Session 1: SEED data archiving

Mouse Reusch and Alissa Scire
data_group@passcal.nmt.edu
Session 1 outline

- 8:15am Background
  - SEED basics
  - Requirements
  - The importance of metadata
  - Instrumentation differences and data

- 9:00am Archiving steps
  - Batch files and databases
  - RT130 and Q330 archiving steps
  - From PASSCAL to the DMC

- 10:00ish Break

- 10:30am Hands-on data archiving

- 12:00pm Break for lunch
Why should you archive?

- Archiving data at the DMC can allow for the easy transfer of your data into various formats (e.g. SEED, SAC, etc), making analysis easier.
- Serving data to other users is no longer your responsibility; co-PIs and students can access data directly from the DMC.
- Lots of cool stuff in MUSTANG at the DMC: [http://service.iris.edu/mustang/](http://service.iris.edu/mustang/).
- The equipment in the PASSCAL facility represents a significant community resource.
- So, IRIS policy states that all data collected by PASSCAL instruments must be submitted to the IRIS Data Management Center per the Data Delivery Policy: [www.passcal.nmt.edu/content/general-information/policy/data-delivery-policy](http://www.passcal.nmt.edu/content/general-information/policy/data-delivery-policy).
Introduction to SEED

- The Standard for the Exchange of Earthquake Data (SEED) is an international standard format for the exchange of digital seismological data.
- SEED was designed for use by the earthquake research community, primarily so there was a uniform standard for exchange between institutions of unprocessed Earth motion data.
- Adopted by the Federation of Digital Seismographic Networks (FDSN) in 1987.
- See also: www.passcal.nmt.edu/content/all-about-seed-format
SEED format: Full SEED volume

Data: Miniseed

Metadata: Dataless
Miniseed: Data only SEED

Fixed section of data header

- NETWORK CODE <net>, example: XN, PI
- STATION NAME <sta>, example: STA1, EP01
- CHANNEL NAME—refer to Appendix A in SEED manual
- LOCATION CODE
  - Usually left blank
  - Start/end time
  - Total number of samples
  - Sample rate
  - Data header quality indicator: example: D, R, Q, M

Data: Time series

- Wiggles!
- Can be viewed independently
Dataless SEED

It contains the metadata for your experiment such as instrument types, responses, and station coordinates.

A dataless contains NO waveform data.
Full SEED volume

Dataless

Miniseed

- Network code
- Station name
- Location code
- Channel name
- Start/end time
- Sample rate
- Number of samples
Needs for successful archiving

- Hardware and OS requirements
- Software
- Raw data
- Metadata
Hardware & OS requirements

- Hardware: 64-bit computer with internal or external digital space for about 3X the space of the raw data
- OS: Mac OSX 10.8-10.10 or Linux RHEL/CentOS Linux 6.2-6.6 and 7.x
- None of the software works in Windows, but you could use either Linux emulators or a dual-boot machine
Software: PQL II and PASSOFT

PASSOFT and PQLII are available here:
www.passcal.nmt.edu/content/software-resources (get the latest!)
PASSOFT is a collection of PASSCAL-written and/or distributed tools

Used for:
- Converting data formats: rt2ms
- Checking station health: logpeek, qpeek
- Sending data: data2passcal
- Verifying data coverage: coverplot

PQL II is a program for viewing time-series data written by Richard Boaz and supported by PASSCAL staff
Antelope

PASSCAL supports Antelope (latest version is 5.5)

Boulder Real Time Technologies (BRTT): www.brtt.com

“Antelope is an integrated collection of programs for data collection and seismic data analysis”
How to get Antelope

- BRTT (Antelope) provides licenses for US academic institutions: [www.brtt.com/education_and_academic_research.html](http://www.brtt.com/education_and_academic_research.html)

- Have a PASSCAL project but are not a member of a US academic institution? Please contact [data_group@passcal.nmt.edu](mailto:data_group@passcal.nmt.edu)
How PASSCAL uses Antelope

1. Metadata preparation: dbbuild, dbbuild_batch
2. Convert data: miniseed2days, log2miniseed
3. Database quality assurance: dbfixchanids, dbverify, dbversdwf
4. Create a dataless: mk_dataless_seed
5. Verify that the dataless is valid: seed2db
How we don’t use Antelope

1. Event location, building of catalogs
2. Conversion to other formats

Please seek out the Antelope Users Group
http://www.antelopeusersgroup.org or other Antelope users for assistance with these tasks. (It’s not that we don’t want to help you, we just don’t know how!)
What needs to be archived?

- EVERYTHING! meaning...
- All waveform data
- All SOH data
- Accurate metadata in the form of a dataless
Instrumentation and your data
Where it all begins...

PRE-EXPERIMENT

IDEA - Science objective
- Recording parameters

LOGISTICS - Planning, resources, availability
- How will metadata be collected
- Who will be responsible for archiving

FIELD WORK - Installation & service
- Organize and collect field notes (i.e., metadata)
- Field notes are generated with:
  - What stations were where and when
  - Orientation and equipment specifics
- Raw data are retrieved on compact flash disk, USB drive, B14 bale
- Keep multiple backups!

All of the field notes provide the metadata and the raw data will be converted into archive-ready data.
Metadata: Required information

**Network**
- FDSN network code assigned

**Station**
- Number of stations, location, SEED station name

**Instrumentation**
- Type of sensor and datalogger, serial numbers, sensor orientation, gain

**Time**
- Start time, end time, exact times when configurations change

**Data streams recorded**
- Number of data streams
- Sample rates recorded
INSTALL SHEET (STAND ALONE)

STATION Name: ________________

Local Date/Time: __________________ GMT Date/Time: __________________

Field Team: ____________________________

Location of site: ____________________________

Equipment

Sensor S/N: ________________ Sensor Type: ________________

DAS Type: ________________ DAS S/N: ________________

Clock S/N: ________________

Flash Disk 1 S/N: ________________ Size: ________________

Flash Disk 2 S/N: ________________ Size: ________________

INSTALL SENSOR

Level Sensor ____ sensor feet 'locked' ________ (if you have questions, ask)

Declination: ____________ Orientation: ____________ (East Rod STS2; Brass Pin North CMG)

Solar Power System Set-UP

NOTE: The following tests should be performed with the solar panels in full sun, and with fully charged batteries.

1. Test output of the batteries (12.5 – 13 VDC WARNING: DO NOT test current). Voltage: ______

2. Connect the batteries to the power box

3. Test the voltage out of the power box to the DAS from pin A+ to C- (Same as battery voltage.)

NOTE: Make sure the polarity is correct. Voltage: ______

4. Test solar panel output (~18 Volts DC). Voltage: ______

5. Connect solar panels to power box

6. Test the voltage at the battery terminals (Greater than battery voltage above). Voltage: ______

INSTALL DAS

Connect GPS, and Sensor to DAS and then connect Power.

SENSOR Unlock

CMG-3T: Use the host box to unlock the sensor. Press and hold both the Unlock and Enable
Install sheets aren’t always perfect...

<table>
<thead>
<tr>
<th>INSTALL SHEET (STAND ALONE)</th>
<th>Local Date/Time: 6-18-2010 11:30 AM</th>
<th>GMT Date/Time: 6-18-2010 18:30</th>
<th>Station: A08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Team:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPS Location of Site:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor S/N:</td>
<td>T33893</td>
<td>Sensor Type: CMG-3T</td>
<td></td>
</tr>
<tr>
<td>DAS S/N:</td>
<td>A918</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clock S/N:</td>
<td>2801</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash Disk 1 S/N:</td>
<td>80460</td>
<td>Size: 2 GB</td>
<td></td>
</tr>
<tr>
<td>Flash Disk 2 S/N:</td>
<td>21774</td>
<td>Size: 2 GB</td>
<td></td>
</tr>
</tbody>
</table>

INSTALL SENSOR
Level Sensor: sensor feet 'locked': (if you have questions, ask)
Declination: 13.5° E Orientation: T, N. (East Rod STS2, Brass Pin CMG)

<table>
<thead>
<tr>
<th>INSTALL SHEET (STAND ALONE)</th>
<th>Local Date/Time:</th>
<th>GMT Date/Time:</th>
<th>Station: A14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Team:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPS Location of Site:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor S/N:</td>
<td>I3N57</td>
<td>Sensor Type: CMG-3T</td>
<td></td>
</tr>
<tr>
<td>DAS S/N:</td>
<td>9D77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clock S/N:</td>
<td>1397</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash Disk 1 S/N:</td>
<td>2217</td>
<td>Size: 2 GB</td>
<td></td>
</tr>
<tr>
<td>Flash Disk 2 S/N:</td>
<td>2925</td>
<td>Size: 2 GB</td>
<td></td>
</tr>
</tbody>
</table>

INSTALL SENSOR
Level Sensor: V sensor feet 'locked': N/A (if you have questions, ask)
Declination: 13.5° E Orientation: (East Rod STS2, Brass Pin CMG)
Metadata – really important!

- Without accurate metadata, data are almost useless
- Common errors:
  - Wrong equipment types
  - Wrong location (lat, lon, elev)
  - Wrong start and/or end dates
  - Wrong sensor orientation
  - No serial numbers, or incorrect serial numbers
- All of this info comes from field notes; please take them carefully!
Metadata information: Where is it used?

1. To populate your Antelope database
2. To generate a dataless using Antelope
3. To archive your data

Note that without metadata, you cannot archive your data!
PASSCAL instrumentation

- RT130: Reftek Steim-compressed data. Not mseed!
- Q330: Baler records data in multiplexed mseed format
- RT125 (not commonly archived in SEED): Uncompressed format (trd2mseed)
Raw data

**RT130**
- Stored on 2 compact flash cards
- Filenames are *.ZIP when neo is used, 1 ZIP file per CF card

**Q330**
- Recorded to a data baler (B14 or B44)
- B14 filenames are *.ALL
- B44 keeps a “data” directory* of files

*FYI, in B44 projects with a high sample rate and/or a long time between servicing, the B44 will create a new data directory for every 2000 files, renaming the old directory with the date.
More than just file names...

<table>
<thead>
<tr>
<th>RT130</th>
<th>Q330</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Headers are populated by default information that need updating</td>
<td>○ Headers can be programmed at station installation</td>
</tr>
<tr>
<td>○ Single non-uniform sampled text SOH channel</td>
<td>○ Multiple time-series SOH channels</td>
</tr>
</tbody>
</table>
Organization is critical (RT130 example)
Organization is critical (Q330 example)

Experiment_Name/

Service_Run_1/

B14 baler data

RAW/

day_volumes/

DB/

B44 baler data

RAW/

staname.1/

staname.2/

*.ALL files go here, e.g. NNSTAYYMMDD.ALL

BALER44 directories go in staname directories
Switch!
Basic data archiving flow

- Metadata generated
- Raw data collected
- Raw data converted into mseed with specific file naming format
- Metadata converted into dataless
- Dataless and converted data sent to PASSCAL
- Quality controlled dataless and data sent to IRIS DMC
- Data are available to users as either restricted or open access
Metadata to batch file

- What is the batch file?
  - A text file with specific keywords and details used to build an Antelope database
  - A history of your experiment from start to finish
  - Used to generate the parameter file for converting rt130 data into mseed with pre-populated headers

- All of this info comes from your field notes!
#comments can be anything and they start with a pound sign
#comment: This is a batch file example.

# your network info
net XY Chile RAMP

# your station info
sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add
close U04B 12/31/2010 23:59:59
#comment: This is a batch file example.

# your network info
net XY Chile RAMP

# your station info
sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
data logger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add
close U04B 12/31/2010 23:59:59
# comment: This is a batch file example.

# your network info
net XY Chile RAMP

# your station info
sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add

close U04B 12/31/2010 23:59:59

time config start time ← time when you power on the station

*The only requirement is that the date and time are before your first waveform and SOH data samples*
#comment: This is a batch file example.

# your network info
net XY Chile RAMP

# your station info
sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add
close U04B 12/31/2010 23:59:59
#comment: This is a batch file example.

# your network info
net XY Chile RAMP

# your station info
sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add

close U04B 12/31/2010 23:59:59

time config start time ⇐ time when you power on the station

datalogger code serial number ⇐ code is from Antelope *.pf file

Datalogger Antelope parameter files can be found within:
Antelope 5.4 & earlier
$ANTELOPE/data/instruments/dataloggers
Antelope 5.5
$ANTELOPE/data/ contrib/instruments/dataloggers
#comment: This is a batch file example.

# your network info
net XY Chile RAMP

# your station info
sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add
close U04B 12/31/2010 23:59:59
#comment: This is a batch file example.

# your network info
net XY Chile RAMP

# your station info
sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 -1 1
axis N 0 90 -2 1
axis E 90 90 -3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add

close U04B 12/31/2010 23:59:59

tenant ANTELOPE

Sensor Antelope parameter files can be found within:
Antelope 5.4 & earlier
$ANTELOPE/data/instruments/sensors
Antelope 5.5
$ANTELOPE/data/contrib/instruments/sensors

sensor code edepth serial number
edepth is the depth below surface

edepth is the depth below surface
#comment: This is a batch file example.

# your network info
net XY Chile RAMP

# your station info
sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add

close U04B 12/31/2010 23:59:59
#comment: This is a batch file example.

# your network info
net XY Chile RAMP

# your station info
sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add
close U04B 12/31/2010 23:59:59

See ‘Appendix A’ of the SEED manual for channel naming conventions:
www.passcal.nmt.edu/content/data-archiving/documentation/passive-source
### Table 1. Recommended SEED channel names for many of the sensors available from PASSCAL

*The use of “H”, denoting high gain, assumes that the dataloggers are programmed using a gain of 32, which is the recommended gain setting for a typical PASSCAL experiment. In the event the gain is set to 1 at the datalogger, then the second character of the channel name should be set to “L”.*

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Sample Rates (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt;= 1000 to &lt; 5000</td>
</tr>
</tbody>
</table>
#comment: This is a batch file example.

# your network info
net XY Chile RAMP

# your station info
sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add

add ← adds the current configuration to the database

close sta time (very important, closes the station at this time)

close U04B 12/31/2010 23:59:59
#comment: This is a batch file example.

# your network info
net XY Chile RAMP

# your station info
sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130_mp 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add
close U04B 12/31/2010 23:59:59

Notice that there are no mass position listed in the batch file.

Mass positions are considered SOH channels, so, like the LOG files they described in the Antelope parameter file. RT130s didn’t always record mass positions so the default rt130.pf file in the Antelope builds does not include them.

PASSCAL created two new files, rt130_mp.pf and rt130_nmp.pf to accommodate the mass positions and avoid confusion with which one to use if your sensor has masses that can be recorded.
For more information about the batch file look to the man pages for:
- `dbbuild_batch`
- `dbbuild`
- `dbbuild_examples`

Additionally, our appendix ‘Building a Batch File for `dbbuild’ has useful examples and can be found at:

[www.passcal.nmt.edu/content/data-archiving/documentation/passive-source](http://www.passcal.nmt.edu/content/data-archiving/documentation/passive-source)
Batch file to database

- Build metadata tables using dbbuild
  - dbbuild -b dbname batch_file >& dbbuild.out

- Check the output of dbbuild for errors!

- Check your database with dbe
  - dbe dbname

- Look over a few tables such as sitechan, site, and network to check the entries
Some useful database tables to examine...

### AGU-2015

#### File
- Options
- Help
  - calibration
dlsensor
instrument
lastid
network
schanloc
sensor
sensormodel
site
sitechan
snetsite
stage

#### AGU-2015 site

<table>
<thead>
<tr>
<th>sta</th>
<th>ondate</th>
<th>offdate</th>
<th>lat</th>
<th>lon</th>
<th>elev</th>
<th>staname</th>
</tr>
</thead>
<tbody>
<tr>
<td>U04B</td>
<td>2010077</td>
<td>2010273</td>
<td>-37.9867</td>
<td>-72.5698</td>
<td>0.2020</td>
<td>N508 Callipulli, Chile</td>
</tr>
<tr>
<td>U07S</td>
<td>2010085</td>
<td>2010273</td>
<td>-38.2546</td>
<td>-73.4726</td>
<td>0.0830</td>
<td>A403 (6 channel) Quidico, Chile</td>
</tr>
</tbody>
</table>

#### AGU-2015 network

<table>
<thead>
<tr>
<th>net</th>
<th>netname</th>
</tr>
</thead>
<tbody>
<tr>
<td>XY</td>
<td>Chile RAMP – IRIS, University of Chile</td>
</tr>
</tbody>
</table>
Some useful database tables to examine...

<table>
<thead>
<tr>
<th>sta</th>
<th>chan</th>
<th>ondate</th>
<th>offdate</th>
<th>ctype</th>
<th>edepth</th>
<th>hang</th>
<th>vang</th>
<th>descrp</th>
</tr>
</thead>
<tbody>
<tr>
<td>U04B</td>
<td>HHZ</td>
<td>2010077</td>
<td>2010273</td>
<td>0.0000</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>T4906</td>
</tr>
<tr>
<td>U04B</td>
<td>HN</td>
<td>2010077</td>
<td>2010273</td>
<td>0.0000</td>
<td>0.0</td>
<td>0.0</td>
<td>90.0</td>
<td>T4906</td>
</tr>
<tr>
<td>U04B</td>
<td>HHE</td>
<td>2010077</td>
<td>2010273</td>
<td>0.0000</td>
<td>90.0</td>
<td>90.0</td>
<td>90.0</td>
<td>T4906</td>
</tr>
<tr>
<td>U04B</td>
<td>LHZ</td>
<td>2010077</td>
<td>2010273</td>
<td>0.0000</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>T4906</td>
</tr>
<tr>
<td>U04B</td>
<td>LHN</td>
<td>2010077</td>
<td>2010273</td>
<td>0.0000</td>
<td>0.0</td>
<td>90.0</td>
<td>90.0</td>
<td>T4906</td>
</tr>
<tr>
<td>U04B</td>
<td>LHE</td>
<td>2010077</td>
<td>2010273</td>
<td>0.0000</td>
<td>90.0</td>
<td>90.0</td>
<td>9249</td>
<td>T4906</td>
</tr>
<tr>
<td>U04B</td>
<td>LOG</td>
<td>2010077</td>
<td>2010273</td>
<td>0.0000</td>
<td>0.0</td>
<td>0.0</td>
<td>9249</td>
<td>9249</td>
</tr>
<tr>
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<td>VM1</td>
<td>2010077</td>
<td>2010273</td>
<td>0.0000</td>
<td>0.0</td>
<td>0.0</td>
<td>9249</td>
<td>9249</td>
</tr>
<tr>
<td>U04B</td>
<td>VM2</td>
<td>2010077</td>
<td>2010273</td>
<td>0.0000</td>
<td>90.0</td>
<td>90.0</td>
<td>9249</td>
<td>9249</td>
</tr>
<tr>
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<td>VM3</td>
<td>2010077</td>
<td>2010273</td>
<td>0.0000</td>
<td>90.0</td>
<td>90.0</td>
<td>9249</td>
<td>9249</td>
</tr>
<tr>
<td>U07S</td>
<td>LNZ</td>
<td>2010085</td>
<td>2010273</td>
<td>0.0000</td>
<td>0.0</td>
<td>0.0</td>
<td>2448</td>
<td>9BD2X</td>
</tr>
<tr>
<td>U07S</td>
<td>LNN</td>
<td>2010085</td>
<td>2010273</td>
<td>0.0000</td>
<td>0.0</td>
<td>90.0</td>
<td>2448</td>
<td>9BD2X</td>
</tr>
<tr>
<td>U07S</td>
<td>LNE</td>
<td>2010085</td>
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<td>0.0000</td>
<td>90.0</td>
<td>90.0</td>
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</tr>
<tr>
<td>U07S</td>
<td>LOG</td>
<td>2010085</td>
<td>2010273</td>
<td>0.0000</td>
<td>0.0</td>
<td>0.0</td>
<td>9BD2X</td>
<td></td>
</tr>
</tbody>
</table>
Some useful database tables to examine...

```
<table>
<thead>
<tr>
<th>dmodel</th>
<th>id</th>
<th>chident</th>
<th>time</th>
<th>snmodel</th>
<th>snident</th>
</tr>
</thead>
<tbody>
<tr>
<td>rt130</td>
<td>9249</td>
<td>A</td>
<td>3/18/2010 00:00</td>
<td>cmg40t</td>
<td>T4906</td>
</tr>
<tr>
<td>rt130</td>
<td>9BD2X</td>
<td>A</td>
<td>3/26/2010 00:00</td>
<td>episensor_10vpg</td>
<td>2448</td>
</tr>
</tbody>
</table>
```
Common database errors

- Start time too late or end time too soon
- Negatives (-) in latitude or longitude
- Elevation in meters instead of kilometers
- Serial numbers listed at more than one station at the same time
Batch file

batch2par – creates a parameter file for rt2ms

rt2ms – converts data to mseed with correctly populated header values (station/network/channel names)

Evaluate log files using logpeek, waveforms in PQL

log2miniseed – convert log files into day volumes

miniseed2days – cut waveforms into station-channel-day volumes
Batch file – we did this already!

batch2par – creates a parameter file for rt2ms

rt2ms – converts data to mseed with correctly populated header values (station/network/channel names)

Evaluate log files using logpeek, waveforms in PQL

log2miniseed – convert log files into day volumes

miniseed2days – cut waveforms into station-channel-day volumes
batch2par

- We need a parameter file in a future step where the miniseed headers get populated
- batch2par creates this par file from your batch file
- The parameter file is the Rosetta Stone for the header conversions
net XY Chile RAMP

sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add

close U04B 12/31/2010 23:59:59

# das; refchan; refstrm; netcode; station; channel; samplerate; gain
9249; 1; rs100spsrs; XY; U04B; HHZ; 100; x1
9249; 3; rs100spsrs; XY; U04B; HHE; 100; x1
9249; 2; rs100spsrs; XY; U04B; HHN; 100; x1
9249; 1; rs1spsrs; XY; U04B; LHZ; 1; x1
9249; 3; rs1spsrs; XY; U04B; LHE; 1; x1
9249; 2; rs1spsrs; XY; U04B; LHN; 1; x1
net XY Chile RAMP

sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
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channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add

close U04B 12/31/2010 23:59:59

#das; refchan; refstrm; netcode; station; channel; samplerate; gain
9249; 1; rs100spsrs; XY; U04B; HHZ; 100; x1
9249; 3; rs100spsrs; XY; U04B; HHE; 100; x1
9249; 2; rs100spsrs; XY; U04B; HHN; 100; x1
9249; 1; rs1spsrs; XY; U04B; LHZ; 1; x1
9249; 3; rs1spsrs; XY; U04B; LHE; 1; x1
9249; 2; rs1spsrs; XY; U04B; LHN; 1; x1
batch2par batch_file > par_file

et XY Chile RAMP

sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add

#das; refchan; refstrm; netcode; station; channel; samplerate; gain
9249; 1; rs100spsrs; XY; U04B; HHZ; 100; x1
9249; 3; rs100spsrs; XY; U04B; HHE; 100; x1
9249; 2; rs100spsrs; XY; U04B; HHN; 100; x1
9249; 1; rs1spsrs; XY; U04B; LHZ; 1; x1
9249; 3; rs1spsrs; XY; U04B; LHE; 1; x1
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close U04B 12/31/2010 23:59:59
batch2par batch_file > par_file

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sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
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channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add
close U04B 12/31/2010 23:59:59

#das; refchan; refstrm; netcode; station; channel; samplerate; gain
9249; 1; rs100spsrs; XY; U04B; HHZ; 100; x1
9249; 3; rs100spsrs; XY; U04B; HHE; 100; x1
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9249; 3; rs1spsrs; XY; U04B; LHE; 1; x1
9249; 2; rs1spsrs; XY; U04B; LHN; 1; x1
**batch2par batch_file > par_file**

```plaintext
net XY Chile RAMP

sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
sensor cmg40t 0 T4906
axis Z 0 0 - 1 1
axis N 0 90 - 2 1
axis E 90 90 - 3 1
samplerate 100sps
channel Z HHZ
channel N HHN
channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add
close U04B 12/31/2010 23:59:59
```

<table>
<thead>
<tr>
<th>#das; refchan; refstrm; netcode; station; channel; samplerate; gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>9249; 1; rs100spsrs; XY; U04B; HHZ; 100; x1</td>
</tr>
<tr>
<td>9249; 3; rs100spsrs; XY; U04B; HHE; 100; x1</td>
</tr>
<tr>
<td>9249; 2; rs100spsrs; XY; U04B; HHN; 100; x1</td>
</tr>
<tr>
<td>9249; 1; rs1spsrs; XY; U04B; LHZ; 1; x1</td>
</tr>
<tr>
<td>9249; 3; rs1spsrs; XY; U04B; LHE; 1; x1</td>
</tr>
<tr>
<td>9249; 2; rs1spsrs; XY; U04B; LHN; 1; x1</td>
</tr>
</tbody>
</table>
batch2par batch_file > par_file

net XY Chile RAMP

sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
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axis E 90 90 - 3 1
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channel Z LHZ
channel N LHN
channel E LHE
add
close U04B 12/31/2010 23:59:59

| #das; refchan; refstrm; netcode; station; channel; samplerate; gain |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 9249; 1; rs100spsrs; XY; U04B; HHZ; 100; x1 |
| 9249; 3; rs100spsrs; XY; U04B; HHE; 100; x1 |
| 9249; 2; rs100spsrs; XY; U04B; HHN; 100; x1 |
| 9249; 1; rs1spsrs; XY; U04B; LHZ; 1; x1 |
| 9249; 3; rs1spsrs; XY; U04B; LHE; 1; x1 |
| 9249; 2; rs1spsrs; XY; U04B; LHN; 1; x1 |
batch2par batch_file > par_file

net XY Chile RAMP

sta U04B -37.986700 -72.569800 0.202 Callipulli, Chile
time 03/18/2010 00:00:00
datalogger rt130 9249
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axis Z 0 0 - 1 1
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channel Z LHZ
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channel E LHE
add

close U04B 12/31/2010 23:59:59
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net XY Chile RAMP

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channel E HHE
samplerate 1sps
channel Z LHZ
channel N LHN
channel E LHE
add
close U04B 12/31/2010 23:59:59

#das; refchan; refstrm; netcode; station; channel; samplerate; gain
9249; 1; rs100spsrs; XY; U04B; HHZ; 100; x1
9249; 3; rs100spsrs; XY; U04B; HHE; 100; x1
9249; 2; rs100spsrs; XY; U04B; HHN; 100; x1
9249; 1; rs1spsrs; XY; U04B; LHZ; 1; x1
9249; 3; rs1spsrs; XY; U04B; LHE; 1; x1
9249; 2; rs1spsrs; XY; U04B; LHN; 1; x1
# Edit the par_file

- #das; refchan; refstrm; netcode; station; channel; samplerate; gain
- 9249; 1; rs100spsrs; XY; U04B; HHZ; 100; x1
- 9249; 3; rs100spsrs; XY; U04B; HHE; 100; x1
- 9249; 2; rs100spsrs; XY; U04B; HHN; 100; x1
- 9249; 1; rs1spsrs; XY; U04B; LHZ; 1; x1
- 9249; 3; rs1spsrs; XY; U04B; LHE; 1; x1
- 9249; 2; rs1spsrs; XY; U04B; LHN; 1; x1

<table>
<thead>
<tr>
<th>das</th>
<th>refchan</th>
<th>refstrm</th>
<th>netcode</th>
<th>station</th>
<th>channel</th>
<th>samplerate</th>
<th>gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>9249</td>
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<td>1</td>
<td>XY</td>
<td>U04B</td>
<td>HHZ</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>9249</td>
<td>3</td>
<td>1</td>
<td>XY</td>
<td>U04B</td>
<td>HHE</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>9249</td>
<td>2</td>
<td>1</td>
<td>XY</td>
<td>U04B</td>
<td>HHN</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>9249</td>
<td>1</td>
<td>2</td>
<td>XY</td>
<td>U04B</td>
<td>LHZ</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9249</td>
<td>3</td>
<td>2</td>
<td>XY</td>
<td>U04B</td>
<td>LHE</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9249</td>
<td>2</td>
<td>2</td>
<td>XY</td>
<td>U04B</td>
<td>LHN</td>
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<td>1</td>
</tr>
<tr>
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<td>XY</td>
<td>U04B</td>
<td>VM1</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
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<td>U04B</td>
<td>VM3</td>
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<td>1</td>
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<td>XY</td>
<td>U04B</td>
<td>VM2</td>
<td>0.1</td>
<td>1</td>
</tr>
</tbody>
</table>
Run rt2ms

- Check out ‘rt2ms –h’ to see other options
- Run:
  `rt2ms -D dir-of-zips -Y -L -o MSEED -p par_file >& rt2ms.out`
- The output is .log (and .err) files as well as waveform data in subdirectories beneath the MSEED directory
QC your files and data

- Move all .log and .err files into the LOGS directory
- Use logpeek to look for timing problems, power issues, mass position problems
- Use PQL II to evaluate the waveforms
Logpeek

- Use logpeek to look at station health
- Suggestions would be:
  - Look for consistent locking and unlocking of the gps
  - Verify that the solar panels are charging the battery (if applicable)
  - Check the mass positions for excessive drift or pegging
- See ‘Logpeek: Reviewing RT130 State of Health Information’ on this page:

  www.passcal.nmt.edu/content/data-archiving/documentation/passive-source
PQL II

- Use PQL II to review waveform data
- Suggestions would be:
  - Combine all 1sps data together and look at long-term waveform health
  - Identify specific earthquakes from online catalogs and look for them in your data
  - Scan through waveforms on a day-by-day basis
- See PQL help documents on this page:
  
  www.passcal.nmt.edu/content/data-archiving/documentation/passive-source
log2miniseed

- Converts log files into day volumes
- Copy the global log2miniseed parameter file into your working directory by typing:
  - `cp $ANTELOPE/data/pf/log2miniseed.pf .`
Using any text editor, change the default string in the log2miniseed.pf file

from this:

```
wfname %Y/%j/%{sta}.%{chan}.%Y.%j
```

to:

```
wfname day_volumes/%{sta}/%{sta}.%{net}.%{loc}.%{chan}.%Y.%j
```
log2miniseed (finally!)

Ensure that Antelope is using the pf you just modified by using either:

For tcsh: setenv PFPATH $ANTELOPE/data/pf:.  
For bash: export PFPATH=$ANTELOPE/data/pf:.

Then run log2miniseed:

log2miniseed -a -n XY -s U04B LOGS/2010.128.15.09.9249.log

where XY, U04B and LOGS/*/*.log are changed to your network, station, path and file names. Do this for every log file or write a script for it.
miniseed2days

- Convert the waveforms into station-channel-day volumes using miniseed2days

- Use:

```
miniseed2days -d DB/dbname -u -w "day_volumes/%{sta}/%{sta}.%{net}.%{loc}.%{chan}.%Y.%j" MSEED/ >& miniseed2days.out
```

- The -w flag defines a required naming format; use this flag or modify the miniseed2days.pf file
Switching gears to Q330 data
Q330 data – in brief

- Batch file
- miniseed2days – split waveforms into station-channel-day volumes out of multiplexed files
- fixhdr if any headers need to be changed and miniseed2days again only if changes were made
- qpeek for state of health (SOH) review
- pql for waveform and some SOH review
- miniseed2db to add waveforms to the database
Batch file – we did this already!

miniseed2days – split waveforms into station-channel-day volumes out of multiplexed files

fixhdr if any headers need to be changed and miniseed2days again only if changes were made

qpeek for state of health (SOH) review

pql for waveform and some SOH review

miniseed2db to add waveforms to the database
miniseed2days

- Convert the waveforms into station-channel-day volumes using miniseed2days

- For B14 balers:

  miniseed2days -f -w "day_volumes/%{sta}/%{sta}.%{net}.%{loc}.%{chan}.%Y.%j" RAW/*.ALL >& miniseed2days.out

- For B44 balers:

  miniseed2days -f -w "day_volumes/%{sta}/%{sta}.%{net}.%{loc}.%{chan}.%Y.%j" RAW/staname.?/data >& miniseed2days.out
fixhdr (only if...)

- Use fixhdr to fix headers if any are incorrect
- Then, to update the file names, re-run miniseed2days:

```
miniseed2days -u -w "day_volumes2/%{sta}/%{sta}.%{net}.%{loc}.%{chan}.%Y.%j" day_volumes/ >& miniseed2days2.out
```
How to use fixhdr to:

- Correct headers
- Change endianness
- Mark timing questionable
- See ‘Fixhdr Help’ and the training video for RT130-to-SEED processing on our website:

www.passcal.nmt.edu/content/data-archiving/documentation/passive-source
Use `qpeek` to view SOH channels.

Use `PQL` to scan the waveforms as well as focus in on SOH channels such as temperature, voltage and clock quality.

See ‘Q330 State of Health (SOH) Channels’ on this page:

[www.passcal.nmt.edu/content/data-archiving/documentation/passive-source](http://www.passcal.nmt.edu/content/data-archiving/documentation/passive-source)
Qpeek

Similar to logpeek, use qpeek to look at station health

Suggestions would be:
- Check for high clock quality and low phase errors
- Verify that the solar panels are charging the battery (if applicable)
- Look for excessive drift or pegging in the mass positions
- Examine decimated waveforms
- Confirm that the packet buffer is dumping regularly to the baler
PQL II

- Just like for RT130s, use PQL II to review waveform data
- But! An advantage of Q330s is that the SOH channels can be examined more closely due to their format and higher sample rate (vs RT130)
- See PQL help documents on this page:

  www.passcal.nmt.edu/content/data-archiving/documentation/passive-source
10 days of SOH in qpeek
Same 10 days in PQL II

AGU Fall Meeting 2015 PASSCAL workshop

12/13/15
miniseed2db

- Use miniseed2db to add the waveforms to your database:
  miniseed2db day_volumes2/* DB/dbname >& miniseed2db.out

- If you did not need to re-run miniseed2days, use ‘day_volumes’ instead of ‘day_volumes2’
Back together again

You now have a database with metadata and waveforms, whether you have rt130 or q330 data

And/or

Batch file  batch2par  rt2ms  logpeek and pql  log2miniseed  miniseed2days

Batch file  miniseed2days  qpeek and pql  miniseed2db
Now to wrap it up!

dbfixchanids  dbverify  dbversdwf  mk_dataless_seed  seed2db  data2passcal
dbfixchanids

- Syncs the wfdisc table with the sensor table:
  
  dbfixchanids dbname >& dbfixchanids.out

- dbfixchanids will throw an error if a particular wfdisc row does not have a corresponding sensor row
dbverify

- Checks database for consistency:
  
  `dbverify -tj dbname >& dbverify.out`

- A good result is: 0 failures of joins
## dbverify problems

<table>
<thead>
<tr>
<th>Check</th>
<th>Issues on traces &amp; metadata</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>dbverify perform consistency checks on db</td>
<td>Non-described channels/stations</td>
<td>Comparing cmd output &amp; batch file to identify the reason for this warning</td>
</tr>
<tr>
<td></td>
<td>Multiple configurations for same time frame</td>
<td>Mainly due to bad closing times in the batch file or multiple configurations for the same station in one day without proper closing</td>
</tr>
<tr>
<td></td>
<td>Removed files</td>
<td>Missing files in original path</td>
</tr>
<tr>
<td></td>
<td>Duplicate record</td>
<td>Same record in multiple wfdisc entries</td>
</tr>
</tbody>
</table>
dbversdwf

Checks the wfdisc miniseed data files for consistency:

dbversdwf -tu dbname >& dbversdwf.out

A good result is: 0 bad files/0 bad records
## dbversdwarf problems

<table>
<thead>
<tr>
<th>Check</th>
<th>Issues</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>dbversdwarf</td>
<td>BAD records</td>
<td>These warnings are usually associated with:</td>
</tr>
<tr>
<td>check SEED data files</td>
<td></td>
<td>• Bad endianness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bad logical record</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Steim compression issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Corrupted blockette</td>
</tr>
</tbody>
</table>

For details on each check please consult man page (man dbversdwarf)
Generate your dataless

- Use `mk_dataless_seed` to create a dataless based on your database

```
mk_dataless_seed -v -o
NN.YY.dbname.YYYYDOYHHMM.dataless dbname
```

- Where: NN is your network code, YY is the year of your data, and DOYHHMM is the approximate current day-of-year-hour-minute
Common first time problem:

- There is a field in the site.pf that requires an ‘originating organization’

- The error that comes from mk_dataless_seed reads:
  
  `db2sd *fatal*: Please fill in the ‘originating organization’ in db2sd.pf`

- Using admin privileges, edit site.pf to have your institution as the ‘originating organization’

- site.pf is found in $ANTELOPE/data/pf/site.pf
Verify your dataless

- Verify the dataless:

  `seed2db -v NN.YY.dbname.YYYYDOYHHMM.dataless`

- A successful result is a listing of all of your stations followed by zero errors in the 11 SEEDERRORS categories.
Send your data and dataless to PASSCAL

- Email your dataless to data_group@passcal.nmt.edu so that we can open and/or turn on the database allocation for your experiment.

- Use data2passcal.py to send your data to PASSCAL:
  - You will want to run it on the day_volumes directory containing your final miniseed files.
  - All miniseed files found in the directory will be sent.
  - List of sent files is kept in a log file so if the transfer is interrupted, data2passcal will resume where it left off.
And in summary:

- Data and metadata converted to archive-ready format:

  Either RT130 data:
  
  Batch file → batch2par → rt2ms → logpeek and pql → log2miniseed → miniseed2days

  Or Q330 data:
  
  Batch file → miniseed2days → qpeek and pql → miniseed2db
And in summary:

- Database checked, dataless created, data sent:

  - dbfixchanids
  - dbverify
  - dbversdwf
  - mk_dataless_seed
  - seed2db
  - data2passcal
Fin! (With your part)(for now...)
What goes on at the PIC

- We run checks on your waveforms and dataless, looking for:
  - Correct naming convention
  - Overlaps
  - All data described in dataless
  - Consistency with dataless
  - Previously archived?
  - Unique station locations
What next?

- If there are no problems with the data or dataless, the data will be transmitted to the DMC for final archiving within a few days.

- Shortly after that, the data are available for downloading from the DMC via your favorite request tool.

- The Data Group will send you a summary of the data coverage of all of your archived data for confirmation. Please compare this with your field notes to ensure that no data were lost.
Data coverage: coverplot

- coverplot generates a plot illustrating the coverage of the data archived and the dataless

- Uses a data sync file and the dataless to create a graphical review of the data archived

- To load both the sync and the dataless:
  coverplot -m <sync> -d <dataless>
- Light blue: dataless coverage
- Dark blue: data
- Pink: data gap
- Red: data with no dataless (shouldn’t see any)
At the DMC...

Here are some ways to look at the available data for the Chile RAMP network...

www.iris.edu/mda/XY?timewindow=2010-2010

(You can try this out on your network!)
# Network summary (1 time span)

- **Network**: XY :: Chile RAMP :: [XY Network Map](#)
- **Start Year**: 2010
- **End Year**: 2010

### Stations for XY network

**Information limited to 2010/01/01 00:00:00 to 2010/12/31 23:59:59 - Clear timewindow**

<table>
<thead>
<tr>
<th>Station</th>
<th>Site</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevation</th>
<th>First start</th>
<th>Last end</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>U01B</strong></td>
<td>N404 Perales, Chile</td>
<td>-37.29</td>
<td>-72.49</td>
<td>139</td>
<td>2010/03/17</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U02B</strong></td>
<td>N402 Santa Juana, Chile</td>
<td>-37.21</td>
<td>-72.98</td>
<td>201</td>
<td>2010/03/17</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U03B</strong></td>
<td>N407 Mulchen, Chile</td>
<td>-37.70</td>
<td>-72.33</td>
<td>147</td>
<td>2010/03/18</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U04B</strong></td>
<td>N508 Callipulli, Chile</td>
<td>-37.99</td>
<td>-72.57</td>
<td>202</td>
<td>2010/03/18</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U05B</strong></td>
<td>N410 Los Souces, Chile</td>
<td>-37.95</td>
<td>-72.81</td>
<td>98</td>
<td>2010/03/18</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U06B</strong></td>
<td>N412 (6 channel) Llico, Chile</td>
<td>-37.22</td>
<td>-73.55</td>
<td>1</td>
<td>2010/03/19</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U06S</strong></td>
<td>N412 (6 channel) Llico, Chile</td>
<td>-37.22</td>
<td>-73.55</td>
<td>1</td>
<td>2010/03/29</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U07B</strong></td>
<td>A403 (6 channel) Quidico, Chile</td>
<td>-38.25</td>
<td>-73.47</td>
<td>83</td>
<td>2010/03/19</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U07S</strong></td>
<td>A403 (6 channel) Quidico, Chile</td>
<td>-38.25</td>
<td>-73.47</td>
<td>83</td>
<td>2010/03/27</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U08B</strong></td>
<td>NIPA Ranquil, Chile</td>
<td>-36.63</td>
<td>-72.59</td>
<td>71</td>
<td>2010/03/19</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U09B</strong></td>
<td>B504 Funda Casablanca, Carahue, Chile</td>
<td>-38.49</td>
<td>-73.18</td>
<td>676</td>
<td>2010/03/26</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U10B</strong></td>
<td>B502 Lumaco, Chile</td>
<td>-38.20</td>
<td>-72.85</td>
<td>190</td>
<td>2010/03/27</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U11B</strong></td>
<td>N403 Huepil, Chile</td>
<td>-37.21</td>
<td>-71.83</td>
<td>622</td>
<td>2010/03/28</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U12B</strong></td>
<td>UCBS N501 (6 channel) Canete, Chile</td>
<td>-37.95</td>
<td>-73.41</td>
<td>59</td>
<td>2010/03/28</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U12S</strong></td>
<td>UCBS N501 (6 channel) Canete, Chile</td>
<td>-37.95</td>
<td>-73.41</td>
<td>59</td>
<td>2010/03/28</td>
<td>2010/09/30</td>
</tr>
<tr>
<td><strong>U14B</strong></td>
<td>(6 channel) Concepcion, Chile</td>
<td>-36.86</td>
<td>-73.08</td>
<td>27</td>
<td>2010/02/28</td>
<td>2010/09/30</td>
</tr>
</tbody>
</table>
Station summary (1 time span)

Information limited to 2010/01/01 00:00:00 to 2010/12/31 23:59:59 - Clear timewindow

<table>
<thead>
<tr>
<th>Network</th>
<th>XY :: Chile RAMP :: XY Network Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station</td>
<td>U04B :: N508 Callipulli, Chile :: Chile RAMP - IRIS, University of Chile :: U04B Station Map :: View RESP</td>
</tr>
<tr>
<td>Latitude</td>
<td>-37.99</td>
</tr>
<tr>
<td>Longitude</td>
<td>-72.57</td>
</tr>
<tr>
<td>Elevation</td>
<td>202</td>
</tr>
<tr>
<td>Start</td>
<td>2010/03/18 (077) 00:00:00</td>
</tr>
<tr>
<td>End</td>
<td>2010/09/30 (273) 23:59:59</td>
</tr>
<tr>
<td>Epoch</td>
<td>2010/03/25 (084) 20:32:00 - 2010/09/30 (273) 23:59:59</td>
</tr>
<tr>
<td>Instrument</td>
<td>Reftek 130 Datalogger</td>
</tr>
<tr>
<td>Channels (Hz)</td>
<td>Location --: LM1 (1), LM2 (1), LM3 (1), LOG (0) A, VM1 (.1) A, VM2 (.1) A, VM3 (.1) A</td>
</tr>
<tr>
<td>Instrument</td>
<td>Guralp CMG3T/Reftek 130 Datalogger</td>
</tr>
<tr>
<td>Channels (Hz)</td>
<td>Location --: HHE (100) A, HHN (100) A, HHZ (100) A, LHE (1) A, LHN (1) A, LHZ (1) A</td>
</tr>
<tr>
<td>Epoch</td>
<td>2010/03/18 (077) 20:30:00 - 2010/03/25 (084) 20:32:00</td>
</tr>
<tr>
<td>Instrument</td>
<td>Reftek 130 Datalogger</td>
</tr>
<tr>
<td>Channels (Hz)</td>
<td>Location --: LM1 (1), LM2 (1), LM3 (1), LOG (0) A, VM1 (.1) A, VM2 (.1) A, VM3 (.1) A</td>
</tr>
<tr>
<td>Instrument</td>
<td>Guralp CMG40T/Reftek 130 Datalogger</td>
</tr>
<tr>
<td>Channels (Hz)</td>
<td>Location --: HHE (100) A, HHN (100) A, HHZ (100) A, LHE (1) A, LHN (1) A, LHZ (1) A</td>
</tr>
<tr>
<td>MetaData Load</td>
<td>2011/02/11 (042) 07:40:37</td>
</tr>
</tbody>
</table>
Virtual network affiliations:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Primary DC</th>
<th>Secondary DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASSCAL</td>
<td>IRIS PASSCAL Experiment Stations</td>
<td>IRIS PASSCAL</td>
<td>IRIS DMC</td>
</tr>
<tr>
<td>UNRESTRICTED</td>
<td>All unrestricted stations, generated via cron</td>
<td>IRIS DMC</td>
<td>IRIS DMC</td>
</tr>
<tr>
<td>IMAD</td>
<td>International Maule Aftershock Data</td>
<td>IRIS DMC</td>
<td>IRIS DMC</td>
</tr>
</tbody>
</table>

No data available in real-time systems for 2010/01/01 00:00:00 - 2010/12/31 23:59:59

Archive data availability - Make a batch request for data (breq_fast) - (data access overview)

<table>
<thead>
<tr>
<th>Earliest</th>
<th>Latest</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010/03/18 (077) 20:51:30</td>
<td>2010/09/27 (270) 19:37:35</td>
</tr>
</tbody>
</table>

Query archive for data day availability:

2010
SEED data requests from the DMC

- http://ds.iris.edu/data/access/regular.htm
- Ones we have used: BREQ_Fast, JWEED, SOD (listed under Software)
- Web services! http://service.iris.edu
Ok, you have collected, converted, and sent your data to PASSCAL.
We verified and archived it at the DMC. Anybody can now see that your data have been archived. Authorized users can also request the data.

... ...

What now?
Updating your metadata

- Station changes? Errors?
  - New equipment
  - Change of sample rate
  - Moved station

- Edit batch file to reflect changes
  - Ask data_group@passcal.nmt.edu if you have questions!
  - Update database and dataless
  - Send the new version to PASSCAL if your project is still on-going
Good luck!
And never hesitate to ask for assistance
data_group@passcal.nmt.edu