SC2SEI
Automatic transfer of phase readings and waveforms from a SeisComp3 data base to a SEISAN data base

Version 1.13

Terje Utheim and Jens Havskov

Department of Earth Science
University of Bergen
Allegaten 41, 5007 Bergen
Norway

Ph. +47 55583408

Email: Terje.Utheim@uib.no, terjeu@hotmail.com

September 2016

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Any questions or suggestions concerning the software can be sent to the email addresses on the front page.

1 INTRODUCTION

Within the seismological community one of the most popular data acquisition and automatic processing system is the SeisComp3(SC3) system (seiscomp3.org). The system is maintained by Gempa (gempa.de). The system has limited facilities for manual processing of events, so many people choose to transfer the data to the SEISAN analysis software for further processing (Havskov and Ottemöller (1999), www.seisan.info). However this is a slightly cumbersome task since the data manually has to be extracted out of the SC3 relational data base (based on date and time and component) and then manually inserted into the SEISAN data base.

The SC2SEI utility is an attempt to make a simple interface to automatically extract triggered and located events recorded by SC3 and store them in the SEISAN database complete with phase readings, locations and magnitudes as well as a corresponding extracted waveform file. Utilities are also included to extract station coordinates and response files, readable by SEISAN, from SC2SEI. The data in the SEISAN data base will then be ready for the operator for further processing.
SEISAN can also read the continuous data from the SC3 archive so manual extraction of events with SEISAN can be done as well as offline event detection, both using the SC3 archive. The combination SC3-SEISAN will then provide the user with a good system for both automatic and manual processing.

This version of SC2SEI must run on the same computer as the SC3 and SEISAN as utilities in both systems are used.

Any feedback will be appreciated.

2 Modifications in version 1.13

The manual/automatic indicator is extracted from the SC3 bulletin and inserted in the s-file.

The magnitudes, and corresponding amplitudes and periods, are extracted from the SC3 bulletin. In the SC3 bulletin 3 magnitudes are recognized and inserted in line type 1 in the s-file, if present. The corresponding amplitudes and period are stored on the phase lines

MLv   L
mb   b
mB   B

Weight from SC3 bulletin: 1.0 and 0.0 are set to "space" and "4" respectively in the s-file.

First motion from SC3 bulletin is set to C, D or blank in the s-file.

Agency is set to SC3 as default in the s-file

In line 1 in the s-file all events are set to "R", regional.

Three new command line options have been implemented:

-wav 1 (default: record both s-file and waveform)
-wav 0 record s-file only

-allcmp 1 (default: record all components specified in parameter file sc2sei.cfg)
-allcmp 0 record all components that have a phase reading.

-ID sc3-event-id create s-file and record waveform for this SC3 single event id.

The -man option is only valid for mode Request and Archives:

-man 0 (default: record all events, both automatic and manually processed)
-man 1 record all automatically processed events only
-man 2 record all manually processed events only

3 INSTALLATION

Pre-requisites:

SEISAN installed according to SEISAN documentation.
SC3 installed according to SC3 documentation.
Package libmysqlclient-dev must be installed.

3.1   STEP-BY-STEP installation of SC2SEI

STEP 1:

It is assumed there is a user account in where SC2SEI can be installed. If not or you want to use a separate account, first create a user account with a username and directory name. An account **seismo** will be used throughout this manual, but any account name will work.

Username: **seismo**
Password: selected by the user.

Making this account will create a home directory: /home/seismo.
Log into this account to start the installation.

STEP 2:

Copy the distribution tar file into your /home/seismo directory and extract the distribution files:

gunzip sc2sei_v1.13.tar.gz
tar -xvf sc2sei_v1.13.tar

A new directory SC2SEI will be created with the subdirectories:

bin   executables
par   parameter files
slinktool   modified version of the SC3 slinktool
src   sc2sei source files and Makefile

NB !
In this version the database name is set to seiscomp3 which is the default name as per today. For installations of seiscomp3 with another database name, the user must edit the sc2sei.c source code and change the database name to the actual name. Search for all lines that contain the text <u>mysql:</u> and change the database name.

STEP 3:

Change to the SC2SEI directory and type:

make clean
make all

make install

The sc2sei re-compiled executable is now stored in the SC2SEI/bin directory.

NB! Include the environment variable SC2SEIS_TOP, ARCHIVE_TOP and PATH:

bash:

export SC2SEI_TOP=/home/yourdir/SC2SEI

export ARCHIVE_TOP=/archive-directory

PATH=/home/yourdir/SC2SEI/bin:$PATH

csh:

setenv SC2SEI_TOP /home/yourdir/SC2SEI

setenv ARCHIVE_TOP /archive-directory

set sc=(/home/yourdir/SC2SEI/bin)

set path=($path $sc)

The SC3 environment setting SEISCOMP_ROOT must be set to the installation directory of the SC3 unless already set during the installation of SC3. Example:

export SEISCOMP_ROOT=/home/yourdir/seiscomp3

4 How SC2SEI works

SC3 is often operated with both local and remote stations and will thus, in addition to triggering on local events, also trigger on distant events which might not be of interest for the local monitoring. SC2SEI has therefore implemented a latitude-longitude and magnitude window within which the event must occur to be transferred to SEISAN. The magnitude is the one defined as M in SC3. SC3 must be running for SC2SEI to work. To ensure this, SC2SEI enters a loop checking if SC3 is active. When SC3 is active, SC2SEI will continue.

The program can work in four different modes:

- **Request mode**: The program is started to extract events in a given time interval *-begin* to *-end*. Events are extracted from the Seedlink segments. When all events from this time window have been extracted, the program exits.
- **Continuous mode**: The program runs continuously to extract events shortly after an event has been processed by SC3. An input parameter, *-time*, tells the program how far back in time it should start to look for events. When all events up until current time have been transferred, the program will continue checking for new events every minute. When events up to current time have been extracted, the next waveform extract is delayed 90 seconds (can be changed in parameter file), plus post event time to ensure data availability.
- **Archive mode**: The program is started to extract events from a given time interval *-begin* to *-end* and the *-arc* option directs the program to extract the events from the continuous SC3 archives. When all events from this time window have been extracted, the program exits. To use this mode the user must ensure that archives are generated by SC3 (module slarchive must be running).
- **Archive ID mode**: The program is started to extract one event specified by the option *-ID idnumber* where idnumber can be found in for example the SC3 scolv display. To use this mode the user must ensure that archives are generated by SC3 (module slarchive must be running).

All modes will record both s-file and waveform by default.
The user can add the option *-wav 0* on all four modes to record only the s-files.
The user can add the option *-allcmp 0* on all four modes to record only components with phase readings

In all modes, the main tasks performed by SC2SEI are:

- Checks if the magnitude is within the range specified in the parameter file.
- Checks if the location is within the area specified in the parameter file.
- A waveform file (MiniSeed format) with the detected event is extracted from the SC3 segments or archives and stored in the SEISAN database, the S-file is created with the corresponding link to the waveform file. The SC3 segments and archives are normally several days or weeks long. This is configured in SC3.

SC2SEI does not transfer all SC3 parameters. Currently the following are transferred:

origin time, hypocentre, magnitudes and corresponding amplitudes and periods (Ml, Mb and MB), number of stations used, residuals each p-phase reading, rms residual and all automatic p-phase readings.

As agency is not available in the SC3 bulletin, agency in the s-file is set to SC3.

In addition, the user must make his own SEISAN station and model file and the response files. The station and response files can be extracted from SC3 with an included utility while the model information must be provided by the user.

SC3 uses IASP91 model by default. SEISAN can also use IASP91, but then the distance indicator must be set to D.

SC2SEI takes 5 command line arguments:

-time	n	hours to check back in time at startup.
		Note: *-time* cannot be used together with *-begin* and *-end*.
-arc	1	switch to extract data from archives
-u	username	username SC3 database
-p	password	password SC3 database
-begin	time1	format: "2012-01-28 10:30:00"
-end	time2	format: "2012-01-30 15:30:00"
-wav	1/0	1: record waveforms (default) and s-file.
		0: do not record waveforms, only s-files
-allcmp	1/0	1: record all components specified in parameter-file (default)
		0: record only components with phase readings.
-ID	event-id	create s-file and extract the waveform for this SC3 event id

- The username and password must always be present.
- The *-time n* option will extract data from the n hours back in time until current time and continue checking for new events every minute. Data extracted from the Seedlink segments. Not allowed with *-arc*, *-begin* and *-end*.
- The *-arc 1* option will extract data from *-begin* to *-end* from the SC3 continuous data archive. Not allowed with *-time*.
- The *-begin* time1 *-end* time2 will extract events from time1 to time2 and exit. The format must be as shown above (as for SC3).
- The –wav controls if the waveform is extracted into the SEISAN data base or not. Default is 1. If the option 0 is selected, no waveforms are extracted and the corresponding s-file do not include the type 6 line that specifies the filename.
- The –allcmp controls which components that are extracted. Default is 1, which means that all components specified in the parameter-file are extracted. A 0 will extract only components with phase readings.
- If the –arc 1 option is set, data are always extracted from the SC3 archives (normally big archives), otherwise from the SC3 segments (normally only some days storage).

Start sc2sei:

Request mode:

The command below will start *sc2sei*, look for events in the time window from *-begin* to *-end*, and it will log in to the database with the username *alfa* and password *beta*. Data is extracted from the Seedlink segment buffers. Then it will exit.

sc2sei -u alfa -p beta -begin "2012-01-28 10:30:00" -end "2012-01-30 15:30:00"

same as above, but only manually processed events:

sc2sei -man 2 -u alfa -p beta -begin "2012-01-28 10:30:00" -end "2012-01-30 15:30:00"

Continuous mode:

The command below will start *sc2sei*, look for events back in time 1 hour, extract data from Seedlink segment buffer, and it will log in to the database with the username *alfa* and password *beta*. Then continue checking for new events every minute.

sc2sei -time 1 -u alfa -p beta

Archive mode:

The command below will start sc2sei, look for events in the time window from *-begin* to *-end*, extract data from the SC3 continuous archives and exit.

sc2sei -arc 1 -u alfa -p beta -begin "2012-01-28 10:30:00" -end "2012-01-30 15:30:00"

same as above, but only automatically processed events:

sc2sei -man 1 -arc 1 -u alfa -p beta -begin "2012-01-28 10:30:00" -end "2012-01-30 15:30:00"

Archive ID mode:

The command below will start sc2sei, look for event id gfz2015abcd, extract data from the SC3 continuous archives and exit.

sc2sei -ID gfz2015abcd -u alfa -p beta

An example of continuous mode, no waveform recording:

sc2sei -time 1 -u alfa -p beta -wav 0

NB! -time cannot be used together with *-begin* and *-end*

4.1   Which mode to use and testing.

The user decides which mode to run the sc2sei depending on the tasks to be performed with the extracted data. Which mode that can be started will also depend on how the SC3 is configured. For example, if continuous archives are not generated, the *archive mode* and *archive ID mode* does not work. The time window of data to be extracted from the Seedlink

segments (Request mode and Continuous mode) must be within the time window that are configured for the number of segments defined in SC3.

All modes will by default extract data into a SEISAN database called SC3__. If the user already uses this database name for other purposes and don't want data to be mixed or over-written, the SEISAN database name must be changed in the sc2sei configuration file.

It is recommended that the user test the different actual options with a relatively small time interval, for example 2-5 days, before setting up a job to extract data for several months or years. This will give the user the possibility to check that the options works as wanted. This testing can be done in a few minutes while a long time interval can take hours.

It is also important to check the sc2sei.par file to verify that database name, magnitude limits and latitude,longitude are set to correct values.

4.2   Starting sc2sei as a cron job.

Cron jobs can be set up to run sc2sei. An example is shown below (edit the two files below to fit your installation):

cron_restart.bash

```
#!/bin/bash
#
MAILTO=""
PROCESS='sc2sei'
if ps ax | grep -v grep | grep $PROCESS > /dev/null
then
echo "SC2SEI running, EXIT"
exit
else
echo "$PROCESS is not running"
echo "start the process"
echo "Start $PROCESS !"
#echo "put in the start command here"
/home/yourdir/SC2SEI/par/start_sc2sei.bash &
fi
```

start_sc2sei.bash

```
#!/bin/bash
source /home/seisan-dir/COM/SEISAN.bash
export SEISCOMP_ROOT=/home/seiscomp3-dir/seiscomp3
export PATH=/home/seiscomp3-dir/seiscomp3/bin:$PATH
export LD_LIBRARY_PATH=/home/seiscomp3-dir/seiscomp3/lib:$LD_LIBRARY_PATH
export PYTHONPATH=/home/seicomp3-dir/seiscomp3/lib/python:$PYTHONPATH
export MANPATH=/home/seiscomp3-dir/seiscomp3/share/man:$MANPATH
# Setup SC2SEI
export SC2SEI_TOP=/home/yourdir/SC2SEI
export ARCHIVE_TOP=/home/seiscomp3-dir/seiscomp3/var/lib/archive
PATH=/home/yourdir/SC2SEI/bin:$PATH
cd /home/yourdir
/home/yourdir/SC2SEI/bin/sc2sei -time 1 -u alfa -p beta  &
```

Run crontab –e and add the following line to check every 2 minutes that sc2sei is running. If not running, it will be re-started.

```
*/2 * * * * /home/yourdir/SC2SEI/par/cron_restart.bash >/dev/null 2>&1
```

Edit the above to comply with your installation:

yourdir: your account directory, for example /home/seismo
seisandir: where SEISAN is installed, for example /home/seismo
seiscomp3-dir: home directory for the SC3 installation, for example: /home/sysop

5 PARAMETER FILES

5.1 Overview of parameter files.

SC2SEI needs 2 parameter files as input:

sc2sei.par is used to configure sc2sei to look for events within a certain range of magnitude and geographical area.
It also specifies the name of the SEISAN database where the waveform and s-files are to be stored.

sc2sei.cfg is used for sc2seis to specify which station components are to be extracted from the Seiscomp3 archives.

5.2 sc2sei.par

```
This file is parameter file for SC2SEI.
Only the lines with recognized keyword under KEYWORD will be read.
The comments have no importance.
Columns Par 1-Par 2 start in columns 41,51.


All keywords in capital letters.

KEYWORD............Comments.............Par 1.....Par 2
-------------------------------------name of SEISAN database----------------------
DBASENAME          For SEISAN          SC3__
-------------------------------------pre-event in seconds-------------------------
PRE_EVENT          Pre-event (seconds) 60
-------------------------------------post-event in seconds------------------------
POST_EVENT         Post-event (seconds) 240
-------------------------------------seconds to sleep to finish processing---------
PROC_DELAY         Delay (seconds)     90
-------------------------------------magnitude min--------------------------------
MAG_MIN            Minimum magnitude   2.0
-------------------------------------magnitude max--------------------------------
MAG_MAX            Maximum magnitude   9.0
-------------------------------------latitude min---------------------------------
LAT_MIN            Minimum latitude    -40.0
-------------------------------------latitude max---------------------------------
LAT_MAX            Maximum latitude    -10.0
-------------------------------------longitude min--------------------------------
LON_MIN            Minimum longitude   -80.0
-------------------------------------longitude max--------------------------------
LON_MAX            Maximum longitude   -50.0
```

DBASENAME   SEISAN database name (up to 5 letters)
PRE_EVENT   Number of seconds to record before the SC3 origin time.
POST_EVENT   Number of seconds to record after the origin time.
PROC_DELAY   Number of seconds to sleep to finish processing

MAG_MIN	Minimum magnitude.
MAG_MAX	Maximum magnitude.
LAT_MIN	Minimum latitude.
LAT_MAX	Maximum latitude.
LON_MIN	Minimum longitude.
LON_MAX	Maximum longitude.

5.3 sc2sei.cfg

The sc2sei.cfg file specifies which stations and components to be extracted from the SC3 archives. The format is column specific:

The top line RECORD CHILE1 is just a header.
NW   Network name
STAT Station name
LOC   Location (no location is specified as ..)
CMP   Component

```
RECORD CHILE1
NW STAT   LOC CMP
CX PB01   ..  BHZ
CX PB01   ..  BHN
CX PB01   ..  BHE
CX PB02   ..  BHZ
CX PB02   ..  BHN
CX PB02   ..  BHE
CX PB03   ..  BHZ
CX PB03   ..  BHN
CX PB03   ..  BHE
CX PB04   ..  BHZ
CX PB04   ..  BHN
CX PB04   ..  BHE
CX PB05   ..  BHZ
CX PB05   ..  BHN
CX PB05   ..  BHE
CX PB06   ..  BHZ
CX PB06   ..  BHN
CX PB06   ..  BHE
CX PB07   ..  BHZ
CX PB07   ..  BHN
CX PB07   ..  BHE
CX PB08   ..  BHZ
CX PB08   ..  BHN
CX PB08   ..  BHE
CX PB09   ..  BHZ
CX PB09   ..  BHN
CX PB09   ..  BHE
CX PB10   ..  BHZ
CX PB10   ..  BHN
CX PB10   ..  BHE
CX PB11   ..  BHZ
CX PB11   ..  BHN
```

14

```
CX PB11   ..   BHE
CX PB12   ..   BHZ
CX PB12   ..   BHN
CX PB12   ..   BHE
CX PB14   ..   BHZ
CX PB14   ..   BHN
CX PB14   ..   BHE
CX PB15   ..   BHZ
CX PB15   ..   BHN
CX PB15   ..   BHE
CX PB16   ..   BHZ
CX PB16   ..   BHN
CX PB16   ..   BHE
CX MNMCX ..   BHZ
CX MNMCX ..   BHN
CX MNMCX ..   BHE
CX PATCX ..   BHZ
CX PATCX ..   BHN
CX PATCX ..   BHE
CX PSGCX ..   BHZ
CX PSGCX ..   BHN
```

6   Utilities stationhyp and crt_resp

6.1   stationhyp

This routine extracts the station name, latitude, longitude and elevation from the SC3 inventory database. The values are converted into SEISAN format and can be used directly in the STATION0.HYP file. It is recommended to run the routine from a working directory and then edit the STATION0.HYP file and include stations from the stationhyp.txt generated.

6.2   crt_resp

This is a script stored in the SC2SEI directory that will use different routines from SC3 to produce response files that can be used directly in SEISAN.

It is recommended that you start the script from a working directory to check the files before transferring them to the CAL directory in SEISAN. Files can be checked with the SEISAN presp program.

Start the script from for example /home/seismo/TESTING

cd /home/seismo/TESTING

/home/seismo/SC2SEI/crt_resp alfa beta where alfa and beta is SC3 database username and password respectively.
The script will generate response files for all stations defined in the SC3 database.

RESP.CX.PB01..BHZ
RESP.NU.ESPN..HHN
etc.

7 Files in distribution

SC2SEI/Makefile	Makefile for all source codes
SC2SEI/crt_rest	script to create response files
SC2SEI/bin/sc2sei	executable of SC2SE
SC2SEI/bin/getwindow	executable of modified slinktool. Does not reconnect after timeout.
SC2SEI/bin/stationhyp	executable of routine to create SEISAN station file
SC2SEI/par/sc2sei.cfg	configuration file
SC2SEI/par/sc2sei.par	parameter file
SC2SEI/par/cron_restart.bash	cron file
SC2SEI/par/start_sc2sei.bash	file to start SC2SE from cron file
SC2SEI/slinktool/libslink	original seedlink library files needed for getwindow
SC2SEI/slinktool/src	source slinktool and getwindow
SC2SEI/src	source code for sc2sei
SC2SEI/src	source code for stationhyp
SC2SEI/src	mybulletin.py

8 REFERENCES

Havskov, J and L. Ottemøller (1999). SEISAN earthquake analysis software. Seismological Research letters, 70, 532-534. For current version see seisan.info.

Seiscomp3, Gempa, Potsdam, Germany. See www.seiscomp3.org

9 Console output examples

Start sc2sei in continuous mode and look for data 18 hours back in time

```
sc2sei -time 18 -u alfa -p beta
seedlink: not running.......wait....  SC3 not active, wait until started
seedlink: not running.......wait....
seedlink: not running.......wait....
seedlink: 3467  running, continue
code 7
Contin. mode: Extract from segments n hours back in time. Waveforms. All components.
SC2SEI: SEISCOMP_ROOT..........: /home/seismo/seiscomp3
SC2SEI: SEISAN_TOP.............: /home/seismo/snew
SC2SEI: SC2SEI.................: /home/seismo/SC2SEI
SC2SEI: ARCHIVE................: /home/seismo/seiscomp3/var/lib/archive
SC2SEI: Read_Parameters........: /home/seismo/SC2SEI/par/sc2sei.par
SC2SEI: PRE_EVENT..............:  60 seconds
SC2SEI: POST_EVENT.............: 180 seconds
SC2SEI: PROC_DELAY.............:  90 seconds
SC2SEI: LAT_MIN................: -40.00
SC2SEI: LAT_MAX................: -4.00
SC2SEI: LON_MIN................: -80.00
SC2SEI: LON_MAX................: -50.00
SC2SEI: MAG_MIN................:  2.00
SC2SEI: MAG_MAX................:  9.00
SC2SEI: DBASENAME..............: SC3__
SC2SEI: WAVEDIR................: /home/seismo/snew/WAV
************* Read sc2sei ****************************
SC2SEI: Read_Config_to_MEM.....: /home/seismo/SC2SEI/par/sc2sei.cfg
number of lines in parameter file:  57
Mode: Continous
```

Check for event id in time interval

```
Setting start to 2015-10-28 19:41:37
Setting end to 2015-10-29 13:41:37
Extract ID: gfz2015vdqa after sleeping 90 seconds
```

Output from SC3 database

```
 0 Event:
 1    Public ID             gfz2015vdqa
 2    Description
 3      region name: Northern Chile
 4 Origin:
 5    Date                  2015-10-28
 6    Time                  19:45:04.5  +/-  1.0 s
 7    Latitude              -23.26 deg  +/-    6 km
 8    Longitude             -69.27 deg  +/-   13 km
 9    Depth                     62 km   +/-   11 km
10    Agency                AA
11    Mode                  automatic
12    Status                NOT SET
13    Residual RMS             0.57 s
14    Azimuthal gap             215 deg
15
16 2 Network magnitudes:
17    MLv      5.06 +/- 0.20  12
18    M        5.06           12 preferred
19
20 14 Phase arrivals:
21    sta  net cmp  dist azi toang  phase    time            res    wt    sta   loca
22    PB15 CX  BHZ   0.2 284   0.0  P        19:45:15.4   0.0 A  1.0  . PB15
23    PB06 CX  BHZ   0.6 333   0.0  P        19:45:18.7  -0.5 A  1.0  . PB06
24    PB05 CX  BHZ   1.0 295   0.0  P        19:45:22.2  -0.1 A  1.0  . PB05
25    PB10 CX  BHZ   1.2 257   0.0  P        19:45:25.5   0.0 A  1.0  . PB10
26    PB04 CX  BHZ   1.2 318   0.0  P        19:45:25.8   0.1 A  1.0  . PB04
27    PB03 CX  BHZ   1.3 340   0.0  P        19:45:26.8   0.3 A  1.0  . PB03
28    PB07 CX  BHZ   1.6 339   0.0  P        19:45:31.4   0.3 A  1.0  . PB07
29    PB14 CX  BHZ   1.7 217   0.0  P        19:45:32.2   0.1 A  1.0  . PB14
30    PB02 CX  BHZ   2.0 343   0.0  P        19:45:36.9   0.6 A  1.0  . PB02
31    PB01 CX  BHZ   2.2 355   0.0  P        19:45:39.6   0.7 A  1.0  . PB01
```

```
32      HMBCX CX BHZ   3.0 349   0.0  P        19:45:49.7  -0.2 A  1.0  . HMBCX
33      PB08  CX BHZ   3.1   2   0.0  P        19:45:51.7   0.6 A  1.0  . PB08
34      PB11  CX BHZ   3.5 354   0.0  P        19:45:56.0  -0.5 A  1.0  . PB11
35      PSGCX CX BHZ   3.7 348   0.0  P        19:45:58.1  -1.6 A  1.0  . PSGCX
36
37 14 Station magnitudes:
38      sta   net cmp  dist azi  type   value  res                     time        amp per
39      PB15  CX BHZ   0.2 284   MLv     4.40 -0.66  2015-10-28 19:45:26.469   360.98
40      PB06  CX BHZ   0.6 333   MLv     4.92 -0.14  2015-10-28 19:45:31.419   118.315
41      PB05  CX BHZ   1.0 295   MLv     4.75 -0.31  2015-10-28 19:45:37.819   53.2659
42      PB10  CX BHZ   1.2 257   MLv     5.15  0.08  2015-10-28 19:45:47.149   94.0489
43      PB04  CX BHZ   1.2 318   MLv     4.91 -0.15  2015-10-28 19:45:49.519   53.0053
44      PB03  CX BHZ   1.3 340   MLv     4.90 -0.16  2015-10-28 19:45:49.269   48.6762
45      PB07  CX BHZ   1.6 339   MLv     4.90 -0.17  2015-10-28 19:46:04.569   30.7757
46      PB14  CX BHZ   1.7 217   MLv     5.41  0.35  2015-10-28 19:46:00.494   90.7636
47      PB02  CX BHZ   2.0 343   MLv     5.24  0.18  2015-10-28 19:46:11.919   41.615
48      PB01  CX BHZ   2.2 355   MLv     4.92 -0.14  2015-10-28 19:46:14.019   15.2115
49      HMBCX CX BHZ   3.0 349   MLv     5.35  0.28  2015-10-28 19:46:42.350   14.473
50      PB08  CX BHZ   3.1   2   MLv     5.00 -0.06  2015-10-28 19:46:17.419   5.84834
51      PB11  CX BHZ   3.5 354   MLv     5.40  0.34  2015-10-28 19:47:03.549   8.92896
52      PSGCX CX BHZ   3.7 348   MLv     5.33  0.27  2015-10-28 19:47:17.150   6.22662
53
SC2SEI:.fullpath and filename: /home/seismo/snew/WAV/SC3__/2015/10/2015-10-28-1944-04.SC3__
SC2SEI:.waveform directory...: /home/seismo/snew/WAV/SC3__/2015/10
buffer: 10-29-2015  13:43:07.
```

Extracting waveform data. Some components no data and program get timeout

```
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
 0 gfz2015vdqa
 1
 2
 3
 4
 5
 6
 7
 8
 9
```

New event

```
Extract ID: gfz2015vdri after sleeping 90 seconds
 0 Event:
 1     Public ID           gfz2015vdri
 2     Description
 3        region name: Northern Chile
 4 Origin:
 5     Date                2015-10-28
 6     Time                20:25:29.9  +/-  1.1 s
 7     Latitude            -22.62 deg  +/-   5 km
 8     Longitude           -68.87 deg  +/-   9 km
 9     Depth                   10 km
10     Agency              AA
11     Mode                automatic
12     Status              NOT SET
13     Residual RMS           2.22 s
14     Azimuthal gap          229 deg
15
16 2 Network magnitudes:
17     MLv      2.70 +/- 0.34  10
18     M        2.70           10 preferred
19
20 14 Phase arrivals:
21     sta   net cmp  dist azi toang  phase   time          res    wt    sta   loca
22     PB06  CX BHZ   0.7 262   0.0   P        20:25:45.4   2.4 A  1.0  . PB06
```

```
23      PB15  CX BHZ   0.8 223   0.0   P        20:25:42.6  -3.1 A  1.0  . PB15
24      PB03  CX BHZ   1.0 305   0.0   P        20:25:46.2  -2.8 A  1.0  . PB03
25      PB04  CX BHZ   1.2 283   0.0   P        20:25:54.5   2.2 A  1.0  . PB04
26      PB05  CX BHZ   1.3 259   0.0   P        20:25:55.1   2.3 A  1.0  . PB05
27      PB07  CX BHZ   1.3 313   0.0   P        20:25:50.7  -2.7 A  1.0  . PB07
28      PB02  CX BHZ   1.6 324   0.0   P        20:25:57.8  -0.2 A  1.0  . PB02
29      PB01  CX BHZ   1.7 340   0.0   P        20:25:55.8  -3.1 A  1.0  . PB01
30      PB10  CX BHZ   1.8 240   0.0   P        20:26:08.2   7.6 AX 0.0  . PB10
31      PB14  CX BHZ   2.5 215   0.0   P        20:26:19.2   9.4 AX 0.0  . PB14
32      PB08  CX BHZ   2.5 354   0.0   P        20:26:12.1   1.8 A  1.0  . PB08
33      HMBCX CX BHZ   2.5 338   0.0   P        20:26:10.8  -0.0 A  1.0  . HMBCX
34      PB11  CX BHZ   3.0 345   0.0   P        20:26:18.5   1.9 A  1.0  . PB11
35      PSGCX CX BHZ   3.2 339   0.0   P        20:26:21.9   1.3 A  1.0  . PSGCX
36
37 12 Station magnitudes:
38      sta  net cmp  dist azi  type    value   res                      time       amp per
39      PB06  CX BHZ   0.7 262  MLv      1.92  -0.78   2015-10-28 20:26:06.769 0.113909
40      PB15  CX BHZ   0.8 223  MLv      2.42  -0.28   2015-10-28 20:26:24.019  0.29509
41      PB03  CX BHZ   1.0 305  MLv      2.08  -0.62   2015-10-28 20:26:20.269 0.106647
42      PB04  CX BHZ   1.2 283  MLv      2.77   0.07   2015-10-28 20:27:21.419 0.392509
43      PB05  CX BHZ   1.3 259  MLv      2.45  -0.25   2015-10-28 20:27:39.069 0.180837
44      PB07  CX BHZ   1.3 313  MLv      2.50  -0.20   2015-10-28 20:27:17.869 0.191774
45      PB02  CX BHZ   1.6 324  MLv      2.95   0.24   2015-10-28 20:27:24.469 0.356159
46      PB01  CX BHZ   1.7 340  MLv      2.52  -0.18   2015-10-28 20:27:37.819 0.122708
47      PB08  CX BHZ   2.5 354  MLv      2.79   0.09   2015-10-28 20:27:20.819 0.0804687
48      HMBCX CX BHZ   2.5 338  MLv      3.22   0.52   2015-10-28 20:27:56.699 0.206196
49      PB11  CX BHZ   3.0 345  MLv      3.32   0.61   2015-10-28 20:28:00.649 0.150248
50      PSGCX CX BHZ   3.2 339  MLv      3.32   0.62   2015-10-28 20:27:37.899 0.104494
51
SC2SEI:.fullpath and filename: /home/seismo/snew/WAV/SC3__/2015/10/2015-10-28-2024-29.SC3__
SC2SEI:.waveform directory...: /home/seismo/snew/WAV/SC3__/2015/10
buffer: 10-29-2015  13:45:12.
```

No data, timeout

```
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
 0 gfz2015vdqa
 1 gfz2015vdri
 2
 3
 4
 5
 6
 7
 8
 9
```

New event

```
Extract ID: gfz2015vdrv after sleeping 90 seconds
 0 Event:
 1     Public ID              gfz2015vdrv
 2     Description
 3        region name: Northern Chile
 4 Origin:
 5     Date                   2015-10-28
 6     Time                   20:39:32.7  +/-  0.5 s
 7     Latitude               -21.75 deg  +/-    3 km
 8     Longitude              -69.33 deg  +/-    6 km
 9     Depth                     10 km
10     Agency                 AA
11     Mode                   automatic
12     Status                 NOT SET
13     Residual RMS              2.60 s
14     Azimuthal gap             179 deg
15
```

```
16 2 Network magnitudes:
17     MLv      2.35 +/- 0.32   9
18     M        2.35            9 preferred
19
20 12 Phase arrivals:
21     sta  net cmp  dist azi toang  phase   time         res     wt    sta    loca
22     PB03  CX BHZ   0.5 232  0.0   P      20:39:39.3  -3.8 A  1.0  . PB03
23     PB07  CX BHZ   0.5 272  0.0   P      20:39:40.5  -2.9 A  1.0  . PB07
24     PB02  CX BHZ   0.7 309  0.0   P      20:40:00.5  14.3 AX 0.0  . PB02
25     PB01  CX BHZ   0.7 348  0.0   P      20:39:45.4  -1.4 A  1.0  . PB01
26     PB04  CX BHZ   1.0 232  0.0   P      20:39:55.3   4.2 A  1.0  . PB04
27     PB06  CX BHZ   1.0 193  0.0   P      20:39:49.4  -2.2 A  1.0  . PB06
28     PB05  CX BHZ   1.4 216  0.0   P      20:39:59.9   2.5 A  1.0  . PB05
29     PB15  CX BHZ   1.5 185  0.0   P      20:39:56.5  -2.3 A  1.0  . PB15
30     HMBCX CX BHZ   1.6 340  0.0   P      20:40:01.7   1.6 A  1.0  . HMBCX
31     PB08  CX BHZ   1.6   6  0.0   P      20:40:00.5  -0.4 A  1.0  . PB08
32     PB10  CX BHZ   2.1 212  0.0   P      20:40:11.2   3.4 A  1.0  . PB10
33     PSGCX CX BHZ   2.3 341  0.0   P      20:40:11.3   1.1 A  1.0  . PSGCX
34
35 11 Station magnitudes:
36     sta  net cmp  dist azi  type   value  res                    time       amp per
37     PB03  CX BHZ   0.5 232  MLv     1.77 -0.58  2015-10-28 20:40:18.169 0.123352
38     PB07  CX BHZ   0.5 272  MLv     1.79 -0.56  2015-10-28 20:40:10.469  0.11343
39     PB01  CX BHZ   0.7 348  MLv     1.90 -0.44  2015-10-28 20:40:31.069 0.101531
40     PB04  CX BHZ   1.0 232  MLv     2.29 -0.06  2015-10-28 20:40:13.869 0.178882
41     PB06  CX BHZ   1.0 193  MLv     2.22 -0.13  2015-10-28 20:40:10.819 0.148672
42     PB05  CX BHZ   1.4 216  MLv     2.42  0.07  2015-10-28 20:40:47.869 0.142859
43     PB15  CX BHZ   1.5 185  MLv     2.85  0.51  2015-10-28 20:40:23.469 0.344542
44     HMBCX CX BHZ   1.6 340  MLv     2.56  0.21  2015-10-28 20:42:00.049 0.156161
45     PB08  CX BHZ   1.6   6  MLv     2.34 -0.00  2015-10-28 20:41:53.719 0.0887682
46     PB10  CX BHZ   2.1 212  MLv     2.89  0.55  2015-10-28 20:40:48.749 0.169133
47     PSGCX CX BHZ   2.3 341  MLv     2.72  0.38  2015-10-28 20:41:36.299 0.0913921
48
SC2SEI:.fullpath and filename: /home/seismo/snew/WAV/SC3__/2015/10/2015-10-28-2038-32.SC3__
SC2SEI:.waveform directory...: /home/seismo/snew/WAV/SC3__/2015/10
buffer: 10-29-2015  13:47:16.
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
 0 gfz2015vdqa
 1 gfz2015vdri
 2 gfz2015vdrv
 3
 4
 5
 6
 7
 8
 9
```

No more events in the interval 18 hours back in time, check for new events..
```
Setting start to 2015-10-29 13:43:50
Setting end to 2015-10-29 13:48:50
Setting start to 2015-10-29 13:44:50
Setting end to 2015-10-29 13:49:50
```
New event
```
Extract ID: gfz2015vezt after sleeping 90 seconds
 0 Event:
 1     Public ID              gfz2015vezt
 2     Description
 3        region name: Northern Chile
 4 Origin:
 5     Date                   2015-10-29
 6     Time                   13:48:45.9  +/-  0.5 s
```

```
 7     Latitude                -20.86 deg  +/-    3 km
 8     Longitude               -69.80 deg  +/-    7 km
 9     Depth                        16 km  +/-    5 km
10     Agency                  AA
11     Mode                    automatic
12     Status                  NOT SET
13     Residual RMS                1.49 s
14     Azimuthal gap             152 deg
15
16 2 Network magnitudes:
17     MLv       3.07 +/- 0.13   7
18     M         3.07            7 preferred
19
20 13 Phase arrivals:
21    sta  net cmp  dist azi toang  phase   time           res    wt    sta   loca
22    PB01  CX BHZ   0.3 123   0.0  P       13:48:54.8   0.5 A  1.0  . PB01
23    PB02  CX BHZ   0.5 191   0.0  P       13:48:57.0   0.7 A  1.0  . PB02
24    PB07  CX BHZ   0.9 185   0.0  P       13:49:01.5  -1.2 A  1.0  . PB07
25    PB08  CX BHZ   0.9  40   0.0  P       13:49:03.7  -0.1 A  1.0  . PB08
26    PB11  CX BHZ   1.1   7   0.0  P       13:49:06.3   0.0 A  1.0  . PB11
27    PB03  CX BHZ   1.2 178   0.0  P       13:49:05.6  -2.0 A  1.0  . PB03
28    PSGCX CX BHZ   1.3 346   0.0  P       13:49:08.8  -0.2 A  1.0  . PSGCX
29    PB04  CX BHZ   1.5 192   0.0  P       13:49:10.4  -1.7 A  1.0  . PB04
30    PB06  CX BHZ   1.9 174   0.0  P       13:49:15.7  -1.3 A  1.0  . PB06
31    PB05  CX BHZ   2.0 191   0.0  P       13:49:18.0  -1.4 A  1.0  . PB05
32    PB15  CX BHZ   2.4 173   0.0  P       13:49:25.3   1.3 A  1.0  . PB15
33    PB10  CX BHZ   2.7 195   0.0  P       13:49:31.7   2.5 A  1.0  . PB10
34    PB14  CX BHZ   3.8 188   0.0  P       13:49:46.6   2.9 A  1.0  . PB14
35
36 7 Station magnitudes:
37    sta  net cmp  dist azi  type   value   res                      time       amp per
38    PB01  CX BHZ   0.3 123  MLv     2.83 -0.24  2015-10-29 13:49:02.619  3.80754
39    PB02  CX BHZ   0.5 191  MLv     3.21  0.14  2015-10-29 13:49:06.219  3.99441
40    PB07  CX BHZ   0.9 185  MLv     3.33  0.26  2015-10-29 13:49:14.819  2.21577
41    PB08  CX BHZ   0.9  40  MLv     2.97 -0.10  2015-10-29 13:49:18.969 0.900203
42    PB11  CX BHZ   1.1   7  MLv     3.05 -0.02  2015-10-29 13:49:26.000 0.863996
43    PB03  CX BHZ   1.2 178  MLv     3.18  0.11  2015-10-29 13:49:25.219   1.0469
44    PSGCX CX BHZ   1.3 346  MLv     2.93 -0.14  2015-10-29 13:49:31.850 0.516369
45
SC2SEI:.fullpath and filename: /home/seismo/snew/WAV/SC3__/2015/10/2015-10-29-1347-45.SC3__
SC2SEI:.waveform directory...: /home/seismo/snew/WAV/SC3__/2015/10
buffer: 10-29-2015  13:51:20.
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
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TUMOD Timeout. No data for 1 second, try next channel
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TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
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TUMOD Timeout. No data for 1 second, try next channel
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TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
```

```
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
 0 gfz2015vdqa
 1 gfz2015vdri
 2 gfz2015vdrv
 3 gfz2015vezt
 4
 5
 6
 7
 8
 9
```

No data to extract, check every minute

```
Setting start to 2015-10-29 13:48:46
Setting end to 2015-10-29 13:53:46
```

REQUEST MODE

Extract events in given time interval from segments

```
rt>sc2sei -u sysop -p sysop -begin "2015-10-28 20:00:00" -end "2015-10-28 23:00:00"
seedlink: 6620  running, continue
code 27
Request mode: Extract from segments. Waveforms. All components.
SC2SEI: SEISCOMP_ROOT..........: /home/seismo/seiscomp3
SC2SEI: SEISAN_TOP.............: /home/seismo/snew
SC2SEI: SC2SEI.................: /home/seismo/SC2SEI
SC2SEI: ARCHIVE................: /home/seismo/seiscomp3/var/lib/archive
SC2SEI: Read_Parameters........: /home/seismo/SC2SEI/par/sc2sei.par
SC2SEI: PRE_EVENT..............:  60 seconds
SC2SEI: POST_EVENT.............: 180 seconds
SC2SEI: PROC_DELAY.............:  90 seconds
SC2SEI: LAT_MIN................: -40.00
SC2SEI: LAT_MAX................: -4.00
SC2SEI: LON_MIN................: -80.00
SC2SEI: LON_MAX................: -50.00
SC2SEI: MAG_MIN................:  2.00
SC2SEI: MAG_MAX................:  9.00
SC2SEI: DBASENAME..............: SC3__
SC2SEI: WAVEDIR................: /home/seismo/snew/WAV
************* Read sc2sei ***************************
SC2SEI: Read_Config_to_MEM.....: /home/seismo/SC2SEI/par/sc2sei.cfg
number of lines in parameter file:  57
Mode: Request
Setting start to 2015-10-28 20:00:00
Setting end to 2015-10-28 23:00:00
 0 Event:
 1     Public ID              gfz2015vdri
 2     Description
 3       region name: Northern Chile
 4 Origin:
 5     Date                   2015-10-28
 6     Time                   20:25:29.9  +/-  1.1 s
 7     Latitude               -22.62 deg  +/-    5 km
 8     Longitude              -68.87 deg  +/-    9 km
 9     Depth                     10 km
10     Agency                 AA
11     Mode                   automatic
12     Status                 NOT SET
13     Residual RMS             2.22 s
14     Azimuthal gap            229 deg
15
16 2 Network magnitudes:
17     MLv      2.70 +/- 0.34  10
18     M        2.70           10 preferred
19
```

```
20 14 Phase arrivals:
21    sta  net cmp  dist azi toang  phase   time          res    wt    sta   loca
22    PB06  CX BHZ  0.7 262  0.0   P      20:25:45.4   2.4 A  1.0   . PB06
23    PB15  CX BHZ  0.8 223  0.0   P      20:25:42.6  -3.1 A  1.0   . PB15
24    PB03  CX BHZ  1.0 305  0.0   P      20:25:46.2  -2.8 A  1.0   . PB03
25    PB04  CX BHZ  1.2 283  0.0   P      20:25:54.5   2.2 A  1.0   . PB04
26    PB05  CX BHZ  1.3 259  0.0   P      20:25:55.1   2.3 A  1.0   . PB05
27    PB07  CX BHZ  1.3 313  0.0   P      20:25:50.7  -2.7 A  1.0   . PB07
28    PB02  CX BHZ  1.6 324  0.0   P      20:25:57.8  -0.2 A  1.0   . PB02
29    PB01  CX BHZ  1.7 340  0.0   P      20:25:55.8  -3.1 A  1.0   . PB01
30    PB10  CX BHZ  1.8 240  0.0   P      20:26:08.2   7.6 AX 0.0   . PB10
31    PB14  CX BHZ  2.5 215  0.0   P      20:26:19.2   9.4 AX 0.0   . PB14
32    PB08  CX BHZ  2.5 354  0.0   P      20:26:12.1   1.8 A  1.0   . PB08
33    HMBCX CX BHZ  2.5 338  0.0   P      20:26:10.8  -0.0 A  1.0   . HMBCX
34    PB11  CX BHZ  3.0 345  0.0   P      20:26:18.5   1.9 A  1.0   . PB11
35    PSGCX CX BHZ  3.2 339  0.0   P      20:26:21.9   1.3 A  1.0   . PSGCX
36
37 12 Station magnitudes:
38    sta  net cmp  dist azi  type   value  res                      time        amp per
39    PB06  CX BHZ  0.7 262  MLv    1.92 -0.78   2015-10-28 20:26:06.769 0.113909
40    PB15  CX BHZ  0.8 223  MLv    2.42 -0.28   2015-10-28 20:26:24.019  0.29509
41    PB03  CX BHZ  1.0 305  MLv    2.08 -0.62   2015-10-28 20:26:20.269 0.106647
42    PB04  CX BHZ  1.2 283  MLv    2.77  0.07   2015-10-28 20:27:21.419 0.392509
43    PB05  CX BHZ  1.3 259  MLv    2.45 -0.25   2015-10-28 20:27:39.069 0.180837
44    PB07  CX BHZ  1.3 313  MLv    2.50 -0.20   2015-10-28 20:27:17.869 0.191774
45    PB02  CX BHZ  1.6 324  MLv    2.95  0.24   2015-10-28 20:27:24.469 0.356159
46    PB01  CX BHZ  1.7 340  MLv    2.52 -0.18   2015-10-28 20:27:37.819 0.122708
47    PB08  CX BHZ  2.5 354  MLv    2.79  0.09   2015-10-28 20:27:20.819 0.0804687
48    HMBCX CX BHZ  2.5 338  MLv    3.22  0.52   2015-10-28 20:27:56.699 0.206196
49    PB11  CX BHZ  3.0 345  MLv    3.32  0.61   2015-10-28 20:28:00.649 0.150248
50    PSGCX CX BHZ  3.2 339  MLv    3.32  0.62   2015-10-28 20:27:37.899 0.104494
51
SC2SEI:.fullpath and filename: /home/seismo/snew/WAV/SC3__/2015/10/2015-10-28-2024-29.SC3__
SC2SEI:.waveform directory...: /home/seismo/snew/WAV/SC3__/2015/10
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
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TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
 0 Event:
 1    Public ID              gfz2015vdrv
 2    Description
 3      region name: Northern Chile
 4 Origin:
 5    Date                   2015-10-28
 6    Time                   20:39:32.7  +/-  0.5 s
 7    Latitude               -21.75 deg  +/-    3 km
 8    Longitude              -69.33 deg  +/-    6 km
 9    Depth                    10 km
10    Agency                 AA
11    Mode                   automatic
12    Status                 NOT SET
13    Residual RMS             2.60 s
14    Azimuthal gap           179 deg
15
16 2 Network magnitudes:
17    MLv       2.35 +/- 0.32    9
18    M         2.35            9 preferred
19
20 12 Phase arrivals:
21    sta  net cmp  dist azi toang  phase   time          res    wt    sta   loca
22    PB03  CX BHZ  0.5 232  0.0   P      20:39:39.3  -3.8 A  1.0   . PB03
23    PB07  CX BHZ  0.5 272  0.0   P      20:39:40.5  -2.9 A  1.0   . PB07
24    PB02  CX BHZ  0.7 309  0.0   P      20:40:00.5  14.3 AX 0.0   . PB02
25    PB01  CX BHZ  0.7 348  0.0   P      20:39:45.4  -1.4 A  1.0   . PB01
26    PB04  CX BHZ  1.0 232  0.0   P      20:39:55.3   4.2 A  1.0   . PB04
```

25

```
27     PB06  CX BHZ   1.0 193    0.0  P          20:39:49.4  -2.2 A  1.0  . PB06
28     PB05  CX BHZ   1.4 216    0.0  P          20:39:59.9   2.5 A  1.0  . PB05
29     PB15  CX BHZ   1.5 185    0.0  P          20:39:56.5  -2.3 A  1.0  . PB15
30     HMBCX CX BHZ   1.6 340    0.0  P          20:40:01.7   1.6 A  1.0  . HMBCX
31     PB08  CX BHZ   1.6   6    0.0  P          20:40:00.5  -0.4 A  1.0  . PB08
32     PB10  CX BHZ   2.1 212    0.0  P          20:40:11.2   3.4 A  1.0  . PB10
33     PSGCX CX BHZ   2.3 341    0.0  P          20:40:11.3   1.1 A  1.0  . PSGCX
34
35 11 Station magnitudes:
36     sta   net cmp  dist azi   type    value   res                      time       amp per
37     PB03  CX BHZ   0.5 232    MLv     1.77  -0.58  2015-10-28 20:40:18.169 0.123352
38     PB07  CX BHZ   0.5 272    MLv     1.79  -0.56  2015-10-28 20:40:10.469  0.11343
39     PB01  CX BHZ   0.7 348    MLv     1.90  -0.44  2015-10-28 20:40:31.069 0.101531
40     PB04  CX BHZ   1.0 232    MLv     2.29  -0.06  2015-10-28 20:40:13.869 0.178882
41     PB06  CX BHZ   1.0 193    MLv     2.22  -0.13  2015-10-28 20:40:10.819 0.148672
42     PB05  CX BHZ   1.4 216    MLv     2.42   0.07  2015-10-28 20:40:47.869 0.142859
43     PB15  CX BHZ   1.5 185    MLv     2.85   0.51  2015-10-28 20:40:23.469 0.344542
44     HMBCX CX BHZ   1.6 340    MLv     2.56   0.21  2015-10-28 20:42:00.049 0.156161
45     PB08  CX BHZ   1.6   6    MLv     2.34  -0.00  2015-10-28 20:41:53.719 0.0887682
46     PB10  CX BHZ   2.1 212    MLv     2.89   0.55  2015-10-28 20:40:48.749 0.169133
47     PSGCX CX BHZ   2.3 341    MLv     2.72   0.38  2015-10-28 20:41:36.299 0.0913921
48
SC2SEI:.fullpath and filename: /home/seismo/snew/WAV/SC3__/2015/10/2015-10-28-2038-32.SC3__
SC2SEI:.waveform directory...: /home/seismo/snew/WAV/SC3__/2015/10
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
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TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
TUMOD Timeout. No data for 1 second, try next channel
```

Above 2 events were extracted from time interval.

Below 2 s-files generated

```
 2015 1028 2025 29.9 R -22.620 -68.870 10.0  SC3 14 2.2 2.7LSC3                  1
 GAP=229           1.10     5.0      9.0                                         E
 2015-10-28-2024-29.SC3__                                                        6
 ACTION:NEW 15-10-28 20:25 OP:SEIS STATUS:              ID:20151028202529        I
 Northern Chile                                                                  3
 STAT SP IPHASW D HRMM SECON CODA AMPLIT PERI AZIMU VELO AIN AR TRES W  DIS CAZ7
 PB06 BZ IP     A 2025 45.4                                   2.40       77 262
 PB15 BZ IP     A 2025 42.6                                  -3.10       88 223
 PB03 BZ IP     A 2025 46.2                                  -2.80      111 305
 PB04 BZ IP     A 2025 54.5                                   2.20      133 283
 PB05 BZ IP     A 2025 55.1                                   2.30      144 259
 PB07 BZ IP     A 2025 50.7                                  -2.70      144 313
 PB02 BZ IP     A 2025 57.8                                  -0.20      177 324
 PB01 BZ IP     A 2025 55.8                                  -3.10      189 340
 PB10 BZ IP     A 2026  8.2                                   7.60      200 240
 PB14 BZ IP     A 2026 19.2                                   9.40      278 215
 PB08 BZ IP     A 2026 12.1                                   1.80      278 354
 HMBCXBZ IP     A 2026 10.8                                  -0.00      278 338
 PB11 BZ IP     A 2026 18.5                                   1.90      333 345
 PSGCXBZ IP     A 2026 21.9                                   1.30      355 339
 PB06 BZ   IAML   2026  6.7       113.9                                  77 262
 PB15 BZ   IAML   2026 24.0       295.1                                  88 223
 PB03 BZ   IAML   2026 20.2       106.6                                 111 305
 PB04 BZ   IAML   2027 21.4       392.5                                 133 283
 PB05 BZ   IAML   2027 39.0       180.8                                 144 259
 PB07 BZ   IAML   2027 17.8       191.8                                 144 313
 PB02 BZ   IAML   2027 24.4       356.2                                 177 324
 PB01 BZ   IAML   2027 37.8       122.7                                 189 340
 PB08 BZ   IAML   2027 20.8        80.5                                 278 354
 HMBCXBZ   IAML   2027 56.6       206.2                                 278 338
 PB11 BZ   IAML   2028  0.6       150.2                                 333 345
 PSGCXBZ   IAML   2027 37.8       104.5                                 355 339
```

```
2015 1028 2039 32.7 R -21.750 -69.330 10.0  SC3 12 2.6 2.3LSC3                1
GAP=179          0.50    3.0    6.0                                           E
2015-10-28-2038-32.SC3__                                                     6
ACTION:NEW 15-10-28 20:39 OP:SEIS STATUS:        ID:20151028203932           I
Northern Chile                                                               3
STAT SP IPHASW D HRMM SECON CODA AMPLIT PERI AZIMU VELO AIN AR TRES W  DIS CAZ7
PB03 BZ IP    A 2039 39.3                                   -3.80      55 232
PB07 BZ IP    A 2039 40.5                                   -2.90      55 272
PB02 BZ IP    A 2040  0.5                                   14.30      77 309
PB01 BZ IP    A 2039 45.4                                   -1.40      77 348
PB04 BZ IP    A 2039 55.3                                    4.20     111 232
PB06 BZ IP    A 2039 49.4                                   -2.20     111 193
PB05 BZ IP    A 2039 59.9                                    2.50     155 216
PB15 BZ IP    A 2039 56.5                                   -2.30     166 185
HMBCXBZ IP    A 2040  1.7                                    1.60     177 340
PB08 BZ IP    A 2040  0.5                                   -0.40     177   6
PB10 BZ IP    A 2040 11.2                                    3.40     233 212
PSGCXBZ IP    A 2040 11.3                                    1.10     255 341
PB03 BZ  IAML   2040 18.1      123.4                                   55 232
PB07 BZ  IAML   2040 10.4      113.4                                   55 272
PB01 BZ  IAML   2040 31.0      101.5                                   77 348
PB04 BZ  IAML   2040 13.8      178.9                                  111 232
PB06 BZ  IAML   2040 10.8      148.7                                  111 193
PB05 BZ  IAML   2040 47.8      142.9                                  155 216
PB15 BZ  IAML   2040 23.4      344.5                                  166 185
HMBCXBZ  IAML   2042  0.0      156.2                                  177 340
PB08 BZ  IAML   2041 53.7       88.8                                  177   6
PB10 BZ  IAML   2040 48.7      169.1                                  233 212
PSGCXBZ  IAML   2041 36.2       91.4                                  255 341
```

ID MODE

Extract event-id gfz2015uukb from archive

```
sc2sei -u sysop -p sysop -ID gfz2015uukb

seedlink: 6620  running, continue
code 131
ID mode: Extract event ID gfz2015uukb from archives. Waveform. All components.
SC2SEI: SEISCOMP_ROOT..........: /home/seismo/seiscomp3
SC2SEI: SEISAN_TOP.............: /home/seismo/snew
SC2SEI: SC2SEI.................: /home/seismo/SC2SEI
SC2SEI: ARCHIVE................: /home/seismo/seiscomp3/var/lib/archive
SC2SEI: Read_Parameters........: /home/seismo/SC2SEI/par/sc2sei.par
SC2SEI: PRE_EVENT..............:  60 seconds
SC2SEI: POST_EVENT.............: 180 seconds
SC2SEI: PROC_DELAY.............:  90 seconds
SC2SEI: LAT_MIN................: -40.00
SC2SEI: LAT_MAX................: -4.00
SC2SEI: LON_MIN................: -80.00
SC2SEI: LON_MAX................: -50.00
SC2SEI: MAG_MIN................:  2.00
SC2SEI: MAG_MAX................:  9.00
SC2SEI: DBASENAME..............: SC3__
SC2SEI: WAVEDIR................: /home/seismo/snew/WAV
************* Read sc2sei *************************
SC2SEI: Read_Config_to_MEM.....: /home/seismo/SC2SEI/par/sc2sei.cfg
number of lines in parameter file:  57
Mode: ID request
 0 Event:
 1    Public ID              gfz2015uukb
 2    Description
 3      region name: Off Coast of Northern Chile
 4 Origin:
 5    Date                   2015-10-23
 6    Time                   18:33:31.5  +/-  2.4 s
 7    Latitude               -26.60 deg  +/-   19 km
 8    Longitude              -71.80 deg  +/-   18 km
 9    Depth                      10 km
10    Agency                 AA
11    Mode                   automatic
12    Status                 NOT SET
13    Residual RMS             0.76 s
14    Azimuthal gap            340 deg
```

```
15
16 5 Network magnitudes:
17    MLv       5.06 +/- 0.14  10
18    mB        5.12            2
19    Mw(mB)    4.48            2
20    mb        4.81 +/- 0.28   6
21    M         4.97           10 preferred
22
23 12 Phase arrivals:
24    sta   net cmp  dist azi toang  phase   time         res    wt    sta   loca
25    PB14  CX  BHZ   2.3  33  0.0    P      18:34:09.0  -0.9 A  1.0   . PB14
26    PB10  CX  BHZ   3.3  20  0.0    P      18:34:22.9   0.1 A  1.0   . PB10
27    PB15  CX  BHZ   4.0  32  0.0    P      18:34:34.0   1.3 A  1.0   . PB15
28    PB06  CX  BHZ   4.4  28  0.0    P      18:34:37.4  -0.6 A  1.0   . PB06
29    PB04  CX  BHZ   4.5  20  0.0    P      18:34:39.9   0.0 A  1.0   . PB04
30    PB03  CX  BHZ   4.9  23  0.0    P      18:34:44.9  -0.3 A  1.0   . PB03
31    PB07  CX  BHZ   5.2  20  0.0    P      18:34:48.4  -0.4 A  1.0   . PB07
32    PB02  CX  BHZ   5.6  19  0.0    P      18:34:53.7  -0.3 A  1.0   . PB02
33    PB01  CX  BHZ   5.9  21  0.0    P      18:34:58.8  -0.5 A  1.0   . PB01
34    HMBCX CX  BHZ   6.6  16  0.0    P      18:35:09.0   1.3 A  1.0   . HMBCX
35    PB08  CX  BHZ   6.9  21  0.0    P      18:35:13.5   1.1 A  1.0   . PB08
36    PSGCX CX  BHZ   7.2  13  0.0    P      18:35:15.3  -0.7 A  1.0   . PSGCX
37
38 20 Station magnitudes:
39    sta   net cmp  dist azi  type   value   res                        time        amp per
40    PB14  CX  BHZ   2.3  33   MLv    5.14   0.08   2015-10-23 18:34:26.795  21.9576
41    PB10  CX  BHZ   3.3  20   MLv    4.53  -0.53   2015-10-23 18:35:00.250   1.60612
42    PB15  CX  BHZ   4.0  32   MLv    5.65   0.59   2015-10-23 18:35:22.269  11.1773
43    PB06  CX  BHZ   4.4  28   MLv    5.08   0.02   2015-10-23 18:35:30.269   2.42735
44    PB04  CX  BHZ   4.5  20   MLv    5.03  -0.03   2015-10-23 18:35:39.669   1.99724
45    PB03  CX  BHZ   4.9  23   MLv    5.10   0.04   2015-10-23 18:35:46.869   1.85902
46    PB07  CX  BHZ   5.2  20   MLv    5.24   0.18   2015-10-23 18:35:57.319    2.207
47    PB07  CX  BHZ   5.2  20   mB     5.07  -0.06   2015-10-23 18:35:38.219  1691.18
48    PB07  CX  BHZ   5.2  20   mb     5.09   0.28   2015-10-23 18:35:09.169   148.86 0.72
49    PB02  CX  BHZ   5.6  19   MLv    5.18   0.12   2015-10-23 18:36:24.619   1.56288
50    PB02  CX  BHZ   5.6  19   mB     5.18   0.06   2015-10-23 18:35:52.719  1991.59
51    PB02  CX  BHZ   5.6  19   mb     5.05   0.24   2015-10-23 18:35:18.319  84.7969 0.50
52    PB01  CX  BHZ   5.9  21   MLv    4.84  -0.21   2015-10-23 18:36:21.669  0.573598
53    PB01  CX  BHZ   5.9  21   mb     4.62  -0.18   2015-10-23 18:35:22.419  30.9372 0.54
54    HMBCX CX  BHZ   6.6  16   MLv    5.12   0.06   2015-10-23 18:36:44.699  0.762258
55    HMBCX CX  BHZ   6.6  16   mb     5.01   0.21   2015-10-23 18:35:37.150  61.9356 0.49
56    PB08  CX  BHZ   6.9  21   MLv    5.07   0.01   2015-10-23 18:36:51.919  0.54982
57    PB08  CX  BHZ   6.9  21   mb     4.60  -0.20   2015-10-23 18:35:38.169  26.0943 0.56
58    PSGCX CX  BHZ   7.2  13   MLv    4.69  -0.37   2015-10-23 18:37:04.549  0.197526
59    PSGCX CX  BHZ   7.2  13   mb     4.27  -0.54   2015-10-23 18:35:16.850  11.9064 0.57
60
SC2SEI:.fullpath and filename: /home/seismo/snew/WAV/SC3__/2015/10/2015-10-23-1832-31.SC3__
SC2SEI:.waveform directory...: /home/seismo/snew/WAV/SC3__/2015/10
scart      -dsvE     -l     scartinput.txt    /home/seismo/seiscomp3/var/lib/archive    >
/home/seismo/snew/WAV/SC3__/2015/10/2015-10-23-1832-31.SC3__
```

s-file generated

```
 2015 1023 1833 31.5 R -26.600 -71.800 10.0  SC3 12 0.8 5.0LSC3 4.8bSC3 5.1BSC31
 GAP=340        2.40   19.0   18.0                                            E
 2015-10-23-1832-31.SC3__                                                     6
 ACTION:NEW 15-10-23 18:33 OP:SEIS STATUS:            ID:20151023183331       I
 Off Coast of Northern Chile                                                  3
 STAT SP IPHASW D HRMM SECON CODA AMPLIT PERI AZIMU VELO AIN AR TRES W  DIS CAZ7
 PB14 BZ IP    A 1834  9.0                                      -0.90   255 33
 PB10 BZ IP    A 1834 22.9                                       0.10   366 20
 PB15 BZ IP    A 1834 34.0                                       1.30   444 32
 PB06 BZ IP    A 1834 37.4                                      -0.60   489 28
 PB04 BZ IP    A 1834 39.9                                       0.00   500 20
 PB03 BZ IP    A 1834 44.9                                      -0.30   544 23
 PB07 BZ IP    A 1834 48.4                                      -0.40   578 20
 PB02 BZ IP    A 1834 53.7                                      -0.30   622 19
 PB01 BZ IP    A 1834 58.8                                      -0.50   656 21
 HMBCXBZ IP    A 1835  9.0                                       1.30   733 16
 PB08 BZ IP    A 1835 13.5                                       1.10   767 21
 PSGCXBZ IP    A 1835 15.3                                      -0.70   800 13
 PB14 BZ  IAML   1834 26.7     21957.6                                  255 33
 PB10 BZ  IAML   1835  0.2      1606.1                                  366 20
 PB15 BZ  IAML   1835 22.2     11177.3                                  444 32
 PB06 BZ  IAML   1835 30.2      2427.4                                  489 28
 PB04 BZ  IAML   1835 39.6      1997.2                                  500 20
```

28

```
PB03 BZ   IAML      1835 46.8      1859.0                              544  23
PB07 BZ   IAML      1835 57.3      2207.0                              578  20
PB07 BZ   IVmB_BB   1835 38.2      1691.2                              578  20
PB07 BZ   IAmb      1835  9.1       148.9 0.72                         578  20
PB02 BZ   IAML      1836 24.6      1562.9                              622  19
PB02 BZ   IVmB_BB   1835 52.7      1991.6                              622  19
PB02 BZ   IAmb      1835 18.3        84.8 0.50                         622  19
PB01 BZ   IAML      1836 21.6       573.6                              656  21
PB01 BZ   IAmb      1835 22.4        30.9 0.54                         656  21
HMBCXBZ   IAML      1836 44.6       762.3                              733  16
HMBCXBZ   IAmb      1835 37.1        61.9 0.49                         733  16
PB08 BZ   IAML      1836 51.9       549.8                              767  21
PB08 BZ   IAmb      1835 38.1        26.1 0.56                         767  21
PSGCXBZ   IAML      1837  4.5       197.5                              800  13
PSGCXBZ   IAmb      1835 16.8        11.9 0.57                         800  13
```

ID MODE components with phases only

`sc2sei -u sysop -p sysop -ID gfz2015uukb -allcmp 0`

The command above produces a waveform containing only components with phase readings. The figure below shows the extracted waveform.
The figure also show the effect of a too short POST-EVENT. The magnitude of the event is 5.1 and the POST-EVENT should be at least twice the length.
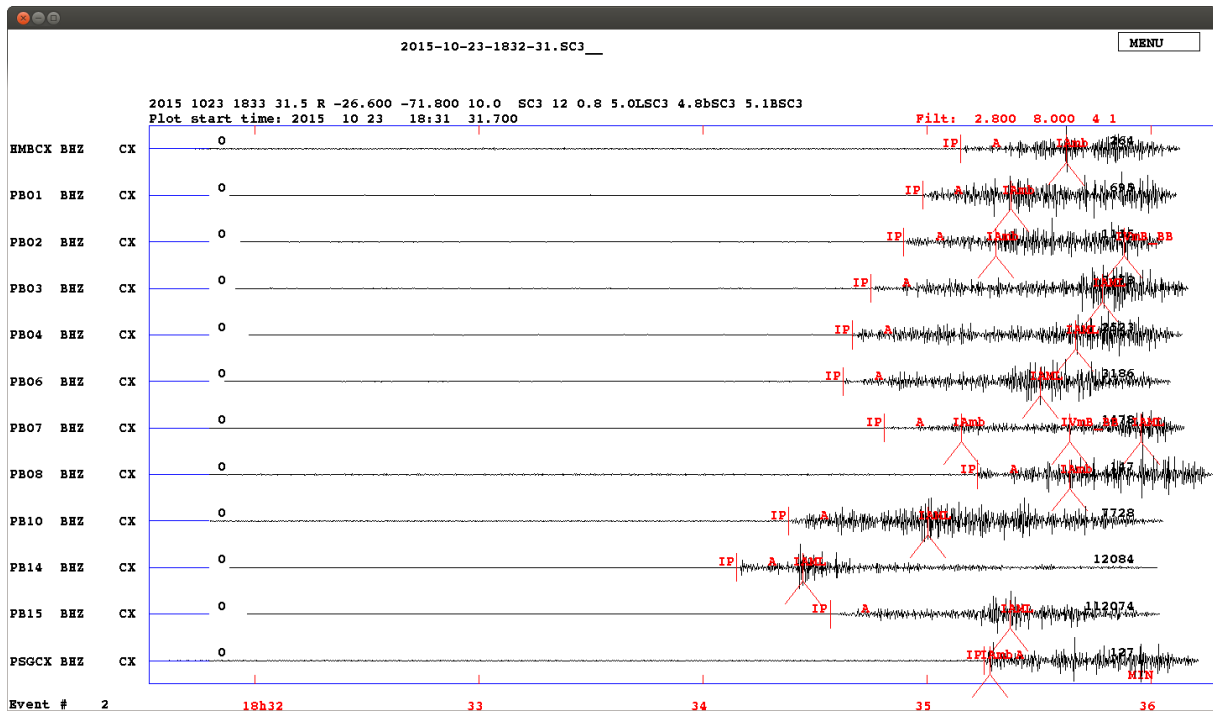
ARCHIVE MODE many events example:

This command will extract events for a time interval of almost a month, a total of 107 events. Each event have 55 components configured and the extracted waveform is around 5 minutes long. Total time to extract all events was around 4 minutes on a standard laptop computer.

`sc2sei -u sysop -p sysop -begin "2015-10-01 00:00:00" -end "2015-10-29 23:00:00" -arc 1`