NGU Rapport 92.275

IMPPET
Petrophysical Database System

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RAPPORT

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IMPPET - PETORPHYSICAL DATABASE SYSTEM

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IMPPET is a database program for the IBM-PC which can perform all of the basic processing and plotting tasks usually associated with the storage and presentation of petrophysical data. IMPPET is menudriven and easy to use.

IMPPET is supplied with a file-set which contain all petrophysical data at NGU from mainland Norway (c. 15000 observations), or alternatively supplied with a selection of data from a particular region.

Emneord	Geofysikk	Database
Petrofysikk	Brukerdokumentasjon	

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1. INTRODUCTION

IMPPET is a database program for the IBM-PC which can perform all of the basic processing and plotting tasks usually associated with the storage and presentation of petrophysical data. IMPPET is menu-driven and easy to use; the user is never far removed from the basic data from which statistical analysis and graphical presentations are derived, and therefore has a sense of total control over the program's performance.

IMPPET is written for the IBM-PC running under MS-DOS with VGA or EGA graphics card. Hardcopy petrophysical lists can be generated on almost any printer, while graphical output may be obtained via HP-GL compatible plotters and HP compatible laserprinters.

IMPPET is supplied with a file-set (PETRO.BIN) which contain all petrophysical data at NGU from mainland Norway (c. 15000 observations), or alternatively sold with a selection of data from a particular region.

1.1 HARDWARE REQUIREMENTS

System requirement:

- IBM AT or compatible (80286/386/486) computer with 640 Kb RAM
- Mathematical co-processor (80287/387/487)
  (slower performance if not present)
- EGA (colour) or VGA (colour) graphics card
- Hard-disk

Graphical Output Devices:

- HP-GL compatible pen-plotter, or
- HP Laser/Deskjet compatible printer

Hardcopy listing devices

- Almost any printer

1.2 INSTALLATION

- Create a sub-directory named PETRO on the hard-disk (drive c) by typing:

```
C:>md petro
```

- Copy all programs and data-files from the IMPPET disks to the hard-disk by typing:

```
C:>copy a:*.* c:\petro
```

1.3 PROGRAMS AND FILE-TYPES

Main programs

IMPPET.EXE	- Database & processing program
INNPETRO.EXE	- Convert PETFYS to IMPPET format

DATA FILE TYPES

PETRO.BIN	- Petrophysical Database mainland Norway
IMPPET.SYS	- System configuration file
NORWAY.BLU/.GRN/.RED/.INT	- Image file of Norway
SNORWAY.BLU/.GRN/.RED/.INT	- Image file of Southern Norway
CNORWAY.BLU/.GRN/.RED/.INT	- Image file of Central Norway
NNORWAY1.BLU/.GRN/.RED/.INT	- Image file of Northern Norway1
NNORWAY2.BLU/.GRN/.RED/.INT	- Image file of Northern Norway2

2. CONVERSION OF DATA FROM PETBASE TO IMPPET FORMAT

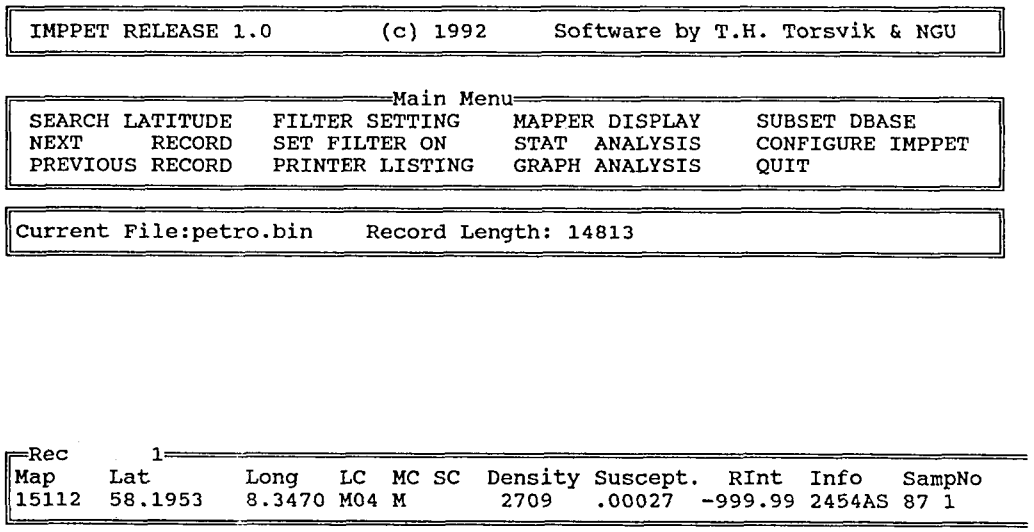
Petrophysical data (density, susceptibility & remanence) are digitally recorded in the survey laboratory (Torsvik & Olesen 1989) and ultimatley transferred to the mainframe database system PETBASE 2.0 (Olesen & Sæther 1990). Input and editing facilities are exclusively handled by this system. The PETBASE system are transferred to the IBM-PC IMPPET system using the program OPPETRIX.PETFYS.GEOF and SORT.PUB.SYS. These routines creates a sorted (by latitude) ASCII file which is transferred to IMPPET Random Access Format (RAF) with the program INNPETRO. The mainframe database system PETBASE 2.0 will be converted to a new UNIX based system during 1993 and will provide the latitude sorted ASCII file directly.

3. DESCRIPTION OF IMPPET

Type IMPPET at the system prompt. The program immediately searches for a configuration file named IMPPET.SYS. If this file is not found on the current directory, IMPPET.SYS is automatically created, containing the setup values listed in section 9.

After start-up the main menu is displayed (Fig. 1). An option in the menu may be selected through the use of the arrow keys, and executed by pressing <ENTER>.

FIG 1 Main menu IMPPET



The following options are included in the main menu:

OPTION	EFFECT
SEARCH LATITUDE	FIND A RECORD BY LATITUDE -INPUT LATITUDE
NEXT RECORD	DISPLAY NEXT RECORD OR DATA-ITEM
PREVIOUS RECORD	DISPLAY PREVIOUS RECORD OR DATA-ITEM
FILTER SETTING	SET FILTER CRITERIA
FILTER ON/OFF	ENABLE/DISABLE FILTER SETTING
PRINTER LISTING	PRINT RECORDS TO LINE-PRINTER -PRINTOUT DEPENDENT ON FILTER SETTING
MAPPER DISPLAY	SET GEOGRAPHIC SEARCH AREA
STAT ANALYSIS	STATISTICAL ANALYSIS -DEPENDENT ON FILTER SETTING
GRAPH ANALYSIS	DISPLAY DATA IN HISTOGRAMS
SUBSET DBASE	CREATE A SUBSET DBASE -DEPENDENT ON FILTER SETTING
CONFIGURE IMPPET	SET SYSTEM VARIABLES
QUIT	RETURN TO DOS

After startup the first record in the database is displayed below the main menu together with the name of the database set and total number of records. The database display contains the following information:

Rec	Current record (1 to N) in the database
Map	Mapsheet number (5 digits)
Lat	Sampling Latitude
Long	Sampling Longitude
LC	Lithological Code (see section 5)
MC	Metamorphic Code (see section 8)
SC	Stratigraphic Code (see section 7)
Density	Density in kg/m^3
Sucept.	Susceptibility in SI units
Rint.	Remanent Intensity in mA/M -999.99 = not measured
Info	Geologist code
SampNo	Sample number

3.1. FILTER SETTING

This is one of the most fundamental options in IMPPET as 'FILTER SETTING' effects options 'STAT ANALYSIS' (3.4), 'GRAPH ANALYSIS' (3.5), 'SUBSET DBASE' (3.6) and 'PRINTER LISTING' (3.2). The following filters (Fig. 2) are implemented:

FILTER	VALUE/EFFECT
STAT. PARAMETER	SET PARAMETER FOR STATISTICAL ANALYSIS & GRAPHICS -DEFAULT IS DENSITY -SELECT DENSITY, SUSCEPT, REMINT OR QFACTOR FROM THE PARAMETER MENU -THE PARAMETER IS SELECTED THROUGH THE USE OF THE ARROW KEY AND EXECUTED BY PRESSING <ENTER>, OR ALTERNATIVELY PRESS <ESC> TO QUIT PARAMETER MENU.
MAPSHEET	SELECT MAPSHEET NUMBER (1:50000)
MIN. LATITUDE	ENTER MINIMUM LATITUDE FOR SEARCH -DEFAULT IS 55°N
MAX. LATITUDE	ENTER MAXIMUM LATITUDE FOR SEARCH -DEFAULT IS 80°N
MIN. LONGITUDE	ENTER MINIMUM LONGITUDE FOR SEARCH -DEFAULT IS 000°E
MAX. LONGITUDE	ENTER MAXIMUM LONGITUDE FOR SEARCH -DEFAULT IS 030°E
	NOTE: MINIMUM & MAXIMUM CO-ORDINATES CAN BE SET BY OPTION 'MAPPER DISPLAY' IN THE MAIN MENU (3.3)
LITHOL. CODE	-SELECT LITHOLOGICAL CODE (SEE 5) -THE CODE IS SELECTED THROUGH THE USE OF THE ARROW KEY AND EXECUTED BY PRESSING <ENTER>, OR ALTERNATIVELY PRESS <ESC> TO QUIT PARAMETER MENU. -USE PGUP & PGDN KEYS TO CHANGE PAGE
METAM. CODE	-SELECT METAMORPHIC CODE (8) -THE CODE IS SELECTED THROUGH THE USE OF THE ARROW KEY AND EXECUTED BY PRESSING <ENTER>, OR ALTERNATIVELY PRESS <ESC> TO QUIT PARAMETER MENU. -USE PGUP & PGDN KEYS TO CHANGE PAGE
STRAT. CODE	-SELECT STRATIGRAPHIC CODE (6) -THE CODE IS SELECTED THROUGH THE

FILTER	VALUE/EFFECT
INFO/GEOLOGIST	USE OF THE ARROW KEY AND EXECUTED BY PRESSING <ENTER>, OR ALTERNATIVELY -USE PGUP & PGDN KEYS TO CHANGE PAGE PRESS <ESC> TO QUIT PARAMETER MENU. -SELECT GEOLOGIST -THE GEOLOGIST IS SELECTED THROUGH THE USE OF THE ARROW KEY AND EXECUTED BY PRESSING <ENTER>, OR ALTERNATIVELY PRESS <ESC> TO QUIT PARAMETER MENU. -USE PGUP & PGDN KEYS TO CHANGE PAGE
MIN. DENSITY	-SET MINIMUM INCLUDED DENSITY
MAX. DENSITY	-SET MAXIMUM INCLUDED DENSITY
MIN. SUCEPT.	-SET MINIMUM INCLUDED SUSCEPTIBILITY
MAX. SUCEPT.	-SET MAXIMUM INCLUDED SUSCEPTIBILITY
MIN. REMINT.	-SET MINIMUM INCLUDED REM. INTENSITY
MAX. REMINT.	-SET MAXIMUM INCLUDED REM. INTENSITY

The 'FILTER SETTING' option is ended by pressing the <ESC> key in any field.

NOTE

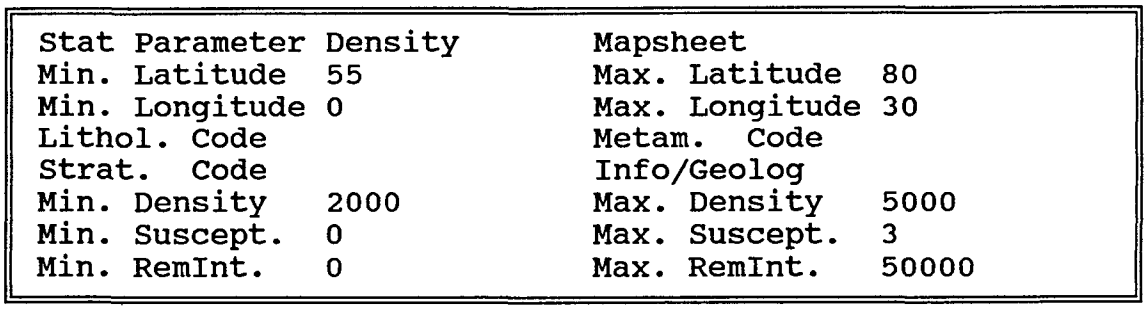
For filters **Mapsheet, Lithological Code** and **Stratigraphic Code** records can be combined in the following manners:

EXAMPLE The operator wish to search for all records with Lithological Code prefix S, e.g. S00, S01 etc.

PROCEDURE Press <ESC> in the Lithological Code menu. Type S in the Lithological Code field and press <ESC> to quit option 'FILTER SETTING'.

Select option 'STAT ANALYSIS' (3.4) followed by 'GRAPH ANALYSIS' (3.5)) or 'PRINTER LISTING' (3.6) in the main menu.

FIG 2 Option 'FILTER SETTING'



3.2 PRINTER LISTING

This option provides a hardcopy list of petrophysical data. Use option 'FILTER SETTING' (3.1) before accessing this options (unless the operator wish to print the whole database). Abort hardcopying by pressing the <a> key.

The 'FILTER SETTING' (3.1) values are printed before hardcopying of petrophysical data.

3.3 MAPPER DISPLAY

This option serves two main functions, i.e. to mark a geographic area of interest and secondly to plot available petrophysical sites within a given region. IMPPET uses five different EGA images (Figs. 3-7), and when entering this option an image file named NORWAY (Fig. 3) is displayed on the screen. The top-left corner of the screen provides the name of the current image and information concerning how the grid was created using a GALLS projection. Latitude and longitude lines for the images are generated with a spacing of 2 degrees.

The mapper menu has 6 different options and an option is selected by using the UP & DOWN arrow cursor followed by <ENTER> or by typing directly the first character of the selected option. The options are:

OPTION	EFFECT
MARK AREA	MARK A GEOGRAPHIC AREA (MIN & MAX) -Move cursor to a selected area using arrow keys. Type d and draw a block. -Type <RETURN> to quit
PLOT SITES	PLOT PETROPHYSICAL SITES WITHIN A SELECTED GEOGRAPHIC AREA -Type <a> to abort plotting
NORTH	DISPLAY NORWEGIAN MAPS NORTHWARD
SOUTH	DISPLAY NORWEGIAN MAPS SOUTHWARD
COPY SCREEN	COPY SCREEN TO LASER/DESKJET PRINTER
QUIT	RETURN TO MAIN MENU

FIG 3 Norway Image

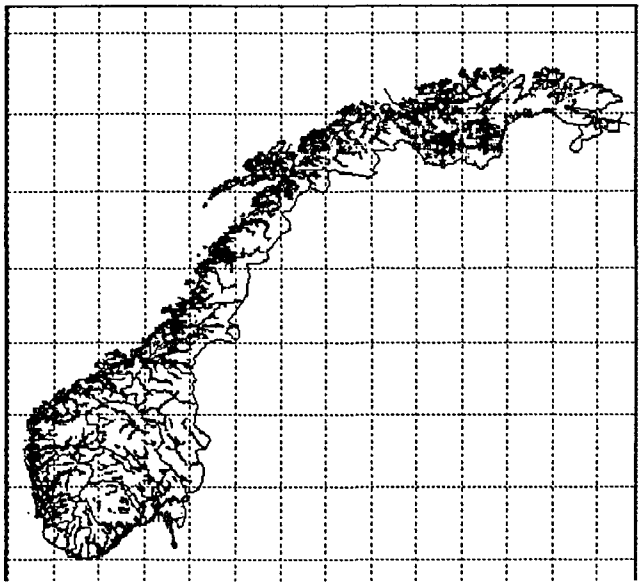


FIG 4 South Norway Image

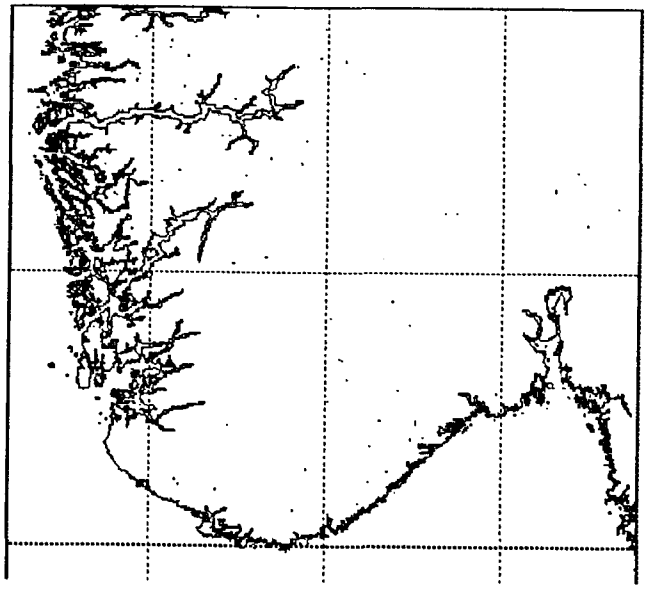


FIG 5 Central Norway Image

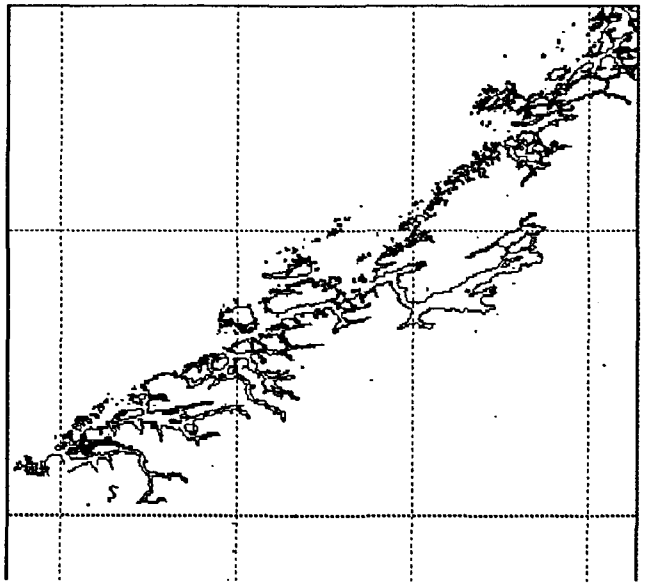


FIG 6 North Norway1 Image

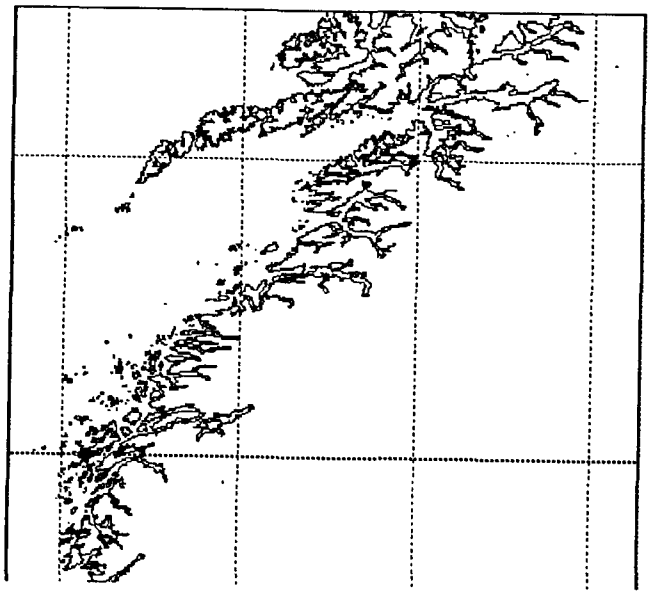
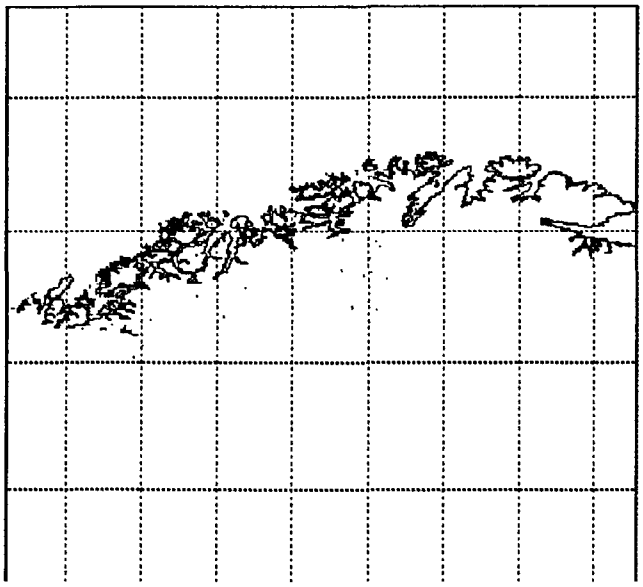


FIG 7 North Norway2 Image



3.3.1 MARK AREA

After having selected the appropriate map of Norway the user can use this option to define a geographic filter area which will be passed back to the main program (automatically inserted in FILTER SETTING). In this mode the user uses the cursor arrows to move around in the map. The current Latitude & Longitude are displayed in the top-left part of the screen. To mark an area type <d> and draw a box enclosing the area of interest (Fig. 3). End option by pressing the <ENTER>/<RETURN> or <ESC> key. In the bottom-left part of the screen the selected area will be displayed in latitude and longitudes.

3.3.2 NORTH and SOUTH

This option controls the displayed EGA image. During start-up a complete map of Norway (Fig. 3) is displayed with coastline & islands (yellow colour), rivers (green colour), county-boundaries (blue colour) and petrophysical sampling sites (grey colour). Latitude and longitudes are shown with 2 degrees spacing. The NORTH (forward) option will take you through all the EGA images, starting with South Norway, Central Norway, North Norway 1, North Norway 2 and finally the complete Norwegian map is displayed (Figs. 4-7). Option SOUTH (backward) reverses this process.

3.4 STAT ANALYSIS

This option examines the database and performs a statistical analysis according to the current 'FILTER SETTING' (3.1).

The statistical display contains the following information:

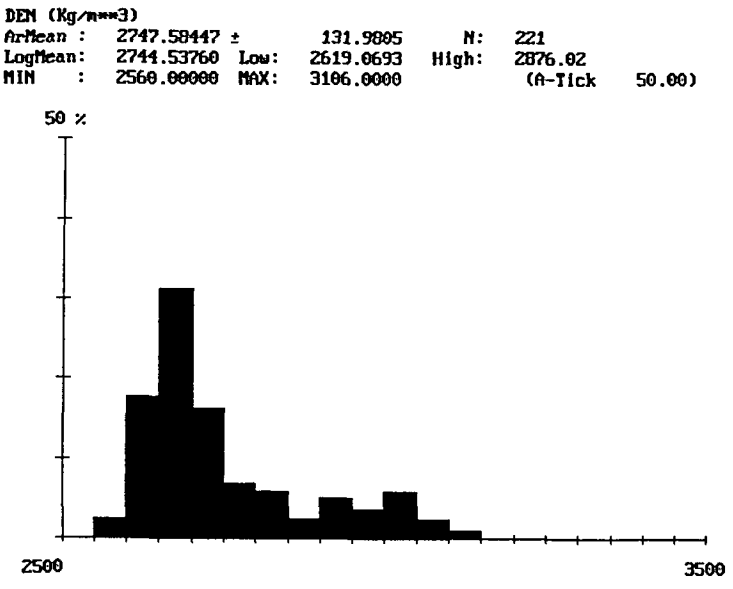
```
MIN  (Minimum observed value)
MAX  (Maximum observed value)
Number of samples
Arithmetic mean & standard deviation
Logarithmic mean & Log. mean - log. standard deviation (LOW)
                   Log. mean + log. standard deviation (HIGH)
```

3.5 GRAPH ANALYSIS

This option provides a histogram presentation (Fig. 8) of data processed in option 'STAT ANALYSIS' (3.4). Statistical parameters are displayed above the diagram. The following sub-options are available:

OPTION	EFFECT
Xmax	ENTER MAXIMUM VALUE ALONG X-AXIS (HOR)
Ymax	ENTER MAXIMUM VALUE ALONG Y-AXIS (VER)
A-Tick	ENTER AXIS-TICK LENGTH ALONG X-AXIS (TICK-LENGTH ALONG Y-AXIS IS SET IN OPTION 'CONFIGURE IMPPET' (3.7))
Text	ENTER TEXT ON SCREEN
Hp-Plot	COPY PLOT TO HP-GL PLOTTER
LaserC	COPY PLOT TO HP COMPATIBLE LASERJET & DESKJET
Quit	RETURN TO MAIN MENU

FIG 8 Example of option "GRAPH ANALYSIS'



3.6 SUBSET DBASE

This option creates a subset database from the current database according to the current 'FILTER SETTING' (3.1). A filename for the new database is prompted (maximum 8 character filename). File extension is allowed (e.g. TEST.BIN).

NOTE

In order to initiate the new database, the operator must change name of the current Petrophysical Database in option 'CONFIGURE IMPPET' (3.7).

3.7 CONFIGURE IMPPET

This option permits the adjustment of parameters which control program output. QUIT/EXIT this option by pressing <ESC>. The configuration file IMPPET.SYS contains names of the variables which are adjusted using 'CONFIGURE IMPPET'. Whenever a parameter is changed, the file IMPPET.SYS is updated, thus recording the adjustment even after IMPPET is terminated.

The following parameters can be changed/updated (Fig. 9):

PARAMETER	VALUE
PLOTTER PORT (Initial value=lpt1:)	com1:,com2,lpt1: or lpt2:
PRINTER PORT/SCREEN DUMP (Initial value=lpt1:)	com1:, com2:,lpt1: or lpt2:
BAUDRATE (for com1: or com2:) (Initial value=9600)	110,300,600,1200,2400,4800 or 9600
PARITY (for com1: or com2:) (Initial value=n)	no, even or odd
DATABITS (for com1: or com2:) (Initial value=8)	7 or 8
STOPBIT (for com1: or com2:) (Initial value=1)	1 or 2
PLOTTER PAPER SIZE (Initial value=4)	3 or 4 (i.e. A3/A4)
PLOTTER PEN (Initial value=1)	1 to 8
PLOTTER SPEED (Initial value=20)	1 to 80 20
PLOT TO FILE (Initial value=n)	y or n (yes or no)
PLOT SIZE LASER DUMP (Initial value=3)	1 to 4
CURRENT PETROPHYSICAL DATABASE (Initial value=petro.bin)	any valid DOS file name petro.bin
SCREEN TYPE (Initial value=ega)	ega or vga
Y MAXIMUM IN XY-PLOT (% OR N) (Initial value=50)	any positive number
DENSITY MINIMUM IN XY-PLOT (Initial value=2500)	any number

Y-AXIS IN % OR N (BY NUMBER) (Initial value=%) Y-AXIS TICK LENGTH (Initial value=10) FREE - FUTURE EXPANSION FREE FREE FREE	% or N any positive number

FIG 9 Option 'CONFIGURE IMPPET'

```
                    C O N F I G U R E  -  S Y S T E M
HPGL     Plotter Port              (lpt1: com1:  ) :com2:
         Printer Port/Screen Dump  (lpt1: com1:  ) :lpt1:
         Baudrate                  (110 to 9600  ) :9600
         Parity                    (n,o or e     ) :n
         Databits                  (8 or 7       ) :8
         Stopbits                  (1 or 2       ) :1
HPGL     Plotter Paper Size        (3 or 4       ) :4
HPGL     Plotter Pen               (1 to 8       ) :1
HPGL     Plotter Speed             (1 to 80      ) :20
HPGL     Plot to file              (n or FileName) :n
         Plot Size LASER-DUMP      (1 to 4)      ) :2
         Current Petrophysical Database            :petro.bin
         Screen Type        (EGA, VGA, CGA or HER) :vga
         Y MAXIMUM IN XY-PLOT      (IN % or N    ) :50
         DENSITY MINIMUM IN XY-PLOT                :2500
         Y-AXIS IN % OR N (by number)     (% or N):%
         Y-AXIS TICK LENGTH                        :10
                                                   :
                                                   :
                                                   :
                                                   :
                                                   :
                                                   <ESC>..QUIT
```

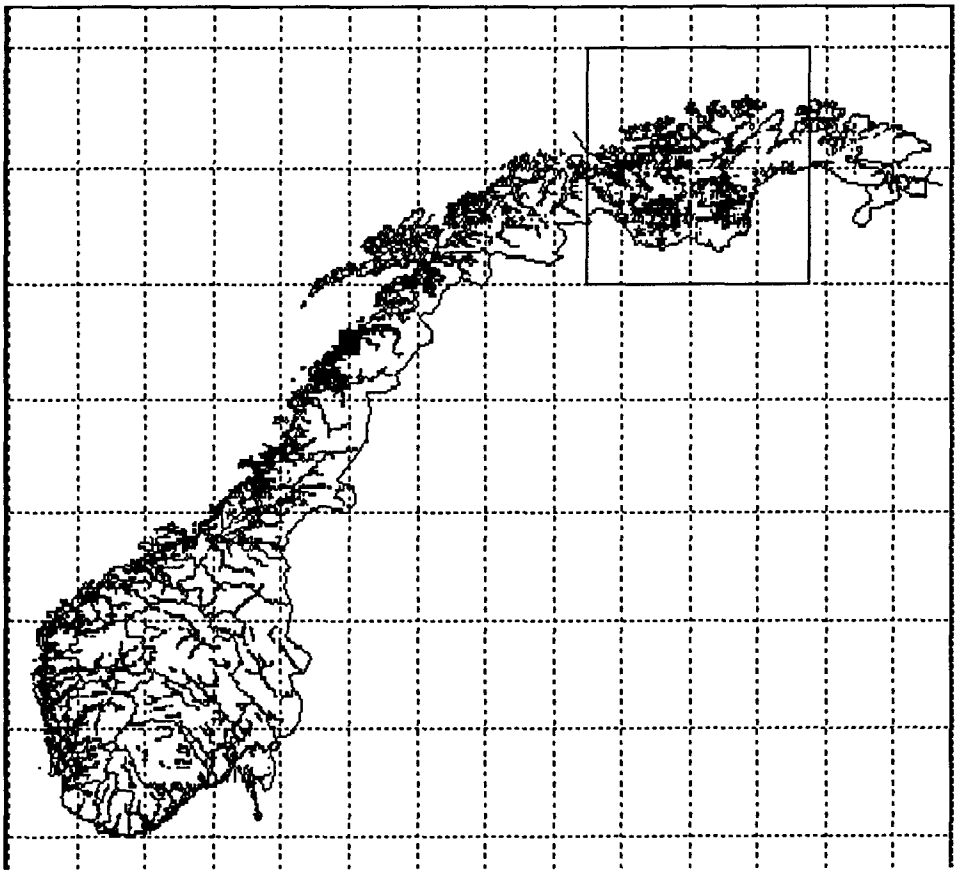
PROBLEM

Calculate the average density of gabbros in Finnmark
(between 68-72°N, 21-27.5°E)

SOLUTION

(1) Select option 'MAPPER DISPLAY' in the main menu
-Use option 'NORTH' to display the correct map image (NNorway2)
-Select option 'MARK AREA'
-Move cursor to the search area using cursor keys
-Type d and draw a box (using cursor keys) to enclose the search area (Fig. 10)
-Press <ENTER> or <ESC> key to quit 'MARK AREA' option
-Select option 'QUIT' to return to main menu

FIG 10 Draw a box to enclose the search area



(2) Select option 'FILTER SETTING' in the main menu
-Select *Density* in the Stat Parameter Field
-Move to Lithol. Code Field using arrow keys
-Use arrow keys or PGUP & PGDN to locate code *I55 GABBRO* and press <ENTER> to select this code (Fig. 11)
-Press <ESC> to leave the 'FILTER SETTING' option

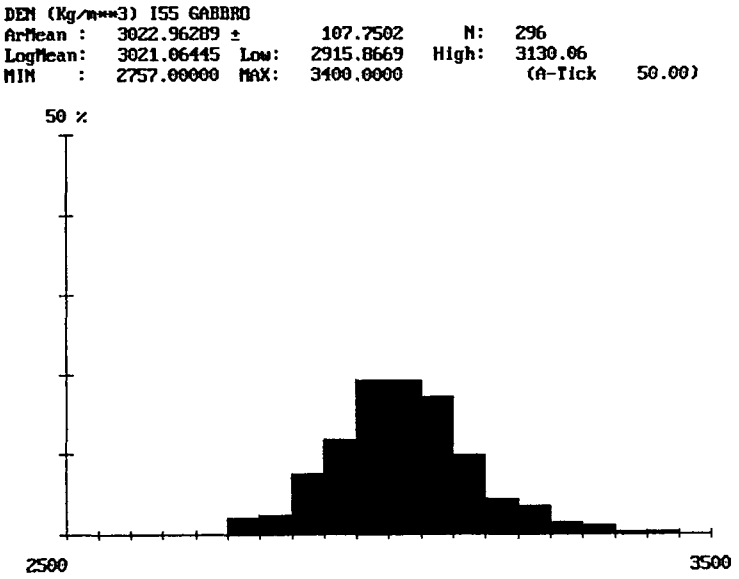
FIG 11 'FILTER SETTING'

Stat Parameter	Density	Mapsheet	
Min. Latitude	68	Max. Latitude	72
Min. Longitude	21	Max. Longitude	27.5
Lithol. Code	I55	Metam. Code	
Strat. Code		Info/Geolog	
Min. Density	2000	Max. Density	5000
Min. Suscept.	0	Max. Suscept.	3
Min. RemInt.	0	Max. RemInt.	50000

(3) Select option 'STAT ANALYSIS' in the main menu
-A total of 296 records are found and the average density is displayed.

(4) Select option 'GRAPH ANALYSIS' in the main menu
-The resultant diagram is shown in Fig. 12

FIG 12 'GRAPH ANALYSIS' option



5 LIST OF LITHOLOGICAL CODES

```
DATA "I00 FELSIC PLUTONIC ROCKS            1200. 2500 2800
DATA "I01 ALKALI-FELDSP. GRANITE          21200. 2500 2800
DATA "I02 GRANITE                         41200. 2500 2800
DATA "I03 GRANODIORITE                    61200. 2500 2805
DATA "I04 TONALITE                        81200. 2500 2800
DATA "I05 TRONDHJEMITE                    81200. 2500 2800
DATA "I10 FELSIC HYPAB. ROCKS            121200. 2500 2800
DATA "I11 APLITE                         101200. 2500 2800
DATA "I12 QUARTS-FELDSPAR PORPHYRITE     121200. 2500 2800
DATA "I13 PEGMATITE                      141200. 2500 2850
DATA "I20 INTERMED. PLUTONIC-/HYPAB.R     81600. 2550 2900
DATA "I21 QUARTS ALKALI-FELTSP. SYENITE   41600. 2550 2850
DATA "I22 QUARTS SYENITE                  21600. 2550 2850
DATA "I23 QUARTS MONZONITE                 1600. 2550 2850
DATA "I24 QUARTS MONZODIROTE               1604. 2550 2850
DATA "I25 QUARTS DIORITE                   1606. 2550 2880
DATA "I26 ALKALI-FELDSP. SYENITE           1608. 2550 2850
DATA "I27 SYENITE                          1610. 2550 2850
DATA "I28 MONZONITE                        1612. 2600 3100
DATA "I29 MONZODIRITE                      1614. 2600 3100
DATA "I30 DIORITE                          1616. 2600 3126
DATA "I40 FOID-BEAR. PLUTONIC-/HYPAB.      1604. 2500 3600
DATA "I41 NEPHELINE SYENITE                1608. 2500 3600
DATA "I50 MAFIC PLUTONIC ROCKS           161202. 2700 3500
DATA "I51 QUARTS MONZOGABBRO             161202. 2700 3500
DATA "I52 QUARTS GABBRO                  161204. 2700 3500
DATA "I53 QUARTS NORITE                  161204. 2700 3500
DATA "I54 MONZOGABBRO                    161206. 2700 3500
DATA "I55 GABBRO                         161206. 2700 3500
DATA "I56 NORITE                         161208. 2700 3500
DATA "I57 HYPERITE                       161208. 2700 3500
DATA "I60 MAFIC HYPAB. ROCKS             161212. 2700 3500
DATA "I61 ALBITE DIABASE                 161210. 2700 3500
DATA "I62 DIABASE                        161212. 2700 3500
DATA "I70 ULTRAMAFIC PLUTONIC-/HYPAB.     80808. 2700 3700
DATA "I71 HORNBLENDITE                   101010. 2800 3700
DATA "I72 PYROXENITE                     121212. 2800 3700
DATA "I73 PERIDOTITE                     141414. 2700 3700
DATA "I74 DUNITE                         161616. 2800 3700
DATA "I80 ANORTHOSITE                     40000. 2600 3300
DATA "I81 CARBONATITE                     40000. 2600 3300
DATA "I82 KIMBERLITE                      60000. 2600 3300
DATA "S00 CONGLOMERATE/SED. BRECCIA       60000. 2500 3100
DATA "S01 CONGLOMERATE, PEBBLE SUPPORTED  80000. 2500 3100
DATA "S02 CONGLOMERATE, MATRIX SUPPORTED  80000. 2500 2900
DATA "S03 TILLITE                        100000. 2500 2900
DATA "S10 PSAMMITIC ROCKS                100000. 2500 2900
DATA "S11 QUARTZITE                      120000. 2480 2830
DATA "S12 QUARTZ-SANDSTONE               120000. 2450 2830
DATA "S13 SANDSTONE, FELDSP.-BEARING     140000. 2400 2840
DATA "S14 ARKOSE                         140000. 2480 2900
DATA "S15 GREYWACKE                      160000. 2500 2840
```

```
DATA "S20 PELITIC ROCKS                          160004  2600 2900
DATA "S21 MUDROCKS                               160006. 2480 2900
DATA "S22 ARGILLITE                              160008. 2600 2900
DATA "S23 PHYLLITE                               160010. 2590 2900
DATA "S24 MICA-SCHIST                            160012. 2490 3160
DATA "S25 GRAPHITIC SCHIST                       160016. 2300 2960
DATA "S26 CALCAREOUS PHYLLITE                            2600 3100
DATA "S27 GARBEN-SCHIST                                  2600 3100
DATA "S40 CARBONATE ROCKS                             4. 2600 3100
DATA "S41 LIMESTONE                                   6. 2500 3000
DATA "S42 CALCITE MARBLE                              8. 2600 3000
DATA "S43 DOLOMITE                                   10. 2500 3000
DATA "S44 DOLOMITE MARBLE                            12. 2600 3000
DATA "S45 MARL                                       16. 2600 3000
DATA "S46 MARBLE                                      8. 2600 3000
DATA "S47 METALIMESTONE                               6. 2600 3000
DATA "S50 JASPER                                    416. 2500 5000
DATA "S51 CHERT                                     816. 2500 5000
DATA "S52 CHERT                                    1216. 2500 5000
DATA "S53 BANDED IRON FORM.                        1616. 2500 5000
DATA "V00 ACID VOLCANITES                         81600. 2500 2800
DATA "V01 RHYOLITE                               101600. 2500 2800
DATA "V02 DACITE                                 121600. 2500 2800
DATA "V03 KERATOPHYRE/QUARTS KERATOPHYRE         141600. 2500 2800
DATA "V04 ACID TUFF/TUFFITE                      161600. 2500 2850
DATA "V10 INTERMEDIATE VOLCANITES                 81604. 2600 2950
DATA "V11 TRACHYTE                               121604. 2600 2900
DATA "V12 ANDESITE                               141604. 2600 2950
DATA "V13 INTERMEDIATE TUFF/TUFFITE              161604. 2600 2950
DATA "V20 BASIC VOLCANITES                       160804. 2700 3500
DATA "V21 BASALT                                 161006. 2700 3500
DATA "V22 GREENSTONE                             161208. 2700 3500
DATA "V23 AMPHIBOLITE                            161210. 2700 3500
DATA "V24 BASIC TUFF/TUFFITE                     161212. 2700 3500
DATA "V25 METADIABASE                            161414. 2700 3500
DATA "V30 ULTRABASIC VOLCANITES                  101010. 2700 3700
DATA "V31 KOMATIITES                             161616. 2700 3700
DATA "V40 NEPHELINE-RICH VOLCANICS                  808. 2600 3100
DATA "V41 PHONOLITE                                1010. 2600 3100
DATA "V42 TEFRITE                                  1010. 2600 3100
DATA "M00 GNEISS                                  80800. 2500 3500
DATA "M01 GRANITIC GNEISS                         81200. 2500 3500
DATA "M02 GRANODIORIC GNEISS                      81600. 2500 3500
DATA "M03 TONALITIC GNEISS                       161600. 2500 3500
DATA "M04 MICAGNEISS                             160800. 2500 3500
DATA "M05 HORNBLENDE GNEISS                      161204. 2500 3550
DATA "M06 BANDED GNEISS                          121600. 2500 3500
DATA "M07 AUGEN GNEISS                           141600. 2500 3500
DATA "M08 MIGMATITE                              161600. 2500 3500
DATA "M10 GREENSCHIST                            160804. 2700 3500
DATA "M11 AMPHIBOLITE                            161208. 2700 3500
DATA "M12 SERPENTINITE                           121616. 2640 3500
DATA "M13 EKLOGITE                               161616. 2700 3750
DATA "M14 CALCSILICATE-SCHIST                            2500 3500
DATA "M15 CALCSILICATE GNEISS                            2500 3500
DATA "M16 HORNBLENDE-SCHIST                              2500 3500
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DATA "M17 DIORITIC GNEISS                          2500 3500
DATA "M18 MANGERITE GNEISS                         2500 3500
DATA "M19 QUARTS-MANGERITE GNEISS                  2500 3500
DATA "M20 SKARN                             800.   2700 5000
DATA "M21 ALBITE-FELS./QUARTS ALB.FELS     1000.   2500 3000
DATA "M23 ALBITE-CARBONATE ROCKS           1200.   2500 3100
DATA "M24 TALCRICH ROCK                  121616.   2600 3000
DATA "M25 OTHER ALTERED ROCKS              1200.   2500 3500
DATA "M30 MYLONITE/BRECCIA               120000.   2500 3000
DATA "M31 HYDROTHERMAL QUARTS            160000.   2500 2900
DATA "M32 CATACLASTIC ROCK                         2500 3500
DATA "M40 MAGNETITE                        1604.   2700 6500
DATA "M41 ORE UNDIFFERENTIATED             1608.   2650 6500
DATA "M99 ALL ROCK TYPES                           2200 6500
```

6 LIST OF STRATIGRAPHIC CODES

Northern Norway

```
DATA "KAU KAUTOKEINO GRØNNSTEINBELTE
DATA "NJA NJALLAJAAKKAKOMPL.
DATA "RAS RAISÆDNO GNEISKOMPL.
DATA "AVZ AVZIFM.
DATA "BIK BIKKACAKKAFM.
DATA "CAS CAS'KEJASFM.
DATA "CAR CARAVARRIFM.
DATA "GÅL GÅLDENVARRIFM.
DATA "BAH BAHARAVDUJAV'RIFM.
DATA "LIK LIK'CAFM.
DATA "MAS MASIFM.
DATA "SOL SUOLUVUOBMIFM.
DATA "STU STUORAJAV'RIFM.
DATA "VOM VUOMEGIELASFM.
DATA "SKU SKUVVANVARRIFM.
DATA "JER JER'GUL GNEISKOMPL.
DATA "GÅB GÅL'LEBAI'KEFM.
DATA "BAK BAKKILVARRIFM.
DATA "RAI RAI'TEGÅR'ZIFM.
DATA "IDD IDDJAJAV'RIGR.
DATA "GÅS TANAELV MIGMATITTKOMPL.
DATA "LEV LEVAJOK GRANULITTKOMPL.
DATA "POL POLMAK MAGMATISK KOMPL.
DATA "PAS PETSAMOGR.
DATA "SIR SIRBMA  MAGMATISK KOMPL.
DATA "SSI STEINSTRYKNES-SHUORT MAGM.KOMPL.
DATA "SPA SØR-PASVIK GNEISKOMPL.
DATA "NEI NEIDEN GRANITTKOMPL.
DATA "SØR GNEIS I SØRVARANGER
DATA "BJV BJØRNEVANNGR.
DATA "GAR GARSJØ GNEISKOMPL.
DATA "GÆC GÆCCOAIVI GRANITE
DATA "SVA SVANVIK GNEISKOMPL.
DATA "KIR KIRKENES GNEISKOMPL.
DATA "JAR JARFJORD GNEISKOMPL.
DATA "VAR VARANGER GNEISKOMPL.
DATA "HOM HOMPEN GNEISKOMPL.
DATA "URF URDFJELL GRANITTKOMPL.
DATA "KOS KOSINFJELL GRANITTKOMPL.
DATA "SVD SØRVARANGER MAF. GANGINTR.
DATA "KGB KARASJOK GRØNNSTEINS BELTE
DATA "BAI BAISVARRI GNEISKOMPL.
DATA "NUS NUSSIRGR.
DATA "SAL SALTVATNGR.
DATA "ULV ULVERYGGFM.
DATA "HOL HOLMVATNGR.
DATA "LLK LILLE LERRESFJORDDALKOMPL.
DATA "KVI KVITFJELL SUITE
DATA "ROD RØDFJELL SUITE
DATA "PRS PORSAGR.
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```
DATA "BOS BOSSEKOPGR.
DATA "SKO SKOADDUVARRIFM.
DATA "KVE KVENVIKFM.
DATA "STN STORVIKNESFM.
DATA "SKB SKIBOTNGR.
DATA "KVÆ KVÆNANGGR.
DATA "OKS OKSFJORDGR.
DATA "VDD VADDASDEKKET
DATA "OAP OAPPIS GABBRO
DATA "VDG VADDASGAISSA GABBRO
DATA "KVT KVÆNANGSTINDAN GABBRO
DATA "RAD RAISDUODDARHALDI GABBRO
DATA "KOM KOMSAGR.
DATA "DIV DIVIDALGR.
DATA "STB STABBURSDALFM.
DATA "AIR AIROAIVIGR.
DATA "LAK LAKSEFJORDGR.
DATA "FRI FRIARFJORDFM.
DATA "LAN LANDERSFJORDFM.
DATA "IFJ IFJORDFM.
DATA "DIG DIGERMULENGR.
DATA "BRL BERLOGAISSAFM.
DATA "KIS KISTEDALFM.
DATA "DUO DUOLBAGAISSAFM.
DATA "VRG SEDIMENTÆRE B.A. VARANGERHALVØYA
DATA "VST VESTERTANAGR.
DATA "BRE BREIVIKFM.
DATA "STA STAPPOGJEDDEFM.
DATA "MOR MORTENSNESFM.
DATA "NYB NYBORGFM.
DATA "SMA SMALFJORDFM.
DATA "TAN TANAFJORDGR.
DATA "GRA GRASDALFM.
DATA "HAN HANGLECÆRROFM.
DATA "VAG VAGGEFM.
DATA "GAM GAMASFJELLFM.
DATA "DAK DAKKOVARREFM.
DATA "STG STANGENESFM.
DATA "GRØ GRØNNESFM.
DATA "VAD VADSØ GR.
DATA "EKK EKKERØY FM.
DATA "GLN GULNESELVFM.
DATA "PAD PADDEBYFM.
DATA "FUG FUGLEBERGFM.
DATA "VEI VEIDNESBOTNFM.
DATA "LØK LØKVIKFJELLGR.
DATA "SKI SKIDNEFJELLFM.
DATA "SKG SKJÆRGÆRDSNESFM.
DATA "STD STORDALSELVFM.
DATA "STY STYRETFM.
DATA "SAN SANDFJORDFM.
DATA "BAR BARENTSHAVGR.
DATA "TYV TYVJOFJELLFM.
DATA "BÅT BÅTSFJORDFM.
DATA "BÅS BÅSNÆRING FM
DATA "KON KONGSFJORDFM.
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DATA "HLF HELLEFJORDGR.
DATA "FAL FALKENESGR.
DATA "STV STORELVGR.
DATA "BER BERLEVÅG FM.
DATA "KLU KLUBBENGR.
DATA "NOR NORDVÅG GR.
DATA "JUL JULDAGNESFM.
DATA "POR PORSANGER DOLOMITT
DATA "SEI SEILAND MAGMATISK KOMPL.
DATA "EID EIDSVÅGEID GNEISKOMPL.
DATA "HON HONNINGSVÅG MAGM.KOMPL.
DATA "KPG PREKAMB. GNEIS I KALEDON
DATA "KRP PREKAM. AMFIB. I KALEDON
DATA "GBT GRUNNFJELLS-B.A. I TROMS
DATA "MAU MAUKENVINDUET
DATA "TRO TROMSØ DEKKET
DATA "LYN LYNGSFJELLDEKKET
DATA "NRD NORDMANNVIKDEKKET
DATA "MÅL MÅLSELVDEKKET
DATA "REI REISADEKKEKOMPL.
DATA "MAG MAGERØ YDEKKET
DATA "KLK KALAKDEKKEKOMPL.
DATA "LKS LAKSEFJORDDEKKEKOMPL.
DATA "GAI GAISSADEKKET
DATA "RAU RAUTASDEKKET
DATA "ABI ABISKODEKKET
DATA "NDE NARVIKDEKKEKOMPL.
DATA "BJE BJERKVIKDEKKET
DATA "SLG SALANGENDEKKET
DATA "NII NIINGENDEKKET
DATA "PLO PREKAMB. I LOFOTEN
DATA "LØD LØDINGEN GRANITTKOMPL.
DATA "TYS TYSFJORD GRANITTKOMPL.
DATA "ROM ROMBAKVINDUET
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Southern Norway

```
DATA "STØ STØRENDEKKET
DATA "GUL GULADEKKET
DATA "LED LEVANGERDEKKET
DATA "SKJ SKJØTINGENDEKKET
DATA "LEK LEKSDAL-REMSKLEPP-DEKKET
DATA "HÆR HÆRVOLADEKKET
DATA "MER MERÅKERDEKKET
DATA "ØYF ØYFJELLDEKKET
DATA "ESS ESSANDSJØDEKKET
DATA "REM REMSKLEPPDEKKET
DATA "GJE GJERSVIKDEKKET
DATA "LEI LEIKVIKVATNDEKKET
DATA "BJØ BJØRKVATNDEKKET
DATA "SEV SEVEDEKKET
DATA "HEL HELGELANDSDEKKET
DATA "TØM TØMMERÅS BERGARTER
DATA "OLD OLDENBERGARTER
DATA "GRO GRONG-KULMINASJONEN
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DATA "OFF OFFERDALDEKKET
DATA "KAL KALEDONSKE B.A.
DATA "SJO SJONA GRUNNFJELLSVINDU
DATA "HOT HØGTUVA GRUNNFJELLSVINDU
DATA "FOR FORMOFOSSDEKKEKOMP.
DATA "SNÅ SNÅSADEKKET
DATA "PRE PREKAMBRISK GRUNNFJ. ØSTLIGE OMR.
DATA "HOV HOVINDEKKET (Undre og øvre Hovin)
DATA "DEV DEVON
DATA "ØVR ØVRE HOVIN
DATA "UND UNDRE HOVIN
DATA "FUN FUNDSJØ GRUPPEN
DATA "KJØ KJØLHAUG GRUPPEN
DATA "SUL SULÅMO GRUPPEN
DATA "VAL VALDRESSPARAGMITT
DATA "VAN VANGFORMASJONEN
DATA "JOT JOTUNDEKKEKOMPLEKSET
DATA "VGR GRUNNFJELL (VESTLIGE GNEISSREG.)
DATA "KBR KAMBRO-SILUR B.A. FRA SMØLA/HITRA OMR.
DATA "KIN KALEDONSKE INTRUSIV B.A.
DATA "STG STØRENGRUPPEN
DATA "FRO FROAN
DATA "NAG NAMSOS GNEISER
DATA "EKN EKNEGRUPPEN (STØRENDEKKET)
DATA "RIS RISSAGRUPPEN (ORDOV.?)
DATA "VAV VANVIKGRUPPEN (?KAMBRISK)
DATA "FOS FOSENGRUPPEN (DEVON)
DATA "BAF BANGSUNDFORMASJONEN
DATA "MET LEPTITT (FRA N. TR.,ant. metarhyolitt)
DATA "LKA B. A. FRA LEKA (vesentl. mafiske .b.a.)
DATA "UHO UNDRE HOVINDEKKET
```

7 LIST OF GEOLOGIST CODES

data"AK	Allan Krill
data"APS	Arne Solli
data"AOS	Atle Sindre
data"CK	Cecilie Knutsen
data"CS	Charles Schlinger
data"BH	Bernt Holst
data"BD	Bírre Davidsen
data"BL	Bjørn Læstad
data"DR	David Roberts
data"DVW	Dirk van der Weel
data"EF	Eigill Fareth
data"ET	Einar Tveten
data"FF	Frode Fasteland
data"FS	Frank Simonsen
data"GB	Gerhard Bax
data"GE	Geir Elvebakk
data"HA	Harald Agersen
data"HG	Håvard Gautneb
data"HJH	Helga Jorunn Hansen
data"IL	Ingvar Lindal
data"JG	Johan Gust
data"JI	J. Inderhaug
data"JSA	Jan Steinar Arnetvedt
data"JRS	Jan Reidar Skilbrei
data"JSS	Jan Sverre Sandstad
data"KBZ	Klaas Bouke Zwaan
data"KK	Ketil Kaada
data"LPN	Lars Petter Nilsson
data"MAM	May Britt Mørk
data"MH	Mikal Heim
data"MO	Morten Often
data"MS	Mark Smethurst
data"OL	Ole Lutro
data"OO	Odleiv Olesen
data"ON	Øystein Nordgulen
data"PI	Peter M.B. Ihlen
data"PP	Peter Padget
data"PR	Per Ryghaug
data"RDM	Reidar Devold Midtun
data"RB	Rognvald Boyd
data"SJ	Sigmund Johnsen
data"SO	Svein Olerud
data"TAK	Tor Arne Karlsen
data"TK	Tore Kjølseth
data"TM	Trygve Mikalsen
data"THT	Trond Torsvik
data"TT	Terje Thorsnes

8 LIST OF METAMORPHIC CODES

```
DATA"A Umetamorf
DATA"B Meget lav metamorfosegrad
DATA"C Meget lav metamorfosegrad - lavtrykk
DATA"D Meget lav metamorfosegrad - høytrykk
DATA"E Lav metamorfosegrad
DATA"F Lav metamorfosegrad - lavtrykk
DATA"G Lav metamorfosegrad - høytrykk
DATA"H Medium metamorfosegrad
DATA"K Medium metamorfosegrad - lavtrykk
DATA"L Medium metamorfosegrad - høytrykk
DATA"M Høy metamorfosegrad
DATA"N Høy metamorfosegrad - lavtrykk
DATA"O Høy metamorfosegrad - høytrykk
DATA"P Høy metamorfosegrad - granulittfacies
DATA"R Høy metamorfosegrad - eklogittfacies
```

PETRO.BIN or user-created SUBSET DATABASES

Random access files (RAF); total record field-length is 68 characters.

RAF format is as follows:

VARIABLE	FIELD LENGTH
1. Mapsheet	5
2. Latitude	8
3. Longitude	8
4. Lithological code	3
5. Metamorphic code	1
6. Stratigraphic code	3
7. Density	5
8. Susceptibility	8
9. Remanence	8
10. Geologist/info	9
11. Sample number	10

IMPPET.SYS

System configuration file in standard ASCII format.

VARIABLE	DEFAULT VALUE
HP-GL PLOTTER PORT	lpt1:
PRINTER PORT & SCREEN DUMP PORT	lpt1:
BAUDRATE SERIEL COMMUNICATION	9600
PARITY SERIAL COMMUNICATION	n
DATA-BIT SERIAL COMMUNICATION	8
STOP-BIT SERIAL COMMUNICATION	1
PAPER FORMAT HP-GL PLOTTER	4 (A4)
DEFAULT HP-GL PLOTTER PEN	1
DRAWING SPEED HP-GL PLOTTER	20
PLOT TO FILE	n
PLOT SIZE LASER SCREEN DUMP	3
DEFAULT DATABASE NAME	petro.bin
SCREEN TYPE	vga
Y MAXIMUM IN XY-PLOT (% OR N)	50
DENSITY MINIMUM IN XY-PLOT	2500
Y-AXIS IN % OR N (BY NUMBER)	%
Y-AXIS TICK LENGTH	10
FREE - FUTURE EXPANSION	
FREE	
FREE	
FREE	

10 REFERENCES

Olesen, O. & Sæther, P.O., 1990. *Petrofysisk database, PETBASE 2.0, Brukerbeskrivelse.* NGU report 90.097, 50pp.

Torsvik, T.H. & Olesen, O., 1988. *Petrophysics and Palaeomagnetism: Initial report of the Norwegian Geological Survey Laboratory.* NGU Report 88.171, 108pp.