HISTMAG Database Manual

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This is the manual of the HISTMAG Database. In section 1 the query form is described, while in section 2 details on the output tables and the user comment function are given. Table A1 summarizes all fields included in the database.
Note: Querying very large data volumes can cause problems. In this case, please restrict your query to specific periods, regions or record types or contact patrick.arneitz@zamg.ac.at.

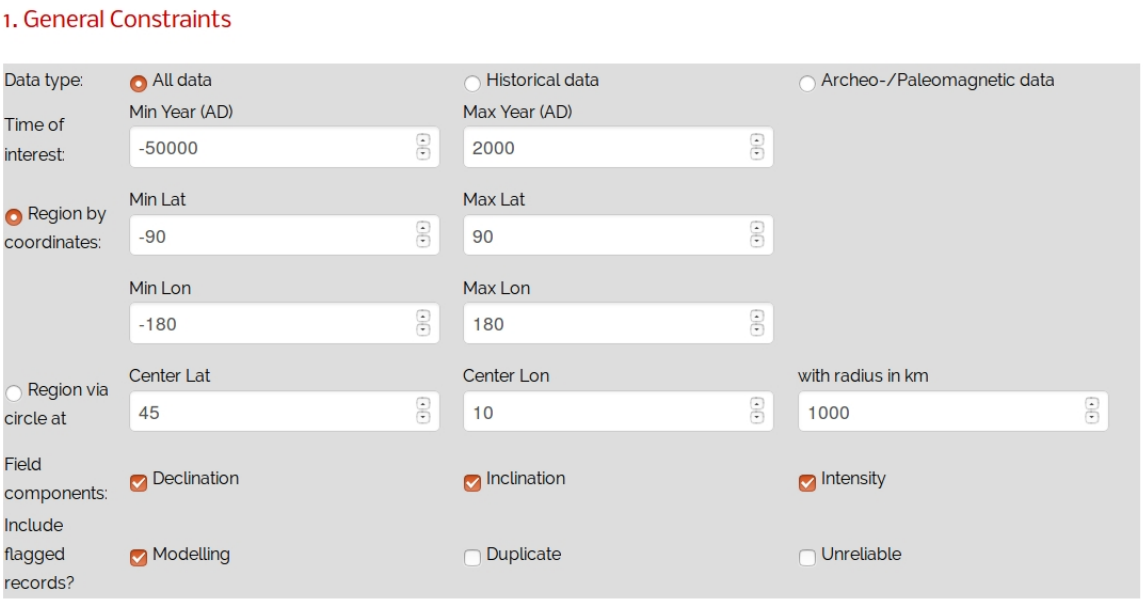

Figure 1: General constraints available for the query.

1 Query form

The query form contains three sections:

1. General Constraints
2. a) Keyword Query or b) Systematic Query
3. Output

1.1 General Constraints

In the first part of the query form (Fig. 1) general search constraints can be set. Firstly, the data type has to be selected. One can search solely for historical, for archaeomagnetic and volcanic records, or both types (="All data"). Temporal limits for the query can be set by providing minimum and maximum years (AD). The geographical region is defined either by specifying minimum/maximum latitude ($\pm 90°$, positive for Northern latitudes) and longitude ($\pm 180°$, positive for Eastern longitudes) or using a circle defined by center latitude and longitude (same units as before) and radius (in km). The choice of eligible field components (declination, inclination and field intensity) is processed with the logical operator "OR". I.e., retrieved records contain values at least for one of the selected field components. With the last selection criterion concerning flagged records, several data can be excluded from the query. The flagging of records has several reasons:

1. Modelling (included by default): This flag is implemented for geomagnetic modelling approaches. E.g., a series of daily measurements is flagged and instead only

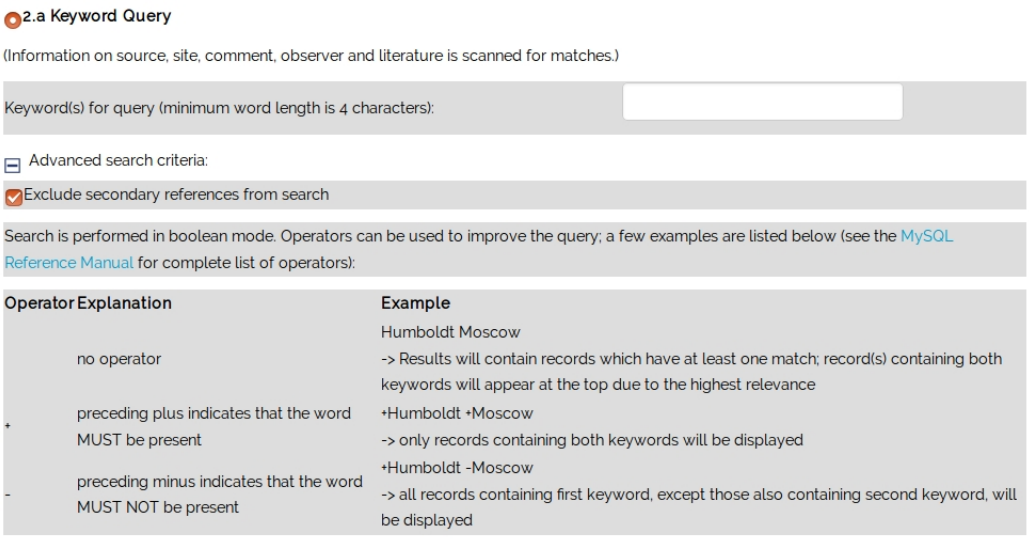

Figure 2: Input field for keyword query and advanced search criteria.

the annual mean is displayed. Furthermore, records without information on *year*, *lat*, *lon* or all geomagnetic components (*decl,inc,inten*) are flagged.

2. Duplicates (excluded by default): Identified duplicate records.

3. Unreliable (excluded by default): Records that are judged as unreliable by author or processor.

1.2 Keyword Query

In the second part of the query form, the user has to choose between a keyword query (Fig. 2) or a systematic query (see 1.3) after checking the corresponding button. The specification of a keyword or a source/material is obligatory; otherwise, no data will be returned. Keywords must have a minimum word length of four characters. The following fields of the database are scanned for matches:

→ *source*

→*site*, *location*, *country*

→*comment*, *obs*, *flag_comm*

→ References (*ref1*, *ref2* – volume and pages are excluded)

Typical applications comprise searches for authors, locations and ship names. It has to be noted that keywords can be found in multiple fields. This can affect e.g. query results for a specific country when the country name is contained in the publication title of a study. All records of this study will be displayed, even though they may originate

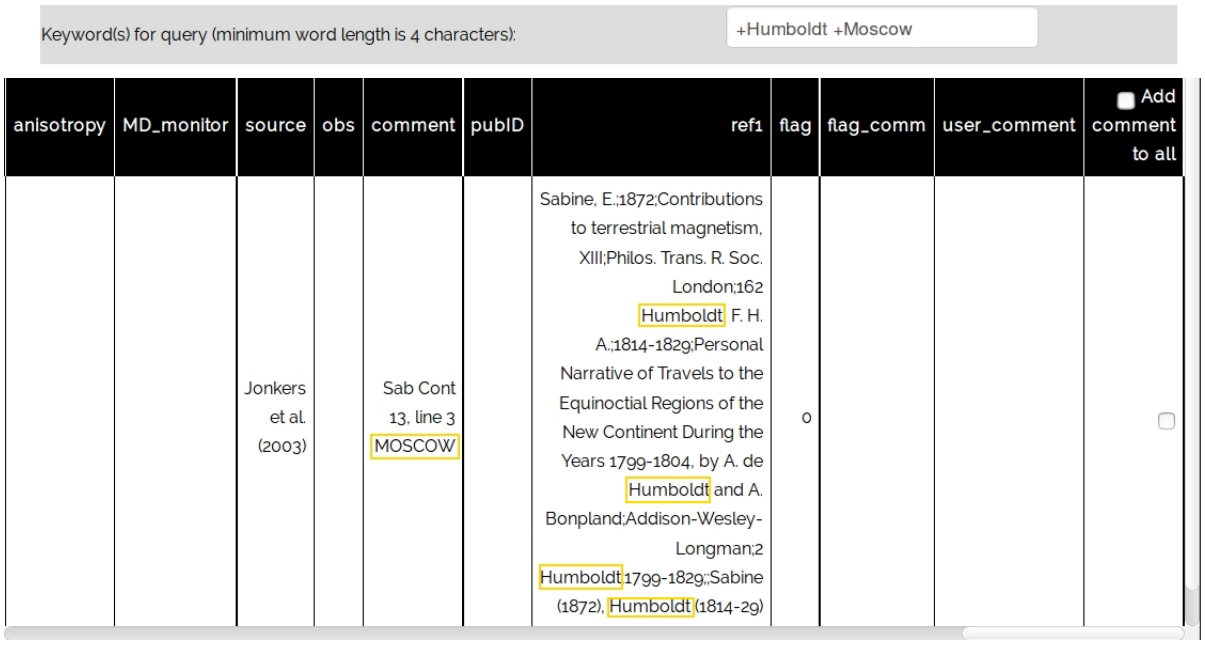

Figure 3: Input field "+Humboldt +Moscow" supports the query for records containing both keywords (top). One record is retrieved and fields containing the keywords are displayed in the bottom plot.

from a different country. For example this is the case for the keyword "France", which is included in the publication title by Thellier (1981), who also reported records from Germany. Advanced search criteria offer the possibility to exclude secondary references from the search (default setting) and describe the usage of boolean operators for the query. An example of the use of boolean operators is given in Fig. 3.

1.3 Systematic Query

The alternative search mode is the systematic query (Fig. 4). Here the user can select different historical sources and materials investigated in palaeo- and archaeomagnetic experiments. The checkboxes "All" help to select all available sources and materials, respectively. For indirect records further checkboxes are available supporting the selection of all archaeomagnetic and volcanic records, respectively. Moreover, restrictions on the intensity experiments can be set; the user can specify whether corrections/monitoring of anisotropy, alteration and cooling rate are obligatory for queried records.

Figure 4: Systematic query constraints.

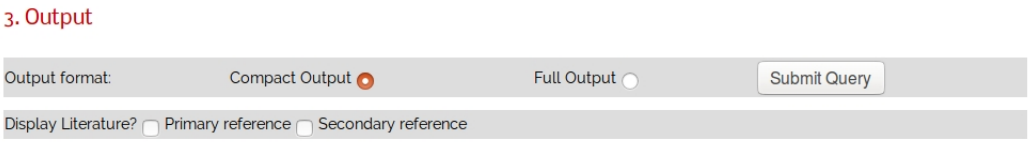

Figure 5: Options for output display.

1.4 Output

In the last part of the query form (Fig. 5), the output display can be chosen. A compact display ("Compact Output") can be selected, where most essential fields of the record – e.g., for geomagnetic field modelling – will be displayed (see Fig. 6):

→ *id*, *origin*, *source*, *user_comment*

→ Age and its uncertainty

→ Geographical coordinates

→ Value and uncertainty of selected geomagnetic field components

Alternatively, "Full Output" yields all available fields from the database (see Table A1). Finally, it can be chosen if primary (original articles/documents) and/or secondary literature (compilations) should be displayed, which can affect the visual design of the results table.

Your query returned 138 results.
Get your file here:Download

Add comment to data (records must be selected in last column; please add your name to text):		Submit Query

id	origin	year	posdyear	negdyear	lat	lon	decl	ddecl	inc	dinc	inten	dinten	inten_code	source	user_
432	0	1810	0	0	45.678	13.442	-17.5	0.167						navy survey	
433	0	1812	0	0	45.643	13.763	-17.7333	0.167						navy survey	
434	0	1857	0	0	45.643	13.763	-13.87		62.3233		20973.0		AHN	navy survey	
437	0	1868	0	0	45.643	13.763	-12.5233		61.8383		21283.0		AHN	navy survey	
438	0	1819	0	0	45.517	13.567	-16.0833	0.167						navy survey	
439	0	1806	0	0	45.517	13.567	-17.1667	0.167						navy survey	

Figure 6: Example of result table for "Compact Output".

2 Results

After the query is submitted, results are presented online (Fig. 6). First, the number of found records will be given, followed with the option to download a TSV-file (Tap-separated values) containing the retrieved records. Then, the results are listed in a html table. If "Full Output" was selected, all fields described in Table A1 are displayed.
In order to reduce computational efforts, it is recommended to confine queries to certain time periods, areas or sources. In case that more than 10000 records are found, only the TSV-file is prepared for download. Selected query parameters are summarized at the end of the TSV-file.

2.1 User comment

In the online display of query results the user can comment the different records. Above the html table a text field is available for typing the comment text. This comment will be assigned to all records selected in the last column. If "Add comment to all" in the table header is checked, all displayed records will be commented. For the moment, a timestamp is automatically generated; however, the creator of the comment remains anonymous. Since the main focus of the comment section is to provide a platform for discussion on validity, quality and usefulness of individual records, we recommend to cite each comment with full names. Comments cannot be deleted by the user.

In Fig. 7 an example is provided on how to add a user comment. Here we want to emphasize the fact that intensity values measured by De Rossel (identified by *inten_code* "RTR") are given on a relative scale and have not been converted to nanotesla.

Your query returned 6 results.
Get your file here:Download

Add comment to data (records must be selected in last column; please add your name to text):	ensity values NOT converted to nT	Submit Query

id	origin	year	posdyear	negdyear	lat	lon	inten	dinten	inten_code	source	user_comment	Add comment to all
1081636	0	1791			48.400	-4.500	1.0		RTR	Jonkers et al. (2003)		☑
1081637	0	1791			28.467	-16.267	0.9		RTR	Jonkers et al. (2003)		☑
1081638	0	1792			-43.533	146.950	1.2		RTR	Jonkers et al. (2003)		☑
1081639	0	1792			-3.700	128.117	0.7		RTR	Jonkers et al. (2003)		☑
1081640	0	1793			-43.533	146.933	1.2		RTR	Jonkers et al. (2003)		☑
1081641	0	1794			-7.233	112.683	0.7		RTR	Jonkers et al. (2003)		☑

Your query returned 6 results.
Get your file here:Download

Add comment to data (records must be selected in last column; please add your name to text):		Submit Query

id	origin	year	posdyear	negdyear	lat	lon	inten	dinten	inten_code	source	user_comment	Add comment to all
1081636	0	1791			48.400	-4.500	1.0		RTR	Jonkers et al. (2003)	06.12.2016 09:55: P. Arneitz: Relative intensity values NOT converted to nT	☐
1081637	0	1791			28.467	-16.267	0.9		RTR	Jonkers et al. (2003)	06.12.2016 09:55: P. Arneitz: Relative intensity values NOT converted to nT	☐
1081638	0	1792			-43.533	146.950	1.2		RTR	Jonkers et al. (2003)	06.12.2016 09:55: P. Arneitz: Relative intensity values NOT converted to nT	☐
1081639	0	1792			-3.700	128.117	0.7		RTR	Jonkers et al.	06.12.2016 09:55: P. Arneitz: Relative	☐

Figure 7: Example of how to add a user comment (top). The comment is displayed at the next query (bottom).

A Database Fields

field	**description**	(Jonkers et al., 2003)	(Brown et al., 2015)
id	Unique ID	-	-
origin	Data origin: 0=direct, 1=indirect	-	-
year	Year AD	year	Age
posdyear	Positive age uncertainty [yrs]	-	σ_{+ve}
negdyear	Negative age uncertainty [yrs]	-	σ_{-ve}
dating_meth	Age determination method	-	DatMethID
dyearCalc	Method of age uncertainty determination	-	σ_{Age}ID
month	Month	month	-
day	Day	day	-
hour	Local time	-	-
seq	Sequence number for archaeological data within a stratigraphy	-	-
prev	Sequence number of previous data in sequence	-	-
next	Sequence number of next data in sequence	-	-
equal	Sequence number of data from same stratum	-	-
lat	Latitude [°N]	lat_d, lat_m, lat_s	Site Lat.
lon	Longitude [°E]	long_d, long_m, long_s	Site Lon.
site	Site name (e.g., monastery)	-	Site Name
location	Location name (e.g., Augsburg)	-	Location Name
country	County or region (e.g., Germany)	-	Country,Region
orig_lon	Original longitude before editing by Jonkers et al. (2003)	orig_long_d, orig_long_m, orig_long_s	-
merid	Reference meridian (Jonkers et al., 2003)	meridian	-
lon_ed	Longitude edited by Jonkers et al. (2003): "Y" yes or "N" no	edited by scrolly(Y/N)	-
decl	Declination value [°]	dec_d, dec_m	Dec
ddecl	Declination uncertainty [°]	-	-
decl_meth	Method of declination determination	-	Dir. Meth ID
no_decl	Number of independent measurements/samples for reported value	no_obs_d	N_Dir
decl_inst	Instrument used for declination determination	-	-
inc	Inclination [°]	inc_d, inc_m	Inc
dinc	Inclination uncertainty [°]	-	-
inc_meth	Method of inclination determination	-	Dir. Meth ID
no_inc	Number of independent measurements/samples for reported value	no_obs_inc	N_Dir

field	**description**	(Jonkers et al., 2003)	(Brown et al., 2015)
inc_inst	Instrument used for inclination determination	-	-
k	Precision parameter	-	k
a95	α_{95} — 95% confidence limit for direction	-	$\alpha 95$
nosp_dir_meas	Number of specimens measured	-	$n_{dir.}$meas.
nosp_dir_acc	Number of specimens accepted for reported directional values	-	$n_{dir.}$acc.
dir_analysis	Analysis method for reported directional values	-	Dir. Analysis ID
inten	Intensity value [nT]	int	Ba
dinten	Intensity uncertainty [nT]	-	σ_{Ba}
inten_code	Code for historical intensity type (Jonkers et al., 2003, Tab. 4)	int_code	-
cal	Calibration factor used to calculate historical field intensity in nT (Jonkers et al., 2003, Tab. 3)	-	-
inten_meth	Method of intensity determination	-	PI Method ID
no_inten	Number of independent measurements/samples for reported value	no_obs_int	N_{Ba}
inten_inst	Instrument used for intensity determination	-	-
nosp_inten_meas	Number of specimens measured	-	n_{Ba}meas.
nosp_inten_acc	Number of specimens accepted for reported intensity value	-	n_{Ba}acc.
alteration	Alteration check	-	Alteration Monitor ID
coolingrate	Cooling rate correction	-	Cooling Rate ID
anisotropy	Anisotropy correction	-	Anisotropy ID
MD_Monitor	Method to monitor multi-domain influence	-	Multi-domain Monitor ID
source	Historical source (e.g., mining) or material type	-	Material ID
obs	Observer	-	-
comment	Comment on data by author or processor	ref and comments	-
pubID	ID within original publication	-	Pub. data ID
comp_id	id number (=X) used within the compilations by Jonkers et al. (2003) ("JX") and Brown et al. (2015) ("GX")	idcode	UID
ref1	Primary reference(s)	idcode	Reference
refs2	Secondary reference(s) (compilation)	-	Compilation ID
flag	0 - no flag; 1 - modelling; 2 - duplicate; 3 - unreliable	-	-

field	**description**	(Jonkers et al., 2003)	(Brown et al., 2015)
flag_comm	Reason for flag	-	-
user_comment	User discussion	-	-

Table A1: Fields displayed in output table/file, with a description and reference of field names within the Jonkers et al. (2003) compilation and GEOMAGIA50v.3 database (Brown et al., 2015), respectively.

References

Brown, M., Donadini, F., Korte, M., Nilsson, A., Korhonen, K., Lodge, A., Lengyel, S., and Constable, C. (2015). GEOMAGIA50.v3: 1. general structure and modifications to the archeological and volcanic database. *Earth, Planets and Space*, 67(1):83.

Jonkers, A. R. T., Jackson, A., and Murray, A. (2003). Four centuries of geomagnetic data from historical records. *Reviews of Geophysics*, 41(2).

Thellier, E. (1981). Sur la direction du champ magnétique terrestre, en France, durant les deux derniers millénaires. *Physics of the Earth and Planetary Interiors*, 24(2):89–132.