

# What's New in Antelope 5.8

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# Introduction - KMI

## Kinemetrics, Inc.

- Founded in 1969
- OYO Corp owned in 1991
- ISO9001 since 1999
- \$35M FY2012 revenue (mostly international)

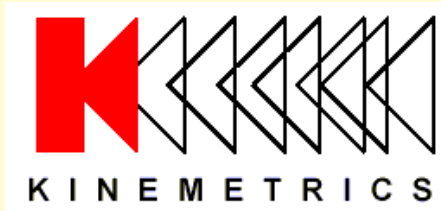


HQ's in Pasadena CA with Sales and Project offices in Switzerland & Abu Dhabi

A screenshot of the Kinemetrics website homepage. The browser address bar shows 'www.kinemetrics.com/p-163-Home.aspx'. The main header features a large image of a person working in a trench with equipment, overlaid with the Kinemetrics logo. Below the header is a navigation menu with links: 'About Us', 'Products', 'Solutions', 'Projects', 'News', 'Downloads', and 'Contact'. The main content area includes several sections: 'NEW KINEMETRICS WEBSITES: Kinemetrics has launched 3 new websites', 'MSNBC: EARTHSCOPE: Humankind's largest and most ambitious scientific project', 'Quanterra Q330S+ Seismic System' with an image of the device, and 'The Innovative World Leader In Earthquake Monitoring' with the tagline 'Developer of Technologies, Products and Solutions to Advance How People Live and Work'. Below this, it states 'For forty years, Kinemetrics has been creating products for:' followed by a list of products: 'Seismic networks', 'Comprehensive environmental monitoring systems', and 'Strong motion and weak motion instrumentation'. Finally, it lists 'Project solutions for' including 'Structural health monitoring (bridges, dams, buildings)' and 'Seismic arrays'.



# Introduction – KMI Team



Designs and manufactures sensors and digitizers – Provides complete systems design, installation and operations



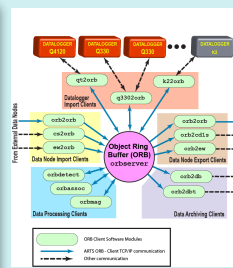
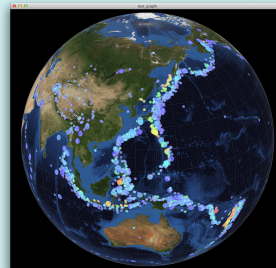
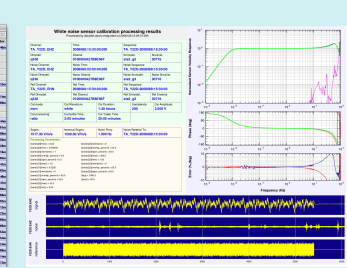
Designs High-End Digitizers



Designs High-End Sensors



Antelope Software

A screenshot of a data table with multiple columns and rows, likely representing sensor data or system logs. The columns include various numerical and text values.

# Kinematics / BRTT

## Comprehensive Hardware, Software, and Services

### Kinematics Systems Solutions

- Turnkey complete systems including enterprise-class computing centers and full communications

### Kinematics Hardware Manufacturer

- World class Kinematics and Quanterra dataloggers
- World class Kinematics, Metrozet and Streckeisen sensors

### BRTT Software Developer

- World class acquisition software for all Kinematics hardware products
- Proven track record for large networks with difficult remote deployments (USArray)
- World class, comprehensive automated and interactive seismic processing software
- Data neutral architecture for support of non-seismic environmental monitoring networks
- Extraordinary Command & Control capabilities with SOH displaying

### Kinematics Services

- Complete systems procurement, installation and training including all aspects of both hardware and software
- Network operations





# What's New In Antelope 5.8

- Infrastructure
  - Critical work for long-term health of the *Antelope* platform
  - Updated operating-system support
  - Node licensing for *RHEL/CentOS 7.4*
    - New root **amd(1)** daemon
  - Licensing dongles
  - Toolchains for both *Linux* and *OS X*
  - *Qt*, *Perl*, and *MATLAB* version upgrades
  - Updated Installer
  - CD1.1 Testing
- Advances
  - Return of **dbevents(1)** waveform display
  - Rewrite of **dbmapevents(1)**
  - New parameter-file explorer **pfe(1)**
  - **filter\_designer(1)** [Danny Harvey Presentation]
  - **inspect\_detection(1)** [Danny Harvey Presentation]
  - *Bighorn* advances [Frank Vernon Presentation]
    - **display\_spec(1)**
  - Variety of noteworthy smaller improvements



# Operating-system Support

- *Antelope 5.8* is released on
  - RedHat/CentOS 7.4
  - Mac OS X 10.13 (High Sierra)
- Latest versions available for each operating system at time of release
- Forcing functions:
  - Apple update policies – hard to install older *OSX* versions
  - OS Support necessary for newly purchased hardware
  - Newer compilers necessary for *Qt*-based advanced graphics development
- Hiatus from previous policy of remaining several OS's behind to ease transitions for customers



# Linux Installation

- We recommend installing most complete *Linux* Environment Group (feature set) available
- In *RHEL*:
  - “*Development and Creative Workstation*”
  - (Not “*Minimal Install*”)
- Missing dynamic libraries (*libnettle.so*, etc.) most common symptom of insufficient install
- Enterprise Class Software:
  - *Antelope* chosen to support mission
  - OS chosen to support *Antelope*
  - Hardware chosen to support OS
- (Recommendation would be different if we were tailoring for multi-purpose research environments instead of operational missions)
- The fix, per *notes\_linux\_setup(5)*:
  - **% yum groupinstall “*Development and Creative Workstation*”**



## Linux node-licensing and *amd(1)*

- *Linux RHEL/CentOS 6.x* had *hald(1)* to get serial-numbers as non-root
- *Linux RHEL/CentOS 7.x* removed this, thwarting our node-license strategy
- We have written *amd(1)*, a daemon that runs as root to support Linux node-licensing
- Requires *sudo* permission at installation, otherwise can't use node-licenses (IP licenses OK)
- Still requires a machine whose hardware manufacturer emplaces a valid serial number (e.g. not *012345*, *0000*, or "O.E.M.")





# Licensing Dongles

- Alternative to IP and node licenses
- Small USB-stick with encrypted keys
- Does not require internet connection
- Works for Linux hosts without valid serial #
- Works for Virtual Machines if the USB hardware is properly mapped
- Currently limited to one dongle per physical machine
- As with serial-number licensing on Linux, requires sudo-installed **amd(1)** daemon
- Not offering this as standard-procedure licensing, but is an option if other alternatives fail



# Toolchains for Linux and OS X

- *Antelope 5.7* shipped with the first *'Toolchain'*, for Linux
- *'Toolchain'* = collection of compilers and tools we use to build Antelope
- Governed by *TOOLCHAIN* macro in Makefiles
  - Set to *'native'* to bypass ours and use what's available on your machine
  - Download ours from *AUG github* repository (e.g. via *install\_toolchain(1)* command)
- *Antelope 5.8*: Using toolchains for both *OS X* and *Linux*
  - *Clang 5.0.0* on *OS X*
  - *GCC 7.2.0* on *Linux*
- Only relevant if you're building software



# Interpreter Version Upgrades

- Perl
  - 5.14.2 -> 5.26.1
  - A few code changes necessary: no “.” on *INC* path due to security; ‘*if( defined( @array ) )*’ now ‘*if( @array )*’; several other probably-rare minor tweaks
- Qt
  - 5.5.0 -> 5.9.0
  - Updates to stay current, per strategic campaign
  - Preserving *X11* support on *Mac*
    - for *ssh* forwarding of graphics
    - for web display via *rtwebserver(1)/rtcachel(1)*
- MATLAB
  - *Antelope 5.8* will support *MATLAB R2018a*
  - Mathworks has a relatively short software lifecycle
- Python 3
  - *Python* still at 2.7.8 for *Antelope 5.8*
  - *Python 3* Comments at end --



# Updated Installer

- *Antelope* installer showing its age, *X11*-bound
- *Antelope 5.8* has new installer
  - **Transitional**, towards fully modern GUI installer
  - Part shell, part GUI at the moment
  - Better control during install and smoother user experience
  - Still using ***antelope\_update\_dep(1)***
  - New ***register\_antelope(1)***, ***setup\_site(1)***
  - Can still invoke legacy installer
- On *Linux* asks for ***sudo*** privilege to install ***amd(1)***
- Expanded options:

```
% ./Install_antelope -h
```

Welcome to the Antelope Installer.

```
./Install_antelope Usage:
```

-h	Help	-- print this options list and exit
-S	Skip checksum	-- proceed without media verification
-C	Checksum verification	-- report media validity and exit
-m	Mortal mode	-- run without invoking any sudo commands (e.g. amd daemon install)
-o	Old mode	-- run legacy installer from earlier Antelope versions
-t	Terminal mode	-- run without GUI
-u	Unattended mode	-- run without asking questions
-v	Verbose	

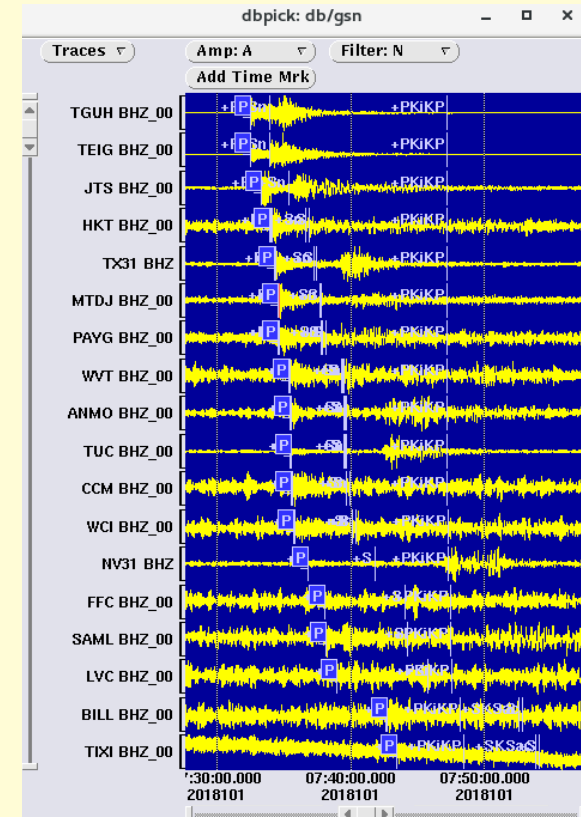
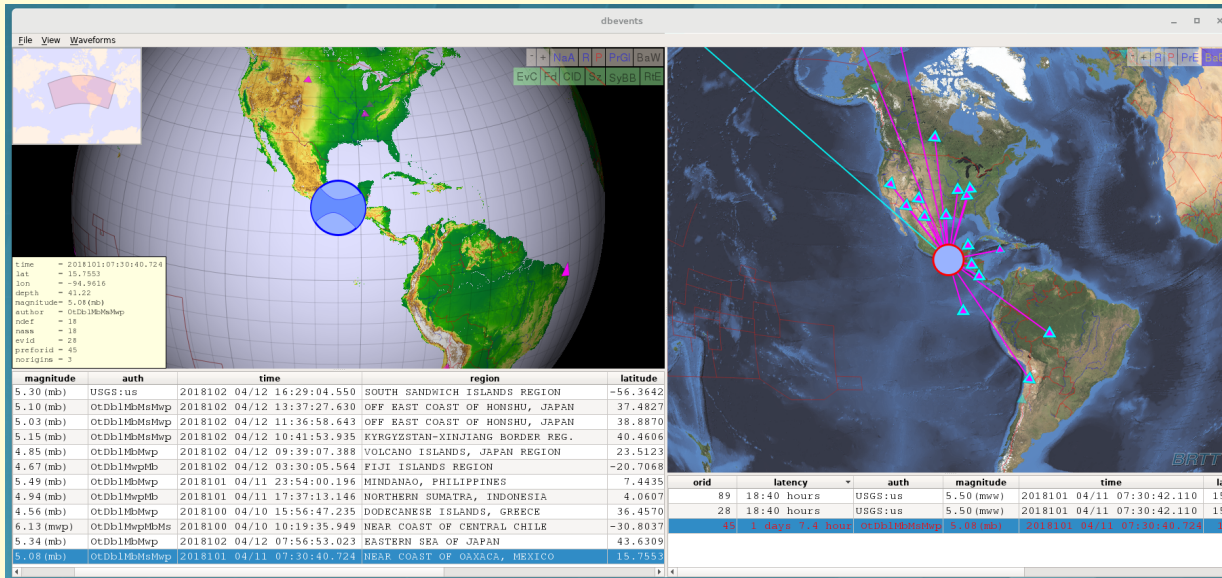


# CD1.1 testing

- Last year we introduced new CD1.1 tools:
  - ***orb2cd11s(1)***
  - ***cd11s2cd11(1)***
  - ***orb2cd11xmit(1)***
  - ***cd11rcv2orb(1)***
- Extensive testing – thanks to colleagues – and some very minor tweaks show:
  - ***cd11rcv2orb(1)*** successfully receives streams of data from Vienna IDC
  - ***orbcd11xmit(1)*** successfully sends CD1.1 data to NDC
- Coded correctly from first-principle IDC format specification (*IDC 3.4.3 CD1.1 Document*)



# *dbevents(1)* waveform display



Once again launches and synchronizes *dbpick(1)* via *Waveforms->Show* menu checkbox



# *dbevents(1)* waveform display: pf

New  
Parameters  
for *dbpick(1)*  
launched  
from  
*dbevents(1)*  
(*dbevents.pf*)

key	value	comment
update_interval	1.0	
width	1800	
height	800	
mapevents_width	900	
mapevents_height	300	
mapevent_height	500	
▶ external_commands &Arr		
dbpickgeom	480x662-0+62	# geometry of main dbpick display window
dbpicktypeinggeom	100x20-0-0	# geometry of dbpick typein window
scsift	*	# default dbpick station-channel sifter
channels	33	# default number of dbpick channels to display
phases	P,S	# default predicted phases to display
additional	swa pal 0	# default additional dbpick commands
twin	1800	# default dbpick display time window
filter	None	# default dbpick filter index
startdbpick	0	# 1 = start dbpick at program startup # 0 = do not start dbpick at program startup
warpdbpick	0	# 1 = warp dbpick window to other display # 0 = don't warp dbpick window to other display
autorefresh_interval	60.0	# automatically refresh dbpick window interval
pf_revision_time	1523998907	

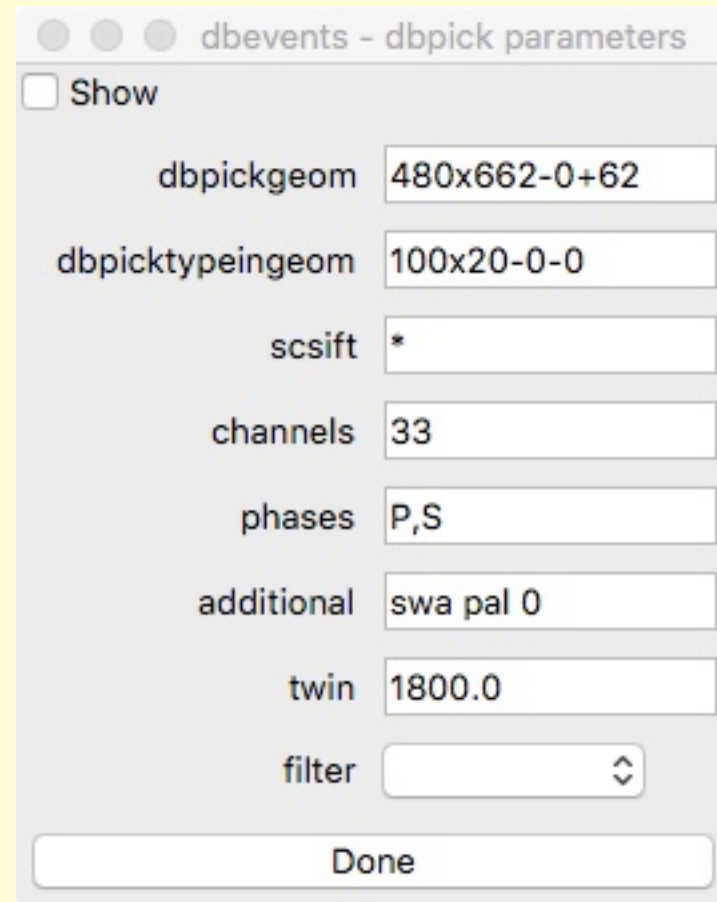
Status:



# *dbevents(1)* waveform display: pf editor



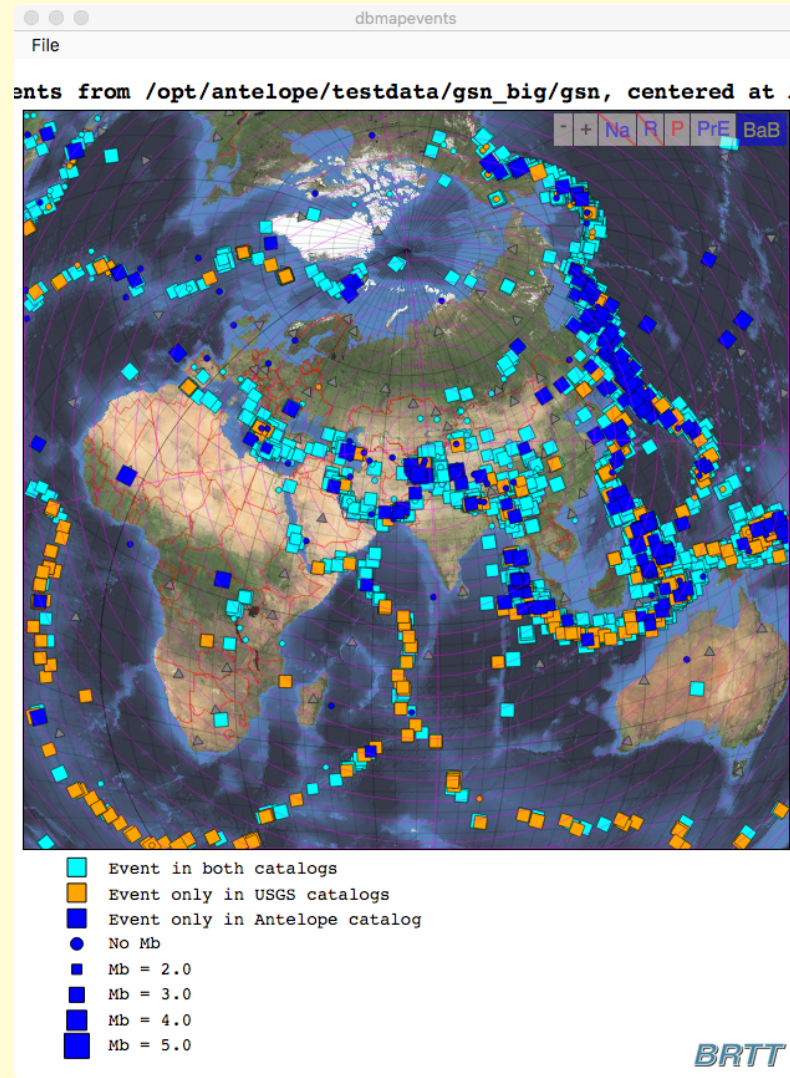
GUI parameter-file editor window from within *dbevents(1)*





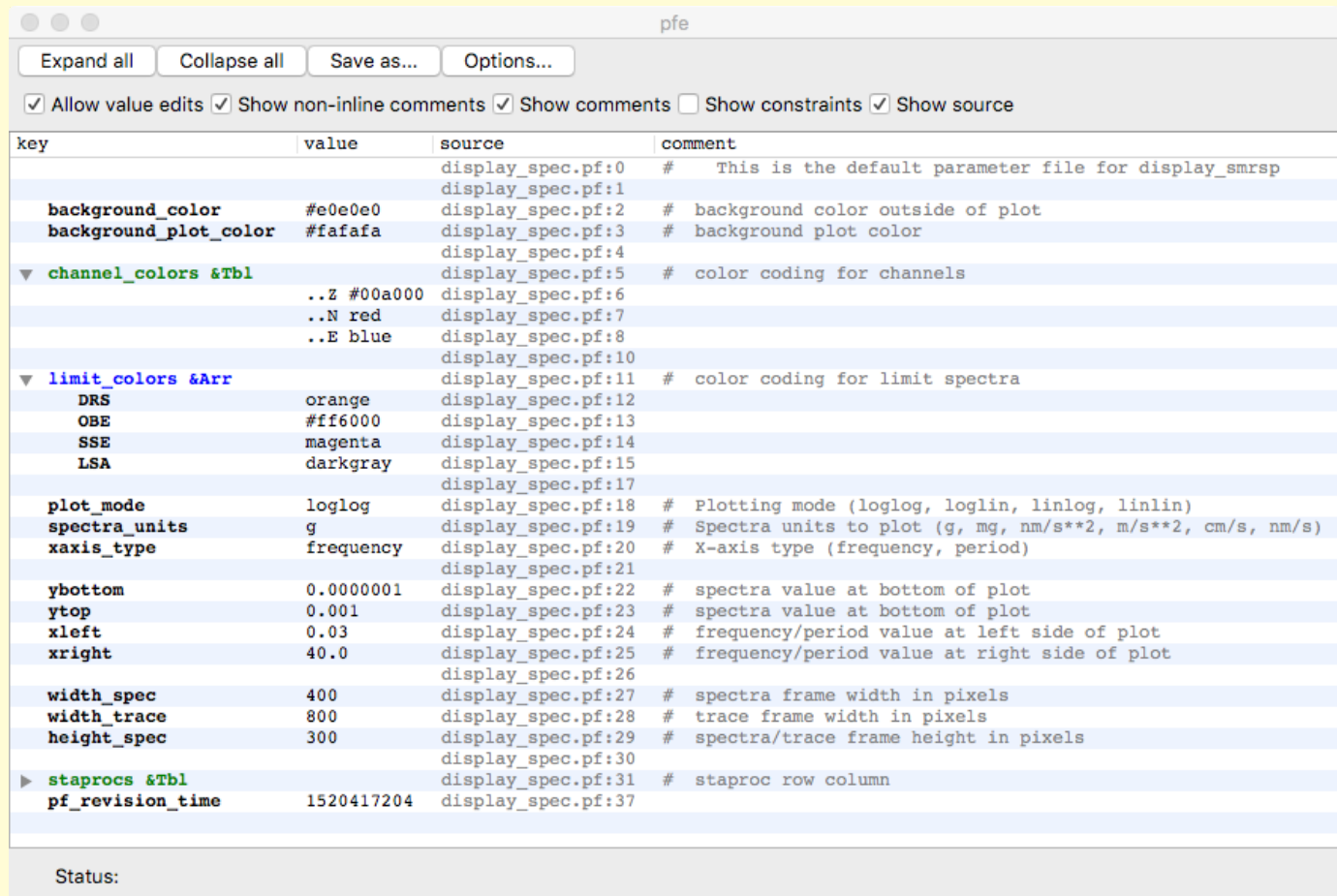
# New dbmapevents(1)

- Another rewrite of classic tool
- Qt-based graphics with all the new mapping capabilities that brings (similar to other new tools)



# new *pfe*(1)

- Rewrite of previous *pfe*(1)
- Lots of new features, to be described in upcoming talk
- Handles basic parameter-files



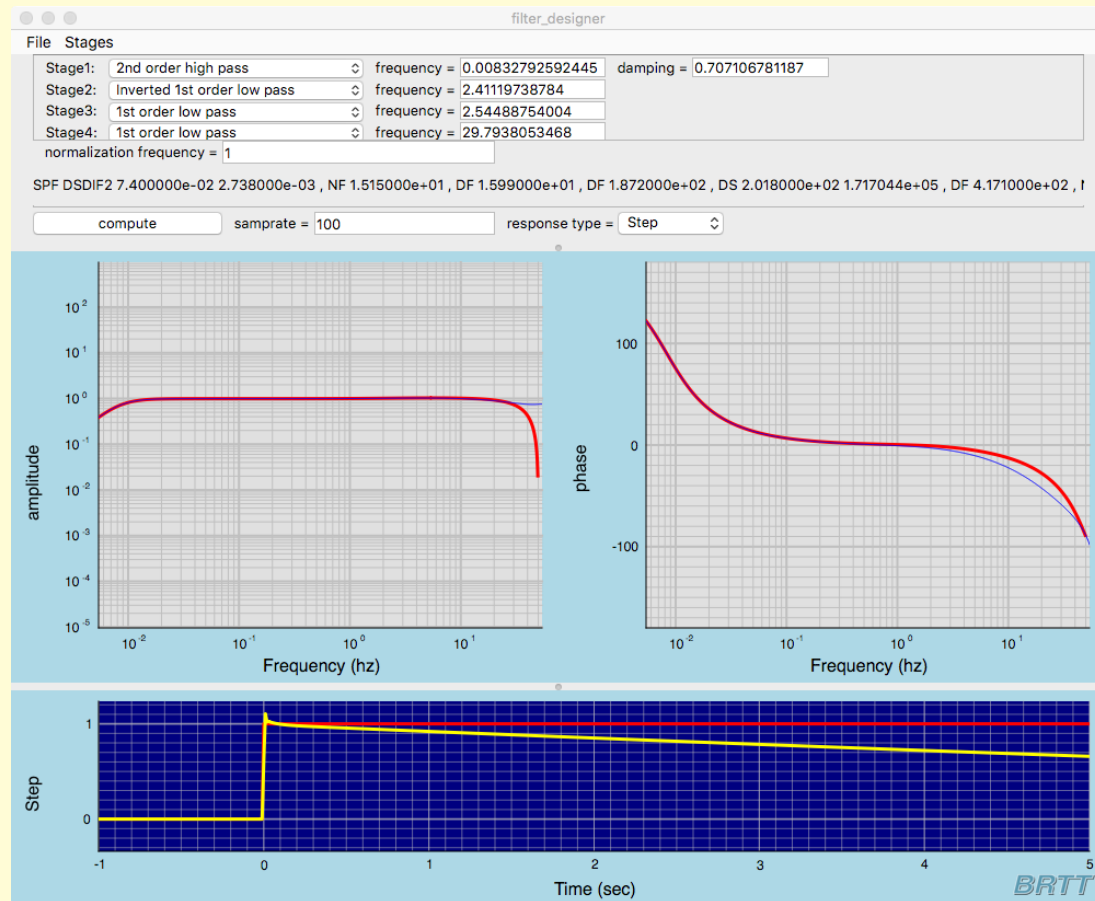
The screenshot shows a window titled 'pfe' with a table of parameters. The table has four columns: 'key', 'value', 'source', and 'comment'. The parameters are listed in a table format with some rows expanded to show sub-parameters.

key	value	source	comment
		display_spec.pf:0	# This is the default parameter file for display_smrsp
		display_spec.pf:1	
background_color	#e0e0e0	display_spec.pf:2	# background color outside of plot
background_plot_color	#fafafa	display_spec.pf:3	# background plot color
		display_spec.pf:4	
▼ channel_colors &Tbl		display_spec.pf:5	# color coding for channels
	..Z #00a000	display_spec.pf:6	
	..N red	display_spec.pf:7	
	..E blue	display_spec.pf:8	
		display_spec.pf:10	
▼ limit_colors &Arr		display_spec.pf:11	# color coding for limit spectra
DRS	orange	display_spec.pf:12	
OBE	#ff6000	display_spec.pf:13	
SSE	magenta	display_spec.pf:14	
LSA	darkgray	display_spec.pf:15	
		display_spec.pf:17	
plot_mode	loglog	display_spec.pf:18	# Plotting mode (loglog, loglin, linlog, linlin)
spectra_units	g	display_spec.pf:19	# Spectra units to plot (g, mg, nm/s**2, m/s**2, cm/s, nm/s)
xaxis_type	frequency	display_spec.pf:20	# X-axis type (frequency, period)
		display_spec.pf:21	
ybottom	0.0000001	display_spec.pf:22	# spectra value at bottom of plot
ytop	0.001	display_spec.pf:23	# spectra value at bottom of plot
xleft	0.03	display_spec.pf:24	# frequency/period value at left side of plot
xright	40.0	display_spec.pf:25	# frequency/period value at right side of plot
		display_spec.pf:26	
width_spec	400	display_spec.pf:27	# spectra frame width in pixels
width_trace	800	display_spec.pf:28	# trace frame width in pixels
height_spec	300	display_spec.pf:29	# spectra/trace frame height in pixels
		display_spec.pf:30	
▶ staprocs &Tbl		display_spec.pf:31	# staproc row column
pf_revision_time	1520417204	display_spec.pf:37	

Status:

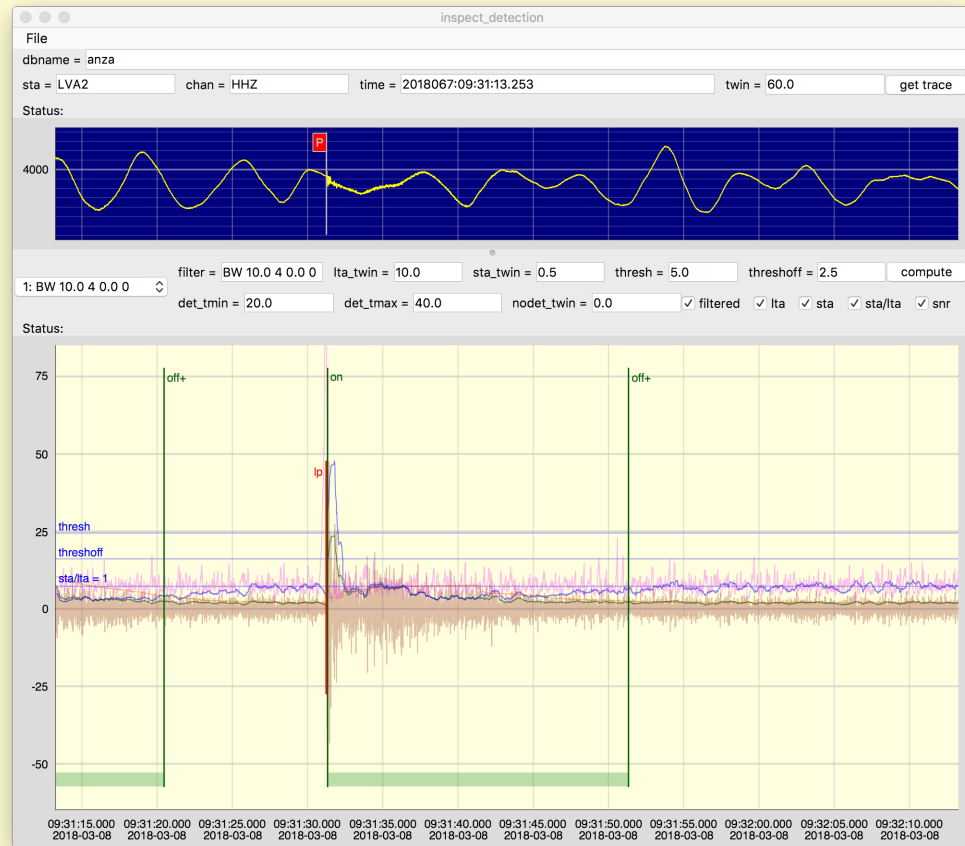
# filter\_designer(1)

- Sophisticated filter-visualization and filter-design tool
- Detailed features to be described in upcoming talk



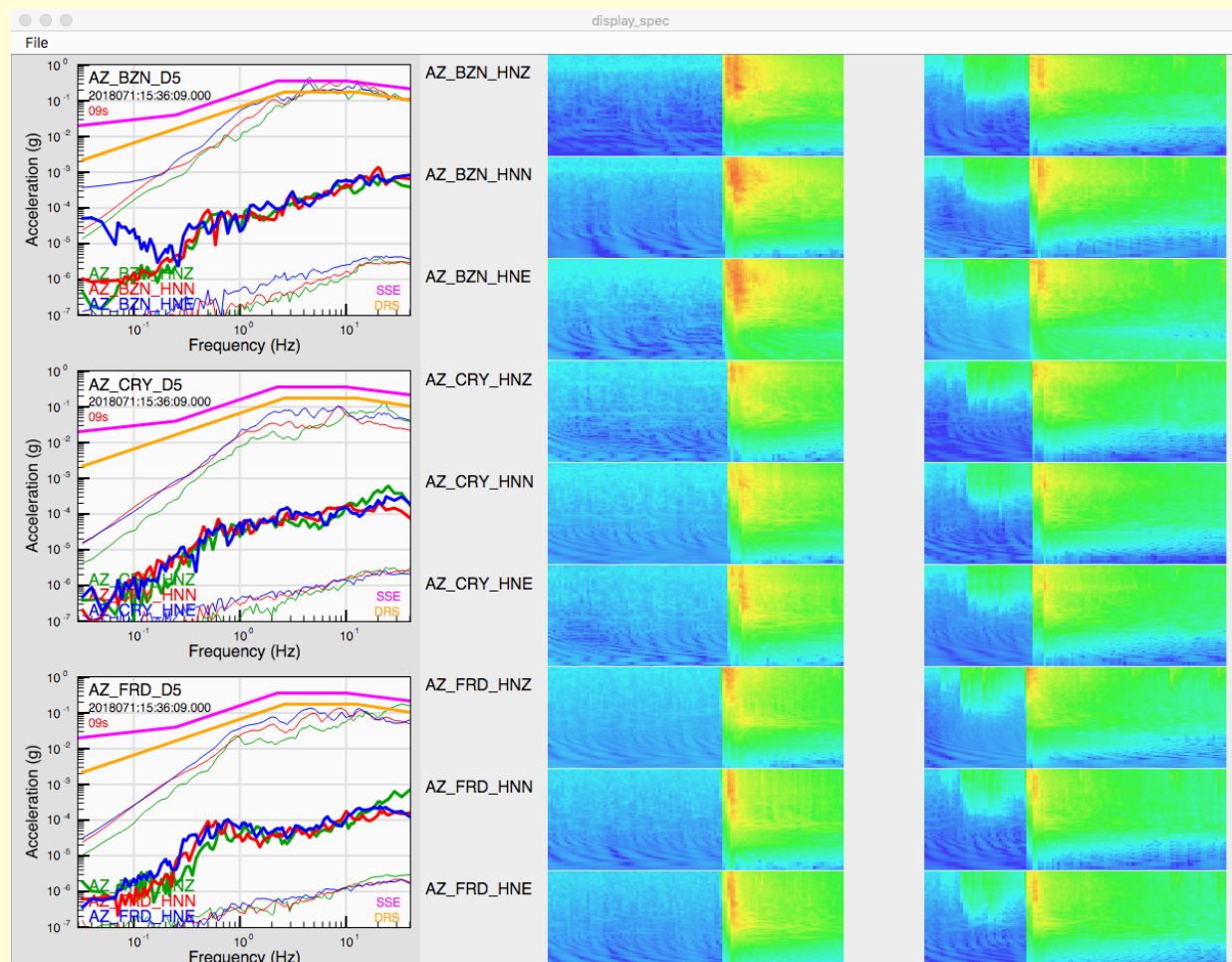
# *inspect\_detection(1)*

- View the effects of ***dbdetect(1)*** and ***orbdetect(1)*** parameter settings
- Tune detection for optimal performance with your network and your seismic setting
- Detailed features to be described in upcoming talk



# display\_spec(1)

- Completely rewritten tool to display real-time streaming spectral processing and monitoring
- Part of *Bighorn* monitoring system included with *Antelope*
- Detailed features to be described in upcoming talk



# Plans for Coming Development Year

- Further:
  - *Comments ?*
  - *Suggestions ?*
  - *Requests ?*





Thank You!

Questions?