

SCSPLOT Documentation

Version 3.21
July 30, 2014

Color-Filled-Contour Plots of 2D CSAMT/NSAMT Inversion Results

SCSPLOT reads Zonge SCS2D inversion-program files (*.mtm and *.mtd) and creates multi-panel plots of inversion-model sections and data pseudosections. Screen plots may be exported to the Windows Print Manager, to Windows metafiles (wmf), to portable network graphics (png) raster image files, to Surfer script and data files or to Oasis montaj control and data files. Output files are given the same filename stem as the source inversion model file, plus a suffix characterizing the plot number, 1 or 2. By default resistivity inversion results are shown on plot 1 and IP results on plot 2, but resistivity and IP plot panels can be combined within a single plot.

Installation

SCSPLOT may be used on any PC running a recent version of Windows and using 16 or 32-bit color graphics.

SCSPLOT program modules

SCSPLOT.EXE	- reads SCS2D files and creates multi-panel plots
SCSPLOT.CFG	- configuration file
SCSPLOT.GX	- Geosoft Oasis montaj gx to build plots from files exported by SCSPLOT
CFTABLE.CLR	- color-fill spectrum in a Surfer color-table file format

Sample data files

SCS2DEMO.MDE	- Zonge-format data processing, plot annotation and control file
SCS2DEMO.MTM	- sample SCS2D survey configuration, inversion control file & model-section file
SCS2DEMO.MTD	- sample SCS2D CSAMT/NSAMT data file

Documentation and notes.

SCSPLOT.PDF	- scsplot documentation in Adobe pdf format
SCSPLOT_UPDATE.NTS	- notes on scsplot updates

SCSPLOT program modules should be unpacked and placed in a directory on the operating system's path. After placing scsplot files in an appropriate hard-drive directory, edit scsplot.cfg and select the correct Surfer page units (cm,inch). If you use Geosoft's Oasis Montaj, put SCSPLOT.GX in the <GEOSOFT>\gx directory so that it can be run from within Oasis Montaj.

Settings in the scsplot configuration file, SCSPLOT.CFG, determine the Surfer page units used in scsplot's output files. SCSPLOT v3.20 writes only Surfer v8 script files, but future SCSPLOT versions may include additional options for compatibility with changes to Surfer.

CFTABLE.CLR controls the color spectrum SCSPLOT uses for color files. It is set to a rainbow spectrum with partial color saturation so that posted values can be read more easily on printed SCSPLOT plots. Color values may be modified by editing the red, green, blue values in cftable.clr to customize the color fill spectrum.

Program Use

Typing "scsplot scs2demo" on the command line runs scsplot to produce a screen plot from the sample files scs2demo.mtm and scs2demo.mtd. If you type "scsplot" without a command-line argument, scsplot will prompt you to choose from a list of scs2d model files present in the current working directory. Once scsplot has the name of a valid model file, it shows a series of interactive dialog boxes to allow plot-parameter editing. (If \$auto=yes in the *.mde file, scsplot skips interactive verification of plot attributes, exports a plot to the hardcopy format specified in the mde file, and then stops.)

The first dialog box allows you to reconfigure plot panel content. Scsplot allows up to nine panels per plot. Scsplot defaults to a single plot with model section, observed data and observed – calculated data error panels. Possible plot-panel types are inversion model section, observed data pseudosection, calculated data pseudosection, calculated – observed data, or a (calculated – observed data)/(data error) pseudosection. To see the list of options for each panel, click on the arrowhead at the right edge of the panel field. Similarly, click on the right edge of the plot data field to select between model resistivity, TM apparent resistivity, TM impedance phase, TE apparent resistivity or TE impedance phase

“Depth of investigation” is current limited to “sensitivity”, but the University of British Columbia DOI parameter will be implemented in the future. “Sensitivity” values are generated from diagonal values of the model parameter importance matrix, scaled to percent and ranging from 0 to 100. Sensitivities are near 100 % close to the electrodes and gradually fall to 0 at depth. Sensitivity values fall off gradually with increasing depth and a typical “maximum depth of investigation” value is between 1 and 0.5 %. “UBC DOI” (Oldenburg and Li, 1999) are calculated by normalizing the difference between two inversions run with different background values by the background value difference. DOI values range from 0 at the surface where the inversion model is primarily controlled by the geophysical data to 1 at depth where the influence of geophysical data is weak and background model constraints dominate the inversion. DOI sections generally have a sharper cutoff than sensitivity contours and the 0.2 to 0.5 contour is a good choice for a “maximum depth of investigation”.

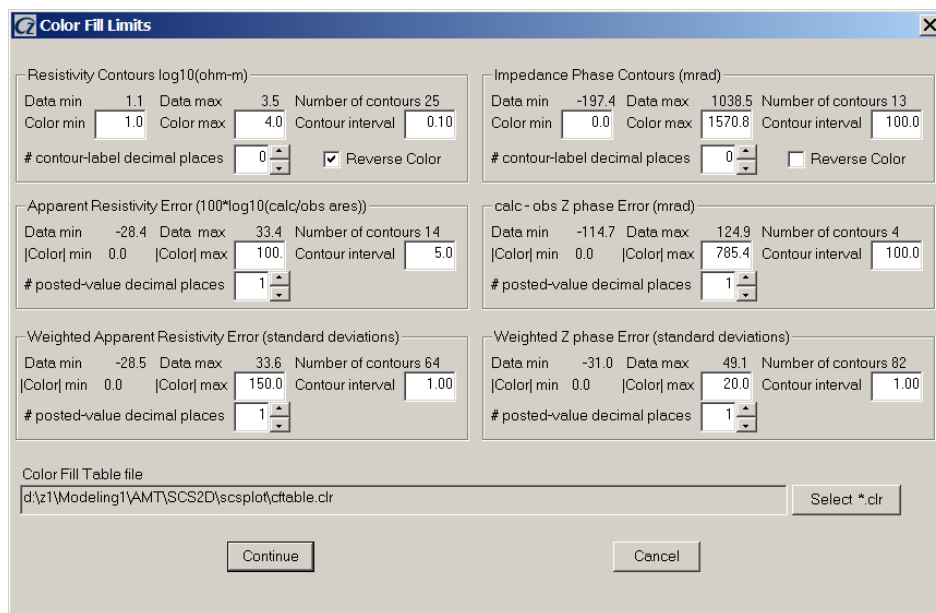
	Plot 1 Type	Plot 1 Data	Plot 2 Type	Plot 2 Data
Panel 1	Inversion Model	Model Resistivity	no plot	Model Resistivity
Panel 2	Observed Data	TM App. Res.	no plot	TM App. Res.
Panel 3	Observed Data	TM Phase(Z)	no plot	TM Phase(Z)
Panel 4	no plot	TM App. Res.	no plot	TM App. Res.
Panel 5	no plot	TM Phase(Z)	no plot	TM Phase(Z)
Panel 6	no plot	Model Resistivity	no plot	Model Resistivity
Panel 7	no plot	Model Resistivity	no plot	Model Resistivity
Panel 8	no plot	Model Resistivity	no plot	Model Resistivity
Panel 9	no plot	Model Resistivity	no plot	Model Resistivity

"Depth of Investigation" Parameter: Sensitivity ☒ Plot Sensitivity/DOI Contours

Continue Cancel

Click on the Cancel button or press the ESC key to abort plot production. Click on the Continue button or press the Enter key to save your changes and continue to a second dialog box.

The second dialog box shows color-fill limits, contour intervals and the number of decimal places to use for posted data values and contour labels.



Color Fill Limits

Resistivity Contours log10(ohm-m)

Data min 1.1 Data max 3.5 Number of contours 25
 Color min 1.0 Color max 4.0 Contour interval 0.10
 # contour-label decimal places 0 ☒ Reverse Color

Impedance Phase Contours (mrad)

Data min -197.4 Data max 1038.5 Number of contours 13
 Color min 0.0 Color max 1570.8 Contour interval 100.0
 # contour-label decimal places 0 ☐ Reverse Color

Apparent Resistivity Error (100*log10(calc/obs ares))

Data min -28.4 Data max 33.4 Number of contours 14
 |Color| min 0.0 |Color| max 100.0 Contour interval 5.0
 # posted-value decimal places 1

calc - obs Z phase Error (mrad)

Data min -114.7 Data max 124.9 Number of contours 4
 |Color| min 0.0 |Color| max 785.4 Contour interval 100.0
 # posted-value decimal places 1

Weighted Apparent Resistivity Error (standard deviations)

Data min -28.5 Data max 33.6 Number of contours 64
 |Color| min 0.0 |Color| max 150.0 Contour interval 1.00
 # posted-value decimal places 1

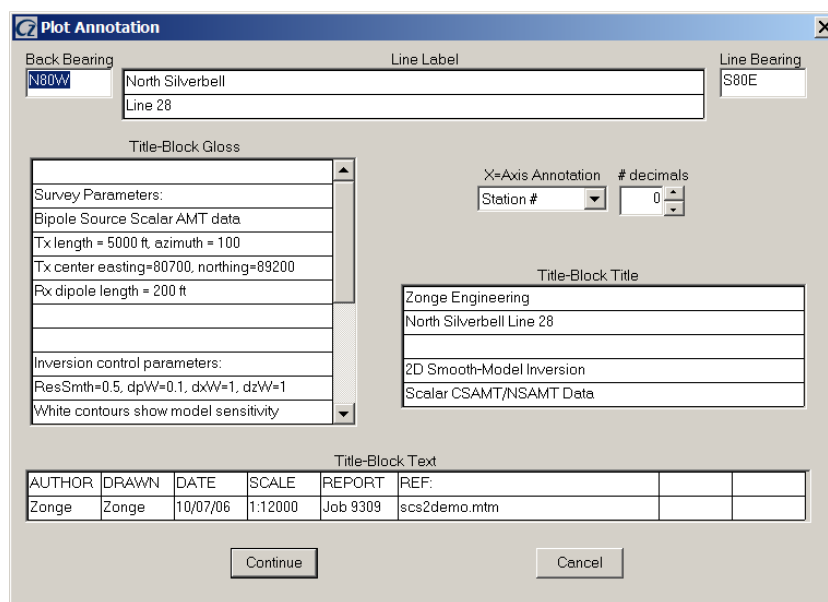
Weighted Z phase Error (standard deviations)

Data min -31.0 Data max 49.1 Number of contours 82
 |Color| min 0.0 |Color| max 20.0 Contour interval 1.00
 # posted-value decimal places 1

Color Fill Table file
 d:\z1\Modeling1\AMT\SCS2D\scsplot\ctable.clr Select *.clr

Continue Cancel

You can move from field to field with the mouse or press tab and shift+tab keys to edit color-fill and contour attributes. Use the select *.clr button if you would like to use a different color-fill table. Again clicking on the Cancel button will abort plot creation and clicking on the Continue button will move you to the next step. Selecting Continue or pressing the Enter key brings up a third dialog box with fields for specifying plot annotation.



Plot Annotation

Back Bearing N80W Line Label North Silverbell Line 28 Line Bearing S80E

Title-Block Gloss

Survey Parameters:
 Bipole Source Scalar AMT data
 Tx length = 5000 ft azimuth = 100
 Tx center easting=80700, northing=89200
 Rx dipole length = 200 ft

Inversion control parameters:
 ResSmith=0.5, dpW=0.1, dxW=1, dzW=1
 White contours show model sensitivity

X-Axis Annotation Station # # decimals 0

Title-Block Title

Zonge Engineering
 North Silverbell Line 28
 2D Smooth-Model Inversion
 Scalar CSAMT/NSAMT Data

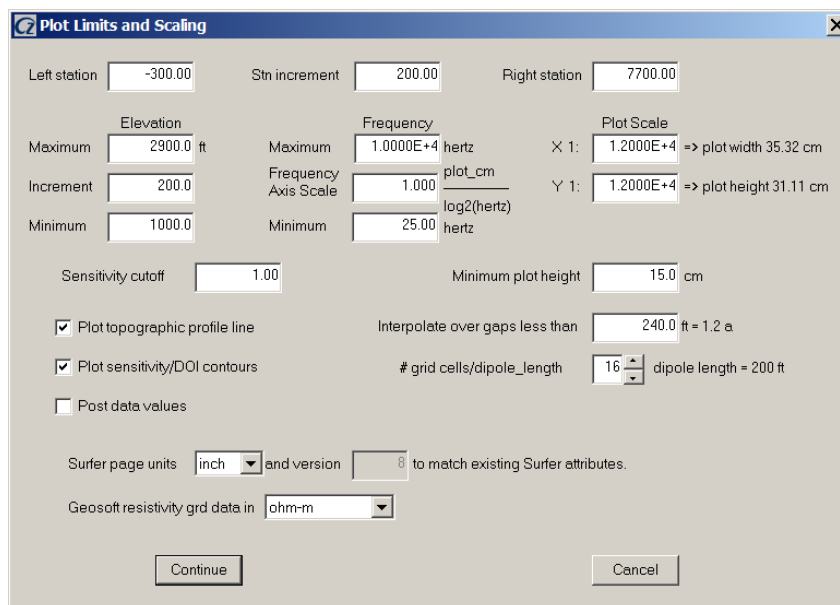
Title-Block Text

AUTHOR	DRAWN	DATE	SCALE	REPORT	REF:
Zonge	Zonge	10/07/06	1:12000	Job 9309	scs2demo.mtm

Continue Cancel

The same plot annotation text is shown in both plots, except for the individual plot panel titles which describe each panel's data type. Default annotation text is generated from system configuration information in mtm files, and is then updated by reading the optional mde file to get possibly more complete information. Scsplot gives you the opportunity to save plot configuration and annotation settings in an updated mde file whenever a plot is exported to a hardcopy format.

The next dialog shows plot limits and scaling

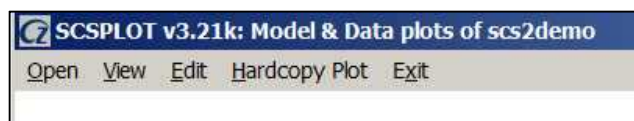


The 'Plot Limits and Scaling' dialog box contains the following fields and options:

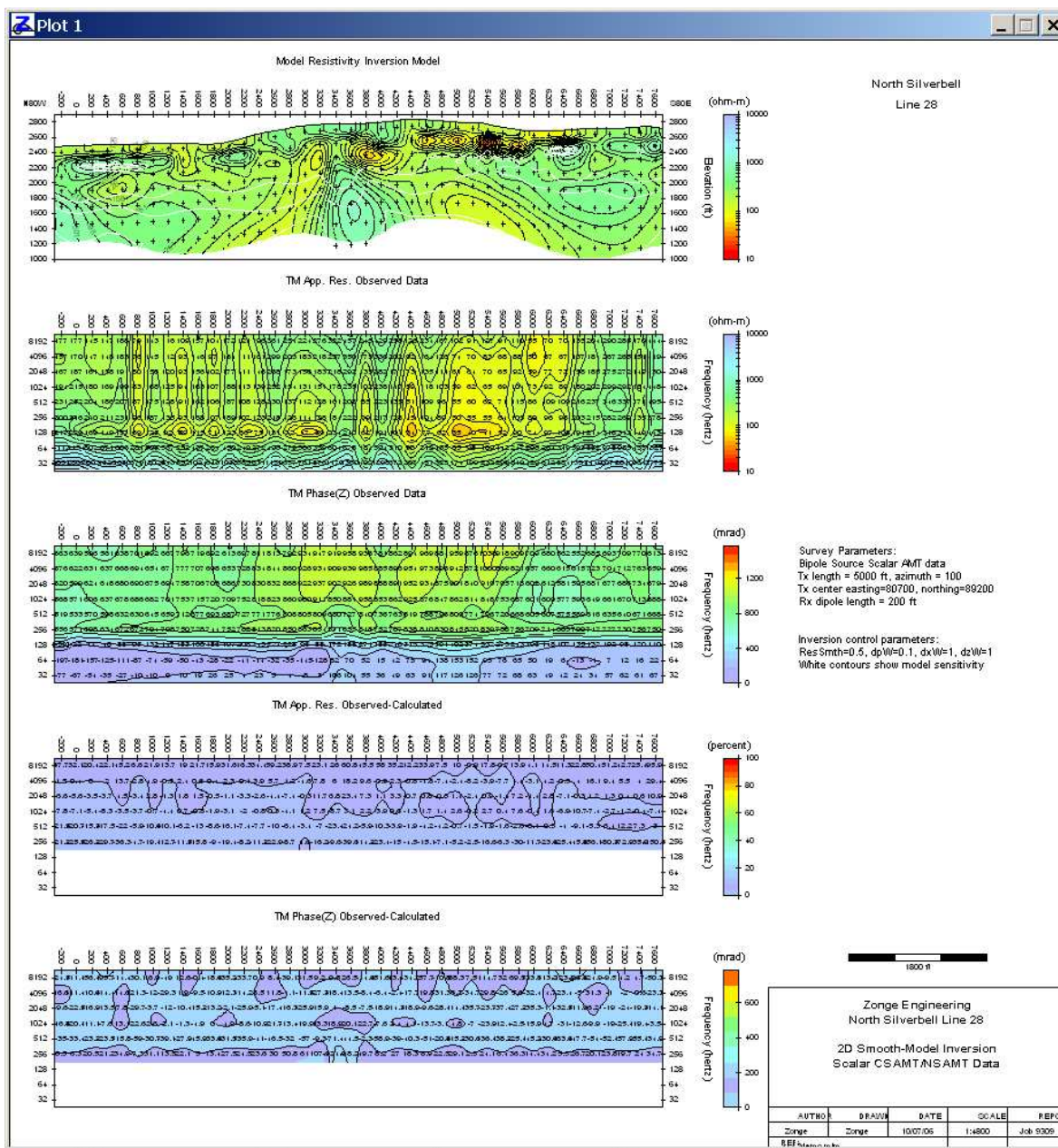
- Left station: -300.00
- Stn increment: 200.00
- Right station: 7700.00
- Elevation: Maximum 2900.0 ft, Increment 200.0, Minimum 1000.0
- Frequency: Maximum 1.0000E+4 hertz, Frequency Axis Scale 1.000 plot_cm log2(hertz), Minimum 25.00 hertz
- Plot Scale: X 1: 1.2000E+4 => plot width 35.32 cm, Y 1: 1.2000E+4 => plot height 31.11 cm
- Sensitivity cutoff: 1.00
- Minimum plot height: 15.0 cm
- ☒ Plot topographic profile line
- Interpolate over gaps less than: 240.0 ft = 1.2 a
- ☒ Plot sensitivity/DOI contours
- # grid cells/dipole_length: 16 (dipole length = 200 ft)
- ☐ Post data values
- Surfer page units: inch and version: 8 to match existing Surfer attributes.
- Geosoft resistivity grd data in: ohm-m
- Buttons: Continue, Cancel

The left station and right station fields control the left and right plot limits. By default, the left station is less than the right station and station numbers will increase from left to right across the plot. If the left station is greater than the right station, station numbers will increase from right to left, reversing the plot's direction. X axis and y axis plot scales can be set independently to allow vertical exaggeration in plots of long lines. Plot size is controlled by station and elevation limits and by plot scale. Minimum plot height puts a lower limit on the plot's height to ensure that single-panel plots have enough space for title block annotation.

The sensitivity cutoff value is used to trim the depth extent of model-section plots. The bottom of the model section is trimmed when model-pixel sensitivity drops below the sensitivity-cutoff value. Increasing the sensitivity cutoff trims off more of the model section, while reducing the sensitivity cutoff retains more model depth extent. In addition scsplot v3.20 shows white sensitivity contours at 1, 2 and 4%. The 1% sensitivity contour is a somewhat optimistic estimate of the maximum depth of investigation, while the 2% contour is a more conservative estimate. As with previous dialogs, click on the Continue button to move to the next dialog panel or click on Cancel to abort the plotting. After you select the Continue button, scsplot generates the each multi-panel plots in its own display screen window, and then displays its main option menu in the main display screen window.



Menu options **Open**, **View**, **Edit**, **Hardcopy Plot** and **Exit** are displayed across the main menu. Selecting **Open** sends you back to the beginning of the plot creation procedure by showing a open-file dialog box listing all mtm files in the current working directory. Selecting **View** brings up two choices, **Plot 1** or **Plot 2**, which will restore either of the plot windows for visual review. The display screen plot windows may also be restored by clicking on the **Plot 1** or **Plot 2** icons showing on the status bar along the bottom of the display screen. If there is only one plot, then selecting **Plot 2** has no effect.



Skipped data. Observed-data apparent resistivity or impedance values in .mtd files are skipped when their corresponding error levels are greater than 5000. Skipped values are not contoured, but are posted on observed data pseudosections as a bracketed value (i.e. [326.2]).

Missing near-field calculated data Note that calculated data or observed – calculated data error pseudosections may be missing low-frequency, near-field values if a two-dimensional inversion of far-field data has been run.

You can make changes to the current inversion plots with the **Edit|Panel Configuration**, **Edit|Color Fill**, **Edit|Plot Scale and Limits** or **Edit|Annotation** menu choices which bring up individual dialog boxes for editing plot attributes. Each of the individual dialog boxes will look familiar, they are all presented in sequence when a new SCS2D file set is plotted starting with the Open menu option.

Hardcopy Plot has several sub-options, **Model to *mtm.csv**, **Printer**, **WMF**, **PNG**, **Surfer Script** or **Geosoft Script**. Selecting Model to *mtm.csv writes pixel-centered model section values to a csv file

with columns of east, north, elevation, xpixel, station, line, inversion_resistivity, log10(ResInv), sensitivity and Oldenburg/UBC depth_of_investigation. Selecting **Printer** sends the current screen plots directly to the Windows Print Manager to produce hardcopy plot copies on your printer. The **Printer** option allows you to select a paper size, margin sizes and paper orientation. If the plot is too big to fit on the paper, it is scaled down until it does fit. Selecting **WMF** produces a windows metafile, which is suitable for pasting into MS-Word documents for report writing. The **PNG** option produces a raster image of the resistivity and IP plots in a portable network graphics file. **PNG** files are a compact raster image format useful for shipping plots over the Internet.

Surfer Script produces Surfer v8 script (bas) and data files (csv, txt, lvi, bln) suitable for plot production with Surfer's scripting program. Exporting a scs2demo plot with **Surfer Script** will produce script file scs2demo1.bas.

Selecting **Geosoft Script** produces Oasis montaj files (con, xyz, grd, zon) which scsplot.gx can turn into a montaj plot. Once you have copied scsplot.gx into the <GEOSOFT>\gx directory, you can open a workspace and run scsplot.gx from the montaj GX|Run GX menu. After exporting scs2demo plots to Geosoft Script, run scsplot.gx and select scs2demo1.con from the scsplot.gx dialog to create the plot scs2demo1.map. Scsplot also creates a number of contour control files, which it prefixes with an underscore so that they can be easily distinguished from the user selectable mapplot control files.

Every time you export a plot to a hardcopy format; plot annotation, plot scale, color fill and contour parameters may be optionally saved as a block of mde file keywords. Scsplot gives you the option of archiving current plot attributes in a mde file with the same filename stem as the input scs2d model files. If the mde file already exists, it is updated, otherwise a new one is created. On subsequent runs, scsplot will read plot scale, axis limit and annotation information from mde file keywords. Saving plot-attribute keywords in mde files is recommended, as it provides an archival record of plot parameters and allows automated plot production from batch files.

Main menu option **Exit** ends scsplot execution.

Scsplot may be run from batch files for more automated plot production. If "\$auto=yes" in the mde file, scsplot skips interactive verification of plot parameters and stops after exporting a hardcopy plot. If "auto=no" or is missing from the mde file, scsplot shows its interactive dialogs to allow interactive plot parameter verification and editing. A dictionary of scsplot mde file keywords is described in the following section.

To further facilitate batch-file operation, scsplot scans its command line for file names. Scsplot uses the model-file name as a template to search for a matching mde file name. If a matching mde file is present, scsplot opens it to scan for plot-attribute specifications.

MDE File Format (Zonge data-processing-control file)

mde files contain one or more "mode" lines. Program-control mode lines start with a \$, optionally followed by a program name and a ":". Next is a keyword followed by an = and then a keyword value. Spaces may be included between elements of the mode line. Putting a ! or " character before the \$, inactivates a mode line, turning it into an inert comment line which is ignored by scsplot. Scsplot will read all mode lines that have either no program name or "\$ scsplot:". It will ignore mode lines which contain other program names.

mde file variables used by SCSPLOT:

AUTO	- yes = batch file mode, no = interactive mode in Zonge data processing programs.
Job.For	- company for which survey was run (text).
Job.Name	- project name (text).
Job.Number	- job number.
Job.Date	- data acquisition date
Line.Name	- line label (string)
Line.Number	- floating point line number.
BRGLINE	- forward line bearing (in direction of increasing station numbers).
BRGBACK	- line back bearing (in direction of decreasing station numbers).

Keywords specific to scsplot.

\$SCSPLOT: - identifies keywords intended specifically for scsplot.

PlotExport	- hardcopy export format (printer,wmf,png,surfer,geosoft)
LengthUnits	- length units (m,ft)

Plot annotation.

BRGLEFT	- line bearing annotation for left end of line.
BRGRIGHT	- line bearing annotation for right end of line.
LNTITLE*	- line title text centered at top of text block (up to two lines).
TBTITLE*	- title-block title information (up to five lines)
TBLABEL*	- title-block text labels along bottom of text block (up to six labels)
TBTEXT*	- title-block text placed along bottom of text block (up to six text strings)
TBGLOSS*	- title-block glossary text placed in the center of text block (up to twenty lines)
FOOTER*	- right footer text (up to three lines).

Plot configuration, limits and scale.

PANELij	- panel configuration (i=plot 1 or 2, j = panels 1 to 4), (Inversion Model, Observed Data, Calculated Data, Calculated-Observed, (Calc-Obs)/Error, no plot), (model resistivity, TM/TE mode apparent resistivity or impedance phase)
DoiType	- 'depth of investigation' contour parameter (Sensitivity or UBC DOI).
XSCALE	- horizontal scale of model-section plot (ground m per plot m).
YSCALE	- vertical scale of model-section plot (ground m per plot m).
YSIZE	- minimum plot height (cm).
StnLeft	- first station on left edge of plot (stations numbers increase from left to right if StnLeft<StnRight and from right to left if StnLeft>StnRight).
StnRight	- last station on right edge of plot.
StnInc	- posted station interval (stn #).
StnDec	- number of decimal places on posted station numbers (0 to 3).
ElvMax	- maximum elevation on model section (length units).
ElvMin	- minimum elevation on model section (length units).
ElvInc	- tick mark increment on model section elevation axis (length units).
SNScutoff	- sensitivity cutoff threshold (0.01 to 50 percent)
Topo	- yes => draw line along topographic profile, no => no line
DataGap	- maximum pseudosection data gridding interpolation distance (LNUnits)

Resistivity color-fill limits and contour attributes.

CRMIN - minimum resistivity color-fill level ($\log_{10}(\text{ohm-m})$).
CRMAX - maximum resistivity color-fill level ($\log_{10}(\text{ohm-m})$).
CRINC - resistivity contour interval ($\log_{10}(\text{ohm-m})$).
CRDEC - number of decimal places on resistivity contour label and posted data (0 to 3).

Resistivity error color-fill limits and contour attributes.

CREMAX - maximum resistivity error |color-fill| level ($100 \cdot \log_{10}(\text{calc/obs})$).
CREINC - resistivity error contour interval ($\log_{10}(\text{ohm-m})$).
CREDEC - number of decimal places on posted resistivity error data (0 to 3).

Weighted resistivity error color-fill limits and contour attributes.

CRWEMAX - maximum weighted resistivity error |color-fill| level (standard deviations).
CRWEINC - resistivity error contour interval (standard deviations).
CRWEDEC - number of decimal places on posted weighted resistivity error data (0 to 3).

Impedance phase color-fill limits and contour attributes.

CPMIN - minimum ZP phase color-fill level (mrad)
CPMAX - maximum ZP color-fill level (mrad).
CPINC - impedance phase contour interval (mrad).
CPDEC - number of decimal places on ZP contour label (0 to 3).

Impedance phase error color-fill limits and contour attributes.

CPEMAX - maximum ZP error |color-fill| level (mrad).
CPEINC - ZP error contour interval (mrad).
CPEDEC - number of decimal places on posted impedance phase error data (0 to 3).

Weighted impedance phase error color-fill limits and contour attributes.

CPWEMAX - maximum weighted ZP error |color-fill| level (standard deviations).
CPWEINC - ZP error contour interval (standard deviations).
CPWEDEC - number of decimal places on posted weighted IP error data (0 to 3).

Listing of scsplot mde-file keywords from s2ddemo.mde:

```
$ Job.Name=North Silverbell
$ Job.Area=Arizona
$ Job.For=Zonge Engineering
$ Job.By=Zonge
$ Job.Number= 9309
$ Job.Date=Nov 93
$ Line.Name=28N
$ Line.Number=28
$ Line.Azimuth=S80E
$ Line.GdpStnBeg=-2.0
$ Line.GdpStnInc=2.0
$ Line.StnBeg=-200.0
$ Line.StnInc= 200.0
$ Unit.Length= FT
$ Survey.Type=Scalar
$ Tx.Type=Bipole
$ Tx.Length= 5000
$ Tx.Azimuth= S80E
$ Tx.Center =80700,89200,0
$ Rx.Azimuth=S80E
$ Rx2Tx.Distance=15840
$ Rx2Tx.Azimuth= North
$ SCSLOT: PlotExport = PNG
$ SCSLOT: LengthUnit = ft
$ SCSLOT: LNTITLE1 = North Silverbell
$ SCSLOT: LNTITLE2 = Line 28
$ SCSLOT: BRGLEFT= N80W
$ SCSLOT: BRGRIGHT= S80E
$ SCSLOT: TBTITLE1 = Zonge Engineering
$ SCSLOT: TBTITLE2 = North Silverbell Line 28
```



```

$ SCSPLOT: TBTITLE3 =
$ SCSPLOT: TBTITLE4 = 2D Smooth-Model Inversion
$ SCSPLOT: TBTITLE5 = Scalar CSAMT/NSAMT Data
$ SCSPLOT: TBLABEL1 = AUTHOR
$ SCSPLOT: TBLABEL2 = DRAWN
$ SCSPLOT: TBLABEL3 = DATE
$ SCSPLOT: TBLABEL4 = SCALE
$ SCSPLOT: TBLABEL5 = REPORT
$ SCSPLOT: TBLABEL6 = REF:
$ SCSPLOT: TBTEXT1 = Zonge
$ SCSPLOT: TBTEXT2 = Zonge
$ SCSPLOT: TBTEXT3 = 10/07/06
$ SCSPLOT: TBTEXT4 = 1:4800
$ SCSPLOT: TBTEXT5 = Job 9309
$ SCSPLOT: TBTEXT6 = scs2demo.mtm
$ SCSPLOT: TBGLOSS01 =
$ SCSPLOT: TBGLOSS02 = Survey Parameters:
$ SCSPLOT: TBGLOSS03 = Bipole Source Scalar AMT data
$ SCSPLOT: TBGLOSS04 = Tx length = 5000 ft, azimuth = 100
$ SCSPLOT: TBGLOSS05 = Tx center easting=80700, northing=89200
$ SCSPLOT: TBGLOSS06 = Rx dipole length = 200 ft
$ SCSPLOT: TBGLOSS07 =
$ SCSPLOT: TBGLOSS08 =
$ SCSPLOT: TBGLOSS09 = Inversion control parameters:
$ SCSPLOT: TBGLOSS10 = ResSmth=0.5, dpW=0.1, dxW=1, dzW=1
$ SCSPLOT: TBGLOSS11 = White contours show model sensitivity
.
$ SCSPLOT: TBGLOSS20 =
$ SCSPLOT: PANEL11 = Inversion Model, Model Resistivity
$ SCSPLOT: PANEL12 = Observed Data, TM App. Res.
$ SCSPLOT: PANEL13 = Observed Data, TM Phase(Z)
$ SCSPLOT: PANEL14 = no plot, TM App. Res.
$ SCSPLOT: PANEL15 = no plot, TM Phase(Z)
$ SCSPLOT: PANEL16 = no plot, Model Resistivity
$ SCSPLOT: DoiType = Sensitivity
$ SCSPLOT: XSCALE = 1.2000E+4 Horizontal scale (plot X-axis)
$ SCSPLOT: YSCALE = 1.2000E+4 Vertical scale (plot Y-axis)
$ SCSPLOT: YSIZE = 15.00 Minimum plot height (cm)
$ SCSPLOT: StnLeft = -300. First station on left edge of plot
$ SCSPLOT: StnRight = 7700. Last station on right edge of plot
$ SCSPLOT: StnDec = 0 # station-number decimals (0 to 3)
$ SCSPLOT: StnInc = 200.00 Station interval (stn #)
$ SCSPLOT: ElvMin = 1000.00 Minimum elevation (plot Y-axis)
$ SCSPLOT: ElvMax = 2900.00 Maximum elevation (plot Y-axis)
$ SCSPLOT: ElvInc = 200.00 Elevation tick interval
$ SCSPLOT: SNScutoff = 1.00 Sensitivity cutoff threshold (percent)
$ SCSPLOT: Topo = yes Draw line along topographic profile.
$ SCSPLOT: PostData = yes Post pseudosection data values.
$ SCSPLOT: DataGap = 240.00 Maximum data gridding interpolation length (ft)
$ SCSPLOT: CRMIN = 1.00 Res contour color minimum (log10(ohm-m))
$ SCSPLOT: CRMAX = 4.00 Res contour color maximum (log10(ohm-m))
$ SCSPLOT: CRINC = 0.10 Res contour interval (log10(ohm-m))
$ SCSPLOT: CRDEC = 0 # res-contour-label decimals (0 to 3)
$ SCSPLOT: CREMAX = 100.00 |Res error| contour color maximum (100*log(calc/obs))
$ SCSPLOT: CREINC = 5.00 Res error contour interval (100*log(calc/obs))
$ SCSPLOT: CREDEC = 1 # res-error contour label decimals (0 to 3)
$ SCSPLOT: CRWEMAX = 150.00 |weighted res error| contour color maximum (standard
deviations)
$ SCSPLOT: CRWEINC = 1.00 Weighted res error contour interval (standard deviations)
$ SCSPLOT: CRWEDEC = 1 # res-error contour label decimals (0 to 3)
$ SCSPLOT: CPMIN = 0.00 IP contour color minimum (IPUnits)
$ SCSPLOT: CPMAX = 1570.80 IP contour color maximum (IPUnits)
$ SCSPLOT: CPINC = 100.00 IP contour interval (IPUnits)
$ SCSPLOT: CPDEC = 0 # IP-contour-label decimals (0 to 3)
$ SCSPLOT: CPEMAX = 785.40 |IP error| contour color maximum (IPUnits)
$ SCSPLOT: CPEINC = 100.00 IP error contour interval (IPUnits)
$ SCSPLOT: CPEDEC = 1 # IP-error contour label decimals (0 to 3)
$ SCSPLOT: CPWEMAX = 20.00 |weighted res error| contour color maximum (std dev)
$ SCSPLOT: CPWEINC = 1.00 Weighted res error contour interval (standard deviations)
$ SCSPLOT: CPWEDEC = 1 # res-error contour label decimals (0 to 3)

```

Scsplot configuration file (scsplot.cfg)

Scsplot.cfg is an ASCII file holding modes to parameters used to configure program scsplot. When scsplot is run, it looks for scsplot.cfg in the current working directory, then in the directory holding scsplot.exe and finally in MS-DOS path directories.

Scsplot.cfg may contain any number of blank or comment lines, and they may be located anywhere in the file. Comment lines begin with a !, /, \ or " character. Scsplot ignores all blank and comment lines.

Scsplot.cfg contains one or more active "mode" lines with the same structure used in mde files. Mode lines begin with a \$ character, followed by a keyword, an = and then a mode value. Spaces may be included between elements of the mode line. Putting a ! character before the \$ inactivates a mode line by creating a comment line, which scsplot will ignore.

scsplot.cfg file variables:

SurferVersion - Surfer version number (8), only Surfer v8 script is implemented in scsplot v3.20
PageUnits - Surfer page units (inches, cm)

Listing of scsplot.cfg:

```
! Program scsplot configuration file, updated 12/July/06 by SCM
! Blank lines are ignored.
! Comment lines start with ! and are ignored.
! Active mode lines start with $ and are used.

! Surfer version number, only Surfer v8 is implemented in scsplot v3.20
$ SurferVersion=8

! Surfer page units, select one of two.
$ PageUnits=inch
!$ PageUnits=cm
```

Scsplot color-fill table file (cftable.clr)

CfTable.clr is an ASCII file specifying the color spectrum to use for color fills. The installation version has a blue-to-red rainbow spectrum, but cftable.clr can be customized to suit individual tastes. CfTable.clr uses a Golden Software's Surfer format, so sample Surfer clr files with different color spectrums can be copied from the Surfer\Samples subdirectory.

Listing of cftable.clr:

```
ColorMap 1 1
    0      178      178      255
    25     153      255      255
    50     128      255      128
    75     255      255       0
   100     255       0       0
```

cftable.clr file variables:

Scsplot ignores the header line "ColorMap 1 1", but it should be included for compatibility with Surfer.

The remaining numerical records specify range, red, green and blue values for a variable number of anchor points, where

Range = percent between minimum and maximum contoured data (0 to 100),

Red = amount of red color from 0=none to 255=maximum,

Green = amount of green color from 0=none to 255=maximum,

Blue = amount of blue color from 0=none to 255=maximum.

Colors are interpolated between anchor points to get continuous gradation of the color-fill spectrum. Range values should be ordered from low to high with no duplicate values.

*mtm.csv format (SCSPLOT => Model to *mtm.csv)

*mtm.csv files hold pixel-centered model-section values in a tabular comma-separated-value format

Partial *mtm.csv file listing:

```
East,North,Elev,XPixel,Station,Line,ResInv,log10(ResInv),Sensitivity,DOI
72096,73407,2393.279,99.787,-600,0,103.3,2.0141,7.03,1
72096,73407,2245.29,99.787,-600,0,95.11,1.9782,4.44,1
72096,73407,2077.022,99.787,-600,0,176.4,2.2465,1.56,1
:      :      :      :      :      :      :      :
:      :      :      :      :      :      :      :
```

*mtm.csv file variables:

Line one holds column labels.

East	- pixel center easting (length units).
North	- pixel center northin (length units).
Elevation	- pixel center elevation (length units).
Ypixel	- pixel center distance along line (length units).
Station	- pixel center station number
Line	- line number
ResInv	- inversion model resistivity (ohm-m).
log10(ResInv)	- log10 of inversion model resistivity (log10(ohm-m)).
Sensitivity	- inversion model sensitivity (percent).
DOI	- inversion model Oldenburg/UBC "depth of investigation (ratio, 0 to 1).

SCSPLOT => SURFER format files

*.bas = Surfer v8 basic script (see Surfer v8 documentation)
*.bln = Surfer blanking file, masks plot above topography and below sensitivity cutoff contour.
*.grd = Surfer v6 format grid file
*.lvl = Surfer color-filled contour level file (see Surfer v8 documentation)

*S.CSV File Format (SCSPLOT => SURFER data file)

*s.csv files hold model values, observed and calculated data in a tabular format suitable for use by Golden Software's Windows SURFER v8 program.

Partial *s.csv file listing:

```
"Xpixel","Ypixel","Res_mod","log10(Res_mod)","Res_sns","Res_doi","Res_RMW","Xdata","Ydata","log10(ARTMobs)","log10(ARTMcalc)","ARTMobs","ARTMcalc","100*log(ARTMobs/ARTMcalc)","log(ARTMobs/ARTMcalc)/ARTMerr","ZPTMobs","ZPTMcalc","(ZPTMobs-ZPTMcalc)","(ZPTMobs-ZPTMcalc)/ZTMerr","log10(ARTEobs)","log10(ARTEcalc)","ARTEobs","ARTEcalc","100*log(ARTEobs/ARTEcalc)","log(ARTEobs/ARTEcalc)/ARTEerr","ZPTEobs","ZPTEcalc","(ZPTEobs-ZPTEcalc)","(ZPTEobs-ZPTEcalc)/ZTEerr"
498.951,2403.365,1.37100E+02,2.137,88.08,,498.951,1000,3.452,,2831,,,-76.5,,,,,,,,,
498.951,2252.932,2.64700E+02,2.423,16,,498.951,1200,3.046,,1112,,,-197.4,,,,,,,,,
498.951,2083.384,2.73900E+02,2.438,8.51,,498.951,1400,2.336,,[216.8],,,[-39.2],,,,,,,,,,
:      :      :      :      :      :      :      :
:      :      :      :      :      :      :      :
```

*S.CSV file variables:

Line one holds column labels.

Inversion-model section

Xpixel	- pixel center location along line (length units).
Ypixel	- pixel center elevation (length units).
Res_mod	- model resistivity (ohm-m).
log10(Res_mod)	- log10 of model resistivity (log10(ohm-m)).
Res_Sns	- resistivity model sensitivity (percent).
Res_doi	- resistivity model "depth of investigation (ratio, 0 to 1).
Res_RMW	- resolution width (length units)

Pseudosection data

Xdata	- pseudosection plot point location along line (length units).
Ydata	- pseudosection plot point vertical plot position (length units).

TM-mode data

log10(ARTMobs)	- observed TM-mode apparent resistivity (log10(ohm-m)).
log10(ARTMcalc)	- calculated TM-mode apparent resistivity (log10(ohm-m)).
ARTMobs	- observed TM-mode apparent resistivity (ohm-m).
ARTMcalc	- calculated TM-mode apparent resistivity (ohm-m).
100*log(ARTMobs/ARTMcalc)	- relative TM-mode apparent resistivity error (%)
log(ARTMobs/ARTMcalc)/ARTMerr	- weighted TM-mode apparent resistivity error (std dev)
ZPTMobs	- observed TM-mode impedance phase (mrad).
ZPTMcalc	- calculated TM-mode impedance phase (mrad).
(ZPTMobs-ZPTMcalc)	- observed – calculated TM impedance phase error (mrad)
(ZPTMobs-ZPTMcalc)/ZPTMerr	- weighted TM impedance phase error (std dev)

TE-mode data

log10(ARTEobs)	- observed TE-mode apparent resistivity (log10(ohm-m)).
log10(ARTEcalc)	- calculated TE-mode apparent resistivity (log10(ohm-m)).
ARTEobs	- observed TE-mode apparent resistivity (ohm-m).
ARTEcalc	- calculated TE-mode apparent resistivity (ohm-m).
100*log(ARTEobs/ARTEcalc)	- relative TE-mode apparent resistivity error (%)
log(ARTEobs/ARTEcalc)/ARTEerr	- weighted TE-mode apparent resistivity error (std dev)
ZPTEobs	- observed TE-mode impedance phase (mrad).
ZPTEcalc	- calculated TE-mode impedance phase (mrad).
(ZPTEobs-ZPTEcalc)	- observed – calculated TE impedance phase error (mrad)
(ZPTEobs-ZPTEcalc)/ZPTEerr	- weighted TE impedance phase error (std dev)

*S.TXT File Format (SCSPLOT => SURFER text file)

*S.TXT files hold plot scale and annotation information in a spreadsheet format suitable for use by Golden Software's Windows Surfer v8 Scripter program (and for manual Surfer plot creation).

*S.TXT file listing:

```
"XStn", "YMSmax", "YPSmax", "Stn", "Xmin", "Xmax", "Yplt", "Freq", "Xmin", "Xmax", "Yplt", "elev"
498.95,2900,2700,-200,399.16,8398.19,1000,32,399.16,8398.19,1000,1000
698.78,2900,2700,0,399.16,8398.19,1200,64,399.16,8398.19,1200,1200
898.89,2900,2700,200,399.16,8398.19,1400,128,399.16,8398.19,1400,1400
1099.05,2900,2700,400,399.16,8398.19,1600,256,399.16,8398.19,1600,1600
1299.16,2900,2700,600,399.16,8398.19,1800,512,399.16,8398.19,1800,1800
1499.03,2900,2700,800,399.16,8398.19,2000,1024,399.16,8398.19,2000,2000
1698.94,2900,2700,1000,399.16,8398.19,2200,2048,399.16,8398.19,2200,2200
1899.06,2900,2700,1200,399.16,8398.19,2400,4096,399.16,8398.19,2400,2400
2098.93,2900,2700,1400,399.16,8398.19,2600,8192,399.16,8398.19,2600,2600
2298.84,2900,2700,1600,,,,,399.16,8398.19,2800,2800
2498.95,2900,2700,1800
2699.07,2900,2700,2000
2899.22,2900,2700,2200
. . . .
. . . .
. . . .

8298.4,2900,2700,7600
8398.19,1000,900,
```

*S.TXT file variables:

Line one holds column labels.

Station number posting

XStn - x-coordinate of station number (length units)
YMSmax - maximum model-section y-coordinate (length units)
YPSmax - maximum pseudosection y-coordinate (length units)
Stn - station number

Pseudosection

Xmin - x-coordinate of left pseudosection y-axis (length units).
Xmax - x-coordinate of right pseudosection y-axis (length units).
Yplt - y-coordinate of y-axis pseudosection annotation (length units = $\text{dipole_length} \cdot \log_2(\text{freq})$).
Freq - y-axis pseudosection annotation values (frequency, hertz).

Model section

Xmin - x-coordinate of left model section y-axis (length units).
Xmax - x-coordinate of right model section y-axis (length units).
Yplt - y-coordinate of y-axis annotation (length units).
elev - y-axis model section annotation values (length units).

SCSPLOT => Geosoft Oasis montaj format files

filename1.con & filename2.con = Geosoft mapplot control files

_filename*.con = contour control files

_filename*s.con = sensitivity contour control files

*.mdf = Geosoft map definition files

*.grd = Geosoft short integer, uncompressed grid files

*.zon = Geosoft contour color-fill files

*m.xyz = model section values

x = pixel center plot x (length units)

y = pixel center plot y (length units*vertical exaggeration)

z1 = station number

z2 = inversion model pixel resistivity (ohm-m) (Line 1) or IP (IP units) (Line 2)

z3 = model pixel sensitivity (%)

z4 = model UBC "depth of investigation"

z5 = model resolution width (length units)

*s.xyz = station and elevation posting

x = x plot coordinate (length units)

y = y plot coordinate (length units)

z1 = post value:

Line 1 = left y-axis elevation posting

Line 2 = right y-axis elevation posting

Line 3 = model section station number posting

Line 4 = left pseudosection y-axis n-spacing posting

Line 5 = right pseudosection y-axis n-spacing posting

Line 6 = pseudosection station number posting

Line 7 = topographic profile

*d.xyz = resistivity (Line 1) and IP (Line 2) pseudosection data

x = x plot coordinate (length units)

y = y plot coordinate (length units)

Line 1

z1 = observed apparent resistivity

z2 = calculated apparent resistivity

z3 = 100*observed/calculated apparent resistivity

z4 = (100* observed/calculated apparent resistivity)/(apparent resistivity error)

Line 2

z1 = observed IP

z2 = calculated IP

z3 = 100*observed - calculated IP

z4 = (100* observed - calculated IP)/(IP error)