

GLOBAL OBSERVING SYSTEMS INFORMATION CENTER (GOSIC) A PORTAL FOR GEOSS RELATED DATA & INFORMATION

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ABSTRACT

The Global Observing Systems Information Center (GOSIC) provides a broad spectrum of users with a centralized resource to aid in finding international observing system datasets and related information in a consistent fashion across a diverse array of international data centers and atmospheric, oceanic and terrestrial observing domains. A variety of data access tools are provided for data discovery and retrieval such as the Global Terrestrial Observing System Data Access Matrix.

Index Terms— global, data, GCOS, GOOS, GTOS

1. INTRODUCTION

The Global Observing Systems Information Center (GOSIC) provides a single point access to data and information, observational requirements, data flows, and products within the three global observing systems: the Global Ocean Observing System (GOOS), the Global Climate Observing System (GCOS) and the Global Terrestrial Observing System (GTOS). The GOSIC has focused on providing a variety of user friendly data discovery tools on its web site that provides users with an integrated overview of data sets within programs and networks and provides access to data sets with minimal amount of steps. The unofficial motto of the GOSIC is “*three clicks to the data*”. By that we mean that the most outstanding feature of the GOSIC is its ability to help users navigate hundreds of data centers across the globe and get to the data they want in an effective and efficient manner.

2. GOSIC BACKGROUND

The GOSIC was established in 1997 as a pilot project to develop methods for easy on-line access to the comprehensive base of Global Observing Systems data and information. Under a National Oceanic and Atmospheric Administration (NOAA) grant, the GOSIC was developed at the University of Delaware, College of Marine Studies, building on experience with information systems for international climate research programs. Guidance and evaluation of the GOSIC is provided by the Scientific

Steering Committees of the three observing systems. The GOSIC reports at these meetings and receives directions for further development. Formal performance reviews were conducted in 2001 and 2003 by groups appointed by each observing system, and the results of these were extremely helpful in shaping the form and function of the GOSIC. Since 2007 the GOSIC has become operational and is a facility operated by the U.S. Global Climate Observing System (US GCOS) program based at NOAA’s National Climatic Data Center (NCDC), and is run on behalf of the international observing community [see <http://gosic.org>].

3. THE MISSION AND ROLE OF GOSIC

The GOSIC’s mission is to provide a broad spectrum of users with a centralized resource to aid in finding international observing system datasets and related information in a consistent fashion across a diverse array of international data centers and atmospheric, oceanic and terrestrial observing domains. Access tools are provided for data discovery and retrieval of global climate, ocean and terrestrial data such as the Essential Climate Variable (ECV) Data and Ocean Data Access Matrices. These tools allow users to query data by theme, topic, program, temporal or spatial extent, key word(s), and data type. For example the thematic categories for Ocean Data Matrix access tools are: Ocean Surface Physical Data, Ocean Sub-surface Physical Data, Ocean Circulation and Currents, Sea Level and Ocean Topography, Surface Meteorological Observations, Ocean Chemical Data, Physical, Chemical and Biological Coastal Zone data, Sea Ice, Ocean Carbon data and Coral Reef Data. These categories are organized in the Ocean Data matrix on the GOSIC website. Users can query these data selecting between global, regional, historical, satellite, gridded or modeled. The result of the query will provide a list of data sets that can be accessed and downloaded. The GOSIC has developed tools with user input. Several of these data access tools are presently available on the GOSIC web site and several additional tools are in the process of being developed. Specifically the GOSIC:

- Functions as a central source for all global observing systems data and also provides information on observing requirements, operational

data systems, and access procedures for finding and obtaining global observing system data and products.

- Provides users with the ability to search for and identify the availability, processing status, location(s), and accessibility of relevant data.
- Provides users with metadata to determine if data meet their requirements in terms of content, coverage and quality. The GOSIC collaborates with the National Aeronautics and Space Administration's (NASA) Global Change Master Directory (GCMD) to provide metadata for the global observing systems data.
- Provides access to an integrating overview of the management and development of the three global observing systems programs, including observing requirements and standards and terms of reference of the panels and expert teams.

4. THE GLOBAL OBSERVING SYSTEMS: THE GCOS, GOOS AND GTOS

The GCOS, GOOS and GTOS are international programs that provide a systematic and comprehensive global set of observations that will allow participating nations to:

- Detect climate change at the earliest possible time
- Document natural climate change variability and extreme climate events
- Model, understand, and predict climate variability and change
- Assess the potential impact on ecosystems and socio-economics
- Develop strategies to diminish potentially harmful effects
- Support sustainable development

These three observing systems use a variety of observing methods, ranging from remote sensing platforms to *in-situ* measurements. The data encompass all components of the climate system including atmosphere, biosphere, cryosphere, hydrosphere and land surface as well as socio-economic relationships. Additionally, the observing systems get direction from existing operational programs such as the World Weather Watch and the Global Atmosphere Watch (GAW), and ongoing research programs, such as the Global Climate Precipitation Project, the Global Energy and Water Cycle Experiment, the Climate Variability and Predictability Program, and other elements of the World Climate Research Program.

5. SUPPORT OF REGIONAL OBSERVING SYSTEMS

The GOSIC supports regional implementation of the observing systems. The GOSIC designed and implemented the Pacific Islands (PI) GCOS, GOOS and the Pacific Hydrological Climate Observing System (HYCOS) web sites on a Pacific Island Server. Several PI Meteorological Services choose to host their web site on this server as well with the support of GOSIC. In addition, the GOSIC provides support with hardware, software and training. The PI-GCOS web site, along with the various PI Meteorological Services web pages, are online and publicly available at <http://pi-gcos.org>. The PI-GOOS and Pacific HYCOS web sites will be made public before the end of 2008. The GOSIC also supports and administers the US GCOS web site, as well as the World Data Center for Meteorology in Asheville [<http://wdca-meteorology.org>].

6. COOPERATION PROJECTS

The following list of cooperation projects demonstrates the utility that the GOSIC has on an international, regional, and national level in support of observing system data support.

- The GOSIC web site, in conjunction with the Intergovernmental Oceanographic Commission of UNESCO (IOC), provides updates of the GOOS National Commitments. These national summaries have been prepared based on GOOS national commitment statements, information obtained from national and international operational centers, principal investigators and various GOOS technical reports and form the basis for documenting national activities, tracking those activities, assessing whether they meet GOOS principles and are appropriate for GOOS. Summaries have been kept current in cooperation with GOOS National Contacts. Overviews of the growth (and in some cases the decline) in GOOS observational components (moorings, surface drifters, etc.) are also available, and more on this can be found at: <http://gosic.org/goos/GOOS-nat-commit.htm>
- The GOSIC cooperates with the NASA GCMD and links to the global observing data sets metadata. The GOSIC has a portal on the GCMD and is available at: <http://gcmd.gsfc.nasa.gov/KeywordSearch/Home.do?Portal=gosic&MetadataType=0>
- In cooperation with NOAA's National Centers for Environmental Prediction (NCEP), the GOSIC posts monthly updates of the Upper Air Height Inventory for the GCOS Upper Air Network (GUAN) stations. These updates are available at: <http://gosic.org/gcos/GUAN/guanrep.txt>

- While the GOSIC does not normally in and of itself store data, on occasion, the GOSIC will post data, and has done so in cooperation with GCOS' Atmosphere Observing Panel for Climate (AOPC) by making available the GCOS Surface Network (GSN) Overlap Data for several stations in Australia, Portugal and Pitcairn Islands (UK). Stations were physically moved from one location to another but gathered data at both locations for a period of time. Overlap data are posted and available for download: <http://gotic.org/gcos/GSN-overlap-data.htm>
- In cooperation with NCDC, the GOSIC has created inventory matrices listing all the GSN and GUAN datasets available at NCDC as well as GSN and GUAN inventories (<http://gotic.org/gcos/GSN/gsndatamatrix.htm>) and performance indicators. (<http://gotic.org/gcos/GSN/gsnperformanceindicators.htm>)
- In cooperation with the US GCOS program, the GOSIC is posting the survey reports and photos for the GSN and GUAN stations Renovation Project (<http://www.ncdc.noaa.gov/oa/usgcos/renovationprojects.htm>)
- In cooperation with GTOS, GOSIC created a data management and data access matrix that links to the GCMD for metadata as well as the Terrestrial Ecosystem Monitoring Sites (TEMS) database. This matrix can be accessed at: http://gotic.org/ios/GTOS_observing_system.asp

7. FUTURE DEVELOPMENTS

The GOSIC is now part of the GEOSS Data Integration Task DA-07-06. The GOSIC has developed data access and retrieval tools that can be beneficial to the Global Earth Observation System of Systems (GEOSS). These tools were developed with user input and have gotten positive reviews. The data access matrices have gotten particular attention as it provides the users with a quick overview of all data available and data can then be accessed with minimal steps making these very efficient data access and retrieval tools. As the GOSIC evolves it is planned to become part of the overall data management structure associated with the GEOSS.