMENT LOG

General Comments

Who	Comment/ question	GEO Secretariat Response
EC	1) The scope of the knowledge hub is not accurately described (for example, it is still unclear whether it is a library with application elements or a library of applications)	See paragraph 2 of the Introduction, which states: "The contents of the GKH are linked documents that contain relevant information for EO applications that promote reproducibility, scalability, and co-design/co-production." Thus, the GKH is a digital library containing all elements of an application needed to successfully reproduce it.
	2) The significant investment for a GKH cannot be justified to address the needs of few scientist, only.	The intended public of the GKH is not a "few scientists". It is rather the growing number of EO experts worldwide that are involved in producing information for decision-making. These experts may work in universities, public institutions and private companies. What they have in common is a need for authoritative information. They are tasked with producing results that would guide evidence-based policy; they need to know what data is available to do the work, what algorithms and tools are required, and how similar results have been achieved elsewhere. The outreach power of the GKH is thus substantial and all GEO Members and POs stand to benefit. For this reason, both EXCOM and the Canberra Plenary have endorsed the Secretariat's proposal to build the GKH. The decision to build the GEO Knowledge Hub has been approved by EXCOM, as part of its decision to support the concept of a 'results-oriented GEOSS". In the Canberra Plenary, there was an overwhelming support by the Member States for the design of the GKH. The decision of the Canberra Plenary was: "*By endorsing proposed design of the GEO Knowledge Hub the GEO Plenary delegates authority to the GEO Executive Committee to oversee its further development, including the allocation of GEO Trust Fund resources and management of demands placed on GEO Members and Participating Organizations, as identified and deemed necessary by the GEO Secretariat"*. There is also support by the GEO Work Programme activities. Many activities of the GWP (e.g, BluePlanet, GEOGLAM) had mentioned their interest of building their own knowledge hubs. In the run-up to the Canberra Plenary, a growing number of GWP activities have stated their intent of using the GKH as a basis for sharing their results. This strong support by the Plenary and GWP activities and the endorsement by EXCOM shows that the GKH is a required addition to the GEOSS infrastructure.
	3) The substantial lack of scope and the missing system design makes it difficult to plan the developments and the costs of the GKH (this information is not present in this IP, basically. This results in a major drawback).	Considering that the GKH Implementation Plan is a document prepared for decision by EXCOM, the Secretariat did not consider it necessary to go into a lot of technical details. Nevertheless, in the revised version of the document, GEOSEC will include additional information on scope and system design.
	4) The reference to the GEOSS Platform is present but then why not to simply expand that and avoid starting from the scratch?	As it has been recognized by the Expert Advisory Group, the GEO Knowledge Hub is a complementary application to the GEOSS Platform, not an addition to it. The recommendation of the EAG, endorsed by EXCOM and by the Canberra Plenary, was to design the GKH as a new module of the GEOSS Infrastructure. The design of the GKH (already endorsed) is that it will be interoperable with the GEOSS Platform and not an expansion. The underlying technology for the GKH which does 95% of the work required by the GKH (CERN's Invenio RDM) already exists. The GKH will simply be a customised interface on top on Invenio RDM. Thus,

Who	Comment/ question	GEO Secretariat Response
		instead of starting from scratch, the GKH will start from a stable and reliable base, which minimizes risks and costs of development. There are already 16 institutions (including JRC and GEO) that are taking part on the development of Invenio RDM.
	5) IPR aspects regarding the CS engagement must be included in the IP –the present document seems to imply that there are no risk in engaging the CS, which is not correct, of course	Point taken. More extensive input on IPR in connection with CS engagement will be developed in next version.
	6) The GEO Secretariat mission is not to become an engineering (or software development) group; therefore, the IP should better describe how the whole GEO community must be engaged in the GKH design and development.	GEOSEC will not become a software development group. In the GKH, there are two main roles for GEOSEC: (a) customising the user interface of an existing product (InvenioRDM), a task that can be accomplished with minimal effort; (b) interacting with the GEO community so that reproducible results can be shared by the GKH, which falls entirely within the core function of the Secretariat
	7) The document content is variegated but a system design and related development framework are largely missing –for example, GKH role and relation with the GEOSS platform is substantially missing.	The GEOSS Infrastructure Development Task Team is invited to provide this information under Task 2 of Section 3 (Enhance GEOSS Platform Interface to the GKH), and elsewhere as appropriate.
ESA	We did a thorough analysis of the document and have one main comment for which we consider the plan still far from it to be considered a baseline that would allow 'us' to start the implementation. It does not provide the relevant information to involved actors to understand what is needed from their side (and allow them to plan - the main objective of an IP) to be done in terms of developments/evolutions and operations. It is missing or not sufficiently detailing scope, users/stakeholders, requirements, logical/physical architecture, estimate of resources, schedule and costs. For what is mentioned the role/involvement is questioned.	As stated above, the document was written from the perspective of being read by non-experts. Based on the comments from EC, GEOSEC will include additional information that addresses the stated concerns. Also as explained above, the actual software development involved in the GKH will be minimal and limited. The GKH will be a customised layer on top of a stable and reliable base (Invenio RDM). Therefore, the team involved in software development will work on the basis of minimum risk and effort. GKH has already taken part on a workshop in CERN where our team (together with representatives from many other organisations, including JRC) has already learned all the steps necessary to customise and deploy InvenioRDM and build the GKH on top of it. Therefore, most of the work in making the GKH useful does not involve software development. The work that is required is to reach out to GWP activities and to the GEO community in general, to identify results that can be organised and shared through the GKH. In the Canberra Plenary, such work was already demonstrated taking the Sen2Agri application as an example. External contributors to the GKH are most welcome. However, based on the current design around InvenioRDM, the contribution of external actors is best done by interacting with the GWP activities to identify results that can be more widely shared.
	It is also not clear from the document how knowledge is defined, how knowledge hub is defined, where knowledge exists, who are the main knowledge 'providers', which are of interest to GEO, which will populate the GKH, which will link to the GKH, etc.	See Assumption 5, Introduction: The GKH will focus on assembling the best in “tacit knowledge” (defined as skills, ideas and practices) gleaned from the experiences of activities of the GWP and translate it into “codified knowledge” (or knowledge that can be readily articulated, accessed and transmitted). In that sense, we use "knowledge" in the ordinary dictionary sense of "facts, information and skills acquired through experience" (Oxford). In more concrete terms, the ideas behind the GKH are widely shared in the scientific community; there is a growing recognition that scientific and technical work which is relevant for public decision-making should be reproducible. In environmental related areas, which are the ones under GEO's remit, shared knowledge and reproducible science are essential for decision-making at a global scale. For example, when

Who	Comment/ question	GEO Secretariat Response
		submitting reports and communications to UN conventions such as UNFCCC, UN CBD, UN CCD and UN SDG, the best practices request Member States to provide information that is verifiable and transparent.
France	Thanks for this very good initial version of the GKH implementation plan. I've made some very minor edit correction in the Google Doc version and provide some comments, remarks and open questions.	Noted.
Italy	The document does not provide a clear view of the objectives. The GKH is defined in different ways going from a full repository of "authoritative, validated and reproducible content for evidence-based reporting on policy commitments and decision-making" to a system collecting a set of linked data and docs requiring a "minimal team that does not require additional resources". This makes difficult to establish the value of the GKH and if the implementation effort is well estimated.	The GKH indeed intends to represent a repository of authoritative, reproducible content for evidence-based reporting. As such, the contents will include sets of linked data and documents detailing the components of a given knowledge package. The next revision of the implementation plan will include estimated percentages of Secretariat staff time needed to develop the GKH. We note that such percentages would be the same as the work carried out in developing the proof of concept for the GEO Week 2019. Since the dedication in 2019 had no negative impact on the actions of the Secretariat, we can state with conviction that the implementation of the GKH will have no negative impacts in 2020.
	The GKH is presented as something that is developed in parallel and "in synergy" with the GEOSS Platform. For the best mobilization of resources, the GKH, if approved, should be a component of a general architectural framework of an enhanced GEOSS Platform to be defined (e.g. starting from GEOSS EVOLVE outcomes and taking into account several existing actions in the direction of publication and generation of knowledge)	The GEOSS Infrastructure Development Task Team is invited to provide this information under Task 2 of Section 3 (Enhance GEOSS Platform Interface to the GKH), and elsewhere as appropriate.
Japan	We would like to suggest to include the risk assessment to implement this plan. Such assessment would contains the possible risks and potential contingency plan. We believe that such risk assessment would increase the transparency of the plan and eventually help the discussion and decision by the people such as PB and ExCom. As the risks, It could include the cases such as: - AWS withdraws their support - Flagships/Initiatives have difficulty to provide knowledge package due to, for ex., shortage of their resources	Point taken. Will include section on Risk Assessment in version 2 .
	How about to add a simple figure about the structure of GKH (we are attaching the example in ppt) which explains the structure of the GKH? The advantage of having such figure is to inform better to the people how GKH functions, for example where the program will be run or where the knowledge is actually placed. We believe such figure would be help for the people inside and outside of the Task Team, such as PB and ExCom to have same understanding on the GKH and to ease the consideration.	Point taken. Will include figure as suggested in version 2. We thank Japan for the effort in preparing the figure, which makes an important contribution to the IP.

Section 1 – Introduction

Who	Where	Comment/question	GEO Secretariat Response
China	Purpose	Also (e) best practise in form of video or interactive help or guide book.	Point taken. Will develop as part of a dissemination/capacity development strategy section in next version.
		All the above digital objects should be linked. The relationship among them will be the most important KNOWLEDGE, sometime we say Knowledge Graph. In the following tasks, it cannot be found. Will we figure the KG manually in this stage?	See comment from Japan on 'General' tab regarding need for an explanatory diagram of the components and information flow of the GKH.
	R12	Is the GKH a universal? Is it possible to set any Regional GEO's GKH? who should be in charge of the management of the regional GKH?	Since they are open source, knowledge packages featured in the GKH can be adapted to any required scale. Management of a regional application could be the remit of the Regional GEOs; however there should be only GKH.
		Sounds like AOGEO is planning to build its GKH. Maybe we can invite AOGEO to attend the listed tasks jointly (they may have some potential funding for KH). Talk with Gu Xingfa if possible.	Noted.
EC	GKH definition and GEO Sec role	The present document tries to define what the GKH should be –see chapter 1. However, it does not seem to provide a clear answer, introducing at least three (quite) different operational frameworks –i.e. a digital library, an online collaborative platform, big-data analytics platform to scale up (existing) scientific applications.	The GKH is primarily intended to be a digital library. It will also include ways for the community to interact and share best practices and experience on scaling up applications. The GKH has never been designed to become a place to perform big data analytics (see Introduction of Section 5).
		Some (insufficient) details are provided only for developing a digital library (see for example chapters 5, 6, 7). However, references to functionalities pertaining to online collaborative platform and/or to big-data analytics platform are present in several sections of the document.	The document will be revised to make it clear that the GKH will be a digital library.
		In this first section, the resources remain very imprecise and are not quantified, with the idea that additional resources might be sought via external entities, which might contradict the first point on vendor independence. The resources can be quantified only if the GKH scope is well defined along with the targeted audience and the competences required.	The software development part of the GKH will be minimal and can be accomplished by GEOSEC according to the staff duties stated in the CONOPS document. The documents that will be included in the GKH will be provided by the GEO community, mostly through the activities of the GWP. There may be cases where synergies can be found with the commercial sector; however the GKH will remain agnostic as to commercial services provided, through open calls and on an as needed basis.
		The role attributed to the GEO Sec. for curation or even ingestion of the knowledge into the system is questionable.	The role of GEOSEC in curation of information to be made part of the GKH and the GEOSS Platform in general has been recognised and accepted by EXCOM, upon approval of the Secretariat Concept of Operations document (CONOPS). As per the CONOPS document, one of the roles of GEOSEC's Data Officer is: "*act as curator of GEO Infrastructure content in close collaboration with Content/Data providers*".
	Requirements	The document reports only some requirements for a digital library. No requirements are provided for being a collaborative and/or a big data analytics platform.	The GKH will not be a big data analytics platform. It will provide information on how to perform big data analytics. The GKH will be only a digital library. The requirements presented in the first version of the IP are directly taken from the EAG final

Who	Where	Comment/question	GEO Secretariat Response
			recommendation.
		Key requirements are missing or insufficiently substantiated: expected performances, computing environment, operation time, failure management, security, portability, scalability, user interface, testing, etc. The necessary integration with the existing and future GEOSS infrastructure should be addressed: it might be that rather than developing a stand-alone digital library, the current GEOSS platform could evolve to incorporate access to knowledge. The tasks listed in the subsequent sections of the document should be associated to each identified requirement.	As stated before, the current version of the document was written on the perspective of being revised and approved by EXCOM. Therefore, some implementation details were deliberately omitted from the document, trying to avoid producing a technical and specialised document. The Secretariat will endeavour to provide additional technical details as requested. The trade-offs of developing a stand-alone digital library rather than an evolution of the current GEOSS Platform have been extensively discussed by the Expert Advisory Group, whose recommendation was to design the GKH as a additional module of the GEOSS Infrastructure rather than an extension of the GEOSS Platform. Subsequent work in developing the Proof of Concept for the Canberra Plenary has provided support for this recommendation. More recently, GEOSEC's interactions with CNES as part of the InvenioRDM consortium (which is the basis for Zenodo and similar digital libraries) have convinced GEOSEC that using InvenioRDM as the basis for the GKH is a sound and safe choice.
		Several GKH requirements seem to be missing	We will revise the document according to the comments we received.
	GKH reference framework and architectural design	Both the reference framework and the components architecture of the GKH are missing –i.e. the entire system design phase. (Complex) system design is essential to estimate the best effort (and hence estimate needed resources) as well as to understand the necessary relations with other systems – i.e. relations between the GKH and the GEOSS infrastructure.	The basic reference framework of the GKH have been included in the EAG report to EXCOM, as an annex to the "Results-Oriented GEOSS" document (ref EXCOM 48.5). As stated earlier, some architectural details were left out of the first version document, because of its intended audience (EXCOM). Given the comments received, GEOSEC will include additional information on the proposed architecture. Furthermore, the basic design of the GKH is simple: (a) it will be a digital library built by customising the InvenioRDM software from CERN; (b) it will interoperate with the GEOSS Platform using the Invenio RDM API (application programming interface). This design minimises risks and development effort.
		A system description usable to be implemented is missing	There is no need for this system description. Implementation of the GKH will consist of customisation of the InvenioRDM. Therefore, the effort of software implementation of the GKH will be minimal. In the new version of the document, GEOSEC will include a general description of InvenioRDM. Since this product is developed and maintained by CERN, there is no need to involve any GEO team in its implementation. Therefore, the system description part of the IP only needs to describe the user interface and the steps required for customisation of InvenioRDM. As stated before, the IP is based on a strategy of reducing the actual software development to a minimum and thus reducing risks.
	GKH Users	The document clarifies that main targeted users are “knowledgeable experts/technicians interested in scaling up applications of the GWP”. Clearly, this is not the kind of users of a digital library.	Point taken. Will rephrase to indicate the GKH will be of interest to knowledgeable experts/technicians seek to customize EO applications for national reporting under global policy commitments, national priorities, etc.

Who	Where	Comment/question	GEO Secretariat Response
		More importantly, this does not seem to go towards the direction recommended by GEO Strategic Plan, advocating to further engage policy makers and non-expert people –an input for the GEO PB.	The Strategic Plan reads: "To realize its Vision and maximise the benefits that GEO can bring to users, through 2025, GEO defines three spheres of activity focusing on advocacy for the value of Earth observations as a fundamental component of timely information; engagement with stakeholder communities to address societal challenges; and delivery of critical data, information and knowledge to inform decision-making." The GKH is targeting in particular the latter portion, knowledge delivery to inform decision-making.
	Resources and competencies needed	The document does not provide any usable information about the estimated resources and competencies required. In particular, it does not even distinguish between the two important phases of system implementation and production/operation. By example, for a large digital library system, the production/operation phase is likely to result more expensive than the software development itself. Having the GKH hosted by a commercial cloud provider (e.g. Amazon) raises, as well, a number of concerns in terms of long-term operations, licensing conditions, transparency and should have been blessed by ExCom, first.	It is not expected that the GKH will be a large digital library. Based on what is the state of the art on Earth observation data analytics, the number of documents to be stored and managed by the GKH will remain at a reasonable rate. It is expected that there will be at most a few hundred relevant documents in the next three years. In terms of cloud providers, GEOSEC is committed to present to EXCOM alternatives to Amazon.
		According to the document, GEO members are asked to decide whether or not to contribute to the GKH implementation, but it does not provide any estimation of the effort and competencies required.	The GKH will be primarily populated from applications developed by the GEO Work Programme, in the course of activities already defined in implementation plans (including resources) and as approved by the Programme Board.
		A real estimation of needed resources and competencies is missing.	Competencies and resources will come from activities contributed by GEO Members and POs to the Work Programme, as outlined in implementation plans approved by the Programme Board. In addition, the next revision of the implementation plan will include estimated percentages of Secretariat staff time needed to develop the GKH. We note that such percentages would be the same as the work carried out in developing the proof of concept for the GEO Week 2019. Since the dedication in 2019 had no negative impact on the actions of the Secretariat, we can state with conviction that the implementation of the GKH will have no negative impacts in 2020.
ESA	Assumption 1	Assumption of vendor independence conflicts with frequent references to commercial solutions such as AWS and GEE.	Vendor independence concerns two main and very different aspects, (1) the digital library itself where the resources will be indexed and (2) running computing environments for the actual EO applications. Independence of the digital library will be guaranteed through a containerized architecture. Regarding the second point, AWS and GEE are mentionned because they have responded to the call for opportunities on cloud credits programme. Ultimately the goal would be to offer access to as many different platforms as possible. When preparing the revised version of the IP, we will explore different alternatives of cloud services to host the GKH.
	Assumption 3	Identity and role of the user communities that need and use the GKH not clear: vague	The implementation plans of Flagships and Initiatives, as approved by the Programme

Who	Where	Comment/question	GEO Secretariat Response
		reference to GEO Flagships and Initiatives as the providers of the packages and to the Member States and the Participating Organizations as future possible users and source of requirements. User representatives completely missing from the roles overview.	Board, contain details as to objectives (including meeting user needs), activities, resources, contributors and deliverables. These are considered to provide sufficient information for identifying candidate knowledge packages for the GKH.
	Requirements	Set of requirements very incomplete (no reference to security, availability, performance, etc.) and formulated as implementation guidelines rather than actual requirements;	The requirements for the GKH have been revised and discussed by the Expert Advisory Group and part of the document "Results-Oriented GEOSS" (doc EXCOM-48.5) which was approved by EXCOM in July 2019. The proof of concept developed for the Canberra Plenary was based on these requirements. Nevertheless, GEOSEC will include additional sections on security and availability in the revised document.
		moreover, the source of the requirements is not clear.	The source of the requirements is the Expert Advisory Group. These requirements are included as annex to the "Results-Oriented GEOSS" document (ref EXCOM-48.5) which was approved by EXCOM in July 2019.
ESIP		Suggested text modifications	Accepted
France	Assumption 3	I'm not sure to understand what we are talking about with the "applications of the GWP." Need to be clarified...	The term "applications of the GWP" is used to describe the results produced by GWP activities that are relevant to GEO community at large and, more specifically, to GEO Member States to produce information for evidence-based policy making and for responding to global conventions they are signatories, such as the Paris Agreement. Possible examples include applications for crop monitoring, food security, deforestation mapping, and water extent and quality. In the revised version, GEOSEC will provide additional explanations of this term.
	Information Flow	This mediation process might need to accommodate an additional actor e.g. a "peer reviewer" selected from GEO community expert per SBA. At a certain point of decision the GEO Sec. might need support from such SBA expert to decide upon the relevance of the contribution of a GKH contributor.	Important point. In the revised version of the document, GEOSEC will address this issue. In general lines, we expect that leaders and contributors to the GWP activities provide their expertise to the Secretariat when selecting relevant results to be included in the GKH.
Germany	Assumption 7	May contradict to 1) Vendor independence	Point taken. The general guideline to be applied in the design of the GKH is only to used technologies that are guaranteed to be vendor independent. Such is the case of the underlying technology of the GKH (InvenioRDM by CERN).
	Assumption 8	Journal publication per se does not ensure reliability/practical applicability/reproducibility. This needs to be more precisely captured	Point taken. We will improve this item in the revised version.
		What community [of experts], who does that, what process, who controls that?	In general, we expect that leaders and participants on GWP activities will be consulted to decide on what results, methods and documents are relevant to be shared with the GEO community as a whole. This point will be further developed in the revised version.
	Assumption 9	According to GEO Data Sharing principles, User registration is not considered to be a restriction and hence compatible with GEO DSPs	This is point where GEOSEC would like to benefit from the consensus on the PB and by GEOSS Infrastructure Task Force. Does the revision team consider it valuable/necessary to include user registration? iIf that is the case, such facilities will be included in the GKH
	Assumption 10	Who controls/decides, who is a trusted	Trusted individuals are leaders and

Who	Where	Comment/question	GEO Secretariat Response
		individual?	participants in the GWP activities, or others acting on their delegation
	Information Flow	This role [mediation (curation)]of the GEOSEC is questioned	Same response as D9 above: *The role of GEOSEC in curation of information to be made part of the GKH and the GEOSS Platform in general has been recognised and accepted by EXCOM, upon approval of the Secretariat Concept of Operations document (CONOPS). As per the CONOPS document, one of the roles of GEOSEC's Data Officer is: "act as curator of GEO Infrastructure content in close collaboration with Content/Data providers".*
		Who? GEOSEC? So far GEOSEC has no operations role (human intervention)	Please see response above. The CONOPS document (approved by EXCOM) clearly states which activities related to the GKH are the responsibility of GEOSEC. They include mediation of the GKH
Italy	Assumption 1	This can be interpreted in two ways: a) GKH should consider acceptable any solution independently of technological choices b) GKH should consider only technologically neutral solutions. The following text seems to suggest a preference for option b).	Point taken. The revised text will make it clear that GKH will follow option (b).
		It is not clear which part of the stack is required to be open source. For example, a Google Earth Engine solution is considered open source? (It uses closed APIs, and users are “unable to use another vendor without substantial switching costs”)	The GKH does not involve running applications on GEE or Amazon; its purpose is to store and disseminate open software and open documents that promote sustainability. The implementation of the GKH will not use components or APIs from private vendors. It relies only on InvenioRDM, the open source software from CERN which is vendor independent.
	Assumption 2	With the new cloud paradigm it is necessary to consider the full stack to define the transparency degree of a solution.	Point taken. However, it is not for the GKH to decide on the transparency degree of a solution. If the relevant community in GEO (e.g., GEOGLAM) considers the application relevant to be shared, and if this application itself is openly available, it will be shared on the GKH.
	Assumption 4	Formalized? [codified]	Noted and agreed.
		EO and Earth Science?	Noted and agreed.
	Assumption 5	Formalized explicit knowledge [codified]	Noted and agreed.
	Assumption 7	This makes sense only if a clear architecture is provided to identify components that might be provided by the commercial sector fitting in the overall framework	Point taken. In the revised version, the IP will make clear there are two main challenges to build the GKH: (a) software development, which will require a modicum of resources, since the work will be mainly a customisation of an open source product (Invenio RDM from CERN): (b) application selection, organisation, and sharing, which will require an important engagement between GEOSEC and the GEO community, especially the GWP.
	Assumption 9	Account registration should be necessary for statistics purposes. (See previous experiences with the GEO Portal and GEO DAB.)	If the recommendation is to include to account registration, such functionality will be implemented.
	Assumption 10	This requires a clear identification of the process and governance to establish trust.	The process for including applications in the GKH involves the participation of the leaders and participants of GWP activities. Each GWP activities will be requested to provide one or more points of contact; these persons

Who	Where	Comment/question	GEO Secretariat Response
			will act as trustees of the GKH; they will oversee the choice of which applications are stored and shared via the GKH.
	Information Flow	Need to check that the planned effort for the GEO Secretariat is well estimated	Important point. The planned effort by GEOSEC is based on the same allocation of hours used to develop the Proof of Concept for the Canberra Plenary. It has been recognised by EXCOM, PB, and the GEO community in general that GEOSEC performed well in 2019. All required documents and actions were provided, the Ministerial and GEO Week were a success, and the GWP 2020-2022 was successfully completed. Therefore, the staff allocation to the GKH work had no negative effects in the performance of GEOSEC. Since what is planned is to use the same staff allocation, there are no grounds to expect any negative effect on GEOSEC's performance.
		Should the GKH be a paper repository?	Published papers describing methodologies used to develop application algorithms will be included as part of knowledge package contained in GKH.
	Requirements	This is a long list of requirements. Some of them actually hide other sub-requirements. Some of these requirements were the objective of full research projects in the past. So we should be careful to not underestimate the effort.	We will revise the document to clean the requirements list. Please note that these requirements have been proposed and revised by the Expert Advisory Group, and are part (as an annex) of the "Results-Oriented GEOSS" document, approved by EXCOM in July 2019.
		Other requirements have an impact on the governance which is not detailed in the doc (e.g. R5)	We will revise the requirements to build a consistent list
	R3	Metadata profile? [descriptors]	Noted and agreed.
Japan	Information Flow	We would like to suggest to follow here the concept of the Assumptions and Constraints 5) Scaling-up applications (p.4).	Noted and agreed.
OGC		Suggested text modifications	Accepted.
	Assumption 10	This should be defined. What is the process to become a "Trusted individual"?	Point taken, will amplify definition of "trusted individual."
	Requirements	Open standards for interoperability of the GHK repository with other systems would be another key requirement	Accepted.
USA		Suggested text modifications	Accepted.
	Assumption 1	Consider revamping this paragraph focusing on Vendor Neutral to support interoperability, cross-platform integration, reduce licensing cost and administration, cultivate agile co-development, exploitation of new emerging technologies etc. ..... As stated this paragraph could be interpreted as restrictive to proprietary vendors who may want to contribute to this effort. GEO is currently working to increase investment from commercial organizations. This could be seen as a detractor for some.	Point taken, will rephrase accordingly.
		Consider using Gartner as a reference instead of Wikipedia . https://www.gartner.com/en/information-technology/glossary/vendor-neutral	Accepted.
	Assumption 4	Consider moving this to number 1	Accepted.
		Consider replacing the word "central" where possible replace with "Cloud-Based" its less	Accepted.

Who	Where	Comment/question	GEO Secretariat Response
		inflammatory.	
	Assumption 5	Consider making this #2	Accepted.
		Consider using just "scaled" . Resources could be scaled up or down as needed not just scaled up.	Accepted.
	Requirements	Recommend moving this up to the Purpose section. These requirements set a foundation for the principles, assumptions and constraints.	Accepted.
I. Petiteville PB co-chair	Assumption 3	How many users ? How many users can use the GKH processing capabilities in // ?	We will address this issue in the revised version
		Experts in EO ? In IT ? In both ? In particular, to use the software environment of the GKH, what are the IT competences needed ?	There is no need for software expertise to use the GKH, as it will be a user-friendly interface. To use the actual contents of what is deposited in the GKH, the required expertise will vary with how reproducible the deposited content will be. Two examples: what is deposited might be a virtual machine with a GUI (as Sen2Agri) which is straightforward to use; or might be an R/python script that requires knowledge of such languages.
	Assumption 5	What about the CA and Regional GEOs' activities ?	The CAs and the Regional GEOs are also encouraged to contribute to the GKH. Nevertheless, the flagships and initiatives have a stronger responsibility to contribute to the GKH with reproducible results.
	Assumption 7	Very vague: the current formulation cannot be quantified. What are the resources needed and which ones are available from the Contributing partners ?	Point taken. This item will be better explained in the revised version. In general, all of the resources required to implement the GKH are available in GEOSEC. Most of the required additional resources are not related to software development, but for organising and sharing reproducible results. These results are envisaged to be in-kind contributions from activities in the GWP.
		The resources needed depends also on the GKH requirements depending whether the GKH is a basic or a more sophisticated infrastructure ..	Point taken. This item will be better explained in the revised version. In general, the GKH is a basic infrastructure; it is user interface layer on top of CERN' s InvenioRDM. So, the actual requirements for software development are small and limited; thus, such resources can be provided by GEOSEC.
	Requirements	Several requirements that will impact the level of resources (human, financial …) are missing. A mail on that exact topic has already been sent in the past to GEO SEC. (Gilberto and Paola) on resp. 28 Nov. and 22 Nov. 2019).	Point taken. This item will be better explained in the revised version.
		A minimum set of requirements are necessary at the very beginning as they have an impact on the resources (human and financial) needed for the implementation and then operations of the GKH such as:	See responses below...
		- Performances: How many users should be able to use the GKH simultaneously ? What is the volume of data to be stored online ? Response time of the system ? Access time to information & data ?	Point taken. This item will be better explained in the revised version. In general, since the GKH functionality relies on CERN's InvenioRDM, GEOSEC will interact with CERN to be able to provide detailed responses.
		- Computing environment: what are the processing capabilities offered to the users ?	No processing capabilities will be offered to users. The GKH is a document storage and retrieval system. Its contents will include virtual machines (e.g., Docker containers)

Who	Where	Comment/question	GEO Secretariat Response
			than can be deployed by users in their processing systems.
		- Operation time: should the GKH be operated / available 7/7 or just from Monday to Friday ? Should we foresee a Helpdesk to support the users (number of persons, working days / hours , response time,.. ?)	The capabilities of the GKH will be basic (storage and retrieval of documents) and will not include support for mission-critical operations. Thus, there is no need for 7/7 operations. GEOSEC staff will be available for user support in normal office hours.
		- Failure management: what is the required percentage of availability of the GKH (e.g. up and running 95 % of the time) ? MTTR & MTBF requirements ? Should we foresee any (hot) redundancy / backup GKH	As GKH is not a processing infrastructure, it will not support mission-critical operations and its failure management will be limited to the what is provided by our cloud providers. As GKH will not support mission-critical apps, we do not foresee the need for a hot backup.
		- Security: any requirements to protect the GKH against misuse / hackers?	Since GKH will not provide processing capabilities and will only store open access and open source documents, we do not foresee additional protection from hackers than the normal protections that we have for the GEO website.
		- Portability: requirements (on software - open source ?-, on host hardware, on cloud provider, ...?) , for a potential future migration or duplication of the GKH to other platforms ?	The GKH will be entirely based on OSS (CERN's InvenioRDM) and has been designed with portability and vendor independence in mind.
		- Expandability: requirements to guarantee a potential future expansion of the system e.g. if the number of users significantly increases ?	Since GKH is basically a document storage and retrieval system, its performance requirements are light and are expected to be handled with a reasonably small infrastructure.
		- User interface: requirements on the User Interface (functions, design, ...?).	See Task 1: "*During this stage, feedback from the knowledge providers and end users will be crucial to identify improvements to the user interface and the functionalities of the initial version of the digital library*"
		- GKH testing: do we foresee any test period before opening to the GEO community ?	= Task 1, 3 and 4
		Those requirements are essential to be able to generate a feasible / actionable implementation plan that can be interpreted with no ambiguity by the teams involved in the implementation and operations of the GKH.	Thanks for the contribution. Please see comments above.
	R6	Meaning ? (Describe big EO catalogues)	Point taken. This item will be better explained in the revised version.
	R8	Will the users be able to process data (or run some processing services remotely) remotely without having to download the data on their PC and do the processing on their PCs ?	No processing capabilities will be offered to users. The GKH is a document storage and retrieval system. Its contents will include virtual machines (e.g., Docker containers) than can be deployed by users in their processing systems.

Section 2 – Management

Who	Comment/question	GEO Secretariat Response
EC	Content recognition process and system governance: Due to the scope of GEO and the objectives of the GKH, it is extremely important to define the process leading to the recognition of the "knowledge" to be present in the GKH, and, more generally the governance of the GKH system.	The GKH will be primarily populated from applications developed by the GEO Work Programme, in the course of activities already defined in implementation plans (including resources) and as approved by the Programme Board. The process for including applications in the GKH involves the participation of the leaders and participants of GWP activities. Each GWP activities will be requested to provide one or more points of contact; these persons will act as trustees of the GKH; they will oversee the choice of which applications are stored and shared via the GKH.
	According to the document, the GEOSS Infrastructure Development Task Team is in charge of the process and the governance of the GKH. In our opinion, this is not the best solution because the knowledge selection process and the system political governance should be technology agnostic –another input for the PB.	The role of GEOSEC in curation of information to be made part of the GKH and the GEOSS Platform in general has been recognised and accepted by EXCOM, upon approval of the Secretariat Concept of Operations document (CONOPS). As per the CONOPS document, one of the roles of GEOSEC's Data Officer is: "act as curator of GEO Infrastructure content in close collaboration with Content/Data providers". Otherwise, the GEOSS Infrastructure Development Task Team is particularly invited to provide information under Task 2 of Section 3 (Enhance GEOSS Platform Interface to the GKH), and elsewhere as appropriate.
	A proper process and governance proposal is missing.	Section 7 (Acceptance) provides an outline of the steps for approval by the GEO community. Ultimate decisions will be taken by the Executive Committee based on annual updates of the GKH implementation plan.
ESA	Role, scope and implementation plan of the mentioned in situ and space component to be clarified.	Each knowledge package featured in the GKH will detail and point to all data sources used, both space-based and/or in situ.
Germany	Well, the CONOPS describes all tasks of the GEOSEC, of which the GKH is just one additional (and not the most important). The table reveals, that two thirds of the GEOSEC will be occupied by the GKH implementation. This is neither feasible nor acceptable. All staff has been more than busy also before the GKH appeared, right?	Point taken. The next revision of the implementation plan will include estimated percentages of Secretariat staff time needed to develop the GKH. We note that such percentages would be the same as the work carried out in developing the proof of concept for the GEO Week 2019. Since the dedication in 2019 had no negative impact on the actions of the Secretariat, we can state with conviction that the implementation of the GKH will have no negative impacts in 2020.
Italy	The proposed effort and actions does not seem to match this ambitious objective. Who decide about authoritativeness?	The notion of "authoritativeness" will come from the experts/contributors involved in the activities of the GWP themselves, as well as proof of some form of peer-review by external experts in the field.
	This evaluation is not complete. The GEO Secretariat should consider the impact on the "normal" operation of GEO. Every resource moved to the GKH is not available for other tasks.	Point taken. The next revision of the implementation plan will include estimated percentages of Secretariat staff time needed to develop the GKH. We note that such percentages would be the same as the work carried out in developing the proof of concept for the GEO Week 2019. Since the dedication in 2019 had no negative impact on the actions of the Secretariat, we can state with conviction that the implementation of the GKH will have no negative impacts in 2020.
	Only R6, R7, R12, R14, R15 seems to be covered [table]	Additional requirements will be addressed in future implementation plan updates.
USA	Suggested text modifications	Accepted.

Who	Comment/question	GEO Secretariat Response
	Add cells: with text "GEO Programme Board Representatives GEOSS Infrastructure Development Task Team Members Ensure …"	Accepted.
	Why is CEOS called out here? There are many other groups in GEO where this work may apply.	Point taken, will modify to make reference generic.

Section 3 – Tasks

Who	Where	Comment/question	GEO Secretariat Response
China	Task 3, Objectives	Please help me to make clear, will GKH only record the meta-information of the algorithms and software for linked-discovery , rather than reuse and operate them directly online?	A knowledge package for an application featured on the GKH will include links to all necessary elements (methods, data, algorithms and code, cloud computing environment [as needed] and results) so that the application can be reproduced and then adapted for customized purposes. In most cases, a Digital Object Identifier will point to the location where a component is located; however, as needed, the GKH can also serve as a repository for any of the knowledge package elements. In cases where a (cloud) computing environment may be required, the GKH will point to one or several options; however the GKH will not serve as a computing environment itself.
EC	WP and related tasks	The WP and its task, described in the document, do not cover the complexity of the GKH, as defined by the document itself. Besides, they do not provide any useful information about resources and competence, needed. In addition, the proposed resources mobilization would consume most of the existing GEO Sec resources distracting them from their existing duties.	The next revision of the implementation plan will include estimated percentages of Secretariat staff time needed to develop the GKH. We note that such percentages would be the same as the work carried out in developing the proof of concept for the GEO Week 2019. Since the dedication in 2019 had no negative impact on the actions of the Secretariat, we can state with conviction that the implementation of the GKH will have no negative impacts in 2020.
ESA		References to financial resources very vague: not clear the amount needed nor from where they will come from.	The GKH will be primarily populated from applications developed by the GEO Work Programme, in the course of activities already defined in implementation plans (including resources) and as approved by the Programme Board.
	Task 2	Missing (logical and physical) architecture design and interfaces (both internal and external).	The GEOSS Infrastructure Development Task Team is invited to provide this information under Task 2 of Section 3 (Enhance GEOSS Platform Interface to the GKH), and elsewhere as appropriate.
		Integration of the GKH with the GEOSS Platform not really addressed: Missing interfaces (two-way)	The GEOSS Infrastructure Development Task Team is invited to provide this information under Task 2 of Section 3 (Enhance GEOSS Platform Interface to the GKH), and elsewhere as appropriate.
		GKH team resources not clear - It seems a responsibility of the some of members of the GEOSS Platform team only (is the GEOSS Platform team proposed to be the GKH team?)	As noted earlier, the role of GEOSEC in curation of information to be made part of the GKH and the GEOSS Platform in general has been recognised and accepted by EXCOM, upon approval of the Secretariat Concept of Operations document (CONOPS). The GEOSS Platform team is invited to work with the Secretariat in implementing the GKH as a component of the GEOSS Platform.
		Task-description is considered incomplete - missing integration of GEOSS Platform (see first comment)	The GEOSS Infrastructure Development Task Team is invited to provide this information under Task 2 of Section 3 (Enhance GEOSS Platform Interface to the GKH), and elsewhere as appropriate.

Who	Where	Comment/question	GEO Secretariat Response
ESIP		Suggested text modifications	Accepted.
	Task 1, Resources	The use of AWS-specific or GitHub-specific capabilities - e.g. the selection of GitHub-specific tools, or AWS specific database platforms or Docker hosting tools as opposed to more generic AWS EC2 machine instances, and the use of standard Git features (related to the preferred use of GitHub noted in the preceding paragraphs) - should be avoided to minimize vendor lock-in.	The digital library architecture is not built on solutions subject to vendor lock-in. It is built on open-source, existing and free solutions (namely Invenio framework and InvenioRDM). GitHub will be used as a sharing platform for people to access the code, it is not foreseen that the GKH will rely on specific functionalities of GitHub.
	Task 2, Objectives	To the extent possible Zenodo's supported open standards, such as OAI-PMH, should be used in preference to platform-specific API calls.	Noted.
France		Suggested text modifications	Accepted.
	Task 1, Resources	Open questions: Though AWS might be consider at the top class cloud provider (CP) , doesn't this bring any possible issues (cost, vendor independence, portability to another CP,...) beside than having a more academic/research type of cloud provider possibly available from the GEO participating organisations members...?	The digital library architecture is designed and has been tested to be deployable elsewhere if needed. The use of AWS here only concerns the digital library, it does not concern the use of cloud-providers to scale up and reuse EO application (tasks 3 and 4). Options for hosting the GKH itself by non-profit cloud providers will also be explored.
		Will AWS be used only for the PoC or as the operation CP platform?	AWS has been used to perform the PoC at GEO Week 2019. GEOSEC is currently working on alternatives to AWS for the full implementation of the GKH.
	Task 3, Activity 2	I suggest that other regional GEO commercial sector providers might be included here…	Agreed, will modify text.
	Task 4, Activity 2	I would suggest to change this to: on any cloud services	Agreed, will modify text.
	Task 5, Criteria 2	How does his search mechanism complies with the search from the GWP ?	We did not fully understand the question. Could you please clarify?
Germany	Task 1. Resources	This seems to contradict our GEO rules for working with the commercial sector (transparency, engaging ExCom, etc.). What about Vendor independence? Public procurement rules? Operational sustainability? An AWS offer might well be a “poisoned gift”.	GEOSEC is currently working on alternatives to AWS for the full implementation of the GKH.
	Task 2, Objectives	From that presentation, it looked like the GEOSS Platform already had a solution working with European assets. They might be an alternative to AWS.	The Secretariat is currently exploring alternative cloud hosting arrangements for the GKH by non-profit providers in Europe.
	Task 3, Resources	The GEO PB should be included in the process of identifying and selecting solutions from within the GWP and have the final say for introducing them into the GKH.	The Secretariat will work with the PB to identify candidate knowledge packages for inclusion in the GKH. However, the GEO Secretariat is tasked with overseeing Foundational Task 3: GEOSS Implementation, of which operation of the GKH is part, as outlined in the GEO Secretariat Concept of Operations, and as such is ultimately responsible for GKH content.
Italy	Task 2	The major point here is that a general architecture framework is necessary. The architecture should consider how the different knowledge sources are collected, how they are possibly processed in heterogeneous multi-cloud environments, how they relate to the regional GEO infrastructures, etc. The GKH should be a component of a enhanced platform and not something running in parallel.	This issue was extensively discussed in the EAG. The EAG recommendation was that the GKH be implemented as an additional module of the GEOSS Infrastructure and not as an extension of the current GEOSS Platform. The infrastructure and basis for the GKH already exists (CERN InvenioRDM) and its customisation is a low-risk activity. The software development effort will be minimized and the time for the GKH to become available will be optimized.

Who	Where	Comment/question	GEO Secretariat Response
	Task 2, Objectives	This suggests two activities running in parallel. [create synergies]	The GKH, once fully implemented, will be a component of the GEOSS Platform.
		The path of evolution should be defined later, after the general architecture.	Agreed.
		Any decision about technological choices should be postponed to the architecture definition. This is the usual software engineering practice.	Agreed
	Task 3, Objectives	The document should clarify the objective of the GKH in this aspect. Reproducibility is important in the research phase to allow cross check of results by the researcher community. But is Open Science an objective of GEO?	In the GEO Strategic Plan, the GEOSS Data Sharing Principles call for data, metadata and products to be shared as Open Data by default. Open Science is merely an extension of this principle.
		Does this mean that replicability is required? [progress from regional to global scale]	Yes, replicability/reproducibility of EO applications is an essential requirement of GKH knowledge packages.
Japan	Task 3, Activity 1	If the target users are decision-makers (or their proxies) replicability would be more important.	Agreed, replicability is a defining characteristic of GKH knowledge packages.
USA		Suggested text modifications	Accepted
	Task 5, Criteria 2	It would be better to have this interface be part of the GEOSS Platform - GeoPortal interface. We as a community have worked diligently over the past several years to have a single entry point for users.	The proposal for the implementation of the GKH as an additional module of the GEOSS Infrastructure and not an extension of the GEOSS Platform was the recommendation of the EAG. The GEOSS Platform has a clearly defined function and its extension to be part of a digital library is much more risky and resource-demanding option than the current proposal.
I. Petiteville PB co-chair	Task 2, Resources	When will this be discussed exactly ? (The financing of the activities under this Task will be subject to discussions between the European Commission, ESA, and the GEO Secretariat)	The discussion on the objectives and funding for the GEOSS Platform is the responsibility of the Programme Board, not of GEOSEC. The GEOSS Platform team has made it clear many times that it reports to the PB, not to GEOSEC. Currently, support for the GEOSS Platform is provided by ESA and EC. While their support is much appreciated, the decision on the future of the GEOSS Platform and funding sources is the responsibility of PB.
	Task 3, Activity 2	To be further consolidated .. (2. The GEO Secretariat will also work with the commercial sector to provide opportunities to the GEO community to leverage new technologies for data analytics and cloud computing that can contribute reproducible, open-science applications of EO)	The participation of the commercial sector in GEO activities has been approved and welcomed by the GEO Plenary. For reasons of IPR rights, only open source and open access documents will be stored in the GKH. If commercial vendors want to contribute to the GKH, they are welcome, on the condition that the documents be open.
	Task 3, Resources	Which GEO Members & POSs ? How their participation will be organised especially in absence of precise requirements in relation to computing resources ? Open call ? When ? Which needs should be satisfied ?	Point taken. This item will be better explained in the revised version. In general, all of the resources required to implement the GKH are available in GEOSEC. Most of the required additional resources are not related to software development, but for organising and sharing reproducible results. These results are envisaged to be in-kind contributions from activities in the GWP. Additionally, the Secretariat has had discussions with ITC Netherlands (PO) to define the capacity development role they will play with respect to the GKH, in particular leveraging their alumni network.
	Task 4, Resources	Still vague … Which GEO Members and POs are envisaged ? Those having participated to Sen2Agri ? Others ?	See above response.

Section 4 – Privacy and Intellectual Property Rights (IPR)

Who	Comment/question	GEO Secretariat Response
ESA	Missing identification of risks and mitigation actions.	Will include section on Risk Assessment in version 2 .
	Not clear the process for ensuring integrity, reliability, reproducibility of the content, and for ensuring that IPR are properly handled: references to "trusted individuals" (not better specified), to a mediator role, presumably in the GEOSEC (which so far has no operations role) and to journal publication (which does not ensure all that).	One has to consider that the GKH will only store open access and open source documents. As for the reproducibility, the documented experience is that achieving reproducible results is a long-term process. We will better explain these issues in the revised version.
Germany	Critical Points. Needs to be scrutinised by layers. And who is going to check and sort all this when content is to be entered into the GKH?	We will address these points in the revised version
Italy	Is recommended or mandatory [using open source licenses]? How far the open requirements should extend? What if an open algorithm uses closed/hidden APIs like in GEE? Is it compliant? What about Machine Learning based algorithms? Are they considered open?	It is mandatory that all GKH content is open source. An algorithm that uses GEE is acceptable as part of the GKH, since there are open source alternatives to the scope of the GEE API. GEE algorithms can be translated to their R or python equivalents.
	No mention is done about the implementation details, so it is difficult to estimate if efforts above are realistic. [modify GKH contents]	We will address these points in the revised version
	Important point [privacy rights]. It should be discussed if and how the text below addresses this point. Nothing is said about the need of information about the physical location of information (needing support for multi-cloud environments)	We will address these points in the revised version
USA	Suggested text modifications.	Accepted
I. Petiteville PB co-chair	How will the Cloud provider be selected ? What are the requirements in terms of services by the Cloud Providers ? How will the yearly operations of the Cloud Providers be financially supported ? By GEO SEC ? By GEO Members / POs ?	GEOSEC is currently working to develop alternatives to AWS as cloud providers for the GKH. These alternatives will be discussed and presented in the revised version of the IP.

Section 5 – Support

Who	Where	Comment/question	GEO Secretariat Response
ESIP	Software	Judging by the above software components it seems that a multi-container Docker solution would be more optimal. Perhaps that is already the case?	Docker containers are some of the types of documents that GKH will store and make available to the community. It is the case that the digital library (based on Invenio RDM) will be supported by multiple containers.
USA	Hardware	This is not vendor-independent. Recommend you remove this or rephrase sentence.	Point taken, will modify text.
I. Petiteville PB co-chair	Hardware	For how long ? How many years of operations ? (Currently, the GEO Secretariat has been granted US$ 50,000 of cloud credits by AWS to host and run the GKH. This amount is expected to be enough to cover the execution of Tasks 1, 3, 4 & 5)	The Secretariat is currently exploring alternative cloud hosting arrangements by non-profit providers for the GKH which may address the longevity issue.

Section 6 – Performance

Who	Where	Comment/question	GEO Secretariat Response
EC		KPI and monitoring The process is largely missing. The reported performance indicator numbers reported in chapters 6 raises several questions about the impact of the GKH.	Point taken. KPI related to GKH impacts will be included in next revision.
		A chapter on expected impact and dissemination is missing.	Point taken. Section on exploitation/dissemination will be included in next revision.
ESA		KPIs only consider content volume: usability and actual use and adoption by actual users is not assessed in any way, nor is the integrity and reliability of the content, the actual reproducibility of the science, which is what it should all be about.	Point taken. KPIs relating to Usability and actual use will be included in next revision.
Germany	1st bullet points	As the purpose of the GKH is to improve quality and reusability, the sheer numbers don't seem to be appropriate performance indicators. At least not solely. The use of the knowledge packages is what counts in the end and makes the difference.	See above response.
Italy	1st bullet points	Is the number a correct indicator? The value of the GKH should be more on the quality aspects that on the simple number of available products	See above response.
		Linked? [deposited papers]	Agreed.
Japan	1st bullet points	In addition to those four indicators, would you plan to count the number of access and use and share the information among the Task Team?	Agreed, and see above responses. GKH performance against KPIs will be shared with GEO community.
	2nd bullet points	Which Flagships/Initiatives would you expect in concrete?	GEOGLAM and GEO BON have already expressed interest. Others will be identified in consultation with Flagship/Initiative points of contact and collaboration with the Programme Board.