Portable Data Collection Center
(PDCC)
v3.8.1 User Manual

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INTRODUCTION

The purpose of PDCC is to enable seismic network operators to describe and maintain their instrument metadata in *SEED* format. This, in turn, allows effective data interchange in an environment of continually changing instrument deployments. This tool is designed to make the process of creating metadata descriptions easy, though some knowledge of the SEED data format is recommended.

PDCC consists of a main editor window for reading, viewing, and writing out *dataless* (metadata-only) SEED files and has a connector to specialized tools that facilitate the construction of metadata entries from external sources. PDCC represents a continued effort by IRIS to support the seismological community with tools to enable data collection and research.

NEW FEATURES IN v3.8

PDCC 3.8 introduced an updated Station Clone Tool that allows the user to create new stations and modify critical differentiating fields in a simple tabular entry form.

The SEED Data Browser tree shows blockettes in an easier to read format.

Recovery of a lost editing session is possible through the use of the Journal File load feature. This is still experimental and not guaranteed to provide complete recovery.

Volt units are asserted in the Channel Input Calibration Units field when creating a new channel.

Confirmation dialog when user attempts to exit PDCC.

Note: Newer versions of PDCC may be the current one you are using. References to version '3.8' or '3.8.1' below can generally be used interchangeably.

SYSTEM REQUIREMENTS

PDCC 3.8.1 is written using Java technology and requires Java 7 or later to run (Java 8 is recommended). You must install a Java virtual machine (JVM) designed for your computer platform in order to run PDCC. You can find JVM downloads at

http://java.oracle.com

Mac users will generally find that Java is already installed on their machine. However, Apple no longer supports their own distribution of Java, so please go to the Oracle link above to find the latest version of the Java JDK for Mac.

The computer used should be 2.0 GHz or greater CPU speed and have at least 1 GB of onboard memory.

Recent Windows, Mac OS X, and Linux operating systems are supported. Other systems may be compatible but this has not been verified.

DOWNLOADING PDCC

You can download PDCC 3.8.1 and later from the following URL directory:

http://www.iris.edu/pub/programs/pdcc

Download the latest version, generally in .zip format (e.g. **pdcc-3.8.1.zip**). There may be other files present that use a different format. Please consult online documentation for instructions with these alternative formats.

INSTALLING PDCC

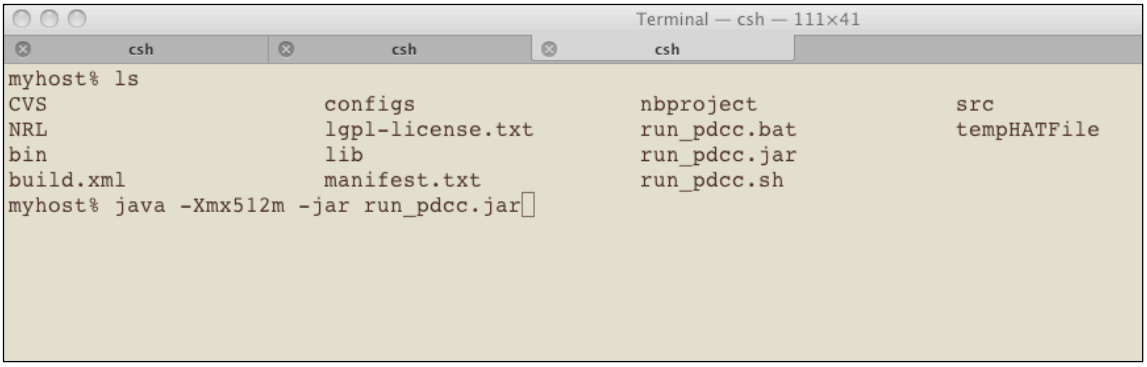
Once you have downloaded the zip file, move the file to a directory where you want to carry out the installation. You can then unpack the file from the command line with:

```
unzip pdcc-3.8.1.zip
```

Or you can attempt to double-click on the icon to invoke your computer's default mechanism for unpacking the file. Some operating systems may not have a native ability to unzip the file, but there are generally free utilities that can be downloaded to provide the capability to unzip the PDCC download.

RUNNING PDCC

Running PDCC from the command line is pretty simple. In a command terminal on your computer, invoke the *java* command and apply an extra memory allocation flag that allows all of PDCC's tools to operate effectively.



To run, enter in a terminal window:

```
java –Xmx512m –jar run_pdcc.jar
```

If processing large dataless SEED files, you'll want to change the Java memory parameter to a larger value, like *–Xmx768m* (768MB) or *–Xmx1024m* (1024MB). Just be careful not to exceed what your system can handle.

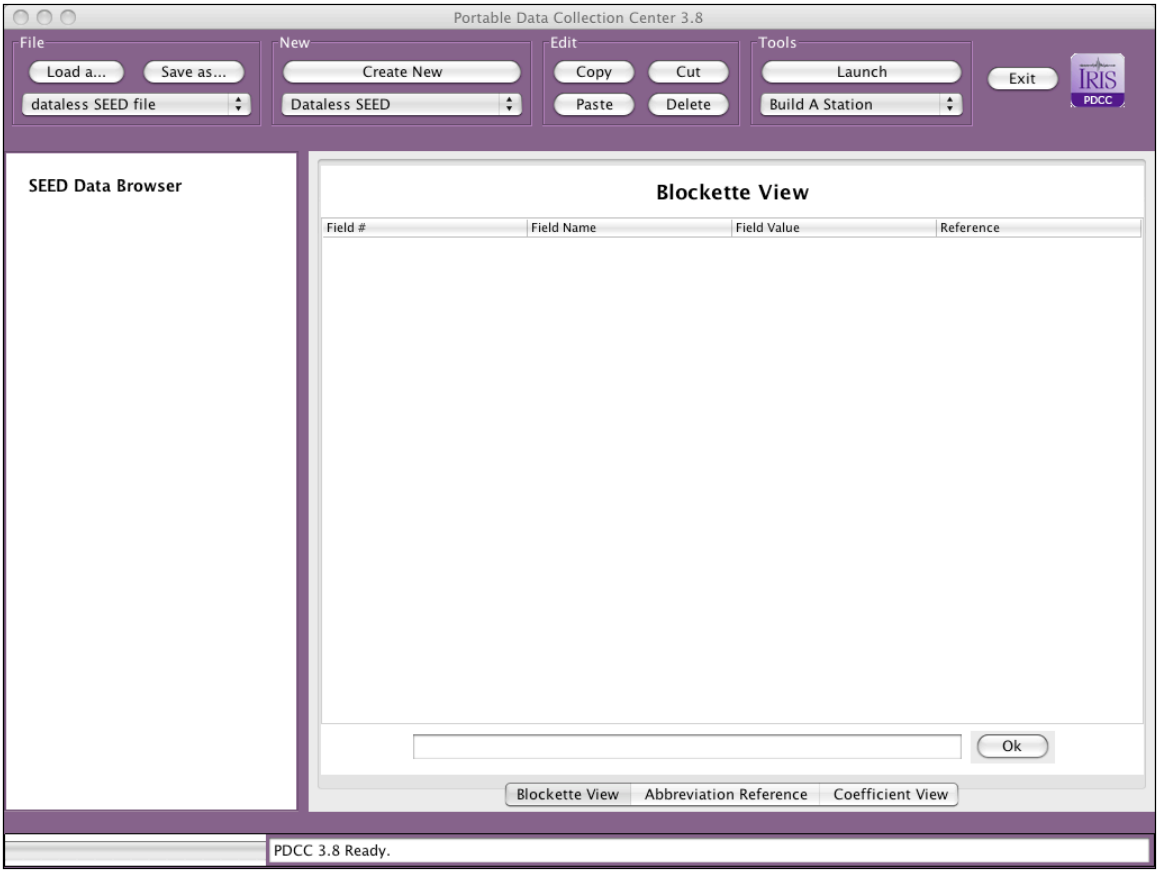
There are two scripts in the distribution that can help users with starting up PDCC.

`run_pdcc.sh` – is a UNIX shell script that can be run from any location and starts up PDCC with the necessary memory settings.

`run_pdcc.bat` – is a batch file for Windows users to run PDCC.

YOUR FIRST RUN

When PDCC starts up, you should be greeted with a window showing you the toolkit interface.



The opening view of PDCC shows you a toolbar along the top with groups of buttons, a SEED file browser window along the left hand side, and a blockette edit window with tabs along the right. On the bottom is a status bar.

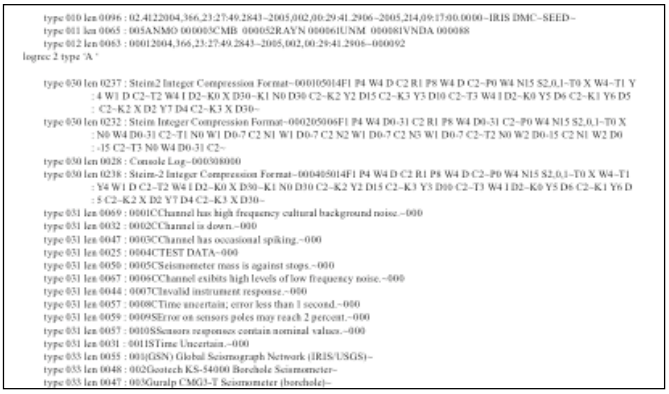
When warning messages are generated, a popup window will appear to display the message. The user can opt to keep this window open where it will silently scroll new warning messages as they come in. The other option is to close the window by hitting the *Ok* button. This window will automatically reappear if a new warning message is reported by PDCC.

When reporting an error in PDCC to IRIS, it can be helpful to copy the contents of the popup window and paste it into your email, since it may contain details on the nature of the error.

ABOUT DATALESS SEED FILES

A dataless SEED file is a seismic data file in SEED format that contains only metadata information and no data records. Dataless SEED files are useful for holding station response information and are a critical component in the data archiving process at the IRIS DMC. PDCC is a tool designed to allow you to create and edit information about

stations in your network and write them to a dataless SEED file. IRIS DMC can accept dataless files from your organization as a prelude to receiving seismic data from your network's instruments.



If you wish to acquire dataless SEED files of seismic networks currently archived at IRIS DMC, you can use the following web request tool:

http://www.iris.edu/SeismiQuery/breq_fast.phtml

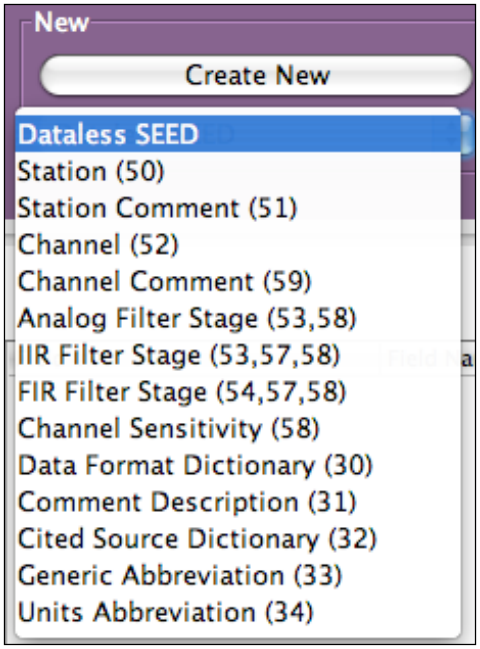
We also have a number of pre-build dataless SEED files available for download:

http://www.iris.edu/pub/RESPONSES/DATALESS_SEEDS/

Otherwise, you can use PDCC to create a new dataless SEED from scratch, as we will detail later in the manual.

MULTIFUNCTION BUTTONS

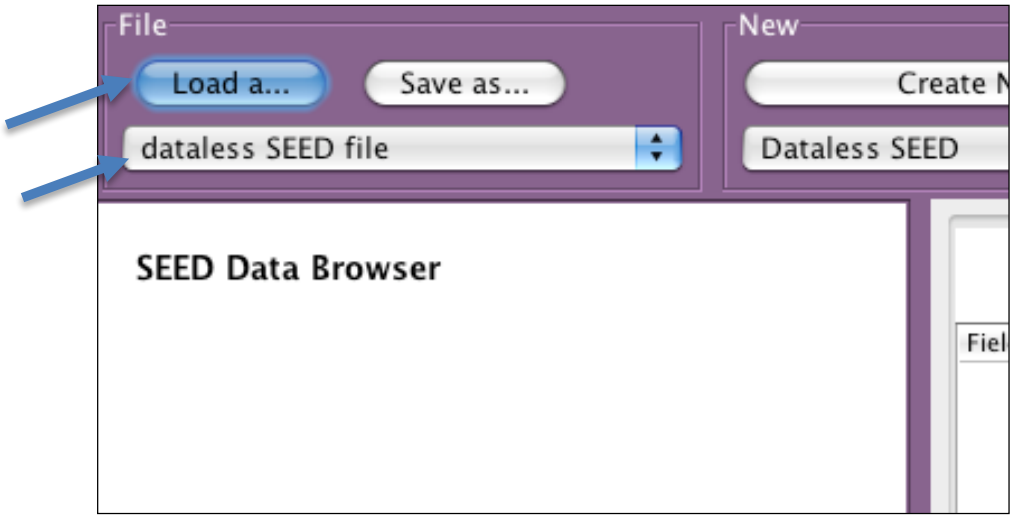
You'll notice that PDCC has buttons grouped into sections in the toolbar. This is a scheme that allows you to use the same button for a number of different purposes. The button represents an *action*, such as 'Load', and the combo-box selector bar below it is a way of specifying *what* to load. You trigger an action by hitting the proper button once the selector bar is showing what to act upon. In addition, you can trigger successive actions on the same target by simply hitting the button again.



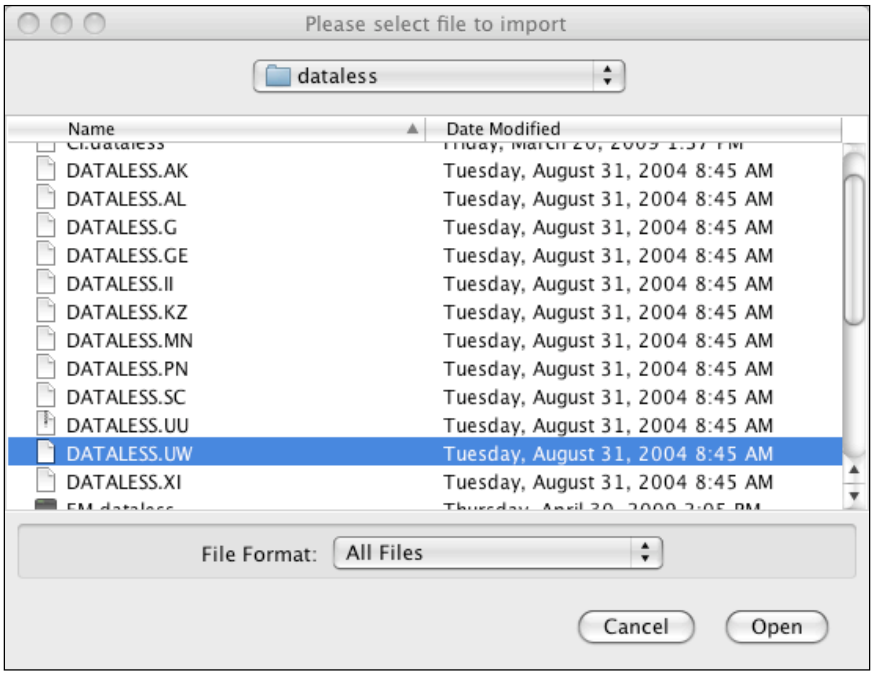
More on the application of these multifunction tools will be described below.

READING A DATALESS SEED

In most cases, you already have a dataless SEED that you wish to examine and edit. To load a dataless SEED file, look to the *File* tool group, make sure that *dataless SEED file* is selected in the combo box, and hit the *Load a…* button.



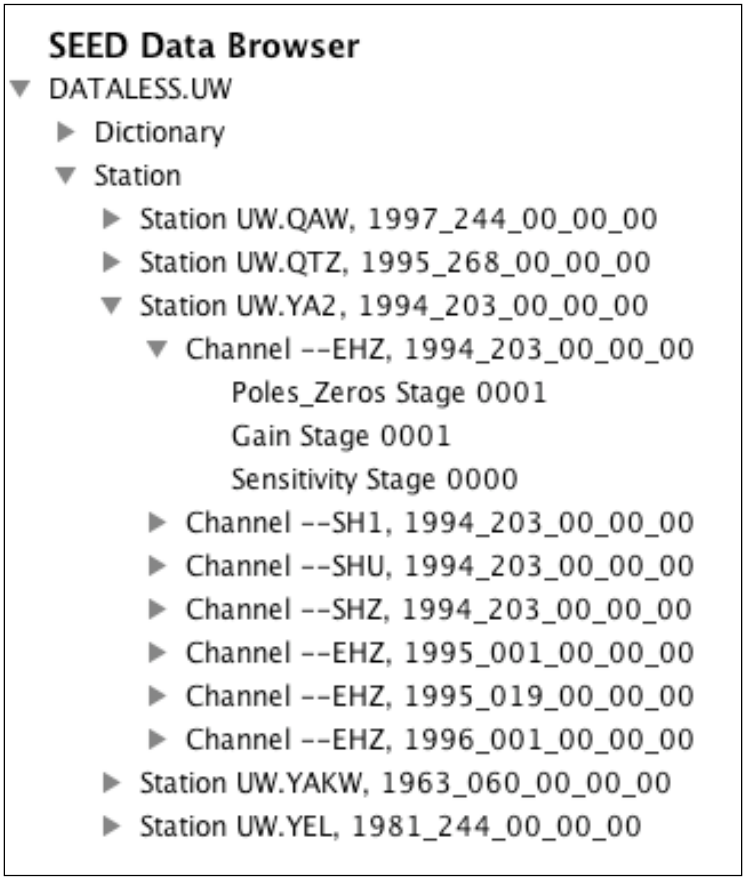
A file selector panel appears, allowing you to search your file system for a dataless SEED file. Once selected, hit the *Open* button and PDCC will attempt to read the information in. You will see prompts in the status bar below, indicating progress and a prompt for when the process is completed.



Small SEED files will load within seconds, but PDCC does have limits to what it can handle. Files more than 1 MB in size will take about a minute to load. Files larger than 10 MB will take a few minutes to load, or you may encounter an *Out of Memory* error. Keeping your dataless SEED files small helps to ensure that you have responsive editing cycles and not encounter crashes in the application. (See the section *RECOVERY OF PDCC EDITS* for information on the use of the Journal file import tool in session recovery.)

SEED DATA BROWSER NAVIGATION

On the tree panel, titled *SEED Data Browser*, on the left hand side, you should now see a new entry matching the filename you selected. This is a *Volume Node* and represents the contents of the dataless SEED file you read in. By selecting the handle to the left of the filename, you will find two subsections: *Dictionary* and *Station*. Selecting the handle on those subsections will reveal *blockette nodes* with labels identifying each of them.



The blockette nodes shown here represent the objects that contain your station information. Blockettes are arranged in a hierarchical fashion based on their *type*. For instance, the blockettes for *stations* (type 50) have multiple *channel blockettes* (type 52), which in turn have multiple *response blockettes* (types 53 thru 62). You can view these by opening the tree branches further. PDCC identifies each blockette with an easily readable name, as shown in the example above.

You can select any blockette node in the tree with the mouse. You can also move up and down the tree using the arrow keys. When the tree gets very large, a scrollbar will appear to allow you to view all contents by scrolling up and down.

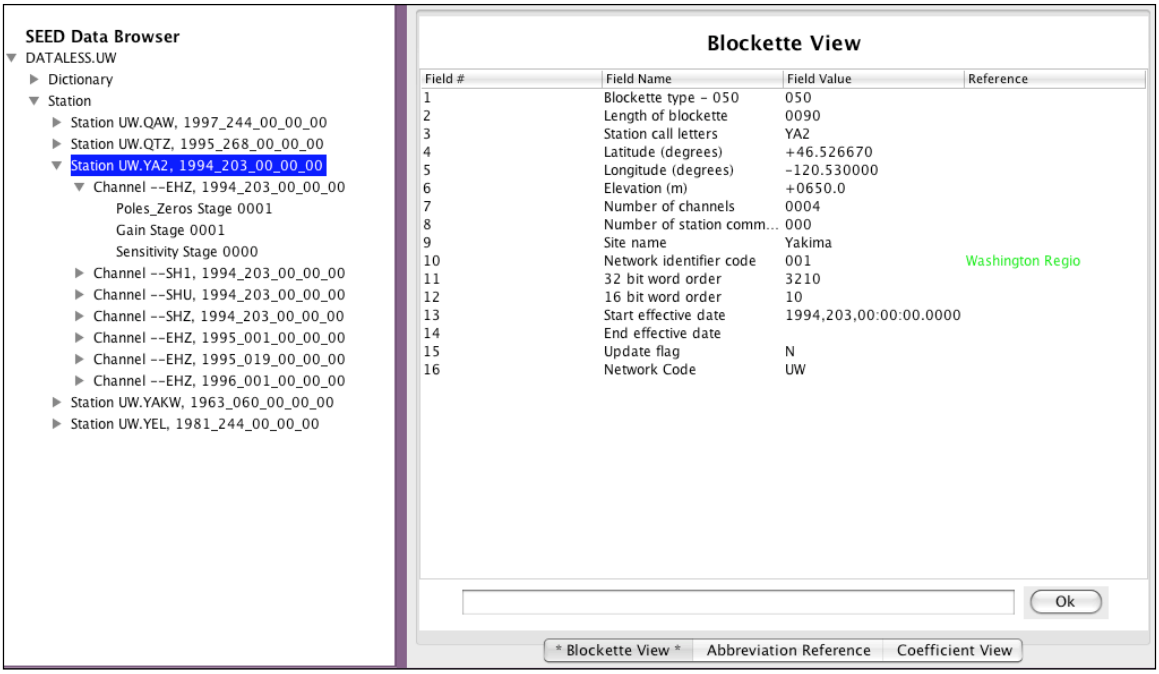
The label for each of these blockette is dependent on type. Stations will be identified by the network code and station identifier, channels will be identified by the location code (dashes '—' are used when the location code is empty) and the channel identifier. Both station and channel include the start effective time as a component of unique identification. Response blockettes are identified by type and stage number. There is usually a sensitivity stage as the very last blockette in a response stack for a given channel.

While these labels cannot be edited directly, they will change when certain contents of a blockette are edited. For instance, if the station ID field of a blockette is changed, the

label will change to reflect this. However, editing the station's elevation value will not result in a visible change in the station tag.

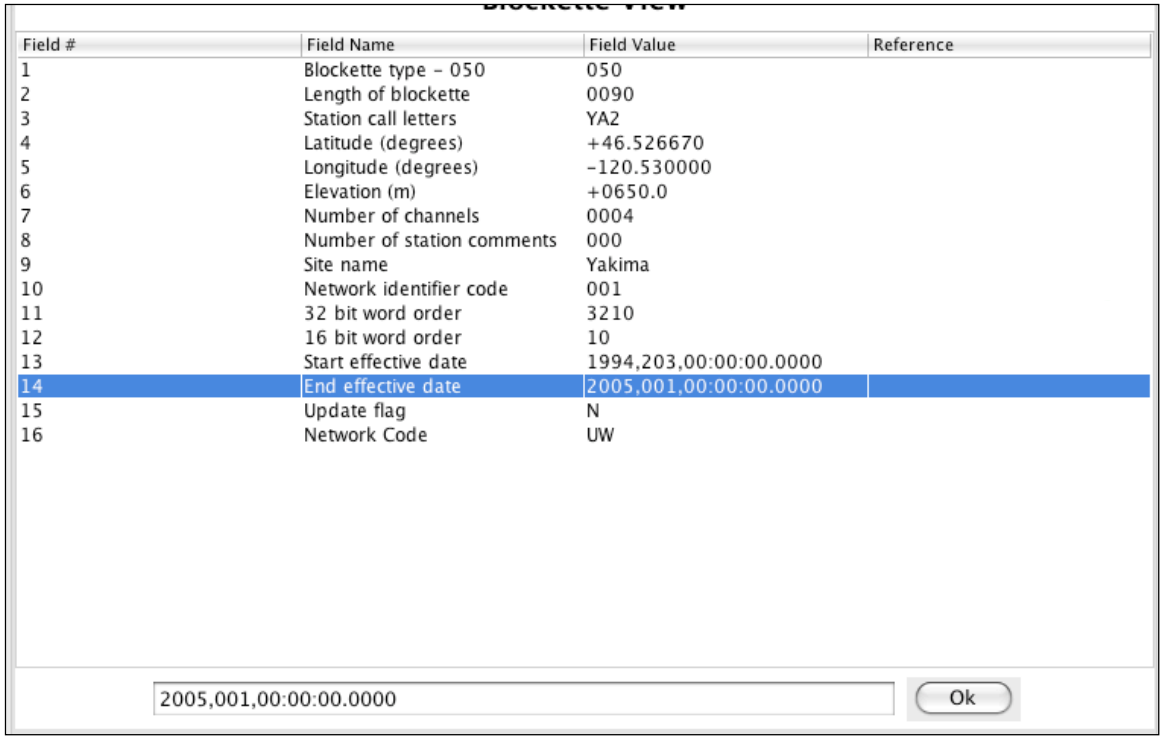
EDITING A BLOCKETTE

When you select a blockette node in the data browser, you will see a table appear on the right side of the PDCC tool. The panel on the right side is actually separated into three sections by tabs. The first one is the *Blockette View*, which is the view you will see when you select a blockette in the tree.



The table is a representation of the contents of that blockette. Each row is a *field* in the blockette, complete with the field name, the value, and any special *references* that may come from that field (abbreviations and coefficients).

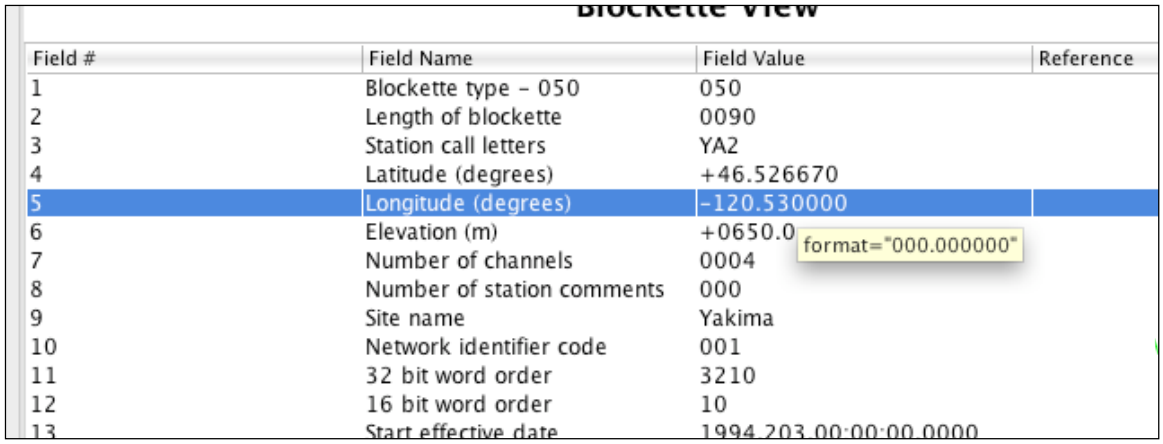
You can select a row in the table to bring up the value in the *text box* below. The text box is the place where you can edit the field contents. Just replace the value there with something else (should be compliant to what the field requires) and hit the *RETURN key* or the *Ok* button next to the text box to enter that value. You should see the value change in the table above.



What you'll notice when you enter a new value is that it will sometimes get reformatted. Certain items like dates and floating-point values have a specific formatting in SEED, and PDCC helps you to achieve the proper formatting by taking your entry and transforming it to SEED standard.

If the value you entered is not compliant with SEED, the value will be rejected and an error message will pop up in the terminal screen. You can change your entry to be SEED compliant so that it is entered into the system.

The Blockette View has helper popups that indicate formatting flags and other helpful tips as it relates to the blockette fields. Just move your mouse pointer over a field to see the tooltip.

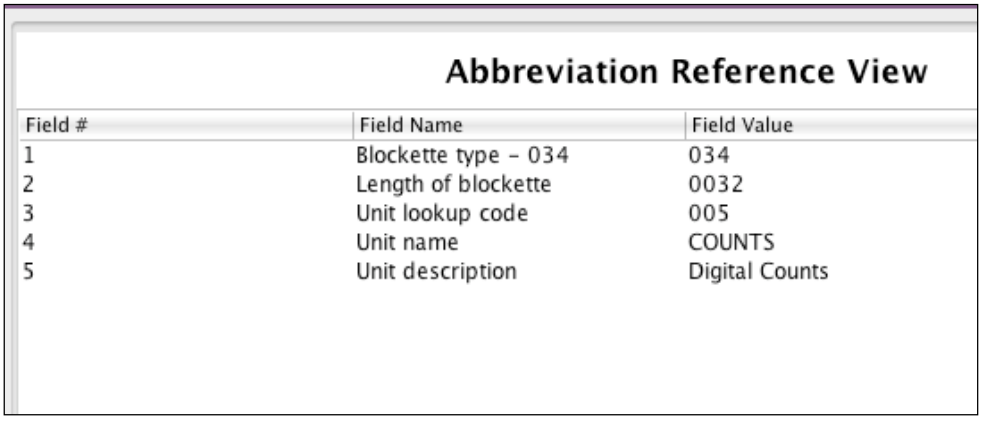


Changes made to the blockettes in PDCC remain for the time that PDCC is running, but in order for these changes to be permanent, you have to *save* your volume to a new dataless SEED file *(please refer to SAVING TO A NEW DATALESS SEED)*.

REFERENCING ABBREVIATIONS

Instrument identifier	003	Mark L-4 1 Hz
Optional comment		
Units of signal response	001	M
Units of calibration input	002	A

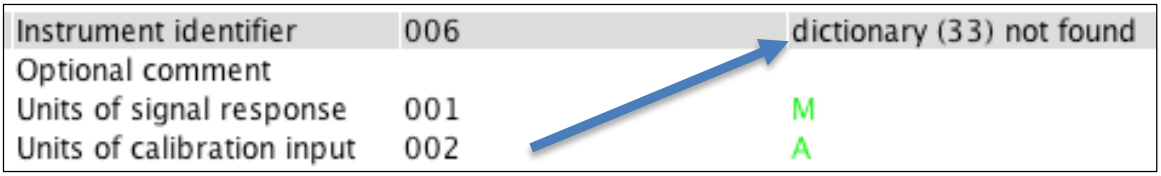
SEED makes use of dictionary lookups to compress common information such as units in an abbreviated form. Abbreviation blockettes are referenced by other blockettes using a *lookup key*, which is a simple sequential number. You can view what a blockette field references by selecting a field in the Blockette View that has green text in the last column of the table. When you select that field, the *Abbreviation Reference* tab will be highlighted with asterisks, indicating that the abbreviation has been placed there for viewing. Select the Abbreviation Reference tab to view that blockette.



You can edit an abbreviation blockette in the Abbreviation Reference view the same way as you do in the Blockette View. It is best not to edit the lookup key for the abbreviation since all other references to it may be lost. PDCC makes an effort to ensure that each abbreviation of a given type is assigned a unique lookup key.

Any change you make directly to an abbreviation blockette will affect what all referencing blockettes see. To have a blockette reference a different abbreviation, change its lookup key to that of a different abbreviation.

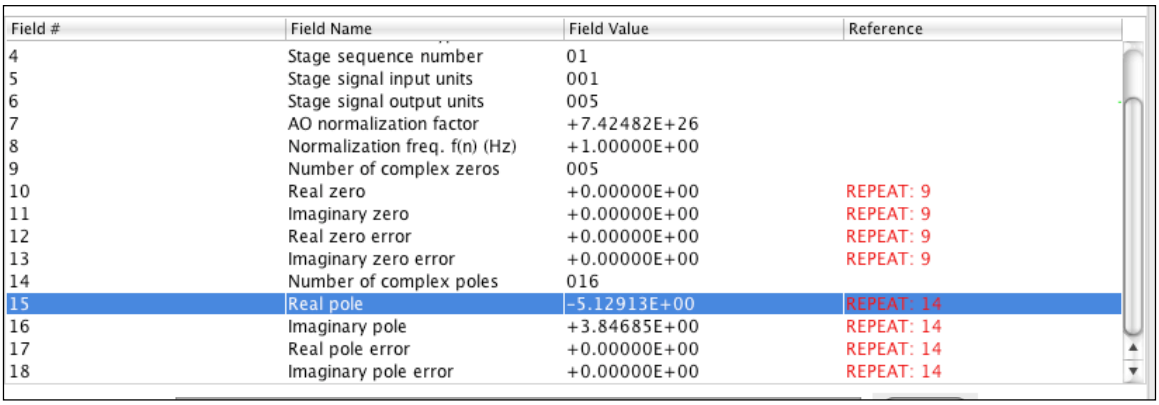
When a blockette has a lookup key that is zero or is a number not found among the abbreviations, PDCC will provide an indication for you.



EDITING COEFFICIENTS AND TABULAR DATA

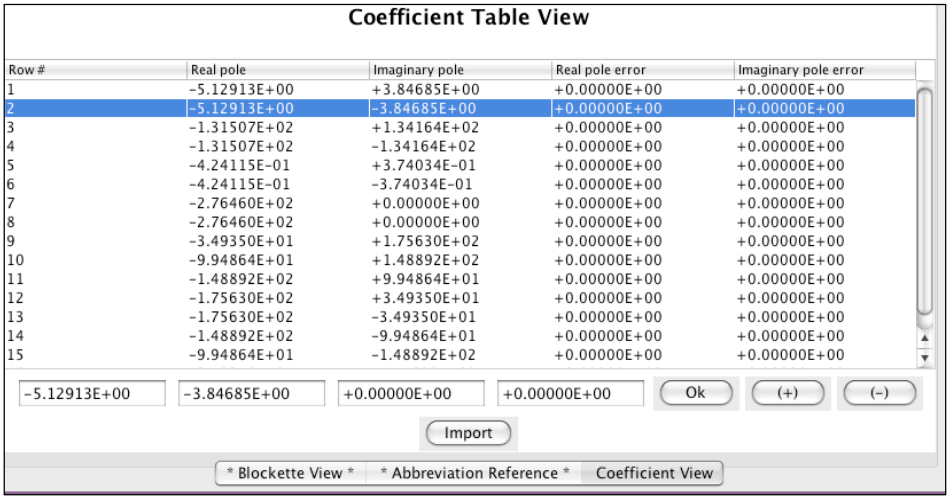
Coefficients are represented in SEED blockettes as a set of contiguous fields that repeat themselves over and over a certain number of times ($[a_1,b_1,c_1,d_1],[a_2,b_2,c_2,d_2],\ldots$etc.). Each repeating set can be seen as a *row* of tabular data, with each field being a separate *column*. This is how we represent them in PDCC.

To view coefficients, or other repeating data groups, select a field with the word REPEAT in the reference column. You will see the *Coefficient View* tab highlighted to indicate that an update has occurred there.



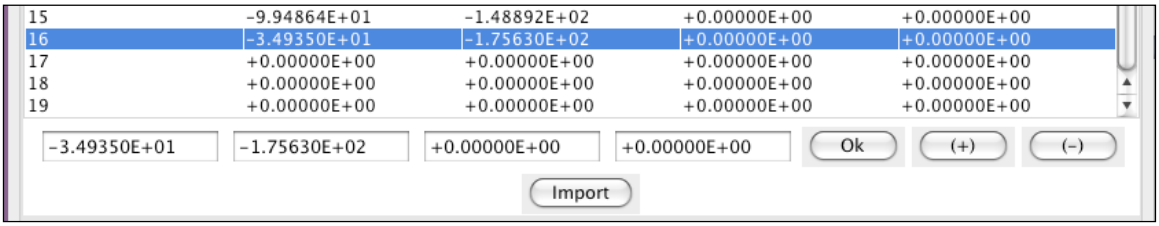
Field #	Field Name	Field Value	Reference
4	Stage sequence number	01	
5	Stage signal input units	001	
6	Stage signal output units	005	
7	AO normalization factor	+7.42482E+26	
8	Normalization freq. f(n) (Hz)	+1.00000E+00	
9	Number of complex zeros	005	
10	Real zero	+0.00000E+00	REPEAT: 9
11	Imaginary zero	+0.00000E+00	REPEAT: 9
12	Real zero error	+0.00000E+00	REPEAT: 9
13	Imaginary zero error	+0.00000E+00	REPEAT: 9
14	Number of complex poles	016	
15	Real pole	-5.12913E+00	REPEAT: 14
16	Imaginary pole	+3.84685E+00	REPEAT: 14
17	Real pole error	+0.00000E+00	REPEAT: 14
18	Imaginary pole error	+0.00000E+00	REPEAT: 14

In the Coefficient View you will find one edit box per column of data. When you select a row, those data columns are filled into the boxes.



As before, changing a value in an edit box and hitting *RETURN* will cause that value to be entered into the table in place of the previous value. When you hit the *Ok* button, the *entire* row of data entries will be updated.

Because this is columnar data, you are allowed to add and subtract rows as needed. To do this, select a row on the screen and hit the (+) button to add a row after the selection. To subtract a row at the selected location, hit the (-) button. If you do not select a row beforehand, hitting the (+) button will add a new row to the end of the table.



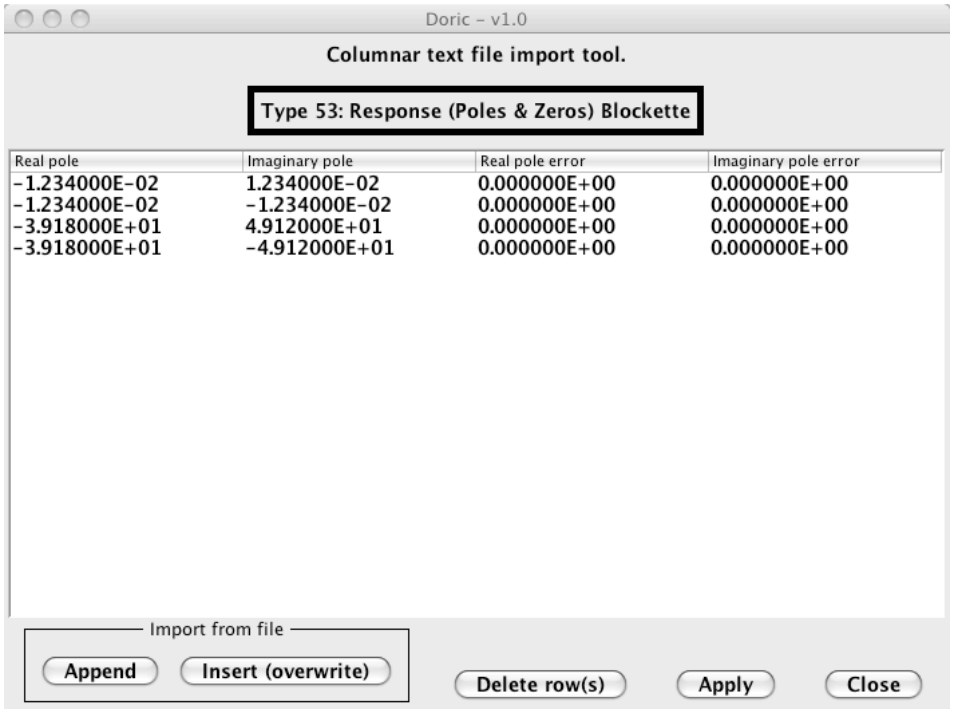
Sometimes, there are no coefficient entries to begin with. Nonetheless, you can begin adding entries by first creating rows to fill in. Simply hit the (+) button and rows will begin to appear.

IMPORTING COLUMNAR TEXT

When creating a new station from scratch, it can be difficult and time consuming to enter coefficient values by hand. For this reason, we offer a helper tool that allows you to enter coefficients from a columnar text file.

```
-1.234000E-02  1.234000E-02  0.000000E+00  0.000000E+00
-1.234000E-02 -1.234000E-02  0.000000E+00  0.000000E+00
-3.918000E+01  4.912000E+01  0.000000E+00  0.000000E+00
-3.918000E+01 -4.912000E+01  0.000000E+00  0.000000E+00
```

The *Import* button in the Coefficient View page brings up an import tool that allows a user to select a file to add (or replace) coefficients from. The source file must be in ASCII text, with white-space separated fields for the columns. The number of data columns should be the same as what is present in the Coefficient View.

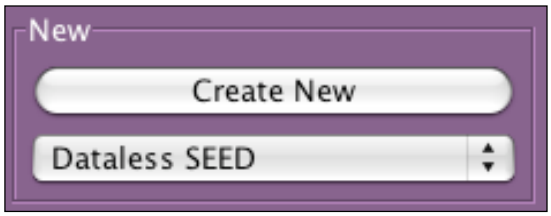


If the user can generate or obtain electronically generated coefficients in text format, this import tool greatly speeds the process of creating response descriptions for new stations.

CREATING NEW DATALESS ENTRIES

Sometimes a user needs to start from scratch when it comes to creating a new station, channel, or a placeholder for a new dataless SEED. PDCC provides the ability to create new template entries of dataless volumes, stations, channels, and others.

To create a new Dataless volume, which is the basis for creating a dataless SEED file, refer to the *New* button group and select *Dataless SEED*.



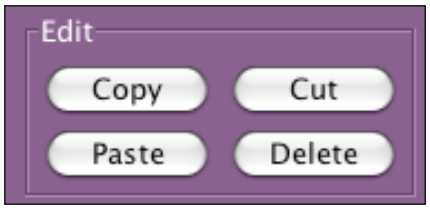
You will be prompted to enter a name for this Dataless SEED. The identifier will then appear in the data browser as a new tree entry. From there you can add new stations,

channels, and others to build out your dataless SEED volume. For a more complete walkthrough of creating a new dataless from scratch, please refer to *Appendix A*.

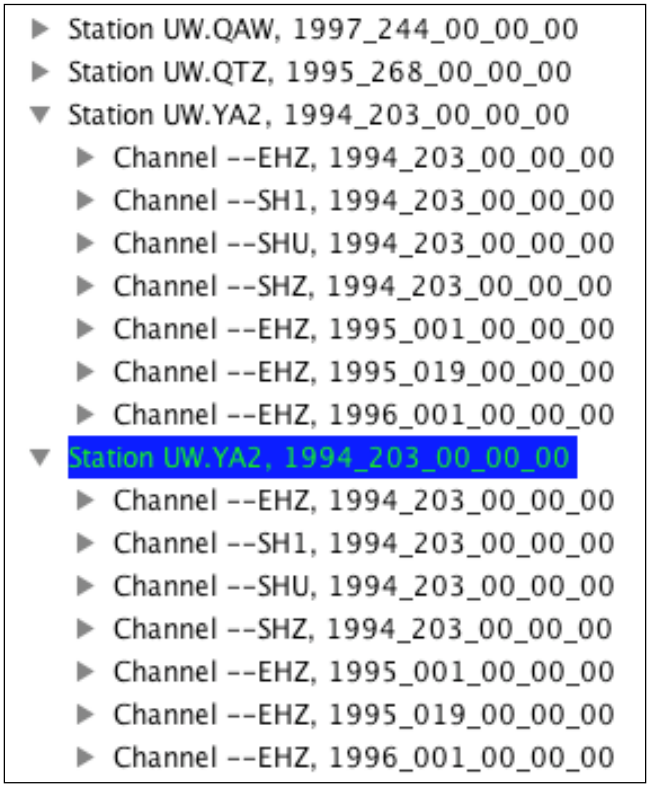
COPYING STATIONS AND CHANNELS

Creating updated listings of stations or channels can be tiresome without some ability to copy a previous version to perform edits on. PDCC provides the ability to copy stations, channels, and responses, as well as abbreviations, for cloning of information that is very similar to another.

Select a blockette in the SEED Data Browser and hit the *Copy* button found in the *Edit* button group. In a moment, PDCC will indicate that it has stored the contents copied so that you can paste it elsewhere.



To paste an object, select a location where you want it to go, then hit the *Paste* button. You should see that blockette's contents copied to that location. If the blockette contained a sub tree of blockettes, those will be copied over as well.



In the case of this example, a station was copied and then pasted back into the same dataless. Though both of these have the same station name, PDCC is able to internally distinguish between the two instances. The user is expected to make meaningful changes afterward that will reflect correctly in the SEED volume, such as creating a new effective time for a copied station entry.

Unlike stations, channels will differentiate from their likenesses by incrementing the time value of the tag by 1 second. Responses will do so by creating a new stage number.

In addition to Copy and Paste, there is also the feature called *Cut*, which will delete a selected item, but, like Copy, will hold a copy of that item for paste elsewhere. There is also a *Delete* button that quickly removes a blockette without making a copy first.

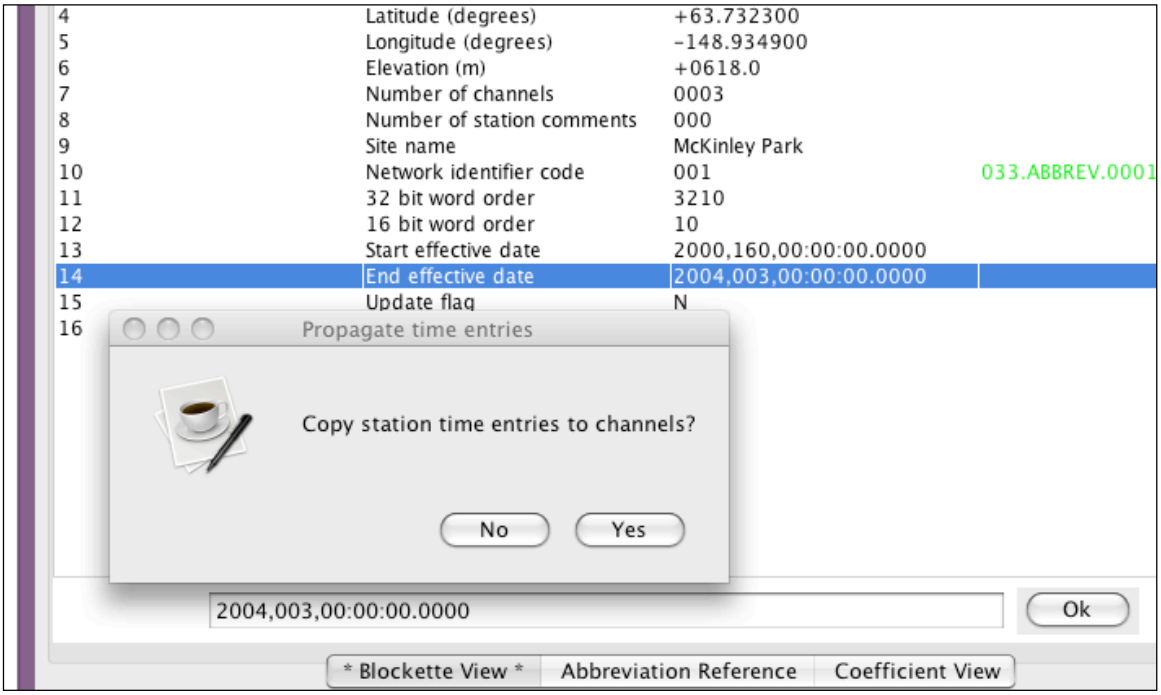
DATA FIELD PROPAGATION FROM STATION TO CHANNEL

PDCC has the ability to propagate changes to certain fields in a station blockette to its own channel blockettes. This is meant for fields that have a meaningful link between station and channel. The fields supported currently are:

- Latitude
- Longitude
- Elevation

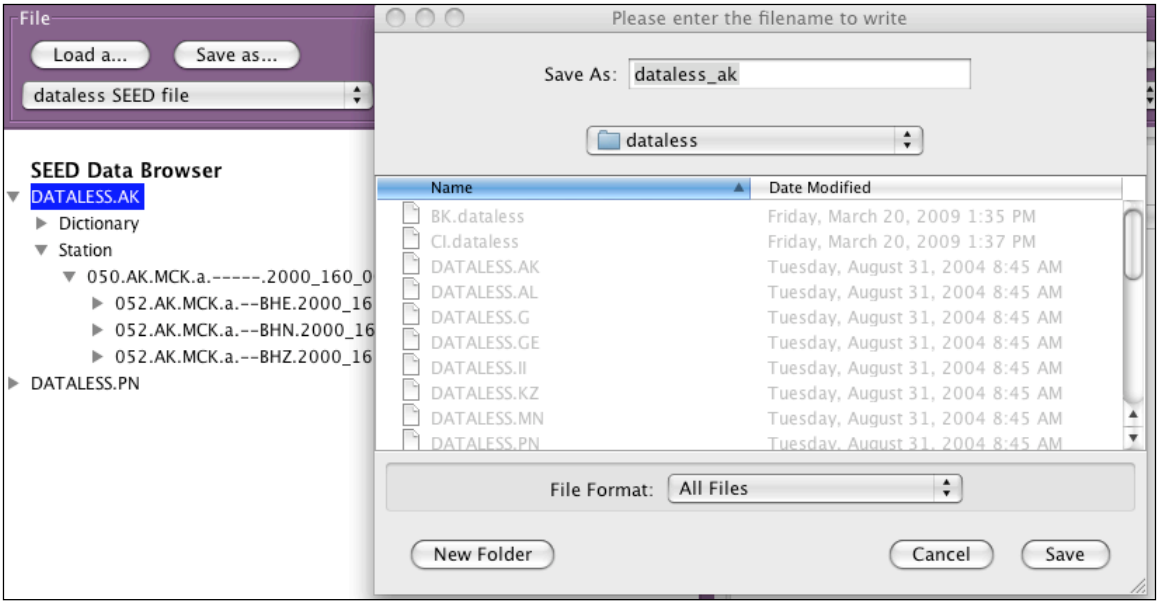
- Start Effective Time
- End Effective Time

When any of these fields are changed in the station blockette, the user is prompted to confirm adding these changes to its channel blockettes. Upon confirmation, the user will find the equivalent fields in each of the channels edited accordingly.

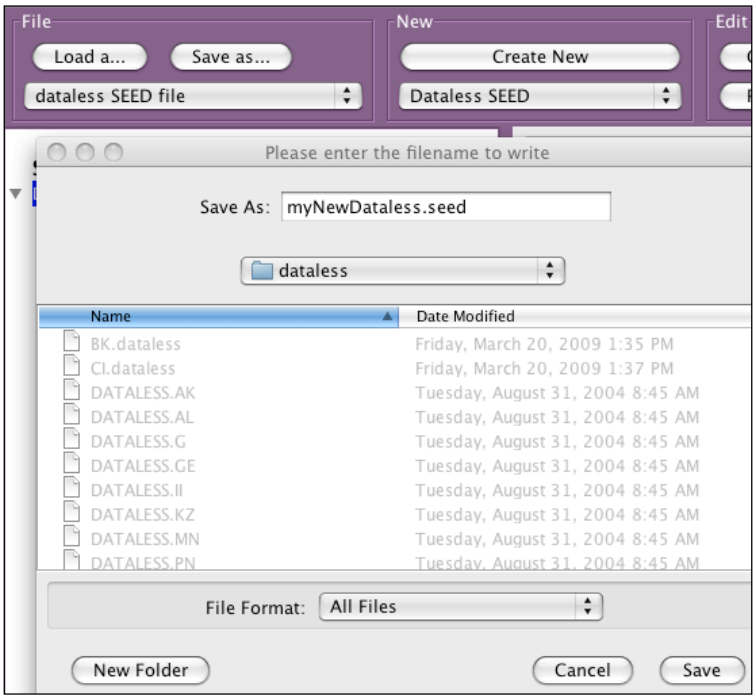


SAVING TO A NEW DATALESS SEED

The end result for your work in PDCC is a dataless SEED file. This is the primary way to save your work, so if you are making changes to the blockette information, you want to *save* your data to a dataless SEED file.



In order to write a dataless SEED to disk, first select the volume node in the data browser that you want to save, then go to the *File* button group, ensure that *dataless SEED file* is showing in the selector bar, and hit the *Save as* button.

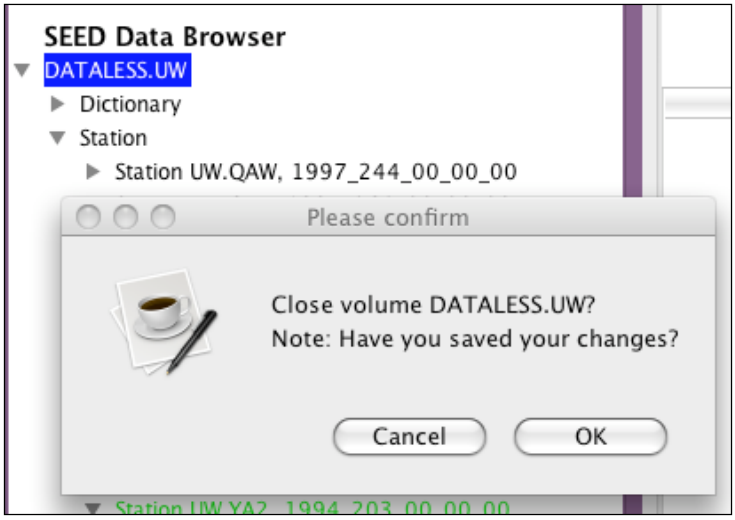


You will be prompted with a File dialog to specify where to save the file and what to name it. **Please use a new and unique name, not the name of your original source dataless!** Once you begin the save operation, you will see activity in the terminal window where you ran PDCC from. It will crawl through all of the blockettes in the Volume tree, compiling a new SEED volume in memory before writing it out to a file.

This operation can take a few minutes to run, so wait for the prompt in the terminal window indicating that the file has been saved. It is a good idea to read the file back into PDCC to check that your changes are there before you exit the program.

CLOSING A VOLUME

This operation may only occasionally be used, but if you wish to remove a SEED volume from PDCC in order to conserve memory or reduce clutter, select a volume name and then hit the *Delete* button, found in the *Edit* button group.

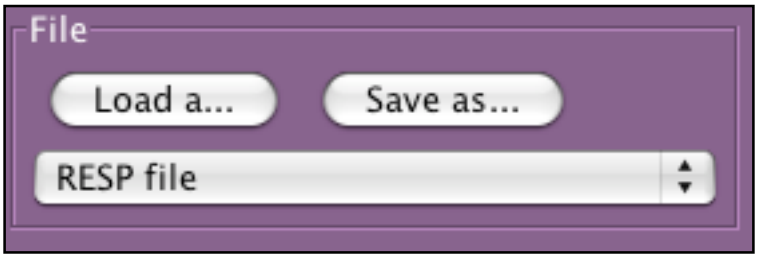


Upon confirming the deletion, the volume entry will be eliminated from the data browser. Be sure to save your changes to a dataless SEED file before doing this, since all changes will otherwise be lost.

READING AND WRITING RESP FILES

You can import a RESP (response) file as a dataless SEED in PDCC. While RESP files typically do not contain all of the station information you would need for a complete dataless, the contents can serve as a starting point for creating a new station or transferring response blockettes to another dataless.

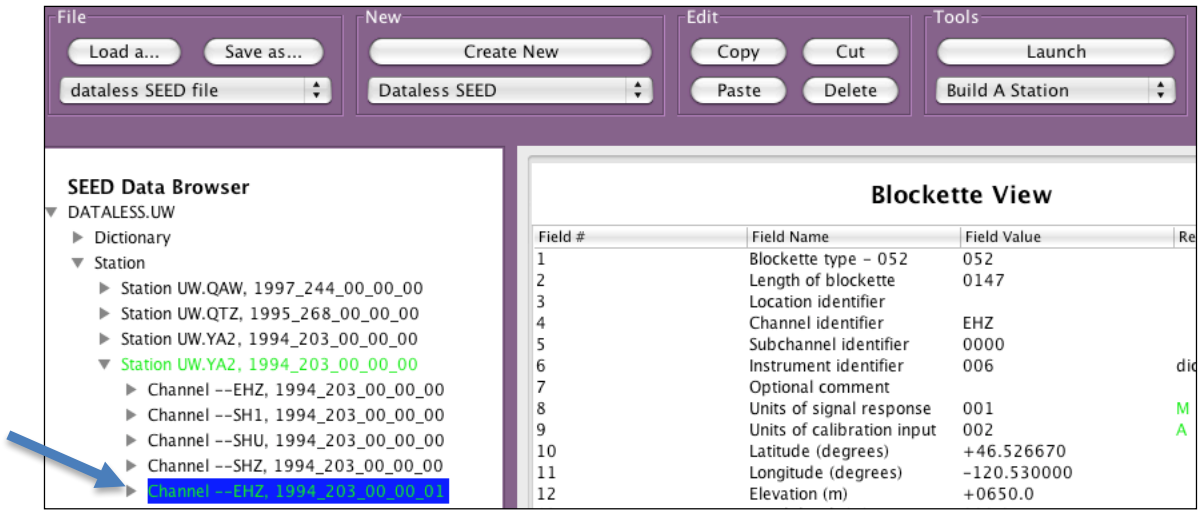
You can also select a station or channel in a dataless and write the contents out in RESP format, giving you the ability to keep a text copy of your station instrument description on file.



SELECTING INSTRUMENTATION – THE NOMINAL RESPONSE LIBRARY (NRL) TOOL

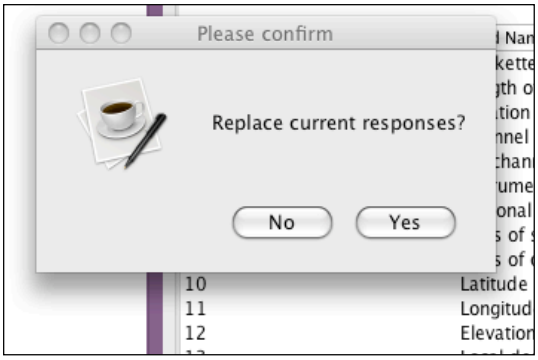
An important contribution to PDCC is the *NRL Tool*, which provides a way to discover nominal response coefficients for well-known sensor and data logger configurations. This tool can be a great time-saver when describing the instrumentation for a new station.

To launch the NRL Tool, first select a Channel blockette where you are to add or replace responses for that channel. The NRL Tool will write its results there.



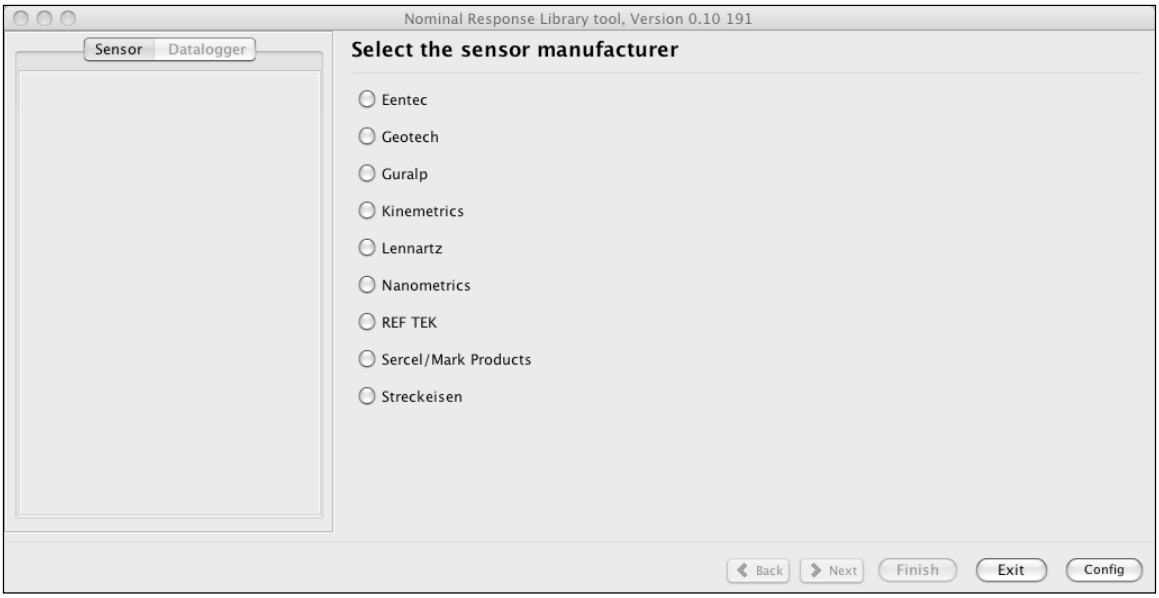
Upon selecting a channel, refer to the *Tools* button group. Make sure that the combo box is selected to *Select Instrumentation*. Then hit the *Launch* button.

If responses already exist, the user will first be prompted to confirm replacement of those response coefficients. Answering *Yes* will launch the NRL Tool.

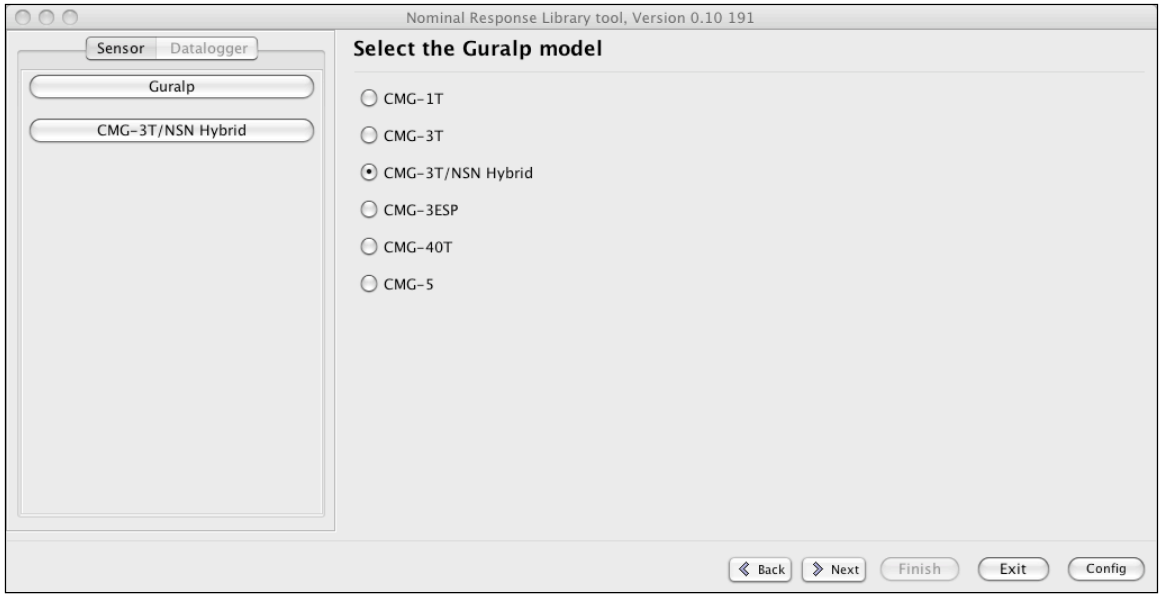


When the NRL Tool first opens, you may be prompted to install the latest Nominal Response Library catalog online. IRIS DMC hosts an online catalog that can be automatically imported into NRL Tool. The updating process takes a few minutes to complete, but it's recommended to get the latest update, especially if this is the first time you have installed and run PDCC. The NRL Tool will then continue.

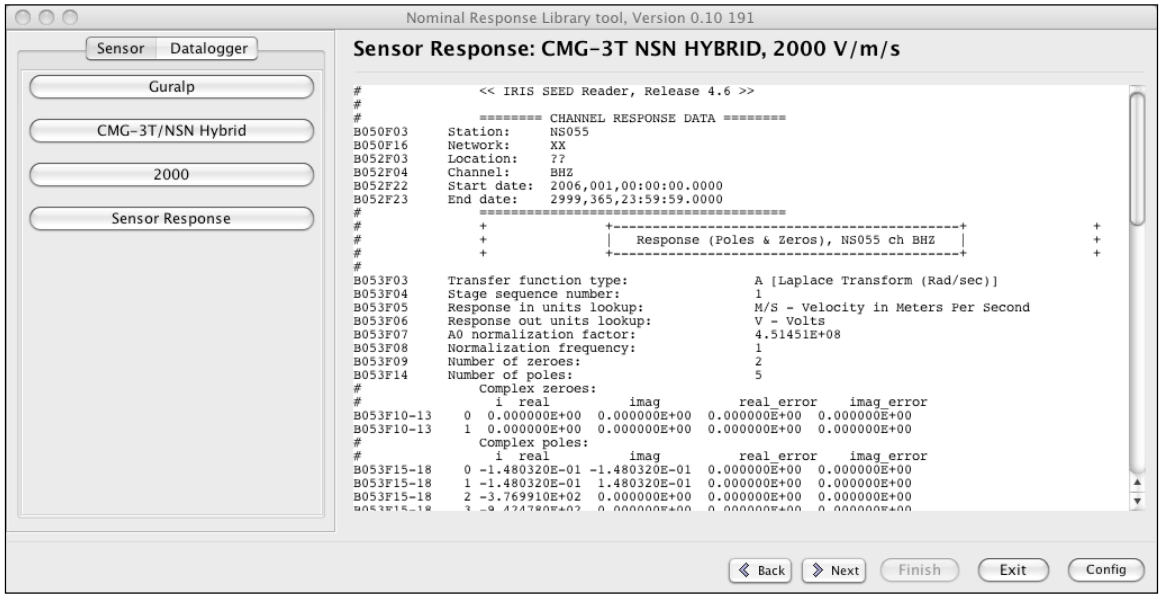
The wizard interface shows a navigation bar on the left, a selection window on the right, and some action buttons along the bottom right.



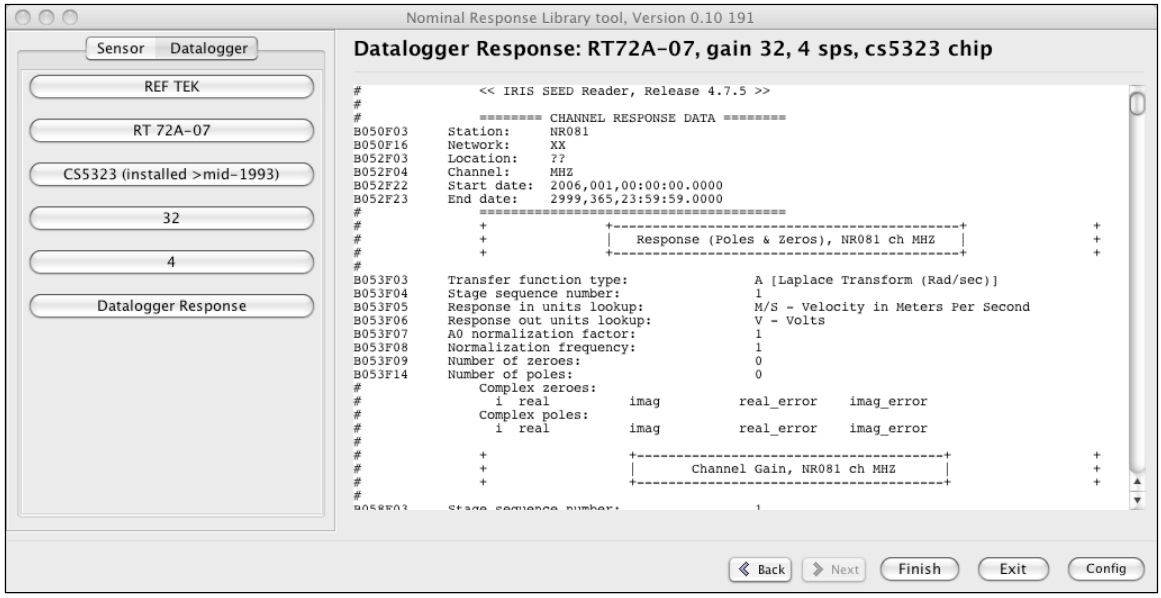
The first goal is to specify the *sensor type*. You start by indicating the manufacturer, then a model number, and then specify additional parameters. This tool operates like a wizard, where you make an entry and then select *Next* to continue.



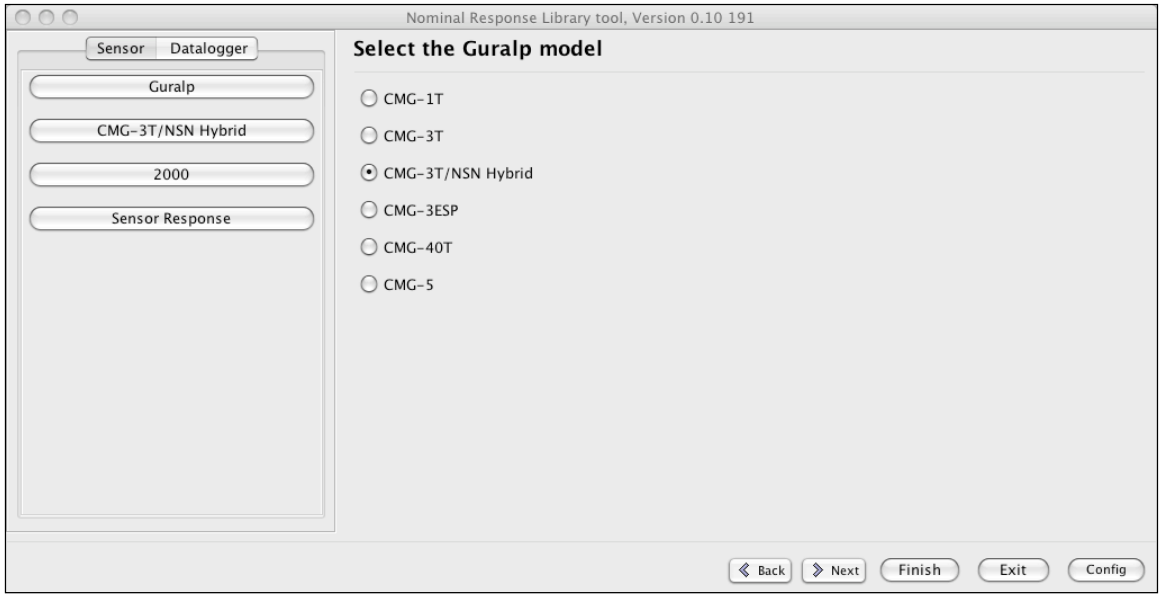
This series of selections ends finally in an example response description that appears in the viewing window. While what is shown represents an entire instrument cascade, only the sensor stage(s) from the response will be used.



Hitting *Next* to continue will take you to the *datalogger* selection phase. Like you did with sensors, you select a manufacturer and model, followed by any additional defining parameters. When you see the response information in the window, you know that you have selected the datalogger as well.



If there are any selections you need to revisit, you can select the *Back* button to track to earlier selections. You may also change these selections as necessary. The navigation bar on the left also allows you to select a specific point in your list of choices to examine and select again if necessary. You can also toggle between the Sensor and Datalogger tabs as needed.

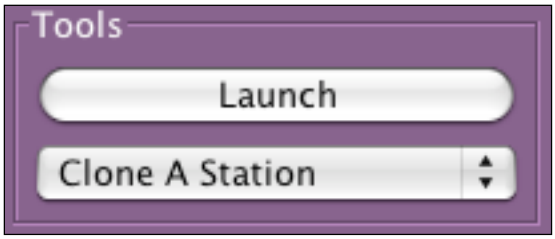


When you are satisfied with your selections, all you need to do is hit *Finish* and the NRL Tool will process the responses into dataless format, which then rewrites the responses for the selected channel in PDCC.

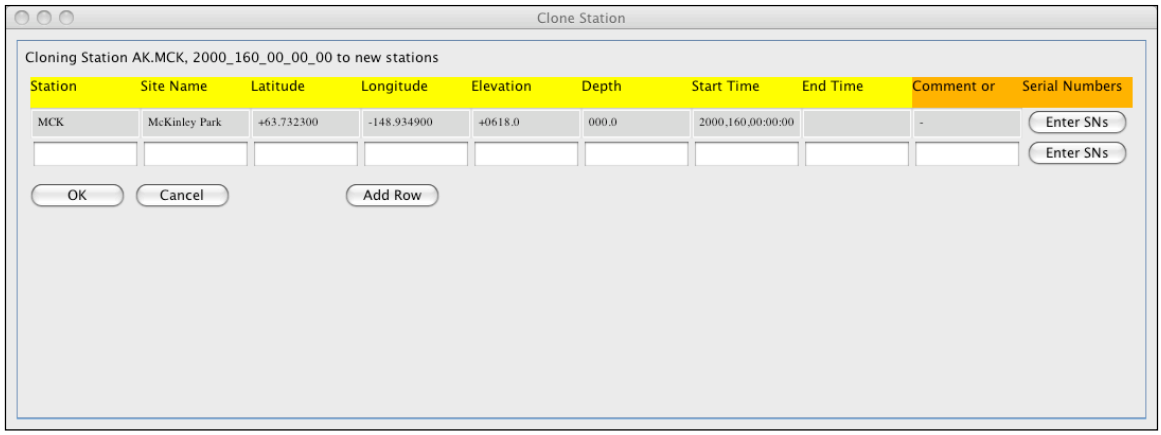
Of course, you can always exit from the NRL Tool by hitting the *Exit* button. No responses will be overwritten or added if you leave the tool in this way.

CLONE STATION TOOL

PDCC has a convenience tool that makes it easy to create a number of new stations similar to an existing one in your dataless SEED. This can be a helpful feature if you have a network containing deployments with a similar instrument makeup. Once you make the effort to specify one of the stations in detail, you can clone that station to create many similar entries easily.

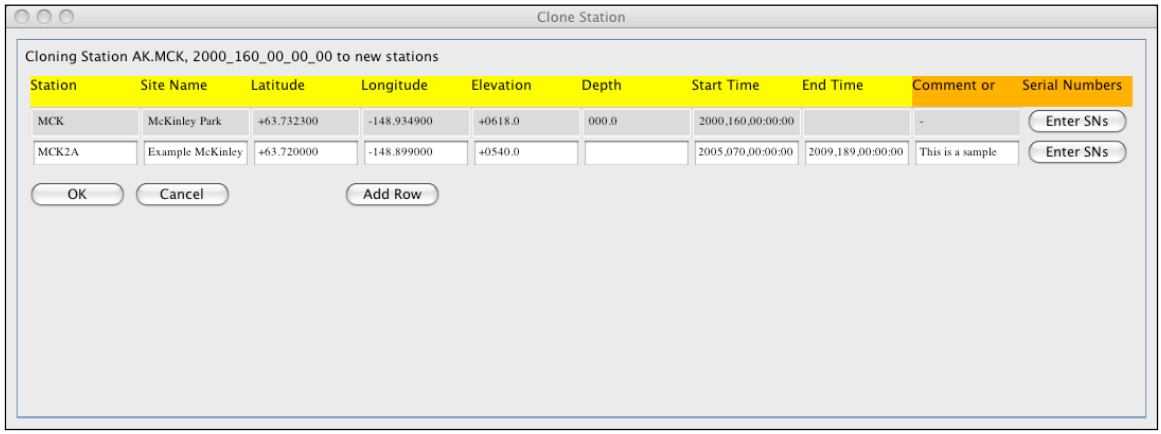


Select a station that represents the instrumentation you want to clone into new stations. In the *Tools* button group, select *Clone A Station*. When you hit *Launch*, you are presented with a tool for specifying any number of new station names, along with the typical data fields that are different from the original station.

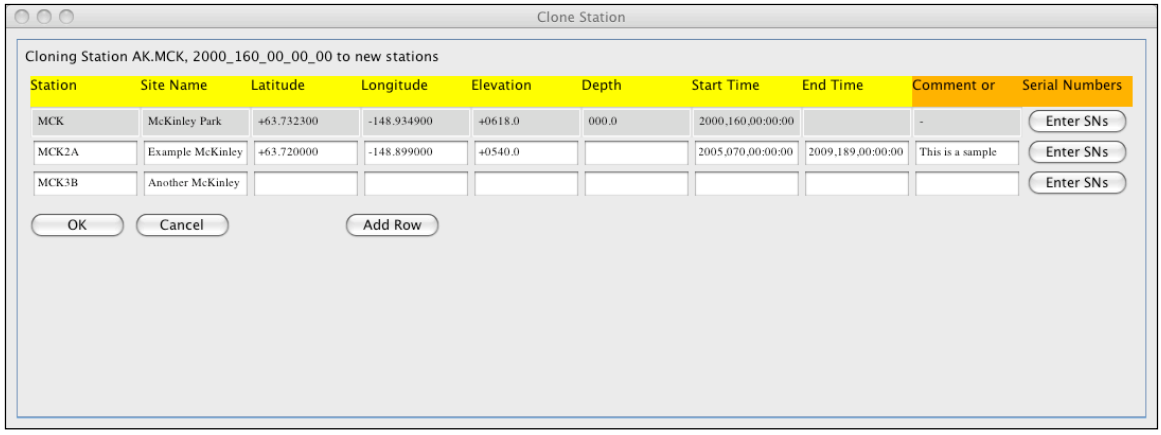


What you see is a tabular entry form with the first row representing the original station. This row, with grey text boxes, cannot be edited, with the exception of entering serial numbers (more on that later).

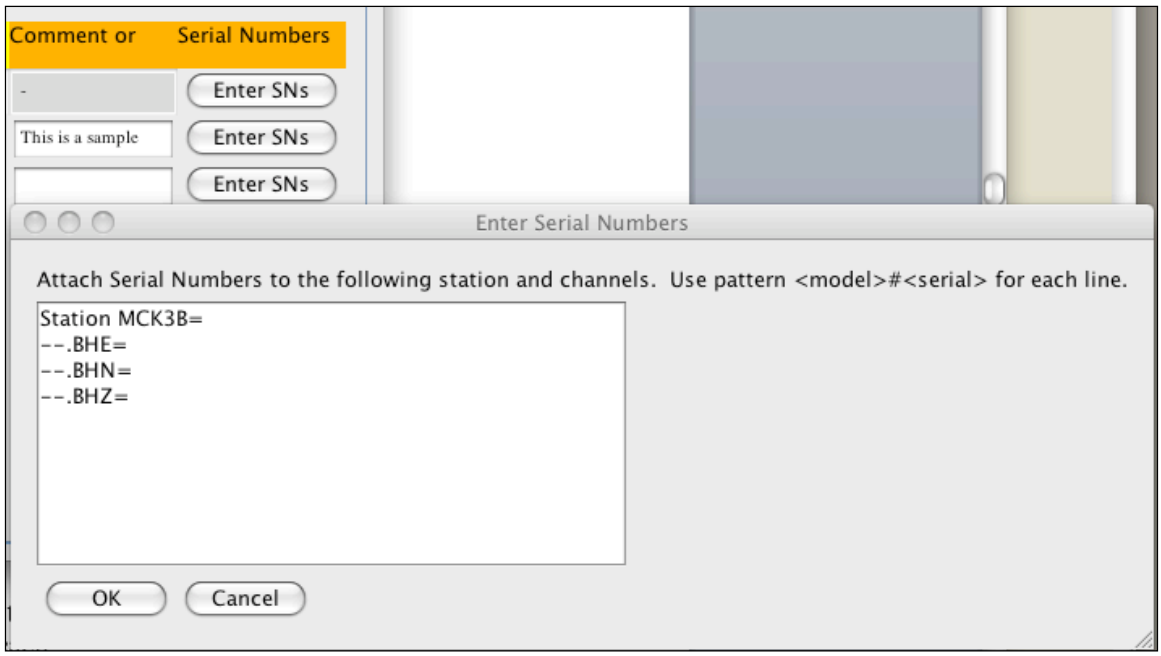
Each row of white text boxes represents a separate new station that you want to create. You have to, at minimum, enter a new station name in the first box for the row to be accepted. You can then enter values for site name, geographic location and effective times that are unique to that station. If you leave any of these fields empty, they default to the original station's values, with the exception of End Time, which will write out an empty field.



You can advance through the entry fields using the *TAB* or *RETURN* key, or by using the mouse. Some entry validation is performed, so you might see error messages asking you to correct an improper entry. Hitting *TAB* or *RETURN* on the very last field will generate a new row for you, allowing you to start the entry for a new station. You can also add additional rows by hitting the *Add Row* button. Deletion of rows is not necessary. The tool will simply ignore rows that lack a station name entry.

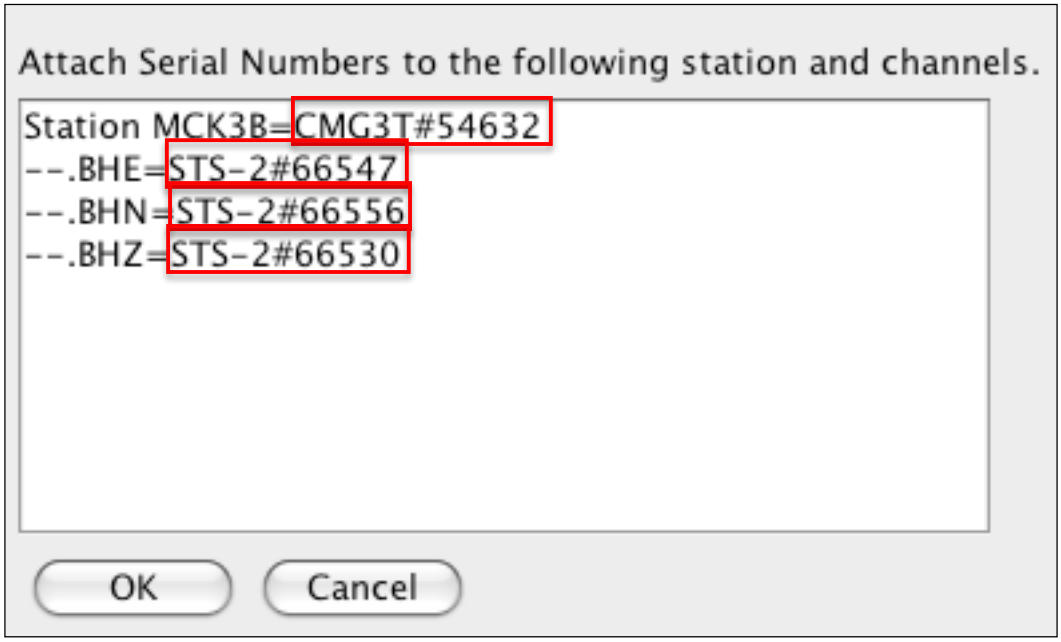


The comment entry field deserves special mention. This is a comment field that appears in each channel blockette (type 52). If you enter text here, it will appear in each channel's comment field for that new station. There is a special Serial Number entry tool that allows you to enter channel-specific serial number comments. You activate this for the station row by hitting the *Enter SNs* button.



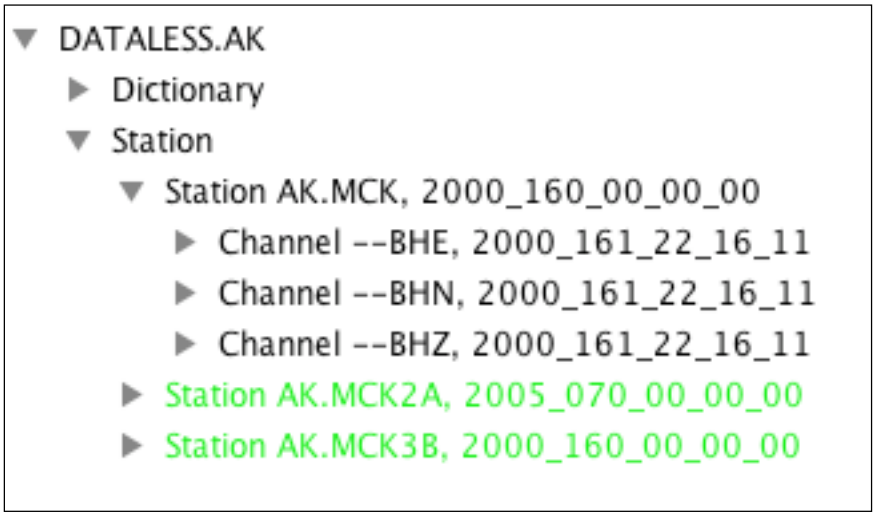
This is a simple text box with an entry for the station datalogger and several channel entries, depending on the number of channels in this current station, pertaining to the sensors.

Because of the limited space available for comments (up to 30 characters), the serial number entries have to be kept very brief. The suggested pattern is shown in the example below.



As mentioned earlier, while you can't edit most of the fields for the original station, you can use the Serial Number tool to add serial numbers to the channel comments of the original station. Just use the *Enter SNs* button as you would for the other stations. The main difference is that what you enter into this popup tool replaces whatever comments may have been there in the beginning.

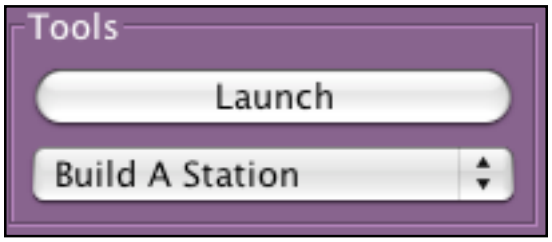
Once you have completed all of your station entries, hit the *OK* button to indicate you are finished and wait for PDCC to process these into new stations. You will see the new stations appear in the SEED Data Browser and you can then continue with normal editing of your dataless.



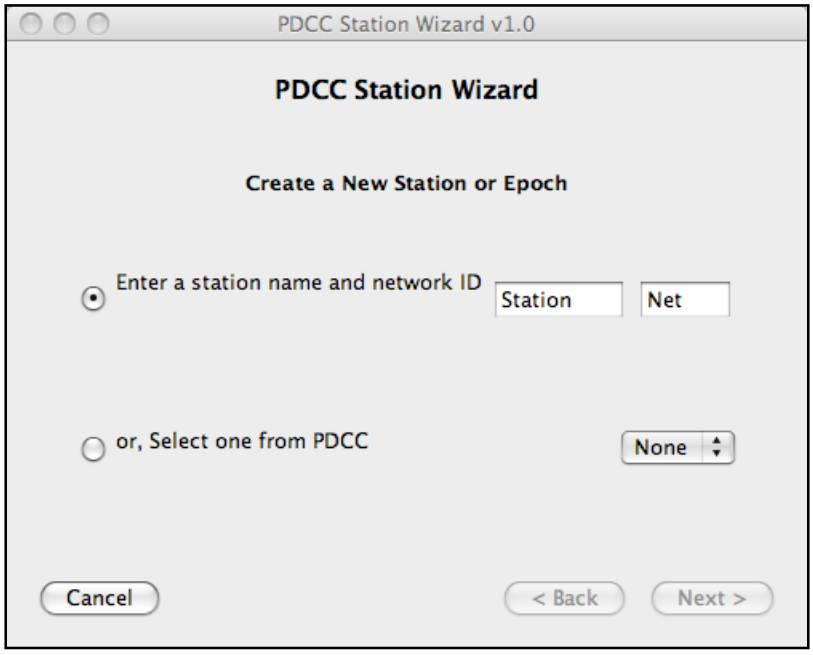
BUILD A STATION – THE STATION WIZARD TOOL

To facilitate the process of creating new stations (or new station epochs) a tool called the *Station Wizard* can be called upon to generate a complete set of station, channel, and response blockettes to describe a station deployment.

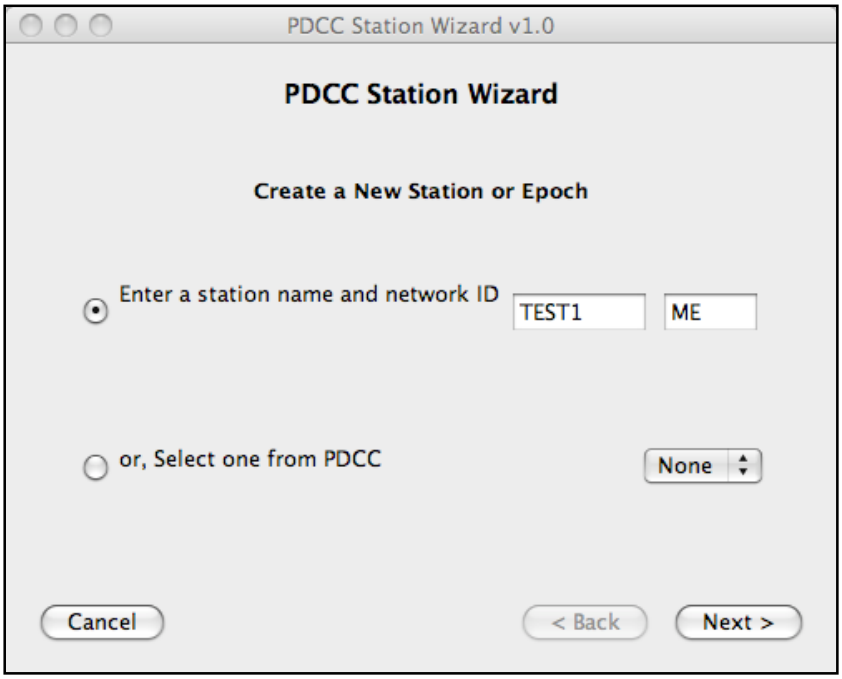
To start the Station Wizard Tool, select any blockette in the dataless you want to add the new station to. If you are starting with a new, empty dataless SEED, simply select the name of the dataless. Then launch the tool by selecting *Build A Station* and hit *Launch*:



You will be presented with a popup window showing the first panel of the wizard.

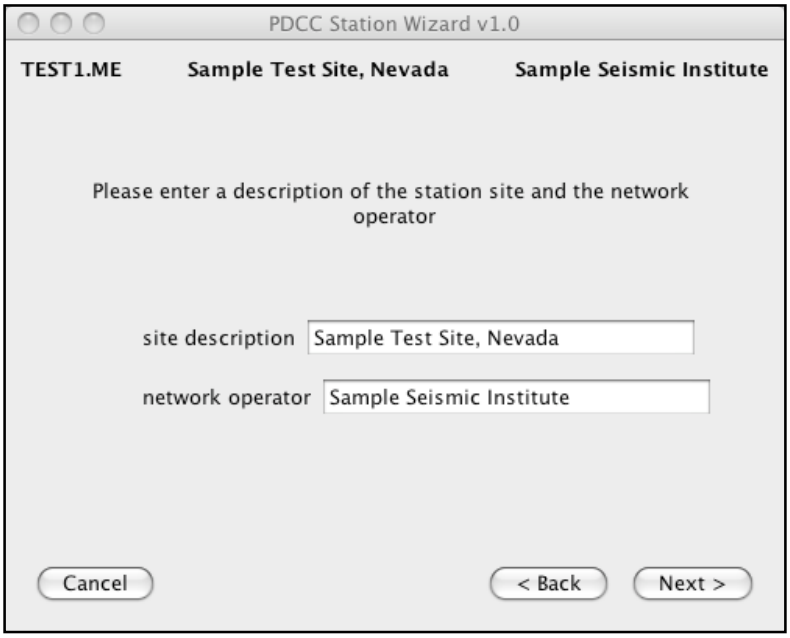


This first panel asks for the station call letters and the network code. If you intend to describe a new epoch for an existing station, select from the listing on the second line. Just as with many wizards, you are presented with one or more options to select from. The button on the left indicates the active selection on any given panel.



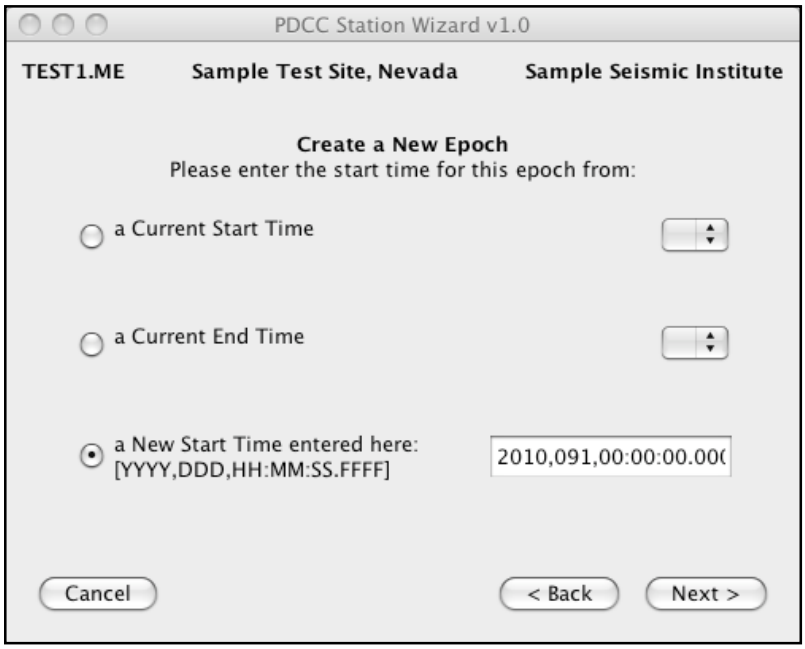
Once you have entered or selected station and network identifiers, the Next button will be active. To advance to the next panel, simply press the Next button. You can also return back to a prior panel to change your selection by hitting the Back button. You can always cancel your session by hitting the Cancel button.

The next panel asks you for the full name and network operator for the station. You would fill out this information and advance with the Next button, just as before.



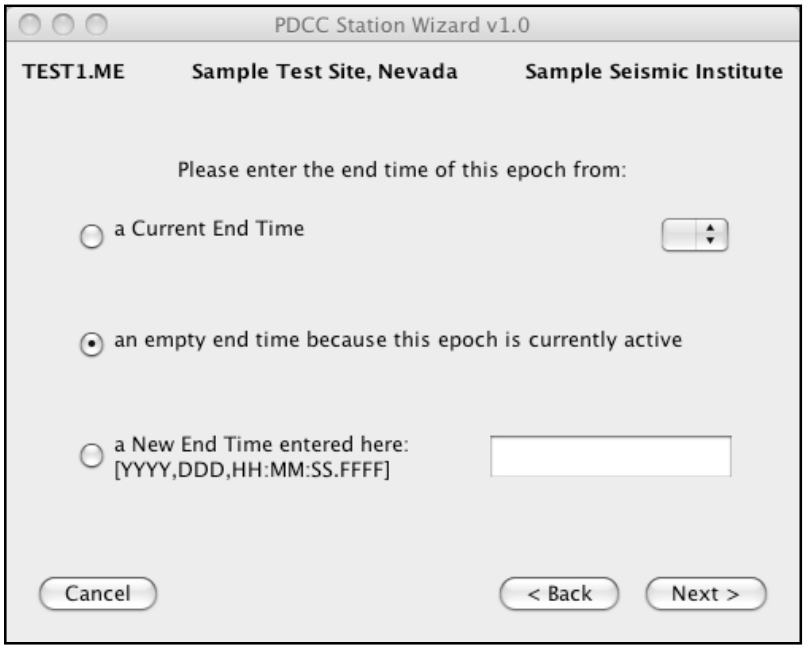
Following this, you need to define the period of time that this station deployment is in effect. This is known as an *epoch*, and an epoch has a start time and an end time.

When you specify the start time, you can select from start and end times that may exist in your dataless already, as a matter of convenience. For instance, if your station recently experienced a change but is still operational, you might select the last end time listed under 'a Current End Time' as the start time for your new epoch. For our example, we will simply enter a new start time on the last line.

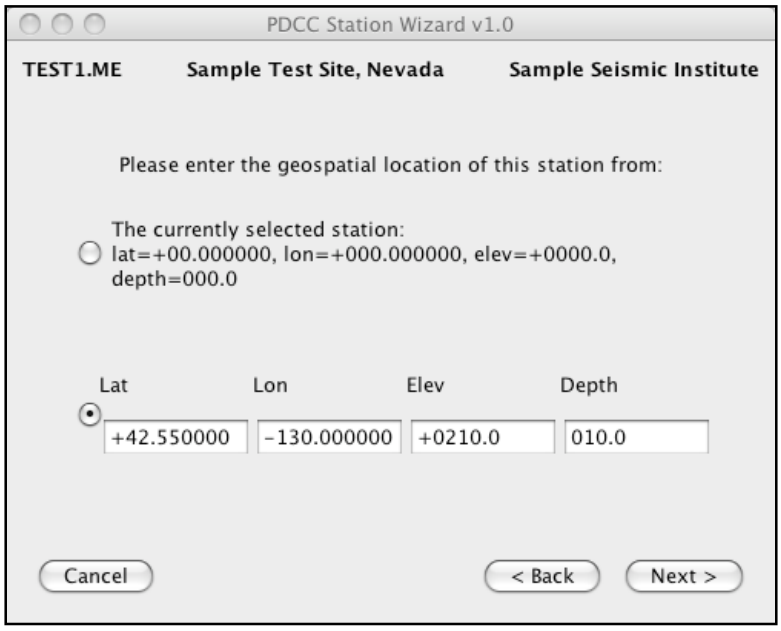


The Station Wizard will complete time strings for you if you hit Tab or Return after typing in the year and/or day.

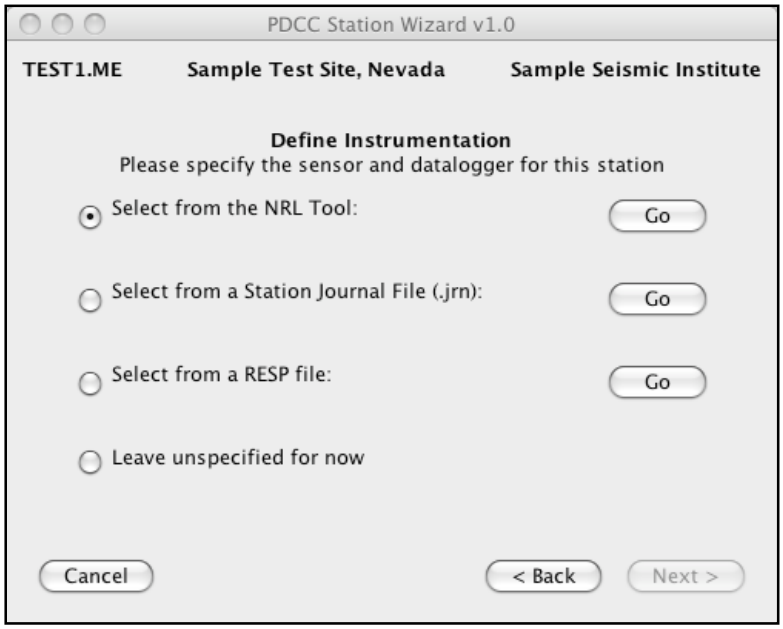
For the next panel, the end time can be a specific point in time that the station no longer operated under these parameters or was taken out of commission. It can also be given no ending time, which is a way to say that the station is currently operational.



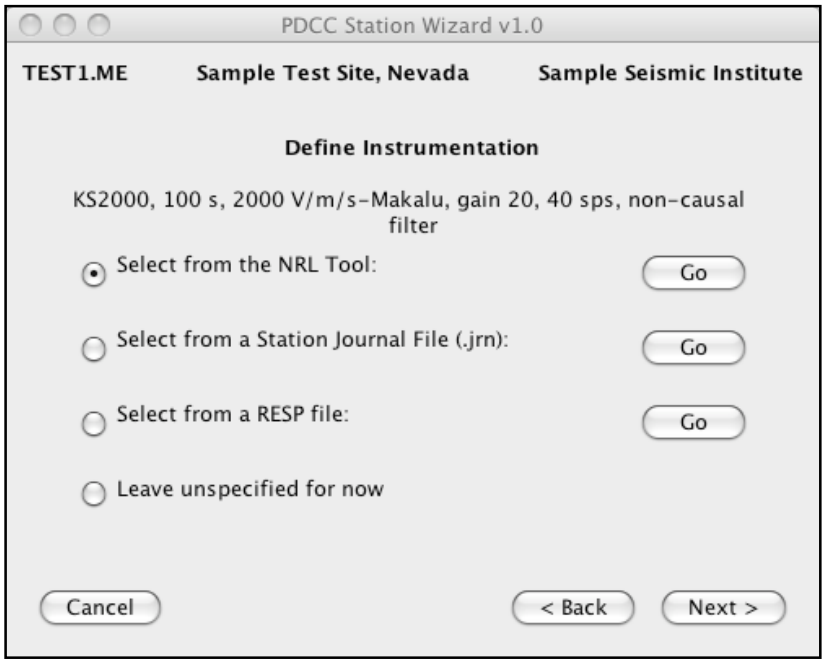
The next panel has you specify the location of this station. The latitude, longitude, and elevation pertain to where the station is sited. The depth relates to how deep the sensors are buried versus ground level. You can select a pre-existing location value, assuming a pre-existing station name was used, or enter the values in the four boxes below.



When you arrive at the Instrumentation panel, you have the option of using the NRL Tool or loading from a RESP or Journal file to supply response blockettes.



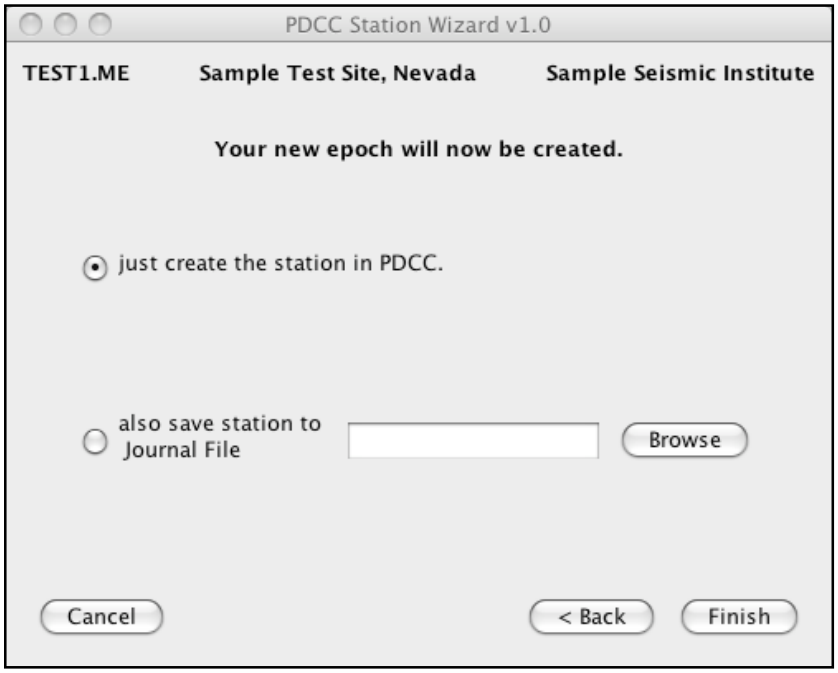
You would use the NRL Tool just as before. Select your sensor and datalogger type and upon hitting the Finish button in the NRL Tool, you will find a description at the top of the wizard to indicate your selection.



The other two sources you can use are files in RESP or Journal file format. The key with using these files is that they should only contain information for a single channel. Only the response blockettes (and their abbreviations) are used, but having multiple channels in the RESP file will cause the creation of too many stages. Therefore, keep single channel RESP or Journal files at hand that you can maintain with a text editor and you'll have a nice personal catalog for creating new station entries with the Station Wizard.

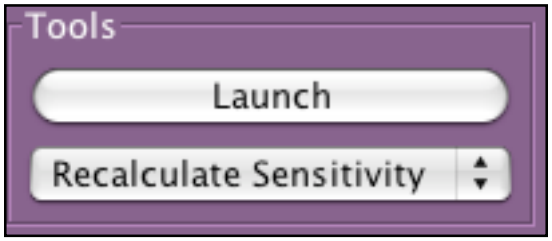
There is also the option to not include any responses in your new station. Selecting this option means that you will have to add these responses later in PDCC. You can use the NRL Tool, the columnar import tool, or copy and paste other responses to accomplish this.

The next panels ask for indicating the type of sensor, the orientations of those sensors, and the sample rates. Finally, you arrive at the final panel that will result in the new station being created for you. If you would like to have a text record kept of your selection, select the 'Also write to Journal File' option and use the file browser to select an output file. You can later use this output to create a single channel Journal file for later use in importing responses (requires some editing).



As you hit Finish, a new station will be created in your selected dataless. Depending on how many orientations and sample rates you specified, you will have one to many channels, each appropriately named. You can edit these entries in PDCC as normal.

RECALCULATE SENSITIVITY TOOL



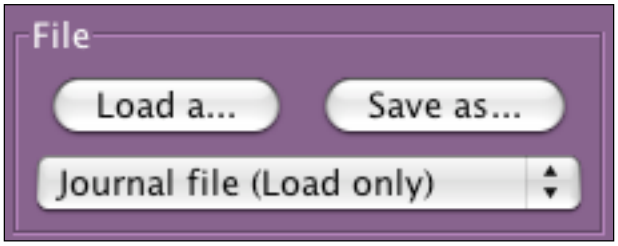
This is a simple feature to run a recalculation of the current response stack in a selected channel in your dataless, the output of which is the sensitivity of the channel. This value gets inserted into the Blockette 58, Stage 0 of your channel's response stack automatically, the same way as NRL Tool does.

Simply select a channel and run the tool.

RECOVERY OF PDCC EDITS

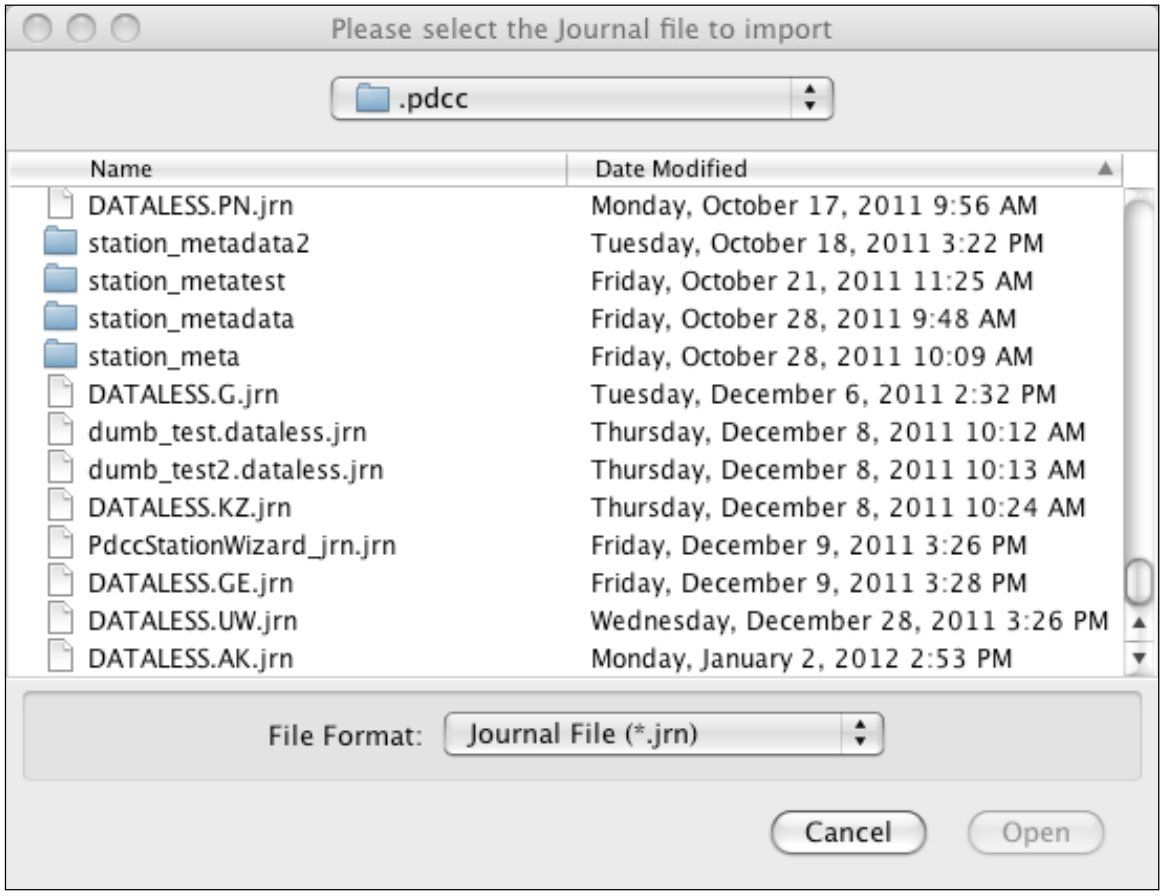
PDCC has the ability to recover work from a crashed session or accidental exit from the application. This feature is still experimental and may not give you the complete results you expect. It can serve to recover a lot of your lost work, though, should it occur.

As a part of the File toolbox is the option to *Load a…Journal file*. PDCC stores a running log of the user's editing activities in a Journal file of the same name as the dataless or other source file loaded. If you want more details on what a Journal file is, please see Appendix B.



By default, when you go to load a Journal file, it will take you to a hidden directory in the user's home folder, which contains all of the journal session files the user has created. You can browse to any directory on your disk, however. Generally, a user's recent work will be easy to find if you sort the file list by date. You can select a file that represents the dataless file you were working on and hit OK to begin the import. PDCC will attempt to reconstruct the contents and build a dataless tree in the SEED Browser, just as would

happen with loading a dataless SEED file. The user can then edit the contents in place and continue work. PDCC will re-use that journal file for logging further entries.



This recovery process has not yet been refined to something more automatic and persistent, but it's a start to allowing users to recover where they left off when they last used the application. Further work with this tool will be explored.

❖❖❖

This concludes the PDCC User Manual. Please refer to the *REFERENCES* section for more information as well as the *appendices* for a user tutorial and further background on PDCC.

REFERENCES

IRIS Website: http://www.iris.edu/

IRIS Data Management Center Website: http://ds.iris.edu

PDCC download web page: http://ds.iris.edu/ds/nodes/dmc/software/downloads/pdcc/

IRIS Nominal Response Library: http://ds.iris.edu/NRL/

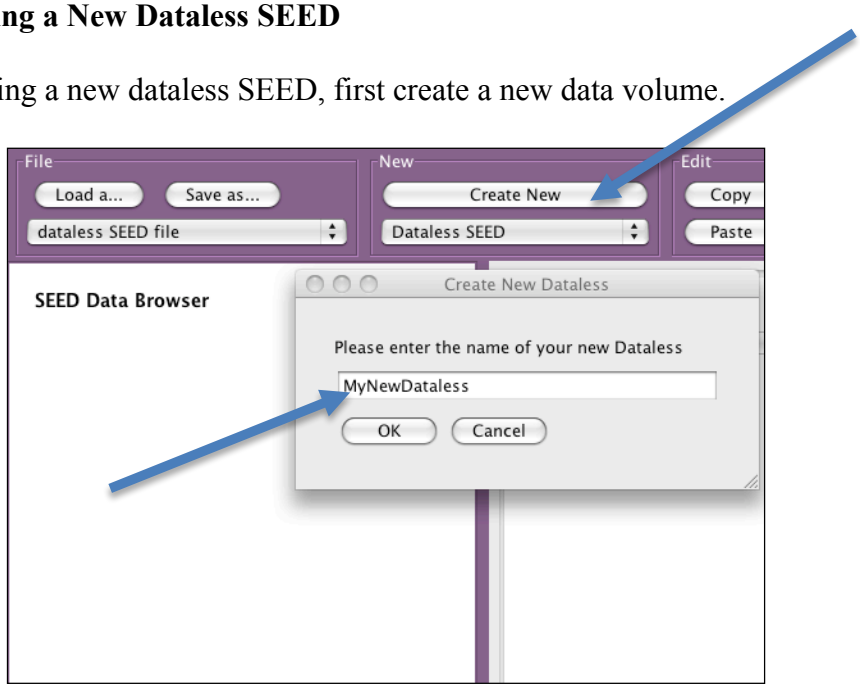
The FDSN SEED Reference Manual:
http://www.fdsn.org/media/_s/publications/SEEDManual_V2.4.pdf

IRIS DMC Web Services: http://service.iris.edu

APPENDIX A: CREATING A NEW NETWORK DATALESS

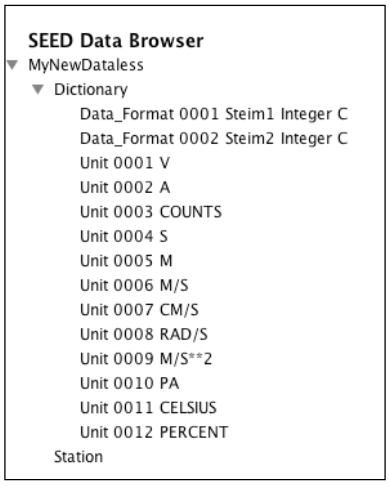
Part 1: Creating a New Dataless SEED

To begin creating a new dataless SEED, first create a new data volume.



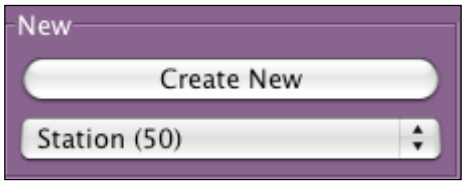
In the *New* button group, ensure that the selector box says *"Dataless Seed"* and hit the *Create New* button. You must then enter a name for your dataless volume. In this example, we call it simply "MyNewDataless".

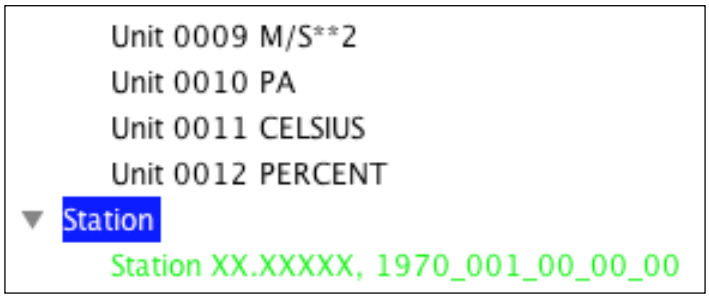
When you hit *OK*, you will find your named entry in the Data Browser window. When you open it up, you will find a Dictionary and Station section, ready for entries to be placed. As an added convenience, the Dictionary section gets populated with a sample of the most commonly used abbreviations that you can make immediate use of as you build out your dataless SEED.



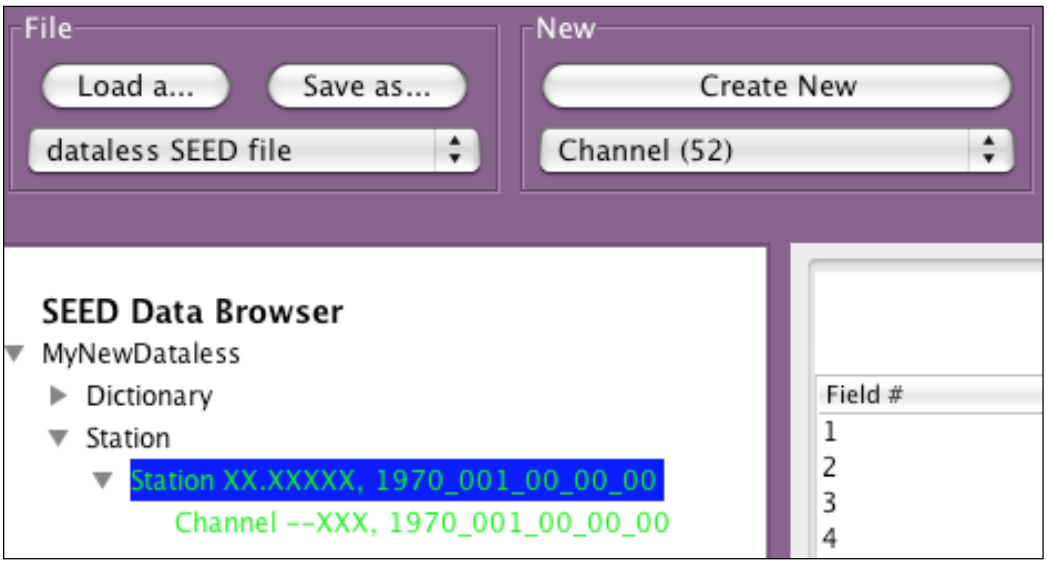
Next, we want to create our first station. You could easily carry this out with the Station Wizard Tool (see the manual instructions above for more information). However, the manual process illustrated below is instructive in how to create (and edit) a new station in detail.

Select the *Station* node under *MyNewDataless* and change the selector for *Create New* to *"Station (50)"*. The number '*50'* represents the *blockette type* number in SEED format for a station representation. Hitting the *Create New* button results in a 'blank' entry for a station that has no discernable status until you edit its contents.

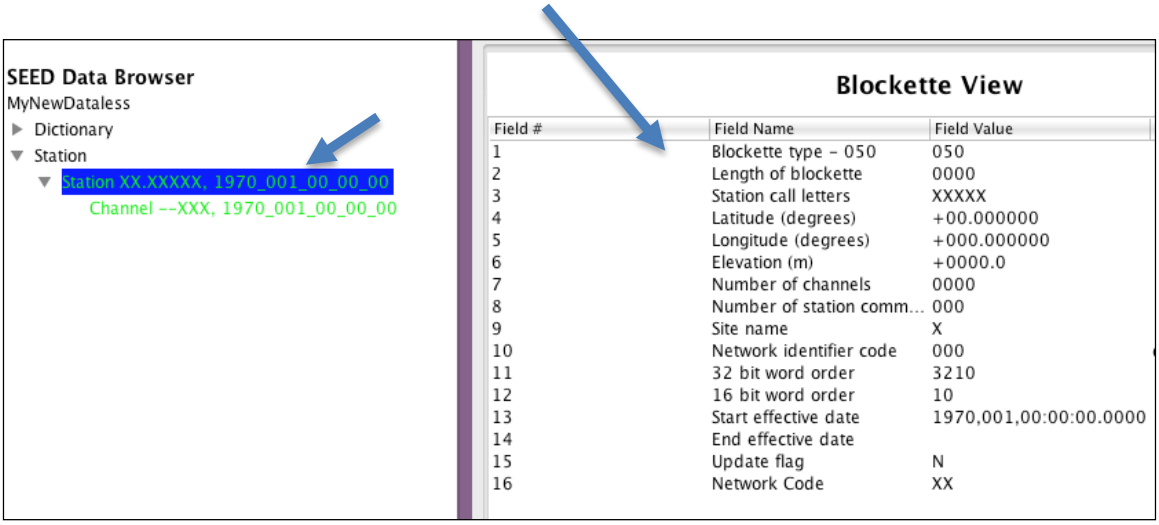




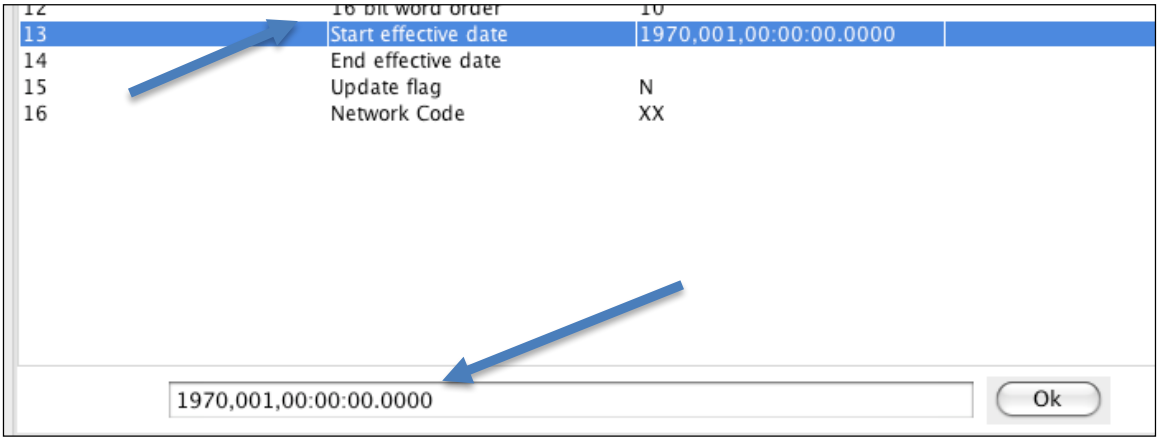
Our station will consist of three broadband channel components. Let's go ahead and add a single channel that we can replicate to the other two components. We will do a *Create New* action using the *"Channel (52)"* selection, making sure that we have the station still selected.



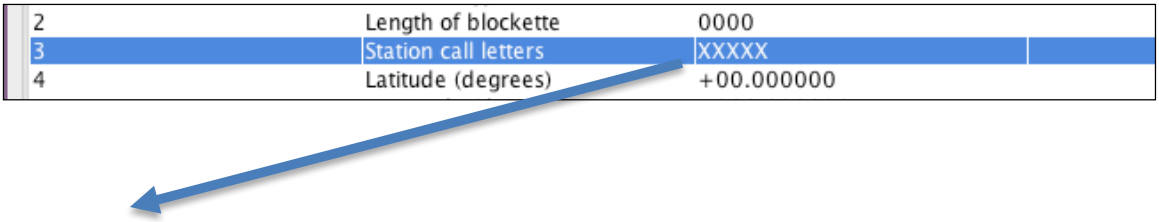
With these two principle elements (Station and Channel) created, we can now edit the station contents to give it a unique identity. Click on the Blockette 50 entity and proceed to the Blockette View window to the right.

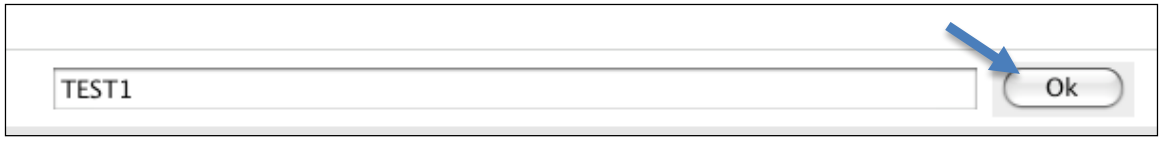


In the edit window, you can select any field row and find the Field Value represented in the edit box below.

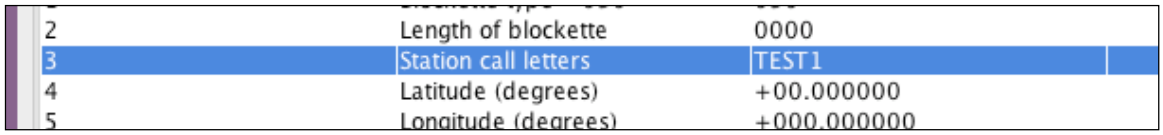


Let us select Field 3, *Station call letters*, and edit the 'XXXXX' name value to a new name, 'TEST1', by changing the value in the edit box below. Once you select the edit box to place the cursor there, you can highlight the text there, use the DELETE and BACKSPACE keys, and type in new values.

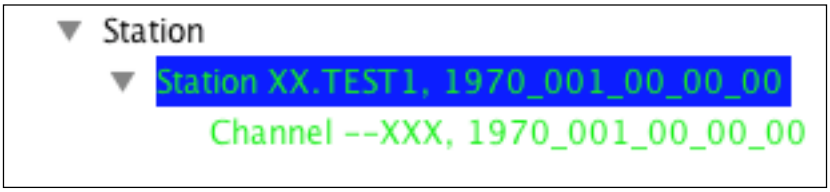




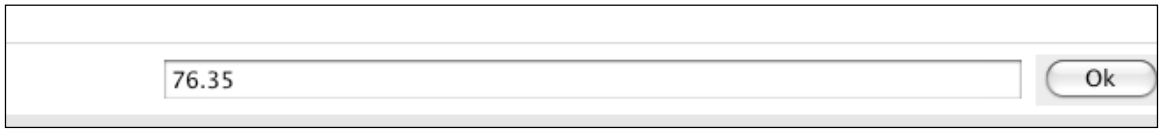
By hitting the *Ok* button (or the *RETURN* key), the edited value is applied to the blockette, which you can see in Field 3.



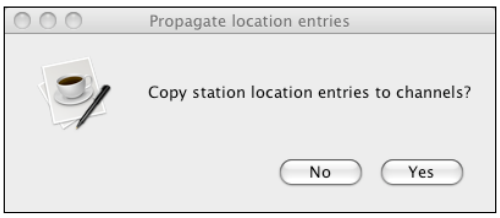
In addition, the tag identity for the tree node of the *Data View* window is changed to the new name. Station tag names get propagated to their channels to ensure they remain 'connected' to each other.



Let us now set the *Latitude* value for this station (Field 4), using the same steps as before. Enter the value '76.35' into the edit box and hit the Ok button.



For this field, you'll encounter a popup window asking to copy location entries to the channels below it. In this case, you have only edited the latitude so far, so you can opt to indicate Yes or No. The benefit of this option is that the Latitude, Longitude, and Elevation entries for the station can be passed to all channels it contains.



Select the *Longitude* field and set the value to '-41.84'. You will see the popup box again. For the *Elevation* field, set the value to '100', and say *Yes* when asked to copy location entries to channels. You can verify that these location values have been passed

to the channel by selecting the blockette 52 Channel node in the Data View, and observing the edit window as shown below.

Blockette View

Field #	Field Name	Field Value
1	Blockette type - 052	052
2	Length of blockette	0000
3	Location identifier	
4	Channel identifier	XXX
5	Subchannel identifier	0000
6	Instrument identifier	000
7	Optional comment	X
8	Units of signal response	000
9	Units of calibration input	000
10	Latitude (degrees)	+76.350000
11	Longitude (degrees)	-041.840000
12	Elevation (m)	+0100.0

Return to the station TEST1 edit window and change field 6, Number of Channels to '3', for the number of channels we are adding to this station.

Change the start effective date, to '2009,100,00:00:00'. You will be asked to copy the time entry to the channel. Hit *Yes* to confirm.

Each FDSN registered seismic network has a one or two-character code to designate their organization's stations. This is entered in field 16. Try entering the designation 'YZ' in this field.

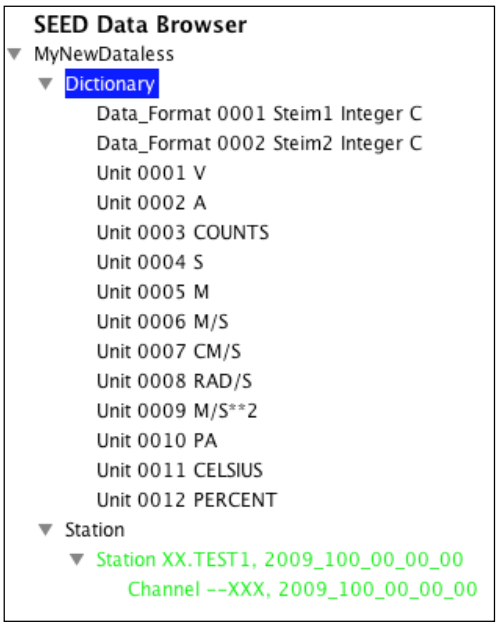
One final addition we want to add is the network code entry in field 10. This field expects a code number that references an entry in the Dictionary. The default entry is '000', which denotes *no entry*.

Blockette View

Field #	Field Name	Field Value	Reference
1	Blockette type - 050	050	
2	Length of blockette	0000	
3	Station call letters	TEST1	
4	Latitude (degrees)	+76.350000	
5	Longitude (degrees)	-041.840000	
6	Elevation (m)	+0100.0	
7	Number of channels	0003	
8	Number of station comments	000	
9	Site name	X	
10	Network identifier code	000	dictionary (33) not found
11	32 bit word order	3210	
12	16 bit word order	10	
13	Start effective date	2009,100,00:00:00.0000	
14	End effective date		
15	Update flag	N	
16	Network Code	YZ	

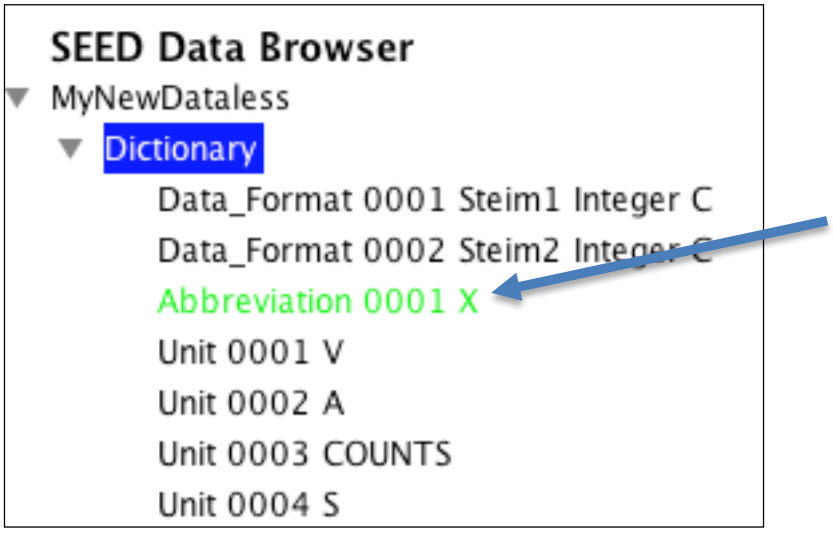
We want to create our own network dictionary entry for this station to point to. As you can see in the *Reference* column, the text 'dictionary (33) not found' appears. This provides a hint as to the blockette type we need to create.

Click on the *Dictionary* node in the SEED Data Browser and double-click it if it is not already showing its contents. Your view should look like this:



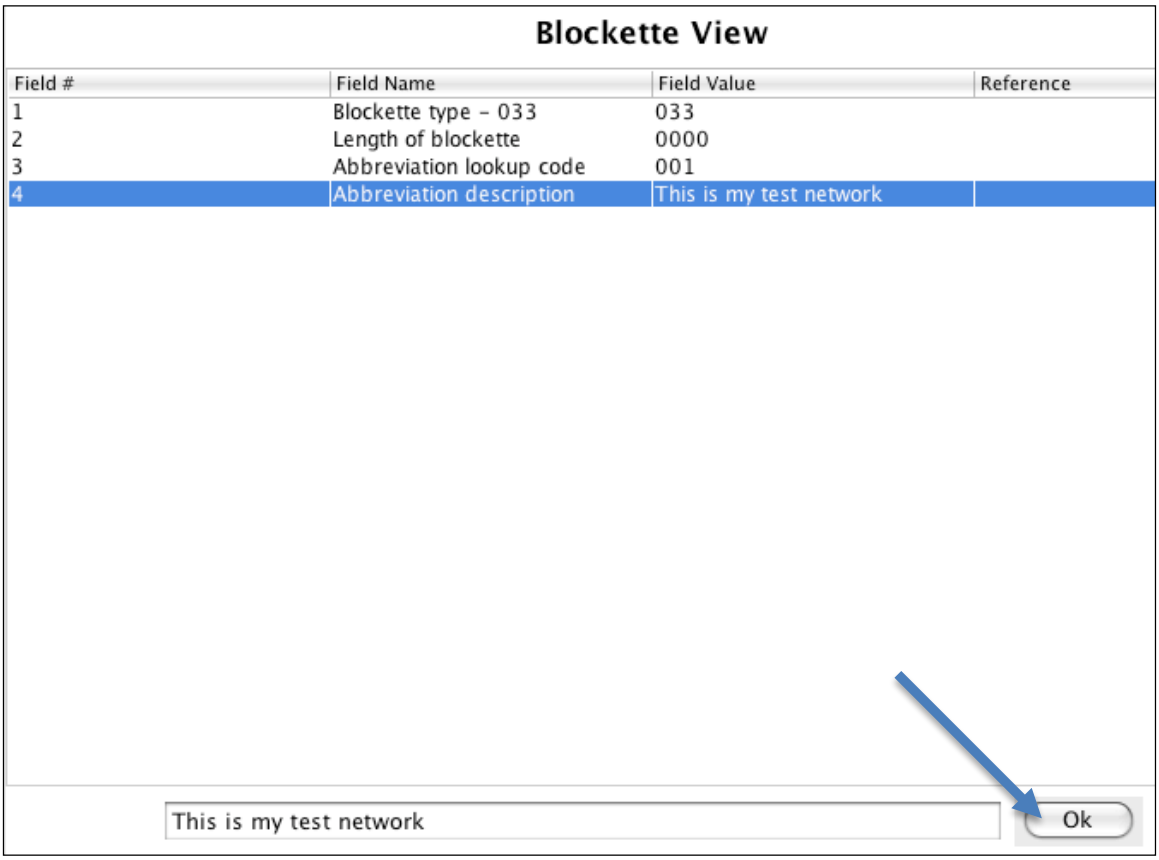
There are currently no *Generic Abbreviation* blockettes here (Blockette 33), which is the type of blockette the *Network Identifier Code* references.

Let's create a new blockette 33 by going to the *New* button group and bringing up 'Generic Abbreviation (33)' in the popup box. When you hit the *Create New* button, an empty Blockette 33 is created.



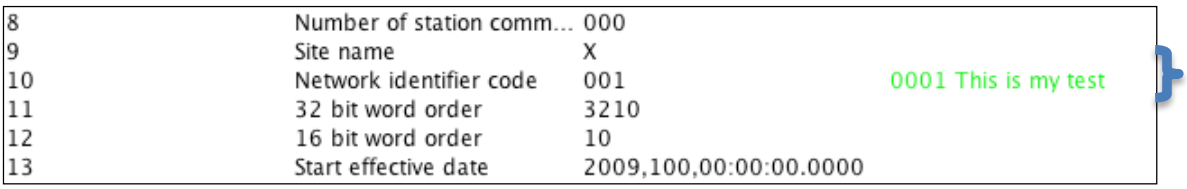
Click on that new Abbreviation blockette and proceed to the *Blockette View* on the right.

The abbreviation lookup code ('001') is automatically generated and should be a unique number, so this does not need to be changed. All we need to modify is the *Abbreviation* description field. Let's select the new blockette add a sample entry in the *Blockette View* table: 'This is my test network'.



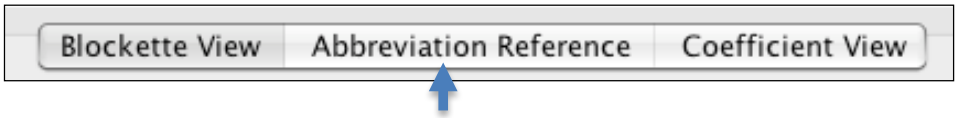
Remember to hit the Ok button when you put in new entries.

We now have an abbreviation for the station TEST1 to point to. Click on the station and modify field 10 to be the lookup code for your new abbreviation ('001').

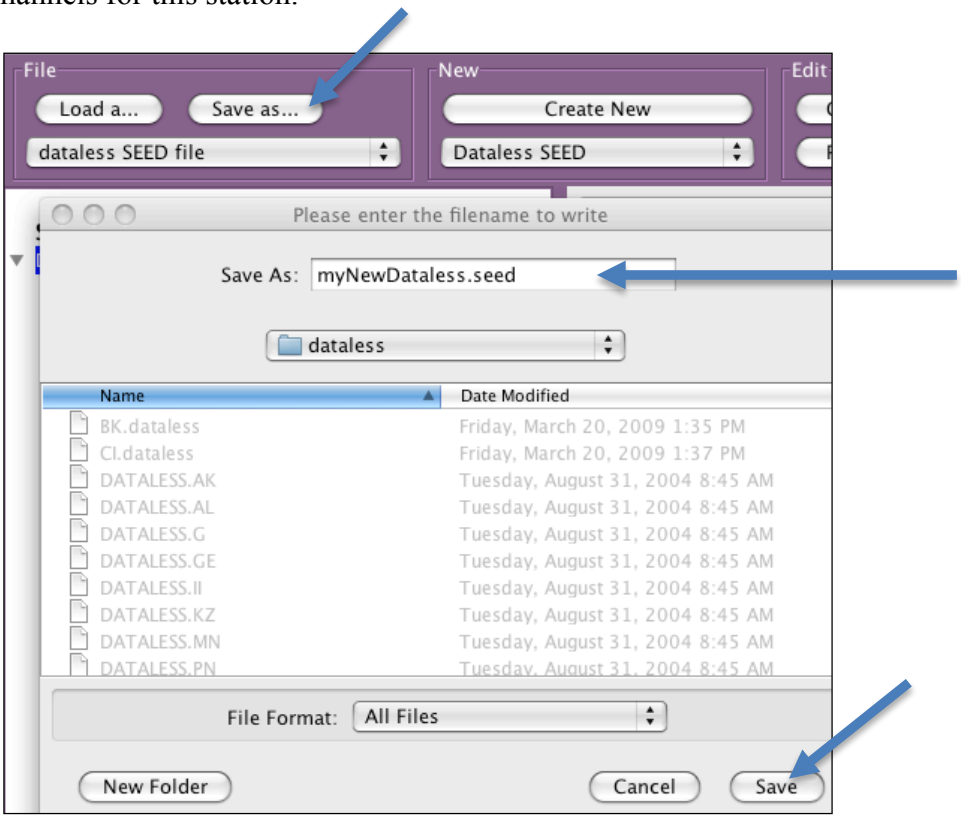


You'll notice that the Reference column now contains a shorthand text representation of the abbreviation ('0001.This is my test…'). To easily look at a referenced abbreviation,

click on that field and refer to the *Abbreviation Reference* tab. (If the field does not appear to respond, click on a different field and then go back.)



We are now done specifying our station. At this stage, you might want to make your first save of this dataless, just to be safe. Click on MyNewDataless in the SEED Data Browser and click the *Load a…* button with *dataless SEED file* selected in the combo box. Provide a file name for your dataless file and save it. Now we can continue with editing the channels for this station.



Part 2: Creating a Sensor Channel Entry

Since we are ultimately creating three broadband channels for this station, we want to write out one of the channels with as much specific information as we know and then *copy* the contents of one to the other two. In this way, we do not have to fully edit three empty channels.

We want our first channel to be identified as 'BHE'. This is an FDSN standard designation for **B**roadband, **H**igh gain, **E**ast-west orientation. We enter this value in field 4, *Channel identifier*.

3	Location identifier		
4	Channel identifier	BHE	
5	Subchannel identifier	0000	

Having east-west orientation means that the *Azimuth* and *Dip* of the instrument have particular degree values, as indicated in the FDSN SEED manual.

Z – Azimuth 0, Dip -90
N – Azimuth 0, Dip 0
E – Azimuth 90, Dip 0

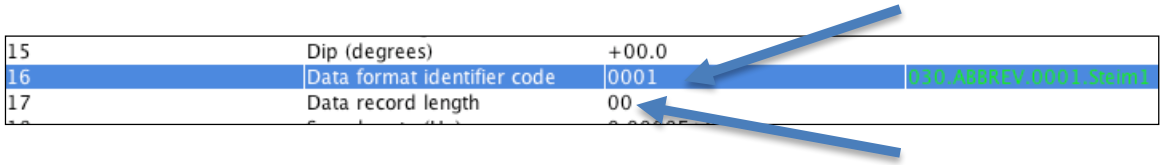
For this orientation, we will enter *Azimuth* of '90' degrees and a *Dip* of '0' degrees. The *Dip* value defaults to '0', so we just edit *Azimuth* to '90'.

13	Local depth (m)	000.0
14	Azimuth (degrees)	090.0
15	Dip (degrees)	+00.0
16	Data format identifier code	0000

Field 16, *Data format identifier code*, is a dictionary lookup that points to a description of the type of data compression the channel's digitized readings will be stored as. Very commonly, the form of compression is 'Steim 1', so for practice, we will go ahead and find the reference to that compression type.

Click on the *Dictionary* section of the dataless and find a blockette 30 that says 'Steim 1 Integer…'. What you'll see in the *Blockette View* is a short description of the compression type and fields that contain coded keys describing the data transcription pattern. This is known as a *Data Description Language* (DDL). All we have to do is list the lookup code in our channel ('0001').

Go back to our BHE channel and find field 16. Change the lookup code to '0001'.



If field 17, the *Data record length*, is not set to '12', set that number to '12' now.

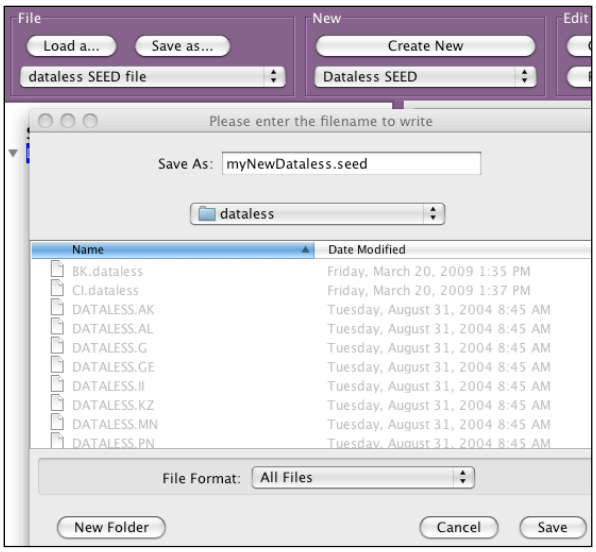
For field 18, we need to enter the *Sample rate* of the instrument. Broadband channels are generally 20 Hz to 80 Hz sample rate. Let's go with 20 Hz for this tutorial. You can enter the number '20' in the edit box and it will be reformatted to scientific notation in the field entry.

17	Data record length	12	
18	Sample rate (Hz)	2.0000E+01	
19	Max clock drift (seconds)	0.0000E+00	

As you'll notice in field 22, the *Start date field* matches the start date of the station. This is a copy of the entry in the station blockette that you added earlier. Channel time entries can still be changed and possibly be different from its parent station. It is more likely that you'll want to keep the start and end times the same.

20	Number of comments	0000
21	Channel flags	CG
22	Start date	2009,100,00:00:00.0000
23	End date	
24	Update flag	N

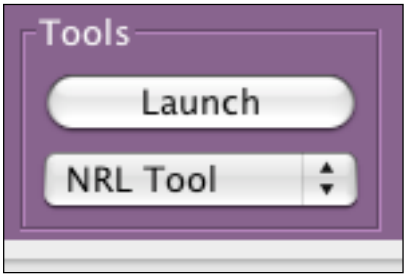
Let's do another write to dataless SEED, just to save our current work. It's good practice to save often in case something goes wrong during your editing session.



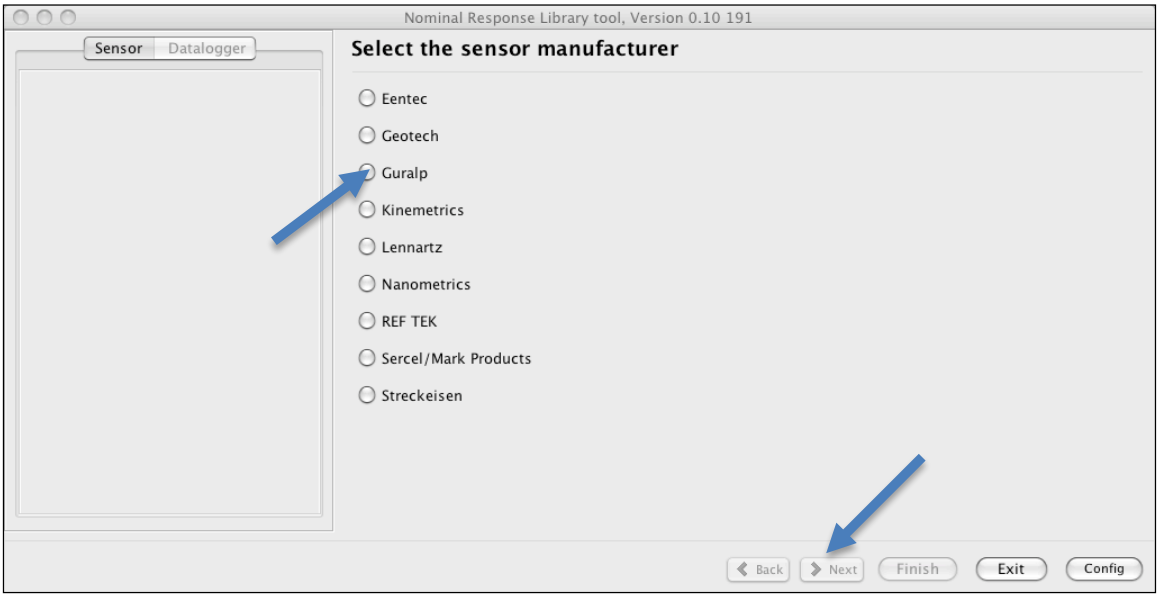
Part 3: Creating the Channel Instrument Response

Now we are ready to add instrument information (responses) for our channel. For this, we will use the *NRL Tool*. We will proceed in this tutorial under the assumption that we know what kinds of instrumentation we are using, which is essential for the *NRL Tool* to be used.

Click on the BHE channel we were editing and select 'NRL Tool' from the selector box in the *Tools* button group. Click on the *Launch* button and wait for the tool to load.

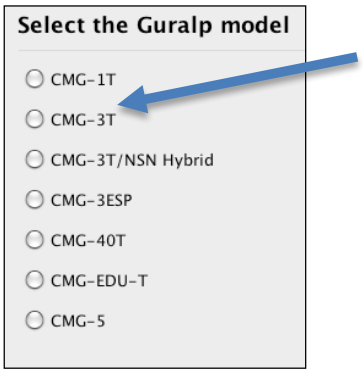


If you are prompted about updating responses in the *Nominal Response Library*, click *Yes* to confirm the update. When the tool appears, we are ready to select our *Sensor response.*

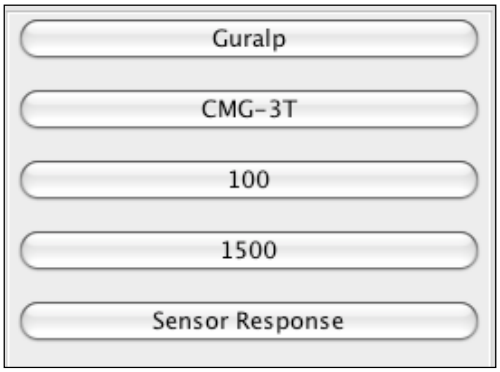


For this exercise, we will go with a *Guralp* sensor. Select 'Guralp' from the list above and click on the *Next* button.

Now select the 'CMG-3T' model of sensor. Click *Next*.

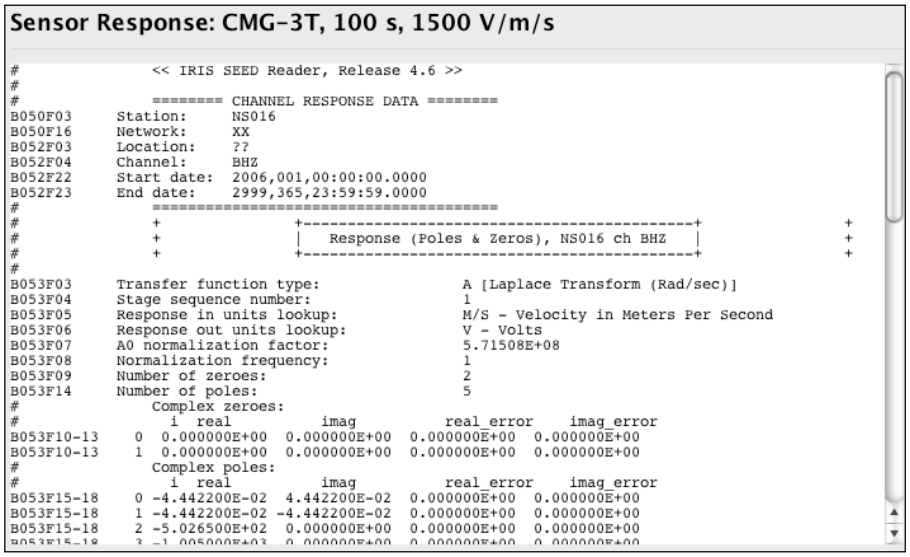


Subsequently, select '100' for the *natural period* and '1500' for the *sensitivity*. Your selection list on the left should look like the following:

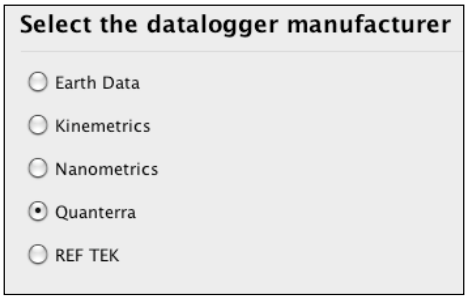


Remember, you can click on one of these buttons to go back and correct your selection. Hitting the *Back* button also allows you to go back to change your choices.

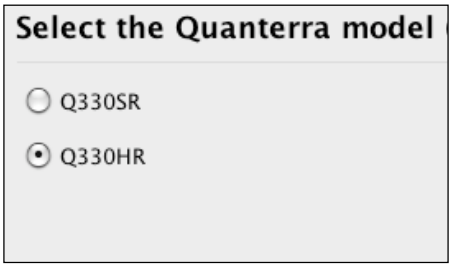
You should see a screen showing the nominal response information for this sensor. To continue, click *Next*.



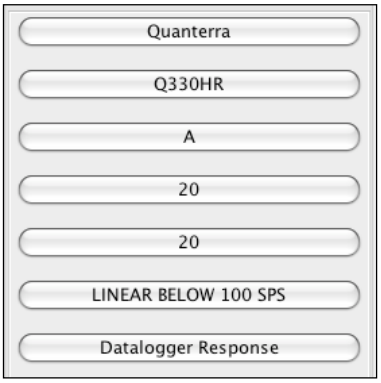
Now we select the *datalogger manufacturer*. Let's make it a *Quanterra* datalogger.



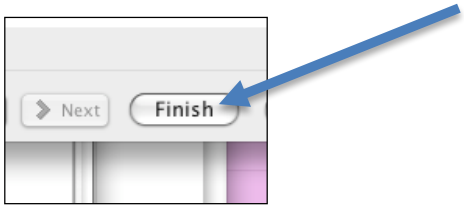
When you click *Next*, you'll want to select the 'Q330HR' unit.



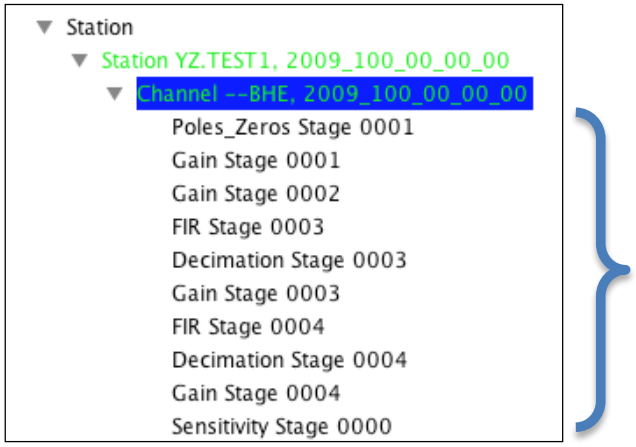
Go with *Sensor Port* 'A', *preamp* of '20', select a *sample rate* of '20' (important that this match our BHE blockette!), and 'Linear below 100 SPS'. Your final selection stack should look like the following:



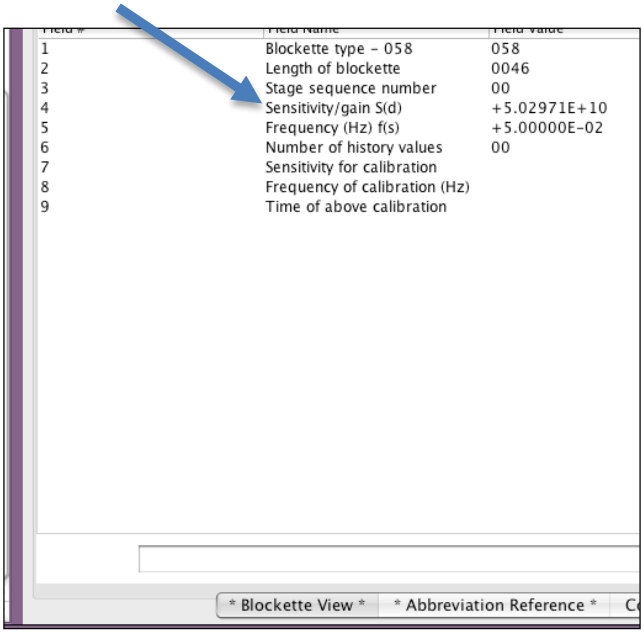
You will see a response representation when you hit *Next*. The last thing to do is hit *Finish*, which signals that you are done and want to enter this information into your channel (do not hit Exit).



The tool will close and you'll see some activity in the status bar. This is a sign that PDCC is adding response blockettes to the channel. Also, the channel node in the *Data Browser* shows an arrow (or similar) marker to indicate that it contains items. Hit that marker or double click the channel to open and see the responses.



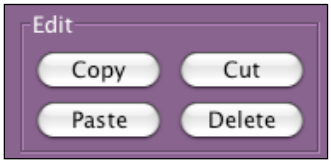
The blockettes are ordered from the first stage to the last stage of the instrumentation response. The very last response stage should always be '0', which is an overall *sensitivity* response. The *NRL Tool* supplies a computed value for the instrument sensitivity and places this value in the *sensitivity* blockette.



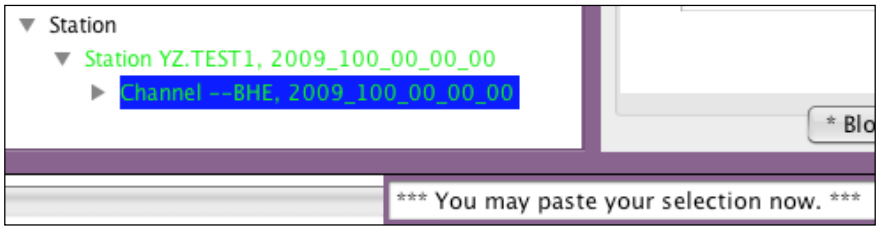
With this completed, we can consider our channel specification done. To be on the safe side, it is recommended you write out a new dataless with this information.

Part 4: Creating Other Channels

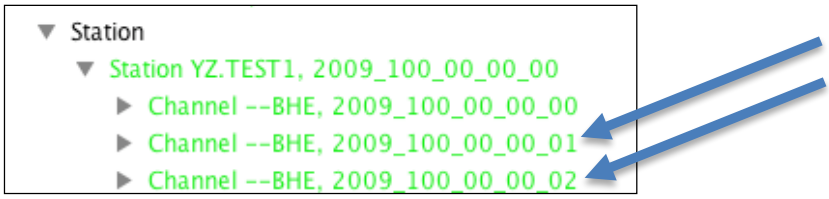
The next step we will undertake is expanding our single channel into *three* channels, and then modifying the *orientation* data for each component. For this, we will make use of the *Copy* function to copy a single channel and paste two copies of it. Select your channel now and hit the *Copy* button.



You should see an indication in the status bar that the copy has completed and that you can paste your selection.



Since we are pasting after the current channel, we can leave our channel selection in place and hit *Paste* to lay down a new copy of this channel right after the first one. It will contain all of the responses of the copied channel. Since we are doing two channels, hit *Paste* a second time.



To create a BHN channel, select the first of the new channels and edit two fields. The first is the *Channel identifier* field (4), where you enter 'BHN'. The second is the *Azimuth*, which goes to a value of '0' for the N orientation.

Field #	Field Name	Field Value	Reference
1	Blockette type - 052	052	
2	Length of blockette	0000	
3	Location identifier		
4	Channel identifier	BHN	
5	Subchannel identifier	0000	
6	Instrument identifier	002	033.ABBREV.0002.CMG-3T, 100
7	Optional comment	X	
8	Units of signal response	015	034.ABBREV.0015.M/S.-----
9	Units of calibration input	000	dictionary (34) not found
10	Latitude (degrees)	+76.350000	
11	Longitude (degrees)	-041.840000	
12	Elevation (m)	+0100.0	
13	Local depth (m)	000.0	
14	Azimuth (degrees)	000.0	
15	Dip (degrees)	+00.0	
16	Data format identifier code	0001	030.ABBREV.0001.Steim1
17	Data record length	12	
18	Sample rate (Hz)	2.0000E+01	
19	Max clock drift (seconds)	0.0000E+00	
20	Number of comments	0000	
21	Channel flags	CG	
22	Start date	2009,100,00:00:00.0000	
23	End date		
24	Update flag	N	

Now, do the same for the other new channel you created, change the name to 'BHZ', modify the *Azimuth* to '0', and the *Dip* to '-90' degrees.

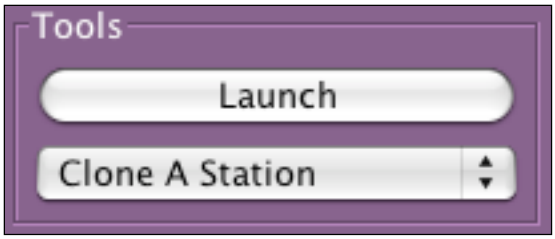
Having done this, you have completed your first three-component station! Save your results to a dataless SEED file, and then we will proceed to the next step.

Keep in mind that a lot of what we have done so far can be completed very easily with the *Build A Station (Station Wizard)* tool, so regular users are encouraged to use that process to start new stations. The above examples serve as a lesson in fine-tuning your station component specification.

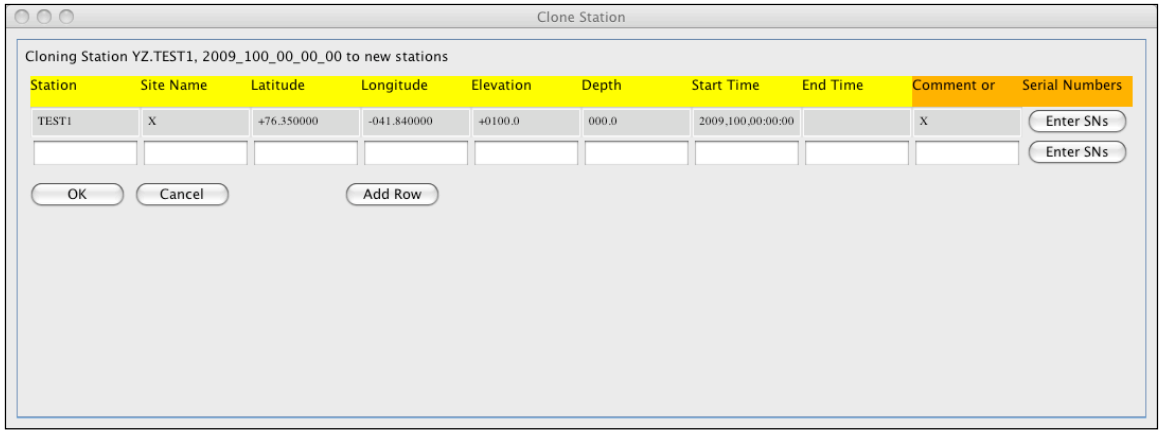
Part 5: Creating Other Stations

The final process for this tutorial is to simulate a network that has many similar stations. We can create a number of similar stations quite easily with the *Station Cloning* tool.

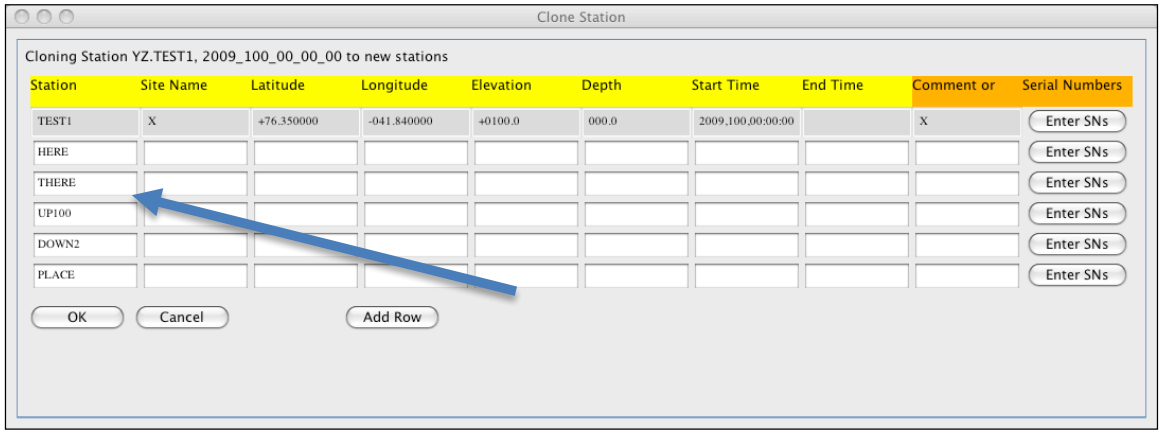
Click on station *YZ.TEST1* in the SEED Browser and change the selector in the *Tools* group to *Clone A Station*.



Hit the *Launch* button, and wait for the tool to come up.

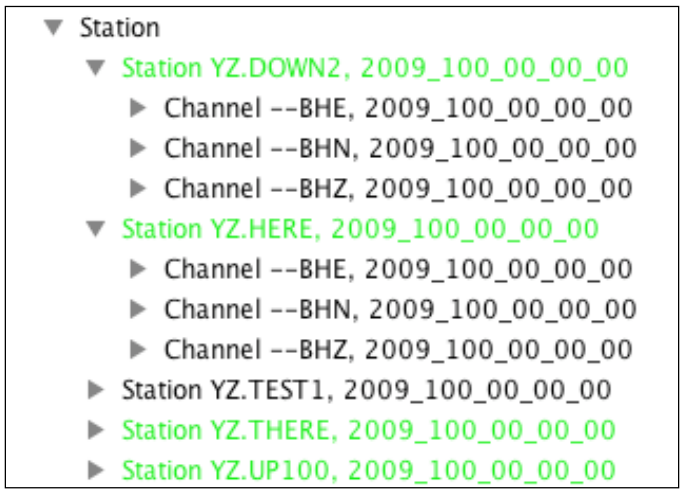


Begin entering five different names for new stations you want to create. Remember that you can add rows by hitting *RETURN* on the last entry field or by hitting the *Add Row* button. Below is an example:



At this stage, you would also enter Site Names, Geographic Coordinates, and Effective Times in the tool for each station. If you leave these entries blank, then the original station's values will be substituted.

When you are done, click the *OK* button and in a short moment you should see new station instances appear in the *SEED Data Browser*. All of them have the same channel contents as the original.



Perform one final save of this dataless (remember to click on the volume name first) and you are done.

Congratulations on creating your first dataless SEED!

This concludes the tutorial for Appendix A.

APPENDIX B: JOURNAL FILES

PDCC maintains a log of dataless edit activity in *journal files*, located in the user's home directory under the directory name *.pdcc*. Files there will have the suffix of *.jrn*, to indicate that these are journal files.

PDCC currently writes to a .jrn file of the same name as the dataless SEED file it represents. So, if you're reading a file called *MyDataless.seed*, you will find a file called *MyDataless.jrn* in the ${USER_HOME}/.pdcc directory. These .jrn files are re-used at every opportunity by overwriting their previous contents.

While these files are needed by PDCC when it runs, the files can be safely removed later on when not using PDCC. Usually, these files do not get large enough to start filling up a user's disk. However, you should feel free to keep this directory cleaned up at your discretion.

Later editions of PDCC may use these files more extensively to allow recovery of editing sessions from a previous run as well as the ability to backtrack edits in an *Undo*-like fashion. Dataless entry recovery is the first feature to be implemented that accesses these saved files.

These files can otherwise serve as a useful log of activity and may be requested by support personnel at IRIS to resolve reports of bugs or other issues.

```
010|0114|02.3|12|2000,160,00:00:00.0000|2599,365,00:00:00.0000|2000,300,17:42:00.0000|IRI
S_DMC|DATALESS.AK.102600.dmc
011|0021|001|MCK|000003
030|0237|Steim2 Integer Compression Format|0003|050|14|F1 P4 W4 D C2 R1 P8 W4 D C2|P0 W4
N15 S2,0,1|T0 X W4|T1 Y4 W1 D C2|T2 W4 I D2|K0 X D30|K1 N0 D30 C2|K2 Y2 D15 C2|K3 Y3 D10
C2|T3 W4 I D2|K0 Y5 D6 C2|K1 Y6 D5 C2|K2 X D2 Y7 D4 C2|K3 X D30
031|0035|0001|V|CSS Volume: mckseed|000
::c::030.ABBREV.0001.Steim2 Integer C.6F53A::030|0237|Steim2 Integer Compression
Format|0001|050|14|F1 P4 W4 D C2 R1 P8 W4 D C2|P0 W4 N15 S2,0,1|T0 X W4|T1 Y4 W1 D C2|T2
W4 I D2|K0 X D30|K1 N0 D30 C2|K2 Y2 D15 C2|K3 Y3 D10 C2|T3 W4 I D2|K0 Y5 D6 C2|K1 Y6 D5
C2|K2 X D2 Y7 D4 C2|K3 X D30
033|0035|002|Alaskan Network Stations
::c::031.ABBREV.0001.CSS Volume- mcks.60089::031|0035|0001|V|CSS Volume: mckseed|000
033|0042|006|CMG 3TD - T1 100 sec Horizontal
::c::033.ABBREV.0001.Alaskan Network .C6B1B::033|0035|001|Alaskan Network Stations
033|0040|007|CMG 3TD - T1 100 sec Vertical
::c::033.ABBREV.0002.CMG 3TD - T1 100.261EF::033|0042|002|CMG 3TD - T1 100 sec Horizontal
034|0044|004|M/S|velocity in meters per second
::c::033.ABBREV.0003.CMG 3TD - T1 100.6B39D::033|0040|003|CMG 3TD - T1 100 sec Vertical
034|0025|005|V|emf in volts
::c::034.ABBREV.0001.M/S.7A564::034|0044|001|M/S|velocity in meters per second
050|0097|MCK|+63.732300|-148.934900|+0618.0|0003|000|McKinley
Park|002|3210|10|2000,160,00:00:00.0000|^|N|AK
::c::034.ABBREV.0002.V.34F51::034|0025|002|V|emf in volts
052|0128|  |BHE|0000|006|-|004|005|+63.732300|-
148.934900|+0618.0|000.0|090.0|+00.0|0003|12|5.0000E+01|5.0000E-
03|0000|TG|2000,161,22:16:11.0000|^|N
::c::050.AK.MCK.a.-----.2000_160_00_00_00.0000::050|0097|MCK|+63.732300|-
148.934900|+0618.0|0003|000|McKinley Park|001|3210|10|2000,160,00:00:00.0000|^|N|AK
054|0024|D|01|004|005|0000|^|^|0000|^|^
::c::052.AK.MCK.a.--BHE.2000_161_22_16_11.0000::052|0128|  |BHE|0000|002|-
|001|002|+63.732300|-148.934900|+0618.0|000.0|090.0|+00.0|0001|12|5.0000E+01|5.0000E-
03|0000|TG|2000,161,22:16:11.0000|^|N
057|0051|01|5.0000E+01|00001|00000|+0.0000E+00|+0.0000E+00
```

APPENDIX C: KEYSTROKE COMMANDS

PDCC has a small set of keystrokes for special editing actions that can be performed in the SEED Data Browser. These capabilities will be expanded further over time.

ALT-DELETE = delete
ALT-X = cut
ALT-C = copy
ALT-V = paste