GCMD OpenSearch

What is OpenSearch?

OpenSearch is a standard defined by **http://opensearch.org**. (http://www.opensearch.org/Specifications/OpenSearch) It is used for describing search interfaces and for advertising search interfaces in a self-describing way to both software and people. GCMD uses OpenSearch to advertise the availability of our search interface and to advertise how to build a search request.

Background

The GCMD OpenSearch implementation was originally implemented to improve web browser integration (via custom search sites) with the GCMD website. The Open Search implementation was then expanded to address the requirements of API implementers interested in GCMD/IDN distributed searches. In both cases, OpenSearch was used to expose the existing GCMD Search Language as well as "free text" search.

Metadata records can be searched using GCMD Keywords, GEO BOX coordinates, and temporal values. The GCMD OpenSearch results can be presented as HTML, Atom, RSS, KML (BETA), or CSV (BETA).

Getting started

OpenSearch works by first providing a link tag to what is called the "OpenSearch Description" (OSD) document. It is an XML file that describes how, where, and what parameters can be used to make an OpenSearch request. From then on a search client can build a request URL for the desired format whenever search results are needed.

On the GCMD website there is an OpenSearch Description link tag in most pages. These links are all Portal (metadata subsets) specific. This means that results are subset based on the Portal rules. For example, on the main GCMD view one would find the following in the HTML:

```
<link rel="search" type="application/opensearchdescription+xml" title="Global Change Master Directory"
href="/KeywordSearch/default/openSearch.jsp?Portal=GCMD">
```

This URL advertises where the OSD is. Calling the URL in a web browser or with a tool like [curl](http://en.wikipedia.org/wiki/curl) produces the following:

```
> curl http://gcmd.nasa.gov/KeywordSearch/default/openSearch.jsp?Portal=GCMD

<?xml version="1.0" encoding="UTF-8" ?>
<OpenSearchDescription xmlns="http://a9.com/-/spec/opensearch/1.1/"
  xmlns:geo="http://a9.com/-/opensearch/extensions/geo/1.0/"
  xmlns:time="http://a9.com/-/opensearch/extensions/time/1.0/"
  xmlns:parameters="http://a9.com/-/spec/opensearch/extensions/parameters/1.0/">
<Tags>
    AGRICULTURE, ATMOSPHERE, BIOLOGICAL CLASSIFICATION, BIOSPHERE, CLIMATE INDICATORS, CRYOSPHERE, HUMAN DIMENSIONS, LAND
SURFACE, OCEANS, PALEOCLIMATE, SOLID EARTH, SPECTRAL/ENGINEERING, SUN-EARTH INTERACTIONS, TERRESTRIAL HYDROSPHERE, services
  </Tags>

  <ShortName>GCMD</ShortName>
  <Image height="16" width="16" type="image/x-icon">
    http://gcmd.nasa.gov/favicon.ico
  </Image>

  <Contact>gsfc-gcmduso@mail.nasa.gov</Contact>

  <LongName>Global Change Master Directory</LongName>

  <Description>
    The GCMD database holds more than 25,000 descriptions of Earth science
    data sets and services covering all aspects of Earth and environmental
    sciences.
  </Description>

  <Query role="example" searchTerms="modis" />

  ......
</OpenSearchDescription>
```

This output advertises the following parameters:

- Searches
  - terms - `{searchTerms}`
  - pagination - `{count?}`, `{startIndex?}`, `{startPage?}`
  - geo - `{geo:box?}` (code assumes `INTERSECTS` mode)
  - date - `{time:start?}`, `{time:end?}` (code assumes `T00:00:00Z`)
- Formats
  - HTML
  - RSS
  - ATOM
  - KML (BETA)
  - CSV (New)

Examples:

- **<http://gcmd.nasa.gov/KeywordSearch/OpenSearch.do?searchTerms=water&output=atom&count=10&startPage=1&Portal=GCMD>**
- **<http://gcmd.nasa.gov/KeywordSearch/OpenSearch.do?searchTerms=water&output=atom&count=3&startPage=1&geoBox=-150,-45,-150,45&Portal=GCMD>**
- **<http://gcmd.nasa.gov/KeywordSearch/OpenSearch.do?searchTerms=water&output=atom&count=1&startPage=1&geoBox=-150,-45,-150,45&timeStart=2000-02-14&timeEnd=2010-02-14&Portal=GCMD>**

A partial output from the last example is below:


```
<?xml version="1.0" encoding="utf-8"?>
<feed xmlns="http://www.w3.org/2005/Atom"
    xmlns:opensearch="http://a9.com/-/spec/opensearch/1.1/"
    xmlns:geo="http://a9.com/-/opensearch/extensions/geo/1.0/"
    xmlns:georss="http://www.georss.org/georss"
    xmlns:dif="http://gcmd.gsfc.nasa.gov/Aboutus/xml/dif/dif.xsd"
    xmlns:dc="http://purl.org/dc/elements/1.1/"
    xmlns:time="http://a9.com/-/opensearch/extensions/time/1.0/">
  <author>
     <name>Global Change Master Directory</name>
     <email>gsfc-gcmduso@mail.nasa.gov</email>
  </author>

  <updated>2014-07-31T06:00:52Z</updated>
  <title>GCMD Search: [Freetext=&#039;water&#039;]|[Spatial_Coverage
INTERSECTS:Northernmost_Latitude=&#039;45&#039;,Southernmost_Latitude=&#039;-45&#039;,Easternmost_Longitude=&#039;-
150&#039;,Westernmost_Longitude=&#039;-150&#039;]|[Temporal_Coverage: Start_Date=&#039;2000-02-14&#039;, Stop_Date=&#039;2010-02-
14&#039;]</title>
  <id>http://gcmd.gsfc.nasa.gov/KeywordSearch/OpenSearch.do</id>

  <opensearch:totalResults>1356</opensearch:totalResults>

<opensearch:startPage>1</opensearch:startPage>
     <!--Depricate startIndex as soon as we find out if the spec is going with startPage -->
     <opensearch:startIndex>1</opensearch:startIndex>
  <opensearch:itemsPerPage>1</opensearch:itemsPerPage>
  <opensearch:Query role="request" searchTerms="water" startPage="1"/>
  <!-- Navigation Links: -->
  <!-- Debug: 1<==1==> 2 out of 1356 -->
  <link rel="first"      type="application/atom+xml"
href="http://gcmd.gsfc.nasa.gov/KeywordSearch/OpenSearch.do?searchTerms=water&amp;output=atom&amp;count=1&amp;startPage=1&amp;geoBox
=-150,-45,-150,45&amp;timeStart=2000-02-14&amp;timeEnd=2010-02-14&amp;MetadataType=0&amp;Portal=GCMD&amp;clientId=fromgcmd"/>
  <link rel="self"      type="application/atom+xml"
href="http://gcmd.gsfc.nasa.gov/KeywordSearch/OpenSearch.do?searchTerms=water&amp;output=atom&amp;count=1&amp;startPage=1&amp;geoBox
=-150,-45,-150,45&amp;timeStart=2000-02-14&amp;timeEnd=2010-02-14&amp;MetadataType=0&amp;Portal=GCMD&amp;clientId=fromgcmd" />
  <link rel="next"       type="application/atom+xml"
href="http://gcmd.gsfc.nasa.gov/KeywordSearch/OpenSearch.do?searchTerms=water&amp;output=atom&amp;count=1&amp;startPage=2&amp;geoBox
=-150,-45,-150,45&amp;timeStart=2000-02-14&amp;timeEnd=2010-02-14&amp;MetadataType=0&amp;Portal=GCMD&amp;clientId=fromgcmd"/>
  <link rel="last"      type="application/atom+xml"
href="http://gcmd.gsfc.nasa.gov/KeywordSearch/OpenSearch.do?searchTerms=water&amp;output=atom&amp;count=1&amp;startPage=1356&amp;ge
oBox=-150,-45,-150,45&amp;timeStart=2000-02-14&amp;timeEnd=2010-02-14&amp;MetadataType=0&amp;Portal=GCMD&amp;clientId=fromgcmd"/>

  <!-- Other Links -->
  <link href="gcmd.gsfc.nasa.gov"/>
  <link rel="http://esipfed.org/ns/fedsearch/1.0/search#" href="http://gcmd.gsfc.nasa.gov/KeywordSearch/OpenSearch.do"/>
  <link rel="alternate" type="text/html"
href="http://gcmd.gsfc.nasa.gov/KeywordSearch/OpenSearch.do?searchTerms=water&amp;output=atom&amp;count=1&amp;startPage=1&amp;geoBox
=-150,-45,-150,45&amp;timeStart=2000-02-14&amp;timeEnd=2010-02-14&amp;MetadataType=0&amp;Portal=GCMD&amp;clientId=fromgcmd"/>

  <entry>
      <!--
      If entry ID starts with [GCMD] it can be dropped in requests as this
      value is the assumption.
      [GCMD]PODAAC-TEOCN-0GJ05
      -->
      <dif:Originating_Metadata_Node>GCMD</dif:Originating_Metadata_Node>
      <dif:Entry_ID>PODAAC-TEOCN-0GJ05</dif:Entry_ID>

      <id>http://gcmd.gsfc.nasa.gov/getdif.htm?PODAAC-TEOCN-0GJ05</id>
      <title>GRACE MONTHLY OCEAN MASS GRIDS GIF JPL RELEASE 5.0</title>
…..
```

Wild Cards

The GCMD OpenSearch parameter `searchTerms` support wildcards.[2] For example, to search for words starting with "wind" do the following:

```
>curl "http://gcmd.nasa.gov/KeywordSearch/OpenSearch.do?searchTerms=wind*  &output=atom&count=1&Portal=GCMD" | grep "openSearch:totalResults"
```

Which results in:

```
<openSearch:totalResults>4626</openSearch:totalResults>
```

vs. the base case:

```
>curl "http://gcmd.nasa.gov/KeywordSearch/OpenSearch.do?searchTerms=wind&output=atom&count=1&Portal=GCMD" | grep "openSearch:totalResults"
```

Which results in viewer results:

```
<openSearch:totalResults>3689</openSearch:totalResults>
```

Relative Dates

The `{time:start?}` and `{time:end?}` attributes accept relative dates if they are defined as a number followed by "days ago" or "days from now".

- `timeStart=2%20days%20ago` - 2 days ago
- `timeEnd=3+days+from+now` - 3 days from now