

Global Observing Systems Information Center (GOSIC) Review

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Summary and Purpose of Document

This document outlines the history, need for, and review of the Global Observing Systems Information Center (GOSIC) as a critical data portal discovery tool for the community of Global Climate Observing System users at <http://gosis.org>. It presents some background, an overview of the facility; and more recent progress and plans discussing the latest developments related to its role as a data portal in support of GCOS, GOOS, and GTOS. A more detailed history is chronicled in the Appendix. It is presented to the GCOS Steering Committee (SC) for informational purposes and in response to the recommendations from past reviews of GOSIC that encouraged such presentations. The last presentation of GOSIC to the GCOS SC was in 2003 and since then considerable progress and evolution have taken place. Since the GOSIC was chartered by the GCOS SC back in 1997, the intent was to provide periodic updates to the GCOS SC, and for one reason or the other this has not been the case for the past few years. At the GCOS SC-XVI meeting in 2008, it was agreed to re-establish that reporting linkage beginning at the GCOS SC-XVII meeting in 2009. To aid in better publicizing the GOSIC, a recently published cover article on it is referenced as follows: **Diamond, H. J., and C. J. Lief (2009), A comprehensive data portal for global climate information, *Eos Trans. AGU*, 90(39), 341–342, doi:10.1029/2009EO390001.**

ACTION PROPOSED

The Steering Committee is invited to note the information in this document with a view towards:

- Providing any advice and recommendations for improvements and/or enhancements to the GOSIC site.
- Endorsing the GOSIC as a viable and active data portal facility for the GCOS community of users and helping to better advertise its existence as a GCOS data portal.
- Becoming a proponent for the use of the GOSIC as a unifying facility for the GCOS, GOOS, and GTOS programs.
- Reinstating updates of the GOSIC at the annual SC meeting.

A. Background

In support of GCOS, GOOS, and GTOS, the GOSIC seeks to: (1) provide for searches for data and information across all participating Global Observing Systems data centers using the Internet; (2) return results regardless of the data format, or where the data are located; (3) provide results back in a standard easy-to-read, easy-to-understand format; (4) allow users to determine the type and quality of the data through documentation provided by the participating data centers; and (5) allow users to obtain data sets. The GOSIC does not in and of itself hold data. Rather, it maintains metadata (information about the data sets that are available in the three programs) and points to the data centers for the data and information. GOSIC does not create or modify the presentation of data. If the data centers identify the program that was the source of data and information on a database or product, then the acknowledgement will appear in GOSIC.

As such, a single entry point for users best serves the distributed nature of the Global Observing Systems data and information systems. As envisioned since its inception in the late 1990s, the GOSIC provides a central source to explain the Global Observing Systems data system and provides integrating overviews of the data, information and services that comprise the Global Observing Systems. GOSIC offers a search capability, optimized for Global Observing Systems data centers, to facilitate access to a worldwide set of observations and derived products. The transition of the GOSIC from its development to residence at an operational agency is a crucial step in making the GOSIC a realistic tool for all the global observing systems to use. The planned final two-year project at the University of Delaware will provide such an orderly transition to an operational center. The GOSIC has a relatively long history that is detailed in the Appendix to the paper.

In response to a need identified by the global climate observing community for easier and more effective access to observational climate data and information, the Global Observing Systems Information Center (GOSIC) was initiated in 1997 at the request of the Global Climate Observing System (GCOS) Steering Committee (GCOS, 1997). The GOSIC is an information center that manages an online portal which provides a central entry point for users of climate related global observing systems' data and information systems. The goal is to provide basic user services including a description of the systems and their data as well as a tailored search capability which facilitates access to a worldwide set of observations and derived products.

B. Overview

The unique value that GOSIC offers is its ability to quickly link users to a wide range of data sets that reside at multiple data centers around the world via a consistent and user friendly interface; the entry page for the GOSIC at <http://gosic.org> immediately gives users a robust choice of links to data, metadata, other search tools, and related climate observing information. Additionally, users can rely on the GOSIC staff to aid in ensuring that the portal is continually updated and kept relevant to ensure that data access to climate datasets are as up-to-date as possible. The initial development and implementation of the GOSIC was done at the University of Delaware from 1997-2006, and was then transitioned to the National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC) beginning in 2006. With agreement from the various global climate observing systems, in 2007, NCDC took over the operational responsibility for the GOSIC on behalf of the international climate observing and data user communities. While NCDC operates the GOSIC facility, we do so with an eye to accommodating the requirements of the greater international observing community.

The GOSIC portal does not in and of itself hold data, but rather serves as a data access service by providing a common access point to global and regional data sets and analyses for use in various aspects of climate research. The portal functions by maintaining metadata and pointers to the data centers to access data and information, and does not

create or modify the presentation of data. If data centers identify the programs that are the source of data and information on a database or product, then the acknowledgement will appear on the GOSIC portal. The GOSIC, in a collaborative partnership with NASA, uses the Global Change Master Directory (GCMD) at <http://gcmd.gsfc.nasa.gov> to provide users with metadata on a variety of global observational data sets. In general the GOSIC portal seeks to: (1) provide a capability to search for data and information across all participating global observing systems' data centers using the Internet; (2) return results regardless of the data format, or where the data are located; (3) provide results back in a standard easy-to-read, easy-to-understand format; (4) allow users to determine the type and quality of the data through documentation provided by the participating data centers; and (5) allow users to obtain data sets as easily as possible.

As envisioned since its inception, the GOSIC provides a central source to detail the various global observing systems by providing an integrated overview of the data, information and services that comprise each of the observing systems; and the real strength of the GOSIC portal comes from the overlap of the observing systems. For example, users can search for the data that the two observing systems have in common.

The GOSIC portal provides data and metadata search capabilities through various search mechanisms and matrices, which are optimized to facilitate access to a worldwide set of observations and derived products. For example, the GOSIC Portal Data Registry¹ provides quick access to data and information. In addition, the portal provides a comprehensive list of programs and related data sets for the various observing systems, as well as to regional alliances such as the Global Ocean Observing System Regional Alliances². The GOSIC provides support to regional observing systems by aiding in the establishment and maintenance of a web presence such as for the Pacific Islands regional GCOS program, and in developing data and information management and exchange capabilities. In response to user requests, a number of unique data access tools have been developed by the GOSIC in order to aid users in more easily getting to various datasets. Several matrices have been designed in order to provide quick overviews and access to data; one such matrix provides users with access to global observing systems terrestrial data by variable type (e.g., biodiversity, climate, coastal, land and water)³; while another one in development will provide access to global datasets via the 44 GCOS Essential Climate Variables (ECV)⁴. Given the importance of the GCOS ECVs to a number of climate monitoring applications, this matrix in particular, while still under construction, is proving to have a high degree of utility for a number of users and this will only increase as it evolves.

C. Functionality and Structure

The structure of the GOSIC's portal content is unique and provides tailored views back to the user that cannot be obtained using generic Internet search engines such as Google. Content and links are verified and kept up to date with the help input from various data centers, and the GOSIC also provides specific portal support for the World Data Center for Meteorology⁵. A unique product of the portal is the provision of data flow diagrams for several observing programs; these diagrams step users through the data transmission paths for several systems (including hot links to data centers) and has proven to be a popular feature on the site; an example is the data flow diagram for the GCOS Surface Network⁶. Subsequent user feedback has been very positive with respect to the implementation of these new data access tools. This diverse array of data access tools allows users to search for data by program, theme, variable, key word, data center and more. GOSIC's vision has always been to provide the most

¹ See <http://gosic.org/Datasets/ds-report.asp>

² See <http://www.gosic.org/goos/GRA.htm>

³ See http://gosic.org/ios/GTOS_observing_system.asp

⁴ See <http://www.wmo.ch/pages/prog/gcos/index.php?name=essentialvariables>

⁵ See <http://www.ncdc.noaa.gov/oa/wdc/index.php>

⁶ See <http://gosic.org/gcos/GSN-flow.htm>

comprehensive and easily accessible tools to access, compile, and integrate environmental observation data sets on behalf of a diverse set of customers (e.g., scientists, policymakers, students, and the general public).

Recently, the GOSIC has begun working with the Group on Earth Observations (GEO) Portal at <http://www.geoportal.org/>. The GOSIC Data Registry is now available as a data access service on the GEO Portal in order to aid in accessing data related to the GEO's 9 Societal Benefit Areas: Agriculture, Biodiversity, Climate, Disasters, Ecosystems, Energy, Health, Water, and Weather. The GEO Portal is intended to provide one of the most comprehensive, data discovery, access, retrieval and delivery systems. This site has been implemented to work with, and build upon, existing national, regional, and international systems. The GOSIC works with the GEO Portal to aid in providing comprehensive, coordinated, Earth observations from thousands of services, instruments, collections, libraries and catalogues worldwide, transforming the data collected into vital information for society. The GOSIC Portal for climate information is a proactive and flexible facility that has as its goal providing users the most efficient and effective access to a diverse array of climate data and information from around the world.

D. Summary

In summary, the success of the GOSIC is dependent upon, and has benefitted from, feedback from users, in order to assure that it remains as a relevant, effective, and efficient tool for data access to a wide variety of users. The GOSIC is constantly evolving to help meet users' data access needs, and people are encouraged to utilize the portal site and provide feedback to the staff. The GOSIC staff is quite open to incorporating new features and improving existing ones, as well in collaborating with other global environmental data access activities. Therefore, people are encouraged to visit the GOSIC Portal at <http://gotic.org>, use the tools there, and provide feedback on any possible improvements we might be able to incorporate to improve the access to climate data and information.

The GOSIC's overriding goal is to best serve the data access needs of all of GCOS (atmosphere, ocean, and terrestrial), and as such, we believe that serves as a data portal for GCOS. That in no means that it is the sole route to such data, however, the GOSIC has the potential to serve as a unifying facility for GCOS that reaches across the various domains and gets GCOS out of the mold of being perceived as being only about the GSN and GUAN. The GOSIC facility also helps GCOS reach out to the greater GEOSS community as well by having established linkages in the GEOSS Data Registry as well as membership on the GEO Data Architecture team dealing with data integration and analysis (GEO task DA-09-02a).⁷

The GOSIC facility exists to serve the data access needs of the entire GCOS, GOOS, and GTOS communities and as such we are very open to suggestions to make things better and tailored to the needs of our users. So we encourage people to become users and take advantage of this service. If GOSIC suffers from one thing, it is a lack of publicity – once people learn about it, they are usually quite satisfied with its features. One thing we hear many times from people is how such a portal needs to be developed, and so we hope that the GOSIC will fill that need for people, and that is why we believe the GCOS Steering Committee saw fit to first commission this effort back in 1997. The GOSIC has evolved considerably since then and we believe it is a mature and relevant tool for the community to take advantage of, and so we would encourage you not only to use it, but to be a proponent of it as a unifying facility on behalf of all the observing domains of GCOS.

⁷See http://geossregistries.info/geosspub/component_details_ns.jsp?compld=urn:uuid:24b7f5e8-ccd1-4b9d-82ad-e9fa8a0811be

Appendix – GOSIC History

(1) **GCOS Publication 11 of the GCOS Data and Information Management Panel, first session**, *Washington DC, USA, February 7-10, 1995*, first noted that a GCOS Information Center could be useful as a centralized or distributed activity to help users by providing an “Ombudsman” function to provide access to a directory of climate data and information on GCOS programs and plans, prepare documentation on the system, and to establish a bulletin board to facilitate communication between research and operational communities, including plans for data collection.

(2) **GCOS Publication 25, the Report of the GCOS Data and Information Management Panel, second session**, *Ottawa, Ontario, Canada, May 14-17, 1996*, invited sponsors and participating agencies (members of GCOSnet) to host the GCOS Information Center with a Terms of Reference intended to:

- Help users; provide a GCOS “Ombudsman” function;
- Provide access to a distributed directory of climate data and information, including links to the datasets;
- Provide information on GCOS programs and plans including an inventory of data centers, sources, and experts;
- Collate and maintain the requirements for data and information for use by GCOS bodies and panels;
- Prepare documentation on GCOSnet;
- Maintain links to the data and information aspects of the major climate research and operational observing programs;
- Maintain a bulletin board to facilitate communication between research and operational communities, including plans for data collection;
- Support the Technical Advisory Group in the dissemination of information about standards and procedures.

(3) **GCOS Publication 39, the Report of the GCOS/GOOS/GTOS Joint Data and Information Management Panel, third session**, *Tokyo, Japan, July 15-18, 1997*, further called for the establishment of a Data and Information Service with objectives similar to those listed above, with the added incorporation of the non-climate elements of GOOS and GTOS. The vision for GOSIC was for it to be part of a distributed data and information system that would allow users to locate and access data and information holdings at participating centers. The GOSIC would provide search capabilities and access to a world-wide set of observations and information; it would point to other centers and systems; it would provide access to data, but would not hold data itself.

(4) At the **GCOS SC-IX** session in Beijing in September 2000, Dr. Ferris Webster made a presentation on the status of GOSIC and the pending dissolution of the JDIMP; he was looking for guidance from the Global Observing System community in providing guidance for the further development of GOSIC. It was decided then to pull together a review panel to do just that and the Global Ocean Observing System Steering Committee took the lead in that endeavor. Subsequently, in April 2001 such a review took place. A report of the review is available at http://www.gos.udel.edu/gosic/GOSIC_review_report.htm. The review was quite positive on the use of GOSIC and a number of positive recommendations were made and carried out.

(5) At the **GCOS SC-XI** session in Melbourne in April 2003, there was an active discussion of the GOSIC; this discussion led to the call for the second review of the GOSIC that was conducted in October 2003. The discussion also involved some very important points that the SC must resolve in seeing whether the GOSIC should continue as a viable facility.

The key areas of discussion from SC-XI were as follows:

- From the AOPC standpoint GOSIC is viewed as being duplicative of what is already going on at the various data centers; AOPC's view is that GOSIC takes resources away from resources for data access and management that should be done at data centers. The Google search engine is believed to be a better way to get to data, and in fact GOSIC is viewed as taking resources away from data center activities and does not fit in with the AOPC data management plans. While GOSIC was thought to have had its place several years ago when one-stop-shops were a legitimate way to get to data, they believe that the distributed nature of data holdings makes GOSIC irrelevant and duplicative today. It was deemed difficult to get people to devote the resources necessary to ensure that the content of GOSIC is current.
- From the OOPC standpoint, the GOSIC does not solve the problem of the need for a data base solution that takes individual data sets and compiles them into a usable data product vis-à-vis what is done with the World Ocean Database. However, the OOPC Chair also indicated that it is probably difficult for a committee of specialists to pass judgment on a data access facility that may be used by non-specialists.
- The issue of the irrelevance of the GOSIC was raised in relation to exactly what the GOSIC audience is getting out of it. While GOSIC is maintaining quantitative statistics on access, there is no indication on who this audience is and what utility GOSIC is providing them; it would be good to know more about the makeup of the GOSIC constituency and what benefit(s) they gain from it.
- While data access seems to be irrelevant, some indicated that the GOSIC provides a facility for getting information on areas such as requirements and documentation in a manner that is not provided via other facilities. The GCOS SC Chair indicated that the SC has fallen down on the job of providing better guidance to the GOSIC and needed to rectify that.
- There was a discussion on the continued (and undesirable) use of the G3OS terminology, and this is something that has already been addressed.
- The GOOS Steering Committee has endorsed the progress of the GOSIC, and Bill Erb from I-GOOS indicated that GOOS will be participating in another review of GOSIC, and that perhaps judgment should be withheld until such a review. In fact the GOOS SC has endorsed the GOSIC as being a useful application. The GCOS SC chair indicated that a representative from GCOS should participate in this review. Howard Diamond did this the last time in 2001, but given his sponsorship of the GOSIC it was believed that it was inappropriate for him to continue in this review capacity. The eventual representative from GCOS was Stefan Rosner from the GSN Monitoring Centre at the DWD.
- One important point that Howard Diamond brought up was the intended use of the GOSIC to as an engine for a regional data portal facility for the Pacific Region. As a wholly owned utility of the region under the auspices of the GOSIC, such a regional portal facility has great potential value to serve as a central clearinghouse for gathering hard-to-obtain national atmospheric, oceanic, and terrestrial climate related datasets.
- Such a Pacific Data Portal will serve as a tool for the GCOS regional program officer to better administer GCOS in the region, as well as providing a focus for applications such as a virtual Regional Climate Center, which will be pulling resources together across the region to bring climate resources to bear on regional climate applications. Neil Plummer of BoM and Andrew Matthews of NIWA supported this GOSIC function for the Pacific Region.

(6) The key recommendations from the **second GOSIC Review in 2003** (Annex I, p. 8) that the GCOS SC should address revolve around the provision of annual guidance, review, and endorsement of the GOSIC to provide input on the transition of GOSIC to an operational center. Since the last review in October, the GOSIC has gained tremendous ground from a GTOS-perspective and GTOS has begun using GOSIC as the engine of its data management activities. The Review Team, in which GCOS participated, concluded the review with a generally positive evaluation of GOSIC. The team believed that GOSIC performed a necessary service and should be continued; no reviews of GOSIC have to date come up with any opinion or finding contrary to that.

(7) With the concurrence of the secretariats from GCOS, GOOS, and GTOS, the GOSIC was transitioned from a developmental effort to at the University of Delaware to a sustained operational status at NOAA's National Climatic Data Center (NCDC) in 2007. NCDC views the GOSIC as being applicable to a wide and diverse set of observing systems beyond GCOS, GOOS, and GTOS. Given the recent progress made concerning the Group on Earth Observations, the GOSIC has also been involved in work related to the GEOSS Data Portal.