

NSF Magnetism Information Consortium

<http://earthref.org/MAGIC/>

MagIC: Next Generation

**Introduction Into Archiving
in the MagIC Database**

TOPICS

- **MagIC Products Overview**
- **MagIC Data Model**
- **MagIC Console Software**
- **Data Uploading into MagIC**
- **MagIC Data Policy**
- **Interoperability Needs**

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MagIC Products

Designed, Tested and Implemented

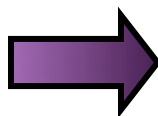
- Standard MagIC Data and Metadata Model, Version 2.4
- MagIC Console Software
- MagIC Database at San Diego Supercomputer Center
- MagIC Home Page and Search Portals
- MagIC Online Help File System
- MagIC Python Software (from data acquisition to MagIC)
- IRM Internal Relational Database
- Community-driven Data Reviewing System

Designed, but not activated (yet)

- RMAG Portal
- XML MagIC Web Services

MagIC Data Model Philosophy

Descriptive Data and Metadata



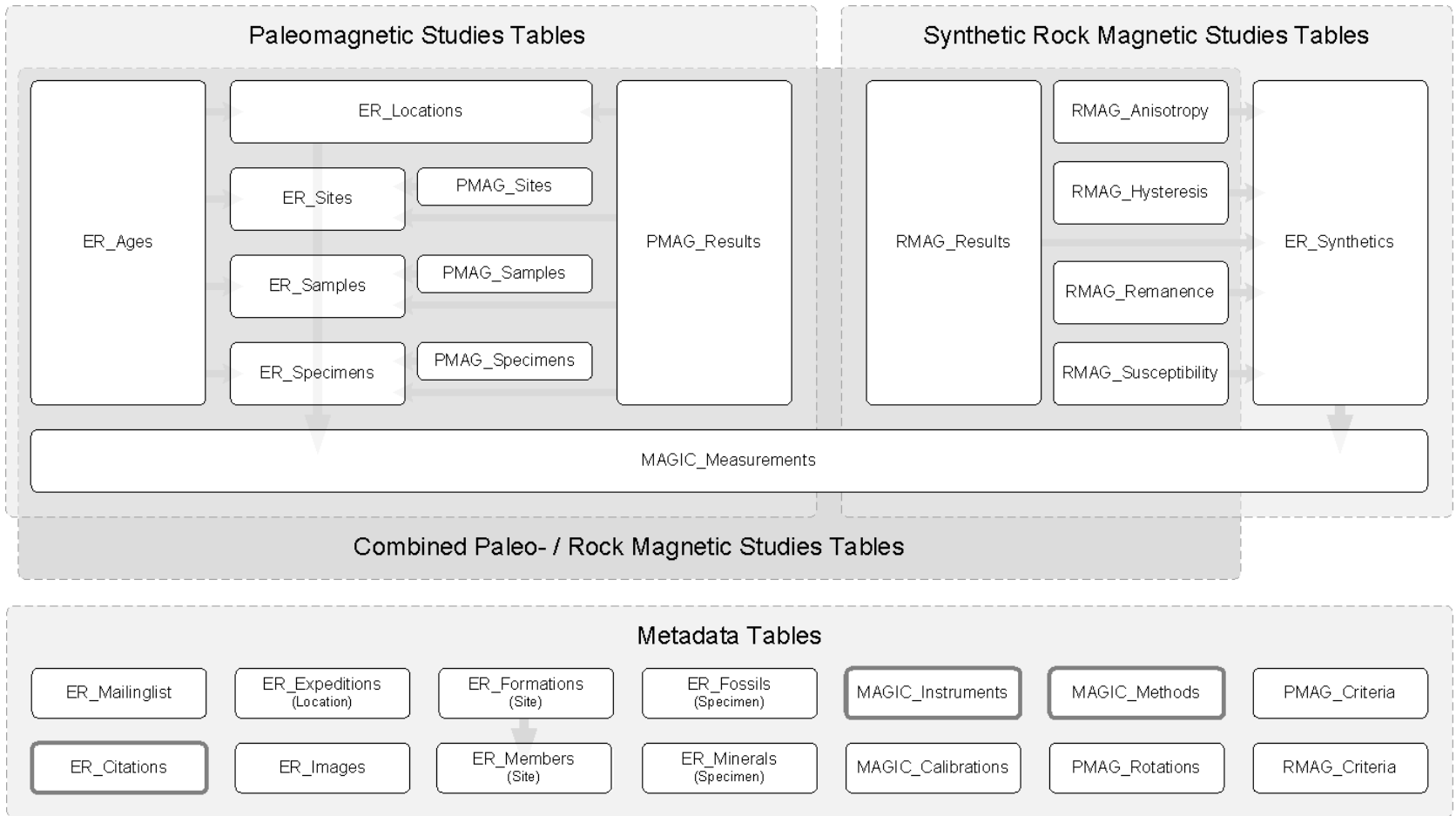
Some Statistics *

- **30** Tables
- **1,081** Columns
- **193** Required

* Required columns decrease if less tables are needed ...

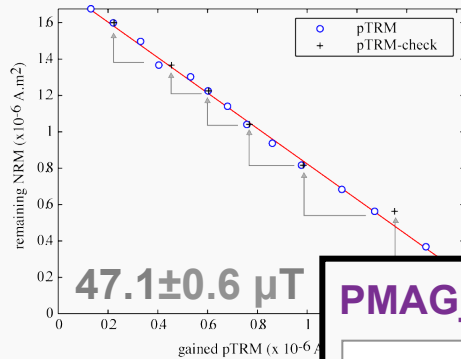
Tables	Oracle Name	Description
EarthRef	ER_Expeditions	Expedition, fieldwork or cruise definition
EarthRef	ER_Locations	Location definition
EarthRef	ER_Formations	Unique rock formation or sequence
EarthRef	ER_Members	Unique rock member or section
EarthRef	ER_Sites	Unique rock unit in terms of geological age
EarthRef	ER_Samples	Sample from site
EarthRef	ER_Specimens	Specimen from sample
EarthRef	ER_Fossils	Taxon or fossil
EarthRef	ER_Minerals	Naturally occurring minerals
EarthRef	ER_Synthetics	Synthetic material that is not necessarily related to geology
EarthRef	ER_Ages	Ages for discrete samples or horizons in stratigraphic sections or cores
EarthRef	ER_Citations	List of references
EarthRef	ER_Mailinglist	List of addresses
EarthRef	ER_Images	List of images and photographs
MagIC	MAGIC_Measurements	Level zero analytical data
MagIC	MAGIC_Methods	Description sampling, Laboratory and statistical techniques
MagIC	MAGIC_Instruments	Instrument listing based on institute, year of build and instrument name
MagIC	MAGIC_Calibrations	Calibrations
PMAG	PMAG_Specimens	Specimen from sample
PMAG	PMAG_Samples	Sample from site
PMAG	PMAG_Sites	Unique rock unit in terms of magnetization and geological age
PMAG	PMAG_Results	Summary results: Magnetic poles, VGP, VDM and VADM
PMAG	PMAG_Rotations	Data used to perform complex rotations between coordinate systems
PMAG	PMAG_Criteria	Selection criteria used in data selection
RMAG	RMAG_Susceptibility	Experiment for susceptibility parameters
RMAG	RMAG_Remance	Experiment for magnetic remanence: ARM, IRM, TRM, CRM, VRM and DRM
RMAG	RMAG_Hysteresis	Experiment for hysteresis loops and FORCs
RMAG	RMAG_Anisotropy	Experiment for anisotropy parameters
RMAG	RMAG_Results	Summary results: Critical temperatures
RMAG	RMAG_Criteria	Selection criteria used in data selection

MagIC Data Model Philosophy



MagIC Data Flow Example

PMAG_specimens



ological site ...

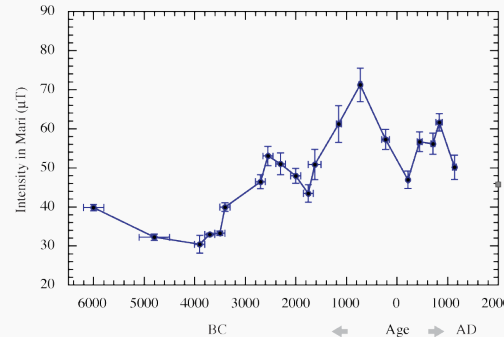
LOT 12

PMAG_samples

n=2 $\Rightarrow 47.6 \pm 0.5 \mu\text{T}$



PMAG_sites



MAGIC_methods

Thellier&Thellier-Coe
ATRM Corrected
Cooling Rate Corrected
Archeological Constraints
Etc.

MAGIC_instruments
MAGIC_measurements



MagIC Data Format Details

Name of corresponding table in the MagIC template

Delimiter

Header lines

Data

<code>er_location_name</code>	<code>location_type</code>	<code>location_begin_lat</code>
Tell Sabi Abyad	Archeological site	36.7
Tell Masaikh	Archeological site	35
Mashnaqa	Archeological site	36.3
Mari	Archeological site	34.5
Shaara	Archeological site	32.7
Tell Shheil	Outcrop	35.2
Tell Qaryat Medad	Outcrop	35.2
Tell Guftan	Archeological site	35.2

Name of the column in the MagIC table

The column names may appear in random order, and empty columns can be omitted...

- All **Units** are prescribed and in **S.I.**
- **Data Model** is published on the **MagIC Website**
- Text file in basic **ASCII Text (MS-DOS) Format**

MagIC Console Software

The screenshot displays the MagIC Wizard software interface with several overlapping windows. The main window, titled "MagIC Wizard", contains the following sections:

- MagIC Databases:** Paleomagnetism, Rock Magnetism
- Including:** Measurements, Calibration
- Paleomagnetic Data Categories:** Inclination, Intensity, Declination, Rotations
- Rock Magnetic Experiments:** Susceptibility, Hysteresis, Remanence, FORC, Anisotropy, Critical Temperatures
- Options:** Mailing List, Images, Ages, Instruments

Navigation buttons include "?", "<< Back", "Next >>", "Use Predefined Settings ...", and "Show All".

The "Predefined Wizard Settings" dialog box is open, showing a list of study types:

- Classical Directional Study
- Classical Intensity Study
- Classical Directional and Intensity Study** (highlighted)
- Classical Poles Study
- Full Paleomagnetic Study
- Rock Magnetism on Pure Synthetics
- Rock Magnetism on Nature-Based Synthetics
- Rock Magnetism on Natural Samples
- Stratigraphic or Drill Core Study

Buttons in the dialog include "?", "Cancel", and "OK".

Another dialog box in the foreground shows additional options:

- Members
- Locations
- Sites
- Samples
- Specimens
- Minerals
- Fossils
- Nature-based

Buttons in this dialog include "?", "Use Predefined Settings ...", "Show All", and "Clear All".

The status bar at the bottom left of the main window shows "Ready".

Uploading Data in MagIC

Home | Search | Upload Your Data | Help

MagIC Contribution Wizard -- Introduction

This is the start of the contribution process. We will take you through a few steps that begins with your file upload. Please select the appropriate contribution type below and click the **Continue** button.



- New contribution
- Update an existing contribution

You have **2** previous contribution currently logged in as **Anthony**

Home | Search | Upload Your Data | Help

MagIC Contribution Wizard -- Data Parsing

Processing er_samples ...



176 of 302 [58%]

Home | Search | Upload Your Data | Help

MagIC Contribution Wizard -- Data Parsing

Data parsing completed in 4 seconds.

Please **Activate your new contribution** below and by clicking the **Continue** button.

- Keep private Activate your upload ...
- I am one of the original authors ...

Back Continue

Home | Search | Upload Your Data | Help

MagIC Contribution Wizard -- Data Parsing

Data parsing completed in 4 seconds.

Please **Activate your new contribution** by selecting the checkbox below and by clicking the **Continue** button.

- Keep private Activate your upload ...
- I am one of the original authors ...

If you keep your contribution **Private** your data will not show up in public database searches. However, you can always search for your own data when you are logged in. You also can provide **Limited Access** to your colleagues by setting a group name and password.

ocean **Group Name** (optional)
floor **Group Password** (optional)

Back Continue

Upload Policy and Ownership

- **User Actions**
 - **New Contribution** (as per single publication)
 - **Update** (no deletions, unless private)
- **Contribution Types**
 - **Protected Data** (private)
 - **Group Data** (private with group access only)
 - **Activated** (every user has access)
- **Data Ownerships**
 - **Random Contributor**
 - **Original Author** (overwrites contributor)
 - **MagIC Database Team** (can overwrite if needed)

Interoperability Needs

IGSN (International Geological Sample Number)

- Needed for interoperating with other initiatives based on registered sample number
- Completely integrated in MagIC Data Model

DOI (Digital Object Identifier)

- Needed for interoperating based on reference

GEOCHRON / GPlates / IODP

- MagIC needs access to high precision age data (e.g. $^{40}\text{Ar}/^{39}\text{Ar}$, U-Pb zircon)
- GPlates needs access to MagIC for magnetic poles
- Combine shipboard and land-based IODP data

Interoperability Needs

Per Example:

- $^{40}\text{Ar}/^{39}\text{Ar}$ data calculated with ArArCALC can now be uploaded + stored in:
 - ✓ GEOCHRON
 - ✓ ERDA
 - ✓ EarthRef.org Reference Database
- Storage in GEOCHRON and ERDA are tagged with IGSN numbers

Upload to GEOCHRON and ERDA Databases

Age Standard & Methods | Sample | Location | Laboratory

Age Standard

Standard * 28.03 ± 0.01 %SD [Ma]

Name * FCT-3

Mineral * Biotite

Batch

Reference *
Renne, P.R., Swisher, C.C., Deino, A.L., Karner, D.B., Owens, T.L. and DePaolo, D.J. (1998). Intercalibration of standards, absolute ages and uncertainties in Ar-40/Ar-39 dating. Chemical Geology 145(1-2): 117-152. doi: 10.1016/S0009-2541(97)00159-9.

Methods Applied

Experiment Type * Incremental Heating

Extraction Method * Bulk Laser Heating

Duration Heating 600 [sec]

Duration Isolation 15 [min]

Reference
Koppers, A.A.P., Staudigel, H. and Duncan, R.A. (2003). High-resolution Ar-40/Ar-39 dating of the oldest oceanic basement basalts in the western Pacific basin. Geochemistry, Geophysics, Geosystems 4: doi: 10.1029/2003GC000574. issn: 1525-2027.

Online Help

Import IGSN Info

Request New IGSN

Upload Age Files Into ERDA

Export Data Into GEOCHRON

Save Metadata

Close