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MULTILINGUAL SOIL DATABASE

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Preface

This is the first version of the FAO-ISRIC-CSIC multilingual soil database (SDBm), a user-friendly tool to facilitate the organization, storage and retrieval of basic soil data on a micro-computer. The present system is a further enhancement of the FAO/ISRIC soil database (SDB) originally developed in cooperation with the International Soil Reference and Information Centre (ISRIC), Wageningen, the Netherlands, subsequently adapted to Botswana conditions and then rewritten for universal use. The enhancement concerns mainly the conversion of the FAO/ISRIC SDB in English into a three-language software package (English, French, Spanish), the addition of basic statistical analyses and improved database management tools. It was carried out in collaboration with the Institute of Natural Resources and Agro-biology (CSIC), Seville, Spain.

Soil surveys generate large quantities of data from both field description and laboratory analysis. Commonly their potentials to generate useful information are exploited to only a minimal extent because of the data handling limitations of manual methods of analysis and the summary in written documents of voluminous data recorded in the field.

By enabling the storage and retrieval of soil profile data in a quick, efficient and systematic way, SDBm can enhance the exploitation of soil survey data for various purposes. In particular, it can ease the flow of such data into computerized land evaluation systems, land resource based geographic information systems (GIS) and simulation models, and programs to provide interfaces for such uses will be added to future editions.

SDBm is flexible according to its requirements and it operates on a range of hardware platforms.

The coding system used in the database follows the draft version of the revised FAO Guidelines for Soil Profile Descriptions (1990). A variable system of coding field data is used to facilitate adaptations to local conditions.

The database runs on IBM-compatible micro-computers. It was compiled using the CLIPPER compiler.

SDBm is in a continuous process of development. This version, including the manuals in the three languages, still needs to be improved. SDBm is designed as an "open" system which can be easily modified in the future. New features to be included in SDBm will depend on the future development of soil mapping and land evaluation systems. Feedback and suggestions from those who receive the software are most welcome and will facilitate AGLS' task of removing "bugs" and upgrading it.

Please address your comments to: Chief, AGLS
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Acknowledgements

SDBm is the result of cooperation between experts from the Soil Resources, Management and Information Service, Land and Water Development Division of FAO (AGLS), the International Soil Reference and Information Centre (ISRIC) and the Institute of Natural Resources and Agro-Biology (CSIC). AGLS wishes to acknowledge the important contributions of Mr. E. Van Waveren, the main author of the original SDB program, Prof. D. de la Rosa, F. Mayol and J.A. Moreno, as well as Fabio Grita, for the development of the SDBm package.

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Chapter 1

Introduction

BRIEF DESCRIPTION OF THE MULTILINGUAL SOIL DATABASE

The FAO-ISRIC-CSIC Multilingual Soil Database (SDBm) is a multilingual (English/French/Spanish) system designed to store and manipulate morphological and analytical soil data. It is a collection of programs written in CLIPPER 5.2 and C languages which constitutes a user-friendly tool for an efficient and systematic organization of soil profile data. Data storage is greatly facilitated by the multilingual function which provides "assist menus" in the selected language. Decoding tables in English, French and Spanish for the automatic translation of codes are available. Its main features are:

- A menu-based interactive user interface. On-screen instructions and help screens assist the user in running SDBm. Options are selected and started by simply pressing single keys.

- The entry/edit screens are provided with pop-up menus for entering data using selection bar (codes and definitions conform with FAO-ISRIC, 1990 "Guidelines for Soil Profile Description").

- Input and edit procedures include a validity control on coded data.

- Facilities to activate and deactivate variables according to the collection or availability of data.

- A flexible coding system. SDBm provides 3 different sets of codes related to the 3 available languages. It also allows the classification and coding of variables to be changed. A limited number of additional site variables can also be defined.

- Extensive selection facilities. Results may be sent to a printer or to diskfiles in order to make the data available to other programs.

- Options for graphic representation of the analytical data. The vertical variability is displayed using XY coordinate system and the complementary percentage of groups of variables is represented using a pie chart.

- The soil layer generator option, whose output can be linked to a Geographic Information System (GIS) or Land Evaluation System (LES), is a tool that helps in the practical soil interpretation. It calculates weighted averages or dominant values of selected diagnostic

variables by soil unit, depth range and group of profiles. Output data can be exported for further utilization.

- A read/write facility to communicate with other SDBm databases. This allows SDBm to be used in a number of offices. For instance data can be entered in regional offices and feed a central database, or data can be entered directly in the field in a portable computer and afterwards added to the main databases.

- The databases are protected against operational errors.

SYSTEM REQUIREMENTS

Micro Computer: IBM PC, XT or AT, or a 100% compatible with at least 512K RAM and a hard disk.
DOS version 6.0 or greater is preferable but the software is compatible with previous DOS versions.

To ensure a reasonable performance with larger databases, an AT compatible with at least 640K RAM is required. SDBm makes use of extended or expanded RAM. If expanded RAM is present, SDBm will require at least 16K of the expanded memory.

Printer: 80 column matrix printer, or laser printer.

SDBm does not have any specific requirements with respect to type or make of the printer. However it assumes that the printer is connected to the 1st parallel port, which is the case in most configurations. If not, a minor modification should be made in the SDB.BAT file. See Appendix A for more information.

Printouts always have an A4 format. This means that SDBm assumes a page length of 12 inches. SDBm sends information to the printer in ASCII, and different makes of matrix printers can be used without the need to change settings.

With laser printers it is slightly more complicated since SDBm uses a condensed format, which is set by the DOS <Mode lpt1:132> command. This command may not be supported by the laser printer. Consult your printer manual on how to change to condensed format. You may wish to include this statement as a program line in the SDBm start program. See Appendix A for more information on how to modify SDB.BAT.

dBASE COMPATIBILITY

SDBm is originally a dBASE application, which was later rewiritten and compiled in CLIPPER (Nantucket), consequently all databases are dBASE compatible. This includes the main databases, the conversion files and the databases SDB creates with the write to file facility (*.DAT files).

The file structures are given in the data dictionary (Appendix C).

Chapter 2

Structure and configuration

DATA STRUCTURE

SDBm can be used to store field descriptions, standard analytical results, soluble salts and related determinations on saturated paste, and soil physical data such as infiltration and water retention.

Field description

The field description is largely stored in a coded format. The coding system is explained in the next section and listed in Appendix B. The following variables are described:

General:	profile code, status, date, authors (3 entries), local soil unit
Location:	sheet number, grid reference, coordinates, location (descriptive), elevation
Soil classification:	FAO-Unesco-ISRIC (1990), FAO (1974), USDA (1975), Soil Climate
Geomorphology:	topography, landform, land element, position, slope gradient, slope form, micro topography
Flooding:	frequency, duration
Land use:	type, crops (2 entries)
Vegetation:	type, main species (5 entries), grass/forb cover
Parent material:	rock type (2 entries)
Rockoutcrops:	abundance, distance, height
Surface stones:	abundance, size
Erosion/Deposition:	intensity, type (2 entries)
Sealing/Crusting	
Drainage:	class, internal (permeability), external (run off/ponding)
Watertable:	actual depth, fluctuation, type
Moisture conditions (3 entries)	
Effective soil depth	
Human influence	
Remarks (descriptive)	
Five additional 'blank' variables to be defined by the user	

Horizon description (2 entries can be made for each variable unless stated otherwise):

Designation

Depth
Colour (moist/dry)
Mottles
Texture (<2mm)
% clay (field estimate)
Consistency: dry - moist - wet
Cutans
Cementation/compaction (one entry only)
Pores/voids
Rock fragments >2mm
Mineral nodules
Roots
Biological features
Reaction HCL (one entry)
pH (one entry)
Remarks

Standard analyses

Information on the following variables can be stored in the database:

Sample depth
pH: H2O - CaCl2
EC
P
N
Organic C
CaCO3: total, active
CaSO4 - total
CEC: soil, clay
Exchangable cations: Ca, Mg, Na, K, H, Al
Base Saturation
Fixed K
Particle size: sand (very coarse - coarse - medium - fine - very fine)
silt (coarse - fine)
clay

Methods: 10 analytical methods to be defined by the user

Determination of soluble salt

Sample depth
pH
EC

Ca Mg K Na B
Cl CO3 HCO3 SO4 NO3
SAR

Methods: 7 analytical methods to be defined by the user

Soil physical data

This information is grouped into information on the site and information per sample:

Basic infiltration (3 entries)
Surface structure stability

Methods: 2 analytical methods to be defined by the user

for each sample:

Sample depth
Moisture content - 0.03 bar 0.05 bar 0.1 bar 0.3 bar 1 bar 3 bar 5 bar 15 bar
Bulk density
Methods: 2 analytical methods to be defined by the user

DATA ORGANIZATION

To use SDBm effectively it is important to have a general understanding of the way the data are organized in the system.

The database contains information on individual soil profiles. The information is entered for each soil profile separately.

The soil profile data are grouped in the following data blocks:

- field description (site description, profile description and remarks),
- standard analyses,
- soluble salts, or more correctly analyses on saturated paste,
- soil physical data.

The blocks should be seen as separate databases which can be manipulated independently. For instance, for a certain soil profile code only the analytical results may be entered, updated, printed or selected.

It is not important which data block is entered first, or in which physical order the soil profiles are entered in the data blocks.

Profile Code

The soil profile code is particularly important since it identifies the information in each block of data, links the data blocks and connects them to the actual observation or sample.

If, for example, analytical data are entered under the wrong profile code it will be linked either with the wrong field description, or with no field description at all.

SDBm checks profile codes for all data groups and duplicates are not accepted. This reduces the risk of entering incorrect codes considerably, but it does not prevent the user from entering a non-existent, wrong code.

The profile code always consists of 6 digits; these may be letters, numbers, or a combination of both. Codes containing less than 6 digits are not accepted by SDBm. The number of digits is fixed to guarantee proper sorting. For instance, the following series of codes; BA1 - BA2 - BA11, will be sorted in alphabetical / numerical order by the computer as BA1 - BA11 - BA2, whereas BA01 - BA02 - BA11 will be sorted as BA01 - BA02 - BA11

Note that a blank is considered to be a character.

Valid codes are	Invalid codes are
A 2 41	st1234
MA0021	s7
L 0903	INT42
T24ANG	abc94X
MA 021	

Coding System

Site and profile information is largely stored in a coded format according to the SDBm coding systems. Each language is provided with its own coding system in order to make codes more familiar to the user. Switching from one language to another results in a full automatic conversion of codes. Although only English codes are stored in the output file, this does not affect the operation of the database because the conversion of codes is totally transparent to the user. Coding systems are flexible and form part of the database. It contains a set of default classes and codes; however changes or additions can be made. See Chapter 5 for more information on this subject.

All coded data are checked for validity after entering or editing and the user is forced to replace invalid codes immediately. Codes are considered invalid if SDBm cannot find them in the coding system. SDBm allows entries in both upper and lower case, but lower case entries will always be converted to upper case.

It should be realized that the character fields are supposed to be filled starting from the farthest left place (left justified). A code is considered invalid if it is placed in the wrong position(s) in a field. For instance a single character code should always occupy the first position in a 2 digit box. SDBm controls only the validity of the codes and not their meaning. In other words it merely checks whether the entered code exists for a particular variable and not whether the use of this code makes sense in this specific context.

The missing value for coded variables is a blank. Do not use a 0 (zero) since this is used in the SDBm coding system as a positive statement. For instance, leaving the entry for

surface sealing blank means that no information is available. Entering a 0 means that that no sealing was observed.

Numerical Data

Laboratory data are predominantly stored in a numerical format. Numerical entries are automatically right justified. Blank entries are replaced in the database by a zero. To avoid confusion, it is advised to define a code for missing values, e.g. -1 or 999.

Descriptive Data

Descriptive data, such as location and remarks, are stored in exactly the same way as they are entered. Upper and lower case letters can be used, as well as numbers or any other digit.

Chapter 3

Operating directions

SDBm is a menu-driven program. It is a very easy to use even by people inexperienced in using computers. However, one should take care during the initial installation of the system and its use. It must be remembered that the storage and manipulation of soil survey data is only a part of the process of soil surveying and the uses to which that soil survey data is put. However, the earlier in the process the computerized data base can be incorporated into the the programme of work, the greater the potential benefits that can be obtained from its use.

INSTALLATION

SDBm is distributed on one 3.5" 1.44 MB floppy disk. To make installation onto the hard disk straightforward an MS-DOS batch file called SDBMINS.BAT is included on the disk. Insert the disk in drive A and type:

A: <return>

SDBMINS <return>

Before starting the installation, the user is asked to choose the subdirectory where the SDBm program is to be stored. The default path is "SDBM". The user may confirm the default settings by pressing the ENTER key or modify it by typing a new directory path.

SDBm operates under MS-DOS, there is no copy protection or other traps to catch the user unaware. The only restriction on the use of the system is that SDBm only accesses files in the current working directory. It is also possible to store the whole SDBm anywhere on the computer.

If a previous version of SDB is installed in the computer, the procedure is to first delete that version and install the new one.

Depending on which DOS version is available, previous SDB versions can be removed using the command DELTREE or ERASE + RD. For example, if old SDB is stored in directory SDB2, type the command:

C:\>DELTREE SDB2 <E>

if MS-DOS 6.0 or a later version are available; or:

C:\>ERASE SDB2 <E>

C:\>RD SDB2 <E>

for previous MS-DOS versions.

Refer to Appendix A for more detail on SDBm installation.

Configuring SDBm

It is very difficult to write a general purpose database management system to meet the requirements of all soil surveyors in all parts of the world. SDBm has been designed with a certain amount of user configurability in mind. The user has the option of choosing up to 8 additional site description parameters and up to 12 additional analytical tests to the profile description. It is not essential that all fields within the database are used.

Once it is decided what will be recorded in a soil profile, then the additional variables can be allocated, ignoring those which are of no interest. The user also has the possibility of using some of the predefined fields for other purposes. For example, the database fields Soil Unit and Survey Area can, if necessary, be used to store land units or information about available aerial photographs. Similarly the Status field can be used to store a data reliability factor.

Once the paramenters being used to describe the profile have been determined, then it is necessary to allocate codes to the various classes. The distribution copy of SDBm contains default classifications. Take these as a guide, adding and subtracting from them to reflect the range of expected descriptions. Appendix B describes the coding system in detail.

Using SDBm

Before starting SDB the printer should be switched on. Check the amount of paper. Errors may occur in the printing if the printer runs out of paper while printing. The printer is set to condensed format (132 characters/line) automatically when SDBm is started.

Warning: Switching the printer off and on during a SDB session resets the printer to the normal format. Restart SDB if your printer can not be switched manually to condensed print mode (132 characters/line).

To start SDBM from the root directory, the file SDBM.BAT must be copied to the root directory; type:

c:>copy\SDBM\SDBM.BAT

Start SDB from the root directory of the hard disk by typing:

SDBm + <Return>

After some time the SDBm entry screen and the introduction page appear on screen. Press any key, 5 times, to skip to the main menu.

From the main menu one can go to any of the sub-menus to start an action by pressing the number or character indicated to the left of the option or using the selection bar. Examples of sub-menus are the input menu, print menu and edit menu.

Press H to obtain on-screen information on the various options.

Q to quit SDBm or to go back to previous menu

Main Menu options are explained in detail in Chapter 4.

Quitting and backing up SDBm

Go to the main menu and press Q to quit. It will returns you to the MS-DOS prompt. At the end of every working day use the MS-DOS BACKUP command to back up the complete SDBm database onto floppy disks. The recommended procedures are as follows:

Make sure you have an adequate supply of formatted floppy disks. As a rough formula allow 3 Kbytes for each profile and add an extra disk for SDBm. These disks should be either blank or contain material that you do not mind loosing, like a previous backup. Two completely separate sets are a good idea , used on alternative days. If lightning strikes your computer while backing up, you have at least a complete set only one day out of date.

Insert the backup diskette in drive A, and type: MSBACKUP

Select DBF and the file SETUP.MEM to backup

and respond to the requests of the program issues on the screen.

Do not use MSBACKUP to transfer data to a different database, use the import/export function instead. Also be very careful about using the BACKUP to move the SDBm system to a different computer. Different versions of MS-DOS use different formats for backing up files and they are not always compatible. The best may be to move your complete system to your new computer using a file transfer program such as LAPLINK.

INTERACTIVE INTERFACE

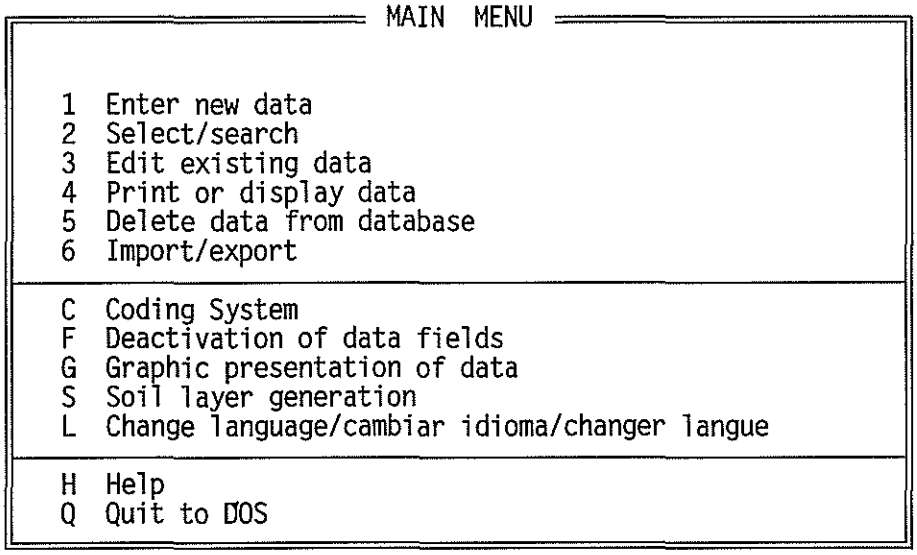
SDBm is easy to operate and largely self explanatory. Options and guidelines to run the various procedures appear on screen, and SDBm prompts the user to respond whenever necessary. The user reacts by simply pressing one of the keys, following the instructions on the screen.

Help screens provide additional on-screen information on the possible alternatives, and data screens facilitate relatively easy input and editing of data.

Menus

SDBm asks the user which action it should perform next by displaying a menu. A menu is a list with possible options. The user selects one of these options simply by pressing one of the highlighted keys in the menu. Both upper and lower case entries are accepted.

FIGURE 1
Main menu



Pressing a wrong key (any key not listed in the menu) will not have any affect, the program just waits until a correct entry has been made.

The Main Menu (Figure 1) is an example of such a menu.

SDBm waits for the user to select one of the options, e.g. press 1 to start data input, 4 to obtain printouts, or h or H to get help.

One menu may bring you to the next menu. For instance selecting option 4 (printing) from the main menu brings the user to the print menu in which the possible print options can be specified.

All menus include a Help option for on-screen additional information on the options listed in the menu.

SDBm may need additional instructions from the user during the performance of an action. For instance the user specifies the print outputs by answering the following question:

Print Analytical Data (Y/N)?

Again SDBm will only continue after a correct key has been presssed, in this case upper or lower case Y or N.

Data entry screens

All data are entered or updated (edited) with the help of data screens. These screens contain the names of the variables followed by light-coloured boxes (fields) in which the data are

entered. There are different screens for the site description (Figure 2), horizon descriptions (Figure 3), standard analyses, soluble salts (Figure 4) and soil physical data (Figure 5).

FIGURE 2
Profile description entry screen

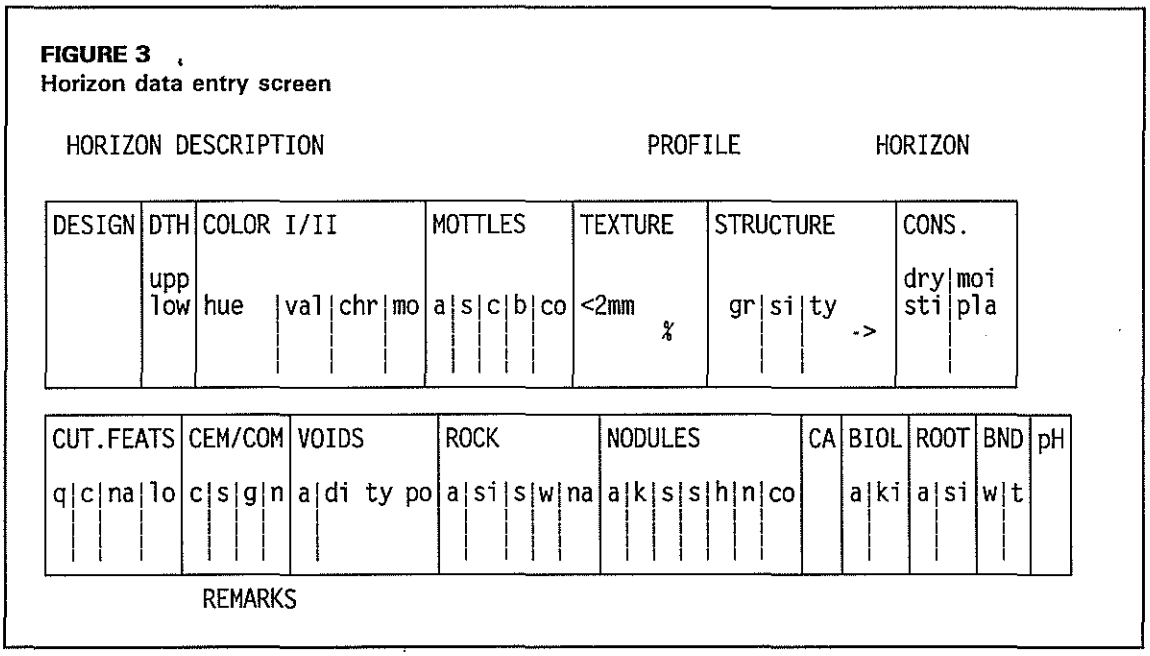
SITE DESCRIPTION PROFILE CODE PAGE 1

STATUS	DATE / /	AUTHOR	| |	SOIL UNIT	
LOCATION			SURVEY AREA		
ELEVATION	SHEET	GRID	LAT - | |	LON - | |	
FAO 90 |	74	phase	ST gg|sg |	psc|min|rx | |	
SOIL CLIMATE	smr|str |		LOCAL SOIL SERIE		
TOPOGRAPHY	LANDFORM	LAND ELEMENT		POSITION	
SLOPE class	form	MICRO TOPO	FLOOD frq|duration |		
LAND USE	type	crops |			
VEGETATION structure		species	| | | |	grass/forb cover	
PARENT MATERIAL	-over-		derived from		

SITE DESCRIPTION PROFILE CODE PAGE 2

STONES |	ROCS abun|dst|hght	| |	EROSION/DEP	: |	:
SEALING CRUSTS					
DRAINAGE	int/ext |	WATER TABLE obs|min|max|type		| |	
MOIS COND D:0-	|M:- | :-	EFFECTIVE SOIL DEPTH		HUMAN	
REMARKS					

FIGURE 3
Horizon data entry screen



The cursor can be moved over the data screen by a number of keys. The functions of the most important keys are summarized on the bottom line of each screen. A complete list is given below:

To move the cursor within a box:

<-	moves the cursor one place to the left
->	moves the cursor one place to the right

To move the cursor between boxes:

| or Shift-Tab	skips the cursor to the beginning of the previous box
| or Tab	skips the cursor to the next box, but not necessarily to the beginning
<——┘	Return or Enter key, skips the cursor to the beginning of the next box. Note that if this key is used to skip a box without entering data the numerical data are replaced with 0. Character data remain unchanged.

Other keys:

<---	Backspace key, deletes the digit left of the cursor
Pgdn	Page down forces the cursor to the end of the screen (exit). For updating of small parts of the screen this key may prove to be very useful.
Esc	Escape forces the cursor to the end of the screen; however newly entered or modified data are lost.

If a box is completely filled the cursor will automatically jump to the next. In all other cases use -> to move within the same box or | to skip to the next.

FIGURE 4
Analytical and soluble salt data entry screen

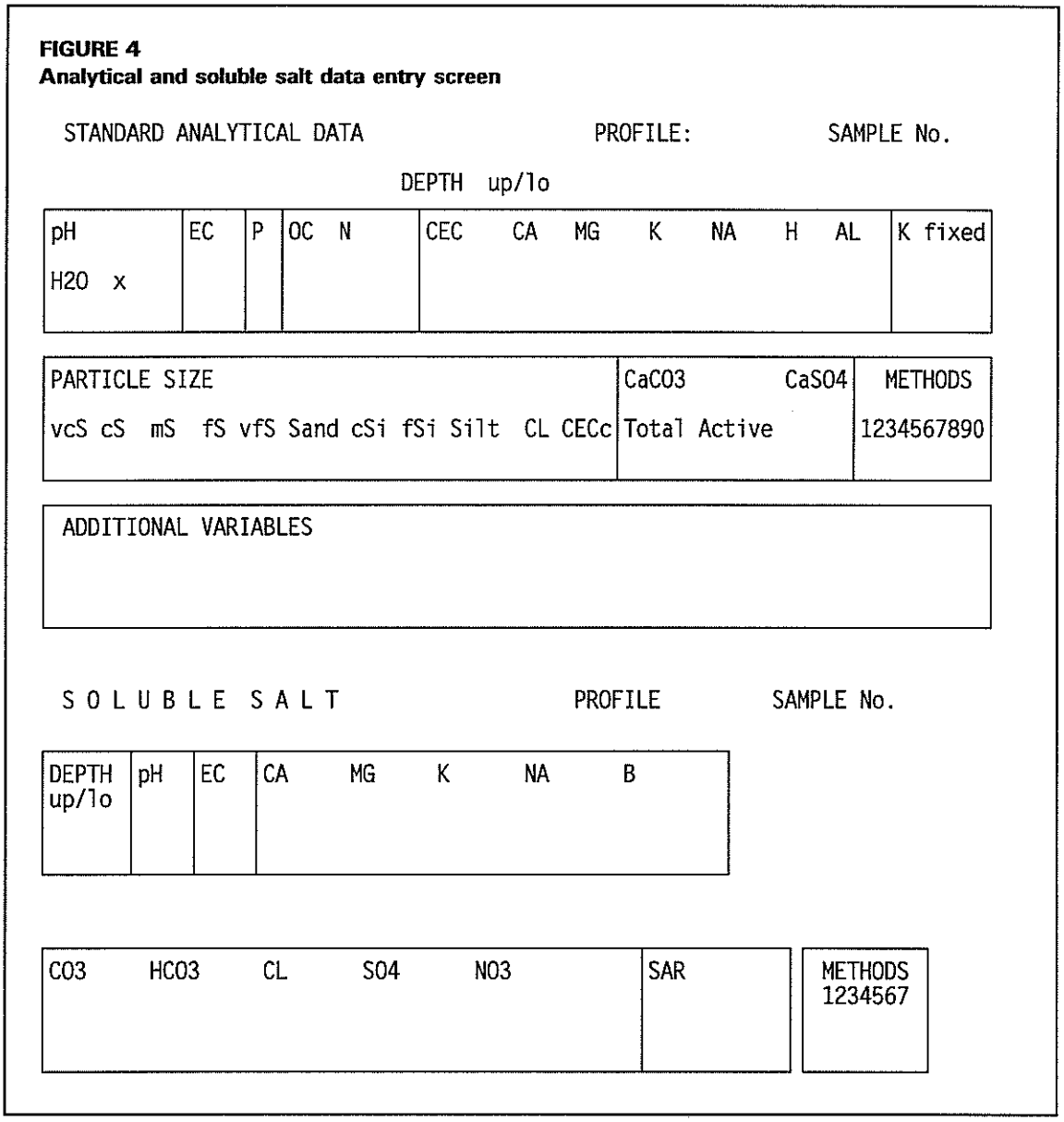
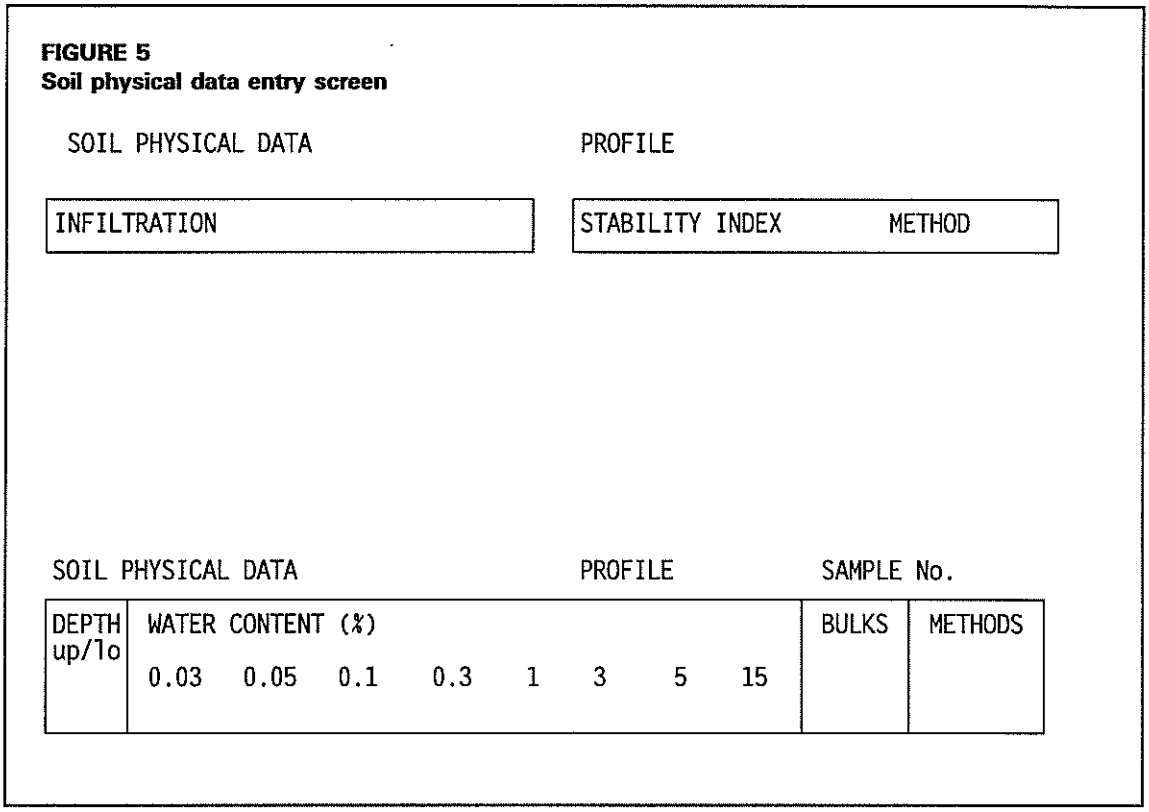


FIGURE 5
Soil physical data entry screen



Chapter 4

Basic software features

SDBm features are distinguished into two main groups: basic and special. The first group refers to the conventional applications common to every database while the second includes those which were developed to provide more analytical tools to the SDBm user. This chapter deals with basic features in order as they appear in the main menu.

ENTER NEW DATA

This option is used to enter new profile descriptions and/or laboratory data into the database. Use EDIT to change information on, and to add information to, profiles that are already stored in the database.

The field information is entered according to the SDBm coding system (Appendix B) and making use of the help system (see Chapter 5). The validity of the codes is checked and unknown codes (codes not included in the coding system) are not accepted.

All coded information can be entered in both upper and lower case. On screen SDBm automatically transfers lower case into upper case. The descriptive information (site location and remarks) will be stored exactly the way it is entered.

All data are entered for individual soil profiles. The soil profile is identified by its profile code. Invalid codes are not accepted.

The profile codes are unique, i.e. it is not possible to enter duplicates. If a profile code is entered that already exists an error message will appear and the input operation will be aborted. Use EDIT to change or update information on these profiles.

Start input procedure

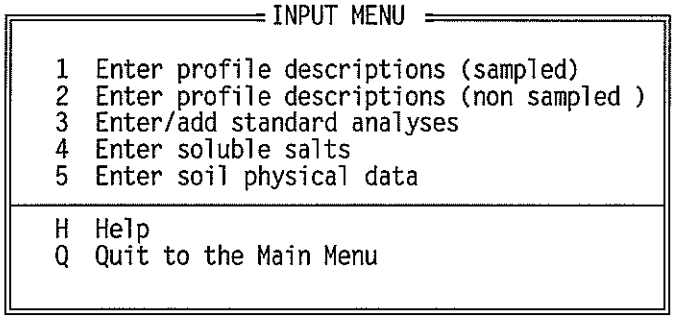
Leave the Main Menu by pressing 1. The Input Menu appears on screen (Figure 6).

Select option 1 to enter field desciptions of sampled profiles; or if analytical results are not yet available.

The following set of input screens will appear successively:

- site data screen (2 pages),

FIGURE 6
Input menu



- horizon data screen,
- standard analytical data screen.

Enter the sample depths in the standard analytical data screens, to ensure the printing of sample codes and depths on the field description printouts.

Select option 2 to enter descriptions of non sampled profiles.

The following set of input screens will appear successively:

- site data screen (2 pages),
- horizon data screen.

Select option 3 to enter or add standard analytical data. The following input screen will appear:

- standard analytical data screen.

Select option 4 to enter or add soluble salts data. The following input screen will appear:

- soluble salts data screen.

Select option 5 to enter or add soil physical data. The following input screens will appear:

- soil physical data screen 1,
- soil physical data screen 2.

Site description entry screen

The site input screen consists of two pages (Figure 2). After completing page one the following message appears on screen:

Screen Completed
Modify this page
Go to next page

After completing page 2 the following message appears on screen:

Screen Completed
Return to page 1
Modify this screen
Save

Selecting the last option, the validity of the codes is checked. If no invalid codes are encountered SDBm installs the horizon description screen, otherwise the user is prompted to replace the invalid codes first.

The user is reminded that a blank field is a valid input code and it can be used to exit the input routine while the invalid code is investigated.

Horizon description entry screen

The first horizon description data screen appears automatically after the site data are checked for validity (Figure 3).

After the first screen is filled out the following message appears on the lower part of the screen:

Screen completed
Modify this screen
Go to previous screen
Save and quit
Edit the next horizon

Before the next data screen appears the data are checked. If an invalid code is detected the user is prompted to replace it.

The number of the horizon that is presently being entered is displayed in the upper right corner of the screen. Enter the horizons in the right order, since in the soil profile descriptions the horizons are printed in the sequence of entry (as indicated by the horizon number).

Use upper and lower case properly while entering the horizon designation. All other (coded) information can be entered in both upper and lower case.

Most variables allow two entries. Fill the first (upper) entry first. Do not place any data in the second one while the first is still empty or contains a 0.

Standard analytical and soluble salts data entry screens

Data are entered per sample (Figure 4). Enter the samples in the right order since the sample codes (A B C etc) are automatically assigned following the order of input. Sample codes are displayed on screen in the upper right corner.

To operate the data screens follow the instructions given in the previous section (horizon data screens).

Each numerical variable has a fixed number of decimals.

A code should be defined to indicate missing values, e.g. -1 or 99. Note that blanks are automatically converted into 0's (zeros).

Soil physical data entry screens

The first data screen (Figure 5a) includes fields to enter infiltration data and the surface stability index.

Water retention data and bulk density are entered in the second screen (Figure 5b). Data are entered per sample. Enter the data in the right order since the sample codes (A B C etc) are automatically assigned following the order of input. Sample codes are displayed on screen in the upper right corner.

To operate the soil physical data data screens follow the instructions given in the previous section.

A code should be defined to indicate missing values, e.g. -1 or 99. Note that blanks are automatically converted into 0's (zeros).

Methods

The SDBm methodology for the morphological description of soils follows the FAO-ISRIC 1990 "Guidelines for Soil Profile Description". Nevertheless, changes are possible because of the flexibility of the coding system.

Coded information on the methods used for the laboratory analysis should be entered under the heading Methods according to the following criteria. Up to 10 entries (one code each) can be combined in this field. Use always the same position for the same variable. The suggested organization of the METHODS field is the following:

Determination of the standard analytical data:

1 = pH water
2 = pH (x)
3 = Electrical conductivity, EC
4 = Phosphorus, P
5 = Organic Matter, OC, N
6 = Cation Exchange Capacity, CEC

7 = Exchangeble Cations, Ca, Mg, K, Na, H, Al
8 = Particle size
9 = Calcium Carbonate, CaCO3
0 = Sulphates, CaSO4

Determination of soluble salt data:

1 = pH
2 = Electrical conductivity, EC
3 = Soluble Cations, Ca, Mg, K, Na, B
4 = Soluble Anions, CO3, HCO3, Cl, SO4, NO3
5 = SAR

Determination of physical data:

1 = Bulk Density
2 = Water Content

For each position of the METHODS field, a code should be entered which refers to the method used to determined the corresponding variable. A "blank" might indicate missing value or method not specified. Below is a list of suggested codes for the indicated methods.

pH water:

A = 1:1
B = 1:2.5
C = 1:5
D = 1:10
E = Saturated Paste

pH (x):

A = KCl
B = CaCl2
C = Saturated Paste in CaCO3

Electrical Conductivity, EC; and Soluble Salts:

A = 1:5
B = 1:10
C = Saturated Paste
E = CaCl2
F = 1:1
G = 1:1.5
H = 1:2
I = 1:2.5

Phosphorus, P:

A = P2O5, ppm
B = Total, ppm
C = Total, ppm/10
D = TRUOG
E = Total, %
F = BRAY
G = P available, Kg/ha
H = P available, Lb/acre
I = P available, mg/100g

Organic Carbon, C:

A = Walkley-Black
B = Dry combustion

Cation Exchange Capacity, CEC:

A = NH4Ac pH 7
B = BaCl2 pH 8.2
C = NaAc pH 8.2
D = TEA
E = Ca absorption
F = NH4Ac pH 8.2
G = CaCl2
H = Li-ETDA
I = Sum of Cations
J = ECEC
K = CEC7

Exchangeable Cations:

A = NH4Ac
B = HCl N/20
C = ETDA
D = Base saturation
E = Sodium saturation
F = Sodium absorption

Particle Size:

A = Pipette
B = Hydrometer

Calcium Carbonate, CaCO3:

A = Calcimeter with HCl
B = Hydrochloric acid

Sulphates, CaSO4:

A = Precipitation in acetone
B = Na3-ETDA solution
C = NH4Ac

Bulk Density:

A = 1/3 bar
B = Oven dry
C = Field humidity
D = Air dry
E = Absorption 3 cm

The METHODS field is not related to any conversion table. Therefore, codes, positions and methods suggested in the above tables can be changed by the user without using the Coding System functions. However, the listed tables can be consulted using the Help option of the data entry menus.

SELECT/SEARCH

This SDBm option enables the selection of soil profiles based on the presence of one or more variables with specified values. Outputs in various formats may be sent to diskfiles or to the printer. A listing of the selection result can be produced.

SDBm offers two selection routines: fast and detailed search routines.

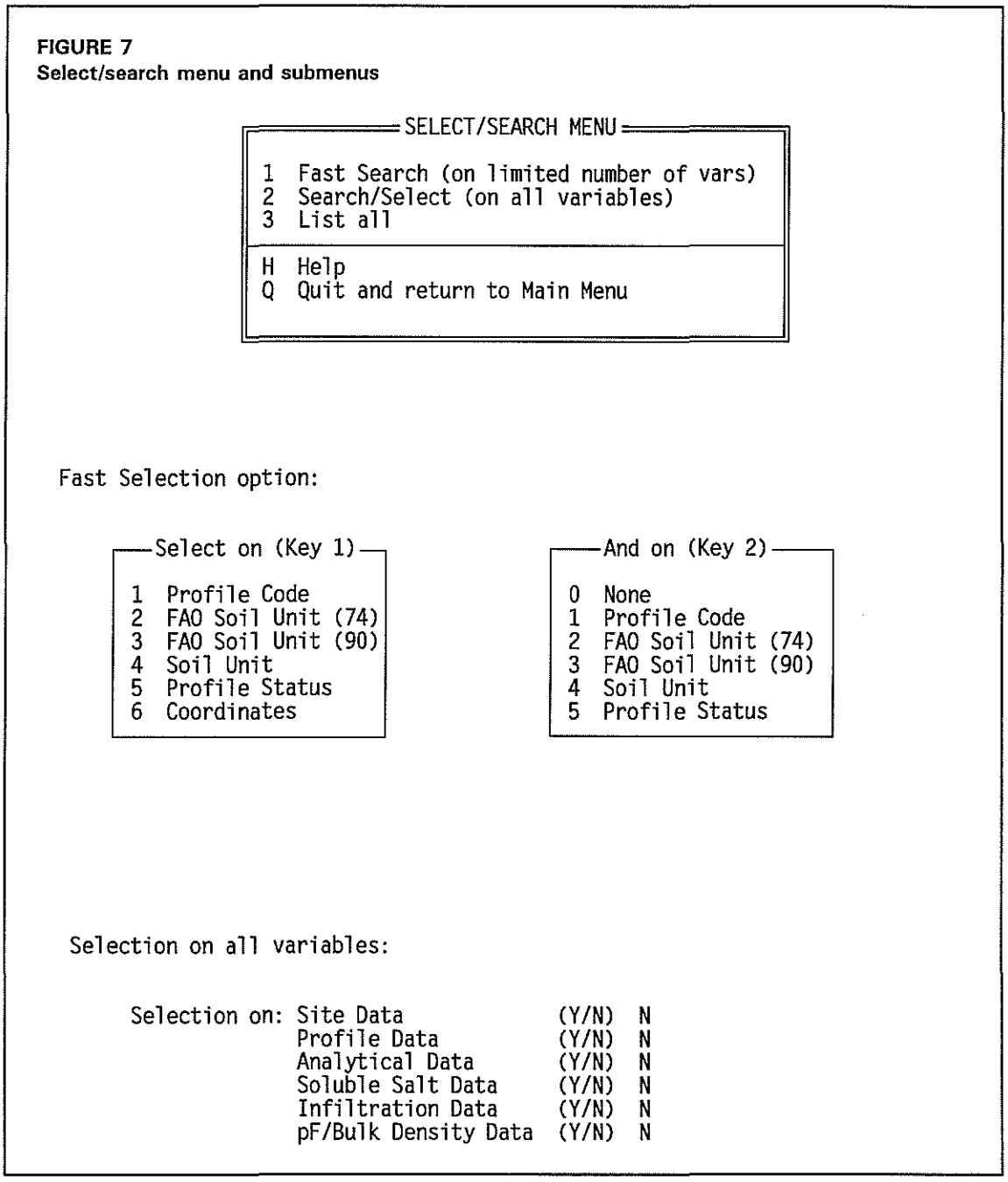
To obtain field descriptions or tables of analytical data of the selected profiles a print facility is included in both routines, the same data may also be written to diskfiles.

Fast search routine

This routine should be used if the database is to be searched on one, or a combination of two, of the following variables: profile code, FAO Soil Unit (1990 and 1974), soil unit, status and coordinates. This selection procedure results in a listing on screen sorted on the first key variable and profile code. This routine covers most of the ordinary selection requests.

- A series of profile codes: for instance profiles XXX000 to XXX100. Note that the lowest profile code should exist in the database, otherwise the procedure results in a no find.
- Coordinates: the database can be searched on any area defined by its coordinates. However the area should be situated in either the Eastern or Western hemisphere. Run two selection procedures if the area includes parts of both hemispheres.
- FAO 90 classification: searches may be defined on first, second and third level. For instance one may select all Vertisols, or all Calcic Vertisols or all Grumi-Calcic Vertisols.
- FAO 74 classification: searches may be defined on first and second level, and if appropriate a third level.

FIGURE 7
Select/search menu and submenus



- Soil unit
- Status

Go to the Select/List Menu and press 1 (Figure 7). SDBm returns with a listing of primary and secondary key variables.

Select the primary key variable by pressing 1, 2, 3, 4, 5 or 6. Subsequently a second key variable can be selected. Press 0 if a second key variable is not required.

The primary and secondary key should be different variables, otherwise they are not accepted.

If the variables are accepted the first key variable is displayed and the user is prompted to enter the code or value. Both upper and lower case entries are accepted. Invalid codes are accepted but will result in a no find.

Subsequently the user is asked to enter the value of the second key variable (if appropriate).

A selection procedure will result in a listing of the codes, soil classification, unit and location of the selected profiles on screen.

The total number of selected profiles appears in the upper right corner.

A single screen contains information on 16 profiles only. After the first screen is filled the listing is paused and the following message appears:

Press any key to continue...

Press any key to skip to the next page. It is not possible to return to the previous page.

The end of the list is indicated by:

End of information. Press any key to continue..

Pressing any key brings the output options menu on the screen. See next section for more information.

Detailed selection

This routine is used to select on virtually any field and laboratory characteristics, or combination of those. The codes of the selected profiles will be displayed on screen in alphabetic/numerical order.

Go to the Select/List Menu and press 2 (Figure 7). The ad hoc selection menu appears on screen.

The key variables are grouped according to the following data blocks:

- site data block,
- profile data block,
- standard analyses data block,
- soluble salts data block,
- infiltration data block,
- water retention data block.

Figure 8 gives a list of potential key variables for each data block.

FIGURE 8
Key variables for selection

```
-------------------------------------------------------------------------------
Site variables                          Profile variables
--------------                          -----------------
sheet                                   designation
soil unit                               depth:  upper - lower
status                                  mottles: abundance -size - contrast -
FAO classification (1990/1974)          boundary - colour
phase                                   texture
soil moisture regime                    structure: grade - size - type
soil temperature regime                 consistence: dry - moist - stickiness - plasticity
soil climate classification             cutans: quantity - contrast - nature -
landform                                location
land element                            cementation:  continuity - grade -
position of site                        structure - nature
topography                              pores: abundance - size
slope class                             rock fragments: abundance - size - shape -
micro topography                        weathering - nature
surface sealing/crusting                nodules: abundance - kind - size - shape - hardness -
flooding frequency - duration           nature - colour
surface feature additional variable 1   carbonates
surface feature additional variable 2   biological features: abundance - kind
stoniness (abundance)                   roots: abundance - size
rock outcrops (abundance)               boundary: width - topography
parent material                         Standard Analytical variables
rock type                               ----------------------------
drainage - class                        pH: H2O - other
         - internal - external          EC
erosion: type - intensity               P
land use type                           organic C - N
crops                                   K fixed
vegetation structure                    CEC: soil - clay
species                                 exchangable cations: Ca - Mg - K - Na - H - Al
grass cover                             base saturation
human influence                         sand: very coarse - coarse - medium fine - very fine
authors                                 silt: coarse - fine
additional variables 1, 2 and 3         clay
                                        CaCO3 total - active
Soluble Salts                           CaSO4
-------------                           lower sample depth
pH
EC
Ca                                      Infiltration
Mg                                      ------------
K                                       Basic infiltration (average of 3 entries)
Na                                      Surface structure stability index
B

CO3                                     Water Retention
HCO3                                    ---------------
CL                                      Moisture content 0.03bar 0.05bar 0.1bar 0.3bar 1bar
SO4                                     3bar 5bar
CO3                                     Available moisture (as defined by user)
NO3                                     Bulk density
SAR                                     Lower Sample depth
lower sample depth
-------------------------------------------------------------------------------
```

Choose the appropriate data block(s) by replacing N with Y. Subsequently a list of variables of the first block appears on screen. Activate the required key variable by entering its number. A second key variable of the same block may be selected. Press <0> if a second key variable is not required.

Subsequently the selected key variables appear on screen. Enter the code or numerical value to search on.

Note that SDBm does not check on the validity of the codes. If a non-existing code (for that particular variable) is entered the search procedure will result in a no find.

For a numerical variable a range is defined by entering the lower and upper limits. The actual values entered on the screen are excluded from the range.

Repeat this exercise for the next data blocks (if appropriate).

The result is displayed on screen. The total number of selected profiles appears in the upper right corner, and the codes of the profiles that meet the selection criteria are listed in alphabetical/numerical order. Press any key to go to the output options menu (see next Section).

Output options

The following menu appears on screen:

Press 1 for a printed list
2 for printed soil descriptions
3 for printed tabular standard analytical data
4 for printed tabular soluble salt data
5 for printed tabular water retention data
6 Write data to diskfiles
0 Return to menu

Menu options refer to all selected profiles.

Press 6 to create dBASE diskfiles with data from the selected profiles. The data will be written to the root directory of the hard disk (C:\).

After pressing 6 the following information appears on screen:

Write Site & Profile Data (Y/N)?
....Analytical Data (Y/N)?
.Soluble Salts Data (Y/N)?
.Soil Physical Data (Y/N)?

Press **Y** to select the appropriate data groups. Subsequently SDBm displays the names of the files to which the data will be written and starts sending. This procedure may take some time.

FIGURE 9
Example of profile listing on screen

Code	FAO (74) (90)	Phase	ST	Unit	Status	Coordinates
HU0163			EOX li02		2	N-37|56|54 W- 6|37|36
HU0164			IOX aa		2	N-37|55|10 W- 6|12|31
HU0165			IOX li02		2	N-37|50|10 W- 6|34|11
HU0166			IOX li02		2	N-37|50|20 W- 7|03|24
HU0167			IOE dy02		2	N-37|55|26 W- 6|52|06
HU0168			IOE ru02		2	N-37|53|00 W- 6|28|31
HU0169			MXR aa		2	N-37|56|43 W- 6|52|42
HU0170			AXA li02		2	N-37|51|05 W- 6|24|11
HU0171			AXR ru09		2	N-37|51|08 W- 7|24|16
HU0172			AXB		2	N-37|53|18 W- 6|23|38
HU0173			AXB ul		2	N-37|55|50 W- 6|11|11
HU0174			UBX		2	N-37|55|40 W- 6|40|31
HU0175			IMX li02		2	N-37|50|10 W- 6|34|11
HU0176			MDA li02		2	N-38|00|31 W- 7|26|11
HU0177			IOX dy02		2	N-38|04|20 W- 6|40|21
HU0178			MR aa		2	N-37|51|20 W- 6|24|26
HU0179					2	N-37|25|00 W- 6|22|00

The names of the files are fixed:

C:\SDBSITE.DAT contains site data
C:\SDBHORIZ.DAT ..... horizon data
C:\SDBANA1.DAT ..... standard analytical data
C:\SDBANA2.DAT ..... soluble salts data
C:\SDBPHYS1.DAT ..... infiltration data
C:\SDBPHYS2.DAT ..... moisture retention data

The files will have a dBASE format. See your dBASE manual to convert these files into ASCII or other formats.

The structures of these databases are identical to the structures of the main databases, and are given in the data dictionary. The created databases and main databases have the same names, but different extensions. See Appendix C for more information.

List database contents

Go to the Select/List Menu and press 3. The actual number of profiles stored in the database is displayed on screen (Figure 9). Keep in mind that a screen displays only 16 profiles at a time. Viewing a large number of profiles may take some time. Press <Esc> to cancel the listing and quit the application.

EDIT MENU

This option is used for updating field descriptions and laboratory data that are already stored in the database. Samples/horizons may be added to the description. Use INPUT to enter new profiles.

The edit screens are identical to the data screens and function in the same way. The only difference is that the edit screens contain the actual information of the site/horizon/sample to be changed, whereas the data screens are empty.

All entered codes are checked for validity. The user is prompted to replace all invalid codes immediately. See Chapter 3 for further information on validity of codes.

Site and horizon codes of the current language are displayed on the edit screen. Changing of language also produces a conversion to the new language codes.

Go to the Main Menu and press 3. The Edit menu appears on screen (Figure 10).

Subsequently, enter the profile code and select the proper screens by replacing the **N** with a **Y**.

Only valid profile codes are accepted. A message appears if the profile code is not found in one of the selected databases and the related edit screen is cancelled.

After editing a horizon or sample the following message appears on screen:

EDITING OF THIS HORIZON/SAMPLE COMPLETED

S = Save and Quit
P = Go to previous screen

Or press any other key to edit the next horizon/sample

Pressing any other key after the last horizon/sample has been edited results in:

Add new horizons/samples to the description (Y/N)?

Press Y to create an empty data screen and to add new data.

PRINT/VIEW MENU

This option is used to obtain printouts of individual soil profiles and analytical data, or to view abridged soil profile descriptions and/or laboratory results on screen.

With the range option information on a series of profiles can be printed with a single print command. Printouts of groups of profiles can be obtained specifying the corresponding range, for example: PA0010 to PA0040.

FIGURE 10
Edit menu

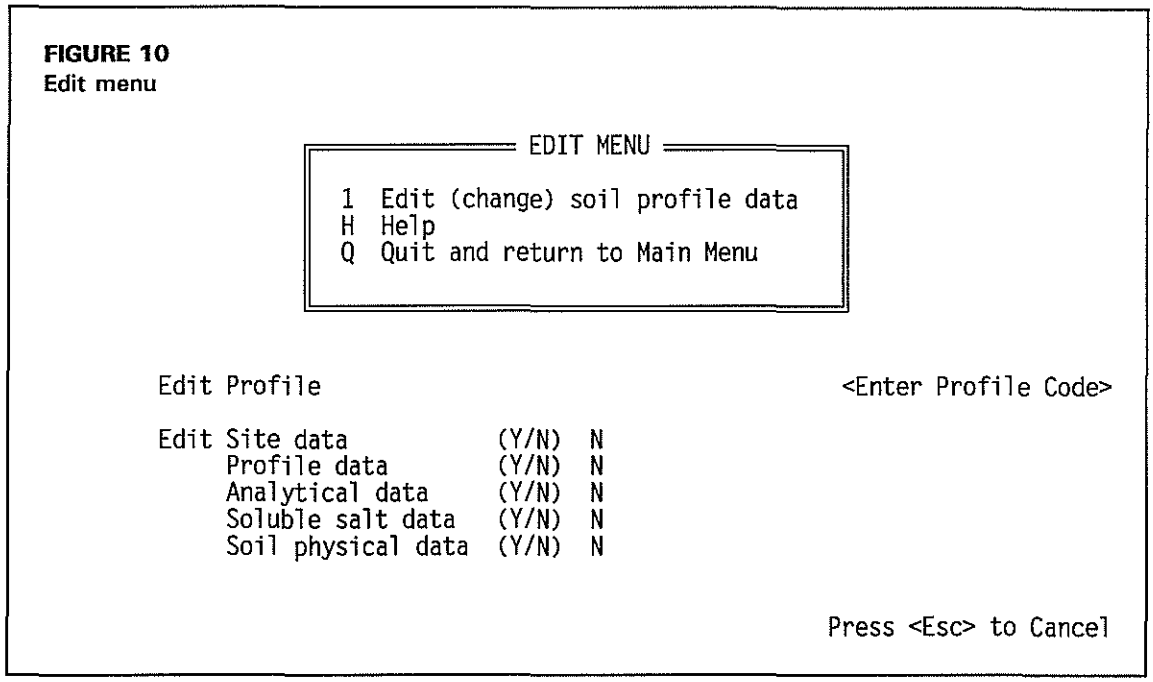
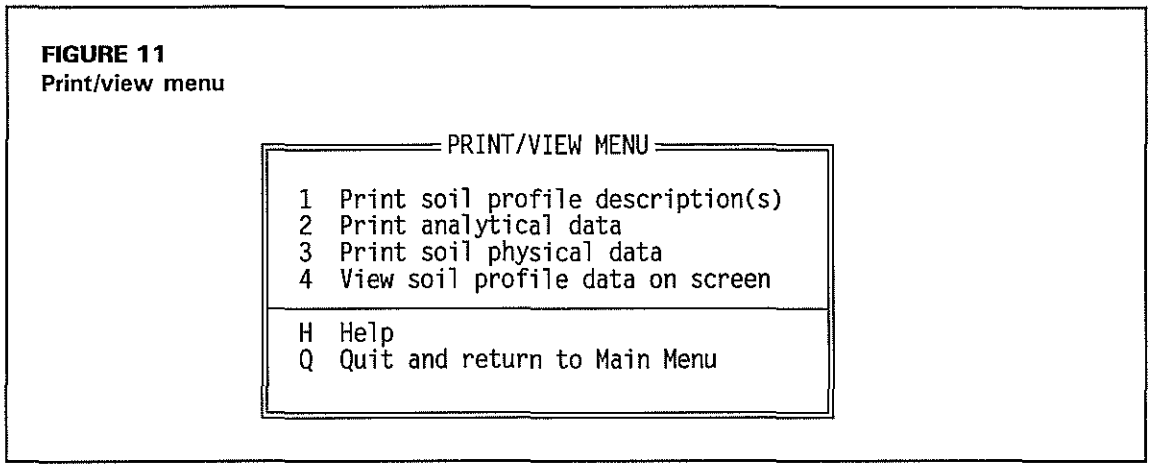


FIGURE 11
Print/view menu



The printing of the profile data requires a special setting of the printer. Check if the printer is online. Note that to reset the printer SDBm should be restarted.

The soil profile descriptions, analytical and soil physical data are printed on A4 format (format used by ordinary copier). An example of printout is reported in Chapter 6.

Go to the Main Menu and press 4. The Print/View Menu appears with the following options (Figure 11):

- printing of profile descriptions
- printing of analytical data
- printing of soil physical data

FIGURE 12
Example of soil profile displayed on screen

```
VIEW    Profile code: SE1021              Status:            Unit:


Sheet  1019    Grid          Crds:  N- 37-09-50  W-006-04-05    Elev:  2m
Location: Puebla del Rio (Sevilla). Finac "La Mejorada"
Class'n:
Physiogr: Alluvial plain
Microtop:
Landuse:  Annual crops
Vege'tion:
Prnt Mat: Marine Deposits
Drainage:


Horizon    DEPTH    Color            Texture     Structure(gr si ty)     Bound

Ap1         0 - 20    10YR  4/2(m)      SICL      mo me ab                 d-s
Ap2        20 - 30     5Y   5/1(m)      SIC       ma         st fm ab      c-s
C1         30 - 52     5Y   5/1(m)      C         mo fm ab                 c-s
C2         52 - 64     5Y   5/1(m)      C         st fm ab                 c-s
C3         64 +      7.5YR  5/4(m)      SIC       st fm ab                  -
```

- view a summary of site profile characteristics and/or available laboratory data on screen

Option 4 (Figure 12) is useful to obtain a fast general impression of the soil.

After an option is selected the program returns with:

Select range (Y/N)? N

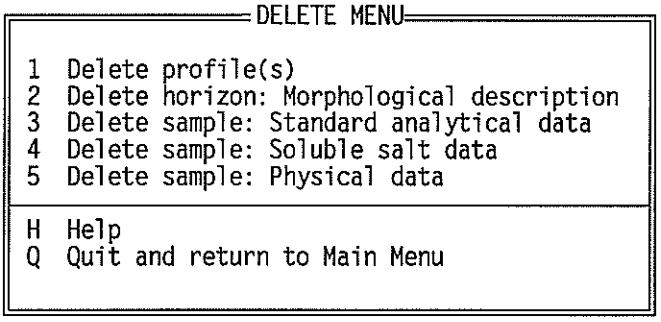
The default is N. In this case information on single profiles is printed. The user is asked to enter the profile code. Invalid profile codes are not accepted. If the soil profile does not exist SDBm returns with an error message and the print procedure is aborted.

If Y is pressed a series may be defined by entering successively the lowest and highest profile code (the series will include both codes). Both codes should actually exist, otherwise a message appears and the user is prompted to enter other (existing) profile codes.

Before the actual printing starts SDBm asks you to check to printer. Press any key to start the printing or **Q** to abort the print procedure and to return to the menu.

If necessary the print procedure can be interrupted during printing by pressing **End**. It returns the program to the print menu after finalizing the current print.

FIGURE 13
Delete menu



DELETE MENU

This option is used to remove all information stored under a particular soil profile code from the database. After entering the profile code SDBm asks for confirmation.

Warning. This procedure is very time consuming with large databases, since it involves reindexing and copying of all databases.

Run delete

Go to the Main Menu and press 5. The Delete Menu appears on screen (Figure 13).

Subsequently, SDBm returns with:

ENTER PROFILE CODE

Invalid profile codes are not accepted. If the profile code is not found in the database a message is returned and the delete procedure is aborted, otherwise the following message appears:

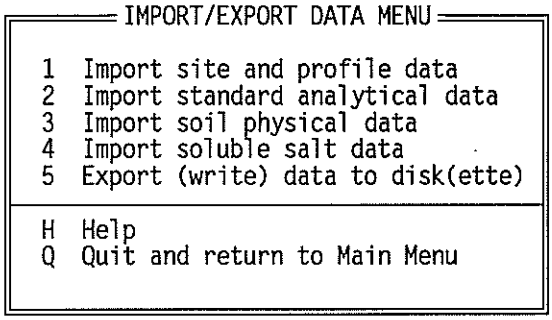
Are you sure (Y/N)?

Press Y to start the delete procedure. Pressing N aborts the delete procedure and returns the program to the Delete Menu.

Horizon and sample delete option

SDBm allows deletion of only part of the stored profile information. Selecting any of the existing profiles, it is possible to proceed to the elimination of the single horizons or analytical samples.

FIGURE 14
Import/export data menu



IMPORT/WRITE MENU

This facility is used to transfer information from one SDBm database to another. Available data on a single profile or a series of profiles may be written onto a diskette and subsequently be imported into another SDBm database.

Go to the Main Menu and press 6 to activate the Import/Write Menu (Figure 14).

Data import

Select option 1 to add site and profile descriptions to the database, option **2** to add standard analytical data, option 3 to add soil physical data and option **4** to add soluble salts data.

SDBm returns with:

Insert Data diskette in Drive A

The source files on the diskette should have been created with the SDBm write facility. If SDBm cannot find the appropriate data files on the diskette a message appears on screen and the import procedure is aborted.

All site/profile, analytical or soil physical information on the diskette is appended to the database.

Existing data are not overwritten. SDBm returns with the following message if a profile code also exists in the original database(s):

Profile Code already exists and is not appended

Data export

Go to the Import/Write Menu and press 5. The Write Menu appears on screen. Press <return> to continue.

Subsequently SDBm asks for the lowest and highest codes of the first series of soil profiles to be transferred. Enter the appropriate profile codes and specify the type of data to be written to the diskette (site/profile, standard analytical, soluble salts and/or soil physical data).

Warning. SDBm does not check the available disk space. A completely described soil profile including remarks and all laboratory data will on average need 2-3Kb

After the information is written on to the diskette SDBm returns with:

Write more profiles to diskette ? (Y/N)

Press Y to repeat the procedure.

Chapter 5

Special features

SDBm includes special features which confer to the software the possibility of a universal use, enhance its management capabilities and allow graphic presentations. In this way stored soil information can be analysed in various ways which may help further interpretations and automatic evaluations.

This chapter deals with these aspects without explaining in detail all procedures since they are similar to what was decribed previously. Menus and help functions are self-explanatory.

CODING SYSTEM AND HELP

To facilitate effective database management the descriptive field data need to be stored in a coded format (Appendix 1). Storage of coded data reduces the size of the database and, equally important, it standardizes the descriptive data and thus allows for selection, comparison and validity control.

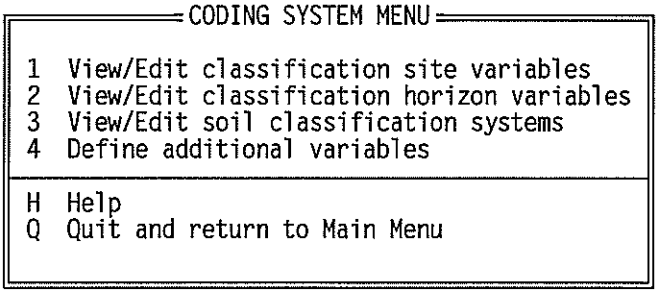
A coding system gives the classification and class codes of all the variables or attributes that are used for the description.

This system recognizes the codes and the correspondent definitions for two major groups. The first group includes 34 fields and refers to the site description; the second, with 44 fields, to the horizon. Each language is provided with a set of codes and definitions except for those fields which correspond to the taxonomic classifications.

The coding system forms an integral part of the SDBm system and is stored in a number of conversion tables. A conversion table contains the classification of a single variable. The first three columns of the table contains the codes respectively in English, Spanish and French, the second three the related terms in the three languages using the same order. For instance the conversion table of the variable Cutans - Abundance may look like:

CODES			DESCRIPTIONS		
English	Spanish	French	English	Spanish	French
O	O	O	none	ninguno	néant
V	M	T	very few	muy pocos	très peu
F	P	P	few	pocos	peu
C	F	F	common	frecuentes	fréquents

FIGURE 15
Coding system menu



The classifications of the variables are not fixed. Each conversion table can be edited interactively from the Coding System Menu (Figure 15). This means that codes can be added, terms can be changed and codes and related terms can be removed from the classification of every variable. Consequently the default SDBm coding system for the site and horizon description can be improved by the user. The coding system follows the "Guidelines for Soil Profile descriptions" of FAO (1974, 1990).

Changing Classes, Codes, Terminology

Go to the Coding System Menu (Figure 15). Options 1, 2 and 3 are used to change codes, classes, or terminology. Select the proper set of variables. After pressing 1, 2 or 3 a list with variables appears on screen. Select the variable which you want to change the classes, codes or terms. After entering the number of the variable the conversion table with the presently defined codes and classes of the current language appears on screen.

Select one of the options on the bottom line of the screen to perform one of the possible actions: change, add or delete a class. Follows a display of the modified conversion table. Press any key to confirm the present classes.

When a new class is added, the user is forced to enter codes in all three languages; definitions not required can be omitted.

Activating the Additional Variables

The number of variables are fixed. However, up to eight 'blank' site variables may be defined in addition by the user. This allows description of features which are not covered by the basic set. These additional variable can contains either codes or numeric data. Another 12 additional variables are available for the analytical data.

Once the variables are activated they can be used like any other SDBm variable. They will be printed on printouts, will appear on the data screens and may be used for selections. They will form part of the coding system and classifications may be entered or changed.

After a coded variable has been defined, the classification (codes and terms) should be entered in the related conversion table.

Start the procedure by selecting option 4 from the Coding System Menu. An overview appears on screen with the variables numbered from 1 to 20, followed by definitions and information on the type (numerical or coded).

Inactive variables are labelled Non defined. Note that variables 1 and 2 should be used for surface features only since they will be placed with the other surface characteristics on data screens and printouts. Other 6 variables can be used to describe any feature since they appear at the bottom of the site description both in the entry screen and in the printout.

The 12 additional variables available for the analytical data are always numerical and their picture is '99.9'. No other format is allowed.

Variables can be removed using the delete option.

The additional variables should preferably be defined in the initial stage of the development of the database. If a variable is activated in a later stage all previously entered site descriptions will need updating on this subject.

Help-Windows

In order to facilitate data entry tasks, normally tedious and slow, tables of conversion can be displayed for any coded variable. Windows showing codes and definitions of the field on which the cursor is positioned can be opened from the entry screen pressing <F1> key. Codes can be entered in the entry form using the selection bar to locate the desired definition and then pressing <return>. Figure 16 shows an example of help-windows of the site description screen. This procedure avoids the consultation of the manual to search for the correct code to enter (Appendix B).

(DE)ACTIVATION OF FIELDS

If not all the soil information available in SDBm are to be entered, the user can deactivate unnecessary fields making the data entry faster and easier. Deactivated fields will disappear from the entry/edit screen.

The deactivation is permanent and it will be maintained until deactivated fields are re-activated by the user. Nevertheless, activation and deactivation do not compromise data previously entered.

The De/Activation Menu (Figure 17) includes the following options: profile description, analytical data, soluble salt and physical data. Select any of the options and a table containing all correspondent variables appears on screen. Replace the letter "A" with a "D" to deactivate any of the listed variables. Figure 18 shows an example of deactivation of analytical data and the consequent shape of the entry form.

FIGURE 16
Example of help-window

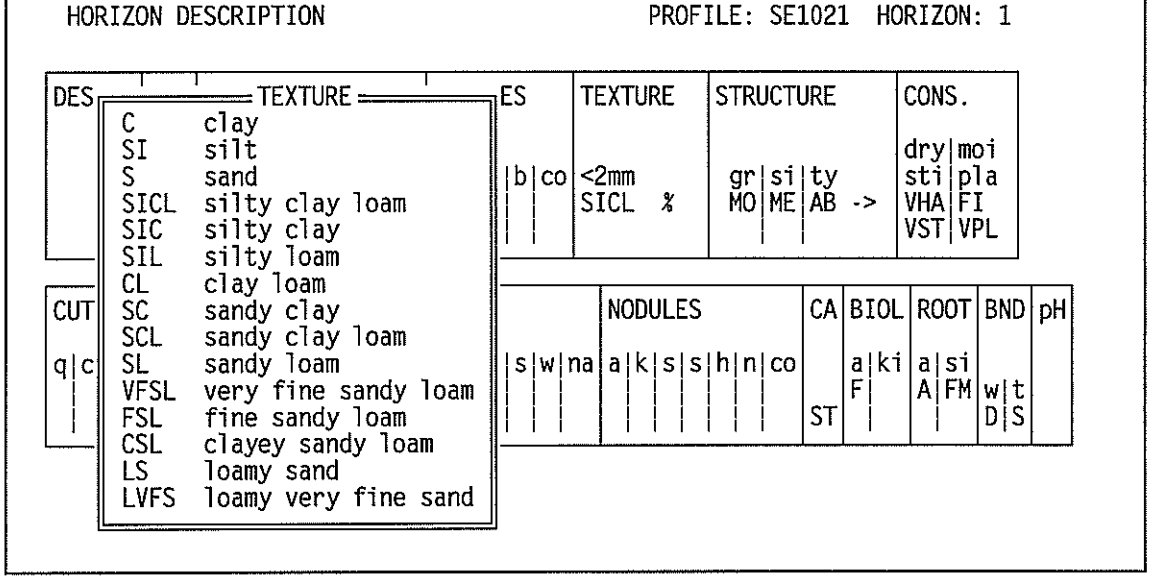
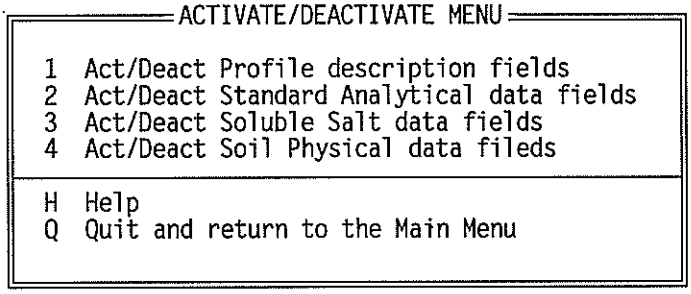


FIGURE 17
Activate/deactivate menu



GRAPHIC PRESENTATIONS

This SDBm application allows the screen display of the following graphics:

- vertical distribution of the analytical variables
- pie representation of the texture classes and exchangeble cations

This function helps in the characterization of a soil profile and facilitate comparison with other soils.

In the vertical distribution, the X axis shows the values of the examined variable and the Y axis the depth of the samples.

FIGURE 18
Example of deactivation of standard analytical variables and resulting input screen

STANDARD ANALYTICAL DATA

pH WATER	A	TOTAL SAND	A
pHC	D	COARSE SILT	D
EC	A	FINE SILT	D
P	D	TOTAL SILT	A
OC	A	CLAY	A
N	A	CEC CLAY	D
CEC	A	CaCO3 TOTAL	A
Ca	A	CaCO3 ACTIVE	D
Mg	A	CaSO4	D
K	A	METHODS	A
Na	A		
H	A		
Al	A		
PBS	A		
K FIXED	D		
VERY COARSE SAND	D		
COARSE SAND	D		
MEDIUM SAND	D		
FINE SAND	D		
VERY FINE SAND	D		

STANDARD ANALYTICAL DATA PROFILE: SE1021 SAMPLE No. A

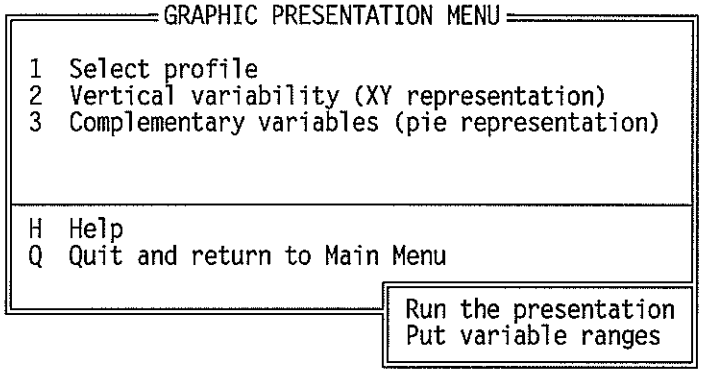
DEPTH up/lo 0 10

pH	EC		OC	N	CEC	CA	MG	K	NA	H	AL	
H2O												
7.9	1.2		1.36	0.12	19.6	17.2	1.8	0.3	0.3	0.4	0.6	

PARTICLE SIZE			CaCO3	METHODS
Sand	Silt	CL	Total	1234567890
5	55	38	22.9	

ADDITIONAL VARIABLES

FIGURE 19
Graphic presentation menu



In the pie representation, the relative percentage of the three main texture fractions (sand, silt and clay) and the four main exchangeable cations (Ca, Mg, K and Na) are displayed.

Go to the Graphic Presentation Menu (Figure 19) and press 1. The user then is asked to choose between the vertical or pie presentations.

The first option brings to a submenu with two options:

- graphic presentation which shows graphs of the analytical variables (Figure 20)
- change of analytical value ranges to enhance the vertical variabiliy

The second option asks for the pie presentation of the textural fraction or exchangeable cations. An example of pie representation is shown in Figure 21.

SOIL LAYER GENERATION

This functions allows SDBm to be utilized as source of data for geographic information systems (GIS) such as IDRISI, crop simulation models (Driessen & Konijn, 1992) or land evaluation systems (De La Rosa *et al.*, 1994). The linkage of SDBm data with a GIS can be very useful for interpertation purposes. This option offers to the user the possibility to create a control section or a layer within a profile or a group of profiles. Weighted averages or dominant values of the morphological and analytical data under examination are calculated for the defined layer.

First the depth range must be specified; then the number of profile and variables to be analysed must be specified. This results in a matrix having as many rows as the number of selected profiles and the columns corresponding to the chosen variables.

FIGURE 20
Example of vertical variability graphs

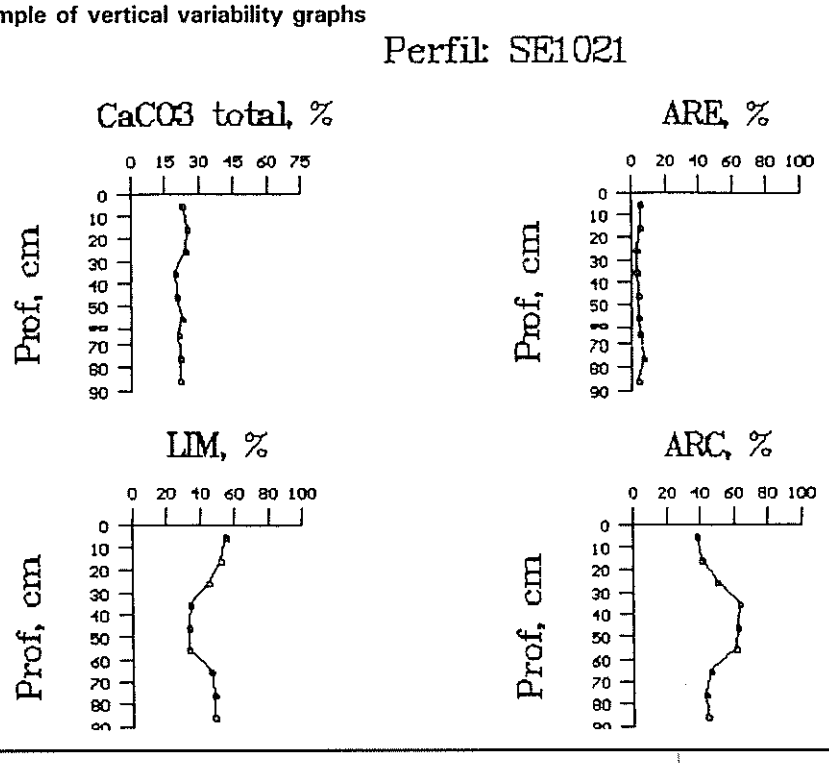


FIGURE 21
Example of pie representation

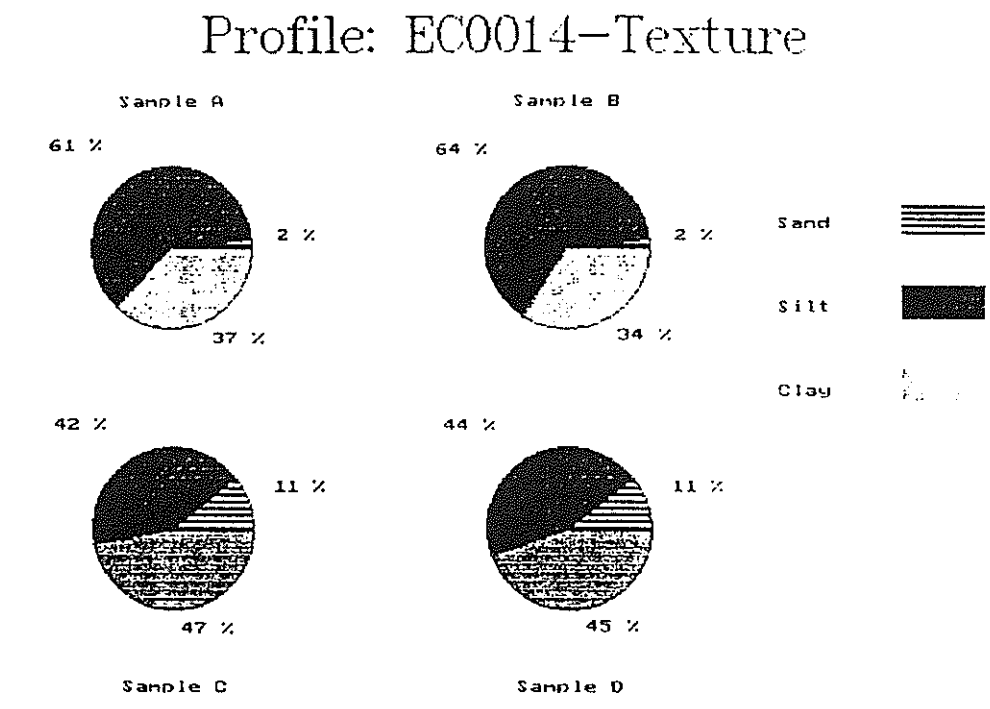
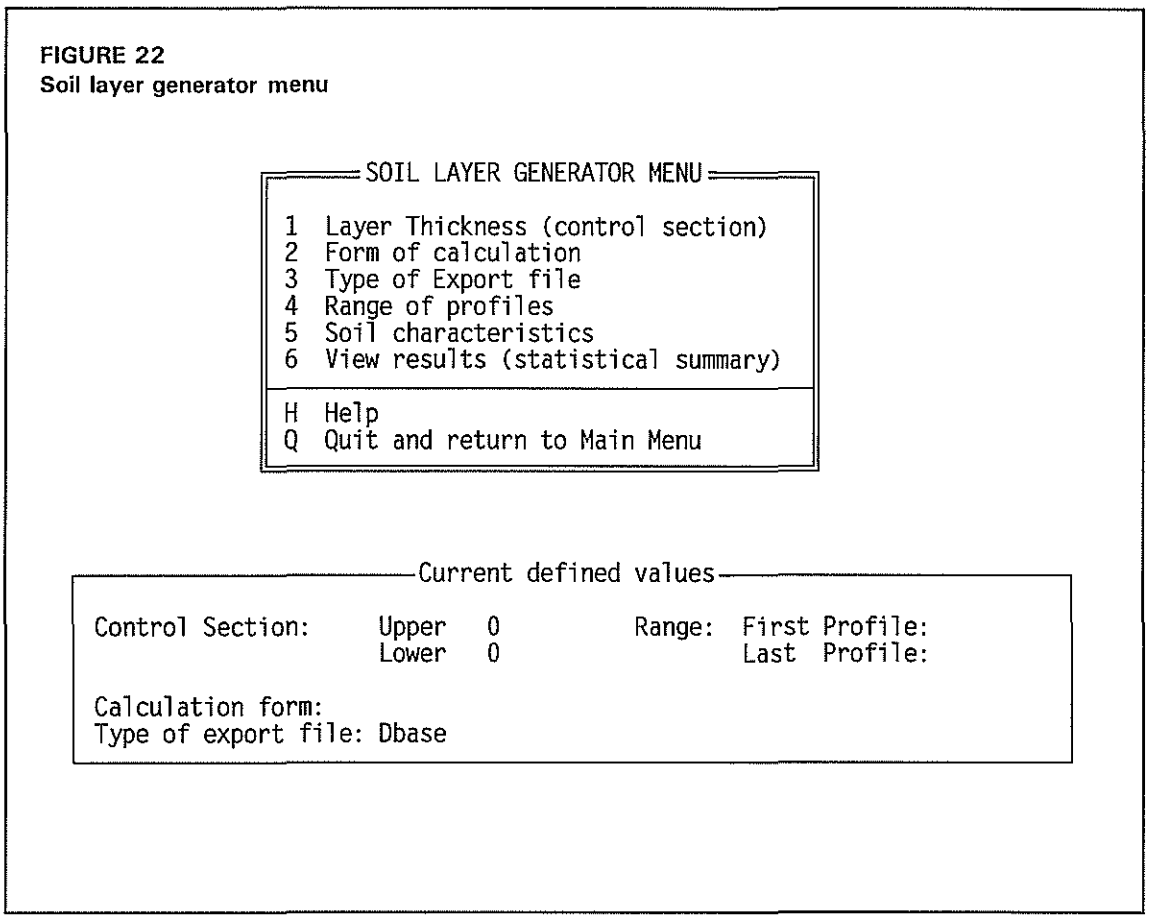


FIGURE 22
Soil layer generator menu



The layer generator menu (Figure 22) consists in the following options:

- Layer thickness: determination of the thickness of the control section to be analyzed within the vertical profile.
- Form of calculation: to select the type of calculation; weighted average or dominant value. The last one refers to the values more represented in the control section; codified variables only use this method. For the site variables, codified as well as numerical, the value corresponding to each profile is considered.
- Range of profiles: selection of the profiles to be analyzed.
- Soil characteristics: selection of the morphological and analytical variables to be analyzed (Figure 23).
- Type of export file: default file format is Dbase but a SDF (System Data File) can be produced (Figure 24).
- View results: display of the result table (Figure 25). Average, maximum and minimum values, standard deviation and variance are determined for each selected variable and control section.

FIGURE 23
List of morphological and analytical variables that may be used in the soil layer generator procedure

SITE DESCRIPTION VARIABLES

Field	Description
SHNO	sheet number
GRID	grid number
UNIT	soil unit
STAT	status
FAO	FAO soil unit 74
PHAS	FAO phase
FAOR	FAO 90 soil unit + 3rd level
STSG	ST great group + subgroup
STFM	ST mineralogy + texture + reaction
SCLM	soil climate
SMTR	soil moisture regime + soil temperature regime
LOCALSER	local series
LAT	latitude
LON	longitude
ELEV	elevation
DATE	date
AUTH	authors
LAFO	landform
LAEL	land element
POS	position of site
TOP	topography
SLGR	slope gradient class
SLFR	slope form
MITO	micro-topography
SEAL	surface sealing/crusting
SUR1	additional surface description variable
SUR2	additional surface description variable
STON	surface stones: abundance + size
ROCK	rock outcrops: abundance + distance + height
PAMA	parent material
ROTY	rock type
DRAI	drainage class
DRA2	permeability + external drainage
MOIS	moisture condition/depth
EROS	erosion/deposition intensity
LUT	land use type
CROP	crops
VEG	vegetation type
GRCO	grass cover
SPEC	species
DEPT	effective soil depth
HUM	human influence
FLOD	flooding frequency + duration
GWAT	watertable depth
SURVEYAR	survey area
LOC	location, descriptive
REMS	remarks
ADD1	additional variable 1
ADD2	additional variable 2
ADD3	additional variable 3
ADD4	additional variable 4
ADD5	additional variable 5
ADD6	additional variable 6

FIGURE 23 Cont'd

HORIZON DESCRIPTION VARIABLES

Field	Description
COL1	1st colour hue, value, chroma, modifier
COL2	2nd colour hue, value, chroma, modifier
MOT1	1st mottles abundance/size/contrast/boundary/color
MOT2	2nd mottles abundance/size/contrast/boundary/color
TEX1	1st texture
TEX2	2nd texture
CLAY	% clay, field estimate
STR1	1st structure grade/size/type
STR2	2nd structure grade/size/type
ST12	relation 1st and 2nd structure
COSP	consistence wet stickiness + plasticity
CODM	consistence dry + consistence moist
CUT1	1st cutans quantity/contrast/nature/location
CUT2	2nd cutans quantity/contrast/nature/location
CEME	cementation/compaction continuity + grade + structure + nature
POR1	1st pores abundance/size
POR2	2nd pores abundance/size
ROC1	1st rock fragment abundance/size/shape/weathering/nature
ROC2	2nd rock fragment abundance/size/shape/weathering/nature
MIN1	1st nodule abund/kind/size/shape/hardness/nature/color
MIN2	2nd nodule abund/kind/size/shape/hardness/nature/color
CARB	carbonates
BIO1	biological features quantity/kind
BIO2	biological features quantity/kind
RTS1	roots abundance/size
RTS2	roots abundance/size
PH	field pH
BOUN	boundary width/topography

STANDARD ANALYTICAL DATA

Field	Description
PHW	pH water
PHC	pH CaCl2
EC	electro conductivity
P	phosphorus
N	nitrogen
OC	organic carbon
CACO	total CaCO3
CACA	effective CaCO3
CASO	total CaSO4
CECS	CEC soil
CA	exchangeable calcium
MG	exchangeable magnesium
K	exchangeable potassium
NA	exchangable sodium
H	exchangeable hydrogen
AL	exchangeable alluminium
PBS	Percentage base saturation
KF	fixed potassium
VCS	very coarse sand
CS	coarse sand
MS	medium sand
FS	fine sand
VFS	very fine sand
CSI	coarse silt
FSI	fine silt
CL	clay
CECC	CEC clay

FIGURE 23 Cont'd

SOLUBLE SALT DATA

Field	Description
PH	pH
EC	electro conductivity
CA	soluble calcium
MG	soluble magnesium
K	soluble potassium
NA	soluble sodium
BO	soluble borium
CO3	soluble CO3
HCO3	soluble HCO3
CL	soluble CL
SO4	soluble SO4
NO3	soluble NO3
SAR	SAR

SOIL PHYSICAL DATA

Field	Description
M003	water retention 0.03bar
M005	water retention 0.05bar
M01	water retention 0.1bar
M03	water retention 0.3bar
M1	water retention 1bar
M3	water retention 3bar
M5	water retention 5bar
M15	water retention 15bar
BULK	bulk density

FIGURE 24
Example of the soil layer generator output file

```
EC00001 8.0 99.9 99.9 99.99 2.40 99.9 99.9 99.9 99.9 99.9 6 45 49
EC00002 5.4 99.9 99.9 0.10 1.80 99.9 99.9 99.9 99.9 99.9 6 56 4
EC00003 7.1 6.7 99.9 99.99 0.67 99.9 99.9 99.9 99.9 99.9 6 11 6
EC00004 6.6 6.5 99.9 0.49 0.80 99.9 99.9 99.9 99.9 99.9 6 25 15
EC00005 6.9 5.8 99.9 0.01 1.83 99.9 99.9 99.9 0.3 99.9 6 82 4
EC00006 8.0 7.4 99.9 99.99 1.23 99.9 99.9 99.9 99.9 99.9 6 34 32
EC00007 5.3 99.9 99.9 99.99 1.32 99.9 99.9 5.8 99.9 99.9 6 67 43
EC00008 6.4 99.9 99.9 99.99 1.45 99.9 99.9 99.9 99.9 99.9 6 45 49
EC00009 3.8 3.6 99.9 0.11 2.98 99.9 0.2 99.9 99.9 99.9 6 45 65
EC00010 6.5 5.2 99.9 0.04 3.10 99.9 99.9 99.9 2.1 99.9 6 43 54
EC00011 7.7 6.3 99.9 99.99 0.87 99.9 99.9 99.9 99.9 99.9 6 38 38
EC00012 5.9 5.4 99.9 0.20 1.75 99.9 8.7 99.9 99.9 99.9 6 76 23
EC00013 8.9 8.3 99.9 0.07 1.80 99.9 3.7 99.9 99.9 99.9 6 45 98
EC00014 8.3 7.3 21.3 99.99 1.04 99.9 99.9 99.9 99.9 99.9 6 45 76
EC00015 7.6 6.8 1.2 99.99 3.50 99.9 99.9 99.9 99.9 99.9 6 45 49
EC00016 8.3 99.9 99.9 0.18 2.75 99.9 1.70 99.9 99.9 99.9 6 45 12
EC00017 6.4 5.2 99.9 0.14 99.99 99.9 99.9 8.6 99.9 6 45 11
EC00018 8.1 99.9 99.9 99.99 0.98 99.9 99.9 99.9 99.9 99.9 6 45 32
EC00019 7.2 6.5 99.9 0.35 4.00 99.9 99.9 99.9 99.9 99.9 6 45 8
EC00020 8.1 6.9 99.9 0.08 1.09 99.9 99.9 99.9 99.9 99.9 6 45 33
```

FIGURE 25
Example of statistical summary of the soil layer generator option

Soil Layer Generator: Statistical Summary

File: EUROPE.TXT Number of Profiles: 20

Variable	n	(m - M)		(x)/n	s	s2
PHW	20	3.80	8.90	7.02	1.23	1.52
PHC	14	3.60	8.30	6.28	1.13	1.27
N	11	0.01	0.49	0.16	0.14	0.02
OC	19	0.10	6.25	1.57	1.55	2.40
CA	10	0.30	75.60	20.10	23.31	543.55
MG	10	0.00	12.50	4.55	4.51	20.33
K	10	0.00	1.70	0.51	0.51	0.26
NA	10	0.00	7.70	1.12	2.27	5.14
SAND	20	4.00	98.00	36.60	37.12	1377.74

FIGURE 26
Change language menu

CHANGE LANGUAGE MENU

1 English
2 Spanish
3 French

H Help
Q Quit and return to Main Menu

CHANGE LANGUAGE

SDBm allows the user to work in the languages: English, French and Spanish; the software expansion to include other languages is also foreseen.

The default language is English. The Change Language option (Figure 26) is available in the Main Menu.

Selecting a different language, the program changes the memory variables to those of the current new language.

EXAMPLE OF SOIL DESCRIPTION PRINTOUT

SOIL PROFILE DESCRIPTION Profile: SE1021 Unit: Status:

Sheet/Grid : 1019/
Location : Puebla del Rio (Sevilla). Finca "La Mejorada".
Survey Area:
Author(s) : Jose L. Arrue

Coord : N 37-09-50 W 006-04-05
Elevation: 2 m
Date : 10/03/73

Classification FAO:
ST : Fluvaquent
Soil Climate:
Topography : flat
Element/Pos.: flood plain-
Micro Top:
Land Use : annual field cropping- crops: rice

Land Form: alluvial plain
Slope : 0.7 - 2%

Human Infl: ploughing

Vegetation :
Species :

Grasscover:

Parent Material: marine deposits
Eff. Soil Depth: 100-150cm
Rock Outcrops :
Surface Stones :
Erosion :

Sealing/Crusting:

Drainage :
Watertable:
Flooding :
Moist Cond:
Remarks: Suelo salino alcalino.

Samples: A: 0- 10 B: 10- 20 C: 20- 30 D: 30- 40 E: 40- 50 F: 50- 60 G: 60- 70 H: 70- 80 I: 80- 90

Horizon	Depth	Morphological Description
Ap1	0 - 20 cm	Dark grayish brown (10YR 4/2) (moist), light brownish gray (10YR 6/2) (dry); silty clayloam; moderate medium angular blocky structure; very hard (dry), firm (moist), very sticky (wet), very plastic (wet), many fine-medium pores; and common coarse pores;, abundant fine-medium roots; strongly calcareous; diffuse smooth boundary.
Ap2	20 - 30 cm	Gray (5Y 5/1) (moist), light brownish gray (2.5Y 6/2) (dry); silty clay; massive strong fine and medium angular blocky structure; hard (dry), friable (moist), very sticky (wet), very plastic (wet), common fine pores; and few medium-coarse pores;, common fine and common very fine roots; strongly calcareous; clear smooth boundary.
C1	30 - 52 cm	Gray (5Y 5/1) (moist), light brownish gray (2.5Y 6/2) (dry); clay; moderate fine and medium angular blocky structure; hard (dry), friable (moist), very sticky (wet), very plastic (wet), many fine-medium pores;, few slickensides; few fine and few very fine roots; strongly calcareous; clear smooth boundary.

C2 52 - 64 cm Gray (5Y 5/1) (moist), light gray (10YR 7/2) (dry); clay; strong fine and medium angular block structure; hard (dry), friable (moist), very sticky (wet), very plastic (wet), abundant fine-mediu pores;, common slickensides; few fine roots; strongly calcareous; clear smooth boundary.

C3 64 cm + Brown (7.5YR 5/4) (moist), light gray (10YR 7/2) (dry); silty clay; strong fine and medium angula blocky structure; hard (dry), friable (moist), very sticky (wet), very plastic (wet), common fine pores; and common coarse pores;, common calcareous concretions; strongly calcareous.

S O I L A N A L Y S I S R E S U L T S

PROFILE: SE1021

	DEPTH	pH		EC	P	C	N	CaCO3		CaSO4	CEC	Ca	Mg	K	Na	PBS	K fixed
		H2O	X					Total	Act.								
	cm			mS/cm	ppm	weight %					meq/100gr soil					%	
A	0- 10	7.9		1.1		1.36	0.12	22.9			19.6	17.2	1.8	0.3	0.3	100	
B	10- 20	8.1		1.1		1.27	0.11	25.2									
C	20- 30	8.4		1.1		0.76	0.07	24.5			14.7	12.3	2.1	0.1	0.2	100	
D	30- 40	8.5		1.2		0.85	0.08	19.6									
E	40- 50	8.6		1.1		0.68	0.07	20.9			18.6	14.3	3.4	0.2	0.7	100	
F	50- 60	8.7		1.2		0.72	0.07	22.8									
G	60- 70	8.8		1.3		0.64	0.06	21.0			13.7	11.8	1.5	0.1	0.3	100	
H	70- 80	8.6		1.8		0.66	0.06	22.2									
I	80- 90	8.5		2.4		0.58	0.06	21.8			8.8	7.4	1.1	0.1	0.2	100	

	Particle size (weight %)								CEC	METHODS
	vcS	cS	mS	fS	vfS	Sand	cSi	fSi	Silt	Cl	cl	1234567890
A			5				55		38			E C AAABA
B			5				52		41			E C A BA
C			3				45		50			E C AAABA
D			3				34		63			E C A BA
E			4				33		62			E C AAABA
F			4				33		61			E C A BA
G			5				46		46			E C AAABA
H			7				48		43			E C A BA
I			4				48		44			E C AAABA

S O L U B L E S A L T S

PROFILE: SE1021

	DEPTH	pH	EC	Ca	Mg	K	Na	B	CO3	HCO3	Cl	SO4	NO3	SAR	METHODS
	cm		mS/cm	---------- meq/100gr soil ----------										1234567
A	0- 10	7.9	1.1	1.6	1.3	0.2	3.5			1.9	3.5				CCCC
B	10- 20	8.1	1.1	1.6	0.5	0.1	3.5			2.6	4.5				CCCC
C	20- 30	8.4	1.1	1.2	0.7	0.1	3.5			2.6	5.1				CCCC
D	30- 40	8.5	1.2	1.6	0.5	0.1	4.3			2.6	6.1				CCCC
E	40- 50	8.6	1.1	1.4	0.4	0.1	4.7			3.1	5.5				CCCC
F	50- 60	8.7	1.2	0.7	0.6	0.1	5.0			3.1	6.1				CCCC
G	60- 70	8.8	1.3	0.6	0.6	0.1	6.2			3.1	6.5				CCCC
H	70- 80	8.6	1.8	0.4	0.1	0.1	8.7			3.7	8.7				CCCC
I	80- 90	8.5	2.4	0.9	0.9	0.2	5.7			3.7	11.4				CCCC

S O I L P H Y S I C A L P R O P E R T I E S

PROFILE: SE1021

INFILTRATION (cm/hr) METHODS

1
2
3

SURFACE STRUCTURE STABILITY INDEX:

DEPTH (cm)	B. D. (gr/cc)	WATER CONTENT (weight %)						METHODS
		0.03bar	0.05bar	0.1bar	0.3bar	1.0bar	3.0bar	5.0bar	15.0bar	12
A 0- 5	1.40			30.10	29.20			25.7	22.1	B
B 5- 10	1.40			33.60	32.00			25.7	22.1	B
C 10- 15	1.30			36.10	34.20			23.8	22.5	B
D 15- 20	1.30			37.50	35.20			23.8	22.5	B
E 20- 30	1.53			26.80	26.50			24.4	22.2	B
F 30- 40	1.44			28.40	27.70			25.1	22.5	B
G 40- 50	1.41			31.40	29.10			26.1	25.2	B
H 50- 60	1.37			33.40	31.40			27.8	26.2	B
I 60- 70	1.33			34.00	32.00			27.6	26.3	B
J 70- 80	1.30			34.00	31.70			26.8	24.4	B
K 80- 90	1.40			32.50	31.10			24.5	22.9	B

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SOFTWARE USED

CLIPPER 5.0 1984-1991. Nantucket Corporation.

DBASE IV 2.0. 1984-1993. Borland International Inc.

IDRISI 4.1. 1993. Graduate School of Geography, Clark University.

TURBO C 1.5. 1987. Borland International Inc.

Appendix A

Installation of SDBm

INSTALLATION

If you use the automatic installation facility SDBm will be installed on your hard disk (C drive) in a subdirectory \SDBm.

* Insert SDBm diskette in one of your disk drives.

* Switch to the floppy unit

* Type SDBMINS and press <return>

* The end of the operation re-displays the menu. The user, then, can quit to DOS and start SDBm.

To start SDBm, go to the root directory and type:

SDBm + <return>

The file CONFIG.SYS should contain at least the following statements:

```
FILES = 30
BUFFERS = 8
```

After a successful installation the subdirectory that contains SDBm should include the following files (61):

SDB2.EXE	SDBM.BAT
SDBTOOLS.EXE	SDBMINS.EXE
GRAPH.EXE	SDBMINS.DOC
LOGO.EXE	
SDB2INP.OVL	ENG.MEN
SDB2INP2.OVL	
SDB2OUTP.OVL	SP.MEM
SDB2OUTG.OVL	FR.MEM
SDB2OUTQ.OVL	
SKELANA1.DBF	TOENG.MEM
SKELPHY1.DBF	SETUP.MEM

SKELPHY2.DBF
COLOR.DBF
DIVIS.DBF
SDBACT1.DBF
SDBACT2.DBF
SDBACT3.DBF
SDBSITE.DBF
SDBHORIZ.DBF
SDBANA1.DBF
SDBANA2.DBF
SDBREMAR.DBF
SDBPHYS1.DBF
SDBPHYS2.DBF
SDBKEY01.DBF
SDBKEY02.DBF
SDBKEY03.DBF
SDBKEY04.DBF
SDBKEY05.DBF
SDBKEY06.DBF
SDBKEY07.DBF
SDBKEY08.DBF
HORREMAR.DBF
POSP.MEM
TOFR.MEM
SITELIST.NTX
SITEPRNO.NTX
ANA1ALL.NTX
SITEFAOR.NTX
SITEFAO.NTX
SITEUNIT.NTX
SITESTAT.NTX
REMAPRNO.NTX
HORIZALL.NTX
HORIPRNO.NTX
ANA1PRNO.NTX
REMPRNOH.NTX
ANA2PRNO.NTX
ANA2ALL.NTX
PHY1PRNO.NTX
PHY2PRNO.NTX
PHY2ALL.NTX

The root directory of the hardisk should include SDBM.BAT

PASSWORD

A password can be defined to protect the database. It controls the access to the edit, delete, import/export and coding system routines. When SDBm is installed, the password is not active. The option "password" in the SDBTOOLS menu must be selected to define and activate it. Four digits are available to it.

Once the password is activated, SDBm asks for it before displaying the Main Menu. If the password is not correctly entered, the only options that are available are printing, select/search and enter new data.

PRINTER SETUP

If a different version from MS-DOS version 2 is used, problems might occur when printing soil profiles.

Sometimes SDBm stops printing after few lines and it continues only after pressing the "Y" key. In this case, the DOS command MODE is not correctly installed in the SDBM.BAT file and one needs to replace the command:

MODE LPT1:132,8 por

with:

MODE LPT1:132,8,p

If an old MS-DOS version is used, and an error message appears while starting SDBm, remove the ",p" from the given command.

Appendix B

Coding system

CODING SYSTEM OF THE SITE DESCRIPTION VARIABLES

1. Authors
2. Soil climate
3. Topography
4. Landform
5. Land element
6. Position
7. Slope Gradient classes
8. Slope form
9. Micro topography
10. Flood frequency
11. Flood period
12. Landuse
13. Crops
14. Vegetation type
15. Grass/forb cover
16. Species
17. Parent material
18. Parent rock
19. Drainage
20. Internal drainage
21. External drainage
22. Water table depth
23. Water table type
24. Moisture conditions
25. Effective soil depth
26. Human influence
27. Stones size
28. Stones abundance
29. Rock outcrop quantity
30. Rock outcrop distance
31. Rock outcrop height
32. Erosion/accumulation type
33. Erosion/accumulation intensity
34. Sealing/crusting

1. AUTHOR(S)

AUTOR(ES)

AUTEUR(S)

2. SOIL CLIMATE Presently Defined Classes:

CLIMA DEL SUELO Clases actualmente definidas:

CLIMAT DU SOL Classes actuellement définies:

	SOIL MOISTURE REGIME		REGIMEN DE HUMEDAD DEL SUELO		REGIME HYDRIQUE DU SOL
AQ	aquic	AC	ácuico	AQ	aquique
PQ	peraquic	PA	perácuico	PQ	péraquique
AR	aridic	AR	arídico	AR	aridique
TO	torric	TO	tórrido	TO	torrique
UD	udic	UD	údico	UD	udique
PU	perudic	PU	perúdico	PU	pérudique
US	ustic	US	ústico	US	ustique
XE	xeric	XE	xérico	XE	xérique
	SOIL TEMPERATURE REGIME		REGIMEN DE TEMPERATURA DEL SUELO		REGIME DE TEMPERATURE DU SOL
PG	pergelic	PG	pergélico	PG	pergélique
CR	cryic	CR	crífico	CR	cryique
FR	frigid	FR	frígido	FR	frigide
ME	mesic	ME	mésico	ME	mésique
TH	thermic	TE	térmico	TH	thermique
HT	hyperthermic	HT	hipertérmico	HT	hyperthermique
IF	isofrigid	IF	isofrígido	IF	isofrigide
IM	isomesic	IM	isomésico	IM	isomésique
IT	isothermic	IT	isotérmico	IT	isohyperthermique
IH	isohyperthermic	IH	isohipertérmico	IH	isohyperthermique
MT	megathermic	MT	megatérmico	MT	mégathermique

3. TOPOGRAPHY Presently Defined Classes:

TOPOGRAFIA Clases actualmente definidas:

TOPOGRAPHIE Classes actuellement définies:

F	flat	P	plana	P	plate
A	almost flat	C	casi plana	Q	quasi plate
G	gently undulating	L	ligeramente ondulada	D	légèrement ondulée
U	undulating	O	ondulada	O	ondulée
R	rolling	D	moderadamente ondulada	A	vallonnée
H	hilly	N	colinada	C	accidentée
S	steeply dissected	F	a fuertemente socavada	F	abrupte
M	mountainous	M	montañosa	M	montagneuse

4. LANDFORM Presently Defined Classes:

GEOMORFOLOGIA Clases actualmente definidas:

GEOMORPHOLOGIE Classes actuellement définies:

PL	plain	LL	llano	PL	plaine
AP	alluvial plain	LA	llano aluvial	PA	plaine alluviale
LP	lacustrine plain	LC	llano lacustre	PL	plaine lacustre
CP	coastal plain	LO	llano costero	PC	plaine côtière
FG	fluvio-glacial plain	LF	llano fluvio-glacial	PF	plaine fluvio-glacial
UP	upland	SI	sierra	HT	chaîne de montagne
GP	glacial plain	LG	llano glacial	PG	plaine glaciaire
SP	sand plain	LR	llano de arena	PS	plaine de sable
DU	dunefield	CD	campo de dunas	DU	champ de dunes
PN	peneplane	PE	penillanura	PN	pénéplaine
PT	plateau	ME	meseta	PT	plateau
PE	pediment	PI	piedemonte	PE	pédiment
HI	hill	CO	colina	CO	colline
VA	valley	VA	valle	VA	vallée
MO	mountain	MO	montaña	MO	montagne
VO	volcano	VO	volcán	VO	volcan
LA	lava plain	LV	llano de lava	LA	plaine de lave
DT	delta	DE	delta	DT	delta
BA	basin	CU	cuenca	BA	bassin
TF	tidal flat	LM	llanura mareal	ES	slikke
PY	playa	PL	plaua	PY	playa

5. LAND ELEMENT Presently Defined Classes:

POSICION FISIOGRAFICA Clases actualmente definidas:

POSITION PHYSIOGRAPHIQUE Classes actuellement définies:

FP	flood plain	LI	llano inundable	PI	plaine alluviale
DE	depression	DE	depresión	DE	dépression
CH	channel	CA	canal	CH	chenal
VA	valley	VA	valle	VA	vallée
BA	backswamp	PA	pantano	MA	marais
DU	dune	DU	duna	DU	dune
LD	longitudinal dune	DL	duna longitudinal	DL	dune longitudinale
ID	interduce depression	DI	depresión interdunar	DI	dépression interdunaire
TE	terrace	TE	terraza	TE	terrasse
RI	ridge	CO	cordillera	BU	crête de montagne
IF	interfluve	IN	interfluvio	IF	interfluve
SL	slope	PE	pendiente	PE	pente
LA	lagood	LA	lagune	LA	lagune
LE	levee	LE	levee	LE	levée
PA	pan	PN	pan	PA	pan
CO	coral reef	AC	arrecife de coral	CO	récif de corail
CA	caldera	CL	caldera	CA	caldera
BR	beachridge	FD	frente de dunas	BE	front de dunes maritime
VF	valley floor	FV	fondo de valle	FV	fond de vallée
AF	alluvial fan	AA	abanico aluvial	GA	glacis alluvial
ME	meseta	ME	meseta	ME	meseta

6. POSITION Presently Defined Classes:

EMPLAZAMIENTO DEL PERFIL Clases actualmente definidas:

POSITION DU PROFIL Classes actuellement définies:

CR	crest	CI	cima	CR	crête
US	upper slope	PA	pendiente alta	PS	pente supérieure
MS	middle slope	PM	pendiente media	PM	pente intermédiaire
LS	lower slope	PB	pendiente baja	PI	pente inférieure
SL	slope	PE	pendiente	PE	pente
HI	higher part	PT	parte más alta	PH	partie plus élevée
IN	intermediate part	PI	parte intermedia	PR	partie intermédiaire
LO	lower part	PJ	parte más baja	PB	partie plus basse
BO	bottom	FO	fondo	FO	fond

7. SLOPE GRADIENT CLASSES Presently Defined Classes:

CLASES DE PENDIENTE Clases actualmente definidas:

CLASSES DE PENTE DU TERRAIN Classes actuellement définies:

0	0 - 0.1%
1	0.1 - -.3 %
2	0.3 - 0.7%
3	0.7 - 2%
4	2 - 8%
5	8 - 16%
6	16 - 30%
7	30 - 60%
8	>60%

8. SLOPE FORM Presently Defined Classes:

FORMA DE LA PENDIENTE Clases actualmente definidas:

FORME DE LA PENTE Classes actuellement définies:

C	concave	C	cóncava	C	concave
S	straight	R	recta	R	droit
V	convex	O	convexa	V	convexe
T	terraced	A	aterrazada	T	étagée en terrasses
X	complex	M	compleja	X	complexe

9. MICRO TOPOGRAPHY Presently Defined Classes:

MICROTOPOGRAFIA Clases actualmente definidas:

MICROTOPOGRAPHIE Classes actuellement définies:

GL	low gilgai	GP	gilgai poco desarrollado	GF	gilgai peu développé
GM	medium gilgai	GM	gilgai moderadamente desarrollado	GM	gilgai modérément développé
GH	high gilgai	GD	gilgai muy desarrollado	GE	gilgai très développé
GI	gilgai	GI	gilgai	GI	gilgai
TM	termite mounds	TT	tumulos de termitas	TM	buttes de termites
AT	animal tracks	HA	huellas de animales	PA	pistes d'animaux
AB	animal burrows	MA	madrigueras	TA	galeries d'animaux
HL	low hummocks	MB	monticulos bajos	MF	monticules bas
HM	medium hummocks	MM	monticulos medios	MM	monticules moyens
HH	high hummocks	ML	monticulos altos	ME	monticules hauts
HU	hummocks	MO	monticulos	MO	monticules
UN	uneven	NN	terreno no nivelado	TN	terrain non nivelé
SS	shifting sands	AM	arenas móviles	SM	sables mouvants
LE	level	LL	llano	PH	niveau
0	even	TN	terrano nivelado	O	terrain nivelé

10. FLOOD FREQUENCY Presently Defined Classes:

FRECUENCIA DE INUNDACIONES Clases actualmente definidas:

FREQUENCE DES INONDATIONS Classes actuellement définies:

0	nil	O	nula	N	néant
D	daily	D	diaria	J	journalière
W	weekly	S	semanal	H	hebdomadaire
M	monthly	M	mesnual	M	mensuelle
A	annually	A	anual	A	annuelle
B	biennually	B	bianual	B	bisannuelle
R	rare	E	escasa	R	rare
F	once every 2-4 years	F	una vez cada 2-4 años	F	une fois chaque 2-4 années
T	once every 5-10 years	G	une vez cada 5-10 años	T	une fois chaque 5-10 années
N	not known	N	desconocido	N	inconnu

11. FLOOD PERIOD Presently Defined Classes:

PERIODO DE INUNDACION Clases actualmente definidas:

PERIODE DES INONDATIONS Classes actuellement définies:

1	less than 1 day	1	menos de 1 dia	1	moins d'1 jour
2	1-15 days	2	1-15 dias	2	1 à 15 jours
3	15-30 days	3	15-30 dias	3	15 à 30 jours
4	30-90 days	4	30-90 dias	4	30 à 90 jours
5	90-180 days	5	90-180 dias	5	90 à 180 jours
6	180-360 days	6	180-360 dias	6	180 à 360 jours
7	continuous	7	continuamente	7	continuellement

12. LAND USE Presently Defined Classes:

USO DEL TERRENO Clases actualmente definidas:

UTILISATION DE LA TERRE Classes actuellement définies:

0	none	0	ninguno		néant
U	not used and not managed	S	sin uso ni manejo	N	non utilisée
S	settlements	U	urbano	I	agglomérations urbaines
A	agriculture	A	agrícola	C	agriculture
AA	annual field cropping	CA	cultivo anual	CA	cultures annuelles
AP	perennial field cropping	CP	cultivo perenne	CP	cultures pérennes
AT	tree cropping	CR	cultivo arboreo	AB	arbre
H	animal husbandry	G	cria de ganado	E	élevage
F	forestry	F	forestal	F	forêt
M	mixed farming	M	agricultura mixta	M	agriculture mixte
E	extraction and collection	C	cantera	EC	extraction et collection
P	nature protection	Z	zona protegida	P	zone protégée
AF	agroforestry system	DE	dehesa	SA	système agro-sylvicole
SR	residential use	UR	uso residencial	IR	usage résidence
SI	industrial use	UI	uso industrial	II	usage industriel
ST	roads	CT	carreteras	IT	routes
SC	recreational use	UE	uso recreativo	IL	usage récréatif
SX	excavation	EX	excavación	IX	excavation
A1	shifting cultivation	CN	cultivo migratorio	CA1	divagation des cultures
A2	fallow system	BA	barbecho	CA2	terre en jachère
A3	ley system cultivation	PT	prato temporal	CA3	pâture temporaire
A4	rainfed arable cultivation	CI	cultivo arable inundado	CA4	culture arable inondée
A5	paddy rice cultivation	AI	arroz bajo inundación	CA5	culture riz inondée
A6	irrigated cultivation	CG	cultivo de riego	CA6	culture d'irrigation

13. CROPS Presently Defined Classes:

CULTIVOS Clases actualmente definidas:

CULTURES Classes actuellement définies:

SO	sorghum	SO	sorgo	SO	sorghum
MA	maize	MA	maiz	MA	maïs
MI	millet	MI	moji	MI	millet
WH	wheat	TR	trigo	FR	blé
RI	rice	AR	arroz	RI	riz
RU	upland rice	AT	arroz de tierras altas	RM	riz de montagne
PE	peas	GU	guisantes	PO	pos
BE	beans	JU	judias	HA	haricots
SF	sunflower	GI	girasol	TS	tournesol
CT	cotton	AL	algodón	CT	coton
CP	cowpea	FR	frijol	NI	niébé
CF	coffee	CA	café	CF	café
TE	tea	TE	té	TH	thé
SC	sugar cane	CZ	caña de azucar	CS	canne à sucre
VE	vegetables	CH	cultivos hortícolas	LE	légumes
FR	fruits	CF	cultivos frutícolas	AF	fruits
BA	barley	CE	cebada	OR	orge
CH	cashew	AN	anacardo	AN	noix d'acajou
CA	cassava	CS	casava	MN	manioc
CC	coconut	CO	coco	CC	noix de coco
GR	groundnut	CT	cacahuette	AR	arachide
OP	oil palm	PA	palma aceitera	PA	palme à huile
RR	rubber	CU	caucho	HE	caoutchoic
SP	sweet potato	BA	batata	PD	patate douce
YA	yams	NA	ñame	IG	igname
TB	tobacco	TA	tabaco	TB	tabac
PO	potato	PT	patata	PI	pomme deterre
OL	olive tree	OL	olivos	OL	olivier
AL	alfalfa	AF	alfalfa	LU	luzerne
SB	sugar beet	RE	remolacha	BE	betterave
CR	carthamus	CM	cártamo	CR	cartheme
AM	almond tree	AM	almendro	AM	amandier
VI	vine	VI	vid	VI	vigne
AV	oats	AV	avena	AV	avoine
CO	cocoa	CC	cacao	CA	cacao
~~RB~~ FB	flooded rice	AI	arroz bajo inundación	RN	riz inondation
SY	soybean	SJ	soja	SJ	soya

14. VEGETATION TYPE Presently Defined Classes:

TIPO DE VEGETACION Clases actualmente definidas:

TYPE DE VEGETATION Classes actuellement définies:

F	closed forest	B	bosque cerrado	F	forêt dense
FE	evergreen forest	BP	bosque perennifolio	FV	forêt sempervirente à feuillage
FS	semi-deciduous forest	BS	bosque semi-caducifolio	FS	forêt à feuillage semi-caduc
FD	deciduous forest	BC	bosque caducifolio	FC	forêt à feuillage caduc
FX	xeromorphic forest	BX	bosque xeromórfico	FX	forêt xéromorphe
W	woodland	M	bosque maderero	B	forêt claire
WE	evergreen woodland	MP	bosque maderero perennifolio	BV	forêt claire sempervirente
WS	semi-deciduous woodland	MS	bosque maderero semi-caducifolio	BS	forêt claire à feuillage semi-caduc
WD	deciduous woodland	MC	bosque maderero caducifolio	BC	forêt claire à feuillage caduc
WX	xeromorphic woodland	MX	bosque maderero xeromórfico	BX	forêt claire xéromorphe
S	shrub	A	arbusto	A	arbuste
SE	evergreen shrub	AP	arbusto perennifolio	AV	arbuste sempervirent
SS	semi-deciduous shrub	AS	arbusto semi-caducifolio	AS	arbuste à feuillage semi-caduc
SD	deciduous shrub	AC	arbusto caducifolio	AC	arbuste à feuillage caduc
SX	xeromorphic shrub	AX	arbusto xeromórfico	AX	arbuste xéromorphe
D	dwarf shrub	E	arbusto enano	N	arbuste nain
DE	evergreen dwarf shrub	EP	arbusto enano perennifolio	NV	arbuste nain sempervirent
DS	semi-deciduous dwarf shrub	ES	arbusto enano semi-caducifolio	NS	arbuste nain à feuillage semi-caduc
DD	deciduous dwarf shrub	EC	arbusto enano caducifolio	NC	arbuste nain à feuillage caduc
DX	xeromorphic dwarf shrub	EX	arbusto enano xeromórfico	NH	arbuste nain xéromorphe
DT	tundra	ET	tundra	NT	tundra
H	herbaceous	H	herbaceos	H	herbe
HT	tall grassland	HA	pasto alto	HH	prairie haute
HM	medium tall grassland	HM	pasto medio	HM	prairie moyenne
HS	short grassland	HB	pasto bajo	HC	prairie basse
HF	forb	HF	helecho	HB	herbe
G	grassland	P	pradera	P	herbages
FO	forbland	CH	campo de helecho		
SA	savanna	SA	sabana	SA	brousse
N	no vegatation	N	sin vegetación	N	sans vegetation

15. GRASS/FORB COVER Presently Defined Classes:

COBERTURA DE HERBACEAS Clases actualmente definidas:

COUVERTURE HERBACÉE Classes actuellement définies:

0	0-15%
1	15-40%
2	40-80%
3	>80%

16. SPECIES Presently Defined Classes:

ESPECIES Clases actualmente definidas:

ESPECES Classes actuellement définies:

SP	silvestre pine	PS	pino silvestre	PS	pin sylvestre
LP	laricio pine	PL	pino laricio	PL	pin laricio
BP	black pine	PN	pino negro	PN	pin noir
PP	stone pine	PP	pino pinonero	PP	pin à pignons comestibles
WP	swamp pine	PC	pino carrasco	PD	pin des marécages
CP	canario pine	PA	pino canario	PC	pin canario
MP	monterey pine	PG	pino insigne	PM	pin monterey
PI	pinsapo	PI	pinsapo	PI	pinsapo
TO	Turkey oak	RE	rebollo	CT	chêne de Turquie
MO	muricated oak	QU	quejigo	CH	chêneau
AO	andaluz oak	RO	roble andaluz	CA	chêne d'Andalousie
CO	cork oak	AL	alcornoque	CL	chêne-liège
HO	holm oak	EN	encina	VF	yeuse
CT	chestnut tree	CA	castano	CG	châtaigne
WO	wild olive	AC	acebuche	OS	olivier sauvage
CB	white poplar	CB	chopo blanco	PB	peuplier blanc
CT	aspen poplar	CT	chopo temblon	PT	peuplier tremble
CN	black poplar	CN	chopo negro	PE	peuplier noir
WE	white eucaliptus	EB	eucalipto blanco	EB	eucalyptus blanc
RE	red eucaliptus	ER	eucalipto rojo	ER	eucalyptus rouge
AL	carob tree	AG	algarrobo	CR	caroubier
GU	guayule	GU	guayule	GU	guayule

17. PARENT MATERIAL Presently Defined Classes:

MATERIAL ORIGINAL Clases actualmente definidas:

MATERIAU PARENTAL Classes actuellement définies:

AU	aeolian deposits	DE	depositos eolicos	EN	dépôts éoliens
FL	fluvial deposits	DF	depositos fluviales	PL	dépôts fluviaux
MA	marine deposits	DM	depositos marinos	MA	dépôts marins.
LA	lacustrine deposits	DL	depositos lacustres	LA	dépôts lacustres
GL	glacial deposits	DG	depositos glaciales	GL	dépôts glaciaires
VA	volcanic ash	CV	cenizas volcánicas	CV	cendres volcaniques
LG	lagoonal deposits	LD	depositos lagunares	LG	dépôts lagunaires
LI	littoral deposits	DT	depositos litorales	LI	dépôts littoraux
AV	alluvium	TA	terreno aluvial	AV	sol alluvial
CO	colluvium	TC	terreno coluvial	CO	sol colluvial
WE	in situ weathered	ME	meteorizado in situ	AT	altéré in situ
LO	loess	LO	loess	LO	loess
PY	pyroclastic deposits	DP	depósitos piroclásticos	PY	dépôts pyroclastiques
OR	organic deposits	DO	depósitos orgánicos	OR	dépôts organiques
AS	aeolian sand	AE	arenas eólicas	SE	sable éolien
UU	unconsolidated	SC	sin consolidar	NC	sans consolider
LH	loess (Holocene)	LH			
AH	Alluvium (Holocene)	AH			
AP	Alluvium (Pleistocene)	AP			

18. PARENT ROCK Presently Defined Classes:

ROCA ORIGINAL Clases actualmente definidas:

ROCHE-MERE Classes actuellement définies:

GR	granite	GR	granito	GA	granite
PY	pyroclastic rock	RP	roca piroclastica	PY	roche pyroclastique
GN	gneiss	GN	gneis	GN	gneiss
QZ	quartzite	CU	cuarcita	QZ	quartzite
SC	schist	ES	esquisto	JC	schiste
AC	acid igneous/ metamorphic	RA	roca acida ignea/ metamorfica	AC	roche acide ignée/ métamorphique
BT	basalt	BA	basalto	BT	basalte
DO	dolerite	DO	dolerita	DO	dolérite
DI	diorite	DI	diorita	DI	diorite
UB	ultrabasic rock	RU	roca ultrabásica	UB	roche ultrabasique
BA	basic igneous/ metamorphic	RB	roca básicaígnea/ metamórfica	BA	roche basique ignée/ métamorphique
PU	pumice	PU	pumita	PP	pierre ponce
TU	tuff	TO	toba volcanica	TU	tuf
SA	sandstone	AR	arenisca	GR	grès
CO	conglomerate	CO	conglomerado	CO	conglomérat
SL	siltstone	LI	limonita	SI	limonite
SH	shale	LU	lutita	SA	shale
LI	limestone	CA	caliza	CA	calcaire
SE	sedimentary rock	RS	roca sedimentaria	SE	roche sédimentaire
MA	marl	MA	marga	MA	marne
DM	dolomite	DL	dolomita	DM	dolomite
EV	evaporite	EV	evaporita	EV	évaporite
NK	not known	SC	desconocida	NC	inconnue
SD	shale (Devonian)	LD	lutita (Devónico)	SD	shale (Dévonien)
MP	marl-gypsum (Pliocene)	MP	marga yesífera (Plioceno)	MP	marne-gypsum (Pliocène)
MY	marl-gypsum (Triassic)	MY	marga yesifera (Triásico)	MY	marne-gypsum (Trias)
LC	lime-sandstone (Miocene)	AC	arenisca caliza (Mioceno)	GC	grès calcaire (Miocène)
LE	limestone (Eocene)	CE	caliza (Eoceno)	CE	calcaire (Eocène)
MO	marl (Oligocene)	MO	marga (Oligoceno)	MO	marne (Oligocène)
ME	marl (Eocene)	ME	marga (Eoceno)	ME	marne (Eocène)
MM	marl (Miocene)	MM	marga (Mioceno)	MM	marne (Miocène)
MT	marl (Trias)	MT	marga (Trias)	MT	marne (Trias)
LM	lime (Miocene)	CM	caliza (Mioceno)	CM	calcaire (Miocène)
CQ	conglomerate (Pleistocene)	CP	conglomerado (Pleistoceno)	CP	conglomérat (Pléistocène)
CP	conglomerate (Pliocene)	CL	conglomerado (Plioceno)	CL	conglomérat (Pliocène)
AN	andesite	AN	andesita	AN	andésite
LS	lime-sandstone (Pliocene)	AP	arenisca caliza (Plioceno)	GL	grès limoniteux (Pliocène)
SD	shale (Devonian)	LT	lutita (Devónico)	SD	shale (Dévonien)
AH	clay (Holocene)	AH	arcilla (Holoceno)	AH	argile (Holocène)
SO	sandstone (Oligocene)	AO	arenisca (Oligoceno)	GO	grès (Oligocène)
SK	shale (Cambrium)	LC	lutita (Cámbrico)	SC	shale (Cambrique)
SM	schist (Cambrium)	EC	esquisto (Cámbrico)	SH	schiste (Cambrique)
SN	shale (Carboniferous)	LR	lutita (Carbonífero)	SN	shale (Carbonifère)
AP	clay (Pliocene)	AL	arcilla (Plioceno)	AP	argile (Pliocène)
SP	sandstone (Pleistocene)	AT	arenisca (Pleistoceno)	GP	grès (Pléistocène)
MC	marl (Cretaceous)	MC	marga (Cretaceo)	MC	marne (Crétacé)
LJ	limestone (Jurassic)	CJ	caliza (Jurásico)	CJ	calcaire (Jurassique)
ST	schist (Triassic)	ET	esquisto (Triásico)	ST	schiste (Triassique)
LK	limestone (Cambrium)	CB	caliza (Cámbrico)	CC	calcaire (Cambrique)
IA	igneous rock	RI	roca ígnea	RI	roche ignée
SL	saprolite	SG	saprolite	SL	saprolite
GA	gabbro	GA	gabro	GA	gabro

19. DRAINAGE Presently Defined Classes:

DRENAJE Clases actualmente definidas:

DRAINAGE Classes actuellement définies:

V	very poor	M	muy pobre	T	très pauvre
P	poor	P	pobre	D	pauvre
I	imperfect	I	imperfecto	I	imparfait
M	moderately well	O	moderadamente bueno	M	modéré
W	well	B	bueno	B	normal
S	somewhat excessively	A	algo excesivo	P	légèrement excessif
E	excessively	E	excesivo	E	excessif

20. INTERNAL DRAINAGE Presently Defined Classes:

DRENAJE INTERNO Clases actualmente definidas:

DRAINAGE INTERNE Classes actuellement définies:

S	slow	L	lento	P	pauvre
M	moderate	M	moderado	M	modéré
H	rapid	R	rápido	E	excessif
V	very slow	T	muy lento	T	très pauvre
R	very rapid	A	muy rápido	R	très rapide

21. EXTERNAL DRAINAGE Presently Defined Classes:

DRENAJE EXTERNO Clases actualmente definidas:

DRAINAGE SUPERFICIEL Classes actuellement définies:

P	ponded	I	impedido	A	areisme
S	slow	L	lento	F	ruissellement faible
M	moderate	M	moderado	M	ruissellement modérément rapide
R	rapid	R	rápido	R	ruissellement rapide
N	neither receiving nor shedding	N	sin recibir ni mojar	N	ni reception ni évacuation d'eau

22. WATER TABLE DEPTH Presently Defined Classes:

PROFUNDIDAD A LA CAPA FREATICA Clases actualmente definidas:

PROFONDEUR DE LA NAPPE PHREATIQUE Classes actuellement définies:

1	0-25 cm	1	0-25 cm	1	0-25 cm
2	25-50 cm	2	25-50 cm	2	25-50 cm
3	50-100 cm	3	50-100 cm	3	50-100 cm
4	100-150 cm	4	100-150 cm	4	100-150 cm
5	> 150 cm	5	> 150 cm	5	> 150 cm
0	not observed	0	no observada	0	néant

23. WATER TABLE TYPE Presently Defined Classes:

TIPO DE CAPA FREATICA Clases actualmente definidas:

TYPE DE NAPPE PHREATIQUE Classes actuellement définies:

SA	saline	SA	salina	SA	saline
BR	brackish	SL	salobre	SM	saumâtre
FR	fresh	AD	agua dulce	FR	eau douce
OX	oxygenated	OX	oxigenada	OX	eau oxygénée
PO	polluted	CO	contaminada	PO	eau polluée
SG	stagnating	ES	estancada	SG	eau stagnante

24. MOISTURE CONDITION Presently Defined Classes:

CONDICIONES DE HUMEDAD Clases actualmente definidas:

ETAT HYDRIQUE DU SOL Classes actuellement définies:

D	dry	S	seco	S	sec
M	moist	H	húmedo	H	humide
W	wet	M	mojado	T	mouillé
S	slightly moist	L	ligeramente húmedo	L	légèrement humide

25. EFFECTIVE SOIL DEPTH Presently Defined Classes:

PROFUNDIDAD UTIL Clases actualmente definidas:

PROFONDEUR DE LA NAPPE PHREATIQUE Classes actuellement définies:

1	0 -25 cm
2	25-50 cm
3	50-100 cm
4	100-150 cm
5	> 150 cm

26. HUMAN INFLUENCE Presently Defined Classes:

INFLUENCIA ANTROPICA Clases actualmente definidas:

INFLUENCE HUMAINE Classes actuellement définies:

0	no influence	O	sin influencia	N	aucune influence
VU	vegetation disturbed	VA	con vegetación alterada	VN	végétation dégradée
IU	irrigation	DR	de regadio	IN	irrigation
AD	artificial drainage	AD	artificialmente drenado	DA	drainage artificiel
FE	application of fertilizers	FE	fertilizado	AE	application d'engrais
BU	bunding	CE	cercado	CD	bunding
BR	burning	RQ	con restos quemados	BR	écobuage
TE	terracing	AT	aterrazado	CT	terrassement
PL	ploughing	AR	arado	LA	labourage
MP	plaggen	PL	plágeno	PL	plaggen
MR	raised beds	LE	levantado	BU	billons surélevés
MS	sand additions	EN	enarenado	AS	apports de sable
PO	pollution	CO	contaminado	PO	pollution
CL	clearing	AC	aclarado	EC	éclairci
SC	surface compaction	CS	compactado superficialmente	CS	compaction de la surface
VS	slightly disturbed vegetation	VL	vegetación ligeramente disturbada	VP	végétation légèrement troublé
VM	moderately disturbed vegetation	VM	vegetación moderadamente disturbada	VM	végétation modérément troublé
VE	strongly disturbed vegetation	VF	vegetación fuertemente disturbada	VF	végétation fortement troublé
IS	sprinkler irrigation	RA	riego por aspersión	IA	irrigation pour aspersion
IF	furrow irrigation	RS	riego por surco	IS	irrigation pour sillon
IP	flood irrigation	RM	riego a manta	II	irrigation pour inondation
IB	irrigation	RI	riego	ID	irrigation
MU	mineral fertilizer use	UF	uso de fertilizantes	AM	usage des fertilisantes
NK	not known	NC	desconocida	NC	inconnu

27. STONES SIZE Presently Defined Classes:

TAMANO DE PIEDRAS Clases actualmente definidas:

CLASSES DE DIMENSIONS DES ELEMENTS GROSSIERS Classes actuellement définies:

G	gravel	G	gravas	G	graviers
S	stones	P	piedras	P	cailloux
B	boulders	C	cantos rodados	B	blocs
F	fine gravel	F	gravas finas	F	graviers fin
M	medium gravel	M	gravas medias	M	graviers moyens
C	coarse gravel	R	gravas gruesas	R	graviers grossiers
L	large boulders	N	grandes cantos rodados	V	grandes cailloux roulés

28. STONES ABUNDANCE Presently Defined Classes:

PEDREGOSIDAD Clases actualmente definidas:

ABONDANCE D'ELEMENTS GROSSIERS Classes actuellement définies:

0	nil	N	ninguna	N	néant
V	very few	L	muy pocas	T	très peu nombreux
F	few	P	pocas	P	peu nombreux
C	common	F	frecuentes	C	nombreux
M	many	M	muchas	N	très nombreux
A	abundant	A	abundantes	A	abondants
D	dominant	D	dominante	D	dominant

29. ROCK OUTCROP QUANTITY Presently Defined Classes:

AFLORAMIENTOS ROCOSOS Clases actualmente definidas:

AFFLEUREMENTS ROCHEUX Classes actuellement définies:

0	nil	N	ninguno	N	non rocheux
V	very few	L	muy pocos	T	très peu rocheux
F	few	P	pocos	P	assez rocheux
C	common	F	frecuentes	C	rocheux
M	many	M	muchos	N	très rocheux
A	abundant	A	abundantes	A	excessivement rocheux
D	dominant	D	dominante	D	dominant

30. ROCK OUTCROP DISTANCE Presently Defined Classes:

DISTANCIA ENTRE AFLORAMIENTOS Clases actualmente definidas:

DISTANCE ENTRE AFFLEUREMENTS Classes actuellement définies:

1	>5 m
2	20-50 m
3	5-20 m
4	2-5 m
5	< 2m

31. ROCK OUTCROP HEIGHT Presently Defined Classes:

ALTURA DE LOS AFLORAMIENTOS Clases actualmente definidas:

HAUTEUR DES AFFLEUREMENTS Classes actuellement définies:

32. EROSION/ACCUMULATION TYPE Presently Defined Classes:

TIPO DE EROSION/DEPOSICION Clases actualmente definidas:

TYPE D'EROSION/DEPOT Classes actuellement définies

WG	gully erosion	EC	erosión en cárcavas	EA	érosion par ravinement
WR	rill erosion	ES	erosión en surcos	EI	érosion en rigoles
WS	sheet erosion	EL	erosión laminar	EN	érosion en nappe
AM	wind erosion/deposition	ED	erosión/deposición eólica	ED	érosion/accumulation éolienne
AE	wind erosion	EE	erosión eólica	EE	érosion éolienne
AD	wind deposition	DE	deposición eólica	DV	dépôt éolien
WD	deposition by water	DA	deposición por agua	DE	dépôt aquatique
WT	tunnel erosion	ET	erosión en tunel	ES	érosion souterraine

33. EROSION/ACCUMULATION INTENSITY Presently Defined Classes:

INTENSIDAD DE EROSION/DEPOSICION Clases actualmente definidas:

INTENSITE DES DEPOTS EOLIENS Classes actuellement définies:

0	nil	N	nula	N	nulle
SL	slight	L	ligera	L	légère
MO	moderate	M	moderrada	M	modérée
ST	strong	F	fuerte	F	forte
SE	severe	S	severa	S	sévère
E	extreme	E	extrema	E	extrême

34. SEALING/CRUSTING Presently Defined Classes:

CEMENTACION/ENCOSTRAMIENTO Clases actualmente definidas:

CIMENTATION/CUIRASSE Classes actuellement définies:

0	nil	N	ninguno	N	néant
CR	crust	CO	costra	CU	cuirasse
SL	slight sealing	LC	ligeramente cementado	PC	peu cimenté
MO	moderate sealing	MO	moderadamente cementado	FC	fortement cimenté
ST	strong sealing	FC	fuertemente cementado	IN	induré

CODING SYSTEM FOR THE HORIZON DESCRIPTION VARIABLES

1. Colour modifier
2. Mottles abundance
3. Mottles size
4. Mottles contrast
5. Mottles boundaries
6. Mottles colour
7. Texture
8. Structure grade
9. Structure size
10. Structure type
11. Structure relation
12. Consistency dry
13. Consistency moist
14. Stickiness
15. Plasticity
16. Cutans quantity
17. Cutans contrast
18. Cutans nature
19. Cutans location
20. Cem/comp continuity
21. Cem/comp structure
22. Cem/comp grade
23. Cem/comp nature
24. Pores/roots abundance
25. Pores/roots size
26. Rock abundance
27. Rock size
28. Rock shape
29. Rock weathering
30. Rock nature
31. Nodules abundance
32. Nodules size
33. Nodules kind
34. Nodules shape
35. Nodules hardness
36. Nodules nature
37. Nodules colour
38. Carbonates
39. Biological features abundance
40. Biological features kind
41. Boundary width
42. Boundary topography
43. Voids type
44. Porosity

1. COLOUR MODIFIER Presently Defined Classes:

MODIFICADOR DE COLOR Clases actualmente definidas:

TERME MODIFICATEUR DE COULEUR Classes actuellement définies:

M	(moist)	H	(húmedo)	H	humide
D	(dry)	S	(seco)	S	sec
MM	Mottled (moist)	MH	manchas (húmedo)	TM	tacheté (mouillé)
MD	Mottled (dry)	MS	manchas (seco)	TS	tacheté (sec)

2. MOTTLES ABUNDANCE Presently Defined Classes:

CANTIDAD DE MANCHAS Clases actualmente definidas:

ABONDANCE DE TACHES Classes actuellement définies:

0	none	S	sin	O	aucune
V	very few	L	muy pocas	T	très peu nombreuses
F	few	F	pocas	P	peu nombreuses
C	common	M	frecuentes	F	fréquentes
M	many	L	muchas	N	nombreuses
A	abundant	A	abundante	A	abondantes

3. MOTTLES SIZE Presently Defined Classes:

TANAÑO DE MANCHAS Clases actualmente definidas:

DIMENSION DES TACHES Classes actuellement définies:

V	very fine	F	muy fina	T	très fine
F	fine	P	pequeñas	F	fines
M	medium	M	medianas	M	moyennes
C	coarse	G	grandes	G	grandes

4. MOTTLES CONTRAST Presently Defined Classes:

CONTRASTE DE MANCHAS Clases actualmente definidas:

CONTRASTE DES TACHES Classes actuellement définies:

F	faint	I	indistintas	F	faible
D	distinct	D	definidas	D	distinct
P	prominent	E	destacadas	P	prononcé

5. MOTTLES BOUNDARY Presently Defined Classes:

LIMITE DE MANCHAS Clases actualmente definidas:

LIMITE DES TACHES Classes actuellement définies:

S	sharp	B	brusco	N	brusque
C	clear	N	neto	C	nette
D	diffuse	D	difuso	D	diffuse

6. MOTTLES COLOUR Presently Defined Classes:

COLOR DE LAS MANCHAS Clases actualmente definidas:

COULEUR DES TACHES Classes actuellement définies:

WH	white	BL	blancas	BL	blanches
RS	reddish	RJ	rojizas	RT	rougeâtres
RE	red	RO	rojas	RO	rouges
YR	yellowish-red	RA	rojo amarillentas	RJ	rouge-jaunâtre
RB	reddish-brown	PR	pardo rojizas	BR	brun-rougeâtre
YB	yellowish-brown	PA	pardo amarillentas	BJ	brun-jaunâtre
BR	brown	PD	pardas	BU	brune
BS	brownish	PS	parduscas	BT	brunâtres
RY	reddish-yellow	AR	amarillo rojizas	JR	jaune-rougeâtre
YE	yellow	AM	amarillas	JA	jaunes
GE	green	VE	verdes	VE	vertes
GR	grey	GR	grises	GR	grises
GS	greyish	GS	grisaceas	GI	grisâtres
BB	bluish-black	NA	negro azuladas	NB	noir-bleuâtre
BL	black	NE	negras	NO	noires
BA	yellowsh-white	BA	blanco-amarillentas	BA	blanc-jaunâtre

7. TEXTURE Presently Defined Classes:

TEXTURA Clases actualmente definidas:

TEXTURE Classes actuellement définies:

C	clay	A	arcilloso	A	argile
SI	silt	LI	limoso	LI	limon
S	sand	ARE	arenoso	SNS	sable non specifé
SICL	silty clayloam	FAL	franco arcillo limoso	LALI	limon argileux fin
SIC	silty clay	ARL	arcillo limoso	ALI	argile limoneuse
SIL	siltloam	FRL	franco limoso	LLI	limon fin
CL	clayloam	FRA	franco arcilloso	LA	limon argileux
SC	sandy clay	AA	arcillo arenoso	AS	argile sableuse
SCL	sandy clayloam	FAA	franco arcillo arenoso	LAS	limon argilo-sableux
SL	sandy loam	FRAR	franco arenoso	LS	limon sableau
VFSL	very fine sandy loam	FRAF	franco arenoso muy fino	LSTF	limon sableux très fin
FSL	fine sandy loam	FAF	franco arenoso fino	LSF	limon sableux fin
CSL	coarse sandy loam	FAG	franco arenoso grueso	LSG	limon sableux grossier
LS	loamy sand	ARF	areno francoso	SL	sableau limoneux
LVFS	loamy very fine sand	ARFF	areno francoso muy fino	STFL	sable limoneux très fin
LFS	loamy fine sand	AFF	areno francoso fino	SFL	sable limoneux fin
LCS	loamy coarse sand	AFG	areno francoso grueso	SLG	sable limoneux grossier
VFS	very fine sand	AMF	arenoso muy fin	STF	sable très fin
FS	fine sand	AFI	arenoso fino	SF	sable fin
CS	coarse sand	AGR	arenoso grueso	SG	sable grossier
L	loam	FR	franco	L	limon
MS	medium sand	AM	areno media	SM	sable moyen
US	unsorted sand	ASC	arena sin clasificar	SNC	sable non donné

8. STRUCTURE GRADE Presently Defined Classes:

GRADO DE ESTRUCTURA Clases actualmente definidas:

DEGRE DE STRUCTURE Classes actuellement définies:

VW	very weak	MD	muy débilmente desarrollada	TF	très faiblement développé
WE	weak	DD	débilmente desarrollada	FA	faiblement développé
MO	moderate	MD	moderadamente desarrollada	MO	moyennement développé
ST	strong	FD	fuertemente desarrollada	FO	fortement développé
VS	very strong	MF	muy fuertemente desarrollada	TF	très fortement développé
WM	weak to moderate	DM	de débil a moderadamente desarrollada	FM	de faible à moyennement développé
MS	moderate to strong	MG	de moderada a fuertemente desarrollada	MF	de moyenne à fortement développé
SG	single grain	GS	de grano suelto	PT	structure particulaire
MA	massive	MA	masiva	MA	structure massive
MP	porous massive	MP	masiva porosa	SM	structure massive poreuse

9. STRUCTURE SIZE Presently Defined Classes:

CLASE DE ESTRUCTURA Clases actualmente definidas:

CLASSE DE STRUCTURE Classes actuellement définies:

VF	very fine	MF	muy fina	TF	très fine
FI	fine	FI	fina	FI	fine
ME	medium	ME	media	MO	moyenne
CO	coarse	GR	gruesa	GR	grossière
VC	very coarse	MG	muy gruesa	TG	très grossière
FM	fine and medium	FM	fina y media	FM	fine et moyenne
MC	medium and coarse	MD	media y gruesa	MG	moyenne et grossière
CV	coarse and very coarse	GG	gruesa y muy greusa	GT	grossière et très grossière
FC	fine to coarse	FG	fina a greusa	FG	de fine à grossière
MV	medium to very coarse	DG	media a muy gruesa	MT	de moyenne à très grossière
FF	fine and very fine	FF	fina y muy fina	FF	fine et très fine

10. STRUCTURE TYPE Presently Defined Classes:

TIPO DE ESTRUCTURA Clases actualmente definidas:

TYPE DE STRUCTURE Classes actuellement définies:

GR	granular	GR	granular	GR	granulaire
CR	crumb	MI	migajosa	GM	grumeleuse
PR	prismatic	PR	prismatica	PR	prismatique
SB	subangular blocky	BS	en bloques subangulares	PS	polyédrique sub-angulaire
AB	angular blocky	BA	en bloques angulares	PA	polyédrique angulaire
AW	wedge shaped angular blocky	BC	en bloques angulares cuneiformes	PF	polyédrique angulaire en fuseaux
CO	columnar	CO	columnar	CO	en colonnes
PL	platy	LA	laminar	LA	feuilletée
SA	subngular and angular blocky	AB	en bloques angulares y sunangulares	SA	ployédrique angulaire et sub-angulaire
AS	angular and subngular blocky	SB	en bloques subangulares y angulares	AS	polyédrique subandulaire et angulaire
PS	subangular prismatic	B	prismática subangular	RS	prismatique sub-angulaire
SN	nutty subangular blocky	BN	bloques en forma de nuez	SN	bloc en forme de noix
RS	rocky structure	ER	estructura rocosa	SR	structure rocheux
SS	stratified structure	EE	estructura estratificada	SS	structure stratifiée

11. STRUCTURE RELATION Presently Defined Classes:

RELACION EE ESTRUCTURA Clases actualmente definidas:

RELATION DE STRUCTURE Classes actuellement définies:

*	parting to	*	que se deshace en	*	se séparant en
+	and	+	y	+	et
/	to	/	a	/	à

12. CONSISTENCY DRY Presently Defined Classes:

CONSISTENCIA EN SECO Clases actualmente definidas:

CONSISTANCE EN SEC Classes actuellement définies:

LO	loose	SU	suelto	ME	meuble
SO	soft	BL	blando	TE	tendre
SHA	slightly hard	LI	ligeramente duro	LDU	peu dur
HA	hard	DU	duro	DU	dur
VHA	very hard	MD	muy duro	TDU	très dur
EHA	extremely hard	ED	extremadamente duro	EDU	extrêmement dur
SSH	soft to slightly hard	BD	blando a ligeramente duro	TLD	tendre à peu dur
SH	slightly hard to hard	LD	ligeramente duro a duro	LDD	peu dur à dur
HV	hard to very hard	DB	duro a muy duro	DTD	dur à très dur

13. CONSISTENCY MOIST Presently Defined Classes:

CONSISTENCIA EN HUMEDO Clases actualmente definidas:

CONSISTANCE A L'ETAT FRAIS Classes actuellement définies:

LO	loose	SU	suelto	ME	meuble
VFR	very friable	MF	muy friable	TFR	très friable
FR	friable	FR	friable	FR	friable
FI	firm	FI	firme	FE	ferme
VFI	very firm	MU	muy firme	TFE	très ferme
EFI	extremely firm	EF	extremadamente firme	EFE	extrêmement ferme
VFR	very friable to friable	MR	muy friable a friable	TFF	très friable à friable
FRF	friable to firm	FB	friable a firme	FRF	friable à ferme
FVF	firm to very firm	FF	firme a muy firme	FTF	ferme à très firme

14. STICKINESS Presently Defined Classes:

ADHESIVITAD Clases actualmente definidas:

ADHESIVITE Classes actuellement définies:

NST	non sticky	NA	no adherente	NCO	non-collant
SST	slightly sticky	LA	ligeramente adherente	LCO	peu collant
ST	sticky	AD	adherente	CO	collant
VST	very sticky	MA	muy adherente	TCO	très collant
SS	slightly sticky to sticky	LH	ligeramente adherente a adherente	LCC	peu collant à collant
SV	sticky to very sticky	AA	adherente a muy adherente	CTC	collant à très collant

15. PLASTICITY Presently Defined Classes:

PLASTICIDAD Clases actualmente definidas:

PLASTICITE Classes actuellement définies:

NPL	non plastic	NP	no plástico	NPL	non-plastique
SPL	slightly plastic	LP	ligeramente plástico	LPL	peu plastique
PL	plastic	PL	plástico	PL	plastique
VPL	very plastic	MP	muy plástico	TPL	très plastique
SP	slightly plastic to plastic	LG	ligeramente plástico a plástico	LPP	peu plastique à plastique
PV	plastic to very plastic	PP	plástico a muy plástico	PVP	plastique à très plastique

16. CUTANS QUANTITY Presently Defined Classes:

CANTIDAD DE CUTANES Clases actualmente definidas:

ABONDANCE DE CUTANES Classes actuellement définies:

0	none	N	ninguno	N	néant
V	very few	M	muy pocos	T	très peu
F	few	P	pocos	P	peu
C	common	F	frecuentes	C	fréquents
M	many	C	muchos	N	nombreux
A	abundant	A	abundantes	A	abondantes
D	dominant	D	dominantes	D	dominant

17. CUTANS CONTRAST Presently Defined Classes:

CONTRASTE DE CUTANES Clases actualmente definidas:

NETTETE DES CUTANES Classes actuellement définies:

F	faint	I	indiferenciados	F	faibles
D	distinct	D	definidos	D	distincts
P	prominent	E	destacados	P	prononcés

18. CUTANS NATURE Presently Defined Classes:

NATURALEZA DE LOS CUTANES Clases actualmente definidas:

NATURE DES CUTANES Classes actuellement définies:

CL	clay	AR	arcillosis	A	argileux purs
CS	clay-sesquioxides cutans	SA	sesquióxido-arcillosos	AS	argileux-sesquioxydes
CH	clay-humus cutans	AH	arcillo-húmicos	AH	argileux-humiques
PF	pressure faces	CP	caras de presión	FP	faces de pression
SL	slickensides	SL	slickensides	G	faces de glissement
SP	partly intersecting slickensides	SP	parcialmente disectados		partiellement entrecoupées
SI	intersecting slickensides	SD	slickensides disectados	GE	faces de glissement entrecoupées
SF	shiny ped forces				

19. CUTANS LOCATION Presently Defined Classes:

UBICACION DE CUTANES Clases actualmente definidas:

LOCALISATION DES CUTANES Classes actuellement définies:

PF	on pedfaces	CA	en las caras de los agregados	P	en surface des agrégats
PV	on vertical pedfaces	CV	en las caras verticales de los agregados	PV	sur les faces verticales des agrégats
PH	on horizontal pedfaces	CH	en las caras horizontales de los agregados	PH	sur les faces horizontales des agrégats
PO	in pores	PO	en los poros	VI	dans les pores
LA	lamellae	PL	formando lamelas	LA	en lamelles
CF	coarse fragments	FG	fragmentos gruesos	FG	fragments grossiers
NS	not specified	NE	no especificado	NS	no especifiée

20. CEM/COMP CONTINUITY Presently Defined Classes:

CONTINUIDAD DE CEM/COMP Clases actualmente definidas:

CIMENTATION - CONTINUITE Classes actuellement définies:

0	no	N	no	N	néant
D	discontinuous	D	discontinuo	D	discontinue
C	continuous	C	continuo	C	continue
B	broken	Q	quebrada	B	cassé

21. CEM/COMP STRUCTURE Presently Defined Classes:

ESTRUCTURA DE CEM/COMP Clases actualmente definidas:

CIMENTATION - STRUCTURE Classes actuellement définies:

M	massive	M	masiva	M	massive
V	vesicular	V	vesicular	V	vésiculaire
P	platy	L	laminar	L	lamellaire
N	nodular	N	nodular	N	noduleuse

22. CEM/COMP GRADE Presently Defined Classes:

GRADO DE CEM/COMP Clases actualmente definidas:

DEGRE DE CIMENTATION Classes actuellement définies:

W	weakly cemented	D	debilmente cementado	F	peu cimenté
C	compacted	C	compactado	C	cimenté
S	strongly cemented	F	fuertemente cementado	R	fortement cimenté
I	indurated	E	endurecido	I	induré
N	not cemented nor compacted	N	no cementado ni compactado	N	non cimentée ni compactée
Y	compacted but not cemented	O	compactado pero no cementado	Y	compactée mais non cimentée
M	moderately cemented	M	moderadamente cementado	M	peu cimentée

23. CEM/COMP NATURE Presently Defined Classes:

NATURALEZA DE LA CEM/COMP Clases actualmente definidas:

NATURE DE LA CIMENTATION Classes actuellement définies:

K	carbonates	C	carbonatos	K	carbonates
Q	silica	Q	sílice	Q	silice
S	sesquioxides	S	sesquíoxidos	S	sesquioxydes
F	iron	H	hierro	F	fer
P	pisolitic	P	pisolitica	P	pisolotique
M	iron-manganese	M	hierro-manganeso	M	ferro-manganèse
O	iron-organic matter	O	hierro-materia orgánica	O	ferro-manganèse organique
Y	gypsum	Y	yeso	P	plâtre
C	clay	A	arcilla	A	argile
N	not known	D	desconocida	N	inconnu

24. PORES/ROOTS ABUNDANCE (code = 1 digit only) Defined Classes:

CANTIDAD DE POROS/RAICES Clases actualmente definidas:

ABONDANCE DE PORES/RACINES Classes actuellement définies:

0	nil	N	ninguno/a	N	néant
F	few	P	pocosas	P	peu nombreux
C	common	F	frecuentes	C	nombreux
M	many	M	muchos/as	N	très nombreux
A	abundant	A	abundantes	A	abondants
V	very few	L	muy pocos/as	T	très peu nombreux

25. PORES/ROOTS SIZE Presently Defined Classes:

TAMAÑO DE POROS/RAICES Clases actualmente definidas:

DIAMETRE DES PORES Classes actuellement définies:

FI	fine	FI	finos/as	FI	fin
VF	very fine	MF	muy finos/as	TF	très fin
FM	fine-medium	FM	de finos/as a medios/as	FM	fin et moyen
ME	medium	ME	medios/as	MO	moyen
MC	medium-coarse	MG	de medios/as a gruesos/as	MG	moyen et grossier
CO	coarse	GR	gruesos/as	GR	grossier
VC	very coarse	GG	muy gruesos/as	TG	très grossier
FF	fine and very fine	FF	finos/as y muy finos/as	FF	fin et très fin

26. ROCK FRAGMENTS ABUNDANCE Presently Defined Classes:

CANTIDAD DE FRAGMENTOS DE ROCAS Clases actualmente definidas:

ABONDANCE DE FRAGMENTS ROCHEUX Classes actuellement définies:

0	none	N	ninguno	N	néant
V	very few	L	muy pocos	T	très peu nombreux
F	few	P	pocos	P	peu nombreux
C	common	F	frecuentes	C	nombreux
M	many	M	muchos	N	très nombreux
D	dominant	D	dominantes	D	dominance de roches
A	abundant	A	abundantes	A	abondants

27. ROCK FRAGMENTS SIZE Presently Defined Classes:

TAMAÑO DE FRAGMENTOS DE ROCAS Clases actualmente definidas:

DIMENSION DES FRAGMENTS ROCHEUX Classes actuellement définies:

FI	fine	PE	pequeños	FI	fin
ME	medium	ME	medianos	MO	moyen
CO	coarse	GR	gruesos	GR	grossier
VC	very coarse	GG	muy gruesos	TG	très grossier
EC	extremely coarse	EG	extremadamente gruesos	EG	extrêmement grossier
SB	stones and boulders	PC	piedras y cantos rodados	PB	pierres et cailloux roulés
FM	fine and medium	PM	pequeños y medianos	FM	fin et moyen
MC	medium and coarse	MG	medios y gruesos	MG	moyen et grossier
CV	coarse to very coarse	GM	gruesos a muy gruesos	GT	grossier à très grossier
	stones				
	boulders				
LB	large boulders				

28. ROCKS SHAPE Presently Defined Classes:

FORMA DE LAS ROCAS Clases actualmente definidas:

FORME DES FRAGMENTS ROCHEUX Classes actuellement définies:

R	rounded	R	redondeados	R	sphériques
F	flat	P	planos	P	plats
A	angular	A	angulares	A	anguleux
S	subrounded	S	subredondeados	S	irréguliers

29. ROCKS WEATHERING Presently Defined Classes:

METEORIZACION DE LOS FRAGMENTOS DE ROCAS Clases actualmente definidas:

ALTERATION DES FRAGMENTS ROCHEUX Classes actuellement définies:

F	fresh-slightly weathered	P	poco ó nada meteorizados	L	peu ou non-altérés
W	weathered	M	meteorizados	A	altérés
S	strongly weathered	F	fuertemente meteorizados	F	très altérés

30. ROCKS NATURE Presently Defined Classes:

NATURALEZA DE LOS FRAGMENTOS DE ROCAS Clases actualmente definidas:

NATURE DES FRAGMENTS ROCHEUX Classes actuellement définies:

QU	quartz	CU	de cuarzo	QU	quartz
CH	chert	SI	de silex	CH	chert
GR	granite	GR	de granito	GA	granite
BT	basalt	BA	de basalto	BT	basalte
GN	gneiss	GN	de gneiss	GN	gneiss
QZ	quartzite	CC	de cuarcita	QZ	quartzite
SC	schist	ES	de esquisto	SC	schiste
DO	dolerite	DO	de dolerita	DO	dolérite
DI	diorite	DI	de diorita	DI	diorite
GA	gabbro	GA	de gabro	GB	gabbro
SI	siltstone	LI	de limonita	SI	limon
SH	shale	LU	de lutita	SA	shale
SA	sandstone	AR	de arenisca	GR	grès
DM	dolomite	DL	de dolomita	DM	dolomite
LI	limestone	CA	de caliza	VA	calcaire
TU	tuff	TB	de toba volcánica	TU	tuf
PU	pumice	PU	de pumita	PO	ponce
MI	mica	MI	mica	MI	mica
FE	feldspar	FE	feldespato	FE	feldspath

31. NODULES ABUNDANCE Presently Defined Classes:

CANTIDAD DE NODULOS Clases actualmente definidas:

ABONDANCE DE NODULES Classes actuellement définies:

0	nil	N	ningún	N	néant
V	very few	L	muy pocos	T	très peu nombreux
F	few	P	pocos	P	peu nombreux
C	comon	F	frecuentes	C	nombreux
M	many	M	muchos	N	très nombreux
D	dominant	D	dominantes	D	dominance de nodules
A	abundant	A	abundantes	A	abondantes

32. NODULES SIZE Presently Defined Classes:

TAMAÑO DE NODULOS Clases actualmente definidas:

DIMENSION DES NODULES Classes actuellement définies:

V	very fine	F	muy finos	T	très fine
F	fine	P	pequeños	F	fin
M	medium	M	medianos	M	moyen
C	coarse	G	grandes	G	grossier

33. NODULES KIND Presently Defined Classes:

TIPO DE NODULOS Clases actualmente definidas:

TYPE DE NODULES Classes actuellement définies:

C	concretions	C	n(dulos (concreciones)	C	concrétions
T	crystals	T	cristales	T	cristaux
S	soft segregation	S	nódulos (segregaciones blandas)	S	nodules (ségrégations tendres)
N	nodules	N	nódulos	N	nodules
R	residual rock fragments	F	fragmentos de rocas residuales	R	fragments de roches residuelles

34. NODULES SHAPE Presently Defined Classes:

FORMA DE LOS NODULOS Clases actualmente definidas:

FORME DES NODULES Classes actuellement définies:

S	spherical	E	esféricos	S	sphérique
I	irregular	I	irregulares	I	irrégulier
A	angular	A	angulares	A	anguleux
F	flat	P	plano	P	plain
E	elongated	L	alargado	E	allongée

35. NODULES HARDNESS Presently Defined Classes:

DUREZA DE LOS NODULOS Clases actualmente definidas:

DURETE DES NODULES Classes actuellement définies:

H	hard	D	duros	D	durs
S	soft	B	blandos	T	tendres
B	hard and soft	R	duros y blandos	B	durs et tendres

36. NODULES NATURE Presently Defined Classes:

NATURALEZA DE LOS NODULOS Clases actualmente definidas:

NATURE DES NODULES Classes actuellement définies:

K	calcareous	C	calcáreos	K	calcaires
G	gypsiferous	Y	yesíferos	G	gypsifères
Q	siliceous	S	silíceos	Q	siliceux
S	iron-manganese	H	de hierro-manganeso	S	ferro-manganeux
F	ferrigenous	F	ferruginosos	F	ferrugineux
M	manganiferous	M	manganíferos	M	manganifères
C	argilleous	A	acrillosos	A	argileux
X	carbonate-silica	R	carbonato-sílice	C	carbonate-silice
T	clay-sesquioxides	L	arcilla-sesquióxidos	R	argile sesquioxydes
L	salt	E	sales	L	sels
U	sulphur	U	sulfuros	P	sulphures
N	not known	D	desconocidos	N	inconnus

37. NODULES COLOUR Presently Defined Classes:

COLOR DE LOS NODULOS Clases actualmente definidas:

COULEUR DES NODULES Classes actuellement définies:

WH	white	BL	blancos	BL	blancs
RE	red	RO	rojos	RO	rouges
BR	brown	PA	pardos	BU	bruns
GR	grey	GR	grises	GR	gris
YE	yellow	AM	amarillos	JA	jaunes
BB	bluish-black	NA	negro azulados	BN	noir-bleuâtre
BL	black	NE	negros	NO	noirs
RB	reddish-black	NR	negro rojizos	BR	noir-rougeâtre
RS	reddish	RJ	rojizos	RT	rougeâtre
YR	yellowish-red	RA	rojo amarillento	RJ	rouge jaunâtre
BS	brownish	PR	pardusco	BT	brunâtre
YB	yellowish brown	PD	pardo amarillento	BJ	brun jaunâtre
RY	reddish yellow	AR	amarillo rojizo	JR	jaune rougeâtre
GE	green	VE	verde	VE	verte
GS	greyish	GS	grisáceo	GT	grisâtre
BU	blue	AZ	azul	BL	bleu

38. CARBONATES Presently Defined Classes:

CARBONATOS Clases actualmente definidas:

CARBONATES Classes actuellement définies:

0	non alcareous	N	no calcáreo	N	non-calcarifère
EX	extremely calcareous	EX	extremadamente calcáreo	EC	extrêmement calcarifère
ST	strongly calcareous	PC	fuertemente calcáreo	FC	très calcarifère
MO	moderatelyc alcareous	MC	moderadamente calcáreo	MC	modérément calcarifère
SL	slightly calcareous	LC	ligeramente calcáreo	LG	peu calcarifère

39. BIOL FEATURES ABUNDANCE (code = 1 digit only) Defined Classes:

CANTIDAD DE RASGOS BIOLOGICOS (código = 1 dígito) Clases definidas:

CARACTERES D'ORIGINE BIOLOGIQUE (code = 1 chiffre) Classes définies:

0	nil	N	ningún	N	néant
V	very few	L	muy pocos	T	très peu
F	few	P	pocos	P	peu
C	common	F	frecuentes	C	fréquents
M	many	M	muchos	N	beaucoup

40. BIOL FEATURES KIND Presently Defined Classes:

TIPOS DE RASGOS BIOLOGICOS Clases actualmente definidas:

TYPES DE CARACTERE D'ORIGINE BIOLOGIQUE Classes actuellement définies:

BU	burrows	MA	madrigueras	GA	galeries d'animaux
BO	open burrows	MD	madrigueras abiertas	TO	galeries ouvertes
BI	infilled burrows	MR	madrigueras rellenadas	TR	galeries remplies
TC	termite channels	TE	termiteros	GT	galeries de termites
IA	insect activity	AI	actividad de insectos	NJ	nids d'insectes
EW	earthworms	LO	lombrices	LO	lombric
CC	charcoal	CV	carbón vegetal	CB	charbon de bois
AR	artefacts	AR	artefactos	EN	engin
PT	pedotubules	PE	pedotúbulos	PE	pedotubules
AB	biological activity	AB	actividad biologica	AB	activité biologique

41. BOUNDARY WIDTH Presently Defined Classes:

ANCHURA DEL LIMITE ENTRE HORIZONTES Clases actualmente definidas:

NETTETE DE LA TRANSITION VERS L'HORIZON SOUS-JACENT Classes actuellement définies:

A	abrupt	B	brusco	A	abrupte
C	clear	N	neto	D	distincte
G	gradual	G	gradual	G	graduelle
D	diffuse	D	difuso	F	diffuse

42. BOUNDARY TOPOGRAPHY Presently Defined Classes:

TOPOGRAFIA DEL LIMITE Clases actualmente definidas:

REGULARITE DE LA TRANSITION Classes actuellement définies:

S	smooth	P	y plano	R	régulière
W	wavy	O	y ondulado	O	ondulée
I	irregular	I	e irregular	I	irrégulière
B	broken	R	e interrumpido	T	interrompue

43. VOIDS TYPE Presently Defined Classes:

TIPOS DE HUECOS Clases actualmente definidas:

TYPES DE VIDES DANS LE SOL Classes actuellement définies:

I	interstitial pores	I	poros intersticiales	I	pores interstitiels
B	vesicles	V	vesículas	V	vésicules
V	vughs	C	cavidades	C	cavités
C	channels	N	canales	L	chenaux
P	planes	P	plano	P	plans

44. POROSITY Presently Defined Classes:

POROSIDAD Clases actualmente definidas:

POROSITE Classes actuellement définies:

0	very low porosity	J	muy baja	T	porosité très basse
L	low porosity	B	baja	B	porosité basse
M	medium porosity	M	media	M	porosité moyenne
H	high porosity	E	elevada	P	porosité élevée
V	very high porosity	U	muy elevada	E	porosité très élevée

FAO SOIL UNIT CODES (1974)

A	Acrisols
AF	Ferric Acrisol
AG	Gleyic Acrisol
AH	Humic Acrisol
AO	Orthic Acrisol
AP	Plinthic Acrisol
B	Cambisols
BC	Chromic Cambisol
BD	Dystric Cambisol
BE	Eutric Cambisol
BF	Ferralic Cambisol
BG	Gleyic Cambisol
BH	Humic Cambisol
BK	Calcic Cambisol
BV	Vertic Cambisol
BX	Gelic Cambisol
C	Chernozems
CG	Glossic Chernozem
CH	Haplic Chernozem
CK	Calcic Chernozem
CL	Luvic Chernozem
D	Podzoluvisols
DD	Dystric Podzoluvisol
DE	Eutric Podzoluvisol
DG	Gleyic Podzoluvisol
E	Rendzinas
F	Ferralsols
FA	Acric Ferralsol
FH	Humic Ferralsol
FO	Orthic Ferralsol
FP	Plinthic Ferralsol
FR	Rhodic Ferralsol
FX	Xanthic Ferralsol
G	Gleysols
GK	Calcic Gleysol
GD	Dystric Gleyol
GE	Eutric Gleysol
GH	Humic Gleysol
GM	Mollic Gleysol
GP	Plinthic Gleysol
GX	Gelic Gleysol
H	Phaeozems
HC	Calcaric Phaeozem
HG	Gleyic Phaeozem
HH	Haplic Phaeozem
HL	Luvic Phaeozem
I	Lithosol
J	Fluvisols
JC	Calcaric Fluvisol
JD	Dystric Fluvisol
JE	Eutric Fluvisol
JT	Thionic Fluvisol
K	Kastanozems
KH	Haplic Kastanozem
KK	Calcic Kastanozem
KL	Luvic Kastanozem
L	Luvisols
LA	Albic Luvisol
LC	Chromic Luvisol
LF	Ferric Luvisol
LG	Gleyic Luvisol
LK	Calcic Luvisol
LO	Orthic Luvisol
LP	Plinthic Luvisol
LV	Vertic Luvisol
M	Greyzems
MG	Gleyic Greyzem
MO	Orthic Greyzem
N	Nitosols
ND	Dystric Nitosol
NE	Eutric Nitosol
NH	Humic Nitosol
O	Histosols
OD	Dystric Histosol
OE	Eutric Histosol
OX	Gelic Histosol
P	Podzols
PF	Ferric Podzol
PG	Gleyic Podzol
PH	Humic Podzol
PL	Leptic Podzol
PO	Orthic Podzol
PP	Placic Podzol
Q	Arenosols
QA	Albic Arenosol
QB	Cambic Arenosol
QC	Calcaric Arenosol
QD	Dystric Arenosol
QE	Eutric Arenosol
QF	Ferralic Arenosol
QK	Calcic Arenosol
QL	Luvic Arenosol
QP	Petrocalcic Arenosol
R	Regosols
RC	Calcaric Regosol
RD	Dystric Regosol
RE	Eutric Regosol
RX	Gelic Regosol
S	Solonetz
SG	Gleyic Solonetz
SM	Mollic Solonetz
SO	Orthic Solonetz
T	Andosols
TH	Humic Andosol
TM	Mollic Andosol
TO	Ochric Andosol
TV	Vitric Andosol
U	Rankers
V	Vertisols
VC	Chromic Vertisol
VP	Pellic Vertisol
W	Planosols
WD	Dystric Planosol
WE	Eutric Planosol
WH	Humic Planosol
WM	Mollic Planosol
WS	Solodic Planosol
WX	Gelic Planosol
X	Xerosols
XH	Haplic Xerosol
XK	Calcic Xerosol
XL	Luvic Xerosol
XY	Gypsic Xerosol
Y	Yermosols
YH	Haplic Yermosol
YK	Calcic Yermosol
YL	Luvic Yermosol
YT	Takyric Yermosol
YY	Gypsic Yermosol
Z	Solonchaks
ZG	Gleyic Solonchak
ZM	Mollic Solonchak
ZO	Orthic Solonchak
ZT	Takyric Solonchak

FAO SOIL UNIT CODES (1990)

FL Fluvisols
FLE Eutric Fluvisol
FLC Calcaric Fluvisol
FLD Dystric Fluvisol
FLM Mollic Fluvisol
FLU Umbric Fluvisol
FLT Thionic Fluvisol
FLS Salic Fluvisol

GL Gleysols
GLE Eutric Gleysol
GLK Calcic Gleysol
GLD Dystric Gleysol
GLA Andic Gleysol
GLM Mollic Gleysol
GLU Umbric Gleysol
GLT Thionic Gleysol
GLI Gelic Gleysol

RG Regosols
RGE Eutric Regosol
RGC Calcaric Regosol
RGY Gypsic Regosol
RGD Dystric Regosol
RGU Umbric Regosol
RGI Gelic Regosol

LP Leptosols
LPE Eutric Leptosol
LPD Dystric leptosol
LPK Rendzic Leptosol
LPM Mollic Leptosol
LPU Umbric leptosol
LPQ Lithic Leptosol
LPI Gelic leptosol
LPC Calcaric Leptosol

AR Arenosols
ARH Haplic Arenosol
ARB Cambic Arenosol
ARL Luvic Arenosol
ARO Ferralic Arenosol
ARA Albic Arenosol
ARK Calcic Arenosol
ARC Calcaric Arenosol
ARG Gleyic Arenosol

AN Andosols
ANH Haplic Andosol
ANM Mollic Andosol
ANU Umbric Andosol
ANZ Vitric Andosol
ANG Gleyic Andosol
ANI Gelic Andosol

VR Vertisols

VRY Gypsic Vertisol
VRD Dystric Vertisol
VRK Calcic Vertisol
VRH Haplic Vertisol

CL Calcisols
CLH Haplic Calcisol
CLL Luvic Calcisol
CLP Petric Calcisol

GY Gypsisols
GYH Haplic Gypsisol
GYK Calcic Gypsisol
GYL Luvic Gypsisol
GYP Petric Gypsisol

SN Solonetz
SNH Haplic solonetz
SNM Mollic Solonetz
SNK Calcic Solonetz
SNY Gypsic Solonetz
SNJ Stagnic Solonetz

SC Solonchaks
SCH Haplic Solonchak
SCM Mollic Solonchak
SCK Calcic Solonchak
SCY Gypsic Solonchak
SCN Sodic Solonchak
SCG Gleyic Solonchak
SCI Gelic Solonchak

KS Kastanozems
KSH Haplic Kastanozem
KSL Luvic Kastanozem
KSK Calcic Kastanozem
KSY Gypsic Kastanozem

CH Chernozems
CHH Haplic Chernozem
CHK Calcic Chernozem
CHL Luvic Chernozem
CHW Glossic Chernozem
CHG Gleyic Chernozem

PH Phaeozems
PHG Gleyic Pheaozem
PHH Haplic Phaeozem
PHC Calcaric Phaeozem
PHJ Stagnic Phaeozem
PHL Luvic Phaeozem

GR Greyzems
GRH Haplic Greyzem
GRG Gleyic Greyzem

LV Luvisols
LVH Haplic Luvisol
LVF Ferric Luvisol
LVX Chromic Luvisol
LVK Calcic Luvisol
LVJ Stagnic Luvisol
LVG Gleyic Luvisol

PL Planosols
PLE Eutric Planosol
PLD Dystric Planosol
PLM Mollic Planosol
PLU Umbric Planosol
PLI Gelic Planosol

PD Podzoluvisols
PDE Eutric Podzoluvisol
PDD Dystric Podzoluvisol
PDJ Stagnic Podzoluvisol
PDG Gleyic Podzoluvisol
PDI Gelic Podzoluvisol

PZ Podzols
PZH Haplic Podzol
PZB Cambic Podzol
PZF Ferric podzol
PZC Carbic Podzol
PZG Gleyic Podzol
PZI Gelic Podzol

LX Lixisols
LXH Haplic Lixisol
LXF Ferric Lixisol
LXP Plinthic Lixisol
LXA Albic Lixisol
LXJ Stagnic Lixisol
LXG Gleyic Lixisol

AC Acrisols
ACH Haplic Acrisol
ACF Ferric Acrisol
ACU Humic Acrisol
ACP Plinthic Acrisol
ACG Gleyic Acrisol

AL Alisols
ALH Haplic Alisol
ALF Ferric Alisol
ALU Humic Alisol
ALP Plinthic Alisol
ALJ Stagnic Alisol
ALG Gleyic Alisol

NT Nitisols
NTH Haplic Nitisol
NTR Rhodic Nitisol

NTU Humic Nitisol
FR Ferralsols
FRH Haplic Ferralsol
FRX Xanthic Ferralsol
FRR Rhodic Ferralsol
FRU Humic Ferralsol
FRG Geric Ferralsol
FRP Plinthic Ferralsol

PT Plinthosols
PTE Eutric Plinthosol
PTD Dystric Plinthosol
PTU Humic Plinthosol
PTA Albic Plinthosol

CM Cambisols
CME Eutric Cambisol
CMD Dystric Cambisol
CMU Humic Cambisol
CMC Calcaric Cambisol
CMX Chromic Cambisol
CMV Vertic Cambisol
CMO Ferralic Cambisol
CMG Gleyic Cambisol
CMI Gelic Cambisol
CMJ Stagnic Cambisol

AT Anthrosols
ARA Aric Anthrosol
ATC Cumulic Anthrosol
ATF Fimic Anthrosol
ATU Urbic Anthrosol

HS Histosols
HSL Folic Histosol
HSS Terric Histosol
HSF Fibric Histosol
HST Thionic Histosol
HSI Gelic Histosol

Third Level Codes

GE Geli
OT Orthothioni
TA Takyri
YE Yermi
NY Nildeyermi
AD Aridi
PL Plinthi
GL Gleyi
ST Stagni
AN Anthraqui
FL Fluoi
AL Albi
AR Aroni
GI Geri
MH Mollichumi
UH Umbrihumi
HU Humi
HI Histi

FH Fibrihisti
TH Tenihisti
MO Molli
UM Umbri
AC Acri
LX Lixi
AL Ali
LV Luvi
SI Silti
VR Verti
LI Lithi
RU Rupti
PG Petrogypsi
PC Petrocalci
PS Petrosali
PF Petrofini
PE Petri
DV Duri
PA Placi
FR Fragi
GY Gypsi
SO Sooli

SA Sali
AK Alcali
VI Veti
AB Abrupti
PN Plani
LL Lamelli
PC Pachi
Ni Niti
GO Glossi
FE Ferri
CA Calci
CC Calcari
PP Pelli
GR Gumi
XA Xanthi
DY Dystri
EU Eutri
BA Bathi
OR Orthi

SOIL TAXONOMY GREAT GROUP CODES (1987)

Alfisols
ABB Paleboralf
ABE Eutroboralf
ABF Fragiboralf
ABG Glossoboralf
ABN Natriboralf
ABO Cryoboralf
ADA Hapludalf
ADB Paleudalf
ADC Agrudalf
ADF Fragiudalf
ADG Glossudalf
ADI Ferrudalf
ADK Kandiudalf
ADN Natrudalf
ADR Rhodudalf
AGF Fraglossudalf
AQD Duraqualf
AQF Fragiaqualf
AQG Glossaqualf
AQK Kandiaqualf
AQL Plinthaqualf
AQM Umbraqualf
AQN Natraqualf
AQO Ochraqualf
AQW Albaqualf
AUA Haplustalf
AUB Paleustalf
AUD Durustalf
AUH Kanhaplustalf
AUK Kandiustalf
AUL Plinthustalf
AUN Natrustalf
AUR Rhodustalf
AXA Haploxeralf
AXB Palexeralf
AXD Durixeralf
AXF Fragixeralf
AXL Plinthoxeralf
AXN Natrixeralf
AXR Rhodoxeralf

Aridisols
DOB Paleorthid
DOD Durorthid
DOG Gypsiorthid
DOK Calciorthid
DOM Camborthid
DOS Salorthid
DRA Haplargid
DRB Paleargid
DRD Durargid
DRJ Nadurargid
DRN Natrargid

Entisols
EOC Cryorthent
EOD Udorthent
EOP Torriorthent
EOT Troporthent
EOU Ustorthent
EOX Xerorthent
EQA Haplaquent
EQC Cryaquent
EQI Sulfaquent
EQS Psammaquent
EQT Tropaquent
EQV Fluvaquent
EQW Hydraquent
ER Arent
ESC Cryopsamment
ESD Udipsamment
ESP Torripsamment
EST Tropopsamment
ESU Ustipsamment
ESX Xeropsamment
ESZ Quartzipsamment
EVC Cryofluvent
EVD Udifluvent
EVP Torrifluvent
EVT Tropofluvent
EVU Ustifluvent
EVX Xerofluvent

Histosols
HAC Cryosaprist
HAM Medisaprist
HAR Borosaprist
HAT Troposaprist
HEB Borohemist
HEC Cryohemist
HEI Sulfihemist
HEL Luvihemist
HEM Medihemist
HEO Sulfohemist
HET Tropohemist
HIB Borofibrist
HIC Cryofibrist
HIL Luvifibrist
HIM Medifibrist
HIS Sphagnofibrist
HIT Tropofibrist
HLB Borofolist
HLC Cryofolist
HLT Tropofolist

Inceptisols
IG Plaggept
IMA Haplumbrept
IMC Cryumbrept
IMF Fragiumbrept
IMX Xerumbrept
INC Cryandept
IND Durandept
INE Eutrandept
INP Placandept
INV Vitrandept
INW Hydrandept
INY Dystrandept
IOC Cryochrept
IOD Durochrept
IOE Eutrochrept
IOF Fragiochrept
IOU Ustochrept
IOX Xerochrept
IOY Dystrochrept
IQA Haplaquept
IQC Cryaquept
IQF Fragiaquept
IQH Humaquept
IQL Plinthaquept
IQN Andaquept
IQP Placaquept
IQS Sulfaquept
IQT Tropaquept
IQX Halaquept
ITE Eutropept
ITH Humitropept
ITS Sombritropept
ITU Ustropept
ITY Dystropept

Mollisols
MBA Haploboroll
MBB Paleboroll
MBC Cryoboroll
MBK Calciboroll
MBN Natriboroll
MBR Argiboroll
MBV Vermiboroll
MDA Hapludoll
MDB Paleudoll
MDR Argiudoll
MDV Vermudoll
MQA Haplaquoll
MQC Cryaquoll
MQD Duraquoll
MQK Calciaquoll
MQN Natraquoll
MQR Argiaquoll
MR Rendoll
MUA Haplustoll
MUB Paleustoll
MUD Durustoll
MUK Calciustoll
MUN Natrustoll
MUR Argiustoll
MUV Vermustoll
MWN Natralboll
MWR Argialboll
MXA Haploxeroll
MXD Durixeroll
MXK Calcixeroll
MXN Natrixeroll
MXR Argixeroll
MXP Palexeroll

Oxisols
ODA Hapludox
ODC Acrudox
ODE Eutrudox
ODK Kandiudox
ODS Sombriudox
OPA Haploperox
OPC Acroperox
OPE Eutroperox
OPK Kandiperox
OPS Sombriperox
OQA Haplaquox
OQC Acraquox
OQE Eutraquox
OQL Plinthaquox
OTA Haplotorrox
OTC Acritorrox
OTE Eutrotorrox
OUA Haplustox
OUC Acrustox
OUE Eutrustox
OUK Kandiustox
OUS Sombriustox

Spodosols
SHA Haplohumod
SHC Cryohumod
SHF Fragihumod
SHP Placohumod
SHT Tropohumod
SI Ferrod
SOA Haplorthod
SOC Cryorthod
SOF Fragiorthod
SOP Placorthod
SOT Troporthod
SQA Haplaquod
SQC Cryaquod
SQD Duraquod
SQF Fragiaquod
SQP Placaquod
SQS Sideraquod
SQT Tropaquod

Ultisols
UDA Hapludult
UDB Paleudult
UDF Fragiudult
UDL Plinthudult
UDR Rhodudult
UHA Haplohumult
UHB Palehumult

SOIL TAXONOMY SUB GROUP CODES (1987)

AA Typic
AB Abruptic
AB04 Abruptic Aridic
AB08 Abruptic Cryic
AB10 Abruptic Haplic
AB14 Abruptic Udic
AB16 Abruptic Xerollic
AC Acric
AC05 Acric Plinthic
AE Aeric
AE03 Aeric Arenic
AE05 Aeric Grossarenic
AE06 Aeric Mollic
AE09 Aeric Tropic
AE10 Aeric Umbric
AE12 Aeric Xeric
AL Albaquic
AL02 Albaquultic
AL04 Albic
AL08 Albic Glossic
AL09 Albic Alfic
AL10 Alfic
AL12 Alfic Arenic
AL13 Alfic Andeptic
AL16 Alfic Lithic
AN Andic
AN01 Andeptic
AN03 Andaquic
AN03 Andaquic
AN06 Andic Dystric
AN06 Andic Dystric
AN11 Andeptic Glos soboric
AN20 Andic Udic
AN22 Andic Ustic
AN24 Andaqueptic
AN24 Andaqueptic
AN25 Anionic
AN30 Anthropic
AQ Aqualfic
AQ02 Aquentic
AQ04 Aqueptic
AQ06 Aquic
AQ08 Aquic Arenic
AQ14 Aquic Duric
AQ16 Aquic Durorthidic
AQ18 Aquic Dystric
AQ24 Aquic Haplic
AQ26 Aquic Lithic
AQ31 Aquic Psammentic
AQ34 Aquollic
AQ36 Aquultic
AR Arenic
AR02 Arenic Aridic
AR04 Arenic Plinthaquic
AR06 Arenic Plinthic
AR07 Arenic Kandic
AR08 Arenic Rhodic
AR09 Arenic Kandic Rhodic
AR10 Arenic Ultic
AR11 Arenic Kanhaplic
AR12 Arenic Kanhaplic Rhodic
AR13 Arenic Petrocalcic
AR14 Arenic Umbric
AR15 Arenic Calciorthidic
AR16 Arenic Ustalfic
AR17 Arenic Ustochreptic
AR18 Arenic Ustollic
AR19 Arenic Petroferric
AR20 Arenic Petroferric Rhodic
AR21 Arenic Paleorthidic
AR22 Argiaquic
AR24 Argiaquic Xeric
AR26 Argic
AR28 Argic Lithic
AR30 Argic Pachic
AR32 Argic Vertic
AR34 Aridic
AR34 Aridic
AR36 Aridic Calcic
AR36 Aridic Calcic
AR42 Aridic Duric
AR42 Aridic Duric
AR50 Aridic Pachic
AR52 Aridic Petrocalcic
BO Boralfic
BO02 Boralfic Lithic
BO04 Boralfic Udic
BO06 Borollic
BO08 Borollic Glossic
BO10 Borollic Lithic
BO12 Borollic Vertic
CA Calcic
CA04 Calcic Pachic
CA06 Calciorthidic
CA10 Calcixerollic
CA20 Cambic
CH Chromic
CH06 Chromudic
CR Cryic
CR10 Cryic Lithic
CR14 Cryic Pachic
CU Cumulic
CU02 Cumulic Udic
CU04 Cumulic Ultic
DU Durargidic
DU02 Duric
DU08 Duroxerollic
DU10 Duroxerollic Lithic
DU11 Durochreptic
DU12 Durorthidic
DU14 Durorthidic Xeric
DY02 Dystric
DY03 Dystric Enthic
DY04 Dystric Fluventic
DY06 Dystric Lithic
DY08 Dystropeptic
EN Entic
EN02 Enthic Lithic
EN04 Eutropeptic
EN06 Enthic Ultic
EP Epiaquic
EP10 Epiaquic Orthoxic
EU Eutric
EU02 Eutrochreptic
EU04 Eutropeptic
FE Ferrudalfic
FI Fibric
FI02 Fibric Terric
FL02 Fluvaquentic
FL06 Fluventic
FL12 Fluventic Umbric
FR10 Fragiaquic
FR18 Fragic
GL02 Glossaquic
GL04 Glossic
GL10 Glossic Udic
GL12 Glossic Ustollic
GL14 Glossoboralfic
GL16 Glossoboric
GR Grossarenic
GR01 Grossarenic Entic
GR04 Grossarenic Plinthic
GR05 Grossarenic Petroferric
GR06 Grossarenic petroferric Rhodic
GR07 Grossarenic Kandic
GR08 Grossarenic Kandic Rhodic
GR09 Grossarenic Kanhaplic
GR10 Grossarenic Kanhaplic Rhodic
GR11 Grossarenic Rhodic
GR12 Grossarenic Petrocalcic
GR13 Grossarenic Ustollic
GR14 Grossarenic Ustalfic
GR15 Grossarenic Aridic
HA Haplaquodic
HA01 Haplaquic
HA02 Haplic
HA05 Haplohumic
HA07 Haploxerollic
HA09 Hapludic
HA12 Hapludollic
HA16 Haplustollic
HE Hemic
HE02 Hemic Terric
HI Histic
HI02 Histic Lithic
HI06 Histic Pergelic
HU Humic
HU02 Humic Lithic
HU05 Humic Pergelic
HU06 Humoxic
HU10 Humaqueptic
HU15 Humic Rhodic
HU20 Humic Xanthic
HY Hydric
HY02 Hydric Lithic
IN Inceptic
KA Kandic
KA02 Kandiudalfic
KA04 Kandiustalfic
KH Kanhaplic
LE Leptic
LI Limnic
LI02 Lithic
LI03 Lithic Petrocalcic
LI04 Lithic Mollic
LI05 Lithic Pergelic
LI06 Lithic Ruptic-Alfic
LI07 Lithic Ruptic-Argic
LI08 Lithic Ruptic-Entic Xerollic
LI09 Lithic Ruptic-Entic
LI10 Lithic Udic
LI11 Lithic Ruptic-xerorthentic
LI12 Lithic Ultic
LI13 Lithic Ruptic-Ultic
LI14 Lithic Umbric

LI15 Lithic Ruptic-Xerochreptic
LI16 Lithic Ustic
LI18 Lithic Ustollic
LI20 Lithic Vertic
LI22 Lithic Xeric
LI24 Lithic Xerollic
MO Mollic
NA06 Natric
OC Ochreptic
OR Orthidic
OR01 Orthic
OR02 Orthoxic
PA Pachic
PA02 Pachic udic
PA04 Pachic Ultic
PA06 Paleorthidic
PA08 Paleustollic
PA10 Palexerollic
PA20 Paralithic Vertic
PE Pergelic
PE01 Pergelic Ruptic-Histic
PE02 Pergelic Sideric
PE04 Petrocalcic
PE06 Petrocalcic Ustalfic
PE08 Petrocalcic Ustollic
PE14 Petrocalcic Xerollic
PE16 Petroferric
PE17 Petroferric Rhodic
PE20 Petrogypsic
PK Placic
PK10 Plaggeptic
PK12 Plaggic
PL Plinthaquic
PL04 Plinthic
PL06 Plinthudic
PS Psammaquentic
PS02 Psammentic
PS04 Psammentic Kandic
PS06 Psammentic Rhodic
PS08 Psammentic Kandic Rhodic
PS09 Psammentic Ustollic
PS10 Psammentic Ustalfic
QU Quartzipsammentic
RE Rendollic
RH Rhodic
RU02 Ruptic-Alfic
RU09 Ruptic-Lithic
RU11 Ruptic-Lithic-Entic
RU15 Ruptic-Lithic-Xerochreptic
RU17 Ruptic-Ultic
RU19 Ruptic-Vertic
SA Salorthidic
SA02 Sapric
SA04 Sapric Terric
SI Sidfric
SO Sombric
SO04 Sombrihumic
SP Sphagnic
SP02 Sphagnic Terric
SP04 Spodic
SU Sulfic
TE Terric
TH04 Thapto-Histic
TH06 Thapto-Histic Tropic
TO Torrertic
TO02 Torrifluventic
TO04 Torriorthentic
TO06 Torripsammentic
TO10 Torroxic
TR Tropaquodic
TR02 Tropeptic
TR04 Tropic
UD Udertic
UD01 Udalfic
UD02 Udic
UD03 Udollic
UD05 Udorthentic
UD10 Udoxic
UL Ultic
UM Umbreptic
UM02 Umbric
US Ustalfic
US02 Usteric
US04 Ustic
US06 Ustochreptic
US08 Ustollic
US12 Ustoxic
VE Vermic
VE02 Vertic
XA Xanthic
XE Xeralfic
XE02 Vertic
XE02 Xerertic
XE04 Xeric
XE08 Xerollic

SOIL TAXONOMY FAMILY CODES (1987)

Mineralogy

03	allitic
05	carbonatic
08	coprogenous
09	chloritic
10	diatomaceous
12	ferrihumic
14	ferritic
16	ferruginous
18	gibbsitic
20	glauconitic
22	gypsic
24	halloysitic
26	illitic
27	illitic (calcareous)
28	kaolinitic
30	marly
32	micaceous
34	mixed
35	mixed (calcareous)
37	montmorrilonitic
38	montmorrilonitic (calcareous)
40	oxidic
44	serpentinitic
46	siliceous
48	sesquic
50	vermiculitic

Texture

003	cindery
004	cindery over sandy
005	ashy
006	cindery over loamy
007	ashy over cindery
008	ashy over loamy
009	ashy skeletal
010	medial
011	medial skeletal
012	medial o. cindery
013	ashy over loamy skeletal
014	medial o.clayey
015	cindery over medial skeletal
016	medial o.fragmental
018	medial o.loamy
019	ashy over medial
020	medial o.loamy skeletal
022	medial over sandy
024	medial o.thixotropic
026	thixotropic
027	thixotropic skeletal
028	thixotropic o.fragmental
030	thixotropic o. sandy (sk)
032	thixotropic o.loamy skel.
034	thixotropic over loamy
036	fragmental
044	sandy skeletal
046	sandy skeletal o. oamy
050	loamy skeletal
051	loamy skeletal o.fragment
052	loamy skeletal o.sandy
054	loamy skeletal o. clayey
055	loamy skeletal or clayey skeletal
056	clayey skeletal
058	clayey-skeletal o.sandy
062	sandy
063	sandy or sandy skeletal
064	sandy over clayey
066	sandy over clayey
068	loamy
072	loamy over sandy(skel)
080	coarse loamy
082	coarseloamyo.fragmental
084	coarse loamy o.sandy (sk)
086	coarse loamy o.clayey
088	coarse silty
092	coarse silty o.sandy
094	coarse silty o.clayey
096	fine loamy
097	fine loamy o.cindery
098	fine loamy o.fragmental
100	fine loamy o.sandy (skel)
102	fine loamy o.clayey
106	fine silty
108	fine silty o.fragmental
110	fine silty o.sandy
112	fine silty o.clayey
114	clayey
116	clayey over fragmental
118	clayey over sandy
120	clayey o.loamy skeletal
122	clayey over fine silty
124	clayey over loamy
126	fine
134	very fine

Reaction

AL	allic
NC	noncalcareous
AC	acid
NA	nonacid
EU	euic
DY	dysic

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** Out of print

Appendix C

Technical information and data dictionary

This appendix gives technical information on SDBm. All system files and datafiles are briefly discussed. The database structures are given and contents of the fields described.

PROGRAM FILES

file names	description
SDB2.EXE	SDBm program
SDBTOOLS.EXE	SDBm tools
SDBMINS.EXE	installation SDBm
SDBM.BAT	start SDBm
SDB2INP.OVL	overlay file of the entry routines
SDB2INP2.OVL	
SDB2OUTP.OVL	first overlay file of the output routines
SDB2OUTG.OVL	second overlay file of the output routines
SDB2OUTQ.OVL	
GRAPH.EXE	graphic representation program
LOGO.EXE	FAO introduction screen

MEMORY FILES

file names	description
SETUP.MEM	status additional site variables
ENG.MEM	memory variable of the English text
SP.MEM	memory variable of the Spanish text
FR.MEM	memory variable of the French text
TOENG.MEM	memory variable of the English text
TOSP.MEM	memory variable of the Spanish text
TOFR.MEM	memory variable of the French text

DATA FILES

The databases are linked by the profile code (keyfield: PRNO).

A second keyfield (PRNO or SANO) is used to identify records in SDBHORIZ.DBF, SDBANA1.DBF SDBANA2.DBF and SDBPHYS2.DBF, as they generally contain more than one record on a single profile code.

filename	contents
SDBANA1.DBF	standard analytical data
SDBANA2.DBF	analyses on saturated paste (soluble salts)
SDBHORIZ.DBF	horizon data
SDBPHYS1.DBF	soil physical data 1 - infiltration - structure stability
SDBPHYS2.DBF	soil physical data 2 - water retention - bulk density
SDBREMAR.DBF	remarks data
SDBSITE.DBF	site data
HORREMAR.DBF	horizon remarks data

INDEX FILES

The index files are not dBASE compatible, but it is possible to generate Dbase index files as previously indicated. HORIPRNO.NTX, ANA1PRNO.NTX and PHY2PRNO.NTX are created with the UNIQUE statement (index on to unique). These index files only have a limited amount of pointers (each profile code occurs only once) and allow for fast searches.

The ordinary index files (HORIZALL.NTX, ANA1ALL.NTX, PHY2ALL.NTX) are indexed on the same keys but contain the profile codes of all records and consequently are much larger. These index files are used in the print modules to put the horizons and samples of a soil profile in the right order.

file name	associated datafile	keyfield
ANA1ALL.NTX	SDBANA1.DBF	PRNO
ANA1PRNO.NTX	SDBANA1.DBF	PRNO (unique)
ANA2ALL.NTX	SDBANA2.DBF	PRNO
ANA2PRNO.NTX	SDBANA2.DBF	PRNO (unique)
HORIPRNO.NTX	SDBHORIZ.DBF	PRNO (unique)
HORIZALL.NTX	SDBHORIZ.DBF	PRNO
PHY1PRNO.NTX	SDBPHYS1.DBF	PRNO
PHY2ALL.NTX	SDBPHYS2.DBF	PRNO
PHY2PRNO.NTX	SDBPHYS2.DBF	PRNO (unique)
PROFILE.NTX	SDBANA1.DBF	PRNO
PROFILE.NTX	SDBANA2.DBF	PRNO
REMAPRNO.NTX	SDBREMAR.DBF	PRNO
REMPRNOH.NTX	HORREMAR.DBF	PRNO + HRNO
SITEFAO.NTX	SDBSITE.DBF	FAO
SITEFAOR.NTX	SDBSITE.DBF	FAOR
SITEPRNO.NTX	SDBSITE.DBF	PRNO
SITESTAT.NTX	SDBSITE.DBF	STAT
SITEUNIT.NTX	SDBSITE.DBF	UNIT

CONVERSION FILES

The field description databases contain predominantly coded data. Conversion files are used in the print/display modules to decode this information.

Conversion files are database files containing pairs of fields. Each pair comprises a field with codes and a second field with the associated descriptive terms. SDBKEY03, 04, 05, 06 and 08 contain codes and their associated description. The remaining, SDBKEY01, 02 and 07, contain codes and descriptions in the three SDBm languages.

file name	contents
SDBKEY01.DBF	horizon variables classification
SDBKEY02.DBF	site variables classification
SDBKEY03.DBF	FAO soil units (1989/1974), phases, 3 level
SDBKEY04.DBF	Soil Taxonomy great/subgroup codes
SDBKEY05.DBF	Soil Taxonomy family level codes
SDBKEY06.DBF	surveyors names
SDBKEY07.DBF	vegetation species
SDBKEY08.DBF	survey area

DEACTIVATION DATA FILES

These files allow the deactivation of fields, analytical and morphological of the data entry screens.

file name	contents
SDBACT1.DBF	file for the deactivation of profile description fields
SDBACT2.DBF	file for the deactivation of analytical data fields
SDBACT3.DBF	file for the deactivation of soluble salt data fields
SDBACT4.DBF	file for the deactivation of physical data fields

AUXILIARY FILES

In order to facilitate the graphic presentation of the vertical variability, an auxiliary file containing the maximum and minimum values of the considered variable was created. This file allows changes in the variable range.

DIVIS.DBF vertical variability range file

Another auxiliary file is used for the decoding of soil colours according to the Monsell chart:

COLOR.DBF soil colour file

FIELDS OF DATA FILES

Related items are often stored in one field in order to keep the data structures efficient. For instance the field CUT1 in the SDBHORIZ.DBF data file contains all information on the primary cutans. This information consists of the codes of 4 different items:

- quantity (1 character code) occupies place 1
- contrast (1 character code) 2
- nature (2 character code) 3,4
- location (2 character code) 5,6

In the print and selection modules the information on the individual items is extracted from these fields by using the substring selection functions LEFT(), RIGHT() and SUBSTR().

In the description column items are listed with the number of places they occupy. Items are given in the right order. For instance the contents of field CUT1 is described as quantity(1)/ contrast(1) / nature(2) / location (2).

File name	field	type	length	dec	description
SDBSITE.DBF	PRNO	C	6	0	profile code
SDBSITE.DBF	SHNO	C	6	0	sheet number
SDBSITE.DBF	GRID	C	12	0	grid number
SDBSITE.DBF	UNIT	C	5	0	soil unit
SDBSITE.DBF	STAT	C	1	0	status
SDBSITE.DBF	FAO	C	3	0	FAO soil unit 74
SDBSITE.DBF	PHAS	C	2	0	FAO phase
SDBSITE.DBF	FAOR	C	6	0	FAO soil unit(3) + 3rd level (3) 88
SDBSITE.DBF	STSG	C	7	0	ST great group(4) + subgroup(2)
SDBSITE.DBF	STFM	C	7	0	ST mineralogy(2) + texture(3) + reaction(2)
SDBSITE.DBF	SCLM	C	3	0	soil climate
SDBSITE.DBF	SMTR	C	4	0	soil moisture regime(2) + soil temperature regime
SDBSITE.DBF	LOCAL SER.	C	3	0	local soil series
SDBSITE.DBF	LAT	C	7	0	latitude
SDBSITE.DBF	LON	C	8	0	longitude
SDBSITE.DBF	ELEV	N	4	0	elevation
SDBSITE.DBF	DATE	D	8	0	date
SDBSITE.DBF	AUTH	C	9	0	author(3) + author(3) + author(3)
SDBSITE.DBF	LAFO	C	2	0	landform
SDBSITE.DBF	LAEL	C	2	0	land element
SDBSITE.DBF	POS	C	2	0	position of site
SDBSITE.DBF	TOP	C	1	0	topography
SDBSITE.DBF	SLGR	C	2	0	slope gradient class
SDBSITE.DBF	SLFR	C	1	0	slope form
SDBSITE.DBF	MITO	C	2	0	micro-topography
SDBSITE.DBF	SEAL	C	2	0	surface sealing/crusting
SDBSITE.DBF	SUR1	C	2	0	additional surface description variable
SDBSITE.DBF	SUR2	C	2	0	additional surface description variable
SDBSITE.DBF	STON	C	3	0	surface stones abundance(2) + size(1)
SDBSITE.DBF	ROCK	C	6	0	rock outcrops abundance(2) + distance (2) + height (2)
SDBSITE.DBF	PAMA	C	4	0	parent material(2) + Parent material(2)
SDBSITE.DBF	ROTY	C	2	0	rock type
SDBSITE.DBF	DRAI	C	2	0	drainage class
SDBSITE.DBF	DRA2	C	4	0	permeability(2) + external drainage(2)
SDBSITE.DBF	MOIS	C	12	0	moisture condition(1)/depth(3) + cond(1)/ depth(3) + cond(1)/depth(3)
SDBSITE.DBF	EROS	C	8	0	erosion/deposition intensity(2)/ type(2) + intensity(2)/type(2)
SDBSITE.DBF	LUT	C	5	0	land use type
SDBSITE.DBF	CROP	C	4	0	crop(2) + crop(2)
SDBSITE.DBF	VEG	C	5	0	vegetation type
SDBSITE.DBF	GRCO	C	1	0	grass cover
SDBSITE.DBF	SPEC	C	15	0	species(3) + species(3) + species(3) + species(3) + species(3)
SDBSITE.DBF	DEPT	C	2	0	effective soil depth
SDBSITE.DBF	HUM	C	2	0	human influence
SDBSITE.DBF	FLOD	C	4	0	flooding frequency(2) + duration(2)
SDBSITE.DBF	GWAT	C	8	0	watertable actual depth(2) + min depth (2) + maximum depth(2) + kind(2)
SDBSITE.DBF	SUREVY AREA	C	50	0	survey area
SDBSITE.DBF	LOC	C	120	0	location, descriptive
SDBSITE.DBF	REMS	L	1	0	remarks, flag
SDBSITE.DBF	ADD1	C	3	0	additional variable 1
SDBSITE.DBF	ADD2	C	3	0	additional variable 2
SDBSITE.DBF	ADD3	C	3	0	additional variable 3
SDBSITE.DBF	ADD4	C	3	0	additional variable 4
SDBSITE.DBF	ADD5	C	4	0	additional variable 5
SDBSITE.DBF	ADD6	C	5	0	additional variable 6
	total		398		
SDBREMAR.DBF	PRNO	C	6	0	profile code
SDBREMAR.DBF	REMS	C	254	0	remarks, descriptive
	total		261		

SDBHORIZ.DBF	PRNO	C	6	0	profile code
SDBHORIZ.DBF	HRNO	N	2	0	horizon number
SDBHORIZ.DBF	DESI	C	6	0	horizon designation
SDBHORIZ.DBF	UPBO	N	3	0	depth, upper boundary
SDBHORIZ.DBF	LOBO	N	3	0	depth, lower boundary
SDBHORIZ.DBF	COL1	C	13	0	1st colour hue(5)/ value(3)/ chroma(3) + modifier(1)
SDBHORIZ.DBF	COL2	C	13	0	2nd colour hue(5)/ value(3)/ chroma(3) + modifier(1)
SDBHORIZ.DBF	MOT1	C	6	0	1st mottles abundance(1)/size(1)/ contrast(1)/ boundary(1)/ color(2)
SDBHORIZ.DBF	MOT2	C	6	0	2nd mottles abundance(1)/size(1)/ contrast(1)/ boundary(1)/ color(2)
SDBHORIZ.DBF	TEX1	C	4	0	1st texture
SDBHORIZ.DBF	TEX2	C	4	0	2nd texture
SDBHORIZ.DBF	CLAY	N	2	0	% clay, field estimate
SDBHORIZ.DBF	STR1	C	6	0	1st structure grade(2)/ size(2)/ type(2)
SDBHORIZ.DBF	STR2	C	6	0	2nd structure grade(2)/ size(2)/ type(2)
SDBHORIZ.DBF	ST12	C	1	0	relation 1st and 2nd structure
SDBHORIZ.DBF	COSP	C	6	0	consistence wet stickiness(3) + plasticity (3)
SDBHORIZ.DBF	CODM	C	6	0	consistence dry(3) + consistence moist(3)
SDBHORIZ.DBF	CUT1	C	6	0	1st cutans quantity(1) /contrast(1)/ nature(2)/ location(2)
SDBHORIZ.DBF	CUT2	C	6	0	2nd cutans quantity(1) /contrast(1)/ nature(2)/ location(2)
SDBHORIZ.DBF	CEME	C	4	0	cementation/compaction continuity(1)+ grade(1) + structure(1) + nature(1)
SDBHORIZ.DBF	POR1	C	3	0	1st pores abundance(1)/size(2)
SDBHORIZ.DBF	POR2	C	3	0	2nd pores abundance(1)/size(2)
SDBHORIZ.DBF	PTY1	C	1		1st pores type
SDBHORIZ.DBF	PTY2	C	1		2nd pores type
SDBHORIZ.PBR	PRTY	C	1		porosity
SDBHORIZ.DBF	ROC1	C	7	0	1st rock fragment abundance(1)/size(2) /shape(1)/weathering(1)/nature(2)
SDBHORIZ.DBF	ROC2	C	7	0	2nd rock fragment abundance(1) /size(2) /shape(1)/ weathering(1)/nature(2)
SDBHORIZ.DBF	MIN1	C	8	0	1st nodule abund(1)/kind(1)/size(1) /shape(1)/hardness(1)/nature(1)/color(2
SDBHORIZ.DBF	MIN2	C	8	0	2nd nodule abund(1)/kind(1)/size(1) /shape(1)/hardness(1)/nature(1)/color(2
SDBHORIZ.DBF	CARB	C	2	0	carbonates
SDBHORIZ.DBF	BIO1	C	3	0	biological features quantity(1) / kind(2)
SDBHORIZ.DBF	BIO2	C	3	0	biological features quantity(1) / kind(2)
SDBHORIZ.DBF	RTS1	C	3	0	roots abundance(1)/size(2)
SDBHORIZ.DBF	RTS2	C	3	0	roots abundance(1)/size(2)
SDBHORIZ.DBF	PH	N	4	1	field pH
SDBHORIZ.DBF	BOUN	C	2	0	boundary width(1)/topography(1)
SDBHORIZ.DBF	REMARKS	L	1		remarks
total			169		

SDBANA1.DBF	PRNO	C	6	0	profile code
SDBANA1.DBF	SANO	C	1	0	sample number
SDBANA1.DBF	UPBO	N	3	0	depth upper boundary
SDBANA1.DBF	LOBO	N	3	0	depth lower boundary
SDBANA1.DBF	PHW	N	4	1	pH water
SDBANA1.DBF	PHC	N	4	1	pH CaCl2
SDBANA1.DBF	EC	N	4	1	electro conductivity
SDBANA1.DBF	P	N	2	0	phosphorus
SDBANA1.DBF	N	N	5	2	nitrogen

SDBANA1.DBF	OC	N	5	2	organic carbon
SDBANA1.DBF	CACO	N	4	1	total CaCO3
SDBANA1.DBF	CACA	N	4	1	effective CaCO3
SDBANA1.DBF	CASO	N	4	1	total CaSO4
SDBANA1.DBF	CECS	N	5	1	CEC soil
SDBANA1.DBF	CA	N	4	1	exchangable calcium
SDBANA1.DBF	MG	N	4	1	exchangable magnesium
SDBANA1.DBF	K	N	4	1	exchangable potassium
SDBANA1.DBF	NA	N	4	1	exchangable sodium
SDBANA1.DBF	H	N	4	1	exchangable hydrogen
SDBANA1.DBF	AL	N	4	1	exchangable alluminium
SDBANA1.DBF	PBS	N	3	0	Percentage base saturation
SDBANA1.DBF	KF	N	4	1	fixed potassium
SDBANA1.DBF	VCS	N	2	0	very coarse sand
SDBANA1.DBF	CS	N	2	0	coarse sand
SDBANA1.DBF	MS	N	2	0	medium sand
SDBANA1.DBF	FS	N	2	0	fine sand
SDBANA1.DBF	VFS	N	2	0	very fine sand
SDBANA1.DBF	CSI	N	2	0	coarse silt
SDBANA1.DBF	FSI	N	2	0	fine silt
SDBANA1.DBF	SAND	N	2	0	sand
SDBANA1.DBF	SILT	N	2	0	silt
SDBANA1.DBF	CL	N	2	0	clay
SDBANA1.DBF	CECC	N	3	0	CEC clay
SDBANA1.DBF	METH	C	10	0	methods
SDBANA1.DBF	ADDVAR 1	N	4	1	additional variable 1
SDBANA1.DBF	ADDVAR 2	N	4	1	additional variable 2
SDBANA1.DBF	ADDVAR 3	N	4	1	additional variable 3
SDBANA1.DBF	ADDVAR 4	N	4	1	additional variable 4
SDBANA1.DBF	ADDVAR 5	N	4	1	additional variable 5
SDBANA1.DBF	ADDVAR 6	N	4	1	additional variable 6
SDBANA1.DBF	ADDVAR 7	N	4	1	additional variable 7
SDBANA1.DBF	ADDVAR 8	N	4	1	additional variable 8
SDBANA1.DBF	ADDVAR 9	N	4	1	additional variable 9
SDBANA1.DBF	ADDVAR 10	N	4	1	additional variable 10
SDBANA1.DBF	ADDVAR 11	N	4	1	additional variable 11
SDBANA1.DBF	ADDVAR 12	N	4	1	additional variable 12
	total		166		

SDBANA2.DBF	PRNO	C	6	0	profile code
SDBANA2.DBF	SANO	C	1	0	sample number
SDBANA2.DBF	UPBO	N	3	0	depth upper boundary
SDBANA2.DBF	LOBO	N	3	0	depth lower boundary
SDBANA2.DBF	PH	N	4	1	pH
SDBANA2.DBF	EC	N	4	1	electro conductivity
SDBANA2.DBF	CA	N	6	1	soluble calcium
SDBANA2.DBF	MG	N	6	1	soluble magnesium
SDBANA2.DBF	K	N	6	1	soluble potassium
SDBANA2.DBF	NA	N	6	1	soluble sodium
SDBANA2.DBF	BO	N	6	1	soluble borium
SDBANA2.DBF	CO3	N	6	1	soluble CO3
SDBANA2.DBF	HCO3	N	6	1	soluble HCO3
SDBANA2.DBF	CL	N	6	1	soluble CL
SDBANA2.DBF	SO4	N	6	1	soluble SO4
SDBANA2.DBF	NO3	N	6	1	soluble NO3
SDBANA2.DBF	SAR	N	5	1	SAR
SDBANA2.DBF	METH	C	7	0	methods
	total		94		

SDBPHYS1.DBF	PRNO	C	6	0	profile code
SDBPHYS1.DBF	INB1	N	5	1	basic infiltration run 1
SDBPHYS1.DBF	INB2	N	5	1	basic infiltration run 2

	SDBPHYS1.DBF	INB3	N 5	1	basic infiltration run 3
X	SDBPHYS1.DBF	STAB	N 5	2	structure stability index
	SDBPHYS1.DBF	METH	C 2	0	methods
		total	28		
	SDBPHYS2.DBF	PRNO	C 6	0	profile code
	SDBPHYS2.DBF	SANO	C 1	0	sample code
	SDBPHYS2.DBF	UPBO	N 3	0	depth upper boundary
	SDBPHYS2.DBF	LOBO	N 3	0	depth lower boundary
	SDBPHYS2.DBF	M003	N 5	2	water retention 0.03bar
	SDBPHYS2.DBF	M005	N 5	2	water retention 0.05bar
	SDBPHYS2.DBF	M01	N 5	2	water retention 0.1bar
	SDBPHYS2.DBF	M03	N 5	2	water retention 0.3bar
	SDBPHYS2.DBF	M1	N 5	2	water retention 1bar
	SDBPHYS2.DBF	M3	N 5	2	water retention 3bar
	SDBPHYS2.DBF	M5	N 5	2	water retention 5bar
	SDBPHYS2.DBF	M15	N 5	2	water retention 15bar
X	SDBPHYS2.DBF	BULK	N 5	2	bulk density
	SDBPHYS2.DBF	METH	C 2	0	methods
		total	60		

Note: databases created with the write to disk options (*.DAT) and the main database files (*.DBF) have identical structures.

FIELD CONVERSION FILES

Codes are normally in upper case. If a field contains information on two variables, the codes of the second variable are stored in lower case (indicated with a suffix (L) in the description column).

file name	field	type	length	dec	description
SDBKEY01.DBF	CCLR	C	2	0	colour modif.(L)+colour mottles Eng. code
SDBKEY01.DBF	CSCLR	C	2	0	colour modif.(L)+colour mottles Spa. code
SDBKEY01.DBF	CFCLR	C	2	0	colour modif.(L)+colour mottles Fre. code
SDBKEY01.DBF	ECLR	C	15	0	colour modif.(L)+colour mottles Eng. desc
SDBKEY01.DBF	SCLR	C	18	0	colour modif.(L)+colour mottles Spa. desc
SDBKEY01.DBF	FCLR	C	18	0	colour modif.(L)+colour mottles Fre. desc
SDBKEY01.DBF	CMT1	C	1	0	mottles abundance+size(L) Eng. code
SDBKEY01.DBF	CSMT1	C	1	0	mottles abundance+size(L) Spa. code
SDBKEY01.DBF	CFMT1	C	1	0	mottles abundance+size(L) Fre. code
SDBKEY01.DBF	EMT1	C	6	0	mottles abundance+size(L) Eng. descr
SDBKEY01.DBF	SMT1	C	10	0	mottles abundance+size(L) Spa. descr
SDBKEY01.DBF	FMT1	C	10	0	mottles abundance+size(L) Fre. descr
SDBKEY01.DBF	CMT2	C	1	0	mottles contrast+boundary(L) Eng. code
SDBKEY01.DBF	CSMT2	C	1	0	mottles contrast+boundary(L) Spa. code
SDBKEY01.DBF	CFMT2	C	1	0	mottles contrast+boundary(L) Fre. code
SDBKEY01.DBF	EMT2	C	10	0	mottles contrast+boundary(L) Eng. descr
SDBKEY01.DBF	SMT2	C	11	0	mottles contrast+boundary(L) Spa. descr
SDBKEY01.DBF	FMT2	C	10	0	mottles contrast+boundary(L) Fre. descr
SDBKEY01.DBF	CTXT	C	4	0	texture Eng. code
SDBKEY01.DBF	CSTXT	C	4	0	texture Spa. code
SDBKEY01.DBF	CFTXT	C	4	0	texture Fre. code
SDBKEY01.DBF	ETXT	C	20	0	texture Eng. descr
SDBKEY01.DBF	STXT	C	23	0	texture Spa. descr
SDBKEY01.DBF	FTXT	C	23	0	texture Fre. descr
SDBKEY01.DBF	CST1	C	2	0	structure grade + size(L) Eng. code
SDBKEY01.DBF	CSST1	C	2	0	structure grade + size(L) Spa. code

SDBKEY01.DBF	CFST1	C 2	0	structure grade + size(L) Fre. code
SDBKEY01.DBF	EST1	C 26	0	structure grade + size(L) Eng. descr
SDBKEY01.DBF	SST1	C 26	0	structure grade + size(L) Spa. descr
SDBKEY01.DBF	FST1	C 27	0	structure grade + size(L) Fre. descr
SDBKEY01.DBF	CST2	C 2	0	structure type and relation(L) Eng. code
SDBKEY01.DBF	CSST2	C 2	0	structure type and relation(L) Spa. code
SDBKEY01.DBF	CFST2	C 2	0	structure type and relation(L) Fre. code
SDBKEY01.DBF	EST2	C 30	0	structure type and relation(L) Eng. descr
SDBKEY01.DBF	SST2	C 35	0	structure type and relation(L) Spa. descr
SDBKEY01.DBF	FST2	C 38	0	structure type and relation(L) Fre. descr
SDBKEY01.DBF	CCY1	C 3	0	consistence dry + moist(L) Eng. code
SDBKEY01.DBF	CSCY1	C 3	0	consistence dry + moist(L) Spa. code
SDBKEY01.DBF	CFCY1	C 3	0	consistence dry + moist(L) Fre. code
SDBKEY01.DBF	ECY1	C 27	0	consistence dry + moist Eng. descr
SDBKEY01.DBF	SCY1	C 27	0	consistence dry + moist Spa. descr
SDBKEY01.DBF	FCY1	C 27	0	consistence dry + moist Fre. descr
SDBKEY01.DBF	CCY2	C 3	0	consistence plasticity(L) + stickiness Eng. code
SDBKEY01.DBF	CSCY2	C 3	0	consistence plasticity(L) + stickiness Spa. code
SDBKEY01.DBF	CFCY2	C 3	0	consistence plasticity(L) + stickiness Fre. code
SDBKEY01.DBF	ECY2	C 27	0	consistence plasticity + stickiness Eng. descr
SDBKEY01.DBF	SCY2	C 27	0	consistence plasticity + stickiness Spa. descr
SDBKEY01.DBF	FCY2	C 27	0	consistence plasticity + stickiness Fre. descr
SDBKEY01.DBF	CCS1	C 1	0	cutans quantity + contrast(L) Eng. code
SDBKEY01.DBF	CSCS1	C 1	0	cutans quantity + contrast(L) Spa. code
SDBKEY01.DBF	CFCS1	C 1	0	cutans quantity + contrast(L) Fre. code
SDBKEY01.DBF	ECS1	C 16	0	cutans quantity + contrast Eng. descr
SDBKEY01.DBF	SCS1	C 16	0	cutans quantity + contrast Spa. descr
SDBKEY01.DBF	FCS1	C 16	0	cutans quantity + contrast Fre. descr
SDBKEY01.DBF	CCS2	C 2	0	cutans location(L) + nature code Eng. code
SDBKEY01.DBF	CSCS2	C 2	0	cutans location(L) + nature code Spa. code
SDBKEY01.DBF	CFCS2	C 2	0	cutans location(L) + nature code Fre. code
SDBKEY01.DBF	ECS2	C 33	0	cutans location + nature Eng. descr
SDBKEY01.DBF	SCS2	C 42	0	cutans location + nature Spa. descr
SDBKEY01.DBF	FCS2	C 46	0	cutans location + nature Fre. descr
SDBKEY01.DBF	CPRS	C 2	0	roots/pores abundance + size(L) Eng. code
SDBKEY01.DBF	CSPRS	C 2	0	roots/pores abundance + size(L) Spa. code
SDBKEY01.DBF	CFPRS	C 2	0	roots/pores abundance + size(L) Fre. code
SDBKEY01.DBF	EPRS	C 20	0	roots/pores abundance + size Eng. descr
SDBKEY01.DBF	SPRS	C 25	0	roots/pores abundance + size Spa. descr
SDBKEY01.DBF	FPRS	C 20	0	roots/pores abundance + size Fre. descr
SDBKEY01.DBF	CRK1	C 1	0	rock fragment abundance Eng. code
SDBKEY01.DBF	CSRK1	C 1	0	rock fragment abundance Spa. code
SDBKEY01.DBF	CFRK1	C 1	0	rock fragment abundance Fre. code
SDBKEY01.DBF	ERK1	C 13	0	rock fragment abundance Eng. descr
SDBKEY01.DBF	SRK1	C 13	0	rock fragment abundance Spa. descr
SDBKEY01.DBF	FRK1	C 19	0	rock fragment abundance Fre. descr
SDBKEY01.DBF	CRK2	C 1	0	rock fragment shape +weathering(L) Eng. code
SDBKEY01.DBF	CSRK2	C 1	0	rock fragment shape +weathering(L) Spa. code
SDBKEY01.DBF	CFRK2	C 1	0	rock fragment shape +weathering(L) Fre. code
SDBKEY01.DBF	ERK2	C 35	0	rock fragment shape + weathering Eng. descr
SDBKEY01.DBF	SRK2	C 35	0	rock fragment shape + weathering Spa. descr
SDBKEY01.DBF	FRK2	C 35	0	rock fragment shape + weathering Fre. descr
SDBKEY01.DBF	CRK3	C 2	0	rock fragment nature + size (L) Eng. code
SDBKEY01.DBF	CSRK3	C 2	0	rock fragment nature + size (L) Spa. code
SDBKEY01.DBF	CFRK3	C 2	0	rock fragment nature + size (L) Fre. code
SDBKEY01.DBF	ERK3	C 30	0	rock fragment nature + size Eng. descr

SDBKEY01.DBF	SRK3	C 30	0	rock fragment nature + size Spa. descr
SDBKEY01.DBF	FRK3	C 30	0	rock fragment nature + size Fre. descr
SDBKEY01.DBF	CMN1	C 1	0	nodules abundance + size(L) Eng. code
SDBKEY01.DBF	CSMN1	C 1	0	nodules abundance + size(L) Spa. code
SDBKEY01.DBF	CFMN1	C 1	0	nodules abundance + size(L) Fre. code
SDBKEY01.DBF	EMN1	C 25	0	nodules abundance + size Eng. descr
SDBKEY01.DBF	SMN1	C 25	0	nodules abundance + size Spa. descr
SDBKEY01.DBF	FMN1	C 25	0	nodules abundance + size Fre. descr
SDBKEY01.DBF	CMN2	C 1	0	nodules kind + shape(L) Eng. code
SDBKEY01.DBF	CSMN2	C 1	0	nodules kind + shape(L) Spa. code
SDBKEY01.DBF	CFMN2	C 1	0	nodules kind + shape(L) Fre. code
SDBKEY01.DBF	EMN2	C 30	0	nodules kind + shape Eng. descr
SDBKEY01.DBF	SMN2	C 32	0	nodules kind + shape Spa. descr
SDBKEY01.DBF	FMN2	C 30	0	nodules kind + shape Fre. descr
SDBKEY01.DBF	CMN3	C 1	0	nodules hardness + nature (L) Eng. code
SDBKEY01.DBF	CSMN3	C 1	0	nodules hardness + nature (L) Spa. code
SDBKEY01.DBF	CFMN3	C 1	0	nodules hardness + nature (L) Fre. code
SDBKEY01.DBF	EMN3	C 15	0	nodules hardness + nature Eng. descr
SDBKEY01.DBF	SMN3	C 19	0	nodules hardness + nature Spa. descr
SDBKEY01.DBF	FMN3	C 15	0	nodules hardness + nature Fre. descr
SDBKEY01.DBF	CMN4	C 2	0	nodules colour Eng. code
SDBKEY01.DBF	CSMN4	C 2	0	nodules colour Spa. code
SDBKEY01.DBF	CFMN4	C 2	0	nodules colour Fre. code
SDBKEY01.DBF	EMN4	C 15	0	nodules colour Eng. descr
SDBKEY01.DBF	SMN4	C 15	0	nodules colour Spa. descr
SDBKEY01.DBF	FMN4	C 15	0	nodules colour Fre. descr
SDBKEY01.DBF	CCAR	C 2	0	carbonates Eng. code
SDBKEY01.DBF	CSCAR	C 2	0	carbonates Spa. code
SDBKEY01.DBF	CFCAR	C 2	0	carbonates Fre. code
SDBKEY01.DBF	ECAR	C 21	0	carbonates Eng. descr
SDBKEY01.DBF	SCAR	C 23	0	carbonates Spa. descr
SDBKEY01.DBF	FCAR	C 23	0	carbonates Fre. descr
SDBKEY01.DBF	CBIO	C 2	0	biol feature abundance + kind(L) Eng. code
SDBKEY01.DBF	CSBIO	C 2	0	biol feature abundance + kind(L) Spa. code
SDBKEY01.DBF	CFBIO	C 2	0	biol feature abundance + kind(L) Fre. code
SDBKEY01.DBF	EBIO	C 20	0	biological features Eng. descr
SDBKEY01.DBF	SBIO	C 22	0	biological features Spa. descr
SDBKEY01.DBF	FBIO	C 20	0	biological features Fre. descr
SDBKEY01.DBF	CBND	C 1	0	boundary width + topography(L) Eng. code
SDBKEY01.DBF	CSBND	C 1	0	boundary width + topography(L) Spa. code
SDBKEY01.DBF	CFBND	C 1	0	boundary width + topography(L) Fre. code
SDBKEY01.DBF	EBND	C 9	0	boundary width + topography Eng. descr
SDBKEY01.DBF	SBND	C 15	0	boundary width + topography Spa. descr
SDBKEY01.DBF	FBND	C 11	0	boundary width + topography Fre. descr
SDBKEY01.DBF	CCM1	C 1	0	cementation continuity+structure(L) Eng. code
SDBKEY01.DBF	CSCM1	C 1	0	cementation continuity+structure(L) Spa. code
SDBKEY01.DBF	CFCM1	C 1	0	cementation continuity+structure(L) Fre. code
SDBKEY01.DBF	ECM1	C 15	0	cementation continuity+structure Eng. descr
SDBKEY01.DBF	SCM1	C 15	0	cementation continuity+structure Spa. descr
SDBKEY01.DBF	FCM1	C 15	0	cementation continuity+structure Fre. descr
SDBKEY01.DBF	CCM2	C 1	0	cementation grade+nature(L) Eng. code
SDBKEY01.DBF	CSCM2	C 1	0	cementation grade+nature(L) Spa. code
SDBKEY01.DBF	CFCM2	C 1	0	cementation grade+nature(L) Fre. code
SDBKEY01.DBF	ECM2	C 17	0	cementation grade + nature Eng. descr
SDBKEY01.DBF	SCM2	C 21	0	cementation grade + nature Spa. descr
SDBKEY01.DBF	FCM2	C 17	0	cementation grade + nature Fre. descr
SDBKEY01.DBF	CPOR	C 1	0	porosity Eng. code
SDBKEY01.DBF	CSPOR	C 1	0	porosity Spa. code

SDBKEY01.DBF	CFPOR	C 1	0	porosity Fre. code
SDBKEY01.DBF	EPOR	C 20	0	porosity Eng. descr
SDBKEY01.DBF	SPOR	C 20	0	porosity Spa. descr
SDBKEY01.DBF	FPOR	C 20	0	porosity Fre. descr
SDBKEY01.DBF	CPTY	C 1	0	porosity type Eng. code
SDBKEY01.DBF	CSPTY	C 1	0	porosity type Spa. code
SDBKEY01.DBF	CFPTY	C 1	0	porosity type Fre. code
SDBKEY01.DBF	EPTY	C 20	0	porosity type Eng. descr
SDBKEY01.DBF	SPTY	C 20	0	porosity type Spa. descr
SDBKEY01.DBF	FPTY	C 20	0	porosity type Fre. descr
	total	1760		

SDBKEY02.DBF	CLF	C 2	0	landform Eng. code
SDBKEY02.DBF	CSLF	C 2	0	landform Spa. code
SDBKEY02.DBF	CFLF	C 2	0	landform Fre. code
SDBKEY02.DBF	ELF	C 21	0	landform Eng. descr
SDBKEY02.DBF	SLF	C 21	0	landform Spa. descr
SDBKEY02.DBF	FLF	C 21	0	landform Fre. descr
SDBKEY02.DBF	CLE	C 2	0	land element Eng. code
SDBKEY02.DBF	CSLE	C 2	0	land element Spa. code
SDBKEY02.DBF	CFLE	C 2	0	land element Fre. code
SDBKEY02.DBF	ELE	C 40	0	land element Eng. descr
SDBKEY02.DBF	SLE	C 40	0	land element Spa. descr
SDBKEY02.DBF	FLE	C 40	0	land element Fre. descr
SDBKEY02.DBF	CMTP	C 2	0	micro-topography + position (L) Eng. code
SDBKEY02.DBF	CSMTP	C 2	0	micro-topography + position (L) Spa. code
SDBKEY02.DBF	CFMTP	C 2	0	micro-topography + position (L) Fre. code
SDBKEY02.DBF	EMTP	C 40	0	micro topography + position Eng. descr
SDBKEY02.DBF	SMTP	C 40	0	micro topography + position Spa. descr
SDBKEY02.DBF	FMTP	C 40	0	micro topography + position Fre. descr
SDBKEY02.DBF	CTSF	C 1	0	topography + slope from (L) Eng. code
SDBKEY02.DBF	CSTSF	C 1	0	topography + slope from (L) Spa. code
SDBKEY02.DBF	CFTSF	C 1	0	topography + slope from (L) Fre. code
SDBKEY02.DBF	ETSF	C 18	0	topography + slope form Eng. descr
SDBKEY02.DBF	STSF	C 22	0	topography + slope form Spa. descr
SDBKEY02.DBF	FTSF	C 20	0	topography + slope form Fre. descr
SDBKEY02.DBF	CSEA	C 2	0	surface sealing/crusting Eng. code
SDBKEY02.DBF	CSSEA	C 2	0	surface sealing/crusting Spa. code
SDBKEY02.DBF	CFSEA	C 2	0	surface sealing/crusting Fre. code
SDBKEY02.DBF	ESEA	C 17	0	surface sealing/crusting Eng. descr
SDBKEY02.DBF	SSEA	C 23	0	surface sealing/crusting Spa. descr
SDBKEY02.DBF	FSEA	C 17	0	surface sealing/crusting Fre. descr
SDBKEY02.DBF	CSUR	C 2	0	add.surf.variable +add.surf.var(L) Eng. code
SDBKEY02.DBF	CSSUR	C 2	0	add.surf.variable +add.surf.var(L) Spa. code
SDBKEY02.DBF	CFSUR	C 2	0	add.surf.variable +add.surf.var(L) Fre. code
SDBKEY02.DBF	DSUR	C 15	0	2 add. surface variables Eng. descr
SDBKEY02.DBF	DSUR	C 15	0	2 add. surface variables Spa. descr
SDBKEY02.DBF	DSUR	C 15	0	2 add. surface variables Fre. descr
SDBKEY02.DBF	CSTQ	C 2	0	surface stones abundance Eng. code
SDBKEY02.DBF	CSSTQ	C 2	0	surface stones abundance Spa. code
SDBKEY02.DBF	CFSTQ	C 2	0	surface stones abundance Fre. code
SDBKEY02.DBF	ESTQ	C 25	0	surface stones abundance Eng. descr
SDBKEY02.DBF	SSTQ	C 25	0	surface stones abundance Spa. descr
SDBKEY02.DBF	FSTQ	C 25	0	surface stones abundance Fre. descr
SDBKEY02.DBF	CSTS	C 1	0	surface stones size Eng. code
SDBKEY02.DBF	CSSTS	C 1	0	surface stones size Spa. code
SDBKEY02.DBF	CFSTS	C 1	0	surface stones size Fre. code
SDBKEY02.DBF	ESTS	C 25	0	surface stones size Eng. descr
SDBKEY02.DBF	SSTS	C 25	0	surface stones size Spa. descr
SDBKEY02.DBF	FSTS	C 25	0	surface stones size Fre. descr
SDBKEY02.DBF	CRKQ	C 2	0	rockoutcrops abundance Eng. code

SDBKEY02.DBF	CSRKQ	C 2	0	rockoutcrops abundance Spa. code
SDBKEY02.DBF	CFRKQ	C 2	0	rockoutcrops abundance Fre. code
SDBKEY02.DBF	ERKQ	C 30	0	rockoutcrops abundance Eng. descr
SDBKEY02.DBF	SRKQ	C 30	0	rockoutcrops abundance Spa. descr
SDBKEY02.DBF	FRKQ	C 30	0	rockoutcrops abundance Fre. descr
SDBKEY02.DBF	CRKD	C 2	0	rockoutcrop distance code
SDBKEY02.DBF	DRKD	C 10	0	rockoutcrop distance
SDBKEY02.DBF	CRKH	C 2	0	rockoutcrops height code
SDBKEY02.DBF	DRKH	C 10	0	rockoutcrops height
SDBKEY02.DBF	CLUT	C 5	0	land use type Eng. code
SDBKEY02.DBF	CSLUT	C 5	0	land use type Spa. code
SDBKEY02.DBF	CFLUT	C 5	0	land use type Fre. code
SDBKEY02.DBF	ELUT	C 30	0	land use type Eng. descr
SDBKEY02.DBF	SLUT	C 30	0	land use type Spa. descr
SDBKEY02.DBF	FLUT	C 30	0	land use type Fre. descr
SDBKEY02.DBF	CCRO	C 2	0	crop Eng. code
SDBKEY02.DBF	CSCRO	C 2	0	crop Spa. code
SDBKEY02.DBF	CFCRO	C 2	0	crop Fre. code
SDBKEY02.DBF	ECRO	C 15	0	crop Eng. descr
SDBKEY02.DBF	SCRO	C 22	0	crop Spa. descr
SDBKEY02.DBF	FCRO	C 15	0	crop Fre. descr
SDBKEY02.DBF	CVEG	C 5	0	vegetation type Eng. code
SDBKEY02.DBF	CSVEG	C 5	0	vegetation type Spa. code
SDBKEY02.DBF	CFVEG	C 5	0	vegetation type Fre. code
SDBKEY02.DBF	EVEG	C 30	0	vegetation type Eng. descr
SDBKEY02.DBF	SVEG	C 32	0	vegetation type Spa. descr
SDBKEY02.DBF	FVEG	C 35	0	vegetation type Fre. descr.
SDBKEY02.DBF	CCOV	C 1	0	grass/forb cover code
SDBKEY02.DBF	DCOV	C 10	0	grass forb cover
SDBKEY02.DBF	CPAR	C 2	0	parent material Eng. code
SDBKEY02.DBF	CSPAR	C 2	0	parent material Spa. code
SDBKEY02.DBF	CFPAR	C 2	0	parent material Fre. code
SDBKEY02.DBF	EPAR	C 27	0	parent material Eng. descr
SDBKEY02.DBF	SPAR	C 27	0	parent material Spa. descr
SDBKEY02.DBF	FPAR	C 27	0	parent material Fre. descr
SDBKEY02.DBF	CROC	C 2	0	rock type Eng. code
SDBKEY02.DBF	CSROC	C 2	0	rock type Spa. code
SDBKEY02.DBF	CFROC	C 2	0	rock type Fre. code
SDBKEY02.DBF	EROC	C 26	0	rock type Eng. descr
SDBKEY02.DBF	SROC	C 29	0	rock type Spa. descr
SDBKEY02.DBF	FROC	C 33	0	rock type Fre. descr
SDBKEY02.DBF	CCL3	C 3	0	soil climate+add.variable 3(L) Eng. code
SDBKEY02.DBF	CSCL3	C 3	0	soil climate+add.variable 3(L) Spa. code
SDBKEY02.DBF	CFCL3	C 3	0	soil climate+add.variable 3(L) Fre. code
SDBKEY02.DBF	ECL3	C 25	0	soil climate+additional variable 3 Eng. descr
SDBKEY02.DBF	SCL3	C 25	0	soil climate+additional variable 3 Spa. descr
SDBKEY02.DBF	FCL3	C 25	0	soil climate+additional variable 3 Fre. descr
SDBKEY02.DBF	CDRA	C 2	0	drainage class Eng. code
SDBKEY02.DBF	CSDRA	C 2	0	drainage class Spa. code
SDBKEY02.DBF	CFDRA	C 2	0	drainage class Fre. code
SDBKEY02.DBF	EDRA	C 32	0	drainage class Eng. descr
SDBKEY02.DBF	SDRA	C 32	0	drainage class Spa. descr
SDBKEY02.DBF	FDRA	C 32	0	drainage class Fre. descr
SDBKEY02.DBF	CDR2	C 2	0	permeability+ext. drainage(L) Eng. code
SDBKEY02.DBF	CSDR2	C 2	0	permeability+ext. drainage(L) Spa. code
SDBKEY02.DBF	CFDR2	C 2	0	permeability+ext. drainage(L) Fre. code
SDBKEY02.DBF	EDR2	C 15	0	permeability+external drainage Eng. descr
SDBKEY02.DBF	SDR2	C 15	0	permeability+external drainage Spa. descr
SDBKEY02.DBF	FDR2	C 15	0	permeability+external drainage Fre. descr
SDBKEY02.DBF	CMOI	C 1	0	moisture condition Eng. code
SDBKEY02.DBF	CSMOI	C 1	0	moisture condition Spa. code

SDBKEY02.DBF	CFMOI	C 1	0	moisture condition Fre. code
SDBKEY02.DBF	EMOI	C 15	0	moisture condition Eng. descr
SDBKEY02.DBF	SMOI	C 18	0	moisture condition Spa. descr
SDBKEY02.DBF	FMOI	C 17	0	moisture condition Fre. descr
SDBKEY02.DBF	CERO	C 2	0	erosion intensity + type(L) Eng. code
SDBKEY02.DBF	CSERO	C 2	0	erosion intensity + type(L) Spa. code
SDBKEY02.DBF	CFERO	C 2	0	erosion intensity + type(L) Fre. code
SDBKEY02.DBF	EERO	C 25	0	erosion intensity + type Eng. descr
SDBKEY02.DBF	SERO	C 25	0	erosion intensity + type Spa. descr
SDBKEY02.DBF	FERO	C 29	0	erosion intensity + type Fre. descr
SDBKEY02.DBF	CHUM	C 2	0	human influence Eng. code
SDBKEY02.DBF	CSHUM	C 2	0	human influence Spa. code
SDBKEY02.DBF	CFHUM	C 2	0	human influence Fre. code
SDBKEY02.DBF	EHUM	C 30	0	human influence Eng. descr
SDBKEY02.DBF	SHUM	C 30	0	human influence Spa. descr
SDBKEY02.DBF	FHUM	C 30	0	human influence Fre. descr
SDBKEY02.DBF	CFLQ	C 2	0	flooding frequency Eng. code
SDBKEY02.DBF	CSFLQ	C 2	0	flooding frequency Spa. code
SDBKEY02.DBF	CFFLQ	C 2	0	flooding frequency Fre. code
SDBKEY02.DBF	EFLQ	C 15	0	flooding frequency Eng. descr
SDBKEY02.DBF	SFLQ	C 15	0	flooding frequency Spa. descr
SDBKEY02.DBF	FFLQ	C 15	0	flooding frequency Fre. descr
SDBKEY02.DBF	CFLP	C 2	0	flooding duration Eng. code
SDBKEY02.DBF	CSFLP	C 2	0	flooding duration Spa. code
SDBKEY02.DBF	CFFLP	C 2	0	flooding duration Fre. code
SDBKEY02.DBF	EFLP	C 15	0	flooding duration Eng. descr
SDBKEY02.DBF	SFLP	C 15	0	flooding duration Spa. descr
SDBKEY02.DBF	FFLP	C 15	0	flooding duration Fre. descr
SDBKEY02.DBF	CWAT	C 2	0	water table depth + type (L) Eng. code
SDBKEY02.DBF	CSWAT	C 2	0	water table depth + type (L) Spa. code
SDBKEY02.DBF	CFWAT	C 2	0	water table depth + type (L) Fre. code
SDBKEY02.DBF	EWAT	C 15	0	water table depth + type Eng. descr
SDBKEY02.DBF	SWAT	C 15	0	water table depth + type Spa. descr
SDBKEY02.DBF	FWAT	C 15	0	water table depth + type Fre. descr
SDBKEY02.DBF	CADD	C 3	0	additional variable 1 + 2(L) Eng. code
SDBKEY02.DBF	CSADD	C 3	0	additional variable 1 + 2(L) Spa. code
SDBKEY02.DBF	CFADD	C 3	0	additional variable 1 + 2(L) Fre. code
SDBKEY02.DBF	EADD	C 25	0	additional variable Eng. descr
SDBKEY02.DBF	SADD	C 25	0	additional variable Spa. descr
SDBKEY02.DBF	FADD	C 25	0	additional variable Fre. descr
SDBKEY02.DBF	CDEP	C 2	0	effective soil depth code
SDBKEY02.DBF	DDEP	C 10	0	effective soil depth
SDBKEY02.DBF	CSLG	C 2	0	slope gradient class code
SDBKEY02.DBF	DSLG	C 10	0	slope gradient class
SDBKEY02.DBF	CCL4	C 3	0	additional variable 4 Eng. code
SDBKEY02.DBF	CSCL4	C 3	0	additional variable 4 Spa. code
SDBKEY02.DBF	CFCL4	C 3	0	additional variable 4 Fre. code
SDBKEY02.DBF	ECL4	C 25	0	additional variable 4 Eng. descr
SDBKEY02.DBF	SCL4	C 25	0	additional variable 4 Spa. descr
SDBKEY02.DBF	FCL4	C 25	0	additional variable 4 Fre. descr
SDBKEY02.DBF	CCL5	C 3	0	additional variable 5 Eng. code
SDBKEY02.DBF	CSCL5	C 3	0	additional variable 5 Spa. code
SDBKEY02.DBF	CFCL5	C 3	0	additional variable 5 Fre. code
SDBKEY02.DBF	ECL5	C 25	0	additional variable 5 Eng. descr
SDBKEY02.DBF	SCL5	C 25	0	additional variable 5 Spa. descr
SDBKEY02.DBF	FCL5	C 25	0	additional variable 5 Fre. descr
SDBKEY02.DBF	CCL6	C 3	0	additional variable 6 Eng. code
SDBKEY02.DBF	CSCL6	C 3	0	additional variable 6 Spa. code
SDBKEY02.DBF	CFCL6	C 3	0	additional variable 6 Fre. code
SDBKEY02.DBF	ECL6	C 25	0	additional variable 6 Eng. descr
SDBKEY02.DBF	SCL6	C 25	0	additional variable 6 Spa. descr
SDBKEY02.DBF	FCL6	C 25	0	additional variable 6 Fre. descr
	total	2228		

```
SDBKEY03.DBF  C74        C  3      0    codes FAO 74 soil units(U)/phases(L)
SDBKEY03.DBF  D74        C 27      0    FAO 74 soil unit/phase
SDBKEY03.DBF  C88        C  3      0    codes FAO 88 soil units(U)
SDBKEY03.DBF  D88        C 25      0    FAO 88 soil unit
SDBKEY03.DBF  C883       C  3      0    codes FAO 88 3rd level(L)
SDBKEY03.DBF  D883       C 35      0    FAO 88 3rd level
          *total*          96
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
SDBKEY04.DBF  CGG        C  3      0    codes ST great group
SDBKEY04.DBF  DGG        C 18      0    ST great group
SDBKEY04.DBF  CSG        C  4      0    codes subgroup
SDBKEY04.DBF  DSG        C 28      0    ST subgroup
          *total*          53
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
SDBKEY05.DBF  CTXT       C  3      0    codes ST texture
SDBKEY05.DBF  DTXT       C 25      0    ST texture
SDBKEY05.DBF  CMIN       C  2      0    codes ST mineralogy + reaction (L)
SDBKEY05.DBF  DMIN       C 25      0    ST mineralogy + reaction
SDBKEY05.DBF  CSCL       C  2      0    codes STR + SMR (L) Eng. code
SDBKEY05.DBF  CSSCL      C  2      0    codes STR + SMR (L) Spa. code
SDBKEY05.DBF  CFSCL      C  2      0    codes STR + SMR (L) Fre. code
SDBKEY05.DBF  ESCL       C 17      0    ST soil temperature+moisture regime
                                        Eng. descr
SDBKEY05.DBF  SSCL       C 17      0    ST soil temperature+moisture regime
                                        Spa. descr
SDBKEY05.DBF  FSCL       C 17      0    ST soil temperature+moisture regime
                                        Fre. descr
          *total*         112
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
SDBKEY06.DBF  CONA       C  3      0    codes surveyors name
SDBKEY06.DBF  NAME       C 20      0    surveyors name
          *total*          23
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
SDBKEY07.DBF  COSP       C  3      0    vegetation species Eng. code
SDBKEY07.DBF  CSOSP      C  3      0    vegetation species Spa. code
SDBKEY07.DBF  CFOSP      C  3      0    vegetation species Fre. code
SDBKEY07.DBF  ESPEC      C 50      0    vegetation species Eng. descr
SDBKEY07.DBF  SSPEC      C 50      0    vegetation species Spa. descr
SDBKEY07.DBF  FSPEC      C 50      0    vegetation species Fre. descr
          *total*         159
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
SDBKEY08.DBF  LOCALSERIE  C  3    0    local series code
SDBKEY08.DBF  LOCSERIESD  C  30   0    local series description
          *total*           33
-------------------------------------------------------------------------------
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SOURCE FILES

Source files are the following:

```
-------------------------------------------------------------------------------
SDBCLIP  PRG     SDBm main menu
SDB10000 PRG     input menu
SDBH0000 PRG     SDBm general help screen
SDB11000 PRG     input site data
SITEINP1 PRG     input/edit screen site data #1
SITEINP2 PRG     input/edit screen site data #2
SITEHELP PRG     help-windows for site data
```

HORIHELP	PRG	help-windows for horizon data
SITECONV	PRG	conversion site French and Spanish code to English
CONVSITE	PRG	conversion site English codes to French and Spanish
HORICONV	PRG	conversion horizon French and Spanish codes to English
CONVHORI	PRG	conversion horizon English codes to French and Spanish
SDB11100	PRG	validity control site data (part 1)
SDB11200.	PRG	validity control site data (part 2)
SDB12000	PRG	input horizon data
HORINP	PRG	input/edit horizon data screen
SDB12100	PRG	setup validity control horizon data
SDB12110	PRG	validity control horizon data
SDB13000	PRG	input analytical data
ANA1INP	PRG	input/edit screen analytical data
SDB14000	PRG	input soil physical data
SDB14100	PRG	input/edit screen soil physical data
SDB15000	PRG	input soluble salts data
ANA2INP	PRG	input/edit screen soluble salts data
SDB1H000	PRG	help screen input procedure
SDB20000	PRG	select/list menu
SDB21000	PRG	list results on screen
SDB22000	PRG	list results on printer
SDB23000	PRG	ad hoc selection menu
SDB23100	PRG	select procedure on site data
SDB23200	PRG	select procedure on horizon data
SDB23300	PRG	select procedure on standard analytical data
SDB23600	PRG	select procedure on soluble salts data
SDB23700	PRG	select on infiltration and surface structure
SDB23800	PRG	select on water ritention, bulk density and available water
SDB24000	PRG	fast search menu
SDB24100	PRG	fast search procedure
SDB24110	PRG	select output menu
SDB2H000	PRG	help screen select/search procedure
SDB30000	PRG	edit menu
SDB31000	PRG	edit site data
SDB32000	PRG	edit horizon data
SDB33000	PRG	edit standard analytical data
SDB34000	PRG	edit soil physical data
SDB35000	PRG	edit soluble salts data
SDB3H000	PRG	help screen edit procedure
SDB40000	PRG	print/view menu
SDB41000	PRG	display data on screen master procedure
SDB41100	PRG	display site data
SDB41200	PRG	display horizon data
SDB41300	PRG	display standard analysis
SDB41400	PRG	display soluble salts data
SDB41500	PRG	display soil physical data
SDB46000	PRG	print soil physical data
SDB47000	PRG	print table standard analysis - first part
SDB48000	PRG	print horizon data descriptive (Part 1)
SDB48001	PRG	print horizon data descriptive (Part 2)
SDB49000	PRG	print site data
SDB4A000	PRG	print standard analysis
SDB4B000	PRG	print soluble salts
SDB4C000	PRG	print table soluble salts
SDB4D000	PRG	print table water ritention-bulk density
SDB4E000	PRG	print table standard analysis - second part
SDB4H000	PRG	help screen print procedure
SDB50000	PRG	delete menu and procedures
SDB5H000	PRG	help screen delete procedure
SDB60000	PRG	import/export menu
SDB61000	PRG	import site data
SDB62000	PRG	import standard analysis
SDB63000	PRG	import soil physical data
SDB64000	PRG	import soluble salt data

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SDB85120 PRG     export of soil layer generator profile results
SDB85200 PRG     export of soil layer generator analytical data
SDB85300 PRG     export of soil layer generator soluble salts data
SDB85400 PRG     export of soil layer generator soil physical data
SDB8H000 PRG     help screen soil layer generator procedure
SDBG0000 PRG     graphic presentation menu
SDBG2000 PRG     vertical variability procedure
SDBG2100 PRG     variable ranges definition procedure
SDBG3000 PRG     pie presentation procedure
SDBGH000 PRG     help screen graphic presentation procedure
SDB90000 PRG     coding system menu
SDB91000 PRG     add/modify site variables
SDB92000 PRG     view/change classification
SDB92100 PRG     create parameters site variables
SDB92200 PRG     create parameters horizon variables
SDB92300 PRG     create parameters soil classification variables
SDB92400 PRG     view\change classification site variables
SDB92500 PRG     view\change classification horizon variables
SDB92600 PRG     view\change soil classification procedure
SDB9H000 PRG     help screen view/change classifications
SDBL0000 PRG     change language menu

CARGAVAR PRG     English memory variable generator procedure
CARGSVAR PRG     Spanish memory variable generator procedure
CARGFVAR PRG     French memory variable generator procedure
SDBN0000 PRG     change language procedure
TOOLENG  PRG     English memory variable generator procedure in SDBTOOLS
TOOLSP   PRG     Spanish memory variable generator procedure in SDBTOOLS
TOOLFR   PRG     French memory variable generator procedure in SDBTOOLS
IND      PRG     create index files
SDBPROC  PRG     procedures for SDBm colours and legends
SDBTOOLS PRG     tools and password main menu
CODING   PRG     lists coding system files (part 1)
CODING2  PRG     lists coding system files (part 2)
INDEX    PRG     reindex .DBF files
SDBADAPT PRG     conversion procedure from SDB to SDBm
SDBMINS  PRG     installation procedure
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