

Seismic Handler

German-Chinese Training Course Seismology and Seismic Hazard Assessment II

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Content

- Seismic Handler's project web pages
- Installing Seismic Handler
- Using your own seismological data
- Include detailed station information
- Customize Seismic Handler
- Handle SeisComP3 data volumes
- Incorporate SC3 (automated) solution

About

Website www.seismic-handler.org includes

- documentation for SH and SHM (wiki)
- subversion source code access
- downloads
- ticket system for bugs and enhancements
- mailing lists (<http://list.seismic-handler.org/>)
- discussion forum
- tools

Installation

Native software:

- Linux
- Solaris

As virtual machine:

- Windows
- MacOS X

Virtual machine

- Get and install VMware player from www.vmware.com
- Download Seismic Handler VMware container from www.seismic-handler.org/portal/wiki/AllDownloads
- Start virtual machine

Native installation

- Download installation package
www.seismic-handler.org/portal/wiki/AllDownloads
- Follow installation instructions on website for your operation system

Using your own waveform data

Seismic Handler supports various data formats:

- miniseed
- GSE
- q-file (Seismic Handler's own format)
- ASCII
- Güralp Compressed Format (GCF)
- „foreign formats“ - converter needed

Add station information

Basic station meta data in \$SH_INPUTS/STATINF.DAT

- Code
- Latitude
- Longitude
- Elevation
- possible: configuration as array member

```
GRA1 lat:+49.6918877 lon: +11.2217202 elevation: 499.5 array:01  
xrel: 0.102153 yrel: 0.109822 name:Graefenberg,_F.R.G.
```

GRA1 is array member with xrel/yrel offset (in km).



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Add sensitivity

Configuration file \$SH_INPUTS/sensitivities.txt

- code-stream-component
- start date
- end date
- gain

gra1-bh-z	...	16-oct-1995_11:00	1.212652
gra1-bh-z	16-oct-1995_11:00	09-Apr-2003_12:00	1.33
gra1-bh-z	09-apr-2003_12:00	11-May-2006_08:10	0.99
gra1-bh-?	10-May-2006_08:10	...	1.2713

GRA1 has a history of gain factors. The question mark (?) matches all components (ZNE).

Handle transfer function

Configuration file `$SH_INPUTS/filter_lookup.txt`

- Stream
- Filter file (located in `$SH_FILTER`)

```
GRA1-BH-Z GRSN
```

```
GRA1-BH-N GRSN
```

```
GRA1-BH-E GRSN
```

More about working with simulation filters on [website](#).

Data request from BGR/SZGRF

<http://www.szgrf.bgr.de/> → Requests via WWW

Example for small requests:

- station code: GRA1
- components: ZNE
- channel: BH
- date & time: 2010-08-12 12:00:00
- length in seconds: 600
- output format: GSE2.0
- User-ID: 00000

→ Submit form and download data to file



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Reading miniseed data

Seismic Handler always needs an catalogue for accessing miniseed data files. It does not support reading from an SDS environment or SeisComP3 playbacks.

- create an “sfd” index file (valid for most users) or
- use a database (complex task, see web pages)

```
sh:~> tcsh
```

```
sh:~> $SEED_PROG/sfdlist_l.csh
```

\$SEEDPROG/sfdlist_l.csh

Options (defaults):

- Wildcard for file name (*)
- Root directory (current dir)
- Output file (sfdfile.sfd)
- Scratch file (~/.sfd_scr_\$\$000)
- Record length (auto detect)
- Byte offset (auto detect)

```
$SEED_PROG/sfdlist_l.csh '*' /data/2010/ /data/2010/sfdfile.sfd
```

Processes all files in folder /data/2010/, output is redirected.

Read dialog

stations (also sets and groups of them)

component + channel

date + time + length

input options

read GRSN form

\$NW \$N ---- \$AT GRA1
 ---- \$C \$E \$CZ GRFO
 \$SW \$S \$GMS \$PL \$GRF
 ---- \$KT \$EEU ----
 ---- \$GR \$GERES \$DK \$GRSN

SET1 ----

Z N E ed FA LH BH HH ed BD

▲ ▲ ▲ ▲ ▲ ▲
17-Aug-2010 21:45:00 read length edit: 6.0
▼ ▼ ▼ ▼ ▼ ▼
▼ eventlist 0 ▲
6
read length (min)

Keep Traces Fbox PC-Sun Sfd path: SFD

Customizing read dialog

open configuration file

→ Specials → Configure

read GRSN form

\$NW \$N --- --- \$AT GRA1
 --- \$C \$E --- \$CZ GRFO
 \$SW \$S \$GMS --- \$PL \$GRF
 --- --- \$KT --- \$EEU ---
 --- --- \$GR \$GERES \$DK \$GRSN

SET1 ---

Z N E ed FA LH BH HH ed BD

read length edit:

Keep Traces Fbox PC-Sun Sfd path:

Customizing read dialog

- look for lines starting with „v\$read_dialog_stations“
- trailing number indicates page of „Read dialog“
- list of stations always consists of 30 entries!
- use „---“ to define empty values for skipping
- common case: just station codes (all in one line)

```
v$read_dialog_stations_01  
bfo,brg,bseg,bug,cll,clz,fur,fbe,gec2,grfo,gtnn,gunz,hlg,ibbn,man  
z,mox,neub,nott,nrdl,rgn,rotz,rue,stu,tann,tns,ubba,wet,werd,wern  
,wlf
```

This defines 30 stations on page 1 of the „Read dialog“.

read GRSN form

bfo clz gtnn mox rotz ubba
 brg fur gunz Neub rue wet
 bseg fbe hlg nott stu werd
 bug gec2 ibbn nrdl tann wern
 cll grfo manz rgn tns wlf

..... **Next**

Z N E ed **FA** LH BH HH ed **BD**

 read length edit:

Keep Traces Fbox PC-Sun Sfd path:

Define groups of stations

- 2 groups can be defined
- enclose groups by square brackets
- add group names at the end (now 32 entries in line)

```
v$read_dialog_stations_02  
[GRA1, GRA2, GRA3, GRA4, GRB1, GRB2, GRB3, GRB4, GRB5, GRC1, GRC2, GRC3, GRC4  
,  
[GRF0, RGN, RUE, BUG, BSEG, IBBN, WLF, BF0, CLZ, TNS, STU, FUR, MOX, CLL, BRG, W  
ET, GEC2], GRF, GRSN
```

This defines two groups (GRF and GRSN) including corresponding stations on page 2.

read GRSN form

GRA1 GRB2 GRC2 RUE BFO MOX
 GRA2 GRB3 GRC3 BUG CLZ CLL
 GRA3 GRB4 GRC4 BSEG TNS BRG
 GRA4 GRB5 GRFO IBBN STU WET
 GRB1 GRC1 RGN WLF FUR GEC2

GRF GRSN Next

Z N E ed FA SH XX GD ed BD

▲ ▲ ▲ ▲ ▲ ▲
 19-Aug-2010 10:43:00 read length edit: 6.0
 ▼ ▼ ▼ ▼ ▼ ▼
 ▼ eventlist 0 ▲
 6
 read length (min)

Keep Traces Fbox PC-Sun Sfd path: SFD

Read Again Read New Cancel Reset

Define sets of stations by variables

- variables are indicated by leading \$ symbol
- value of variables has to be defined also in configuration file
- definition is translated into station codes internally

```
v$read_dialog_stations_03    $NW, ---, $SW, ---, ---, $N, $C,  
$S, ---, ---, ---, $E, $GMS, $KT, $GR, ---, ---, ---, ---, $GERES, [$AT, $CZ,  
$PL, $EEU, $DK], GRA1, GRFO, $GRF, ---, $GRSN  
  
v$nw                          bug, ibbn, tns, bseg, clz, wlf, nrdl, hlg
```

This defines several stations sets stations on page 3. The definition of \$NW is also included.

read GRSN form

\$NW \$N ---- ---- \$AT GRA1
 ---- \$C \$E ---- \$CZ GRFO
 \$SW \$S \$GMS ---- \$PL \$GRF
 ---- ---- \$KT ---- \$EEU ----
 ---- ---- \$GR \$GERES \$DK \$GRSN

SET1 ---- **Next**

Z N E ed **FA** LH BH HH ed **BD**

 19-Aug-2010 10:43:00 read length edit: 6.0

 eventlist 0

Keep Traces Fbox PC-Sun Sfd path: **SFD**

Using SeisComP3 playback data volumes

- Convert multiplexed miniseed volume to SDS

```
sc> scart -v -I file://sc3playback.sorted-mseed /path/to/sds/
```

- Create sfd index file

```
sh> $SEED_PROG/sfdlist_l.csh '*' /path/to/sds/
```

- Load data using the „Read dialog“

Using SeisComP3 solution

- Write solution to XML file

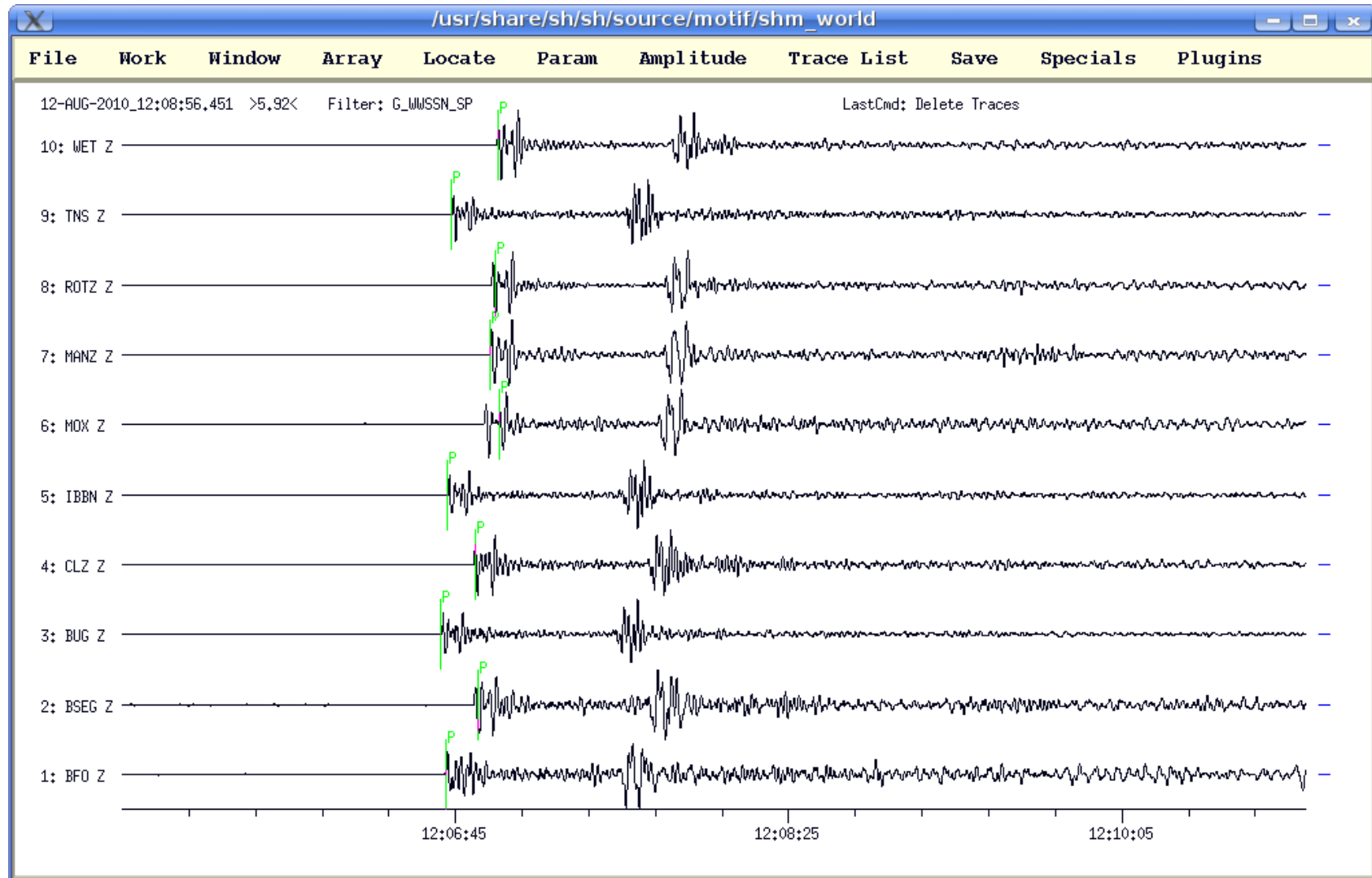
```
./scxmldump --event eventid --database mysql://... \  
--preferred-only --with-picks --formatted --output dump.xml
```

- Make evt file

```
sh> python scxml2evt.py dump.xml dump.evt
```

- Load data & picks:
 1. Load waveforms & Menu → Save, recover EVT...
 2. Use as second parameter in eventlist

Picks are marked as „theoretical onsets“ (light green)!



Final slide



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