CEOS Water Portal Project
<<Final Project Summary>>

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Contents

1. Goal
2. Concept
3. History
4. Data Partners
5. Available Data List
6. System Architecture
7. Future Plan for the portal
8. Lessons and Learned
1. Goal

Data centers (All over the world)

CEOS Water Portal

Data, use case, etc
Useful information

- non-Water Data (DEM)
- In-situ data
- In-situ data
- In-situ data
- Satellite data

Various Users
e.x.) river administrators

Facilitate communications among communities

Users (researchers)

Model calculation

Model Output Data

Register a Use case

Difficult (without any incentive)
2. Concept (1/2)

- CEOS Water Portal is:
  - A distributed data system component of DIAS (Data Integrated Analysis System)-Program
  - To provide “Easy to Access” service to users
  - To provide access to a whole variety of hydrological data and water relevant data scattered over the world
  - To connect the existing components like data centers, scientists and wide users.

- Multiple types of data are available such as:
  - In-situ data
  - Satellite data
  - Model output data
2. Concept (2/2)

1. Dataset Search
   - Category Search/Map Search
   - Connecting to 11 data centers and 2 catalog broker system

2. Dataset Access
   (Depend on the Server side function, ex. OPeNDAP server)
   - Data Subset (time, variables)
   - Data Download/Format conversion (NetCDF, ascii, GRIB (Modeloutput only))

3. Sharing Use Case
   - Use Case registration/browsing
3. History (1/2)

a. Sep., 2010 (WGISS30): Project was approved.

b. Major updates

- JFY 2011
  - New features: Compare service for MOLTS data, Registration service of use case
  - New Data Partners: FLUNEXNET (NASA/ORNL DAAC (FLUX data)) and NASA/JPL (GRACE level 3 data)

- JFY 2012
  - New Data Partners: GEMS/Water (In-situ data) and Deltares (In-situ data)
b. Major updates (cont.)

- JFY 2013
  - New User Interface
  - New Data Partners: NASA ECHO, CUAHSI

- JFY 2014
  - New Data Partners: NCEI and GEO-DAB
  - New System Architecture

- JFY 2015
  - User Authentication Function Change
  - New Dataset (NCEI Model data)
  - Modify the User I/F for GEO-DAB response
  - Choose a more useful Download URL for users.
4. Data Partners

- NASA/JPL (PO.DAAC) - Satellite Data
- NCAR - In-situ (FLUXNET) data
- NASA/ORNL - IN-situ (GPCC) data
- NOAA /ESRL - In-situ data
- NASA/ECHO - Satellite data
- NOAA /NCEI (New) - In-situ data
- NASA/GSFC - Satellite Data
- CEOS Water Portal
- GEMS/Water - In-situ data
- MPI - Model Output data
- CUAHSI - In-situ data
- GEO DAB - Model Output data
- NASA/ECHO - Satellite data
- GLOWASIS - Satellite data
- DIAS - Data Integration & Analysis System
- GEO Group on Earth Observations

Users:
- Search
- Download
- Use Case
- Registration/Browsing
## 5. Available Data List (1/2)

<table>
<thead>
<tr>
<th>Data Partners</th>
<th>Data Types</th>
<th>Variables</th>
<th>Server type</th>
<th>Server Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEOP</td>
<td>Satellite</td>
<td>PR, TMI, AMSR, AMSR-E, MODIS, GLI, SSMI, VISSR</td>
<td>Hyrax</td>
<td>University of Tokyo (Japan)</td>
</tr>
<tr>
<td>Model (MOLTS)</td>
<td></td>
<td>surface pressure, skin temperature, precipitation amount in hour, brightness temperature surface, specific humidity, u-component of wind, v-component of wind, etc</td>
<td>THREDDS</td>
<td>MPI (Germany)</td>
</tr>
<tr>
<td>Model (Grid ded)</td>
<td></td>
<td>Air pressure, surface air pressure, air temperature, precipitation rate, snowfall amount, etc</td>
<td>Blob</td>
<td>MPI (Germany)</td>
</tr>
<tr>
<td>In-situ</td>
<td></td>
<td>Surface Meteorological and Radiation Data Set</td>
<td>http link</td>
<td>NCAR (USA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flux Data Set</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soil Temperature and Soil Moisture Data Set</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meteorological Tower Data Set</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWCI</td>
<td>Model (MOLTS)</td>
<td>surface pressure, skin temperature, precipitation amount in hour, brightness temperature surface, specific humidity, u-component of wind, v-component of wind, etc</td>
<td>THREDDS</td>
<td>MPI (Germany)</td>
</tr>
<tr>
<td>In-situ</td>
<td></td>
<td>Precipitation amount, River discharge, River water level, etc</td>
<td>Hyrax</td>
<td>University of Tokyo (Japan)</td>
</tr>
<tr>
<td>NASA</td>
<td>Satellite</td>
<td>Airs level 3 data</td>
<td>Hyrax</td>
<td>NASA (GSFC)</td>
</tr>
<tr>
<td>NOAA (GPCC)</td>
<td>In-situ</td>
<td>Precipitation data</td>
<td>THREDDS</td>
<td>NOAA (USA)</td>
</tr>
</tbody>
</table>
## 5. Available Data List (2/2)

<table>
<thead>
<tr>
<th>Data Partners</th>
<th>Data Types</th>
<th>Variables</th>
<th>Server type</th>
<th>Server Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASA</td>
<td>Satellite</td>
<td>GRACE Level 3 data</td>
<td>THREDDS</td>
<td>NASA/JPL(PO.D ACC)</td>
</tr>
<tr>
<td>FLUXNET</td>
<td>In-situ</td>
<td>FLUX data Fluxes of carbon dioxide, water vapor, and energy exchange, etc</td>
<td>THREDDS</td>
<td>NASA (ORNL DAAC)</td>
</tr>
<tr>
<td>GEMS/Water</td>
<td>In-situ</td>
<td>Instantaneous Discharge, Dissolved Oxygen, Temperature, etc</td>
<td>WFS</td>
<td>GEMS/Water (CANADA)</td>
</tr>
<tr>
<td>GLOWASIS</td>
<td>Satellite Model</td>
<td>Precipitation, Air temperature</td>
<td>THREDDS</td>
<td>Deltares (Netherland)</td>
</tr>
<tr>
<td>ECHO Broker Service</td>
<td>In-situ Satellite Model</td>
<td>Various types of data via ECHO broker</td>
<td>OpenSearch</td>
<td>NASA (GSFC)</td>
</tr>
<tr>
<td>CUAHSI</td>
<td>In-situ</td>
<td>precipitation, humidity, discharge, oxygen, etc</td>
<td>REST/WaterML2, WaterOneFlow/WaterML1</td>
<td>CUAHSI (USA)</td>
</tr>
<tr>
<td>GEO DAB/GRDC</td>
<td>In-situ</td>
<td>River Discharge via GEO DAB</td>
<td>OpenSearch</td>
<td>GEO</td>
</tr>
<tr>
<td>NOAA/NCEI</td>
<td>In-situ</td>
<td>Air temperature, Precipitation, Air Pressure</td>
<td>THREDDS</td>
<td>NOAA/NCEI</td>
</tr>
</tbody>
</table>

あとで今年度追加分を追記
6. System Architecture

CEOS Water Portal (CWP) Client Component

- Dataset
- Granule

1. Dataset level catalog CMP (GI-Cat)
   - DIF

2. CWP Catalog Broker CMP (GI-Cat)
   - New Partners and updates for some datasets

3. Legacy catalog CMP
   - CEOP Gridded Model
   - CUAHSI Europe
   - GEMS/Water
   - CEOP MOLTS
   - AWCI MOLTS
   - CEOP Satellites (~2013)

Data Centers
- OPeNDAP Server
  - NASA AIRS
  - NASA GRACE
  - NOAA
  - GLOWASIS
  - FLUXNET
  - ISO19115/19139
  - AWCI In-situ

New Data Centers
- ISO-19115/19139
- OPeNDAP
- W*S
- OpenSearch, etc

Operation Flow
1 → 2 → 3

Data Access
- HTTP files
- OPeNDAP

Catalog Interface
- OpenSearch
- WaterOneFlow (WOF)
- CSW (view detailed catalog)

CEOS Water Portal (CWP) Client Component

Users

Download

Search

Subset(html) or File

File

@each data center
7. Future Plan for the portal

- The Tokyo-University team will operate the portal from April 1st, 2016.
- The URL may change on April 1st. This should be confirmed in a week or so.
- It is very likely that the portal will be used as it is (=without major improvement/development).
8. Lessons & Learned (1/2)

1. User communities
   a. We are data/service providers, engineers and system developers. **WE ARE NOT USERS.**
   b. How to collect user requirements/feedback is important.

2. Appropriate POC (Official and Technical) and enough preparation period for adding data partners.
   a. Internal coordination within each data partner agency may take very long time.
3. Use (de-facto) standards for I/F with data partners
   c. Easier implementation for both sides.

4. Continuous improvement on UI should be planned.
   a. Resource planning “in advance” is necessary.