GGOS Portal and Meta Data

Bernd Richter and Carey Noll

Federal Agency for Cartography and Geodesy
NASA Goddard Space Flight Center
The IAG Services already produce very important and valuable products to be promoted by GGOS
Each Service has its own Web site for data access
Fragmentation at national, regional and international level
Users get lost in mountains of information
• Promotion of all IAG products for Earth sciences and applications through the GGOS portal, as a department store for all IAG products
GGOS Portal: Tasks

Provide a unique access point for all products and information relevant in the framework of GGOS!

- Maintenance of a GGOS Web site:
  - general information (structure, components, news, announcements, publications, links, ...);
  - facilitate GGOS communication (calendars, bibliography, working group activities, meeting summaries, ...);

- Maintenance of a GGOS Portal & Clearinghouse):
  - Discovery: search data and service catalogues (local&external);
  - Metadata Editor: collect & manage metadata;
  - Viewer: display data;
  - Applications for data mining of GGOS products and data files, i.e. parse, merge, visualize and analyse data;
http://www.ggos.org => structure of home page, multiple entries to serve all interests

<table>
<thead>
<tr>
<th>GGOS Mission</th>
<th>Natural Hazards Themes</th>
<th>Main Geoscientific Themes</th>
<th>Main Geodetic Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services</td>
<td>Techniques</td>
<td>Applications</td>
<td>Instruments</td>
</tr>
</tbody>
</table>

Unified Analysis Workshop, San Francisco, December 11-12, 2009
GGOS Portal: Architecture

Users

Web browser

Applications

GGOS Portal

Metadata Editor

Web site

Discovery

Web services (e.g. WMS)

Servers

IAG services data

ISDC data

CDDIS data

IERS data

IERS Applications (e.g. CSW)

Metadata catalogues:
- products
- services
- ...

IAG services data

ISDC data

CDDIS data

IERS data

IERS Applications (e.g. CSW)

Unified Analysis Workshop, San Francisco, December 11-12, 2009
GGOS Clearinghouse architecture engineering viewpoint
The Global Geodetic Observing System (GGOS)

GGOS is the Observing System of the International Association of Geodesy (IAG). GGOS works with the IAG components to provide the geodetic infrastructure necessary for monitoring the Earth system and for global change research.

The GGOS Portal will provide a unique access point to all geodetic products. Thus, the Portal will emphasize Geodesy's contribution to Earth Observation for assessing geohazards and reducing disaster. The Portal consists of the GGOS Web site and the portal itself, comprising geoportal components like a clearinghouse, a map viewer, and a metadata editor.

The GGOS Portal is currently under development. The GGOS Web site will be launched in December 2009 and a first basic version of the portal will be available in the beginning of 2010.
Introduction

GGOS is the Observing System of the International Association of Geodesy (IAG). GGOS was established by IAG in July 2003. Since April 2004, GGOS represents IAG in the Group on Earth Observation (GEO) and GGOS is IAG's contribution to the Global Earth Observation System of Systems (GEOSS).

The international cooperation fostered by IAG has led to the establishment of the IAG Services, that provide increasingly valuable observations and products not only to scientist but also for a wide range of non-scientific applications. Considering this development in geodesy, the requirements of Earth observations, and the increasing societal needs, IAG initially created GGOS as an IAG Project during the IUGG meeting in 2003 in Sapporo, Japan. After the first two years devoted to the definition of the internal organizational structure of GGOS and its relationship with external organizations (the "Design Phase"), the Executive Committee of the IAG at its meetings in August 2005 in Cairns, Australia, decided to continue the Project. In the "Implementation Phase" from 2005 to 2007, the GGOS Steering Committee, Executive Committee, Science Panel, Working Groups, and Web Pages were established, and the Terms of Reference were revised. Finally, at the IUGG meeting in 2007 in Perugia, Italy, IAG elevated GGOS to the status of a full component of IAG as the permanent observing system of IAG.
Key Personnel

- **Director:** Dr. Michael Pearlman/CfA, USA
- **Associate Director:** Carey Noll/NASA GSFC, USA
- **Science Coordinator:** Erricos Pavlis/JCET UMBC, USA
- **Co-location Coordinator:** Zuher Altamimi/IGN, France
- **IAG Service Representatives:**
  - IGS: Steve Fisher/JPL
  - ILRS: Michael Pearlman/CfA, USA
  - IVS: Dirk Behrend/NVI/NASA GSFC, USA
  - IDS: Frank Lemoine/NASA GSFC, USA
  - IERS: Bernd Richter/BKG, Germany
  - IGFS: Steve Kenyon/NGA, USA
GGOS Website (draft)

GGOS Workshops

Currently planned/scheduled Workshops and sessions organized or sponsored by GGOS include past GGOS Workshops, which are documented through specific pages.

Forthcoming Workshops

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Location</th>
<th>Workshop page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.12.2009 - 11.12.2009</td>
<td>Unified Analysis Workshop 2009</td>
<td>San Francisco Area</td>
<td>&gt; more...</td>
</tr>
</tbody>
</table>

Past Workshops

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Location</th>
<th>Workshop page</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.09.2009 - 02.10.2009</td>
<td>Towards a Roadmap for Gravity Satellite Missions</td>
<td>Graz, Austria</td>
<td>&gt; more...</td>
</tr>
<tr>
<td>30.08.2009</td>
<td>16-th Meeting of the GGOS Steering Committee</td>
<td>Buenos Aires, Argentina</td>
<td>&gt; more...</td>
</tr>
<tr>
<td>23.05.2009 - 26.06.2009</td>
<td>GGOS Science Workshop 2009: A Joint DynaQlim/GGOS Workshop</td>
<td>Espoo, Finland</td>
<td>&gt; more...</td>
</tr>
<tr>
<td>April 2009</td>
<td>GGOS session at EGU</td>
<td>Vienna, Austria</td>
<td></td>
</tr>
</tbody>
</table>
The Global Geodetic Observing System Portal (GGOS Portal)

GGOS is the Observing System of the International Association of Geodesy (IAG). GGOS works with the IAG components to provide the geodetic infrastructure necessary for monitoring the Earth system and for global change research.

The GGOS Portal will provide a unique access point to all geodetic products. Thus, the Portal will emphasize Geodesy’s contribution to Earth Observation for assessing geohazards and reducing disaster. The Portal consists of the GGOS Web site and the portal itself, comprising geoportal components like a cleanroom, a map viewer, and a metadata editor.

The GGOS Portal is currently under development. The GGOS Web site will be launched in December 2009 and a first basic version of the portal will be available in the beginning of 2010.
Discovery

Simple search
Direct search link without additional specifications.

Advanced search
Refine your search with respect to space, category and time.

Assisted search
Our assistant will guide you through the advanced search to the results.
Viewer & Applications

GGOS map viewer
Web map viewer for GGOS related resources.

Time series viewer
Display time series of geodetic-geophysical time series.

Applications
Web based applications for time series data.

News
- Community White Paper for OceanObs09
- Second IGCP 565 Workshop took place
- GGOS 2020 Book published
- More

Meetings
- Unified Analysis Workshop 2009
- More
Overview of GGOS Products and Infrastructure

GGOS products are provided through the IAG Services. The Services maintain their own web sites with information on sites and products.

Infrastructure inventories:
- List of IGS/GNSS sites: http://igscb.jpl.nasa.gov/network/list.html
- List of IVS/VLBI sites: http://ivsc.gsfc.nasa.gov/about/org/components/ns-list.html
- Lists of correlated sites of all these services (IGS/ILRS/IVS/IDS): http://indigo.nasa.gov/sgp_locations_full_db_site.html

Product inventories:
- Inventory IGS: http://igscb.jpl.nasa.gov/components/compindex.html
- Inventory IAS: http://ias.dfgi.badw.de/index.php?id=31

Links to global reference systems and frames:
- International Terrestrial Reference Frame
- International Celestial Reference Frame

Links to regional reference systems and frames:
- African Geodetic Reference Frame (AFREF)
- Asia and Pacific Regional Geodetic Project (APRGP)
- Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP)
- European Position Determination System (EUPOS)
Metadata provide information about the identification, the extent, the quality, the spatial and temporal schema, the spatial reference and the distribution of data.

Metadata are capable of locating, evaluating, extracting, and employing the required datasets.
Metadata Standards

- Metadata standards are a prerequisite for interoperable and interdisciplinary search

- Choice of meta data catalogue
  - Directory Interchange Format (DIF) developed by NASA (Global Change Master Directory), focused on science, used by Marine Environmental Data Inventory (MEDI) or at GFZ
  - ISO 19XXX standards (widely used standard in GIS, WMO, …)
    - ISO 19115 Meta data
    - ISO 19119 Geographic information - services
    - ISO 19139 Data Exchange - XML schema implementation

- Interoperability by cross-mapping the different metadata standards
## Proposal for GGOS Core Metadata

<table>
<thead>
<tr>
<th>ISO19115 metadata entity set information</th>
<th>ISO No</th>
<th>Metadata elements</th>
<th>ISO core</th>
<th>GGOS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MD_Metadata</strong></td>
<td>2</td>
<td>Metadata file identifier</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Metadata standard name</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Metadata standard version</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Metadata language</td>
<td>c</td>
<td>c</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Metadata character set</td>
<td>c</td>
<td>c</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Metadata point of contact</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Metadata date stamp</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Scope to which the metadata applies</td>
<td>(o)</td>
<td>c</td>
</tr>
<tr>
<td><strong>MD_Identification</strong></td>
<td>360</td>
<td>Dataset title</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>361</td>
<td>Dataset short title</td>
<td>(o)</td>
<td>o</td>
</tr>
<tr>
<td></td>
<td>362</td>
<td>Dataset reference date</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>Dataset responsible party</td>
<td>o</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Abstract describing the dataset</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>33</td>
<td>Descriptive keywords</td>
<td>(o)</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Status</td>
<td>(o)</td>
<td>o</td>
</tr>
<tr>
<td></td>
<td>37</td>
<td>Spatial representation type</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>Spatial resolution of the dataset</td>
<td>o</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>39</td>
<td>Dataset language</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>Dataset character set</td>
<td>c</td>
<td>c</td>
</tr>
<tr>
<td></td>
<td>41</td>
<td>Dataset topic category</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>Geographic location</td>
<td>m</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>Vertical and temporal extent of dataset</td>
<td>o</td>
<td>m</td>
</tr>
</tbody>
</table>
Extension of SINEX Format by one block "FILE/METADATA":

- Consist of approx. 50 Metadata elements, ISO "recommended core elements"
- Compatible to GEO, GeoPortal.Bund (IERS)
GGOS WG on DIS will

- develop and provide suggestions for an uniform access to heterogeneous space geodetic and in-situ data and information systems
- evolve GGOS portal
- promote use of web standards and conventions
- support implementation of metadata management in the services for GGOS
- work on interoperability with other data bases and services i.e., interfaces for machine-to-machine communication
- align with GEOSS (Group on Earth Observations System of Systems) approach and methodology
Membership list:

- Bernd Richter chair / IERS
- Carey Noll chair / ILRS
- Wolfgang Schwegmann (03/2010) Portal manager
- Ruth Neilan IGS
- Laurent Soudarin IDS
- Dirk Behrend IVS
- Franz Barthelmes ICGEM
- Jean-Pierre Barriot ICET
- Sylvain Bonvalot BGI
- Lesley Rickards PSMSL
- Felicitas Arias BIPM
Global and interdisciplinary networks of data make high demands on data management in projects like GGOS and GEOSS.

Interoperability of data and services request the consequent use of standardized
- Meta data
- Data formats
- Web services

GGOS web & portal will provide the necessary technique.

GGOS WG DIS will support the GGOS web and portal development and the services.

but

the services have to provide the data and information.