The amount of hydrological data available from NASA remote sensing and modeling systems is vast and ever-expanding. However, one challenge faced by hydrologists is integrating the vast datasets of this data for and from data collected by end user communities. The Hydrology Data and Information Services Center (HDISC), part of the Goddard Earth Sciences DISC, has continually worked to better understand the hydrological data needs of different end users, to thus better be able to bridge the gap between data and end user communities. One effective strategy is integrating the data into user community tools and environments. There is an ongoing collaborative effort between NASA HDISC, NASA Hydrological Sciences Center, and CUAHSI to integrate NASA gridded hydrodata into the CUAHSI Hydrologic Information System (HIS).

**Hydrological Data at HDISC NASA**

- The goal of a land data assimilation system (LDAS) is to generate optimal fields of land surface states and fluxes and, thereby, facilitate research and development of Earth observing systems.
- NASA LDAS: Global Land Data Assimilation System (Mitchell et al., 2004)
- GLDAS: Global Land Data Assimilation System (H sidel et al., 2004)

Both LDASs and GLDASs data sets have recently been improved. With the development of more comprehensive and consistent data sets, GLDAS-2 data have been generated by using the Princeton meteorological dataset (Sheffield et al., 2006) and upgraded versions of Land Surface Models (LSMs).

**Table 1. Characteristics of the GLDASs and GLDAS products**

<table>
<thead>
<tr>
<th>GLDAS 1</th>
<th>GLDAS 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSM</td>
<td>Land Use Model (LULC)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.5° x 0.5°</td>
</tr>
<tr>
<td>Grid size</td>
<td>3.3 million cells</td>
</tr>
<tr>
<td>Data volume</td>
<td>1 terabyte</td>
</tr>
<tr>
<td>Data access</td>
<td>FTP</td>
</tr>
<tr>
<td>Data formats</td>
<td>GRIB, ASCII</td>
</tr>
<tr>
<td>Data access</td>
<td>Subscription-based</td>
</tr>
</tbody>
</table>

**Table 2. LSM model versions for GLDAS1 and GLDAS2.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Resolution</th>
<th>Parameters</th>
<th>Data availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOAH</td>
<td>0.5° x 0.5°</td>
<td>16</td>
<td>Subscription-based</td>
</tr>
<tr>
<td>Mosaic</td>
<td>1 km</td>
<td>150</td>
<td>Free public access</td>
</tr>
<tr>
<td>CLM</td>
<td>5 km</td>
<td>1000</td>
<td>Free public access</td>
</tr>
</tbody>
</table>

**GLDAS and GLDASs Data Access**

- All GLDAS and GLDASs data are accessible from the Hydrology Data and Information Services Center (HDISC) with several convenient data access methods.
- Use of the GLDAS 1 and GLDAS 2 data and model data is available can be found at Land Data Assimilation System Web site at [http://web.archive.org/web/](http://web.archive.org/web/).

**Gap between Data and End User Communities**

The hydrologic science community commonly requires data to be at specific geo-locations, often as time series. In order to retrieve a single point complete time series for one parameter, e.g., a user has to go through the entire data archive to find the data that contains the time series in the whole world of discrete spatial objects in geographical information systems (GIS) and associated time series and the world of continuous space-time data that is used in weather models, in remote sensing and for oceanographic use. GIS data has been popularly used for anchoring remote sensing data, along with related software packages and tools for handling GRIB files, some users from communities other than meteorology still have difficulty handling data in GRIB format.

**HDF** is a self-describing file format designed to store and organize large amounts of numerical data and for transfer of various types of data between different machines. Although it has been popularly used for anchoring remote sensing data, along with software packages and tools it is still a complicated data format to end user communities.

**Data Organization: Many variables one step too far, inefficient for time series retrieval.**

**Data Volume:** Vast and increasing. GLDAS/GLDAS estimated total around 20 TB

**Bridging the Gap (“Digital Divide”)**

- **HIDISC** has continued efforts to better bridge the gap between NASA data and end user communities.
  - Develop online visualization and analysis system that provides Time Series plot and ASCII output without users needing to download the data online.
  - Major service that provides parameter and spatial sub-setted files.
  - **GRADS** Data Server that provides parameter and spatial sub-setting and outputs data in binary and ASCII format for short time range.

**Effective strategy is integrating the data into end user communities tools and environments.**

- End user communities are specifically designed and implemented for their communities.
- Use of Community hydrodata in data collections for their communities.
- End users are more familiar with their tools.

**HIDISC ongoing efforts**

- **Integrate NASA Hydrodata into CUAHSI HIS.** (This postor focuses on this effort)
- **Integrate NASA NLDAS precipitation data into U.S. Environmental Protection Agency (EPA), Better Environmental Assessment and Planning (BEAP) databases.**
- **Integrate NASA NLDAS precipitation data into U.S. National Park Service (NPS), National Environmental Science Center (NESC), and National Park Systems (NP System).**

In collaboration with the Hydrologic Sciences Branch (HSB) at NASA GSFC and CUAHSI, the NASA HIDISC has integrated NLDAS hydrodata into CUAHSI HIS.

**Figure 1.** Schematic of Hydrodata access from CUAHSI HIS client. HydroData.

**Figure 2.** NASA Hydrodata Service for NASA data access published at registered public data service at CUAHSI HIS.

**References**


**Future Improvement**

- **The prototype NASA Web server is built on GDS for parameter and spatial subsetting and time slicing.** Due to the limited web session time and performance of GDS, limit time range is limited to 240 time steps. For performance reason, this limitation should be lifted.
  - The data need be reprocessed and archived for optimal time series retrieval to remove the limit on the maximum number of retrievable time steps.
  - Data service should be improved for serving time series more efficiently.
  - A better framework for presenting and handling site information for griddata should be developed.
  - Making grid point data available, with more informative site names.
  - Making of grid point data available, with more informative site names.
  - Monitoring grid point data over oceans, waters, so land grid data is listed.
  - All grid point data on other grid point data.

**Conclusions**

- The gap, or “Digital Divide,” between NASA hydrological data and the geophysical community is a longstanding one and will still be bridged. The key to bridging this gap is by providing useful and understandable data used by the geophysical end users, which is a central focus of the NASA HDISC.

- To bridge the gap, one effective strategy is integrating the data into user community tools and environments.

- In collaboration with CUAHSI HIS, NASA HDISC has integrated NLDAS hydrodata into CUAHSI HIS, which has already demonstrated the potential of customized Web services for enhanced access to and use of NASA data.