

Constructing Uniform Resource Locators (URLs) for Searching the Marine Realms Information Bank

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U.S. Department of the Interior
U.S. Geological Survey

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By Guthrie A. Linck, Alan O. Allwardt, and Frances L. Lightsom

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Abstract

The Marine Realms Information Bank (MRIB) is a digital library that provides access to free online scientific information about the oceans and coastal regions. To search its collection, MRIB uses a Common Gateway Interface (CGI) program, which allows automated search requests using Uniform Resource Locators (URLs). This document provides an overview of how to construct URLs to execute MRIB queries. The parameters listed allow detailed control of which records are retrieved, how they are returned, and how their display is formatted.

Introduction

The Marine Realms Information Bank (MRIB; <http://mrib.usgs.gov>) was developed in 2001 by the U.S. Geological Survey (USGS) Coastal and Marine Geology Program (CMGP) in partnership with the Woods Hole Oceanographic Institution (WHOI). The MRIB is a distributed digital geolibrary of worldwide coastal and marine scientific information, created with the desire to provide an alternative to a standard Web search engine. MRIB serves the needs of a diverse audience, including scientists, public servants, advocacy groups, educators, and concerned citizens. For a more complete description of MRIB, see Lightsom and Allwardt (2007; 2009).

The MRIB is an online catalog of Electronic Index Cards (EICs), in which the cards contain many metadata parameters that describe the content of the referenced information resources. Multiple methods of searching for information are offered and are designed to be intuitive and effective in allowing the user to obtain relevant results.

Many of the metadata fields, or *facets*, provided in the MRIB are hierarchical in nature and indexed using controlled vocabularies of standardized terms; one of these facets is a dictionary of place names, or *gazetteer*. The MRIB *faceted classification* provides users with guidance in searching and encourages them to find information using a top-down

approach. An analogy that demonstrates the advantage of such a search system would be a sequential key system that guides the user with a series of questions to determine the species of a particular animal instead of having the user type descriptive keywords of the animal into a standard Web search engine.

The unguided Web search requires the user to try many combinations of keywords, visit the retrieved Web sites, and wade through irrelevant results. The descriptive keyword approach is inefficient because there are so many ways to describe the same entity. The sequential key, in contrast, is structured to provide guidance and allow the user to more effectively make the determination.

Why Construct Search URLs?

Knowing how to construct MRIB search URLs and knowing how the search parameters work will allow users to harvest MRIB metadata records without using the online search interface. Automated harvesting could be especially useful to organizations that have compiled their own databases of online scientific information and want to search the MRIB for specific authors or topics. Established databases that overlap in content with MRIB include the Digital Library for Earth System Education (<http://www.dlese.org/>), the NASA Global Change Master Directory (<http://gcmd.nasa.gov/>), and the National Science Digital Library (<http://nsdl.org/>), among others.

Using the EIC modification time parameter (*etc.modified*, recorded whenever any metadata record is changed), one can search the MRIB for new or corrected records matching certain criteria. A previously harvested record should be checked periodically to see if the corresponding MRIB metadata profile has been modified. For example, if the URL of an online information resource changes because the host institution has restructured its entire URL system, the MRIB metadata profile must be modified to eliminate the dead link. Because distributed digital libraries like MRIB store the URLs of online information resources, not their content, it is essential to maintain valid links to the original resources.

The MRIB Search URL Structure

The structure of an MRIB search URL is fairly simple and consists of two parts, separated by a question mark (?). The first part is the URL of the Common Gateway Interface (CGI) program, in this case `http://mrib.usgs.gov/cgi-bin/search`. The second part consists of a list of `name=value` pairs separated by ampersands (&), which specify the values of the search parameters passed to the CGI program. Thus, to add another search parameter one simply includes the appropriate `&name=value` string at the end of the URL.

Accordingly, a simple search request for records matching the single value *Environment > Climate Change* in the *Hot Topics* field is executed using this URL: `http://mrib.usgs.gov/cgi-bin/search?mrib.topics=environment.climate_change`.

A more complex example, which includes several search criteria and requests an Extensible Markup Language (XML) export of the retrieved records, is the following: `http://mrib.usgs.gov/cgi-bin/search?mrib.topics=environment.climate_change&mrib.topics=hazards_and_disasters.erosion&general.author=sallenger,_asbury_h.,_jr.&cmd=ExportCards&export_format=xml`.

Most non-alphanumeric characters that are passed to the CGI, either in the names or the values, must employ URL encoding, which consists of a percent symbol (%) followed by the two-digit hexadecimal representation of the special character. URL encoding is discussed in greater detail by Wilson (2003) and by Berners-Lee and others (1994).

What is CGI?

The Common Gateway Interface (CGI) is a protocol created to provide a standard method of interfacing external programs to an information server in a platform-independent manner. Unlike static HTML Web pages, which are simply retrieved as is, CGI programs are executed dynamically to provide customized content with each invocation. One of the most common types of CGI program is an interactive search service providing access to information from a database server on the Internet. The MRIB falls within this category.

CGI is explained in more detail at a Web site maintained by the National Center for Supercomputing Applications (<http://hoohoo.ncsa.illinois.edu/cgi/overview.html>). Robinson and Coar (2004) give a technical description of CGI. An excellent source for additional Web-related information is the World Wide Web Consortium (<http://www.w3.org/>).

Parameter Types

The MRIB search CGI uses five basic types of parameters. *Basic action parameters* determine how the results are displayed or used; an example would be `cmd=ViewMap`, which displays search results on a geographical map. *Electronic Index Card (EIC) field parameters* are used to limit the search to those records that match specified values in certain fields; an example would be `general.title=seafloor`, which will match records with the string “seafloor” in the title. *Table parameters* determine how the table of search results is displayed and used; an example would be `rows=50` to display 50 records per page in a table of search results. *Map parameters* determine the appearance of the map and how search results are depicted on it; an example would be `proj=m`, which employs the Mercator projection for the map display. Finally, *facet parameters* determine how the MRIB facets indexing categories are displayed to guide a topical search; an example would be `maxdepth=2`, which displays the first three levels in a facet hierarchy.

Tables of Parameters

The following tables list all search URL parameters that can be passed to the basic MRIB search CGI (`http://mrib.usgs.gov/cgi-bin/search`) to refine a specific search request. The parameter tables below are organized into three columns.

Parameter: Name of the parameter, as well as any synonyms. The first parameter name (in **bold**) is the primary name used in the underlying code. The synonyms are provided for ease of use; some are former names from previous versions of MRIB.

Arguments: Number of values that may be specified for each parameter. Parameters with *1* in the Arguments column accept only one value; parameters with an asterisk in the Arguments column accept multiple values. The single-value parameters may be specified multiple times in the URL, but only one value will be recognized (usually the last value, but the order in which they are passed to the MRIB search CGI will be browser dependent, and therefore not well defined).

Description: How the parameter functions.

The five tables include parameters that govern different functions of the MRIB search.

1. *General parameters and basic actions* (table 1) determine which of several basic MRIB Web pages are generated to guide the search and report the results: facet (category) view, for topical searches; map view, for geographic searches; table view, for viewing and sorting the search results; and export view, for harvesting MRIB records.
2. *Electronic Index Card (EIC) field parameters* (table 2) correspond to the EIC metadata fields and determine which MRIB records are selected by the search.
3. *Table parameters* (table 3) determine the format of a Web page that displays a table of search results: records per page, sort field, sort order, and so on.
4. *Facet (category) parameters* (table 4) determine the format of a Web page that lists the controlled vocabulary of a selected facet (indexing category): for example, the depth of the hierarchy to be displayed.
5. *Map parameters and actions* (table 5) determine the appearance of a Web page that displays search results on a map: bounding coordinates, scale, representation of relief, resolution, and so on.

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Table 1. General parameters and basic actions.

Parameter	Arguments	Description
cmd , action, a	1	Specifies the action to take after the search has been performed. All valid actions begin with a capital letter, including basic actions such as <i>ViewTable</i> , <i>ViewMap</i> , <i>ViewFacet</i> , and <i>ExportCards</i> (below) and map actions such as <i>ZoomIn</i> , <i>ZoomOut</i> , and <i>ZoomReset</i> (table 5). Actions can be specified using the <i>cmd</i> parameter (for example, <i>cmd=ViewTable</i>) or by passing the action directly (for example, <i>ViewTable=1</i>). In the second instance, the action accepts Boolean (1/0) values: if the value is 0 (or an empty string), then the parameter will be ignored; if the value is 1, then the action will be taken. Some action parameters, such as <i>Compass</i> and <i>Imap</i> (table 5), also have <i>P.x</i> and <i>P.y</i> counterparts to work with image maps.
NewSearch	1	Returns to the search home page. Accepts Boolean (1/0) values.
ViewTable	1	Displays the current search results in a table. Accepts Boolean (1/0) values.
ViewMap	1	Displays the current search results on a map. Accepts Boolean (1/0) values.
ViewFacet	1	Displays the current search results in the context of a selected facet (indexing category). Accepts Boolean (1/0) values. Used in conjunction with the <i>facet</i> parameter.
ExportCards	1	Exports the current search results. Accepts Boolean (1/0) values. Used in conjunction with the <i>export_format</i> parameter (if no format is specified, an export menu will be displayed).
ViewSelections , ViewCards	1	Used in conjunction with the <i>idlist</i> parameter to select and display individual records from a previously generated table of search results. Accepts Boolean (1/0) values.
RemoveSelections , RemoveCards	1	Used in conjunction with the <i>idlist_x</i> parameter to remove individual records from a previously generated table of selections. Accepts Boolean (1/0) values.
ContinueSearch	1	Returns the user from a table of selections to the original table of search results. Accepts Boolean (1/0) values.
user	1	Parameter specifying the user interface to display. Three values are currently recognized: <i>mrrib</i> for the Marine Realms Information Bank (the default); <i>cch</i> for the Coastal Change Hazards Digital Library; and <i>mbs</i> for the Monterey Bay Science Digital Library.

Table 2. Electronic Index Card (EIC) field parameters.

Parameter	Arguments	Description
eic.id , id	1	Unique, eight-character hexadecimal identifier assigned by the MRIB Administrator to each EIC (record) in an MRIB top-level directory. All EICs matching the specified ID number or partial ID number are retrieved (matched left to right if fewer than eight characters are specified). Basic searches retrieve EICs from /mrib (the default top-level directory), unless a different top-level directory is specified (see <i>eic.file</i>).
eic.file , file	1	Specifies the nested directory and file structure in which an EIC is stored. The top-level directories include /mrib (the publicly available database), /contrib (user-contributed EICs), and individual user accounts (provisional EICs). This parameter limits the search to records in the given directory or file. For example, most of the records found in the Coastal Change Hazards Digital Library are stored in the mrib/cch directory.
eic.type , type	1	Specifies the type of record to be searched: single documents (0 item) or collections (1 collection), reflecting the nature of the referenced information resources.
eic.collection	1	Not currently utilized as an indexing parameter. The default value for collection records is <code>eic.collection=*</code> (see also <i>eic.type</i>).
eic.public_id , eic.pid, pid, public_id	1	Assigned by the MRIB Administrator to track user-contributed EICs that have been incorporated into the publicly available database. The public database IDs shown in the /contrib directory correspond to the EIC IDs in the /mrib directory. Search is performed in the same way as in the <i>eic.id</i> field.
eic.accession_id , eic.submission_id, eic.sid, eic.submit_id, sid, submission_id, submit_id	1	Assigned by the MRIB Administrator to track provisional, user-contributed EICs awaiting review. The Accession IDs shown in the /mrib directory correspond to the EIC IDs in the /contrib directory. Search is performed in the same way as in the <i>eic.id</i> field.
eic.created , eic.ctime	1	Date the EIC was created (may differ from date the EIC was completed and submitted to the MRIB Administrator for review). See date formats. ¹ Prefix with < to search for records created before the specified date or with > to search for records created after the specified date.
eic.modified , eic.mtime	1	Date the EIC was last modified. See date formats. ¹ Prefix with < to search for records modified before the specified date or with > to search for records modified after the specified date.
eic.submitted , eic.stime	1	Date the EIC was submitted to the MRIB Administrator for review and incorporation into the publicly available database. See date formats. ¹ Prefix with < to search for records submitted before the specified date or with > to search for records submitted after the specified date.
eic.indexer , indexer	*	The name and email address of the person who created or modified the EIC. Stored values are in the format <code>Last, _First_Middle name@email.com</code> (the middle name or initial and email address are optional). Search is performed using simple string matching. ²
eic.indexer_comments , eic.comments, indexer_comments	1	Additional information about the indexed information resource or the EIC itself. Search is performed using simple string matching. ²
eic.rules	1	Limits the search to records created under a specific set of cataloging rules. At present, two sets of rules are recognized: <code>mrib</code> , which employs the generalized Hot Topics ³ controlled vocabulary (the default), and <code>cch</code> , which employs the specialized Coastal Change Hazards Topics ³ controlled vocabulary. Search is performed using simple string matching. ²
general.url , url	1	Uniform Resource Locator (URL) for the referenced information resource. Search is performed using simple string matching. ²

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Table 2. Electronic Index Card (EIC) field parameters.—Continued

Parameter	Arguments	Description
eic.url_active , url_active	1	Indicates the status of the URL for the referenced information resource: active (0) or not active (1). This database management parameter is not currently utilized.
general.title , title	1	Title of the referenced information resource. Search is performed using simple string matching. ²
general.custodian , general.curator, general.poc, custodian, curator, poc	*	The name and email address of the person responsible for providing the information resource on a Web site (and who normally responds to inquiries about this Web site and its content). Stored values are in the format <code>Last, _First_Middle name@email.com</code> (the middle name or initial and email address are optional). A custodial title (for example, <code>Agency_Webmaster</code>) may be listed in place of a personal name. The URL of a “Contact Webmaster” Web form may be substituted for the email address. Search is performed using simple string matching. ²
general.description , general.desc, description, desc	1	Basic description of the content of the referenced information resource. Search is performed using simple string matching. ²
general.date , general.modified, general.modified_date, modified, modified_date	1	Date on which the referenced information resource was created or last modified. See date formats. ¹ Prefix with < to search for information resources predating the specified date or with > to search for information resources postdating the specified date.
general.content_start_date , general.content_start, general.content_begin_date, general.content_begin, content_start_date, content_start, content_begin_date, content_begin	1	Starting date (and time, if applicable) of the intellectual content in the information resource. See date formats. ¹ Prefix with < to search for content starting before the specified date or with > to search for content starting after the specified date.
general.content_end_date , general.content_end, content_end_date, content_end	1	Ending date (and time, if applicable) of the intellectual content in the information resource. See date formats. ¹ Prefix with < to search for content ending before the specified date or with > to search for content ending after the specified date.
general.mean_longitude , general.mean_lon, general.longitude, general.lon, mean_longitude, mean_lon, longitude, lon	1	Mean longitude of the study area referenced in the information resource (if applicable). This field is not currently implemented as a search parameter.
general.mean_latitude , general.mean_lat, general.latitude, general.lat, mean_latitude, mean_lat, latitude, lat	1	Mean latitude of the study area referenced in the information resource (if applicable). This field is not currently implemented as a search parameter.

Table 2. Electronic Index Card (EIC) field parameters.—Continued

Parameter	Arguments	Description
general.west_longitude , general.west_lon, west_longitude, west_lon, x0	1	West bounding coordinate of the study area referenced in the information resource (if applicable). See degree formats. ⁴ Note: geographic searches are usually specified using <i>mrrib.location</i> or the <i>zoom</i> parameter.
general.east_longitude , general.east_lon, east_longitude, east_lon, x1	1	East bounding coordinate of the study area referenced in the information resource (if applicable). See degree formats. ⁴ Note: geographic searches are usually specified using <i>mrrib.location</i> or the <i>zoom</i> parameter.
general.north_latitude , general.north_lat, north_latitude, north_lat, y1	1	North bounding coordinate of the study area referenced in the information resource (if applicable). See degree formats. ⁴ Note: geographic searches are usually specified using <i>mrrib.location</i> or the <i>zoom</i> parameter.
general.south_latitude , general.south_lat, south_latitude, south_lat, y0	1	South bounding coordinate of the study area referenced in the information resource (if applicable). See degree formats. ⁴ Note: geographic searches are usually specified using <i>mrrib.location</i> or the <i>zoom</i> parameter.
general.mean_elevation , general.mean_elev, general.elev, mean_elev, mean_elevation, elev	1	Mean elevation (in meters) of the study area described in the referenced information resource (if applicable). Prefix with < to search for elevations below the specified value or with > to search for elevations above the specified value.
general.upper_elevation , general.upper_elev, upper_elevation, upper_elev	1	Highest elevation (in meters) of the study area described in the referenced information resource (if applicable). Prefix with < to search for elevations below the specified value or with > to search for elevations above the specified value.
general.lower_elevation , general.lower_elev, lower_elevation, lower_elev	1	Lowest elevation (in meters) of the study area described in the referenced information resource (if applicable). Prefix with < to search for elevations below the specified value or with > to search for elevations above the specified value.
general.keywords , keywords, keyword	*	Searches both the controlled-vocabulary terms (see below) and free-text keywords that were used to index the information resource. Search is performed using simple string matching. ²
general.author , author	*	Limits search to records matching one or more of the specified authors (persons responsible for the intellectual content of the information resource). See the list of registered Authors. ³ Note that MRIB does not employ “corporate authors” (this information is conveyed in the Agency field).
mrrib.agency , agency	*	Limits search to records matching one or more of the specified agencies (organizations that contributed to the information resource, by funding or conducting research, interpreting or compiling data, publishing a document, hosting a Web site, and so on.). See the list of registered Agencies. ³
mrrib.discipline , discipline	*	Limits search to records matching one or more of the specified disciplines (academic fields relevant to the scientific research or issues discussed in the information resource). See the list of registered Disciplines. ³
mrrib.location , loc, location	1	Limits search to records matching the specified gazetteer location. See the list of registered Gazetteer Locations. ³

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Table 2. Electronic Index Card (EIC) field parameters.—Continued

Parameter	Arguments	Description
mrrib.feature_type , mrrib.feature, feature_type, feature	*	Limits search to records matching one or more of the specified feature types (the generic features, geographic and otherwise, with which the information resource is concerned). See the list of registered Feature Types. ³
mrrib.biota , biota	*	Limits search to records matching one or more of the specified biota (using the common names of organisms, arranged in five kingdoms: animals, plants, fungi, protists, and bacteria). See the list of registered Biota. ³
general.content_type , content_type	*	Limits search to records matching one or more of the specified content types (the <i>intellectual</i> form of the information resource, based on the Dublin Core Metadata Initiative Type Vocabulary). See the list of registered Content Types. ³
mime.file_type , file_type	*	Limits search to records matching one or more of the specified file types (the <i>transmission</i> form of the information resource, based on MIME media type/subtype assignments). See the list of registered File Types. ³
mrrib.topics , mrrib.hot_topics, topics, hot_topics	*	Limits search to records matching one or more of the specified Hot Topics (issues of concern to scientists, policymakers, and the general public). See the list of registered Hot Topics. ³ Note: Hot Topics are employed in the MRIB and MBS user interfaces (see <i>user</i>). See also <i>etc.rules</i> .
cch.topics	*	Limits search to records matching one or more of the specified Coastal Change Hazards Topics (issues of concern to scientists, policy makers, and the general public). See the list of registered CCH Topics. ³ Note: CCH Topics are employed in the CCH user interface (see <i>user</i>). See also <i>etc.rules</i> .
mrrib.method , method	*	Limits search to records matching one or more of the specified research methods (techniques employed to collect and analyze the scientific data discussed in the information resource). See the list of registered Research Methods. ³
mrrib.project , project	*	Limits search to records matching one or more of the specified projects (using project names as specified in the information resource, which may differ from the formal project titles employed by the parent agency for its administrative purposes). See the list of registered Projects. ³
mrrib.geologic_time , mrrib.geological_time, mrrib.geotime, geologic_time, geological_time, geotime	*	Limits search to records matching one or more of the specified units of geologic time addressed in the information resource (eon, era, period, and epoch). See the list of registered Geologic Times. ³
mrrib.parent_name , parent_name	1	Name of the Web-based collection to which the referenced information resource belongs (reflecting the internal linking structure of the Web site). Search is performed using simple string matching. ²
mrrib.parent_url , parent_url	1	URL of the Web-based collection to which the referenced information resource belongs (reflecting the internal linking structure of the Web site). Search is performed using simple string matching. ²
mrrib.collection_coverage , mrrib.coverage, collection_coverage, coverage	1	<i>For collection records only.</i> A phrase-length indication of the scope of the collection. Search is performed using simple string matching. ²
mrrib.collection_count , mrrib.count, collection_count, count	1	<i>For collection records only.</i> Number of items in the indexed collection (for example, digital photos in an online database; hyperlinks in an online directory; individual pages in a Web site). Not currently implemented as a search parameter.

Table 2. Electronic Index Card (EIC) field parameters.—Continued

Parameter	Arguments	Description
mrrib.collection_update_frequency , mrrib.update_frequency, mrrib.update, collection_update_frequency, update_frequency, update	*	<i>For collection records only.</i> Limits search to records matching one or more of the specified collection update frequencies. See the list of registered Update Frequencies. ⁵
mrrib.collection_alert , mrrib.alert, collection_alert, alert	1	<i>For collection records only.</i> Notes about dormant collections, the regular removal of data from time-sensitive collections, and so on. Search is performed using simple string matching. ²
mrrib.subset , subset	*	Limits the search to records assigned by the indexer to one or more subsets of the MRIB database. The MRIB database currently includes two subsets: <code>Coastal_Change_Hazards</code> (displayed in the Coastal Change Hazards Digital Library) and <code>Monterey_Bay_Science</code> (displayed in the Monterey Bay Science Digital Library).

¹ Dates and times use the format `yyyy/mm/dd hh:mm:ss` (`mm/dd` and `hh:mm:ss` are optional). Times follow the 24-hour clock convention. For sorting purposes, a less specific date (for example, 1999) predates a more specific date (for example, 1999/5).

² MRIB uses simple case-insensitive substring matching. Search values beginning with a forward slash (/) are interpreted as Perl regular expressions, allowing the experienced programmer to construct complex queries using Boolean and comparison operators. See the *Perl Regular Expressions Tutorial* (<http://perldoc.perl.org/perlretut.html>) and examples from the *MRIB Advanced Search Form* (<http://mrrib.usgs.gov/cgi-bin/search?advanced=1#Examples>).

³ The MRIB controlled vocabulary is online at <http://mrrib.usgs.gov/doc/facets.html>.

⁴ Geographic coordinates are stored internally as decimal degrees (`dd.ddd`) but also may be specified in degrees, minutes, and seconds (`dd:mm:ss`). Longitude values may be expressed in three formats: -180 to 180, 180W to 180E, or 0 to 360. Latitude values may be expressed in two formats: -90 to 90 or 90S to 90N.

⁵ The list of update frequencies is online at http://mrrib.usgs.gov/meta/collection_update_frequency.html.

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Table 3. Table parameters.

Parameter	Arguments	Description
start, startrec	1	In a sequential table of search results, the <i>start</i> parameter specifies the first record to be displayed in the table. The default setting is <i>start=0</i> , which displays record 1 first. (Note: the first record displayed also depends on the <i>sort</i> and <i>order</i> parameters, described below.)
stop, stoprec	1	In a sequential table of search results, the <i>stop</i> parameter specifies the last record to be displayed in the table.
rows	1	Specifies the number of rows per page in a table of search results. The default setting is 10 rows per page.
page	1	In a multipage table of search results, the <i>page</i> parameter specifies the first page to be displayed. The default setting is <i>page=0</i> , which displays page 1 first. (The records included on the first page to be displayed will also depend on the <i>rows</i> parameter. Example: <i>page=1</i> and <i>rows=10</i> will display page 2 first, with records 11–20.)
sort, sortfield, sort_field	1	Specifies the field used to sort a table of search results. The default field for sorting is <i>general.author</i> , but any other field in the table may be used: <i>eic.type</i> , <i>general.title</i> , or <i>general.date</i> . Search results may also be sorted by fields not normally shown in the table, such as <i>eic.id</i> , <i>general.content_start_date</i> , and <i>general.content_end_date</i> .
order, sortorder, sort_order	1	Specifies the sort order in a table: ascending (+ up) or descending (- down). The default sort order is ascending for all fields except time and date fields.
idlist, id_list	*	Parameter used in conjunction with <i>ViewSelections</i> to select and display individual records from a previously generated table of search results. Multiple instances of this parameter may be passed. The format is hexadecimal (see <i>eic.id</i>).
idlist_x, id_list_x, id_x	*	Parameter used in conjunction with <i>RemoveSelections</i> to remove individual records from a previously generated table of selections. Multiple instances of this parameter may be passed. The format is hexadecimal (see <i>eic.id</i>).
export_format, export_fmt, export	1	Parameter used in conjunction with <i>ExportCards</i> to specify the format of exported search results. The available export formats ¹ include plain text (<i>txt</i>), comma-separated values (<i>csv</i> or <i>csv_int</i>), Extensible Markup Language (<i>xml</i>), Keyhole Markup Language (<i>kml</i>), and Electronic Index Card format (<i>eic_mod</i>). The latter is the internal format used to store records in the MRIB database.

¹ MRIB export formats are described in more detail at <http://mrib.usgs.gov/doc/export.html>.

Table 4. Facet (category) parameters.

Parameter	Arguments	Description
facet, f, category	1	Specifies the facet to search. Used in conjunction with the <i>facet_value</i> parameter and any basic action (<i>ViewTable</i> , <i>ViewMap</i> , <i>ViewFacet</i> , or <i>ExportCards</i>).
facet_value, fvalue, fv, category_value	1	Used in conjunction with the <i>facet</i> parameter to specify a particular facet value. Facet values may be specified by name, ID, or ID span (for example, see <i>Agency</i> facet: http://mrib.usgs.gov/meta/agency.html).
maxdepth, depth, level	1	Used in conjunction with the <i>facet</i> parameter and <i>ViewFacet</i> to specify the number of levels to display in a facet hierarchy. The default display is two levels (<i>maxdepth=1</i>).

Table 5. Map parameters and actions.

Parameter	Arguments	Description
geosearch	1	Specifies how geographic searches are performed: 0 <i>mean</i> (the default) finds study areas whose center points (mean latitude and longitude) are located in the current map region; 1 <i>within</i> finds study areas that fall entirely within the current map region; 2 <i>contains</i> finds study areas that completely encompass the current map region; 3 <i>intersects</i> finds study areas that intersect the current map region.
imap_action	1	Specifies the action taken when clicking on the map: 0 <i>ZoomIn</i> (the default) zooms in on the click point; 1 <i>auto</i> either selects a table of search results or zooms in, depending on the density of search results at the click point; 2 <i>select table</i> selects a table of search results for the click point; 3 <i>ZoomOut</i> zooms out from the click point; 4 <i>pan center</i> recenters the map on the click point.
zoom	1	Limits the search to the specified geographic bounding box. The format is W/E/S/N, with coordinates expressed either in decimal degrees or in degrees, minutes, and seconds (see <i>deg_format</i>). Note: the four bounding parameters that define a specific study area may also be searched: see <i>general.west_longitude</i> , <i>general.east_longitude</i> , <i>general.north_latitude</i> , and <i>general.south_latitude</i> .
zoomloc	1	Internal parameter that manages complex geographic searches. If a <i>gazetteer location</i> is selected first and an overlapping <i>zoom location</i> is selected second, then <i>zoomloc</i> =0. In this instance, <i>ZoomReset</i> will cancel the zoom location and save the gazetteer location. If a zoom location is selected first and an overlapping gazetteer location is selected second, then <i>zoomloc</i> =1. In this instance, <i>ZoomReset</i> will cancel both locations.
scale, map_scale	1	A relative scale from 3 (narrow) to 20 (wide), with 6 being the default setting.
proj, projection, map_projection	1	The following Generic Mapping Tools (GMT) map projections ¹ are currently supported: Mercator (m), basic cylindrical (y), equidistant cylindrical (q), and polar (p).
pproj	1	Internal field containing information about the previous map, used to determine how to generate the next map. The format is PM/S, where P is the <i>projection</i> , M is the median longitude (in 0–360 degree format), and S is the <i>scale</i> .
relief	1	Specifies the type of base map to be generated: shaded relief or outline. Shaded relief maps in MRIB employ the following GMT built-in color palettes ¹ for elevation tinting: <i>relief</i> , <i>globe global</i> , <i>topo</i> , and <i>sealand</i> . The simple color schemes for outline maps include <i>bw</i> (uncolored), <i>gb</i> (green and blue), and <i>bb</i> (brown and blue). The shaded relief maps take longer to generate than the outline maps.
res, resolution, map_resolution	1	Specifies the resolution of physical features on shaded relief maps (not applicable to outline maps). The five GMT resolutions ¹ are <i>f full</i> , <i>h high</i> , <i>m medium</i> , <i>l low</i> , and <i>c crude</i> . The default resolution is <i>m medium</i> . Higher resolution maps take longer to generate.
deg_format	1	Specifies the format of latitude and longitude values. To display degrees, minutes, and seconds (the default setting in the MRIB map interface), use <i>deg_format=dd:mm:ss</i> . To display decimal degrees, use <i>deg_format=dd.ddd</i> (three decimal places being the practical limit). Either format may also accept a plus sign (encoded as %2B) as the leading character, in which case the following conventions will be employed: -90 to 90 for latitude and 0 to 360 for longitude.
dpi, dots_per_inch	1	Specifies the dots per inch when generating map images. A larger <i>dpi</i> value will produce a higher resolution image, but the map will also take longer to generate. The default setting is <i>dpi=200</i> .
image_type, img_type, img	1	Specifies the image format for generating maps: <i>JPEG JPG</i> , <i>PNG</i> , or <i>GIF</i> . The default image format is <i>JPEG</i> .
xy	1	Internally used field specifying the width and height of the previous map image, in pixels (for example, <i>xy=540x320</i>).
area	1	Specifies the bounding coordinates of the map display. The format is W/E/S/N (see also <i>deg_format</i>). The <i>area</i> parameter overrides the <i>zoom</i> parameter in order to change the map display without changing the search coordinates.

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Table 5. Map parameters and actions.—Continued

Parameter	Arguments	Description
basemap	1	Specifies the bounding coordinates of the initial base map. The format is W/E/S/N (see also <i>deg_format</i>). The default setting is the world map: <code>basemap=180W/180E/90S/90N</code> .
zoomratio	1	Specifies the rate of change when zooming in or out of the current map region. The user interface employs three rates: <code>3.0 fast</code> (the linear extent of the map, in degrees, changes by a factor of 3), <code>2.0 medium</code> (factor of two), and <code>1.5 slow</code> (factor of 1.5). The default setting is <code>2.0 medium</code> .
panratio	1	Specifies the rate of panning in map view when clicking on the compass image (see <i>Compass.x</i> and <i>Compass.y</i>). The default setting is <code>0.80</code> , subject to an additional multiplier defined by the click point.
minsize	1	Minimum linear dimension of a zoomed-in map, in decimal degrees. The default setting is <code>0.667</code> .
plot_matches	1	Specifies how geographic search results (matches) are depicted on the map: <code>0 off</code> hides all matches; <code>1</code> displays the footprints of larger study areas; <code>2</code> depicts larger study areas as footprints and point studies as symbols (see below); <code>3</code> displays point studies only; <code>4 on</code> (the default) depicts all studies as symbols (using center points for larger study areas).
symbol, sym, plot_symbol, plotsym	1	Specifies the type and size of the symbol that is used for plotting matches on the map (see <i>plot_matches</i>). The format is <code>cN</code> , where <code>c</code> is the symbol type and <code>N</code> is the size. The available symbol types are: <code>c circle</code> , <code>a star</code> , <code>t triangle</code> , <code>s square</code> , <code>d diamond</code> , and <code>x cross</code> . The default setting is <code>symbol=c0.075</code> .
symbol_pen	1	Specifies the thickness and color of the GMT pen ¹ that is used for outlining the <i>symbol</i> . The format is <code>width/red/green/blue</code> . The default setting is <code>1/0/0/0</code> , a black line one pixel wide.
symbol_fill, symbol_color	1	Specifies the interior color of the <i>symbol</i> . The format is <code>red/green/blue</code> , with a default setting of <code>225/30/30</code> . See GMT area fill attributes ¹ for more information.
study_pen	1	Specifies the thickness and color of the GMT pen ¹ that is used for highlighting the footprints of study areas (see <i>plot_matches</i>). The format is <code>width/red/green/blue</code> , with a default setting of <code>1/225/30/30</code> .
Imap.x and Imap.y	1	The x/y values (in pixels) of the click point on the map image.
Compass.x and Compass.y	1	The x/y values (in pixels) of the click point on the compass image.
ZoomIn, Zoom	1	Zooms into the center of current map region.
ZoomOut	1	Zooms out from the center of current map region.
ZoomReset	1	Removes the bounding-box coordinates defining the current map region.
WorldMap, WorldView	1	Displays the current map region on the world map.
RegionMap	1	Reverses the action of <i>WorldMap</i> .
border	1	Displays political boundaries. The current settings: <code>border=off</code> hides all political boundaries; <code>border=1</code> displays national boundaries; <code>border=2</code> (the default) displays national boundaries and USA State boundaries; <code>border=4</code> displays national boundaries and USA State/county boundaries (counties are displayed only if they can be resolved at the scale of the current base map).
topo250k	1	Displays USGS 1:250,000 topographic map outlines (coastal USA only). The settings: <code>topo250k=off</code> (the default) hides the outlines; <code>topo250k=on</code> displays the outlines; <code>topo250k=auto</code> displays the outlines only if they can be resolved at the scale of the current base map.
topo24k	1	Displays USGS 1:24,000 topographic map outlines (coastal USA only). The settings: <code>topo24k=off</code> (the default) hides the outlines; <code>topo24k=on</code> displays the outlines; <code>topo24k=auto</code> displays the outlines only if they can be resolved at the scale of the current base map. Note: <i>topo24k</i> is currently implemented in the MBS user interface only (see <i>user</i>).

Table 5. Map parameters and actions.—Continued

Parameter	Arguments	Description
eez	1	Displays Exclusive Economic Zone boundaries (USA only). The settings: <code>eez=off</code> (the default) hides the boundaries; <code>eez=on</code> displays the boundaries; <code>eez=auto</code> displays the boundaries only if they can be resolved at the scale of the current base map.
nms	1	Displays National Marine Sanctuary and Marine National Monument boundaries (USA only). The settings: <code>nms=off</code> (the default) hides the boundaries; <code>nms=on</code> displays the boundaries; <code>nms=auto</code> displays the boundaries only if they can be resolved at the scale of the current base map.
opdlm	1	Displays Minerals Management Service (MMS) Official Protraction Diagram and Leasing Map outlines (offshore USA only). The settings: <code>opdlm=off</code> (the default) hides the outlines; <code>opdlm=on</code> displays the outlines; <code>opdlm=auto</code> displays the outlines only if they can be resolved at the scale of the current base map.
hucs	1	Displays USGS hydrologic unit (watershed) boundaries (USA only). The settings: <code>huc=off</code> (the default) hides the boundaries; <code>huc=on</code> displays the boundaries; <code>huc=auto</code> displays the boundaries only if they can be resolved at the scale of the current base map.
grid	1	Displays latitude and longitude grid lines. The settings: <code>grid=off</code> (the default) hides the grid lines; <code>grid=on</code> displays the grid lines; <code>grid=auto</code> displays the grid lines only if they can be resolved at the scale of the current base map.
river	1	Displays rivers. The settings: <code>river=off</code> (the default) hides rivers; <code>river=on</code> displays rivers; <code>river=auto</code> displays rivers only if they can be resolved at the scale of the current base map.
lake	1	Displays lakes. The settings: <code>lake=off</code> hides lakes; <code>lake=on</code> displays lakes; <code>lake=auto</code> (the default) displays lakes only if they can be resolved at the scale of the current base map.

¹ For more information about Generic Mapping Tools (GMT) map parameters, see http://gmt.soest.hawaii.edu/gmt/doc/gmt/html/GMT_Docs/node1.html.

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