Documentation of MAP-RIVIERA database

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1 Introduction

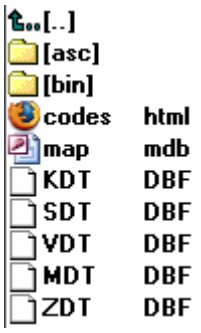
The MAP-RIVIERA database contains all data collected at the permanent sites during the experiment. All time series are available with a resolution of 30 minutes. Additionally the wind components (u,v,w) and temperature (θ_v) of Sonic data are archived with a resolution of 1 minute. A description of all stations and instruments can be found in the Meta Data Report (this DVD: …\documentation\MetaDataReport.pdf) or alternatively at

http://www.iac.ethz.ch/en/research/map_riviera/index3.html

All instruments are calibrated as indicated in this report. Sonic data are processed such that u+ is directed towards east, v+ is directed towards north. The uv-plane is horizontal. Where raw data are available sonic data are given with and without linear detrending. Matrix corrections are applied where available (see MetaDataReport). No other corrections are applied.

1.1 Database Design - overview

The map.mdb file (Microsoft Access) is the central part of the database. The database itself consists of five dBase tables and a directory where all data is kept in the form of binary .xdr files as well as a directory where all data is kept as ascii files. In the directory …\data \ you will find:



- The subdirectory \bin contains an .xdr file for every variable (e.g.: absolute humidity at station B2 (Rored) measured with the Krypton KH2O 1370 in 23.78 m heigh. Filename: AHA_B2.XDR). A total of 1047 datafiles are available.
- The subdirectory \asc contains the same data but in ascii format. This may be more convenient to read, but if many variables need to be read it is fairly slow.
- The Meta-Information documenting the time series is given in the 5 dBase tables (MDT.dbf, SDT.dbf, KDT.dbf, VDT.dbf, ZDT.dbf) where MDT stands for measurement data table, SDT for Station data table, KDT for configuration data table, VDT for variable data table and ZDT for time data table. For a further description of these tables please refer to chapter 2.2.
- codes.html leads to an overview on all data files sorted either by variables or by stations. This is a confortable way to get the variable names.

2 Organisation of the Database

2.1 XDR-files

2.1.1 Format

For every single variable there extists a .xdr-file in the directory …\data\bin\. XDR (External Data Representation Standard) is a standard for the description and encoding of data. It is useful for transferring data between different computer architectures:
(http://www.ietf.org/rfc/rfc1832.txt)

The xdr-files contain the data in binary xdr-float format (4 bytes for each datapoint) and the files do not contain a header. Where no data is available values are set to -9999.

As mentioned before the same data exists as ascii files in the directory in the directory …\data\asc\

2.1.2 Filenames

The filename of the XDR and ascii-files corresponds exactly to the code given in codes.html. None of these codes is longer than 8 characters, the codes are unique and built as follows:

PPA(X)_S(S)(L)(C).xdr or PPA(X)_S(S)(L)(C).asc

where characters in brackets are not necesseraly given

P = Parameter (2 characters, e.g. AH → Absolute Humidity)
A = Type (1 character, e.g. A: mean, S: standard deviation)
X = either: R → if set then linear detrending has been applied else no detrending has been applied
or: 1 → if set then the time resolution is 1 min else it is 30 min

S = Code of the station (1 or 2 characters)
L = Level of the station (1 character, 1 indicates the downmost level)
C = Set for slow measurements

2.2 DBF-Tables

2.2.1 Relational Database

The meta-information on all variables (all xdr-files) is kept in 5 dBase-tables. These tables are related to each other in the Meta Data Table (MDT). The MDT is therefore the central part of the database. There is a record for every single datafile (thus 1047 records) in the MDT. SDT contains the description of the station, KDT is the configuration, ZDT gives time information and VDT are the variables.

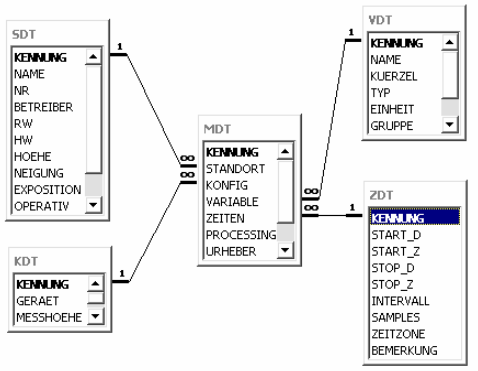


Abb. 2: set-up of the relational database

2.2.2 Features and oddities of the dBase-tables

- Entries in the dBase-tables are kept in english but the field names are german. This has historical reasons (The concept of this data base has been developed by D. Scherer at the University of Basel and since it has been used for several campaigns.)
- There are no special characters such as ° oder µg. They are input as HTML-characters (&deg for °, *µg for µg*).
- Unique codes (or IDs) and field names are written with capital letters.

2.2.3 MDT (Meta Data Table)

field entry	**mandatory / unique**	**format**	**description**	**example**
KENNUNG (identifier)	Yes / Yes	Character ≤ 8	Code of the measured time series. This code is identical whith the filename (ch 2.1.2).	„ATA_E11“ for XDR-file „ATA_E11.xdr“
STANDORT (site, station)	Yes / No	Character	Code of the station / site. Refers to a unique entry in the **SDT**.	„E1“
KONFIG (configuration)	Yes / No	Character	Code of the configuration / of the instrument. Refers to a unique entry in the **KDT**.	„SONE11“
VARIABLE (variable)	Yes / No	Character	Code of the variable. Refers to a unique entry in the **VDT**.	„AT_A1“
ZEITEN (time)	Yes / No	Character	Code with time information. Refers to a unique entry in the **ZDT**.	„Z1_BS“
URHEBER (reponsible)	No /No	Character	Describes who made the measurements / is responsable for the data time series.	„ETH Zurich“ „University of Basle“
LOCK	No / No	Number	1 = time series is protected and can not be changed / prolonged. 0 = time series is not protected and can be changed.	0
BEMERKUNG (remarks)	No / No	Character	Further description of time series	

2.2.4 SDT (Site Data Table)

field entry	**mandatory / unique**	**format**	**description**	**example**
KENNUNG (identifier)	Yes / Yes	Character	Code of site / station. Refers to a the entry STANDORT (site, station) in the **MDT**.	„E1“
NAME (name)	Yes / No	Character	Full name of the site	„Maruso-Roasco“
NR	No / No	Number	The number of the station	
BETREIBER (responsible)	No	Character	Describes who made the measurements / is responsable for the data time series.	„ETH Zurich“ „University of Basle“
RW (easting)	Yes / No	Number	Easting; refers to the Swiss geographical coordinate systen (m).	723240
HW (northing)	Yes / No	Number	Northing; refers to the Swiss geographical coordinate systen (m).	125180
HOEHE (height)	Yes / No	Number	Height of the station above sea level (m).	710
NEIGUNG (pitch)	No / No	Number	Pitch (Inclination) of the station (°).	
EXPOSITION (exposition)	No / No	Number	Exposition of the slope (if inclination > 0).	
BESTAND_H (canopy height)	No / No	Number	Mean canopy height z_H of forested or urban areas.	0
Z0	No / No	Number	zero plane displacement	0
PLANAREA	No / No	Number	plan aspect ratio λ_P in urban areas.	0
FRONTAREA	No / No	Number	mean frontal aspect ratio λ_F in urban areas.	0
FULLAREA	No / No	Number	Totel surface devided by total area.	0
NULLPKTV	No / No	Number	zeroplane displacement height (d).	0

OPERATIV (operational)	No / No	Number	2 = The station is operational and automatically updated. 1 = The station is operational and manually updated. 0 = The station was run during a project / experiment and is no longer operational.	0
LOKALITAET (land use)	No / No	Character	Description of the station.	„grassland / meadow“
BEMERKUNG (remarks)	No / No	Character	Further remarks	

2.2.5 VDT (Variable Data Table)

field entry	**mandatory / unique**	**format**	**description**	**example**
KENNUNG (identifier)	Yes / Yes	Character	Refers to a the entry VARIABLE in the **MDT**.	„AT_A1“
NAME (name)	Yes / No	Character	Full name of the measured variable.	„Acoustic Temperature“
KUERZEL (abbreviation)	No / No	Character	Abbreviation for this variable.	„Ts“
EINHEIT (unit)	Yes / No	Character	Unit of the variable.	„°C“
TYP (type)	No / No	Character	Type of aggregation carried out: A : mean X : maximum N : minimum S : standard deviation W : skewness K : kurtosis T : total C : covariance I : wind inclination (±90°, negative = from top to bottom, positive = bottom to top) E : end of aggregation period	„A“
GRUPPE (group)	No / No	Character	T : temperature H : humidity R : radiation W : wind / turbulence N : precipitation P : pressure C : air chemistry F : flux S : soil Q : quadrant analysis X : miscellaneous	„T“
KOMMA (decimal place)	Yes / No	Number	Number of significant decimal places for standard ASCII output.	1
BEMERKUNG (remarks)	No / No	Character	Further remarks	

2.2.6 KDT (Configuration Data Table)

field entry	**manda-tory / unique**	**format**	**description**	**example**
KENNUNG (identifier)	Yes / Yes	Character	Code of the conficuration / instrument. Refers to a the entry KONFIG in the **MDT**.	„SONE12K“
GERAET (instrument)	Yes / No	Character	Full name of the instru-ment(s) eventually with serial number.	“Sonic Gill R2A 0043 / Krypton KH2O 1199”
HOEHE (height)	Yes / No	Number	Height where the instrument was mounted (m a.g.l).	12.7
BEMERKUNG (remarks)	No / No	Character	Further remarks	

2.2.7 ZDT (Time Daten Tabelle)

field entry	mandatory / unique	format	description	example
KENNUNG (identifier)	Yes / Yes	Character	Code of the time information. Refers to a the entry ZEITEN in the **MDT**.	„Z30_BS“
START_D (starting date)	Yes / No	Date	Starting date of the time series as dBase date (JJJJMMDD). This date is the end of the aggregation period of the first measurement.	„19990710“
START_Z (starting time)	Yes / No	Number	Starting time of the time series (HH:MM). This is the end of the aggregation period of the first measurement.	„00:30“
STOP_D (end date)	Yes / No	Date	End date of the time series as dBase date (JJJJMMDD). This date is the end of the aggregation period of the last measurement.	„19991013“
STOP_Z (end date)	Yes / No	Character	End time of the time series (HH:MM). This is the end of the aggregation period of the last measurement.	„00:00“
INTERVALL (interval)	Yes / No	Character	Aggregation period in the form „HH:MM”.	„00:30“
SAMPLES	No / No	Character	Number of samples / measurements that lead to the value in intervall.	
ZEITZONE (time zone)	Yes / No	Character	Time zone (CET)	„CET“
BEMERKUNG (remarks)	No / No	Character	Further remarks	