

Annex 1: Response to Review Comments

At the end of January 2008, the *White Paper and Implementation Guidelines for the GEOSS Data Sharing Principles* was circulated to GEO Committees and Task DA-06-01 Participants with a request for comments. Below are the comments received as of 16 April 2008 from organizations and individuals. We have not included the name of the individual or individuals who responded. A master copy of all original comments is on file with the CODATA Secretariat.

Following each substantive comment, we have included a response that either describes the change made to the report and where in the text changes have been made, or explains why no change was considered necessary. This appendix will be updated as additional comments are received.

1. Portugal: Architecture Data Committee. Sent 29 February 2008 to GEO Secretariat

Following our previous comments on the Data Sharing Principles "White Paper" sent in September 2007, we would like to express our positive feed-back on the main changes performed in the white paper text. Nevertheless I would like to stress that in point 8.a) it is important to maintain some kind of monitoring to evaluate the level of adherence of GEOSS elements to the GEOSS data sharing principles.

Response: We agree. Implementation Guideline 8.a) already mentions this in the text.

2. Capacity Building Committee Co-Chair: European Commission. Sent 5 March 2008 to GEO Secretariat

The Declaration from the GEO Ministerial Summit in Cape Town provides renewed support for the "GEOSS Data Sharing Principles" as it includes the following statement: *"We support the establishment of a process with the objective to reach a consensus on the implementation of the Data Sharing Principles for GEOSS to be presented to the next GEO Ministerial Summit."*

The challenge for the GEO is therefore to agree on a process that can be presented to the GEO Ministerial in 2010 that recognises the wish of all participants in the GEO to encourage full and open exchange of data, whilst recognizing both the voluntary nature of contributions to the GEOSS and the requirement to respect any restrictions that arise from relevant legislation, policies, etc.

The authors of the "white paper" on the GEOSS data sharing principles have taken significant steps to reflect the "GEO spirit" when going from the first to the later drafts of the "white paper". However, there is still a perception that the focus of the "white paper" is still much more on implementing a formal / legalistic framework, rather than one that seeks to promote the benefits of free and open access to EO data through a process that engages directly with both "data providers" and "data users".

With specific regard to the benefits that the GEOSS data sharing principles can bring in support of capacity building, these are hardly articulated in the "white paper". An acceptance and implementation of the basic concepts underlying the GEOSS data sharing principles would give an enormous boost to the ability of developing countries to play a much more prominent role in

the GEO. And to achieve this, what is important is that ever increasing volumes of freely available EO data should begin to flow through the GEOSS as soon as possible. Capacity building issues should therefore be more fully addressed in the "white paper", but not from a formal standpoint, but rather from the perspective of how "data providers" can be both encouraged to and rewarded for making their data readily available and freely accessible.

Response: We agree that the process of implementing the GEOSS data sharing principles must engage the data providers and users directly so that there is full consensus and ownership of the results by the participants in GEOSS. To help reduce the perception of a formal and legalistic approach, we have added this comment in the introduction to the Implementation Guidelines in Chapter 5.

Concerning the comments about the benefits of the GEOSS data sharing principles to capacity building in developing countries, we agree that this point needs to be made more effectively. We have added these comments to section II.D.5. We also will draft a case study in Chapter III in the next version of this White Paper that demonstrates such benefits.

3. Capacity Building Committee Co-Chair: UNESCO forwarded a comment from Chair of the JCOMM (Joint WMO-IOC Commission on Oceanography and Marine Meteorology) Data Management Coordination Group. Sent 5 March 2008 to GEO Secretariat.

[The paper] is quite dry in sections and deals with the subject necessarily at a broad level. As I was reading it I was looking for pieces that we could use in Canada to encourage collectors to share their data. There are sections that deal in encouraging data collected through public funds, but by private organizations such as universities or companies. These are important and it is good that this was addressed.

With respect to university researchers when there is reluctance to provide data they have collected it is nearly always tied to "first right to publish" issues. I didn't see that this was addressed very well. The document did speak to providing attribution rights for shared data, but this is different and seems of less importance to many.

The document treats data sharing from an altruistic view. Since not everyone responds to these approaches, I think it would be worthwhile to argue that data sharing allows a broader base set of data than any one researcher can hope to collect and so provides greater scope for research.

Of course, this argument cannot be applied universally over the wide scope of research, but it is one argument that can count in some circumstances. I did not see this case made.

There is a strong emphasis on remote sensing which in my view reflects the overall emphasis in GEOSS. In itself this is not necessarily bad, but it would be better as a mechanism of inclusion to draw examples and details from other types of collection.

There is a strong emphasis on online data sharing. In one section the report notes that online sharing made disadvantage less developed countries because of cost and bandwidth issues. The latter remark occurs well into the report, whereas the former (use of online systems) occurs often and early in the report. I think its first mention should indicate there are caveats that are

explained later.

There are other comments generated by thinking about what the report says, but they are not appropriate to the text of the report. For example, they talk about metrics for data sharing and that the complexity of meeting a request should be used when a charge is levied rather than the number of bytes delivered. I do not disagree, but when it comes to quantifying complexity, there will be a large diversity of opinion.

Response: We agree that the researcher's first right to publish using data that the researcher has collected is an important issues. It has been added to section II.E.2.

We agree that the disclosure of research data provides a broader base set of data for all researchers, and this point has been added in section II.D.5.

We agree that examples of the types of data described or referenced on the White Paper should be more broadly representative of the nine societal benefit areas and such examples will be added in the next draft.

We believe that the online data sharing caveats for developing country users are part of the more general issue of cost recovery models addressed in guideline 4.d and in the section dealing with that topic and do not need to be raised earlier in the paper.

4. International Federation of Digital Seismograph Networks. Sent 13 March to GEO Secretariat. Sent 14 March to CODATA Secretariat.

Several members of the Federation of Digital Seismographic Networks (*FDSN*) have read with interest the current version of the "Data Policy White Paper for *GEOSS*". All who have read it believe that it represents a very valuable document to advance the rapid and effective dissemination of data.

Nonetheless, there is some concern on the part of the *FDSN* membership, in the sense that our established practices for data distribution encourage the immediate and open release of data. The concern lies in the wording of "minimum delay" that is used in the White Paper. There is some fear that the wording, if agreed upon, may provide some organizations with the option to delay the transmission of information. "Minimum delay" without more qualification is difficult to define and open to interpretation by individual institutions providing data.

Real time distribution of seismological data is essential for disaster warning and prevention where every second counts. The current efforts of developing tsunami warning systems for several ocean basins are a good example of this. Thus we would propose that at least for the seismological data, considering its relevance in disaster warning and prevention, the White Paper advise that "data should be transmitted as close to real time as possible".

FDSN has been an active and enthusiastic participant in *GEO*. We look forward to continuing this collaboration supporting each other to attain our common goals. Please let me know if you have any questions that we would try and respond promptly.

Response: We agree with the suggestion about emphasizing the real-time dissemination of data whenever necessary or practicable and have added the suggested wording in Implementation Guideline 5.

5. University College London (UCL). Sent 19 March to CODATA Secretariat.

I'm emailing you in your capacity as GEOSS task DA-06-01 point of contact. We at UCL have been funded for the last few years by the British National Space Centre as part of its contribution to CEOS WGISS activities to develop a data service. We have now been given some small funding to promote both service and some of the transferable knowledge about setting up this service to GEOSS task leaders.

Our service is called ICEDS (the Integrated CEOS European Data Server - European here in the sense of being hosted in Europe, for reasons of the early history of the project and its relationship to CEOS activities).

URL: <http://iceds.ge.ucl.ac.uk>

ICEDS is an open access Open Geospatial Consortium web-GIS server. We serve global and continental-scale datasets at full resolution. In particular we host SRTM v1 and v2 data, and Landsat 5 continental mosaics (produced by the Cartographic Applications Group at JPL) amongst other data. We also cascade data from other services. At one level then, ICEDS may be of use to you as a data source.

ICEDS serves both map images through the Web Map Service (WMS) standard, and actual raster data extracts through the Web Coverage Service (WCS) standard. Hence SRTM data are available as colourised hill-shaded images from the WMS or as GeoTIFF DEM extracts from the WCS.

Our web site hosts a portal to view our data, inter-compare data (through functionality such as flicker and swiping between datasets) and to add your own WMS sources to the map. It is also possible to download data extracts through the system,

ICEDS is based on open source software on relatively cheap PC hardware and a focus of the BNSC funding has been to produce a Guidelines document to discuss in full detail the installation of the service, preparation of the data, data loading into the WMS & WCS services, and the creation of functionality in the portal client.

The Guidelines have been produced particularly to encourage uptake of the OGC serving methods in organizations with less familiarity with hosting GIS data on the Web. We therefore hope that the Guidelines might be of use in the GEOSS tasks in encouraging a range of service providers to simply put up datasets.

The Guidelines document (current version, 3.2) is available from the ICEDS web site.

Response: We agree that this is a good example of open access to data and capacity building efforts. We will try to reference this example and other similar examples in a new case study on capacity building.

6. Japan Aerospace Exploration Agency (JAXA) member of GEOSS Task DA-06-01. Sent 1 April and 12 May to CODATA Secretariat.

Basically, we are very pleased to hear that such principle would be agreed in GEOSS community.

We would like to respect the principle if it is realized. On the other hand, we would like to confirm if the each data policy of the agency and the right of the each agreement (i.e. MOU) should be reserved. For example, we are concerned that the reuse and re-dissemination is allowed in the Principle although it is prohibited by our policy. We are happy to continue to communicate with you for this matter. If you need further information, please feel free to let us know.

* * *

As we sent the comment before, we operate hybrid purpose (commercial and non-commercial) satellite, such as ALOS (Advanced Land Observing Satellite). So we are concerned if the principle will be applied for such hybrid satellites. Therefore, would you let us know if you add or change the article of the paper in order to make consideration for such hybrid satellites. I could not find the changes.

Response: We agree that each GEOSS participant has its own national policies and MOUs, some of which are different from the GEOSS Data Sharing Principles. This point is made in Principle 1 and Implementation Guideline #3. However, the GEOSS Data Sharing Principles were adopted by consensus by all GEO Members and Participating Organizations, indicating that at least some subset of their data would be made available through GEOSS in a manner consistent with the Principles. It is up to each GEO Member and Participating Organization to determine what data under its control will be made available through GEOSS. This is a voluntary decision by each agency.

We appreciate your concerns, which are shared by some other GEOSS Participants as well. We believe that point 2.b in the draft Implementation Guidelines already addresses these concerns. If this explanation still does not adequately cover these concerns, specific text changes or additions should be suggested.

* * *

The GEO Secretariat sent the *White Paper and Implementation Guidelines for the GEOSS Data Sharing Principles* to the GEO Members and Participating Organizations for their review and comment on 17 May 2008. Comments 7-13 were received between late June and early September.

7. Japan MEXT Comments, sent 8 July 2008

As for Data Sharing Principles document, I am sending comments from Japanese colleagues as below.

Line 1282-1290, 1340-1359

1. We agree that this document will be internationally agreed guideline. The word of "MOU" sounds legally binding agreement, therefore MOU and related words should be amended to more general wording.

Response: Agree. "MOU" has been deleted from the text and other suggested revisions have been made.

Line 1573-1596

2. For more open and wide use of data, negligence clause for data providers should be included.

Response: The legal implications of this suggestion make this issue inappropriate to deal with in the White Paper, but should be raised more formally by the Japanese delegation in the context of the GEO Plenary.

Line 1659-

3. To give incentive to data providers for continuous contribution, providers should know how data is used for what purpose... it shall be mentioned in the text.

Response: The Implementation Guidelines suggest that this be done through a requirement on the user to provide attribution to the source of the data in section 2.c.

Line 1726

4. 3) b.establishing an "authoritative" point of contact to.....

The word "authoritative" sounds powerful, and would contradict the general idea of the principles that ensures consistency with national laws and policies and international agreements.

Response: "The word "authoritative" has been removed.

5. To promote GEOSS data provision, various approaches should be considered on the data with some restrictions such as (1) satellite data which prohibits redistribution because providers need to control quality, (2) hybrid public-private satellite data which has different data policies, and so on.

Also, technical controls on data access is one of options to treat such data. Approaches of technical controls are also considered for data access.

Response: We believe that the Implementation Guidelines should not be too prescriptive and allow flexibility in the implementation. It is not clear how these suggestions would be incorporated into the Guidelines without specific wording changes proposed.

Pls refer the attached doc. with editorial modification and comments also.

Response: All other wording changes have been incorporated.

8. Australian Response to Paper on Data Sharing Principles

Australia would like to express its appreciation to the Committee on data for Science and Technology (CODATA) and the team of experts who drafted the White Paper on Data Sharing Principles. This paper provides a very useful overview of international data sharing agreements, principles and policies as well as recommending additional guidelines for consideration.

Australia can support the guidelines both from the 10-year Implementation Plan and the additional guidelines the task team has drafted in this White paper. By necessitating that any new systems provide full and open access to data, metadata and products in order to be official

elements of GEOSS, it should be possible to see greater adherence to the GEOSS data sharing principles.

It is particularly important within a framework designed around Societal Benefit Groups that users be free to integrate, reuse and re-disseminate data, products and information with minimal restriction.

The limitation of “recognising relevant international instruments and national policies and legislation” is a very broad yet necessary restriction on completely open data exchange and vastly simplifies the level of definition provided at the GEO level in this data sharing paper.

We would suggest some subtle variations in the effort to establish an overall focal point for coordinating the application of these national restrictions as the very nature of GEOSS means a very broad and complex array of data, and the application of these restrictions may be quite specific to individual data sets. Different bodies have responsibility for different data and they will interpret the restrictions in sharing this data. Thus it may be more realistic that, rather than the focal point being an expert of all national restrictions, that they maintain an inventory of these restrictions and also have a contact list of experts for each discipline. The focal point could act as a clearing house for queries on restrictions in sharing data. Many countries now coordinate their activities through national web-sites and this inventory of national restrictions could be accessed through the web-site.

However in general, Australia is pleased with the content of the White Paper and would support its adoption.

Response: We agree with the suggestion about how to describe the national “focal point” and a sentence with the suggested functions has been added to Guideline 3.c.

9. German Aerospace Center Comments, sent 8 July 2008

Thank you for providing us with the advanced drafts of the White Paper on the GEOSS Data Sharing Principles and their accompanying Implementation Guidelines, dated May 17. The documents have matured substantially and clearly reflect the amount of work that has gone into them.

The White Paper presents an outstanding overview of different data policies and how they are currently applied.

The Implementation Guidelines address the issue of how to advance the implementation of the GEOSS data sharing principles. The document must strike a delicate balance. While it must pursue a broad acceptance of the Data Sharing Principles, it needs to recognize that GEOSS is built from contributing systems, which are governed by rules and regulations that may be coherent with these principles only in part or not at all.

The document is generally successful in achieving this balance. The feedback we have received from national experts on data policy indicates, however, that it should be stated even more clearly though, that GEO does not aim at a legal, regulatory implementation, but merely presents guidelines. As an organization based on voluntary contribution, GEO should continue to adhere to its non-binding principle. The data sharing principles will gain importance through voluntary

adherence, which may or may not be accompanied with regulatory measures, e.g. at national levels.

In recognizing that GEOSS is built from contributions that are governed by very different rules, attempting to enforce complete compliance with the GEOSS data sharing principles may be difficult and hamper inclusion of many potential systems. In order to allow more systems to be contributed, compromises will be necessary, particularly initially. As experience with the implementation of the data sharing principles is gained, an acceptable compromises may be categorized by data types – similar to the approach adopted in the INSPIRE directive, which differentiates by data types listed in its Annexes.

Finally we want to add a detailed comment regarding the paragraph on personal privacy (starting in line 1041): Line 1045 refers to privacy protection in the EU, but references the Council of Europe. We recommend differentiating between the EU and the Council of Europe and the fundamental regulations (Directive 95/46/EC on the protection of personal data and resolution No. 108 of the Council of Europe).

Response: We agree regarding the suggestion to differentiate between the EC and Council of Europe protections of personal privacy and this change has been made in the White Paper.

10. Comments from the European Commission, sent 2 July 2008

The White Paper on the GEOSS Data Sharing Principles

It is recognised that as it matures, the White Paper is developing into an excellent document covering issues related to data policy in the Earth Observation domain in a very thorough and even –handed manner. And whilst describing the various options, it makes a clear case for supporting the implementation of the GEOSS Data Sharing Principles (DSP) within the framework of the GEO.

The development of the White Paper can be seen, for example, in Section IV, *IMPLEMENTATION ISSUES FOR GEOSS DATA SHARING PRINCIPLES, Part A. Policy Implementation Issues, Sub-section 1. Alternative approaches for implementing the data sharing principles*. The text reproduced below from the current version of the White Paper proposes a position that recognises the "nature and spirit" of the GEO. This represents a considerable shift in the White Paper from the original version which outlined a very formal legalistic approach based upon the implementation of a "data policy" through enforcement measures.

*1340 Internationally agreed guidelines on a minimum set of common policies. Between the
1341 maximalist and minimalist implementation options outlined above, the data sharing
1342 principles can be implemented via international guidelines, perhaps through a MOU that
1343 promotes best practices and strongly encourages, but does not mandate, adherence.
1344 Desired actions can be encouraged through education, financial assistance, technical
1345 assistance, peer influence and other inducements. The advantage of this approach is that
1346 the Member States retain their full autonomy and can implement these guidelines and
1347 practices in their national jurisdiction in whatever way they want. Participating
1348 Organizations can also be parties to a MOU. The disadvantage is that the guidelines
1349 might not be fully implemented and would be less well enforced than under a mandatory
1350 policy.*

1351

*1352 As a practical matter, however, this type of internationally agreed approach could be the
1353 only one of the options that is acceptable. It is counter-productive to enforce or otherwise
1354 make mandatory anything in an environment where all contributions are voluntary or
1355 “best efforts,” and where the governing body is operating in a non-legally binding
1356 manner. While the participation in and contributions to GEOSS are not legally binding,
1357 the presumption must be that the GEO Member States and Participating Organizations
1358 are taking part in good faith and will do all they can to make data sharing successful and
1359 productive.*

Hence, whilst it is necessary to continue scrutinising the White Paper in detail, the major focus of the EC's remarks at this time is on the Draft Implementation Guidelines for the GEOSS DSP.

The Draft Implementation Guidelines for the GEOSS Data Sharing Principles

During the first part of 2008 CODATA, the main authors of the White Paper, sought feedback on whether the White Paper should be divided into two:

1. A short document containing the suggested Implementation Guidelines, so that they can be reviewed as a stand-alone document, and
2. The draft of the full White Paper, containing the background and rationale leading to the Implementation Guidelines.

The response received was to support the proposal to have a short document setting out the proposed Implementation Guidelines, supported by the White Paper and its Annexes.

When looking at the Declaration from the GEO Ministerial Summit in Cape Town and the following statement: "*We support the establishment of a process with the objective to reach a consensus on the implementation of the Data Sharing Principles for GEOSS to be presented to the next GEO Ministerial Summit*", then this essentially calls as a part of the process for a document setting out proposals on Implementation Guidelines. It is therefore a logical step to divide the original White Paper into two documents and the EC supports this development.

The GEOSS Data Sharing Principles, as set out in the GEOSS 10-year Implementation Plan, are reproduced below:

1. *There will be full and open exchange of data, metadata, and products shared within GEOSS, recognizing relevant international instruments and national policies and legislation.*
2. *All shared data, metadata, and products will be made available with minimum time delay and at minimum cost.*
3. *All shared data, metadata, and products being free of charge or no more than cost of reproduction will be encouraged for research and education.*

The main difficulty that the EC perceives in the draft Implementation Guidelines is that the authors of the White Paper have problems in reconciling the first part of the first GEOSS DSP, "*There will be full and open exchange of data, metadata, and products shared within GEOSS*", with the second part, "*recognizing relevant international instruments and national policies and legislation*".

There is no doubt that the second clause can place restrictions on the "full and open exchange of GEOSS data". It is equally clear that the inclusion of this clause was necessary to enable many GEO Members and Participating Organisations to endorse the GEOSS 10-year Implementation Plan. The unconditional "full and open exchange of GEOSS data" would have violated a number of very well known data policies that do place certain restrictions on access to data. The recognition of such restrictions has allowed organisations such as WMO, for example, to contribute data to the GEOSS in compliance with applicable data policies.

Whilst the authors of the White Paper now recognise the restrictions arising from the second clause of the first GEOSS DSP, it is the view of the EC that they nonetheless try to "separate" the two parts in the DSP Implementation Guidelines. Whilst this is done for the best of motives, i.e. to promote "full and open exchange of GEOSS data", it does mean that the DSP Implementation Guidelines effectively "rewrites" not only the GEOSS DSP, but other sections of the GEOSS 10-year Implementation Plan.

The 1st Implementation Guideline is currently described as follows:

Promoting implementation of the GEOSS Data Sharing Principles through the full and open exchange of data.

1) *In order for a system to become an official component or element of GEOSS, it needs to provide “full and open” access to data, metadata, and products consistent with the GEOSS Data Sharing Principles and with other technical requirements established by GEO.*

This should be contrasted with the GEOSS 10-year Implementation Plan which states at Section 5.2 that *"The GEOSS will be a distributed system of systems, building step-by-step on current cooperation efforts among existing observing and processing systems within their mandates, while encouraging and accommodating new components. Participating members will determine ways and means of their participation in GEOSS."*

Hence there is no requirement in the GEOSS 10-year Implementation Plan that *"In order for a system to become an official component or element of GEOSS, it needs to provide “full and open” access to data"*.

It is the view of the EC that care must be taken, therefore, when drafting the DSP Implementation Guidelines that they do not go beyond what has been endorsed by GEO Members in the GEOSS 10-year Implementation Plan.

The European Commission would therefore propose that these draft DSP Implementation Guidelines should be redrafted along the lines set out in the following pages. To assist the authors, we have included a version showing the proposed amendments to the text in track changes, followed by a "clean" version of the text.

Please note that the European Commission may have further comments to make on sections 4, 5, 6 and 7 when reviewing future drafts.

In closing, the European Commission would stress that the emphasis must be on **promoting** the benefits of full and open access to GEOSS data through a process that engages directly both data providers and data users.

[The EC’s suggested revisions to the text follow.]

THE DRAFT IMPLEMENTATION GUIDELINES FOR THE GEOSS DATA SHARING PRINCIPLES

As derived from the GEOSS Data Sharing Principles White Paper dated 17 May 2008.

Proposed modifications to the Draft Implementation Guidelines from the European Commission

11

12 According to the Global Earth Observation System of Systems (GEOSS) 10-Year
Implementation

13 Plan, the purpose of GEOSS is “to realize a future wherein decisions and actions for the
benefit

14 of humankind are informed via coordinated, comprehensive and sustained Earth observations
and

15 information.” GEOSS is seen by its participants as an important contribution to meeting the

16 United Nations Millennium Development Goals and to furthering the implementation of

17 international treaty obligations. The system will encompass all areas of the Earth, with a
18 particular emphasis on addressing the needs of developing country users. GEOSS will
incorporate

19 in situ, seaborne, airborne, and space-based observations and address the integration of

20 observations with models to support nine societal benefit

21 areas.

22 The GEOSS 10-Year Implementation Plan explicitly acknowledges the importance of data
23 sharing in achieving the GEOSS vision and anticipated societal benefits. The Plan, endorsed
by
24 nearly 60 governments and the European Commission at the 2005 Third Earth Observation
25 Summit in Brussels, highlights the following GEOSS Data Sharing Principles:

26 **1. There will be full and open exchange of data, metadata, and products shared
within**

27 **GEOSS, recognizing relevant international instruments and national policies and
28 legislation.**

29 **2. All shared data, metadata, and products will be made available with minimum
time
30 delay and at minimum cost.**

31 **3. All shared data, metadata, and products being free of charge or no more than cost
of
32 reproduction will be encouraged for research and education.**

33 All members of GEO are required to endorse the Plan and therefore these Principles. The
34 Plan notes that “use of data or products does not necessarily imply agreement with, or
35 endorsement of the purpose behind the gathering of such data.”

36 In 2006, the GEO Secretariat requested the Committee on Data for Science and Technology
37 (CODATA), an interdisciplinary committee of the International Council for Science (ICSU),
to

38 recommend implementation guidelines and draft a background white paper. Based on the
39 CODATA Task Group’s analysis of the GEOSS 10-Year Implementation Plan, applicable
40 international agreements and practice, and extensive consultation with experts on data policy
41 from around the world, the following guidelines are proposed for further consideration by
GEO

42 Members and Participating Organizations in implementing the GEOSS Data
43 Sharing Principles.

NP GEOSS is envisioned as a system of systems that can deliver integrated data and
53 information as rapidly as possible to meet important user needs. Therefore, it is important that
54 the component systems of GEOSS interoperate seamlessly with each other and with the
55 fewest possible constraints on the sharing and integration of data and information (i.e.,
56 metadata and data products). To achieve this, it is vital for data and information providers who
57 share the goals of GEOSS to participate actively in the system.

NP The GEOSS Data Sharing Principles use the term “full and open
60 exchange” of data as the guiding **principle**, which has been used in various public
international

61 and national environmental projects and research over the past two decades. In this context,
62 full and open exchange means that data and information derived from publicly funded
63 activities are made available with as few restrictions as possible, on a nondiscriminatory basis,
64 for no more than the cost of reproduction and distribution. By agreeing to the GEOSS Data
65 Sharing Principles, system operators and other providers allow those data, metadata, and
66 products that they contribute to GEOSS to be shared under clear, predefined terms, consistent
67 with these Principles and Implementation Guidelines.

NP It is important to emphasize that the successful implementation of the Data

44 Sharing Principles will depend
45 upon promoting the benefits of full and open access to GEOSS data through a process
46 that engages directly both data providers and data users.

47 Promoting the full and open exchange of data in accordance with the GEOSS Data Sharing Principles .

1) For GEOSS to realize its vision and potential, it is essential to promote the full and open exchange of metadata, data and products in accordance with the Data Sharing Principles

(Insert into the text what was Implementation Guideline 8, Developing effective coordination and outreach mechanisms for implementing the GEOSS Data Sharing Principles.

308 **a) In order to implement the GEOSS Data Sharing Principles successfully, GEO should**
309 **establish an internal organizational structure for promoting the established policies vis**

310 **à-vis the data providers and users.** The success of GEOSS depends to a large extent on
311 establishing and maintaining data dissemination process and activities founded on the agreed
312 Data Sharing Principles. The Members and Participating Organizations, supported by the
313 GEO Secretariat, therefore need to develop a comprehensive implementation plan that is
314 consistent with the Principles and Implementation Guidelines. This will require consultation
315 with all major GEOSS stakeholder groups and continuing outreach efforts.

316 **b. GEO should consider developing procedures to encourage the adherence of GEOSS**
317 **elements to the GEOSS Data Sharing Principles.** For any data sharing system to be

318 successful, user expectations regarding data accessibility and usability need to be met on
319 a consistent basis. Users—and the GEO purpose—will become frustrated if the

320 exceptions start to become more prevalent than the rule. Since the GEOSS Data Sharing
321 Principles set a high standard for data access, it is important for GEO to develop effective

322 mechanisms and procedures to encourage GEOSS elements to adhere to the Data Sharing
323 Principles.

111 Ensuring consistency with other national laws and policies and international
112 agreements.

113 **2) All GEO Member States and Participating Organizations must abide by various**
114 **specific**

115 **restrictions on the dissemination and use of data and information based on national**
116 **laws and policies and international agreements.** All participants in GEOSS must respect
national laws

119 and policies and international agreements in providing access to all of their data, metadata,
120 and products.

a) In order to promote these goals and to help provide greater

122 **knowledge about these issues within the GEOSS community, GEO should establish an**
123 **online**

124 **compendium of such laws, policies, and agreements.** Such a compilation would provide a
125 major service to both GEOSS providers and users alike.

Then continue with the rest of the old section 3, i.e.

125 **b. GEO should establish an overall focal point for coordinating the application of these**
126 **restrictions to avoid the development of a confusing array of vague and inconsistent**
127 **use policies and approval procedures**

134 **c. Each GEO Member State and Participating Organization also should consider**
135 **establishing an authoritative point of contact to coordinate information on and**
136 **interpretation of any restrictions applicable to its GEOSS elements.**

142 **d. GEO should consider utilizing machine-readable, common-use licensing approaches**
143 **for copyrighted data products that place primary responsibility for compliance on**
144 **the users rather than enforcing compliance through technical controls on data**
145 **access].**

68 Encouraging GEOSS users to reuse and re-disseminate shared data.

69 3) **It is essential that the full and open**

70 exchange of data called for in the Data Sharing Principles apply to GEOSS data,
71 metadata, and products even after such data are disseminated to users. Users need to be
72 able to integrate, reuse, and re-disseminate data and information with minimal
73 restrictions in order to achieve maximum results in the GEOSS societal benefit areas. Because
the value of data lies in their use, the users of GEOSS data

81 need the flexibility to reuse and re-disseminate the resulting data and information in order to
82 maximize their own uses, as well as the relevant secondary applications of such data and
83 information for the broad societal benefits. For example, data and information needed for
84 immediate humanitarian assistance after a natural disaster may also be vital to recovery and
85 reconstruction efforts that are undertaken by a wide variety of both governmental and
86 nongovernmental organizations.

87 a. GEO should encourage all GEOSS components that are developed and operated by
88 governmental, public-sector organizations to provide most, if not all, of their data

89 and information without any reuse or re-dissemination restrictions. Many countries
90 already have made commitments through their national laws and policies and in
91 international agreements to provide open and unrestricted availability for data from
92 various government-operated data systems. By encouraging all publicly funded
93 contributors of GEOSS elements to provide full and open access to their data and
94 information without reuse or re-dissemination restrictions, GEO will ensure the critical
95 mass of digital resources needed to make GEOSS an invaluable resource to the world.

96 b. To meet the full range of user needs identified as priorities by GEO, private-sector or
97 hybrid public-private systems should be encouraged to contribute at least a useful
98 subset of their data and information without any reuse or re-dissemination

99 restrictions. It is in the interest of all GEOSS components and participants to ensure that
100 the range and use of GEOSS data continues to expand, especially in developing countries.
101 Providing usable subsets of data and information without reuse or re-dissemination
102 restrictions from private or public-private data systems will not only help demonstrate the
103 value of those digital resources to existing and potential users, but could also provide
104 incentives for governments or other organizations to contribute new elements to GEOSS.

105 c. Attribution requirements should include recognition of all significant data sources
106 or authors, as well as the GEOSS component that enabled access to and delivery of
107 the data. Recognition is needed not only for the GEOSS participants that delivered data
108 or information to a user, but also to the original data sources or authors, in order to
109 provide greater incentives for such contributions. Recognition of contributions through
110 attribution will help provide incentives to participate in GEOSS.

Then continue with sections 4, 5 6 and 7. Please note that the European Commission may have further comments to make on these sections.

Responses

We agree with the EC suggestions and have implemented them, except in three instances, two of which were only suggested changes to the order in which the Guidelines are presented.

In Guideline #1, we did not delete the original text under the Guideline, as suggested by the EC, because the text on full and open exchange of data is the key concept in Principle #1 and requires further explanation in the Implementation Guidelines. The total deletion of that text does not appear to be warranted, without specific revisions or explanation, especially absent any similar critiques from other GEO Members. We did, however, agree with the suggested changes to the overarching Guideline and the boldfaced Guideline #1, and also added a sentence from the EC's review memo at the end of the text under the Guideline.

Moreover, we did not agree to move Guideline #8 under Guideline #1, because Guideline #8 deals with administration and oversight functions of GEOSS that we believe are properly placed at the end of the Guidelines, following the exposition of all the other functions related to the Data Sharing Principles.

Finally, we do not agree with switching the order of the existing Guidelines #2 and #3, because the current Guideline #2 is substantively linked to Guideline #1 and is more appropriate to keep in that order.

12. Consolidated US GEO Comments

These comments are divided into three parts. The first part contains overall recommendations, the second part is comprised of general comments that, wherever possible, contain a recommended wording change or action. The second part is a set of suggested wording changes, noted by line.

Overall Recommendation

The Co Data paper should be removed from the review process and from this point forward should only serve as the background paper. The guidelines document should be further developed and reviewed.

General Comments

1. The nine implementation guidelines explicitly mention many of the key factors required for international data sharing (i.e., timeliness, metadata, cost, etc.) However, there are some key topics that are missing in the implementation guidelines. The three GEO Data Sharing Principles which were ratified at the 2005 Brussels GEO Summit do not explicitly note these topics.
 - 1.1. The premise of the Implementation Guidelines assumes that the basic Earth observation systems are already in place with the appropriate observations being measured at the appropriate observing density. A statement to this effect was not found in the document.

RECOMMENDATION: Add a Preamble --- The Global Observing System is in a continual state of update, development, and evolution. We recognize that as new observing system components come on line it will be necessary to regularly revisit these data sharing principles. It is not the intent of this document to capture a set of guidelines and principles that remain inflexible as unanticipated breakthroughs in observing system capability emerge.

- 1.2. An important missing factor in the implementation guidelines is data quality. It is implicitly mentioned in guideline 5 which deals with timeliness of operational versus research data. The time delays of data are based in part upon the degree of quality control. Operational data should be delivered with minimal delays as a result of

automated Quality Control. Research data have a higher level of quality control. There are many levels of QC for research data and these are not addressed.

RECOMMENDATION: Add a Section on Data Quality. Consider the aspects of data quality control applied in real-time, near-real time, and retrospective uses. Discuss delays in data availability in context with levels of quality control, e.g., random errors, time dependent biases, etc.

2. It is proposed the implementation guidelines strengthen or broaden the scope of principle 3 by inserting "...will be encouraged *for environmental uses for the public good and for research and education.*"
3. USGEO understands that there is general consensus in GEO that data sharing principles for governmental and "public good", peaceful uses of data for societal benefit are needed to achieve the GEOSS benefit and vision.

USGEO applauds the explication of practical guidelines for achievement of this need. The implementation guidelines spell out a useful implementation roadmap to that end: that systems can be an official component of GEOSS only by provision of "full and open" access, that reuse is a crucial capability, and as part of this objective private-sector or hybrid public-private system providers can participate in GEO by providing a useful subset of these data without any reuse restrictions, and that pricing policies for GEOSS data, metadata, and products for public-interest use in the nine societal benefit areas be set at "minimum cost".

However, the third GEOSS Data Sharing Principle further encourages data, metadata, and products to be made available free of charge or no more than the cost of reproduction for research and education. It has been pointed out that this use is not a primary goal of GEOSS. Further, this usage restriction does place a restriction on much public-interest use in the nine societal benefit areas, and on reuse, restrictions that do not allow the full GEOSS public good use to achieve the desired vision.

- 3.1. RECOMMENDATION: While the implementation guidelines 1) encourage minimum cost to start with a default of cost of reproduction and distribution or marginal cost of fulfilling the user request, and 2) say GEO should encourage cost recovery models that waive or minimize costs for developing country applications and users not covered by the research and education Data Sharing Principle, USGEO suggests that the implementation guidelines could go further to clarify, and hopefully organizationally streamline or explain the relationship of these different points.

The reader of these guidelines who cannot study them deeply may focus on the facet of research and educational use (not the main goal of GEOSS) or discounts for developing countries. This could lead to dismay on the part of the user, and misunderstanding on the part of potential providers.

4. There are two documents available called the Strategic and Tactical Guidance documents. There is a sentence in there that says "Data providers may apply their own particular policies relating to supply and use of their data. However, data providers may be encouraged to do the best effort to apply above principles to meet the needs from each Societal Benefit Area." (p. 7 of the October 8, 2007 version). That seems to imply that a way forward is for member nations to take the three basic data sharing principles (p.2 of the CODATA paper; lines 26 –

32), use the background on data restriction issues to inform their internal debate, decide internally which data they will make available, and then contribute that data with the understanding that the principles apply. In other words, it is not the intention that all data, regardless of use or restriction, should be made available with further caveats on use, but rather that data that members first determine is useful then be available, with no restrictions on use.

4.1. RECOMMENDATION: At the very least, if the authors of the draft data sharing document have not seen the strategic and tactical guidance documentation, they should review that, and consider reconciling those two approaches.

Specific Comments

1. Lines 19-20: Change "...the integration of observations with models..." to "...the integration of observations and models..." Reasoning is that the individual observations will also be integrated among themselves as well as with models.
2. Line 26-32: This implementation document discussed two other additional guidelines that are not addressed by the three main principles listed here. These are developing metrics and an outreach mechanism. Could a fourth principle be added to cover these such as: 4. Appropriate metrics will be developed and coordination and outreach mechanisms will be implemented to monitor the effectiveness of these GEOSS Data Sharing Principles? (Note: later guidance indicated that changes could not be made to the three main principles)
3. Lines 97-99: Recommend wording change to state that the private sector should be encouraged to provide all original data free of charge and to contribute at least a subset of these products without any reuse or re-dissemination restrictions.
4. Lines 111-112: Recommend appending the following to the end of this sentence: "on the dissemination and use of data, metadata and products."
5. Line 114: Here and throughout the text there is a mismatch with some terminology that refers to data. In line 114 there is wording that states "data and information" Principles 1, 2, and 3 (lines 26-32) state "data, metadata, and products". Recommend that the terminology throughout the text be consistent with the lines 26-32.
6. Line 130: Change the word "useful" to "necessary"
7. Line 157: Mismatch with wording on "minimum cost." Recommend using the wording from Principle 3 (line31-32) "...free of charge or no more than the cost of reproduction..."
8. Line 158: Recommend the following rewording "...cost of access to data, metadata, and products from the system needs to be free of charge or at the cost of reproduction..."
9. Lines 184-185: Recommend changing "...will most likely apply..." to "...may apply..."
10. Line 195-197: Recommend a section be added or section d) be modified to address the issue that acquiring data, metadata and products online via the Internet is not complex compared to acquiring this same information by offline methods. This is discussed in section d (Lines 195-212) in the context of providing this information at a lower cost because the request is not complex. The concept of Internet access versus offline access applies to the cost recovery model for all of GEOSS and it is recommended that it be stated.

11. Line 224: Reducing time delays from making data available through GEOSS. Recommend including metadata and products with the word data.
12. Lines 227-229: This sentence describes the applications associated with operational data. Since this is an introductory paragraph that gives an overall description of the guideline, a corollary sentence is needed to describe retrospective applications of data.
13. Lines 232-246: These two subsections describe reducing time delays for operational systems and research data. It is not clear if retrospective data is covered and also whether operational and retrospective products that are developed are covered. Recommend adding a subsection or rewording subsections a) and b) to reflect this information.
14. Line 264-265: Can this section be combined with section 4d?
15. Line 273-274: Can this section be combined with section 7 on metrics?
16. Line 303: Reword "...planning for assessments..." to "... planning for metric and indicator assessments..."

Responses: We agree with all these comments and suggestions, and have made the suggested wording changes, except as follows:

In response to comment 1.1 and the recommended wording, we have implemented that only partially. We believe that the suggested wording is overstated, particularly the second sentence: "We recognize that as new observing system components come on line it will be necessary to regularly revisit these data sharing principles." The consensus principles, by definition, should not be regularly revisited and revised. If they are truly "principles" they should be long-lasting and generally impervious to incremental technological changes. We agree, however, that the Implementation Guidelines should be flexible.

With regard to comment 1.2, we agree that a guideline concerning data quality would be desirable. However, this should be added after the November 2008 GEO Plenary Meeting, because such a guideline should not be drafted in haste. Also, the data quality task group needs to be consulted in this.

Comment 2 cannot be implemented, because the 3 Data Sharing Principles were adopted by consensus of the GEO Members. They are a quote and can only be changed by a reopening of the plenary discussion and the development of a consensus revision.

Comment 3.1 requires further clarification and suggested wording before any revisions are incorporated.

We agree with Comment 4, but also believe that the Implementation Guidelines are already consistent with this suggestion. Specific wording changes need to be suggested, if this is not the case.

13. UNOSAT Comments

Line 267-272: One should encourage the sharing of value added data based on free GEOSS data to the largest extent in order to maximize the benefits for end-users. Especially programs and initiatives that are fully funded through public sector budgets should allow free sharing of value added data to the benefit of society.

Response: This paragraph deals with the IP issues, not the cost of access. The previous paragraph addresses the cost of access issues and defines what “full and open” exchange of or access to data means. Value added data by definition have greater value and there is not as much consensus on the costs at which the data are available. Therefore, we do not believe any further change is needed here.

Line 373: GEO should advocate for further discussion on what "reasonable cost" implies. It is today almost impossible for many developing nations to obtain copy of raw data sensed over their countries, as the cost is too high.

Response: We agree that the costs of data for developing countries need to be considered further, but this discussion in the White Paper describes what the U.N. Remote Sensing Principles do. Section 4.d of the Implementation Guidelines addresses the issue of data costs for developing countries

Line 1623: Although not concluded from the referenced meeting, it should also be argued that free data should be available for humanitarian not-for-profit applications in addition to the three points listed.

Response: As the comment correctly notes, the GEO Members did not come to this consensus conclusion. It is not appropriate to change the agreed list, which is a quote and the basis for the Implementation Guidelines. See also, our response to a similar suggestion in the Consolidated US GEO Comments, above.

14. Comments from DLR, Germany

Thank you for providing us with the latest redline versions of the data sharing implementation guidelines and the additional document outlining the next steps towards their approval.

We have reviewed both documents and can only commend what has been achieved now. The implementation guidelines are very well written and touch on all important points of the discussion. We do not feel that the document needs further work prior to consideration by the GEO Plenary.

Response: No further changes needed.

15. STC Comments Based on a discussion at its meeting on 8 September 2008)

K. Cass from ICSU–CODATA, on behalf of the DA-06-01 Task Team, presented to the STC, during its 8th meeting in Paris on 8-9 September 2008, the draft guidelines, together with the associated process, to implement the GEOSS Data Sharing Principles at the time of the GEO Ministerial in 2010.

The status of the ongoing activities, aimed at presenting a “white paper” on the implementation guidelines to the GEO Plenary V in November 2008, was also presented.

An in-depth discussion took place and its results are summarized in the following statement, agreed by the Committee Co-Chairs:

- Emphasis should now be given to implementation and consensus building. Enough work has been done so far on the White paper. Identifying actions to build consensus should be the priority.
- The principle of “free and open access” is fully supported. The key point is to agree on practical steps to get there. A variety of approach may be envisaged (GBIF has developed a specific policy to data publication - encouraging data sharing).
- The challenge for GEO is to agree and make available a framework that, implementing the will of GEO Members and Participating Organizations, will allow implementation of the principle of “free and open access”, whilst acknowledging the voluntary nature of contributions to GEOSS and recognizing "relevant international instruments and national policies and legislation".
- GEOSS Data Sharing Principles implementation should include provisions that are key to science, e.g., highest quality data, highest accuracy data, minimum cost for data sharing, minimum time delay for data sharing, and sharing of raw data and calibration metadata as appropriate for selected GEOSS SBAs.
- WMO resolutions n.40 (“WMO policy and practice for the exchange of meteorological and related data and products...”) and n. 25 (“Exchange of hydrological data and products”) are considered appropriate for research and scientific applications.
- GEOSS Data Sharing Principles implementation should incite the community to “take concrete steps towards...” rather than just “encourage to...”
- Any project contributing to GEOSS should recommend the use and application of GEOSS Data Sharing Principles.
- Data collection and availability are a pre-requisite to data sharing.
- Papers produced by the DA-06-01 Task Team for GEO Plenary consideration may have to be shortened.

Response: No changes were considered necessary in response to the points made in this summary of the STC discussion.