

## **An uncertainty-focused database approach to extract spatiotemporal trends from qualitative and discontinuous lake-status histories**

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This document provides information on the structure and content of the components of the lake-status database. It is part of Zenodo object <https://doi.org/10.5281/zenodo.4494804>, and is a supplement to

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Please reference the publication above when using any data or methodology related to this material.

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Table	Field	Possible entries
lakes	basintype	"closed", "closed, artificially dammed", "closed, artificially drained", "closed, artificial outflow", "closed, artificially controlled", "closed, bog", "closed, breached", "closed, drained", "closed, dry", "closed, seasonally filled", "closed, significant groundwater influence", "fluvial/oxbow", "not known", "open", "open, artificially controlled", "open, artificial reservoir", "open, artificially dammed", "open, artificially drained", "open, bog", "open, drained", "open, dry", "open, infilled", "open, significant groundwater influence"
dating	datetype	"136C dating", "Alpha U/Th", "Amino acid racemisation", "AMS", "Annual laminations", "Argon/argon", "C14 date (uncorrected)", "Corrected radiocarbon date", "Cosmogenic isotopes Be", "Cosmogenic isotopes other", "Cross-dating", "Electron spin resonance (ESR)", "Event, other", "Event, tephra", "infrared stimulated luminescence (IRSL)", "Liquid Scintillation Counting", "Magnetic Sector ICP-MS U/Th", "MC-ICP-MS U/Th", "Multiple methods", "nan", "Not known", "OSL other", "OSL single grain/single aliquot, central", "OSL single grain/single aliquot, finite mixture", "OSL single grain/single aliquot, minimum", "OSL single grain/single aliquot, unknown measure", "OSL single grain/single aliquot, wgt mean", "OSL unspecified", "Palaeomagnetism", "PB-210/Cs-137", "Thermal ionization mass-spec (TIMS) U/Th", "Thermoluminescence, coarse (>80um)", "Thermoluminescence, fine grained material (4-11um)", "Thermoluminescence, unspecified", "Uranium Thorium (U/Th) dating, unspecified", "Uth TIMS"
dating	materialdated	"aragonite", "archaeological artifact", "bone", "bulk sediment, calcareous lake deposits", "bulk sediment, gyttja", "bulk sediment, minerogenic", "bulk sediment, organic lake deposits", "bulk sediment, organic lake deposits, diatomaceous marl", "bulk sediment, organic lake deposits, diatomite", "bulk sediment, peat", "bulk sediment, unspecified", "calcareous crust", "calcite", "carbonate", "charcoal", "coral", "dispersed NaOH insoluble fraction (humic materials)", "eggshell", "feldspar", "foraminifera", "gastropod shell", "humic acid", "humin", "not known", "organic matter", "other, i.e. none of the things on the current list", "peat", "plant macrofossil", "pollen fraction", "quartz", "Root cast", "shells", "soil", "stromatalite/tufa", "tephra", "wood"
dating	featuretype	"core", "section", "geomorphic feature", "shoreline"
dating	positionreference	"depth from individual core top", "depth from lake water surface", "absolute elevation (asl)", "elevation above lake water surface", "elevation above lake bed"
dating	event_tracer	"climate stratigraphy", "general assumption", "historic information", "IRD stratigraphy", "oxygen isotope stratigraphy", "pollen stratigraphy", "sediment stratigraphy", "tephrostratigraphy", "other stratigraphy", "other", "not known"
dating	event_timereference	"1950 CE", "b2k", "unspecified modern", "date of publication"
dating	published_calibration	"INTCAL13NH", "INTCAL13SH", "INTCAL13 marine", "INTCAL09", "Marine09", "INTCAL04", "Fairbanks", "beyond calibration", "other", "not known"
dating	published_agemodeltype	"linear", "linear between dates", "polynomial fit", "polynomial fit omitting outliers", "Bayesian", "mixed models", "other", "not known"
dating	published_timereference	"1950 CE", "b2k", "unspecified modern", "date of publication"
dating	published_isused	"yes", "no", "not applicable", "not known"
dating	new_calibration	"INTCAL13NH", "INTCAL13SH", "INTCAL13 marine", "INTCAL09", "Marine09", "INTCAL04", "Fairbanks", "beyond calibration", "other", "not known"

dating	new_agemodeltype	"linear", "linear between dates", "polynomial fit", "polynomial fit omitting outliers", "Bayesian", "mixed models", "other", "not known"
dating	new_timereference	"1950 CE", "b2k", "unspecified modern", "date of publication"
dating	new_isused	"yes", "no", "not applicable", "not known"
coding course	datasource	"Algae", "Aquatic plants", "Archaeological data", "Background", "Chironomids", "Diatoms", "Historical data", "Instrumental/gauge data", "Isotopes", "Mineralogy", "Molluscs", "Non-shoreline geomorphology", "Original age model used", "Ostracodes", "Sedimentology", "Shoreline features", "Stratigraphy"
coding course	used	"yes", "no"
coding	basintype	"closed", "closed, artificially dammed", "closed, artificially drained", "closed, artificial outflow", "closed, artificially controlled", "closed, bog", "closed, breached", "closed, drained", "closed, dry", "closed, seasonally filled", "closed, significant groundwater influence", "fluvial/oxbow", "not known", "open", "open, artificially controlled", "open, artificial reservoir", "open, artificially dammed", "open, artificially drained", "open, bog", "open, drained", "open, dry", "open, infilled", "open, significant groundwater influence"

**Table S1** Definition of predefined fields in the database.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
lakename	Most commonly used site name	text	none
latitude	Latitude of the (centre of) the lake expressed in decimal degrees, with negative values referring to southern latitudes	numeric	number within -90 to 90 range
longitude	Longitude of the (centre of) the lake expressed in decimal degrees, with negative values referring to western longitudes	numeric	number within -180 to 180 range
elevation	Elevation of the lake surface or, if dry, lake bed	numeric	none
basintype	Modern hydrological state of the lake	text	selected from pre-defined list
area	Surface area of the lake in km <sup>2</sup> , 0 if dry	numeric	positive decimal or 0
volume	Volume of the lake in km <sup>3</sup> , 0 if dry	numeric	positive decimal or 0
catchment	Catchment area of the lake in km <sup>2</sup>	numeric	positive decimal or 0

**Table S2** Structure and content of database's Lakes table.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
contributorname	Name of the researcher who contributed the site to the data base	text	none
orcid	orcid of contributor	text	none
date	date when site was contributed	text	"Month Year"

**Table S3** Structure and content of database's Contributors table.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
alternativename	Alternative names for lake site, used in scientific literature or other sources	text	none

**Table S4** Structure and content of database's Alternative names table.

Field	Description	Format	Constraints
referenceid	Unique reference identifier	numeric	positive integer
abbrev	Abbreviated version of reference	text	none
reference	Full reference	text	none
doi	Doi of reference	text	none

**Table S5** Structure and content of database's Refs table.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
dateid	Unique date identifier	numeric	positive integer
datatype	Type of date	text	selected from pre-defined list
materialdated	Material that was dated	text	selected from pre-defined list
featuretype	Type of archive from which date was obtained	text	selected from pre-defined list
featurename	Name of feature from which date was obtained	text	none
positionreference	Positional reference for the date	text	selected from pre-defined list
depth	Depth in sediment core or section from which date was obtained, in cm	numeric	positive decimal or 0
elevation	Elevation of shoreline from which date was obtained, in m above sea level	numeric	none
thickness	Thickness of sample, in cm	numeric	positive decimal or 0
labnumber	Lab number of date	text	none
rc_age	Reported radiocarbon age, in <sup>14</sup> C years	numeric	none
rc_uncertainty_positive	Positive uncertainty on reported radiocarbon age, in <sup>14</sup> C years	numeric	positive decimal or 0
rc_uncertainty_negative	Negative uncertainty on reported radiocarbon age, in <sup>14</sup> C years	numeric	positive decimal or 0
reservoir_age	Radiocarbon reservoir effect reported in original publication or calculated from available information	numeric	positive decimal or 0
event_name	If date is based on event, specify the event	text	none
event_tracer	If date is based on event, specify the event's tracer	text	selected from pre-defined list
event_timereference	If date is based on event, specify the age reference for the time scale	text	selected from pre-defined list
published_cal	Published calendar age	numeric	none
published_cal_upper2sigmar1	Originally published upper boundary of first 95-% uncertainty range of age	numeric	none
published_cal_lower2sigmar1	Originally published lower boundary of first 95-% uncertainty range of age	numeric	none
published_cal_upper2sigmar2	Originally published upper boundary of second 95-% uncertainty range of age	numeric	none
published_cal_lower2sigmar2	Originally published lower boundary of second 95-% uncertainty range of age	numeric	none



published_cal_upper2sigmar3	Originally published upper boundary of third 95-% uncertainty range of age	numeric	none
published_cal_lower2sigmar3	Originally published lower boundary of third 95-% uncertainty range of age	numeric	none
published_cal_upper2sigmar4	Originally published upper boundary of fourth 95-% uncertainty range of age	numeric	none
published_cal_lower2sigmar4	Originally published lower boundary of fourth 95-% uncertainty range of age	numeric	none
published_calibration	Radiocarbon calibration curve employed in original publication	text	selected from pre-defined list
published_agemodeltype	Age-model type of originally published chronology	text	selected from pre-defined list
published_timereference	Age reference for the published calendar age	text	selected from pre-defined list
published_isused	Is the date incorporated in the final originally published chronology	text	selected from pre-defined list
new_calibration	Radiocarbon calibration curve employed in age revision	text	selected from pre-defined list
new_agemodeltype	Age-model type of revised chronology	text	selected from pre-defined list
new_timereference	Age reference for the revised calendar age	text	selected from pre-defined list
new_isused	Is the date incorporated in the final revised chronology	text	selected from pre-defined list
new_weightedmean	Weighted mean age of revised date, either from individual date or from age-depth model	numeric	none
new_median	Median age of revised date, either from individual date or from age-depth model	numeric	none
new_oldestuncertainty	Upper boundary of 95-% uncertainty range of age of revised date, either from individual date or from age-depth model	numeric	none
new_youngestuncertainty	Lower boundary of 95-% uncertainty range of age of revised date, either from individual date or from age-depth model	numeric	none
notes	Notes	text	none

**Table S6** Structure and content of database's Dating table.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
status	Relative status class	numeric	positive integer
evidence	Description of the evidence upon which each status class is based	text	none

**Table S7** Structure and content of database's Coding basis table.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
datasource	Type of lake-status proxy	text	selected from pre-defined list
used	Denotes whether the proxy was used in constructing consensus lake-status history	text	selected from pre-defined list
referenceid	Unique identifier of reference where the data source is described	numeric	positive integer

**Table S8** Structure and content of database's Coding source table.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
shorelineid	Unique identifier of geomorphological feature	text	positive integer
shorelinefeature	Description of the feature	text	none
stillwaterlevel	Best-estimate elevation of the lake level at the time when the feature formed, in m above sea level	numeric	none
stillwaterlevellower	Lower bound of uncertainty range of lake level, if available, in m above sea level	numeric	none
stillwaterlevelhigher	Upper bound of uncertainty range of lake level, if available, in m above sea level	numeric	none
area	Best-estimate lake-surface area at the time when the feature formed, in km <sup>2</sup>	numeric	positive decimal or 0
areauncertainty	Uncertainty of lake-surface area at the time when the feature formed, if available, in km <sup>2</sup>	numeric	positive decimal or 0
volume	Best-estimate lake volume at the time when the feature formed, in km <sup>3</sup>	numeric	positive decimal or 0
volumeuncertainty	Uncertainty of lake volume at the time when the feature formed, if available, in km <sup>3</sup>	numeric	positive decimal or 0
catchmentarea	Best-estimate catchment surface area at the time when the feature formed, in km <sup>2</sup>	numeric	positive decimal or 0
catchmentareauncertainty	Uncertainty of catchment surface area at the time when the feature formed, if available, in km <sup>2</sup>	numeric	positive decimal or 0

**Table S9** Structure and content of database's Lake size table.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
levelid	Unique identifier of lake-status episode	numeric	positive integer
status	Best-estimate relative lake-status class	numeric	positive integer
minstatus	Minimum possible relative lake-status class	numeric	positive integer
maxstatus	Maximum possible relative lake-status class	numeric	positive integer
basintype	Hydrological state of the lake	text	selected from pre-defined list
shorelineid	Unique identifier of geomorphological feature	text	positive integer
startdate	Best-estimate age of start of lake-status episode, in cal yr BP	numeric	none
oldeststartdate	Upper boundary of 95-% confidence range of age of start of lake-status episode, in cal yr BP	numeric	none
youngeststartdate	Lower boundary of 95-% confidence range of age of start of lake-status episode, in cal yr BP	numeric	none
enddate	Best-estimate age of end of lake-status episode, in cal yr BP	numeric	none
oldestenddate	Upper boundary of 95-% confidence range of age of end of lake-status episode, in cal yr BP	numeric	none
youngestenddate	Lower boundary of 95-% confidence range of age of end of lake-status episode, in cal yr BP	numeric	none

**Table S10** Structure and content of database's Coding table.

Field	Description	Format	Constraints
basintype	Contains the possible entries for 'basintype' field in other tables	text	none

**Table S11** Structure and content of database's Basintypes table.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
dateid	Unique date identifier	numeric	positive integer
referenceid	Unique reference identifier	numeric	positive integer

**Table S12** Structure and content of database's Datingrefs table.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
levelid	Unique identifier of lake-status episode	numeric	positive integer
shorelineid	Unique identifier of geomorphological feature	numeric	positive integer

**Table S13** Structure and content of database's Codinglakesizes table.



Field	Description	Format	Constraints
datasource	Contains the possible entries for 'datasource' field in other tables	text	none

**Table S14** Structure and content of database's Data sources table.

Field	Description	Format	Constraints
datatype	Contains the possible entries for 'datatype' field in other tables	text	none

**Table S15** Structure and content of database's Datatypes table.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
referenceid	Unique reference identifier	numeric	positive integer

**Table S16** Structure and content of database's Lakerefs table.

Field	Description	Format	Constraints
lakeid	Unique site identifier	numeric	positive integer
shorelineid	Unique identifier of geomorphological feature	numeric	positive integer
referenceid	Unique reference identifier	numeric	positive integer

**Table S17** Structure and content of database's Lakesizerefs table.

Field	Description	Format	Constraints
materialdated	Contains the possible entries for 'materialdated' field in other tables	text	none

**Table S18** Structure and content of database's Materialdated table.