Technical Paper No. 15

ISRIC SOIL INFORMATION SYSTEM
-USER MANUAL
-TECHNICAL MANUAL

E.J. van Waveren and A.B. Bos

Revised edition
July 1988

INTERNATIONAL SOIL REFERENCE AND INFORMATION CENTRE

- Technical Paper 14. Guidelines for the description and coding of soil data. Revised edition, July 1988

- Technical Paper 15. ISRIC Soil Information System - user and technical manuals. Revised edition, July 1988

- ISIS computer programme on 2 diskettes (MS-DOS 5.25")

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FOREWORD

ISRIC's Soil Information System (ISIS) was developed to enable the storage of site and profile descriptions and analytical data of our soil profile collection in a computerized database.

The basis for ISIS and the present Technical Papers 14 and 15 was laid by Mr. E. van Waveren. The programme was subsequently improved by Mr. A.B. Bos, aided by Mr. A. Verhagen, making use of many suggestions received since the first draft was made available last year.

ISIS is suitable for personal and micro-computers using MS-DOS and is available for IBM and compatible computers. The system uses dBASEIII.

Although developed to serve ISRIC's internal needs, due to its flexibility ISIS can also be employed as a prototype for the development of a soil database at any soil centre.

ISRIC is very willing to cooperate with national soil centres, especially in developing countries, at such an undertaking.

No computer programme is perfect; we look forward to receiving comments for improvements.

Dr. W.G. Sombroek
Director

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INTRODUCTION

ISIS (ISRIC SOIL INFORMATION SYSTEM) is a soil information system developed for micro computers.(IBM XT and AT and compatibles). It includes procedures to store, edit, select and print soil data. ISIS uses dBASE III (ASHTON TATE, 1984) a relational database management system(DBMS).
The combination IBM/dBASEIII is deliberately chosen. dBASE is a well-known and often used DBMS and IBM is generally considered as a 'standard' with respect to micro computers.

The system requirements are:
- IBM-XT or AT (or compatible, on which dBASE III runs without problems)
- At least 256 Kb RAM
- Hard disk
- Printer
- Disk Operating System, DOS (Microsoft Corp.), version DOS 2.1 or more
- dBASE III

ISIS is primarily developed to handle the documentation of the ISRIC soil reference collection. Consequently, the soil descriptions are extensive and the selection and output procedures are written to meet the ISRIC requirements. Besides that, ISIS can be considered as a concept for the development of a soil information system. Anyone familiar with the dBASE III application language can modify the procedures to make the system suitable for use in a non-ISRIC environment.

The first part of this manual includes guidelines to start and run ISIS, and it gives additional information on the ISIS procedures.
Although ISIS is fully interactive and self-explanatory (all necessary instructions to run ISIS appear on screen), this manual gives useful information to run the procedures effectively.
It is therefore recommended to read the appropriate part of this manual carefully before running an ISIS procedure.

The second part deals with the technical aspects of ISIS. It contains a data-dictionary and guidelines to work with ISIS on a 'dBASE' level.

The site and profile characteristics should be entered according the ISRIC Technical Paper 14:" Guidelines for the description and coding of soil data" by E.J. van Waveren and A.B. Bos (1988)

A schematic presentation of ISIS is given in fig.1

The site, profile and analytical variables included in ISIS are listed in table 1a, 1b and 1c.

fig. 1. Schematic presentation of ISIS

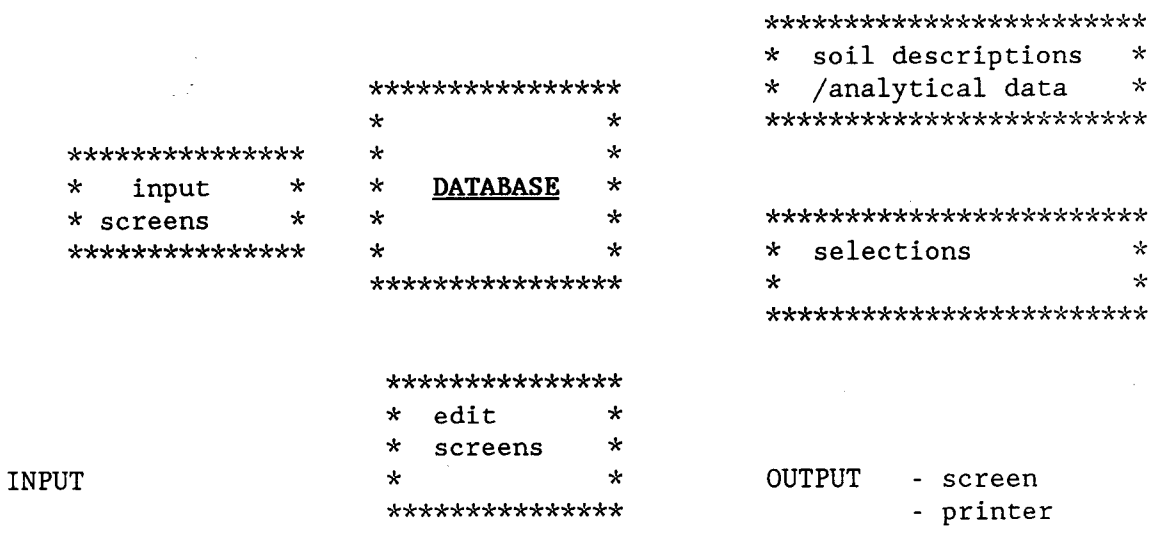

table 1a. Site variables (see ISRIC Technical Paper 14:" Guidelines for the description and coding of soil data" by E.J. van Waveren an A.B. Bos, 1988.

* date
* country
* ISRIC code
* author
* location
* latitude
* longitude degrees - minutes - seconds
* altitude degrees - minutes - seconds
* FAO classification soil unit - phase
* USDA classification great group - subgroup - texture - mineralogy - soil temperature regime - soil moisture regime
* diagnostic horizons (3)
* other diagnostic properties
* local classification
* climate Köppen - climatic data
* climate station name - altitude - distance - latitude - longitude - relevance
* parent material mode - parent rock - texture - weathering - resistance - remarks
* geomorphology landform - topography - physiographic unit - site position
* slope gradient - form - aspect
* micro relief kind - pattern - height
* surface characteristics rockiness - stoniness - stones size - stones form cracking - sealing
* salt/alkali
* effective soil depth
* hydrology water table kind - depth - max. depth - min. depth - stagnating layers - permeability - run off - flooding frequency - nature flood water - drainage - moisture conditions profile
* erosion (soil) type - intensity (2)
* aggradation
* slope stability
* land use land utilization type - crops - irrigation - rotation - improvements
* vegetation type - status - remarks land use/vegetation
* general remarks site/profile

table 1b. Profile variables (see ISRIC Technical Paper 14, 1987)

---

* ISRIC code
* horizon number
* horizon depth
* designation
* boundary
* colour moist - wet
* mottles
* structure
* field texture
* organic materials
* consistency
* pores
* roots
* effervescence
* field pH
* cutans
* inclusions
* rock fragments
* pans
* biological activity

table 1c. Analytical variables

---

* ISRIC code	
* sample horizon number	
* sample depth	cm
* coarse fraction (>2 mm)	%
* sand (2000-1000μm)	%
* sand (1000-500μm)	%
* sand (500-250μm)	%
* sand (250-100μm)	%
* sand (100-50μm)	%
* coarse silt (50-20μm)	%
* fine silt (20-2μm)	%
* total silt (50-2μm)	%
* clay (<2μm)	%
* water dispersable clay (<2μm)	%
* bulk density	g/cm^2
* pF 0, 1, 1.5, 2, 2.3, 2.7, 3.4, 4.2	%
* specific surface (soil)	m^2/g
* pH H_2O and KCl	
* $CaCO_3$ content	%
* org C	%
* org N	%
* exchangeable Ca Mg Na K	me/100g soil
* sum cations	me/100g soil
* exchangeable acidity	me/100g soil
* exchangeable Al	me/100g soil
* CEC soil/clay/org.C	me/100g
* ECEC	me/100g soil
* Base saturation	%
* Al saturation	%

table 1c. continued

---

* EC(1:2.5) mS/cm
* elemental composition (soil and clay) SiO_2, Al_2O_3, Fe_2O_3, CaO, MgO, K_2O, Na_2O, TiO_2, MnO_2, P_2O_5,
* ignition.loss weight %
* molar ratios (soil and clay) SiO_2/Al_2O_3, SiO_2/Fe_2O_3, SiO_2/R_2O_3, Al_2O_3/Fe_2O_3
* water soluble salts: Ca, Mg, K, Na, CO_3, HCO_3, Cl, SO_4, NO_3 me/100g
* ECe ECs mS/cm
* pH (suspension, specify in additional part)
* clay minerals: kaolinite, mica/illite, vermiculite, chlorite, smectite, halloysite, mix, quarzite, feldspar, gibbsite, goethite, hematite; ..(space) not detectable, 1 very weak, 2 weak, 3 medium, 4 strong, 5 very strong
* Fe, Al, Si, Mn (oxalate extraction) %
* Fe, Al, Si (dithionite extraction %
* Fe, Al, C (pyrophosphate extraction) %
* sand minerals: light fraction heavy fraction %
* quartz feldspar mica + 7 free entries %
* additional analysis and remarks (free space/field)

2 **RUN ISIS**

START

THE COMPUTER IS OFF:

- Insert the ISIS START DISKETTE in drive A (left or upper drive at front side of the computer). Insert the diskette with the label side up.
- Be sure the B drive is empty (right or lower drive).
- Switch the PRINTER and the COMPUTER on.
- Insert date (if the computer has no clock/calender)
- Insert time (if the computer has no clock/calender)

THE COMPUTER IS ON:

- Be sure not to interrupt any program.
- Check if the PRINTER is on line.
- Insert the ISIS START DISKETTE in the A drive.
- Remove any diskette from drive B
- Press keys <CTRL> <ALT> <DEL> simultaneously to reset the system.
- Insert date (if the computer has no clock/calender)
- Insert time (if the computer has no clock/calender)

ISIS starts automatically. The starting procedure takes some time. During the starting procedure some messages appear on the screen. The procedure results in the ISIS entry screen:

```
**********************************************************
*                                ISIS                    *
*                   ISRIC SOIL INFORMATION SYSTEM        *
*                   version 3.1       October 1988       *
*                                                        *
*                                                        *
*                                                        *
*                                                        *
*   information: ISRIC, P.O. Box 353                     *
*                Wageningen, The Netherlands             *
**********************************************************

Press any key to continue...
```

- Press any key to skip to the next page. This page contains general information on ISIS.
- Press any key to skip to the MAIN MENU:

```
************************************************************
*  MAIN MENU                                               *
*  ----------------------------------------------------    *
*                                                          *
* 1 = INPUT OF NEW DATA                                    *
*                                                          *
* 2 = OUTPUT: LISTING & SOIL DESCRIPTION                   *
*                                                          *
* 3 = SELECTIONS                                           *
*                                                          *
* 4 = EDIT                                                 *
*                                                          *
* R = QUIT                                                 *
*                                                          *
************************************************************
```

- Consult the manual to run the procedures properly and effectively.

- Select one of the options by pressing <1> or <2> or <3> or <4> or <R>.

- Follow the instructions that appear on the screen. Read the instructions carefully. There are two types of instructions:

  a) Instructions that ask you to ENTER a code, a number etc. TYPE the code the number or whatever and enter it by pressing the <-' key <RETURN or ENTER key>.

  b) Instructions that ask you to PRESS a SINGLE key. The key code is given between <>.

  e.g Press <N> = press N key (upper and lower case are both allowed)
  Press <CTRL>= press key with code CTRL (control key)

QUIT

- Return to the MAIN MENU and press <R>
- If any information is added or edited (INPUT or EDIT option was selected), use the ISISBACK facility to update the backup files of the database (See 7 BACKUP DATAFILES).

- Remove the diskette from the A drive and switch off the computer and the printer.

3 ENTER DATA (INPUT PROCEDURES)

Site and profile information is entered according GUIDELINES FOR THE DESCRIPTION AND CODING OF SOIL DATA (ISRIC Technical Paper 14)

Although it is possible to EDIT the information afterwards, it is recommended to enter only complete descriptions and no preliminary data. This avoids the time consuming EDIT procedure and to keep the database as clean as possible.

Coded information should be entered in lower case only.****

If necessary ISIS automatically transforms lower into upper case characters.

Missing information should be entered as blanks.

Upper case may be used in the following items: LOCATION, LOCAL CLASSIFICATION, HORIZON DESIGNATION, GENERAL REMARKS.

The number of decimals is defined and fixed for each numerical variable. It is not possible to change this. Numerical missing values should be indicated by -1 or -.1 (depending on the place of the decimal point). Do not leave the entry UNFILLED, because empty numerical spaces are automatically replaced by a 0 (on the screen as well as in the database).

The code of class 'nil' or 'none' for variables is Ø (zero) and never an alphabetical O.

IDENTIFIERS (ISRIC CODE & HORIZON/SAMPLE NUMBER and STATION CODE)

All data are entered per individual soil/monolith. The soil/monolith is identified by the ISRIC CODE.
Information on the individual horizons of a soil are identified by the ISRIC CODE and an additional HORIZON/SAMPLE NUMBER.
These identifiers should be unique and entered properly. The ISRIC CODE consists of 5 digits. The first three give the official COUNTRY CODE the last two indicate the SOIL/MONOLITH NUMBER.

If the COUNTRY CODE consists of less than three digits trailing blanks should be entered. If the SOIL/MONOLITH NUMBER is < 10 a leading 0 should be entered.

e.g. bral0 co 03 z 01
^^^^^ ^^^^^ ^^^^^

The horizons are numbered sequentially from top to bottom. The samples (analytical data) are numbered in a similar way. It should be noted that sample depth and horizon depth do not always correspond, consequently the numbering may not match. Both sample depth and depth of the horizon are recorded and indicated on the print out to avoid confusion.
If the number of horizons or samples exceeds 9 continue with A,B,.,.,

The climatic data are stored per CLIMATE STATION. The CODE of this climate station identifies the data. The STATION CODE consists of 6 digits, the first three give the COUNTRY CODE, followed by c (climate) the last two numbers indicate the climate/meteo number (these numbers have no relation with the monolith number !!).

If the COUNTRY CODE consists of less than three digits trailing blanks should be entered. If the CLIMATE STATION NUMBER is < 10 a leading Ø should be entered.

e.g. brac17 co cØ1 z cØ8
^^^^^^ ^^^^^^ ^^^^^^

DATA INPUT SCREENS

All data are entered in the computer with help of so-called INPUT SCREENS. The lay out of these screens is almost similar to the lay out of the SOIL DESCRIPTION FORMS used at ISRIC. There are screens for a number of data groups e.g. for site, profile and climatic data and several groups of analytical data.

When an INPUT session is started the appropriate INPUT SCREEN appears and the CURSOR is placed at the entry of the first variable.

Enter the information on the first variable and skip to the next one by pressing <-'.

The CURSOR can be moved over the input screen by using the following keys:

⇐	moves the cursor one space to the left
⇒	moves the cursor one space to the right
⇓	moves the cursor to the next variable
⇑	moves the cursor to the previous variable
<PgDn>	exit INPUT SCREEN

If the information on the last variable is entered and <-' is pressed, or the <PgDn> key is pressed the INPUT SCREEN is closed and ISIS returns with:

```
****************************************
*                                      *
*                                      *
*                                      *
*       SAVE or MODIFY (S/M)?          *
*                                      *
*                                      *
*                                      *
****************************************
```

Pressing key <M> re-activates the INPUT SCREEN and the CURSOR is replaced at the entry of the first variable and modifications throughout the screen can be made. Pressing key <S> confirms the closing of the INPUT SCREEN.
The information is not yet saved(see page 10).

STARTING THE INPUT PROCEDURE

- Go to the MAIN MENU and start the INPUT procedure by pressing <1>. The INPUT PROCEDURES screen appears; please read the remarks carefully. Press any key to skip to the next page: the following text appears on screen:

```
*************************************************************
*                                                           *
*  INPUT SCREENS                                            *
*  -  SITE DATA                 Y/N                         *
*  -  CLIMATIC DATA             Y/N                         *
*  -  PROFILE DESCRIPTIONS      Y/N                         *
*  -  PHYSICAL/CHEMICAL DATA    Y/N                         *
*  -  ELEM.COMP. CLAY           Y/N                         *
*  -  ELEM COMP. SOIL           Y/N                         *
*  -  WATER SOLUBLE SALTS       Y/N                         *
*  -  CLAY MINERALOGY           Y/N                         *
*  -  SAND MINERALOGY           Y/N                         *
*  -  ADDITIONAL ANALYSIS       Y/N                         *
*                                                           *
*************************************************************
```

- Select the required input screens by pressing <Y> . Press <-' to skip to the next item. The default value for each screen is N.

- It is not necessary to fill in all screens for a specific soil/monolith in one session. However it is recommended to enter as much information on a soil/monolith as possible during the same session to minimize the risk of entering the same data twice.
- After the selection of the input screens ISIS asks for the ISRIC CODE. Enter the CODE properly and press <-'

  Subsequently the first INPUT SCREEN appears. If a specific ISRIC CODE is already stored in one of the databases ISIS displays a warning. The SITE INPUT procedure is aborted/procedure is terminated (it is impossible to enter SITE information on the SAME ISRIC CODE twice). In all other cases it is possible to overrule the WARNING in order to add information on a new horizon/sample.
  Note that ISIS does not check whether the combination of ISRIC CODE and HORIZON/SAMPLE NUMBER is unique.

- After each INPUT PROCEDURE ISIS returns with:

```
**********************************************************
*                                                        *
*                                                        *
* WRITE INFORMATION TO DATABASE (Y/N) OR (E) TO EXIT     *
*                                                        *
*                                                        *
**********************************************************
```

Press <Y> to confirm the actual storage in the database of the data shown on the screen.

If <N> is pressed all data typed in this input screen is DELETED and NO information is written into the database. ISIS continues the INPUT PROCEDURE

If <E> is pressed all data typed in this input screen is DELETED and NO information is written into the database. ISIS returns to the MAIN MENU

******* NOTE: ISIS has no validation procedure. ********

******* It is necessary to check the data on the print out *******

After the last input screen is filled in ISIS returns with:

```
**********************************************************************
*                                                                    *
* Press M to return to MAIN MENU or any other key to re-run INPUT    *
*                                                                    *
**********************************************************************
```

Press any key to enter data on another soil/monolith or press <M> to quit and return to the MAIN MENU.

INPUT SCREENS: CONTENTS AND REMARKS

1) SITE INPUT SCREEN:

Enter general remarks: at the end of the 3 input screen ISIS asks if you want to enter any general remarks. Press <Y> if you want to. ISIS returns with:

HELP MENU

memo (in reverse video)

- Press <CTRL> and <PgDn> simultaneously. ISIS returns with an empty screen with the cursor in the upper left corner. Enter the information.
  If on the screen a line exceeds 67 characters the last word is automatically placed on the next line. Please note that the lines on the printed output form are 105 characters wide and these are filled up until this limit is reached. Consequently there is a difference in lay-out on the screen and on the printed output. Close a line with the <-' key to start a new line on the printer.

- other key functions:

⇐	moves the cursor one space to the left
⇒	moves the cursor one space to the right
⇓	moves the cursor to the next variable
⇑	moves the cursor to the previous variable
<-<backspace)	erases the character to left of the cursor
<DEL>	erases the character on which the cursor is placed
<INS>	inserts at the location of the cursor

- Press <CTRL> and <PgUp> simultaneously to end the input of general remarks.

  HELP MENU

  memo (in reverse video).

- Press <-' to continue the site input procedure

2) CLIMATIC DATA INPUT SCREEN:

The climatic data are identified by the unique code of the climate station (STATCODE, see identifiers).
To start the input of climatic data you first have to enter the country code (consult TP14) of the climate station. After this ISIS gives a listing of station codes and climate station names on screen or as a printout.

ISIS asks: **enter a station-code :**

ISIS checks if this station-code is already entered.

A. If not ISIS asks to enter the **station-name**. It should be noted that ISIS only accepts an unique entry (check correct spelling).
After having entered the station-code and -name ISIS gives the following screen:

STATION CODE (station code)
STATION NAME (station name)

COUNTRY (country code)

ALTITUDE

LATITUDE **LONGITUDE**

When this information is written to the database a menu appears (see B.). If not, ISIS asks: **ENTER ANOTHER CLIMATE STATION (Y/N)**
Press (Y) - to restart climatic data input.
Press (N) - to exit climatic data input.

B. If the station code is found a listing of monoliths linked to that climate station is presented on screen. After this a menu appears :

STATION (station name) STATION CODE (station code)
MONOLITH CODE (monolith code)

1 LINK CLIMATIC STATION TO THIS MONOLITH
2 ENTER NEW DATA TO THIS STATION
3 ENTER ANOTHER CLIMATE STATION

0 EXIT

Press 1,2,3 or 0 to continue...

Press <1> - to link the station-code to this monolith. When this relation is already made, ISIS returns with a warning.
Press <2> - to enter climatic data. ISIS asks to enter the climatic data type (spelling + typography, see TP14) and verifies if the data type is already stored in the database. A warning appears when the climatic data type is already stored or when ISIS does not recognize the code.
Press <3> - to restart climatic data input.
Press <0> - to exit climatic data input.

3) PROFILE DESCRIPTION INPUT SCREEN:

Enter the horizon number properly. Do not enter the same number twice

Use the GENERAL REMARKS part of the SITE INPUT SCREEN for additional remarks

Please note that the lay-out of this input screen and the sequence of the variables is not 100% identical to the profile description form.

4) PHYSICAL/CHEMICAL INPUT SCREEN:

The physical/chemical input screen contains the following variables:

* sample horizon number
* sample depth (top and bottom)
* texture: coarse fraction > 2mm
  sand (2000-1000μm 1000-500μm 500-250μm 250-100μm 100-50μm)
  silt (50 -20μm 20- 2μm total)
  clay < 2μm
  dispersable clay (<2μm)
* bulk density
* pF (0, 1, 1.5, 2, 2.3, 2.7, 3.4, 4.2)
* specific surface
* pH (H_2O and KCl)
* $CaCO_3$
* org.mat. (C and N)
* exchangeable cations (Ca, Mg, Na, K, sum)
* exchangeable acidity and Al
* CEC (soil, clay, org.C.)
* ECEC
* Base saturation
* Al saturation
* EC

Enter the horizon number properly.

Numerical missing values should be indicated by -1 or -.1 (depending on the place of the decimal point).

Do not leave the entry UNFILLED, because empty numerical spaces are automatically replaced by a 0 (on the screen as well as in the database).

5/6) ELEMENTAL COMPOSITION INPUT SCREEN (CLAY AND SOIL)

The input screens for the elemental composition of clay and soil are identical. They include:

* horizon number
* SiO_2, Al_2O_3, Fe_2O_3, CaO, MgO, K_2O, Na_2O, TiO_2, MnO_2, P_2O_5,
* ign.loss
* ratios: SiO_2/Al_2O_3, SiO_2/Fe_2O_3, SiO_2/R_2O_3, Fe_2O_3/Al_2O_3

Enter the sample number properly. You may skip sample numbers of which there is no information available.
E.g. If you have filled in the physical/chemical analysis of 6 samples (see previous screen) and only samples 3 and 4 are analyzed on elemental composition, you just have to enter samples 3 and 4 in this screen.

Numerical missing values should be indicated by -1 or -.1 (depending on the place of the decimal point).

Do not leave the entry UNFILLED, because empty numerical spaces are automatically replaced by a 0 (on the screen as well as in the database).

7) WATER SOLUBLE SALTS INPUT SCREEN

The soluble salt input screen includes the following variables:

* horizon number
* water soluble salts (Ca, Mg, K, Na, CO_3, HCO_3, Cl, SyO_4, NO_3)
* ECe ECs
* pH

Enter the horizon number properly (see above)

Numerical missing values should be indicated by -1

8) CLAY MINERALOGY INPUT SCREEN

This screen includes the following variables:

* sample horizon number
* clay minerals: kaolinite, mica/illite, vermiculite, chlorite, smectite, halloysite, mix, quarzite, feldspar, gibbsite, goethite, hematite;
* extractable Fe, Al, Si, Mn (by oxalate)
* extractable Fe, Al, Si (by dithionite)
* extractable Fe, Al, C (by pyrophospate)

Numerical missing values should be indicated by -1

Enter sample number properly

Indicate missing values on mineralogy as blanks (press spacebar or press return key)

Specify MIX in the additional analysis screen (see below)

Abundance classes mineralogy are:

(space) not detectable
1 very weak
2 weak
3 medium
4 strong
5 very strong

9) SAND MINERALOGY INPUT SCREEN

This input screen contains the following variables:
* sample number
* light and heavy fraction (%)
* minerals (QUAR, FEL, MICA)
* 7 free entries for additional minerals (A, B, C, D, E, F, G)

specify the additional minerals in the ADDITIONAL ANALYSIS SCREEN. (see below).

Enter the sample number properly

Numerical missing values should be indicated by -1

10) ADDITIONAL ANALYSIS INPUT SCREEN

This screen is used to enter variables that are not included in the previous screens and to add remarks on the analytical data.
The input is in a free format. When the first input screen is full, you may open a second one.

4 EDIT DATA (EDIT PROCEDURES)

The purpose of EDIT is to modify information on individual soils/monoliths that is already stored in ISIS.
EDIT can not be used to add new soil descriptions or to extend the number of horizons or samples of a specific soil/monolith (use INPUT).

The EDIT procedures are rather time consuming. It may take a while before ISIS responds, especially when editing the PROFILE DESCRIPTIONS or the PHYSICAL AND CHEMICAL DATA. Please be patient.

EDIT is fully interactive and self explanatory. Follow the instructions that appear on the screen.

EDIT SCREENS

The information is modified with help of EDIT SCREENS. The lay-out of the EDIT SCREENS is identical to that of the INPUT SCREENS, but in addition they also display the actual information on the specific soil/monolith to be edited.

Modify data by simply overwriting the information on the screen. The (DEL) and (INS) keys can be used to delete and insert.

As for INPUT the following keys can be used to move the cursor without changing the contents on the screen.

- other key functions:

⇐	moves the cursor one space to the left
⇒	moves the cursor one space to the right
⇓	moves the cursor to the next variable
⇑	moves the cursor to the previous variable
<-<backspace)	erases the character to left of the cursor
<DEL>	erases the character on which the cursor is placed
<INS>	inserts at the location of the cursor

If the cursor is at the last variable and <-' is pressed, or (PgDn) is pressed the EDIT screen is closed and ISIS returns with:

```
*********************************************
*                                           *
*          SAVE or MODIFY (S/M)?            *
*                                           *
*********************************************
```

Pressing <M> re-activates the EDIT SCREEN and the cursor is replaced to the first variable. Again modifications can be made.
Press <S> to confirm the closing of the EDIT SCREEN. The information on the screen is stored.

START EDIT

Go to the MAIN MENU and start EDIT by pressing <4>, ISIS responds with:

```
**************************************************************
*                                                            *
*  EDIT PROCEDURES                                           *
*  ------------------------------------------                *
*                                                            *
*  REMARKS * EDIT facilities                                 *
*          * Consult the USER MANUAL before starting EDIT    *
*                                                            *
*  EDIT SCREENS:                                             *
*      A SITE DATA                  G ELEMENTAL COMP. SOIL   *
*      B CLIMATIC DATA              H WATER SOLUBLE SALTS    *
*      C PROFILE DESCRIPTION        I CLAY MINERALOGY        *
*      D PHYSICAL DATA              J SOIL MINERALOGY        *
*      E CHEMICAL DATA              K ADDITIONAL ANALYSIS    *
*      F ELEMENTAL COMP. CLAY                                *
*                                                            *
*      Ø return to main menu                                 *
*                                                            *
* ----->                                                     *
**************************************************************
```

Enter ISRIC monolith code :

If the ISRIC-code is not found, ISIS returns with the message:

```
**************************************************************
*                                                            *
*    Code not available; strike any key to retry or Ø to exit*
*                                                            *
**************************************************************
```

After striking Ø ISIS returns with the EDIT screen. To enter another monolith code, strike any other key.

```
**************************************************************
*                                                            *
*    Enter horizon/ sample nr.:                              *
*                                                            *
**************************************************************
```

If combination of ISRIC-code and horizon/ sample number is not found, ISIS returns with the message:

```
**************************************************************
*                                                            *
*    Combination not available; strike any key to retry or Ø to exit *
*                                                            *
**************************************************************
```

After striking Ø ISIS returns with the EDIT screen. To enter another horizon or sample number strike any other key.

After each EDIT ROUTINE ISIS returns with the EDIT SCREEN

5 RETRIEVE INFORMATION (OUTPUT)

This option is used to obtain:

- Information on individual soils/monoliths (soil descriptions on screen and hard copies).
- Overviews of the contents of the database.

To start OUTPUT go to the MAIN MENU and press <2>.
The OUTPUT MENU appears on the screen

```
**************************************************************
*                                                            *
* OUTPUT MENU                                                *
* ---------------------------------------------------        *
*                                                            *
* 1  LISTING OF CONTENTS OF THE DATABASE                     *
* 2  SOIL DESCRIPTION ON SCREEN                              *
* 3  SOIL DESCRIPTION TO PRINTER                             *
* M  RETURN TO MAIN MENU                                     *
*                                                            *
**************************************************************
```

OPTION 1: results in a printout including ISRIC CODE, LOCATION, SOIL CLASSIFICATION CODES of all soils stored in the database. The listing may be sorted on ISRIC CODE (alphabetical order) or on FAO classification.

OPTION 2: Results in a short SITE and PROFILE description on screen. Select option 3 to obtain extended soil descriptions and analytical data.

OPTION 3: Results in a printed "standard" soil description and/or a printout of the analytical data available on the soil (see appendix 1). It takes some time to print a complete soil description. It is therefore advised to check first the soil description on the screen (use OPTION 2).

If the ISRIC CODE is not entered properly or the soil is not present in the database ISIS returns with:

```
**************************************************************
*                                                            *
*  code not in database; strike any key to retry or Ø to exit  *
*                                                            *
**************************************************************
```

Start the procedure again by entering the proper ISRIC CODE. ISIS returns with:

```
**********************************************************************
*                                                                    *
*         OUTPUT FORMAT:                                             *
*         ==============                                             *
*                                                                    *
*         SITE AND PROFILE DESCRIPTION (Y/N)                         *
*                                                                    *
**********************************************************************
```

Press <Y> or <N>, ISIS returns with:

```
************************************************************
*                                                          *
*         ANALYTICAL DATA (Y/N)                            *
*                                                          *
************************************************************
```

Press <Y> or <N>, ISIS returns with:

By answering N to both questions ISIS returns to the main output menu.

6 SELECTIONS

This option offers a number of fully interactive selection procedures on most of the site, profile and analytical variables.
Soils can also be selected on geographical coordinates and country. A listing of all key-variables is given in table 2.

It is NOT possible to cross-select on variables of different data groups. E.g. LANDFORM and STRUCTURE FORM, CLAY CONTENT and pH(H_2O).

However since dBASE III is used, any selection on variables not listed in table 1, or on multiple variables (of different data groups) can be carried out by using the dBASE query language. See part 2 for further information on this subject.

START SELECTION

Go to the MAIN MENU and press <3>, the SELECTION MENU appears on screen.

```
*****************************************************************
*                                                               *
*   SELECTION MENU                                              *
*   ------------------------------------------                  *
*                                                               *
*   SELECT ON:                                                  *
*     General information                                       *
*          A  SOIL CLASSIFICATION (FAO/UNESCO and USDA)         *
*          B  LOCATION (COUNTRY / GEOGRAPHICAL COORDINATES)     *
*          C  COUNTRY & CLASSIFICATION                          *
*     Soil descriptions                                         *
*          D  (other) SITE VARIABLES                            *
*          E  PROFILE CHARACTERISTICS                           *
*     Analytical data                                           *
*          F  PHYSICAL DATA                                     *
*          G  CHEMICAL DATA                                     *
*                                                               *
*          M  RETURN TO MENU                                    *
*                                                               *
*****************************************************************
```

Select the required option (see table 1). ISIS returns with a listing of key-variables and variable codes. Select the key variable(s) and enter the VARIABLE CODE(S).

In case a VARIABLE CODE is not entered correctly, ISIS returns with:

```
**************************************************************
*                                                            *
*    UNKNOWN VARIABLE!!!     TYPE ERROR?                     *
*                                                            *
**************************************************************
```

Press any key to re-enter the VARIABLE CODE.
In case the variable is non-numerical ISIS responds with:

```
**************************************************************
*                                                            *
*     ENTER VARIABLE CLASS:  (see ISRIC CODING SYSTEM)       *
*                                                            *
**************************************************************
```

In case the variable is numerical, ISIS returns with:

```
**************************************************************
*                                                            *
*    ENTER HIGHEST VALUE:                                    *
*    (this value is included in the range)                   *
*                                                            *
*                                                            *
*                                                            *
*    ENTER LOWEST VALUE:                                     *
*    (this value is included in the range)                   *
*                                                            *
*                                                            *
**************************************************************
```

If the same value is entered twice (for upper and lower value) ISIS selects on this single numerical value.

In case DEPTH is used as a key variable. The database is searched for all horizons that cover the total range defined by the upper and lower limit.

E.g. Upper limit = 50 and Lower limit = 70 results in listing of horizons/ samples that have an upper boundary above or equal to 50 cm and a lower boundary below or equal to 70 cm.

Selection procedures on analytical data allow two key-variables. After you have entered the first you are asked to enter a second one. Press <-' if the second variable is not to be used.

Each selection procedure results in a listing of ISRIC CODE and, if appropriate, the horizon number of soils/horizons that match the selection criteria. This listing is first displayed on screen. If the listing exceeds 20 cases, it is continued on the next page. Press any key to skip. The end of the listing is indicated with:

```
**********************************************************************
*                                                                    *
*    END OF INFORMATION PRESS <P> FOR A PRINTOUT OR PRESS            *
*    ANY KEY TO CONTINUE                                             *
*                                                                    *
**********************************************************************
```

Press <P> to obtain a hard copy of the listing displayed on screen.
Press any other key to return to the SELECTION MENU.

TABLE 2. Key variables of interactive selection procedures

CLASSIFICATION

* FAO major soil group
* soil unit
* USDA great group

LOCATION

* geographical coordinates
* country

COUNTRY & CLASSIFICATION

* FAO major soil group + country
* soil unit + country
* USDA great group + country

SITE VARIABLES. selection on one of the following:

* altitude
* climate (Köppen)
* soil temperature regime
* soil moisture regime
* topography
* landform
* position of site
* slope gradient
* slope aspect
* depth of water table
* kind of water table
* soil drainage
* soil erosion degree
* soil erosion type
* soil aggradation
* mass movements
* microrelief kind
* microrelief height
* rock outcrops
* surface stoniness
* surface sealing
* surface salt/alkali
* surface cracking
* parent material (2 types)
* parent material (parent rock)
* parent material, kind (mode of accumulation/ deposition)
* parent material, texture
* effective soil depth

PROFILE CHARACTERISTICS selection on one of the following:

* horizon designation
* horizon depth
* boundary width
* boundary topography
* moist colour hue
* moist colour value
* moist colour chroma
* mottles abundance
* mottles size
* mottles hue
* mottles value
* mottles chroma
* structure form
* structure size
* structure grade
* free $CaCO_3$
* field texture < 2mm
* field texture > 2mm
* cons. wet stickiness
* cons. wet plasticity
* consistence moist
* consistence dry
* consistence other
* cutans continuity
* cutans thickness
* cutans kind
* organic matter kind
* organic matter decomposition
* pores (2 types) quantity
* pores (2 types) size
* pores (2 types) form
* roots (2 types) size
* roots (2 types) quantity
* inclusions quantity
* (2 types) type
* inclusions composition
* rock fragments, size
* rock fragm., quantity
* pans kind
* pans cementation
* biolog.act. kind
* biolog.act. abundance

TABLE 2 continued

PHYSICAL ANALYSES	CHEMICAL ANALYSIS	
Selection on one or two of the following variables:		
* upper boundary	* upper boundary	
* lower boundary	* lower boundary	* exchangeable acidity
* sand (2000-1000μm)	* pH H_2O	* exchangeable Al
* sand (1000-500μm)	* pH KCL	* CEC soil
* sand (500-250μm)	* exch. Ca	* CEC clay
* sand (250-100μm)	* exch. Mg	* CEC org.C
* sand (100-50μm)	* exch. K	* ECEC
* total sand	* exch. Na	* base saturation
* coarse silt	* exch. sum	* Al saturation
* fine silt	* EC	
* total silt	* $CaCO_3$	
* clay	* org C	
	* org N	

* pF 0
* - 1
* - 1.5
* - 2
* - 2.3
* - 2.7
* - 3.4
* - 4.2

7) BACKUP DATAFILES

.All data files should have an up-to-date backup file. If a tape streamer is not available diskettes should be used.
Do not store the backup files on the hard disk that contains ISIS.

With the ISISBACK command all data files are backed up. Use this facility after each substantial INPUT or EDIT procedure.

Start ISISBACK:
- Return to the MAIN MENU and press <R> to Quit.
- The computer returns to the DOS the default drive is A.
- The following message is displayed on screen:

```
**************************************************
*                                                *
*   REM > type ISISBACK to backup datafiles      *
*                                                *
**************************************************
```

- Enter ISISBACK. DOS returns with:

```
**************************************************
*                                                *
*  Insert backup diskette in drive B             *
*  Warning! Diskette files will be erased        *
*  strike any key to continue....                *
*                                                *
**************************************************
```

- Insert ISIS BACKUP DISKETTE DATAFILES No 1 in drive B. Press any key. DOS starts to backup the ISIS and CLIM database files and displays the name of each file while it backs it up. If the diskette has not sufficient space to store all backup files DOS asks to insert a new diskette in drive B. Use ISIS BACKUP DISKETTE DATAFILES No 2. If a next diskette is required, this must be a formatted diskette (see DOS manual p.p. 2.89).

  After the backing up is completed, the computer returns to the DOS command mode. Remove the ISIS start diskette from drive A and the backup diskette from the B drive, switch off the computer, the printer (in this order).

PART 2

TECHNICAL MANUAL

1 INTRODUCTION

In general the interactive ISIS procedures are sufficient to manage the database (see part 1). In exceptional cases dBASE should be used directly (modifications of the database and programs, very complicated selections, etc.) The scope of this part of the manual is to offer background information necessary to work with the ISIS database on a 'dBASE level'.

The manual is by no means complete, it only briefly describes methods to solve a number of problems. It should be used in addition to the DOS and dBASE Manuals, and not instead of them.
Some (user) experience with dBASE as well as with DOS is required. To make modifications in the programs, basic knowledge of the dBASE application language is essential.

In the data dictionary the structure of ISIS is listed and files are briefly described. Subsequently a number of useful DOS and dBASE commands are discussed. Please note that for execution of dBASE commands dBASE should be started first. DOS commands can be executed from within dBASE too, use RUN<DOS command> or !<DOS command> (see dBASE Manual).

2 ISIS STRUCTURE

ISIS can be subdivided into:

system files	database files
.PRG files (programs)	ISIS????.DBF files (soils data)
.FRM files (format files)	CLIM????.DBF files (climatic data)
.LBL file (label file)	.NDX files (index files)
KEY?????.DBF files (conversion files)	

Information fixed, modifications only in dBASE (see part 2)

Information variable. File organization is handled by ISIS (system files). (see part 1)

All files and fields are listed and described in the Data Dictionary (appendix A).

PROGRAM STRUCTURE

ISIS consists of a number of relative small programs. These programs form a 5-level hierarchical system. ISIS is started by activating the general master program (isi00000.prg - Main Menu). This program may activate the second level programs (isi10000.prg -INPUT, isi20000.prg - OUTPUT, isi30000.prg - SELECTIONS, and isi40000.prg - EDIT). The second level programs may activate the third level programs (e.g. isi40000.prg may activate isi41000.prg - the SITE EDIT SCREEN), etc.

The hierarchical order is shown by the name of the program file, e.g.

```
1    isi00000.prg - MAIN MENU -   calls:
2    isi20000.prg - OUTPUT MENU - calls:
3    isi22000.prg - PRINT MENU -  calls:
4    isi22100.prg - PRINT SITE DATA 1 - calls:
5    isi22110.prg - PRINT CLIMATIC DATA - and
     isi22120.prg - PRINT SITE DATA 2
```

Such program files are often called procedures. In general they each have a well defined single task. This program structure makes it relatively simple to locate and/or modify program lines, or to add new programs.
The purpose of each program file is listed in the Data Dictionary.
The size of the individual program files never exceeds 5Kb, consequently they can all be loaded in the dBASE editor.

DATABASE STRUCTURE

The ISIS database consists of 15 datafiles. The file names and contents are listed below. The structure of each file is given in the Data Dictionary . There are several reasons why the database does not consist of one single data file:

- The maximum number of fields in a data file is 128 (limited by dBASE).
- The 'performance' of dBASE (and consequently ISIS) rapidly decreases with an increasing number of fields.
- This way the storage capacity is used as efficient as possible.

ISIS database structure

SITE DATA	isissite.dbf - site information
	isissite.dbt - site & profile remarks
	isisclst.dbf - linkage site -> climatic station
CLIMATIC DATA	climstat.dbf - climate station
	climdata.dbf - climatic data
SOIL PROFILE	isismor1.dbf - profile characteristics 1
	isismor2.dbf - profile characteristics 2
ANALYTICAL DATA	isisphys.dbf - physical analysis
	isischem.dbf - chemical analysis 1
	isisclel.dbf - elemental composition clay
	isissoel.dbf - elemental composition soil
	isissalt.dbf - soluble salts
	isismin.dbf - clay mineralogy
	isissmin.dbf - sand mineralogy
	isisanad.dbf - additional analysis (free format)

INDEX FILES

For each data file the corresponding index files (with a short description) are listed in the Data Dictionary.

3 BACKUP SYSTEM-FILES

All data files, key files, format files and program files should be backed up. The backups of the program, key, and format files are stored on the ISIS SYSTEM FILES BACKUP DISKETTE.
Updating of these backup files is necessary only after modifications are made in program, format or key files.

The data files however should be updated after each INPUT or EDIT session. Use the ISISBACK facility to update all ISIS- and CLIM- data files (.DBF and .DBT files).

Use the DOS BACKUP command to backup all system files.

- Type the following commands:

BACKUP C:\ISIS3*.PRG B:

(causes DOS to backup all PROGRAM files)

DOS returns with:

```
Insert backup diskette in drive B
Warning! Diskette files will be erased
Strike any key to continue..
```

Insert ISIS BACKUP DISKETTE SYSTEM FILES and press any key. DOS starts to backup the program files and displays the name of each file as it backs it up. After the procedure is completed and the computer is back in the DOS command mode enter:

BACKUP C:\ISIS3*.FRM B:/A

(causes DOS to backup the FORMAT files and add them to the program files which are already on the diskette)

BACKUP C:\ISIS3\KEY?????.DBF B:/A

(causes DOS to backup the KEY files and add them to the program and format files which are already on the diskette)

Single files are not overwritten in BACKUP, but added to the directory. Consequently it not possible to update only one file or one type of files, (e.g. only the program files or the format files) unless you first ERASE the appropriate files from the backup diskette.
In this case use the /A parameter to add backup files to the files already on the diskette. Otherwise all previously existing files may be erased.

For additional information consult your DOS Manual.

4 INDEX FILES (dBASE)

In dBASE the index files are not automatically opened when a data file is activated. Open the corresponding index files with SET INDEX TO before any modifications in the database are made with dBASE (dBASE Manual).

USE \isis3\isisphys (activate ISISPHYS.DBF)

SET INDEX TO physcode (opens PHYSCODE.NDX)

Now the active index file (in this case physcode.ndx) is updated whenever a change is made in the associated data file (in this case isisphys.dbf). ISIS searches the index files and not the data files. If the index files are not updated with the data files, ISIS will never find the new information. It is possible to activate more index files at the same time (consult your dBASE Manual).

Rebuild index files with REINDEX (consult your dBASE Manual) in case modifications were made without open index files.

USE \isis3\isisphys

SET INDEX TO physcode

REINDEX (rebuilds PHYSCODE.NDX)

5 SELECTIONS (dBASE)

With ISIS it is possible to make selections on a number of variables (see User Manual table 1). The results are displayed on screen or routed to the printer.
To write the results to another file, or to select on other variables or on combinations of three or more variables, you should use dBASE-commands e.g. COPY TO and LIST TO PRINT in combination with relational and logical operators.

Use COPY TO if the selected data should be written to a DBF file. Use COPY TO SDF if the data should be used in other (non-dBASE) programs.

Use LIST TO PRINT if only a print out of the results is required.

The use of the operators is explained in the dBASE Manual.

An example of such a selection procedure is:

> For instance all soil horizons with more than 50% clay, 10% fine sand and a bulk density less than 1.10 are required for statistical analysis.

Start dBASE and enter:

USE \ISIS3\ISISPHYS (this activates ISISPHYS)

COPY TO select FOR clay>50 .AND. s4=10 .AND. bulk<1.10
(This creates a **select**.dbf with all horizons that meet the selection requirements. The field-names (clay, s4, bulk, etc.) are listed in the Data Dictionary.

USE select (makes **select.dbf** the active file)

Check the contents of select.dbf

COPY to select SDF (creates a text file SELECT.TXT with all horizons with clay > 50%, fine sand=10% and a bulk density < 1.10)

You may now quit dBASE and use the **select.txt** text file.

6 DELETE RECORDS (dBASE)

Purpose: to clean the data files. for instance if a profile description is totally revised it might be useful to erase all existing data before entering the modified data. In general the EDIT SCREENS should be used.

Select the proper database (see Data Dictionary) and open the ISIS data file (USE).
Be sure you have an up-to-date backup of the data file concerned.

Open the corresponding index files (see Data Dictionary) with SET INDEX TO. see also PART 2.4 INDEX FILES).

Mark records for deletion with DELETE FOR e.g.:

DELETE FOR code="brall"	(marks all records with ISRIC code: brall for deletion)
DELETE FOR code="brall" .AND. type="3"	(marks the record with ISRIC code: brall and horizon number: 3 for deletion)

Check the results with the **LIST** command. The records marked for deletion are indicated with *(asterix).

Use **RECALL FOR** to reinstate records that are marked for deletion.

RECALL FOR code="brall" .AND. type="3"	(reinstates the record with ISRIC code:brall and horizon number 3)

Enter **PACK** to remove the records that are marked for deletion.

PACK	(deletes all marked records)

Please note that records, marked for deletion are only removed from the database after PACK is executed.

7 LIST DATABASE CONTENTS (dBASE)

Purpose: To obtain a printout of the contents of a data file. The printout is in tabular form and includes a heading and variable names.

Use the **REPORT FORM TO PRINT** command.

The printer should be set to 132 characters/line and 8 characters/inch. Use the DOS **MODE LPT1:132,8** command. If you are already in dBASE enter **RUN MODE LPT1:132,8**.

Activate the appropriate data file and enter:

REPORT FORM <name format file> TO PRINT

The data files and the corresponding format files are listed below. Data files with a large number of fields have more than one format file.

DATA FILES(.DBF)	FORMAT FILES (.FRM)				
ISISSITE	ISISSIT1	ISISSIT2	ISISSIT3	ISISSIT4	ISISSIT5
ISISMOR1	ISISMO11	ISISMO12	ISISMO13		
ISISMOR2	ISISMO21	ISISMO22			
ISISPHYS	ISISPHYS				
ISISCHEM	ISISCHEM				
ISISSOEL	ISISSOEL				
ISISCLEL	ISISCLEL				
ISISMIN	ISISMIN				
ISISSMIN	ISISSMIN				
ISISSALT	ISISSALT				
ISISANAD	ISISANAD				
CLIMDATA	CLIMDATA				

Use the FOR statement to print selections out of the database.
E.g.:

REPORT FORM <name format file> FOR code="brall" TO PRINT
(causes dBASE to print only the information of the soil with ISRIC code: brall).

8 COMBINE DATA FILES (dBASE).

Purpose: to obtain information out of different datafiles during the same session. This information may be stored in a new data file.

This procedure is very useful because for technical reasons the ISIS database consists of a number of relatively small databases.

Use the dBASE **SELECT** and **SET RELATION TO INTO** commands.

The files are linked according to unique key variable(s), the identifiers (see part 1). For information on the soil this is the ISRIC CODE (field name: CODE), for information on individual horizons or samples this is the ISRIC CODE and the horizon/sample number (field name: TYPE).

The file to which the connection is made should be indexed on the key variables. Use the corresponding ISIS index files (see Data Dictionary).

E.g.: A listing of all silt, clay and pH (H_2O) values is required.

- Silt and clay are stored in isisphys.dbf (fields:si,clay). pH (H_2O) is stored in isischem.dbf (field: phh2o).

SELECT 1	(selects work area 1)
USE isisphys	(opens isisphys in work area 1)
SELECT 2	(selects work area 2)
USE isischem	(opens isischem in work area 2)
SET INDEX TO chemcode	(opens index file; isischem is now indexed on CODE and TYPE).
SELECT 1	(selects work area 1 and makes isisphys the active file)
SET RELATION TO code+type INTO isischem	(links isisphys with isischem, on key variables CODE and TYPE)

Now the two files are linked and information can be obtained from both files simultaneously. The fields in the non-active work areas (in this case work area 2) are referred to as:
b->fieldname (in work area 2)
c->fieldname (in work area 3)
etcetera

To obtain a listing of the silt,clay and pH(H_2O):

LIST FIELDS code,type,si,clay,b->phh2o

A new file containing this information can be created by using the **REPLACE** command, in combination with **SET RELATION TO INTO**.

Create a new file (work area 1) with the following fields **CODE,TYPE** (see identifiers technical manual)
The **FIELD-LENGTH** and **FIELD-TYPE** (C, N or L) have to correspond with the length and type of the field you want to select. This new file is your **target** file

Append from the largest ISIS3-file. Define a condition, otherwise the entire file will be appended.
Open the **source file**(work area 2) with the proper **index file(s)**

Activate work area 1 and **set relation to** (identifiers see index file work area 2)

After having linked the two files you can copy the contents of the **source file** into the **target file** by using the **replace** command.

When the **target file** asks for data linked to a code which is not entered in the **source file** zeros are inserted for numerical fields and blanks for character fields. Because zero is a positive statement, these zeros have to be replaced with -1 or -0.1 (depending on the position of the decimal point)

By repeating this procedure with different **source file** you can add all types of data to the **target file**.
Please note that the **REPLACE** command does not automatically move the record pointer to the top of the file before it starts replacing. Therefore the **GO TOP** should be used.

Please note that the **SET RELATION TO INTO** command does not work properly when **SET EXACT** is switched on.

9 CHANGING THE STRUCTURE OF THE Data files (DELETE OR APPEND VARIABLES)

It is possible to delete or add new variables to the database. It should be stressed however that any change in the structure of the data files requires modifications of the program files (input and edit screens,selection procedures, print programs, etc.)

Do not work with the original data files, make a work copy first. Do not work in the \isis3 subdirectory!

Activate work file with USE and use the dBASE MODIFY STRUCTURE command to change the structure of the data file.
Press <CTRL> <N> to insert new fields and <CTRL> <U> to delete fields. For further information see dBASE Manual.

dBASE automatically creates a backup file with the extension BAK. Do not leave such a file in the \isis3 subdirectory. Use the DOS **ERASE** command to delete backup files. E.g.

ERASE c:\isis3*.bak (deletes all .BAK files in the \isis3 subdirectory).

10 MODIFY PROGRAMS

Use the DOS **TYPE** or the dBASE **TYPE TO PRINT** command to obtain a listing of a program file.

Modifications in the programs can be made in the dBASE editor or any other editor. Load a program file in the dBASE editor with the **MODIFY COMMAND** command. Close the dBASE editor and save the contents by pressing keys <CTRL> <W> simultaneously.

e.g. **MODIFY COMMAND isi41000** (loads isi41000.prg in the dBASE editor)

Please note that modifications made in one program may influence another program.

Any time you load a file in the editor dBASE automatically creates a backup file. Backup files have an extension .**BAK**. Be sure there are no backup files with the same name left in the \ISIS3 subdirectory.

To delete all .**BAK** files simultaneously use the DOS **ERASE** command:

ERASE c:\isis3*.bak (all .BAK files in subdirectory \isis3 are deleted).

11 EXECUTE PROGRAM FILES

Execute dBASE program files with the dBASE **DO** command
E.g.:

DO isi00000 (executes isi00000.prg - the ISIS main menu if the active directory is c:\isis3)

12 TRANSFER OF DATA (dBASE)

FROM ISIS TO STANDARD TEXT FILES (ASCII FILE)

Purpose: to make ISIS data suitable and readable to other programs. A complete data file as well as selections out of a data file are written to a text file.

***** Do not work with the original ISIS files, create a work file! *****

Copy the ISIS file to a diskette. Remember the ISIS files are stored in subdirectory \isis3.

Start dBASE and make the drive with the diskette the default drive. Be sure C:\ISIS3 is not the default.

Activate the copied file **USE**.

Copy this file to a standard text (ASCII) file with the **COPY TO SDF** command.

COPY TO b:<name1> SDF

This command causes dBASE to create a new file (name1.txt) in which each row contains a record and one or more (fixed) columns contain a field. The fields are no longer delimited, and field names are not copied, for instance:

NAME1.DBF

code	var1	var2	var3
eak11	12	23	Axa
bra18	1	45	vre
z 10	34	5	br
nl 12	67	98	sss

NAME1.TXT

```
eak111223Axa
bra11145vre
z  1034 5br
nl 126798sss
```

Consequently in NAME1.TXT the fields can only be identified by the column number(s). A printout of the file structure can be very helpful (**LIST STRUCTURE TO PRINT**).

Use the <scope>, <fields> and <for/while> parameters with the **COPY TO SDF** command to copy only specific fields or records to the text file. In other words use these parameters to select the proper data from the database.

E.g.:

COPY TO name1 FIELDS var1,var2 FOR code="bra11" SDF

(gives a text file named NAME1.TXT with the information on fields VAR1 and VAR2 of soil/monolith: bra11)

Use the logical operators .FOR., .AND., .NOT. to combine selection conditions.

APPEND DATA INTO ISIS FROM OTHER dBASE FILES

Purpose: To enter data into ISIS or CLIM data file (target file) from a non-ISIS or non-CLIM data file (source file).
The source file must have a structure similar to the target file.

Start dBASE and activate the ISIS data file and open the corresponding index file(s) with the **SET INDEX TO** command. Data files and index files are listed and described in the Data Dictionary.

The **APPEND FROM** command is used to copy records from the source file to the end of the active ISIS data file.

APPEND FROM <source file>

Only fields with the same field_name and field_type are copied. Please note that a correct transfer of data also requires similar field width and decimals.

Use the **FOR** statement to append only specific records:

APPEND FROM <sourcefile> FOR code="brall"
(Causes dBASE to append only the data of "brall" into the ISIS file)

This procedure does not check if the identifier is unique. Therefore check the contents of the target file before appending new data.

APPEND FROM NON-dBASE FILES

Purpose: To enter data into ISIS from standard text (ASCII) files. These text files may contain soil data from institutes that use another Data Base Management System.
The text files should have a PC or MS-DOS format.

Use the **APPEND FROM SDF/DELIMITED** command.

The structure of the ISIS (or any other dBASE) file should correspond with the contents of the columns of the ASCII file. You need an exact description of the contents of the ASCII files (variables and variable position).

Do not use the original ISIS file. Copy the structure to a workfile.

Use this workfile for the **APPEND FROM SDF/DELIMITED** procedure. If the contents of the workfile is satisfactory, the workfile should be appended to the end of the ISIS FILE.

If coded information is appended the codes should correspond with the codes in the GUIDELINES FOR THE DESCRIPTION AND CODING OF SOIL DATA (ISRIC Technical Paper 14).

Append to ISIS-/CLIM- files only if the corresponding index files are open.

WHY MEMO FILES (e.g. ISISSITE.DBT) GROW SO FAST?

GENERAL REMARKS of the site data are entered in "memo-fields". Like in Character-fields these can contain text, but "memo-fields" can consist of up to 4,000 characters
They occupy only 10 spaces in a database file, while the memo itself is kept in a separate disk file with the same name of the database file, but with the .DBT extension.
The memo-field in the .DBF file contains "the address" where dBASE can find the block with text in the **.DBT file.**

Each time you edit the GENERAL REMARKS (in the site data), at least one new 512-byte block is added to the existing ISISSITE.DBT file. If the entry exceeds 512 bytes, more blocks are added. The new version is placed on the end of the .DBT file and the pointer (or address) in the (ISISSITE.DBF) memo_field is updated to the new memo location. Previously occupied space is not recovered. The most important thing to remember is that every time you edit a memo field (GENERAL REMARKS in site data), the size of the .DBT file grows by at least the size of the memo field you are editing. This is a handicap of dBASEIII.

As you look for a solution to this ungainly growth of your memo files, note that file space is also not recovered when you DELETE or PACK your database file. Old data remains where it was until you perform a COPY TO<new file> or MODIFY STRUCTURE. The steps below illustrate a simple COPY TO and RENAME procedure you can use to reclame the unused space:

Use the DOS DIR command to know the size(in bytes) of the .DBF file and the .DBT file

```
* - - - Create a new copy of the .DBF and .DBT files.
USE ISISSITE
COPY TO Newfile
CLOSE DATABASES
*
* - - - Erase the original copies of each. (#1)
ERASE ISISSITE.DBF
ERASE ISISSITE.DBT
*
* - - - Rename the copies to the original file names.
RENAME Newfile.DBF TO ISISSITE.DBF
RENAME Newfile.DBT TO ISISSITE.DBT
```

COPY TO is the most important command in this sequence. It creates two new files, one called Newfile.DBF, and the other called Newfile.DBT. Omly the currently valid memo data is copied to the new .DBT file. In many cases, it will be considerably smaller than the original .DBT file (check with DOS DIR command).

#1 An alternate solution to ERASEing them is to save the old versions as backup copies of the original files as follows:

```
RENAME ISISSITE.DBF TO ISISSITE.BKU
RENAME ISISSITE.DBT TO ISISSITE.TBK
```

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APPENDIX

A: Data Dictionary
B: Soil Description
C: Installation Procedure

DATA DICTIONARY
.PRG FILES

SYSTEM	PROGRAM	REMARKS
ISIS	ISI00000	ISIS MAIN MENU
ISIS	ISI00001	ISIS PROCEDURE FILE
ISIS	ISI10000	INPUT MENU
ISIS	ISI11000	SITE INPUT SCREEN
ISIS	ISI12000	CLIMATE INPUT SCREEN #1
ISIS	ISI12100	CLIMATE INPUT SCREEN #2
ISIS	ISI13000	PROFILE INPUT SCREEN #1
ISIS	ISI13100	PROFILE INPUT SCREEN #2
ISIS	ISI14000	INPUT SCREEN PHYSICAL/CHEMICAL DATA
ISIS	ISI15000	INPUT ELEMENTAL COMPOSITION CLAY
ISIS	ISI16000	INPUT ELEMENTAL COMPOSITION SOIL
ISIS	ISI17000	INPUT SOLUBLE SALTS
ISIS	ISI18000	INPUT CLAY MINERAL
ISIS	ISI19000	INPUT SAND MINERAL
ISIS	ISI1A000	INPUT ADDITIONAL ANALYSIS
ISIS	ISI20000	OUTPUT MENU
ISIS	ISI21000	PRINT ON SCREEN
ISIS	ISI22000	PRINT MENU
ISIS	ISI22100	PRINT SITE INFO #1
ISIS	ISI22110	PRINT CLIMATE DATA
ISIS	ISI22120	PRINT SITE INFO #2
ISIS	ISI22130	STORE SITE VARIABLES
ISIS	ISI22200	PRINT PROFILE #1
ISIS	ISI22210	STORE PROFILE VARIABLES
ISIS	ISI22220	PRINT PROFILE #2
ISIS	ISI22230	PRINT PROFILE #3
ISIS	ISI22240	PRINT PROFILE #4
ISIS	ISI2XXX0	COLOR CONVERSION
ISIS	ISI22300	PRINT ANALYTICAL DATA
ISIS	ISI30000	SELECTION MENU
ISIS	ISI31000	SELECT ON PHYSICAL DATA
ISIS	ISI32000	SELECT ON CHEMICAL DATA
ISIS	ISI33000	SELECT ON PROFILE DATA
ISIS	ISI34000	SELECT ON SITE DATA
ISIS	ISI35000	SELECT ON CLASSIFICATION
ISIS	ISI36000	SELECT ON LOCATION
ISIS	ISI37000	SELECT ON LOCATION + CLASSIFICATION
ISIS	ISI40000	EDIT MENU
ISIS	ISI41000	EDIT SITE SCREEN
ISIS	ISI42000	EDIT CLIMATE SCREEN
ISIS	ISI43000	EDIT PROFILE SCREEN #1
ISIS	ISI43100	EDIT PROFILE SCREEN #2
ISIS	ISI44000	EDIT SCREEN PHYSICAL DATA
ISIS	ISI45000	EDIT SCREEN ELEMENTAL COMPOSITION CLAY
ISIS	ISI46000	EDIT SCREEN ELEMENTAL COMPOSITION SOIL
ISIS	ISI47000	EDIT SCREEN SALT
ISIS	ISI48000	EDIT SCREEN CLAY MINERAL
ISIS	ISI49000	EDIT SCREEN SAND MINERAL
ISIS	ISI4A000	EDIT SCREEN ADDITIONAL ANALYSIS
ISIS	ISI4B000	EDIT SCREEN CHEMICAL DATA

DATA DICTIONARY
.DBF FILES

SYSTEM	FILE	REMARKS	KEY
CLIM	CLIMDATA	DATA CLIMATE	STATCODE
CLIM	CLIMSTAT	CLIMATE STATIONS	STATCODE
ISIS	ISISCLST	MON.CODE + CLIM STAT	MON.CODE
ISIS	ISISSITE	DATA SITE	MON.CODE
ISIS	ISISCHEM	DATA CHEMICAL	MON+HOR.
ISIS	ISISCLEL	DATA ELEMENTAL COMP.CLAY	MON+HOR.
ISIS	ISISMIN	DATA CLAY MINERALS	MON+HOR.
ISIS	ISISMOR1	PROFILE DESCRIPTION 1	MON+HOR.
ISIS	ISISMOR2	PROFILE DESCRIPTION 2	MON+HOR.
ISIS	ISISPHYS	DATA PHYSICAL	MON+HOR.
ISIS	ISISSALT	DATA SOLUBLE SALTS	MON+HOR.
ISIS	ISISSOEL	DATA ELEMENTAL COMP.SOIL	MON+HOR.
ISIS	ISISSMIN	DATA SAND MINERALOGY	MON+HOR.
ISIS	ISISANAD	ADDITIONAL ANALYSIS	KEY
KEY	KEYBIOAC	BIOLOGICAL ACTIVITY	KEY
KEY	KEYBOUND	BOUNDARY	KEY
KEY	KEYCALC	FREE $CaCO_3$	KEY
KEY	KEYCLIM	CLIMATIC VARIABLES	KEY
KEY	KEYCONS	CONSISTENCY	KEY
KEY	KEYCOUN	COUNTRY	KEY
KEY	KEYCUTAN	CUTANS	KEY
KEY	KEYDIAG	DIAGNOSTIC FEATURES	KEY
KEY	KEYFAO	FAO SOIL UNITS	KEY
KEY	KEYHYDR	HYDROLOGICAL CHAR.	KEY
KEY	KEYINCL	INCLUSIONS	KEY
KEY	KEYLANDF	LANDFORMS	KEY
KEY	KEYLUT	LAND USE/CROPS	KEY
KEY	KEYMICRO	MICRORELIEF	KEY
KEY	KEYORG	ORGANIC MATERIAL	KEY
KEY	KEYPAN	PANS	KEY
KEY	KEYPAREN	COMPOSITION PARENT ROCK	KEY
KEY	KEYPORES	PORES	KEY
KEY	KEYROOTS	ROOTS	KEY
KEY	KEYRUN	RUNOFF	KEY
KEY	KEYSALT	SALT	KEY
KEY	KEYSIQUA	SIZE,QUANTITY, ABUNDANCE	KEY
KEY	KEYSLOPE	SLOPE CHARACTERISTICS	KEY
KEY	KEYSLPRO	SLOPE PROCES	KEY
KEY	KEYSTRUC	STRUCTURE	KEY
KEY	KEYSURF	SURFACE CHARACTERISTICS	KEY
KEY	KEYTEXT	FIELD TEXTURE	KEY
KEY	KEYUSFAM	USDA FAMILY CODES	KEY
KEY	KEYUSGRP	USDA GROUP CODES	KEY
KEY	KEYVEG	VEGETATION TYPE	KEY
KEY	KEYWEATH	WEATHERING	KEY

DATA DICTIONARY
.FRM FILES

SYSTEM	DBF_FILE	FRM_FILE	REMARKS
ISIS	ISISANAD	ANADPRNT	PRINT ADDITIONAL ANALYSIS
ISIS	ISISCHEM	CHEMPRNT	PRINT CHEMICAL INFO
ISIS	CLIMDATA	CLIMDATA	PRINTING CLIMATICAL DATA
ISIS	ISISCLEL	ELEMPRNT	PRINT ELEMENTAL COMPOSITION CLAY
ISIS	ISISSOEL	ELEMPRNT	PRINT ELEMENTAL COMPOSITION SOIL
ISIS	ISISANAD	ISISANAD	LISTING ADDITIONAL ANALYSIS
ISIS	ISISCHEM	ISISCHEM	LISTING CHEMICAL INFO
ISIS	ISISCHEM	ISISCHSE	PRINT CHEMICAL DATA SELECTION
ISIS	ISISCLEL	ISISCLEL	LISTING ELEMENTAL COMPOSITION CLAY
ISIS	ISISMIN	ISISMIN	LISTING MINERALOGY
ISIS	ISISMOR1	ISISMO11	LISTING PROFILE INFO #1
ISIS	ISISMOR1	ISISMO12	LISTING PROFILE INFO #2
ISIS	ISISMOR1	ISISMO13	LISTING PROFILE INFO #3
ISIS	ISISMOR2	ISISMO21	LISTING PROFILE INFO #4
ISIS	ISISMOR2	ISISMO22	LISTING PROFILE INFO #5
ISIS	ISISPHYS	ISISPHSE	PRINT PHYSICAL DATA SELECTION
ISIS	ISISPHYS	ISISPHYS	LISTING PHYSICAL INFO
ISIS	ISISMOR1	ISISPRSE	PRINT PROFILE DATA SELECTION
ISIS	ISISSALT	ISISSALT	LISTING SOLUBLE SALT
ISIS	ISISSITE	ISISSISE	PRINT SITE SELECTION
ISIS	ISISSITE	ISISSIT1	LISTING SITE INFO #1
ISIS	ISISSITE	ISISSIT2	LISTING SITE INFO #2
ISIS	ISISSITE	ISISSIT3	LISTING SITE INFO #3
ISIS	ISISSITE	ISISSIT4	LISTING SITE INFO #4
ISIS	ISISSITE	ISISSIT5	LISTING SITE INFO #5
ISIS	ISISSMIN	ISISSMIN	LISTING SAND MINERALOGY
ISIS	ISISSOEL	ISISSOEL	LISTING ELEMENTAL COMPOSITION SOIL
ISIS	ISISMIN	MINPRNT	PRINT MINERALOGY
ISIS	ISISPHYS	PHYSPRNT	PRINTING PHYSICAL INFO
ISIS	ISISSITE	REMARKS	PRINTING MEMO INFO
ISIS	ISISSALT	SALTPRNT	PRINT SOLUBLE SALTS
ISIS	ISISSMIN	SMINPRNT	PRINT SAND MINERALOGY

.LBL FILE

SYSTEM	DBF-FILE	LBL-FILE	REMARKS
ISIS	CLIMSTAT	STAT	LISTING CLIMATIC STATIONS

DATA DICTIONARY
.NDX FILES

SYSTEM	DBF_FILE	NDX_FILE	KEY
ISIS	ISISSITE	SITECODE	CODE
ISIS	ISISSITE	SITEFAO	FAO
ISIS	ISISSITE	SITEUSGG	USGG
ISIS	ISISMOR1	MOR1CODE	CODE+TYPE
ISIS	ISISMOR2	MOR2CODE	CODE+TYPE
ISIS	ISISPHYS	PHYSCODE	CODE+TYPE
ISIS	ISISCHEM	CHEMCODE	CODE+TYPE
ISIS	ISISSOEL	SOELCODE	CODE+TYPE
ISIS	ISISCLEL	CLELCODE	CODE+TYPE
ISIS	ISISSALT	SALTCODE	CODE+TYPE
ISIS	ISISMIN	MINCODE	CODE+TYPE
ISIS	ISISSMIN	SMINCODE	CODE+TYPE
ISIS	ISISANAD	ANADCODE	CODE+TYPE
ISIS	ISISCLST	ISISCLST	CODE+REF+STATCODE
ISIS	ISISCLST	ISISSTCO	STATCODE+CODE
ISIS	CLIMSTAT	STATSTCO	STATCODE
ISIS	CLIMSTAT	STATION	STATION
ISIS	CLIMDATA	DATASTCO	STATCODE+TYPE

DATA DICTIONARY

FIELDS

SYSTEM	DBF FILE	FIELD NAME	FIELD-TYPE	FIELD-LENGTH	FIELD-DECIM.	REMARKS
ISIS	ISISSITE	DATE	N	5	2	DATE OF DESCRIPTION
ISIS	ISISSITE	COUN	C	3	0	COUNTRY
ISIS	ISISSITE	CODE	C	5	0	ISRIC CODE
ISIS	ISISSITE	AUTH	C	20	0	AUTHOR
ISIS	ISISSITE	LOC	C	70	0	LOCATION
ISIS	ISISSITE	LATNS	C	1	0	LATITUDE N OR S
ISIS	ISISSITE	LATD	C	2	0	LATITUDE DEGREES
ISIS	ISISSITE	LATM	C	2	0	LATITUDE MINUTES
ISIS	ISISSITE	LATS	C	2	0	LATITUDE SECONDS
ISIS	ISISSITE	LONEW	C	1	0	LONGITUDE E OR W
ISIS	ISISSITE	LOND	C	3	0	LONGITUDE DEGREES
ISIS	ISISSITE	LONM	C	2	0	LONGITUDE MINUTES
ISIS	ISISSITE	LONS	C	2	0	LONGITUDE SECONDS
ISIS	ISISSITE	ALT	C	4	0	ALTITUDE
ISIS	ISISSITE	FAO	C	2	0	FAO SOIL UNIT
ISIS	ISISSITE	FAOSTAT	L	1	0	FINAL CLASSIFICATION
ISIS	ISISSITE	PHA	C	2	0	FAO SOIL PHASE
ISIS	ISISSITE	USGG	C	3	0	USDA GREAT GROUP
ISIS	ISISSITE	USSG	C	4	0	USDA SUBGROUP
ISIS	ISISSITE	USTX	C	3	0	USDA TEXTURE CLASS
ISIS	ISISSITE	USMIN	C	2	0	USDA MINERALOGY
ISIS	ISISSITE	STR	C	2	0	SOIL TEMP.REGIME
ISIS	ISISSITE	SMR	C	2	0	SOIL MOIST.REGIME
ISIS	ISISSITE	DICA1	C	2	0	DIAGN.HORIZONS 1
ISIS	ISISSITE	DICA2	C	2	0	DIAGN HORIZONS 2
ISIS	ISISSITE	DICA3	C	2	0	DIAGN HORIZONS 3
ISIS	ISISSITE	DICA4	C	2	0	DIAGN.FEATURES 1
ISIS	ISISSITE	DICA5	C	2	0	DIAGN FEATURES 2
ISIS	ISISSITE	LOCL	C	30	0	LOCAL CLASSIFICATION
ISIS	ISISSITE	CLIM	C	3	0	KOPPEN CLIMAT. CLASS
ISIS	ISISSITE	PAR	C	2	0	PARENT MATERIAL 1
ISIS	ISISSITE	PAR2	C	2	0	PARENT MATERIAL 2
ISIS	ISISSITE	MODE	C	1	0	MODE OF ACCUMULATION
ISIS	ISISSITE	MODE2	C	1	0	MODE OF ACCUMULATION 2
ISIS	ISISSITE	TEXT	C	2	0	TEXTURE 1
ISIS	ISISSITE	TEXT2	C	2	0	TEXTURE 2
ISIS	ISISSITE	DEPTH	C	3	0	DEPTH OF LITH. BOUND.
ISIS	ISISSITE	WEAT	C	1	0	DEGREE OF WEATHERING
ISIS	ISISSITE	WEAT2	C	1	0	DEGR.OF WEATHERING 2
ISIS	ISISSITE	REST	C	1	0	RESISTANCE 1
ISIS	ISISSITE	REST2	C	1	0	RESISTANCE 2
ISIS	ISISSITE	PARREM	C	20	0	REMARKS PARENT MATERIAL
ISIS	ISISSITE	LNDREG	C	2	0	LANDFORM (REGIONAL)
ISIS	ISISSITE	LNDTOP	C	1	0	TOPOGRAPHY
ISIS	ISISSITE	PHYS	C	30	0	PHYSIOGRAPHY
ISIS	ISISSITE	SLP	C	3	0	SLOPE GRADIENT
ISIS	ISISSITE	POS	C	1	0	POSITION ON SLOPE
ISIS	ISISSITE	SLF	C	1	0	SLOPE FORM
ISIS	ISISSITE	ASP	C	3	0	ASPECT
ISIS	ISISSITE	KND	C	1	0	MICRORELIEF TYPE
ISIS	ISISSITE	PTRN	C	1	0	MICRORELIEF PATTERN
ISIS	ISISSITE	VAR	C	3	0	MICRORELIEF HEIGHT
ISIS	ISISSITE	ROCK	C	2	0	ROCK OUTCROPS
ISIS	ISISSITE	STON	C	2	0	STONINESS

DATA DICTIONARY

FIELDS

SYSTEM	DBF FILE	FIELD NAME	FIELD-TYPE	FIELD-LENGTH	FIELD-DECIM.	REMARKS
ISIS	ISISSITE	STSI	C	2	0	SIZE OF STONES
ISIS	ISISSITE	STSH	C	1	0	SHAPE OF STONES
ISIS	ISISSITE	CRA	C	1	0	SURFACE CRACKING
ISIS	ISISSITE	SEA	C	1	0	SURFACE SEALING
ISIS	ISISSITE	SALT	C	1	0	EVIDENCE SALT
ISIS	ISISSITE	ALKALI	C	1	0	EVIDENCE ALKALI
ISIS	ISISSITE	SODE	C	3	0	SOIL DEPTH
ISIS	ISISSITE	WADE	C	3	0	WATER DEPTH
ISIS	ISISSITE	WAUP	C	3	0	MIN. WATER DEPTH
ISIS	ISISSITE	WALO	C	3	0	MAX. WATER DEPTH
ISIS	ISISSITE	WAKE	C	1	0	KIND OF WATERTABLE
ISIS	ISISSITE	STAUP	C	3	0	UPPER LIMIT STAGN.LR
ISIS	ISISSITE	STALO	C	3	0	LOWER LIMIT STAGN.LR
ISIS	ISISSITE	STAPE	C	1	0	PERMEABILTY
ISIS	ISISSITE	RUN	C	1	0	RUNOFF
ISIS	ISISSITE	FLFR	C	1	0	FLOODING FREQUENCY
ISIS	ISISSITE	FLNA	C	1	0	NATURE OF FLOOD WATER
ISIS	ISISSITE	DRAIN	C	2	0	DRAINAGE
ISIS	ISISSITE	MOIWU	C	3	0	MOIST.COND. WET UPPER
ISIS	ISISSITE	MOIWL	C	3	0	MOIST.COND. WET LOWER
ISIS	ISISSITE	MOIMU	C	3	0	MOIST.COND. MOIST UPPER
ISIS	ISISSITE	MOIML	C	3	0	MOIST.COND. MOIST LOWER
ISIS	ISISSITE	MOIDU	C	3	0	MOIST.COND. DRY UPPER
ISIS	ISISSITE	MOIDL	C	3	0	MOIST.COND. MOIST LOWER
ISIS	ISISSITE	ERT	C	1	0	EROSION TYPE 1
ISIS	ISISSITE	ERT2	C	1	0	EROSION TYPE 2
ISIS	ISISSITE	ERD	C	1	0	EROSION DEGREE 1
ISIS	ISISSITE	ERD2	C	1	0	EROSION DEGREE 2
ISIS	ISISSITE	AGGR	C	1	0	AGGRADATION
ISIS	ISISSITE	MASS	C	1	0	SLOPE STABILITY
ISIS	ISISSITE	LUT	C	2	0	LAND USE TYPE
ISIS	ISISSITE	CROP	C	3	0	LAND USE CROPS
ISIS	ISISSITE	IRR	C	1	0	LAND USE IRRIGATION
ISIS	ISISSITE	ROT	C	2	0	LAND USE ROTATION
ISIS	ISISSITE	IMP	C	2	0	LAND USE IMPROVEMENTS
ISIS	ISISSITE	VET	C	2	0	VEGETATION TYPE
ISIS	ISISSITE	VES	C	1	0	VEGETATION STATUS
ISIS	ISISSITE	VED	C	40	0	REMARKS VEG. + LAND USE
ISIS	ISISSITE	ADPC	L	1	0	LAB. DATA AVAILABLE
ISIS	ISISSITE	ADMM	L	1	0	MICRO MORPH. AVAILABLE
ISIS	ISISSITE	REMARKS	M	10	0	SITE + PROFILE REMARKS
ISIS	ISISMOR1	CODE	C	5	0	ISRIC CODE
ISIS	ISISMOR1	TYPE	C	1	0	HORIZON NUMBER
ISIS	ISISMOR1	SYMBOL	C	5	0	DESIGNATION
ISIS	ISISMOR1	TOP	N	3	0	TOP HORIZON
ISIS	ISISMOR1	BOT	N	3	0	BOTTOM HORIZON
ISIS	ISISMOR1	WID	C	1	0	BOUNDARY WIDTH
ISIS	ISISMOR1	TPG	C	1	0	BOUNDARY TOPOGRAPHY
ISIS	ISISMOR1	HUED	C	3	0	DRY COLOUR HUE
ISIS	ISISMOR1	VALD	C	2	0	DRY COLOUR VALUE
ISIS	ISISMOR1	CHROMD	C	2	0	DRY COLOUR CHROMA
ISIS	ISISMOR1	HUE	C	3	0	WET COLOUR HUE
ISIS	ISISMOR1	VALUE	C	2	0	WET COLOUR VALUE
ISIS	ISISMOR1	CHROMA	C	2	0	WET COLOUR CHROMA

DATA DICTIONARY

FIELDS

SYSTEM	DBF FILE	FIELD NAME	FIELD-TYPE	FIELD-LENGTH	FIELD-DECIM.	REMARKS
ISIS	ISISMOR1	FORM	C	2	0	STRUCTURE 1 FORM
ISIS	ISISMOR1	FORM2	C	2	0	STRUCTURE 2 FORM
ISIS	ISISMOR1	SIZE	C	2	0	STRUCTURE 1 SIZE
ISIS	ISISMOR1	SIZE2	C	2	0	STRUCTURE 2 SIZE
ISIS	ISISMOR1	GRADE	C	2	0	STRUCTURE 1 GRADE
ISIS	ISISMOR1	GRADE2	C	2	0	STRUCTURE 2 GRADE
ISIS	ISISMOR1	FORE	C	1	0	FORM 1 TO FORM 2
ISIS	ISISMOR1	FIELDTX	C	4	0	FIELD TEXTURE <2MM
ISIS	ISISMOR1	TXMOD	C	2	0	FIELD TEXTURE >2MM
ISIS	ISISMOR1	ORGK	C	1	0	ORGANIC MATTER KIND
ISIS	ISISMOR1	ORGD	C	1	0	ORGANIC MATTER DECOMP.
ISIS	ISISMOR1	COND	C	2	0	CONSISTENCE DRY
ISIS	ISISMOR1	CONM	C	2	0	CONSISTENCE MOIST
ISIS	ISISMOR1	CONWS	C	2	0	STICKINESS
ISIS	ISISMOR1	CONWP	C	2	0	PLASTICITY
ISIS	ISISMOR1	CONO	C	2	0	CONSISTENCE OTHER
ISIS	ISISMOR1	PORQ	C	1	0	PORES 1 QUANTITY (1.)
ISIS	ISISMOR1	PORQ1	C	1	0	PORES 1 QUANTITY (.1)
ISIS	ISISMOR1	PORQ2	C	1	0	PORES 2 QUANTITY (2.)
ISIS	ISISMOR1	PORQ21	C	1	0	PORES 2 QUANTITY (.2)
ISIS	ISISMOR1	PORS	C	1	0	PORES 1 SIZE (1.)
ISIS	ISISMOR1	PORS1	C	1	0	PORES 1 SIZE (.1)
ISIS	ISISMOR1	PORS2	C	1	0	PORES 2 SIZE (2.)
ISIS	ISISMOR1	PORS21	C	1	0	PORES 2 SIZE (.2)
ISIS	ISISMOR1	PORC	C	1	0	PORES CONTINUITY 1
ISIS	ISISMOR1	PORC2	C	1	0	PORES CONTINUITY 2
ISIS	ISISMOR1	PORD	C	1	0	PORES DISTRIBUTION 1
ISIS	ISISMOR1	PORD2	C	1	0	PORES DISTRIBUTION 2
ISIS	ISISMOR1	PORF	C	1	0	PORES FORM 1
ISIS	ISISMOR1	PORF2	C	1	0	PORES FORM 2
ISIS	ISISMOR1	PORO	C	1	0	PORES ORIENTATION 1
ISIS	ISISMOR1	PORO2	C	1	0	PORES ORIENTATION 2
ISIS	ISISMOR1	PORT	C	1	0	TOTAL POROSITY
ISIS	ISISMOR1	ROQ	C	1	0	ROOTS QUANTITY 1
ISIS	ISISMOR1	ROQ2	C	1	0	ROOTS QUANTITY 2
ISIS	ISISMOR1	ROS	C	1	0	ROOTS SIZE 1
ISIS	ISISMOR1	ROS2	C	1	0	ROOTS SIZE 2
ISIS	ISISMOR1	ROL	C	1	0	ROOTS LOCATION 1
ISIS	ISISMOR1	ROL2	C	1	0	ROOTS LOCATION 2
ISIS	ISISMOR1	EFFA	C	1	0	EFFERVESCENCE AGENT
ISIS	ISISMOR1	EFFC	C	1	0	FREE $CaCO_3$ CONTENT
ISIS	ISISMOR1	EFFL	C	1	0	EFFERVESCENCE LOCA.
ISIS	ISISMOR1	PHVAL	C	3	0	pH VALUE
ISIS	ISISMOR2	CODE	C	5	0	ISRIC CODE
ISIS	ISISMOR2	TYPE	C	1	0	HORIZON NUMBER
ISIS	ISISMOR2	MOTTA	C	1	0	MOTTLES ABUNDANCE 1
ISIS	ISISMOR2	MOTTA2	C	1	0	MOTTLES ABUNDANCE 2
ISIS	ISISMOR2	MOTTS	C	1	0	MOTTLES SIZE 1
ISIS	ISISMOR2	MOTTS2	C	1	0	MOTTLES SIZE 2
ISIS	ISISMOR2	MOTTC	C	1	0	MOTTLES CONTRAST 1
ISIS	ISISMOR2	MOTTC2	C	1	0	MOTTLES CONTRAST 2
ISIS	ISISMOR2	MOTTB	C	1	0	MOTTLES BOUNDARY 1
ISIS	ISISMOR2	MOTTB2	C	1	0	MOTTLES BOUNDARY 2
ISIS	ISISMOR2	MOTTHUE	C	3	0	MOTTLES COLOUR HUE 1

DATA DICTIONARY

FIELDS

SYSTEM	DBF FILE	FIELD NAME	FIELD-TYPE	FIELD-LENGTH	FIELD-DECIM.	REMARKS
ISIS	ISISMOR2	MOTTVAL	C	2	0	MOTTLES COLOUR VAL 1
ISIS	ISISMOR2	MOTTCH	C	2	0	MOTTLES COLOUR CHR 1
ISIS	ISISMOR2	MOTTHU2	C	3	0	MOTTLES COLOUR HUE 2
ISIS	ISISMOR2	MOTTVA2	C	2	0	MOTTLES COLOUR VAL 2
ISIS	ISISMOR2	MOTTCH2	C	2	0	MOTTLES COLOUR CHR 2
ISIS	ISISMOR2	CUTC	C	1	0	CUTANS QUANTITY
ISIS	ISISMOR2	CUTT	C	1	0	CUTANS THICKNESS
ISIS	ISISMOR2	CUTK	C	1	0	CUTANS KIND
ISIS	ISISMOR2	CUTL	C	2	0	CUTANS LOCATION
ISIS	ISISMOR2	INCQ	C	1	0	INCLUSION QUANTITY 1
ISIS	ISISMOR2	INCQ2	C	1	0	INCLUSION QUANTITY 2
ISIS	ISISMOR2	INCT	C	1	0	INCLUSION TYPE 1
ISIS	ISISMOR2	INCT2	C	1	0	INCLUSION TYPE 2
ISIS	ISISMOR2	INCSI	C	1	0	INCLUSION SIZE 1
ISIS	ISISMOR2	INCSI2	C	1	0	INCLUSION SIZE 2
ISIS	ISISMOR2	INCH	C	1	0	INCLUSION HARDNESS 1
ISIS	ISISMOR2	INCH2	C	1	0	INCLUSION HARDNESS 2
ISIS	ISISMOR2	INCSH	C	1	0	INCLUSION SHAPE 1
ISIS	ISISMOR2	INCSH2	C	1	0	INCLUSION SHAPE 2
ISIS	ISISMOR2	INCC	C	1	0	INCLUSION COMPOSIT.1
ISIS	ISISMOR2	INCC2	C	1	0	INCLUSION COMPOSIT.2
ISIS	ISISMOR2	ROCKQ	C	1	0	FRAGMENTS QUANTITY 1
ISIS	ISISMOR2	ROCKQ2	C	1	0	FRAGMENTS QUANTITY 2
ISIS	ISISMOR2	ROCKS	C	1	0	FRAGMENTS SIZE 1
ISIS	ISISMOR2	ROCKS2	C	1	0	FRAGMENTS SIZE 2
ISIS	ISISMOR2	ROCKW	C	1	0	FRAGMENTS WEATHERING 1
ISIS	ISISMOR2	ROCKW2	C	1	0	FRAGMENTS WEATHERING 2
ISIS	ISISMOR2	ROCKC	C	15	0	FRAGMENTS COMPOSITION
ISIS	ISISMOR2	PANK	C	1	0	PANS KIND
ISIS	ISISMOR2	PANC	C	1	0	PANS CEMENTATION
ISIS	ISISMOR2	PANY	C	1	0	PANS CONTINUITY
ISIS	ISISMOR2	PANS	C	1	0	PANS STRUCTURE
ISIS	ISISMOR2	BIOA	C	1	0	BIOLOGICAL ACTIVITY
ISIS	ISISMOR2	BIOK	C	1	0	BIOL. ACTIVITY KIND 1
ISIS	ISISMOR2	BIOK2	C	1	0	BIOL. ACTIVITY KIND 2
ISIS	ISISPHYS	CODE	C	5	0	ISRIC CODE
ISIS	ISISPHYS	TYPE	C	1	0	SAMPLE NUMBER
ISIS	ISISPHYS	TOP	N	3	0	DEPTH TOP SAMPLE
ISIS	ISISPHYS	BOT	N	3	0	DEPTH BOTTOM SAMPLE
ISIS	ISISPHYS	GRAVEL	N	2	0	COARSE FRACTION >2mm
ISIS	ISISPHYS	S1	N	2	0	VERY COARSE SAND 2000-1000μm
ISIS	ISISPHYS	S2	N	2	0	COARSE SAND 1000-500μm
ISIS	ISISPHYS	S3	N	2	0	MEDIUM SAND 500-250μm
ISIS	ISISPHYS	S4	N	2	0	FINE SAND 250-100μm
ISIS	ISISPHYS	S5	N	2	0	VERY FINE SAND 100-50μm
ISIS	ISISPHYS	TSA	N	2	0	TOTAL SAND FRACTION
ISIS	ISISPHYS	SI1	N	2	0	COARSE SILT 50-20μm
ISIS	ISISPHYS	SI2	N	2	0	FINE SILT 20-2μm
ISIS	ISISPHYS	TSI	N	2	0	TOTAL SILT
ISIS	ISISPHYS	CLAY	N	2	0	CLAY <2μm
ISIS	ISISPHYS	DISPCL	N	2	0	DISPERSABLE CLAY
ISIS	ISISPHYS	BULK	N	4	2	BULK DENSITY
ISIS	ISISPHYS	PF0	N	2	0	pF 0

DATA DICTIONARY

FIELDS

SYSTEM	DBF FILE	FIELD NAME	FIELD-TYPE	FIELD-LENGTH	FIELD-DECIM.	REMARKS
ISIS	ISISPHYS	PF1	N	2	0	pF 1
ISIS	ISISPHYS	PF15	N	2	0	pF 1.5
ISIS	ISISPHYS	PF2	N	2	0	pF 2
ISIS	ISISPHYS	PF23	N	2	0	pF 2.3
ISIS	ISISPHYS	PF27	N	2	0	pF 2.7
ISIS	ISISPHYS	PF34	N	2	0	pF 3.4
ISIS	ISISPHYS	PF42	N	2	0	pF 4.2
ISIS	ISISPHYS	SPECS	N	3	0	SPECIFIC SURFACE
ISIS	ISISCHEM	CODE	C	5	0	ISRIC CODE
ISIS	ISISCHEM	TYPE	C	1	0	SAMPLE NUMBER
ISIS	ISISCHEM	TOP	N	3	0	DEPTH TOP SAMPLE
ISIS	ISISCHEM	BOT	N	3	0	DEPTH BOTTOM SAMPLE
ISIS	ISISCHEM	PHH2O	N	4	1	pH H_2O
ISIS	ISISCHEM	PHKCL	N	4	1	pH KCl
ISIS	ISISCHEM	CACO3	N	4	1	FREE $CaCO_3$
ISIS	ISISCHEM	ORGC	N	4	1	ORGANIC C
ISIS	ISISCHEM	ORGN	N	4	2	ORGANIC N
ISIS	ISISCHEM	CA	N	4	1	Ca
ISIS	ISISCHEM	MG	N	4	1	Mg
ISIS	ISISCHEM	K	N	4	1	K
ISIS	ISISCHEM	NA	N	4	1	Na
ISIS	ISISCHEM	SUM	N	4	1	SUM CATIONS
ISIS	ISISCHEM	EXACID	N	4	1	EXCHANGEABLE ACIDITY
ISIS	ISISCHEM	EXAL	N	4	1	EXCHANGEABLE Al
ISIS	ISISCHEM	CECSOIL	N	4	1	CEC SOIL
ISIS	ISISCHEM	CECCLAY	N	3	0	CEC CLAY
ISIS	ISISCHEM	CECORG	N	3	0	CEC ORGANIC MATTER
ISIS	ISISCHEM	ECEC	N	4	1	ECEC
ISIS	ISISCHEM	BS	N	3	0	BASE SATURATION
ISIS	ISISCHEM	ALS	N	2	0	AL SATURATION
ISIS	ISISCHEM	EC	N	5	2	E.C.
ISIS	ISISSALT	CODE	C	5	0	ISRIC CODE
ISIS	ISISSALT	TYPE	C	1	0	SAMPLE NUMBER
ISIS	ISISSALT	CA	N	6	1	SOLUBLE SALTS Ca
ISIS	ISISSALT	MG	N	6	1	SOLUBLE SALTS Mg
ISIS	ISISSALT	K	N	6	1	SOLUBLE SALTS K
ISIS	ISISSALT	NA	N	6	1	SOLUBLE SALTS Na
ISIS	ISISSALT	CO	N	6	1	SOLUBLE SALTS CO
ISIS	ISISSALT	HCO3	N	6	1	SOLUBLE SALTS HCO_3
ISIS	ISISSALT	CL	N	6	1	SOLUBLE SALTS Cl
ISIS	ISISSALT	SO4	N	6	1	SOLUBLE SALTS SO_4
ISIS	ISISSALT	NO3	N	5	1	SOLUBLE SALTS NO_3
ISIS	ISISSALT	ECE	N	4	1	ECe
ISIS	ISISSALT	ECS	N	4	1	ECs
ISIS	ISISSALT	PH	N	3	1	pH
ISIS	ISISMIN	CODE	C	5	0	ISRIC CODE
ISIS	ISISMIN	TYPE	C	1	0	SAMPLE NUMBER
ISIS	ISISMIN	KAOL	C	1	0	KAOLINITE
ISIS	ISISMIN	MILL	C	1	0	MONTMOR./ILLITE
ISIS	ISISMIN	VERM	C	1	0	VERMICULITE
ISIS	ISISMIN	CHLOR	C	1	0	CHLORITE
ISIS	ISISMIN	SMEC	C	1	0	SMECTITE
ISIS	ISISMIN	HALL	C	1	0	HALLOYSITE
ISIS	ISISMIN	MIX	C	1	0	MIXTURE

DATA DICTIONARY

SYSTEM	DBF FILE	FIELDS FIELD NAME	FIELD-TYPE	FIELD-LENGTH	FIELD-DECIM.	REMARKS
ISIS	ISISMIN	QUAR	C	1	0	QUARTZITE
ISIS	ISISMIN	FELD	C	1	0	FELDSPATE
ISIS	ISISMIN	GIBB	C	1	0	GIBBSITE
ISIS	ISISMIN	GOET	C	1	0	GOETHITE
ISIS	ISISMIN	HEM	C	1	0	HEMATITE
ISIS	ISISMIN	AMMFE	N	4	1	Fe BY AMM.OXALATE
ISIS	ISISMIN	AMMAL	N	4	1	Al BY AMM.OXALATE
ISIS	ISISMIN	AMMSI	N	4	1	Si BY AMM.OXALATE
ISIS	ISISMIN	AMMMN	N	4	1	Mn BY AMM.OXALATE
ISIS	ISISMIN	FE	N	4	1	Fe BY Na DITHIONITE
ISIS	ISISMIN	AL	N	4	1	Al BY Na DITHIONITE
ISIS	ISISMIN	SI	N	4	1	Si BY Na-DITHIONITE
ISIS	ISISMIN	FEP	N	4	1	Fe BY PYROPHOSPHATE
ISIS	ISISMIN	ALP	N	4	1	Al BY PYROPHOSPHATE
ISIS	ISISMIN	CP	N	4	1	C BY PYROPHOSPHATE
ISIS	ISISSOEL	CODE	C	5	0	ISRIC CODE
ISIS	ISISSOEL	TYPE	C	1	0	SAMPLE NUMBER
ISIS	ISISSOEL	SIO2	N	4	1	SiO2 SOIL
ISIS	ISISSOEL	AL2O3	N	4	1	Al_2O_3 SOIL
ISIS	ISISSOEL	FE2O3	N	4	1	Fe_2O_3 SOIL
ISIS	ISISSOEL	CAO	N	5	2	CaO SOIL
ISIS	ISISSOEL	MGO	N	5	2	MgO SOIL
ISIS	ISISSOEL	K2O	N	5	2	K_2O SOIL
ISIS	ISISSOEL	NA2O	N	5	2	Na_2O SOIL
ISIS	ISISSOEL	TIO2	N	5	2	TiO_2 SOIL
ISIS	ISISSOEL	MNO2	N	5	2	MnO_2 SOIL
ISIS	ISISSOEL	P2O5	N	5	2	P_2O_5 SOIL
ISIS	ISISSOEL	RATIOSIAL	N	4	1	SiO_2/Al_2O_3 SOIL
ISIS	ISISSOEL	RATIOSIFE	N	4	1	SiO_2/Fe_2O_3 SOIL
ISIS	ISISSOEL	RATIOSIR	N	4	1	SiO_2/R_2O_3SOIL
ISIS	ISISSOEL	RATIOALFE	N	4	1	Al_2O_3/Fe_2O_3 SOIL
ISIS	ISISSOEL	IGN	N	4	1	IGNITION LOSS SOIL
ISIS	ISISANAD	CODE	C	5	0	ISRIC CODE
ISIS	ISISANAD	ADD	C	110	0	ADDITIONAL ANALYSIS
KEY	KEYBIOAC	BIO	C	20	0	BIOLOGIC ACT. CLASS
KEY	KEYBIOAC	KEY	C	1	0	BIOLOGIC ACT. KEY
KEY	KEYBOUND	BOUND	C	20	0	BOUNDARY CLASSES
KEY	KEYBOUND	KEY	C	1	0	BOUNDARY KEY
KEY	KEYCALC	CALC	C	20	0	$CaCO_3$ CLASSES
KEY	KEYCALC	KEY	C	1	0	$CaCO_3$ KEY
KEY	KEYCLIM	KEY	C	2	0	VARIABLE KEY
KEY	KEYCLIM	REFERENCE	C	20	0	CLIMATIC VARIABLE
KEY	KEYCONS	KEY	C	2	0	CONSISTENCE KEY
KEY	KEYCONS	CONS	C	20	0	CONSISTENCE CLASSES
KEY	KEYCOUN	KEY	C	3	0	COUNTRY KEY
KEY	KEYCOUN	COUNTRY	C	20	0	COUNTRY NAME
KEY	KEYCUTAN	KEY	C	2	0	CUTAN KEY
KEY	KEYCUTAN	CUTAN	C	25	0	CUTAN CLASSES
KEY	KEYDIAG	KEY	C	2	0	DIAGN.FEATURES HORIZNS
KEY	KEYDIAG	DIAG	C	25	0	DIAGN.FEATURES HORIZNS
KEY	KEYFAO	KEY	C	2	0	FAO SOIL UNIT KEY
KEY	KEYFAO	UNIT	C	20	0	FAO SOIL UNIT
KEY	KEYHYDR	CLASS	C	25	0	HYDROLOGIC CLASSES
KEY	KEYHYDR	KEY	C	2	0	HYDROLOGIC CLASSKEY

DATA DICTIONARY

FIELDS

SYSTEM	DBF FILE	FIELD NAME	FIELD-TYPE	FIELD-LENGTH	FIELD-DECIM.	REMARKS
KEY	KEYINCL	KEY	C	1	0	INCLUSION KEY
KEY	KEYINCL	INCL	C	18	0	INCLUSION CLASSES
KEY	KEYLANDF	KEY	C	2	0	LANDFORM KEY
KEY	KEYLANDF	LANDFORM	C	25	0	LANDFORM
KEY	KEYLUT	KEY	C	3	0	LAND USE KEY
KEY	KEYLUT	USE	C	30	0	LAND USE CLASSES
KEY	KEYMICRO	KEY	C	2	0	MICRORELIEF KEY
KEY	KEYMICRO	MICRO	C	20	0	MICRORELIEF
KEY	KEYORG	KEY	C	1	0	ORGANIC MATTER KEY
KEY	KEYORG	ORG	C	20	0	ORGANIC MATTER CLASS
KEY	KEYPAN	KEY	C	1	0	PANS KEY
KEY	KEYPAN	PAN	C	20	0	PANS CLASSES
KEY	KEYPAREN	KEY	C	2	0	PARENT ROCK KEY
KEY	KEYPAREN	PARENT	C	30	0	PARENT ROCK
KEY	KEYPORES	KEY	C	1	0	PORE KEY
KEY	KEYPORES	PORE	C	17	0	PORE CLASSES
KEY	KEYROOTS	KEY	C	1	0	ROOTS KEY
KEY	KEYROOTS	ROOT	C	30	0	ROOTS CLASSES
KEY	KEYRUN	KEY	C	1	0	RUNOFF CLASS KEY
KEY	KEYRUN	RUNOFF	C	10	0	RUNOFF CLASS
KEY	KEYSALT	KEY	C	1	0	SALT CLASS KEY
KEY	KEYSALT	SLT	C	10	0	SALT CLASS
KEY	KEYSIQUA	QUANTITY	C	15	0	QUANTITY CLASS
KEY	KEYSIQUA	QUCO	C	1	0	QUANTITY CLASS KEY
KEY	KEYSIQUA	SHACO	C	1	0	SHAPE CLASS KEY
KEY	KEYSIQUA	SHAPE	C	20	0	SHAPE KEY
KEY	KEYSIQUA	SICO	C	1	0	SIZE CLASS KEY
KEY	KEYSIQUA	SIZE	C	20	0	SIZE CLASS
KEY	KEYSLOPE	KEY	C	1	0	SLOPE CLASS KEY
KEY	KEYSLOPE	PHYS	C	15	0	SLOPE CLASSES
KEY	KEYSLPRO	KEY	C	1	0	SLOPE PROCESS KEY
KEY	KEYSLPRO	TYPE	C	15	0	SLOPE PROCESS TYPE
KEY	KEYSTRUC	KEY	C	2	0	STRUCTURE KEY
KEY	KEYSTRUC	STRUCT	C	20	0	STRUCTURE CLASSES
KEY	KEYSURF	KEY	C	1	0	SURF.CHAR.KEY
KEY	KEYSURF	SURF	C	14	0	SURFACE CHARACTERISTICS
KEY	KEYTEXT	KEY	C	4	0	TEXTURE KEY
KEY	KEYTEXT	TEXT	C	20	0	TEXTURE CLASSES
KEY	KEYUSFAM	KEY	C	3	0	USDA FAMILY CLASS KEY
KEY	KEYUSFAM	DIAGNOSTIC	C	25	0	USDA FAMILY CLASSES
KEY	KEYUSGRP	KEY	C	4	0	USDA GREAT GROUP KEY
KEY	KEYUSGRP	GROUP	C	28	0	USDA GREAT GROUP
KEY	KEYVEG	KEY	C	2	0	VEGETATION KEY
KEY	KEYVEG	VEG	C	30	0	VEGETATION CLASSES
KEY	KEYWEATH	KEY	C	1	0	WEATHERING CLASS KEY
KEY	KEYWEATH	WEAT	C	18	0	WEATHERING CLASS
ISIS	ISISCLST	CODE	C	5	0	ISRIC CODE
ISIS	ISISCLST	STATCODE	C	5	0	STATION CODE
ISIS	ISISCLST	DIST	C	3	0	DISTANCE FROM SITE
ISIS	ISISCLST	DIR	C	3	0	DIRECTION FROM SITE
ISIS	ISISCLST	REF	C	1	0	REFERENCE
CLIM	CLIMSTAT	STATCODE	C	5	0	STATION CODE
CLIM	CLIMSTAT	STATION	C	20	0	STATION NAME
CLIM	CLIMSTAT	COUNTRY	C	3	0	COUNTRY

DATA DICTIONARY
FIELDS

SYSTEM	DBF FILE	FIELD NAME	FIELD-TYPE	FIELD-LENGTH	FIELD-DECIM.	REMARKS
CLIM	CLIMSTAT	LONEW	C	1	0	LONGITUDE E OR W
CLIM	CLIMSTAT	LOND	C	3	0	LONGITUDE DEGREES
CLIM	CLIMSTAT	LONM	C	2	0	LONGITUDE MINUTES
CLIM	CLIMSTAT	LATNS	C	1	0	LATITUDE N OR S
CLIM	CLIMSTAT	LATD	C	2	0	LATITUDE DEGREES
CLIM	CLIMSTAT	LATM	C	2	0	LATITUDE MINUTES
CLIM	CLIMSTAT	ALT	C	4	0	ALTITUDE
CLIM	CLIMDATA	STATCODE	C	5	0	STATION CODE
CLIM	CLIMDATA	TYPE	C	2	0	DATA TYPE
CLIM	CLIMDATA	YEAR	C	2	0	NR YEARS OF RECORD
CLIM	CLIMDATA	ANNUAL	N	5	1	MEAN ANNUAL YEAR
CLIM	CLIMDATA	JAN	N	5	1	DATA JANUARY
CLIM	CLIMDATA	FEB	N	5	1	DATA FEBRUARY
CLIM	CLIMDATA	MAR	N	5	1	DATA MARCH
CLIM	CLIMDATA	APR	N	5	1	DATA APRIL
CLIM	CLIMDATA	MAY	N	5	1	DATA MAY
CLIM	CLIMDATA	JUN	N	5	1	DATA JUNE
CLIM	CLIMDATA	JUL	N	5	1	DATA JULY
CLIM	CLIMDATA	AUG	N	5	1	DATA AUGUST
CLIM	CLIMDATA	SEP	N	5	1	DATA SEPTEMBER
CLIM	CLIMDATA	OCT	N	5	1	DATA OCTOBER
CLIM	CLIMDATA	NOV	N	5	1	DATA NOVEMBER
CLIM	CLIMDATA	DEC	N	5	1	DATA DECEMBER
ISIS	ISISSMIN	CODE	C	5	0	ISRIC CODE
ISIS	ISISSMIN	TYPE	C	1	0	SAMPLE NUMBER
ISIS	ISISSMIN	LF	N	2	0	LIGHT FRACTION
ISIS	ISISSMIN	HF	N	2	0	HEAVY FRACTION
ISIS	ISISSMIN	QUARTZ	N	2	0	QUARTZ
ISIS	ISISSMIN	FELD	N	2	0	FELDSPAR
ISIS	ISISSMIN	MICA	N	2	0	MICA
ISIS	ISISSMIN	AA	N	2	0	MINERAL:A
ISIS	ISISSMIN	BB	N	2	0	MINERAL:B
ISIS	ISISSMIN	CC	N	2	0	MINERAL:C
ISIS	ISISSMIN	DD	N	2	0	MINERAL:D
ISIS	ISISSMIN	EE	N	2	0	MINERAL:E
ISIS	ISISSMIN	FF	N	2	0	MINERAL:F
ISIS	ISISSMIN	GG	N	2	0	MINERAL:G
ISIS	ISISCLEL	CODE	C	5	0	ISRIC CODE
ISIS	ISISCLEL	TYPE	C	1	0	SAMPLE NUMBER
ISIS	ISISCLEL	SIO2	N	4	1	SiO_2 CLAY
ISIS	ISISCLEL	AL2O3	N	4	1	Al_2O_3 CLAY
ISIS	ISISCLEL	FE2O3	N	4	1	Fe_2O_3 CLAY
ISIS	ISISCLEL	CAO	N	5	2	CaO CLAY
ISIS	ISISCLEL	MGO	N	5	2	MgO CLAY
ISIS	ISISCLEL	K2O	N	5	2	K_2O CLAY
ISIS	ISISCLEL	NA2O	N	5	2	Na_2O CLAY
ISIS	ISISCLEL	TIO2	N	5	2	TiO_2 CLAY
ISIS	ISISCLEL	MNO2	N	5	2	MnO_2 CLAY
ISIS	ISISCLEL	P2O5	N	5	2	P_2O_5 CLAY
ISIS	ISISCLEL	RATIOSIAL	N	4	1	SiO_2/Al_2O_3 CLAY
ISIS	ISISCLEL	RATIOSIFE	N	4	1	SiO_2/Fe_2O_3 CLAY
ISIS	ISISCLEL	RATIOSIR	N	4	1	SiO_2/R_2O_3 CLAY
ISIS	ISISCLEL	RATIOALFE	N	4	1	Al_2O_3/Fe_2O_3 CLAY
ISIS	ISISCLEL	IGN	N	4	1	IGNITION LOSS CLAY

ISRIC SOIL DESCRIPTION FORM FOR CODED INFORMATION ISRIC CODE |EC.01|

DATE |04.87| COUNTRY |EC.| AUTH. |KAUFFMAN/del Posso|

LOCATION |Ecuador, Pinchincha, Cajambe, about 1 km of Cajambe|

LATITUDE |N: 0: 1: "| LONGITUDE |W: 78: 7: "| ALTITUDE |2900|

CLASSIFICATION

FAO: SOIL UNIT |Tm| FINAL CLASS, (Y/N) |N| PHASE | |

USDA/SCS: GREAT GROUP |ind| SUBGROUP |aa|

TEXTURE |068| MINERALOGY | | STR |it| SMR |ud|

DIAGNOSTIC HORIZONS I |mo| II | | III | |

(OTHER) DIAGNOSTIC CRITERIA I |Am| II |du|

LOCAL CLASS.: |

CLIMATE KÖPPEN |Cw|

STATION |INIAP St. Catalina| ALTITUDE |3085|

LATITUDE |S: 00: 22: "| LONGITUDE |W: 78: 34: "| DISTANCE |50|

DIRECTION |SE| RELEVANCE |M|

DATA KIND:				
J				
F				
M				
A				
M				
J				
J				
A				
S				
O				
N				
D				
ANNUAL				
PERIOD (YEARS)				

PARENT MATERIAL / PARENT ROCK

I MODE |h| DERIVED FROM |e.2| TEXTURE | | WEATHERING | |

II | | | | | |

RESISTANCE I | |

II | | DEPTH | |

REMARKS |Ash and Lapilli|

EFFECTIVE SOIL DEPTH (cm) |75|

GEOMORPHOLOGY ISRIC CODE |EC :01|

REGIONAL LANDFORM |MO| TOPOGRAPHY |M|

PHYS.UNIT |Footslope mountain|

POSITION OF SITE |l|

SLOPE GRADIENT (%) |14| FORM |X| ASPECT |e|

MICRORELIEF, SURFACE CHARACTERISTICS, ALKALI/SALT

KIND | | PATTERN | | HEIGHT (cm) | |

ROCKOUTCROPS |0| STONINESS |0| SIZE (cm) | | SHAPE | |

CRACKING |0| SLAKING/CRUSTING |0| ALKALI |0| SALT |0|

HYDROLOGY

WATER TABLE: KIND |N| DEPTH (cm) | | FLUCTUATION (cm) FROM | |
TO | |

SLOW PERMEABLE LAYER: FROM |75| TO |?| (cm) PERMEABILITY |S|

FLOODING: FREQUENCY |n| NATURE | | RUN OFF |r| DRAINAGE CLASS |3,4|

MOISTURE CONDITIONS PROFILE (cm):

DRY	FROM		TO	
MOIST	FROM	0	TO	130
WET	FROM		TO	

DENUDATION AND AGGRADATION

SOIL EROSION: DEGREE I |r| TYPE I |S|
II |S| TYPE II |m| AGGRADATION | | SLOPE STABILITY |0|

LAND USE AND VEGETATION

LUT |AM| CROP |CEM| IRRIGATION |S| ROTATION |CC|

IMPROVEMENTS | | VEGETATION TYPE | | STATUS | |

REMARKS: |maize, potato, barley, trigo, beans, Lupinus|

GENERAL REMARKS ON SITE AND PROFILE: |Effective soil depth depends on the depth of the "Cangahua" layer (= 2C horizon), the latter depends on the physiographic position of the site. The effective depth may range from very shallow to deep. "Cangahua is the local name for the hard, consolidated ash layer. Especially the first 20 to 30cm of the Cangahua layer has blackish mottles, which upon close examination appear to be dark coloured continuous thin coatings on faces on peds. The Cangahua is hard and difficult to dig or cut,|

256 CHARACTERS + BLANKS

PHOTOGRAPHS / SLIDES: SUBJECT: LA SU PR PD VE CR LU ER XX

PROFILE CHARACTERISTICS ISRIC CODE EC : 01

	1	2	3
HORIZON NUMBER	1	2	3
DESIGNATION	Ap	Ahg	Bg
DEPTH up/low	0 / 17	17 / 40	40 / 75
BOUNDARY wi/to	g / S	g / S	g / S
COLOUR dry	2.0.0: 5.0: 3.0	2.0.0: 5.0: 3.0	2.0.0: 5.0: 2.0
COLOUR moist	2.0.0: 3.0: 3.0	2.0.0: 3.0: 3.0	2.0.0: 3.0: 2.0
TXT <2mm >2mm	Lsa /	Lsa /	L /
ORG. MAT. ki/de	/	/	/
STRUCT 1/2 grade	1 WE 2 WC	1 WE 2 WC	1 MO 2
STRUCT 1/2 size	1 F.M 2	1 F.M 2	1 M.E 2
STRUCT 1/2 form	1 S.B 2 P.M	1 S.B 2 P.M	1 S.B 2
STRUCT form 1->2	A	A	
CONSIST. dry/mo	S.O / V.F	S.O / V.F	S.H / F.R
CONSIST. sti/pla (wet)	n.S / n.P	n.S / n.P	S.S / S.P
CONSIST. other	/	/	/
PORES 1 qu/si	C / V	M / V.F	M / V.M
PORES 1 fo/or/co/di	T R / /	T R / /	T R / /
PORES 2 qu/si	/ /	/ /	/ /
PORES 2 fo/or/co/di	/ / / /	/ / / /	/ / / /
TOTAL POROSITY			
ROOTS 1 qu/si/lo	M V T	F V T	F V T
ROOTS 2 qu/si/lo	M F /	/ / /	/ / /
$CaCO_3$ ag/cl/lo	/ / /	/ / /	/ / /
pH value/method	/	/	/
MOTTLES 1/2 ab	1 / 2 /	1 / 2 /	1 / 2 /
MOTTLES 1/2 si	1 / 2 /	1 / 2 /	1 / 2 /
MOTTLES 1/2 co	1 / 2 /	1 / 2 /	1 / 2 /
MOTTLES 1/2 bo	1 / 2 /	1 / 2 /	1 / 2 /
MOTTLES col 1	/ : : /	/ : : /	/ : : /
MOTTLES col 2	/ : : /	/ : : /	/ : : /
CUTANS q/t/k/l	/ / / /	/ / / /	/ / / /
INCLUSIONS 1/2 qu	1 / 2 /	1 / 2 /	1 / 2 /
INCLUSIONS 1/2 ty	1 / 2 /	1 / 2 /	1 / 2 /
INCLUSIONS 1/2 si	1 / 2 /	1 / 2 /	1 / 2 /
INCLUSIONS 1/2 ha	1 / 2 /	1 / 2 /	1 / 2 /
INCLUSIONS 1/2 sh	1 / 2 /	1 / 2 /	1 / 2 /
INCLUSIONS 1/2 co	1 / 2 /	1 / 2 /	1 / 2 /
ROCK 1/2 qu	1 / 2 /	1 / 2 /	1 / 2 /
ROCK 1/2 si	1 / 2 /	1 / 2 /	1 / 2 /
ROCK 1/2 we	1 / 2 /	1 / 2 /	1 / 2 /
ROCK nature 1	/	/	/
ROCK nature 2	/	/	/
PANS k/ce/co/s	/ / / /	/ / / /	/ / / /
BIOL.ACT. ab/ki	/ / /	/ / /	/ / /

ISRIC CODE EC : 01

4

2C

75 130

2.0.0:5.0:4.0
2.0.0:3.0:3.0

L

1 S.C 2 M.O
1 M.E
1 M.A 2 S.B
F

V.H F.i
S.S S.p

C V
T R

1 C
1 m
1 d
1 c

D W C m

PROFILE SKETCH

monolith number: EC 01 country: ECUADOR soil description ISRIC 10/19/88

CLASSIFICATION FAO/UNESCO,1974: eutric cambisol, duripan phase (Tent. class.)
USDA,1975: ustropept typic, loamy, isothermic
Diagnostic horizons: ochric, duripan
(other) Diagn. criteria:
Local classification: Suelo de Cangahua

LOCATION : Ecuador, Pichincha, Cayambe, about 1 km W of Cayambe
: Latitude: 0 1 N Longitude: 78 7 W Altitude: 2900 (m.a.s.l.)
AUTHOR(S) - DATE (mm.yy) : Kauffman/Posso - 4.87

GENERAL LANDFORM : vulcano Topography: mountainous
PHYSIOGRAPHIC UNIT : footslope mountain
SLOPE Gradient/aspect/form: 14 % e complex
POSITION OF SITE : lower slope
MICRO RELIEF Kind:
SURFACE CHAR. Rockoutcrops: none Stoniness: none
Cracking: nil Sealing: nil Salt: nil Alkali: nil
SLOPE PROCESSES Soil erosion: moderate sheet and slight rill Aggradation: nil

PARENT MATERIAL I : ejecta ash Derived from: tuff Texture:
Remarks: "cangahua" tuff

EFFECTIVE SOIL DEPTH(cm) : 75

WATER TABLE Depth(cm): Kind: no watertable observed
DRAINAGE : moderately well
PERMEABILITY : slow Slow permeable layer from (cm): 75 to: ?
FLOODING frequency: nil Run off: rapid
MOISTURE CONDITIONS PROFILE : 0 - 130 cm moist

LAND USE : medium level arable farming, maize, seasonly irrigated, crop rotation continuous
VEGETATION Structure:
Landuse/vegetation remarks: maize,potato,barley,trigo,beans,Lupinus*

CLIMATE koppen: Cw Soil Moisture Regime: ustic
Station: QUITO -----0 9 S/78 29 W;2811 (m.a.s.l); 50 km SE from site. Relevance: moderate

QUITO	Period	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
EP penman		90	84	91	83	81	79	88	99	94	94	88	88	1059
Rel. Hum.(%)		48	46	34	37	38	43	47	61	47	47	50	46	45
Precipitation (mm)	75	114	127	150	171	122	47	20	23	77	125	108	101	1185
T mean (C)	30	15.0	15.0	15.0	14.7	14.7	14.5	14.5	15.0	15.0	15.0	14.7	15.0	14.8
T max (C)		22.2	21.7	21.7	21.1	21.1	21.7	22.2	22.8	22.8	22.2	22.2	22.2	22.0
T min (C)		17.6	17.4	17.4	17.0	17.0	17.1	17.3	17.8	17.8	17.6	17.4	17.6	17.4
windspeed (m/sec)		0.4	0.4	0.4	0.4	0.5	0.6	0.8	0.8	0.6	0.4	0.4	0.4	0.5

PROFILE DESCRIPTION

Ap 0- 17cm 10.0YR 3.0/3.0 moist; 10.0YR 5.0/3.0 dry; sandy loam; fine to medium weak subangular blocky and weakly coherent porous massive; non sticky non plastic very friable soft; common very fine random tubular pores; many very fine roots throughout and many fine roots throughout; gradual smooth boundary to

Ahg 17- 40cm 10.0YR 3.0/3.0 moist; 10.0YR 5.0/3.0 dry; sandy loam; fine to medium weak subangular blocky and weakly coherent porous massive; non sticky non plastic very friable soft; common medium distinct clear mottles; many very fine/fine random tubular pores; few very fine roots throughout; abrupt smooth boundary to

Bg 40- 75cm 10.0YR 3.0/2.0 moist; 10.0YR 5.0/2.0 dry; loam; medium moderate subangular blocky; slightly sticky slightly plastic friable slightly hard; common medium distinct clear mottles; many very fine/medium random tubular pores; few very fine roots throughout; abrupt smooth boundary to

2C 75-130cm 10.0YR 3.0/3.0 moist; 10.0YR 5.0/4.0 dry; loam; strongly coherent massive into medium moderate subangular blocky; slightly sticky slightly plastic firm very hard; common/very few fine/medium/coarse/ pores; weakly cemented continuous massive duripan;

REMARKS:

Effective soil depth is controlled by the depth of the "Cangahua" layer (=2C horizon), the latter depends on the physiographic position of the site. The effective depth may range from very shallow to deep. "Cangahua" is the local name for the hard, consolidated ash layer. Especially the first 20 to 30 cm of the Cangahua has blackish mottles, which upon close examination appear to be dark coloured continuous thin coatings on faces of peds. The Cangahua is hard and difficult to dig or cut, however, a piece can be easily broken in subangular blocks. The genesis of the Cangahua is controversial. The cementation is probably of geogenetic and pedogenetic nature. The soil was originally classified as mollic Andosol, however the bulk density is much too high and also the presence of a mollic horizon is not convincing.
* Lupinus alba

monolith number: EC 01 analytical data <missing value = -1> ISRIC: 10/19/88

NO	TOP	BOT	>2 mm	2000 1000	1000 500	500 250	250 100	100 50	TOT	50 20	20 2	<2 um	DISP	BULK DENS	pF- 0.0	1.0	1.5	2.0	2.3	2.7	3.4	4.2	SPEC SURF
1	0	17	-1	1	4	11	30	16	62	14	15	9	-1	1.42	41	41	34	28	0	21	14	12	-1
2	17	40	-1	1	3	9	28	15	56	17	17	10	-1	0.00	0	0	0	0	0	0	0	0	-1
3	40	75	-1	1	4	7	21	13	46	15	22	18	-1	1.43	41	40	38	35	0	31	26	24	-1
4	75	130	-1	6	11	10	14	10	51	14	22	14	-1	1.31	45	45	42	40	0	37	29	27	-1

No.	pH- H2O	pH- KCl	CaCO3 %	ORG- C %	MAT. N %	EXCH CAT. Ca	Mg	K	Na	sum meq	EXCH AC. H+Al /100g-	Al	CEC soil	clay	OrgC	ECEC	BASE SAT %	Al SAT %	EC 2.5 mS/cm
1	5.7	4.8	-1.0	1.1	0.10	3.8	1.3	0.1	0.1	5.3	-1.0	-1.0	5.9	-1	-1	-1.0	91	-1	0.18
2	6.8	5.3	1.2	0.6	0.06	4.9	2.1	0.2	0.1	7.3	-1.0	-1.0	7.3	-1	-1	-1.0	99	-1	0.04
3	7.0	5.4	1.2	0.6	0.05	7.0	4.1	0.5	0.7	12.3	-1.0	-1.0	11.4	-1	-1	-1.0	100	-1	0.06
4	7.3	5.5	1.4	0.3	0.04	8.4	5.8	0.9	0.3	15.4	-1.0	-1.0	14.7	-1	-1	-1.0	100	-1	0.05

CLAY MINERALOGY < 1 very weak, 2 weak, 3 medium, 4 strong, 5 very strong > EXTRACT. Fe Al Si

No	MICA/ ILL	VERM	CHLOR	SMEC	KAOL	HALL	MIX*	QUAR	FELD	GIBB	GOET	HEM	FEo	ALo	SIo	MNo	FEd	ALd	SId	FEp	ALp	C
1				2		2		1	2				0.3	0.1	0.0	-1.0	0.5	0.0	-0.1	0.1	0.0	-1.
2				2		2		1	2				0.2	0.0	0.1	-1.0	0.6	0.0	-1.0	0.1	0.1	-1.
3				2		2			2				0.1	0.1	0.1	-1.0	0.7	0.0	-1.0	0.0	0.0	-1.
4				2		2			2				0.1	0.1	0.1	-1.0	1.3	0.1	-1.0	0.0	0.0	-1.

INSTALL ISIS

1 INSTALL dBASE III ON THE HARD DISK.

dBASE III should be installed on the hard disk in a subdirectory named \dbase.
If dBASE is already installed in another subdirectory on your hard disk you may change the name of this subdirectory (see DOS manual), or modify the AUTOEXEC.BAT file on the ISIS start diskette.

Modify the AUTOEXEC.BAT file:

- load AUTOEXEC.BAT (ISIS diskette) in EDLIN (DOS line editor) or any other editor,
- replace PATH \DBASE with PATH \OTHERNAME.

\OTHERNAME is the subdirectory in which dBASE is already stored on your hard disk.

2 COPY ISIS TO THE HARD DISK AND CREATE ISIS START DISKETTE

The ISIS diskettes contain the following files:

ISIS program files (.PRG), (empty) database files (.DBF), index files (.NDX), KEY files (KEY?????.DBF), format files (.FRM) and label file (.LBL)
The subdirectory \ISISSTAR contains the following files:
AUTOEXEC.BAT : this batch file executes ISIS and creates the necessary paths
ISISBACK.BAT : this batch file executes the backup procedure for the database
CONFIG.SYS : this file configures your system. It sets the number of sector buffers and the number of accessible open files.

* All files stored on the ISIS diskette should be copied to your hard disk in a subdirectory named \ISIS3.

- Create \ISIS3 subdirectory:

MD C:\ISIS3

- Insert the ISIS diskette in drive A

- Copy the ISIS files to C:\ISIS3:

COPY A:*.* C:\ISIS3

* Create the ISIS START DISKETTE:

- Format an empty diskette with FORMAT/S
(/S causes DOS to copy operating system files to the newly formatted diskette)

- Copy
BACKUP.*
MODE.COM
from your DOS diskette to the newly formatted diskette.

- Copy
AUTOEXEC.BAT
ISISBACK.BAT
CONFIG.SYS
from the subdirectory \ISISSTAR on the ISIS diskette to the newly formatted diskette (ISIS START DISKETTE).

The ISIS start diskette should contain:

COMMAND.COM (from your DOS diskette)
BACKUP.COM or BACKUP.EXE (from your DOS diskette).
MODE.COM (from your DOS diskette)
AUTOEXEC.BAT (from the ISIS diskette)
ISISBACK.BAT (from the ISIS diskette)
CONFIG.SYS (from the ISIS diskette)

Now ISIS is ready for use. Store the ISIS source diskettes in a safe place. To start ISIS insert the ISIS START DISKETTE in drive A and switch on the computer. See the ISIS user manual for further instructions.

International Soil Reference and Information Centre (ISRIC)
Publications - November 1988

Soil Monolith Papers

1. Thionic Fluvisol (*Sulfic Tropaquept*) Thailand, 1981
2. Orthic Ferralsol (*Typic Haplustox*) Zambia, in prep.
3. Placic Podzol (*Placaquod*) Ireland, in prep.
4. Humic Nitosol (*Oxic Paleustalf*) Kenya, in prep.
5. Humic Acrisol (*Orthoxic Palehumult*) Jamaica, 1982
6. Acri-Orthic Ferralsol (*Haplic Acrorthox*) Jamaica, 1982
7. Chernozem calcique (*Vermustoll Typique*) Romania, 1986
8. Ferric Luvisol (*Oxic Paleustalf*) Nigeria, in prep.

Technical Papers

1. Procedures for the collection and preservation of soil profiles, 1979
2. The photography of soils and associated landscapes, 1981
3. A new suction apparatus for mounting clay specimens on small-size porous plates for X-ray diffraction, 1979 (exhausted, superseded by TP 11)
4. Field extract of "Soil Taxonomy", 1980, 4th printing 1986
5. The flat wetlands of the world, 1982
6. Laboratory methods and data exchange program for soil characterization. A report on the pilot round. Part I: CEC and Texture, 1982; 3rd printing 1984
7. Field extract of "classification des sols", 1984
8. Laboratory methods and data exchange program for soil characterization. A report on the pilot round. Part II: Exchangeable bases, base saturation and pH, 1984
9. Procedures for soil analysis, 1986; 2nd edition, 1987
10. Aspects of the exhibition of soil monoliths and relevant information (provisional edition, 1985)
11. A simplified new suction apparatus for the preparation of small-size porous plate clay specimens for X-ray diffraction, 1986
12. Problem soils: their reclamation and management (copied from ILRI Publication 27, 1980, p. 43-72), 1986
13. Proceedings of an international workshop on the Laboratory Methods and Data Exchange Programme: 25-29 August 1986, Wageningen, the Netherlands, 1987
14. Guidelines for the description and coding of soil data, revised edition, 1988
15. ISRIC Soil Information System - user and technical manuals, with computer programme, 1988
16. Comparative classification of some deep, well-drained red clay soils of Mozambique, 1987
17. Soil horizon designation and classification, 1988
18. Historical highlights of soil survey and soil classification with emphasis on the United States, 1899-1970, 1988

Soil Monographs

1. Podzols and podzolization in temperate regions, 1982
   with wall chart: Podzols and related soils, 1983
2. Clay mineralogy and chemistry of Andisols and related soils from diverse climatic regions, in prep.
3. Ferralsols and similar soils; characteristics, classification and limitations for land use, in prep.

Wall charts

- Podzols and related soils, 67 x 97 cm, 1983 (see Soil Monograph 1)
- Soils of the World, 85 x 135 cm, 1987 (Elsevier Publ. Company, in cooperation with ISRIC, FAO and Unesco)

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