

Composition of Dr. Yokoi's program for MASW

[Directories]

- ./maswkf
- ./maswkf/data
- ./maswkf/data/c_f_panels
- ./maswkf/data/cmp_gathers
- ./maswkf/data/cmp_gathers/fig
- ./maswkf/data/common_shot_gathers
- ./maswkf/data/common_shot_gathers/fig
- ./maswkf/data/dispersion
- ./maswkf/data/dispersion/fig
- ./maswkf/data/field_data
- ./maswkf/data/geometry
- ./maswkf/data/geometry/fig
- ./maswkf/data/dispersion/log_files
- ./maswkf/data/dispersion/structure
- ./maswkf/data/dispersion/structure/fig
- ./maswkf/data/structure
- ./maswkf/data/structure/fig
- ./maswkf/prm
- ./maswkf/prm/gnuplt_script
- ./maswkf/prm/gnuplt_script/c_f_panels
- ./maswkf/prm/gnuplt_script/dispersion
- ./maswkf/prm/gnuplt_script/structure
- ./maswkf/source

[FORTRAN programs (in directory ./source/)]

- connect.for
- dgflt.f
- disp_comb.for
- disp_sma1_3.for
- draw2d.for
- geometry_plt.for
- masw2_1.for
- masw2cmp.for
- seecmp24.for (subprogram: PSCAL.F)
- seewav24.for (subprogram: PSCAL.F)
- seg2read.for
- seg2readr1.for

[Parameter files (in directory ./maswkf/prm/)]

- connect.prm
- disp_comb.prm
- disp_sma1_3.prm
- draw2d.prm
- geometry.prm
- masw2_1.prm
- masw2cmp.prm
- seecmp24.prm
- seewav24.prm
- seg2read1.prm
- str_range.dat

Simplified procedures of Dr. Yokoi's program for MASW

1. INSTALLATION OF FIELD DATA

Convert from seg2 format to ASCII format.

Parameters	./maswkf/prm/seg2read.prm → data file name, scale, number of channel
Program	./source/seg2readr1.for
Command	“./seg2readr1.exe”
Inputs	./maswkf/data/field_data/sbg100xx.sg2
Outputs	./maswkf/data/common_shot_gathers/sbg100xx.dat (xx: shot number)

2. SETTING OF ARRAY CONFIGURATION

2.1 Create a GNUPLOT input file

Parameters	./maswkf/prm/geometry.prm → number of ASCII files, geophone interval, and positions of shot & 1ch geophone
Program	./source/geometry_plt.for
Command	“./geometry_plt.exe”
Outputs	./maswkf/data/geometry/x_sta.dat ./maswkf/data/geometry/x_cmp.dat ./maswkf/data/geometry/x_shot.dat ./maswkf/prm/gnuplt_script/geometry.plt

2.2 Plot a diagram (geophones - shot point locations)

Command	“gnuplot ./maswkf/prm/gnuplt_script/geometry.plt”
Output	./maswkf/data/geometry/fig/geometry.ps

3. PLOTTING OBSERVED WAVEFORMS

Parameters	./maswkf/prm/geometry.prm ./maswkf/prm/seewav24.prm → Normalizing of waveform plotting
Program	./source/seewav24.for
Command	“./seewav24.exe”
Inputs	./maswkf/data/common_shot_gathers/sbg100xx.dat
Outputs	./maswkf/data/common_shot_gathers/fig/sbg100xx.ps

4.CALCULATION OF CMP GATHERS

4.1 Calculation of CMP gathers

Parameters `./maswkf/prm/masw2_1.prm`
→ frequency range, number of channels,
sampling frequency, geophone interval, data points.
acceptable min. and max. distances from a CMP

Program `./source/masw2_1.for`

Command `“./masw2_1.exe”`

Inputs `./maswkf/data/common_shot_gathers/sbg100xx.dat`

Outputs `./maswkf/data/cmp_gathers/cmpxxx.dat`
(xxx: CMP number)

4.2 Plotting of CMP gathers

Parameters `./maswkf/prm/geometry.prm`
`./maswkf/prm/seecmp24.prm`
→ number of CMP gathers

Program `./source/seecmp24.for`

Command `“./seecmp24.exe”`

Inputs `./maswkf/data/cmp_gathers/cmpxxx.dat`

Outputs `./maswkf/data/cmp_gathers/fig/cmpxxx.ps`

5.CALCULATION OF DISPERSION CURVES

5.1 Calculation of dispersions and create GNUPLOT input files

Parameters `./maswkf/prm/geometry.prm`
`./maswkf/prm/masw2cmp.prm`
→ frequency range, normalization factor,
phase velocity range and CMP range

Program `./source/masw2cmp.for`

Command `“./masw2cmp.exe”`

Inputs `./maswkf/data/cmp_gathers/cmpxxx.dat`

Outputs `./maswkf/data/c_f_panels/crs_cfxxx.dat` (c-f data)
`./maswkf/data/c_f_panels/coh_pkxxx.dat` (peak of c-f)
`./maswkf/data/dispersion/cmpxxxds.dat` (dispersion curve)
`./maswkf/prm/gnuplt_script/c_f_panels/maswxxx.plt`
`./maswkf/prm/gnuplt_script/multi_cf.plt`

5.2 Plotting dispersion curves

Command `“gnuplot ./maswkf/prm/gnuplt_script/multi_cf.plt”`

Outputs `./maswkf/data/c_f_panels/fig/cmpxxx.ps`

5.3 Modify masw2cmp.prm and try 5.1 and 5.2 again

5.4 Set input files for inversions

Parameters `./maswkf/prm/disp_comb.prm` (automatically created)

Program `./source/disp_comb.for`

Command `“sh ./disp_comb”`

Inputs `./maswkf/data/dispersion/cmpxxds.dat`

Outputs `./maswkf/data/dispersion/disp_all.csv`

`./maswkf/data/dispersion/disp_all.dat`

`./maswkf/prm/gnuplt_script/dispersion/dispxxx.plt`

`./maswkf/prm/gnuplt_script/disp_all.plt`

5.5 Plotting of all c-f diagrams

Command `“gnuplot ./maswkf/prm/gnuplt_script/disp_all.plt”`

Outputs `./maswkf/data/dispersion/fig/dispxxx.ps`

6. INVERSIONS

6.1 Apply heuristic search for selected dispersion curves

Parameters `./maswkf/prm/disp_sma1_3.prm`

→ name of initial velocity structure,
available dispersion curve ranges in 6.5,
setting of empirical formulas

Program `./source/disp_sma1_3.for`

Command `“./disp_sma1_3.exe”`

Input `./maswkf/prm/str_range.dat`

→ number of layers, Vp and density for each layer
→ ranges of thickness and Vs for each layer

`./maswkf/data/dispersion/cmpxxds.dat`

Outputs `./maswkf/data/dispersion/progress.dat`

`./maswkf/data/dispersion/err_estm.dat`

`./maswkf/data/dispersion/disp_calxxx.dat` (dispersion)

`./maswkf/data/structure/vel_calxxx.dat` (structure)

6.2 Plotting of all c-f comparisons

Command "gnuplot ./maswkf/prm/gnuplt_script/disp_cal_all.plt"

Outputs ./maswkf/data/dispersion/fig/disp_calxxx.ps

6.3 Plotting of 1D velocity structures

Command "gnuplot ./maswkf/prm/gnuplt_script/vel_cal_all.plt"

Outputs ./maswkf/data/structure/fig/vel_calxxx.ps

7 VISUALIZATION OF 2D STRUCTURE

7.1 Compile 1D structures and create GNUPLOT input files

Parameters ./maswkf/prm/draw2d.prm

→ range for plotting, direction

Program ./source/draw2d.for

Input ./maswkf/data/structure/vel_calxxx.dat

Outputs ./maswkf/prm/gnuplt_script/draw2d.plt

./maswkf/data/structure/draw2d.dat

7.2 Plot a 2D structure

Command "gnuplot ./maswkf/prm/gnuplt_script/draw2d.plt"

Output ./maswkf/data/structure/fig/draw2d.ps