Sonic Visualiser

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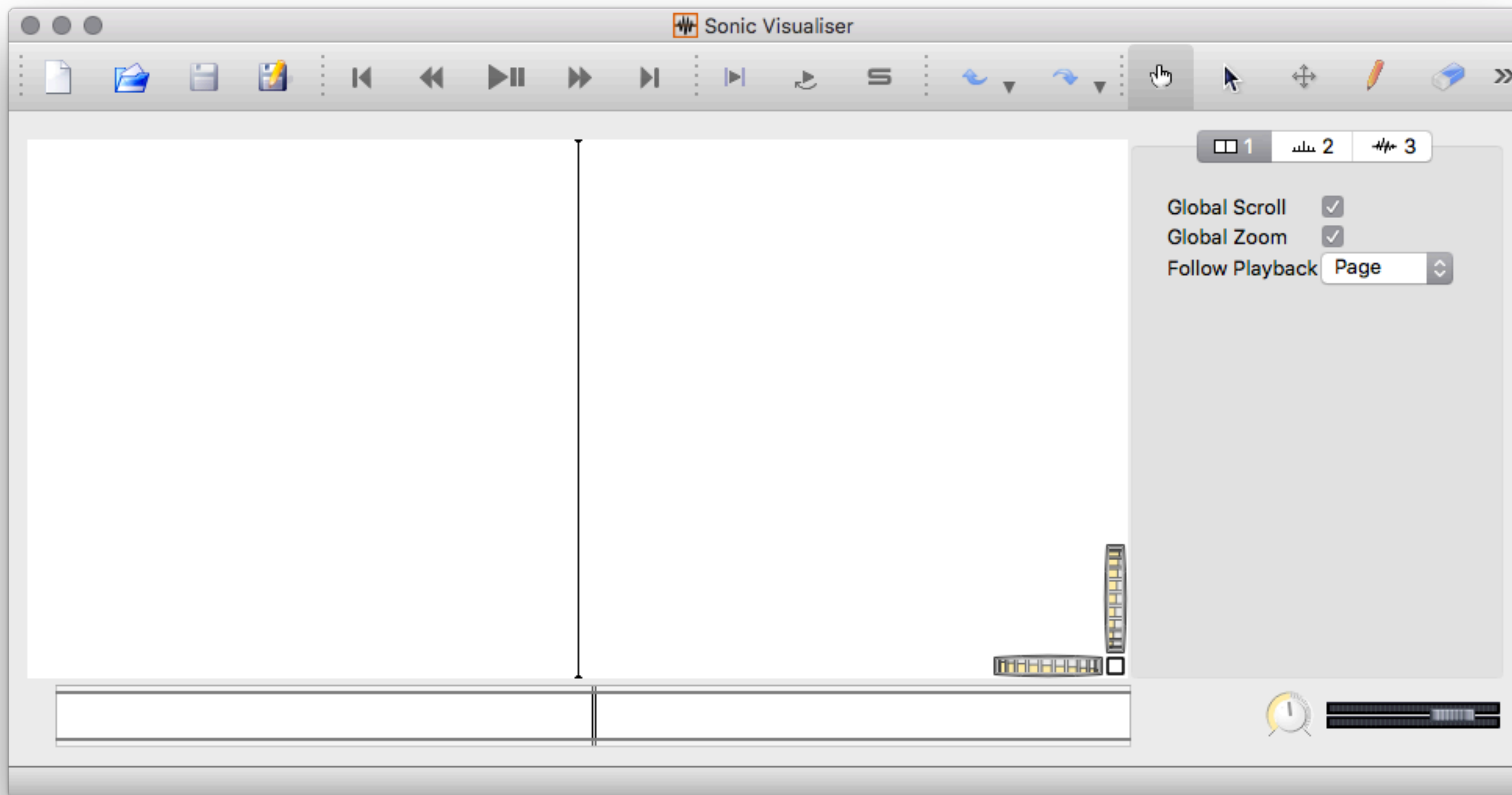
Website

http://www.sonicvisualiser.org

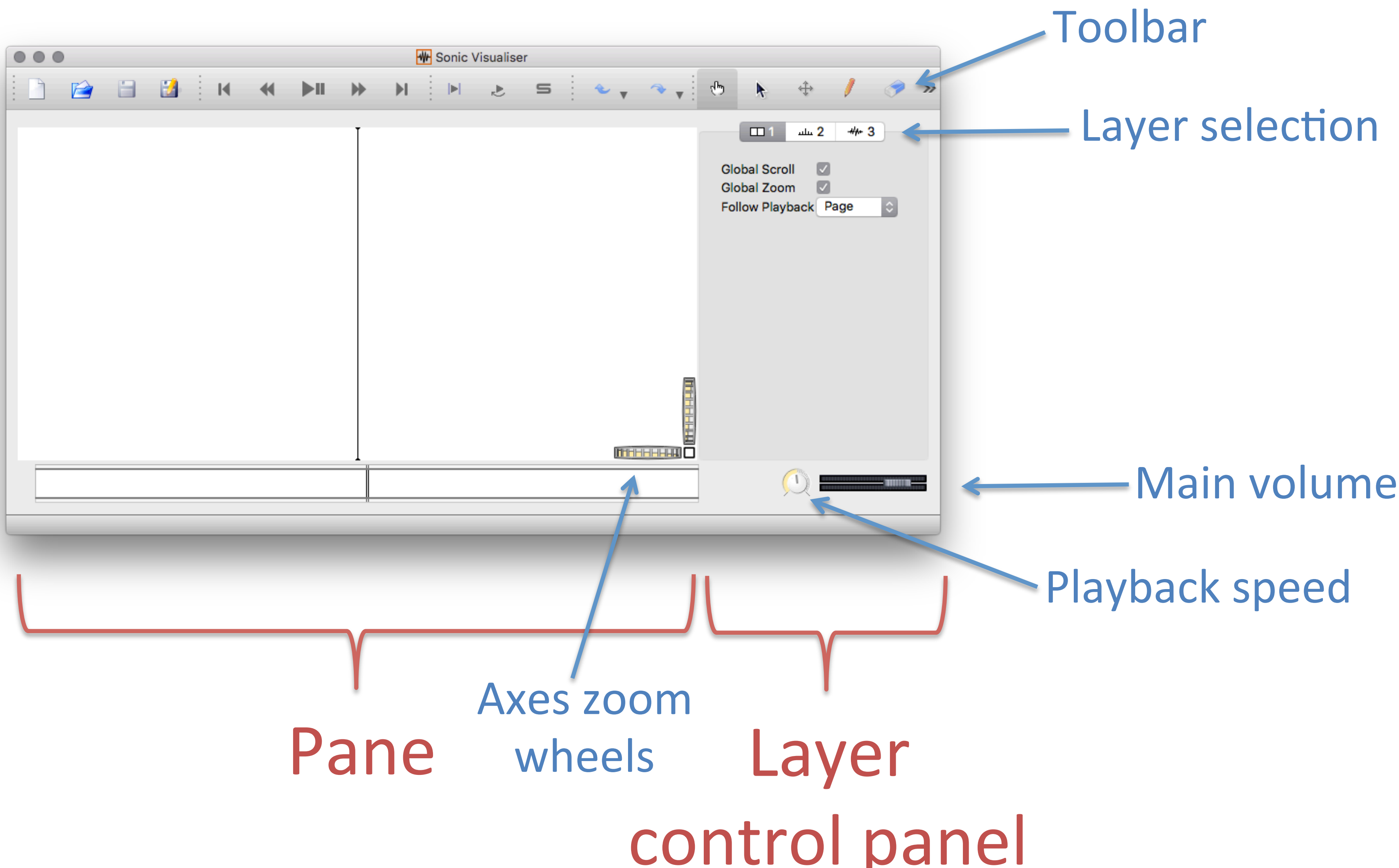
http://www.sonicvisualiser.org/download.html

	Linux	OS/X	Windows
Version 2.5	Download 64-bit Linux package for Ubuntu 14.04	Download 64-bit Intel binary for OS/X 10.6 or newer	Download Windows installer
	For older versions, other platforms, and source code, see the Sonic Visualiser code project download page.		

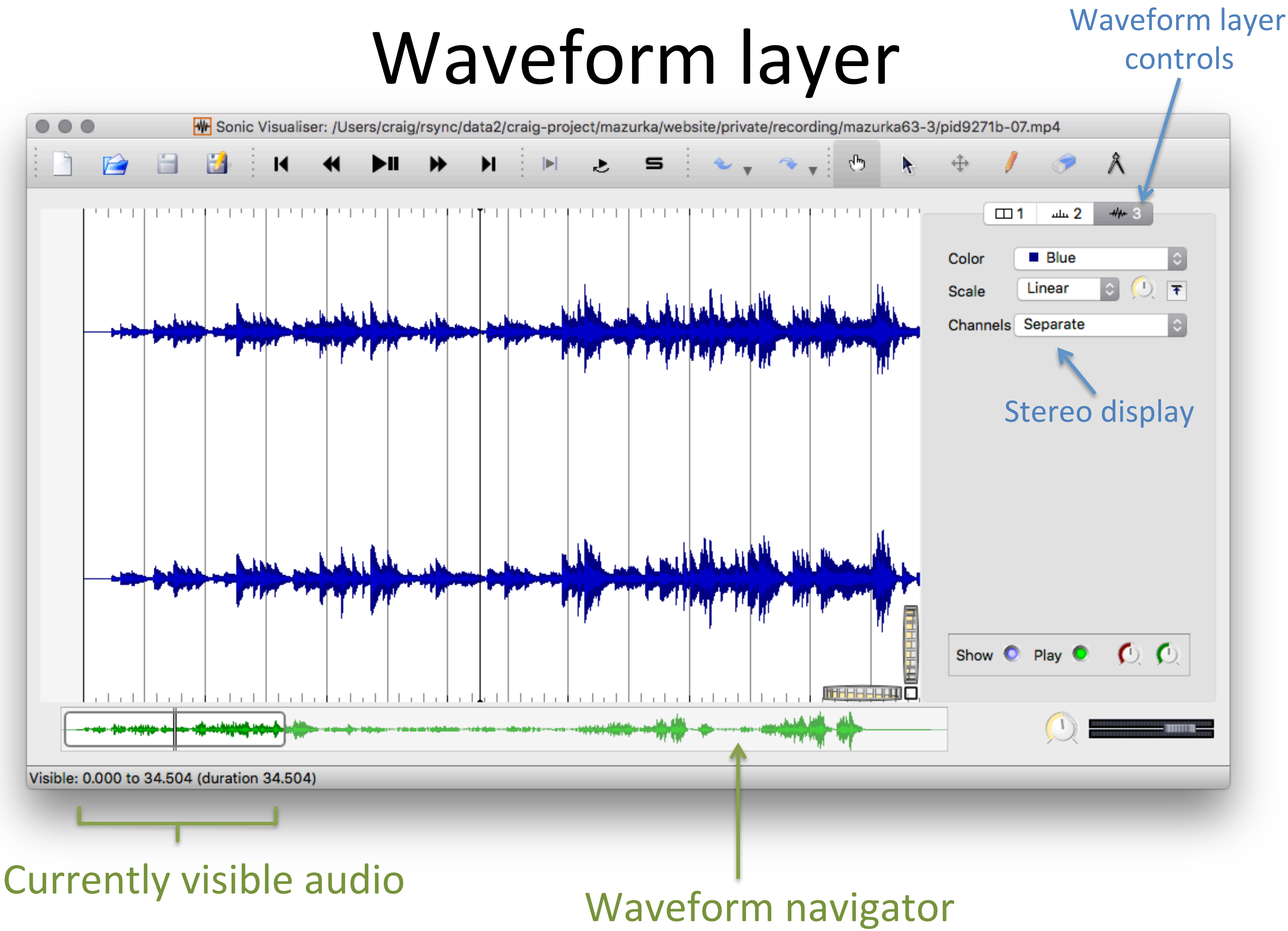
SV window


Sonic Visualiser
1
2
3
Global Scroll
Global Zoom
Follow Playback
Page

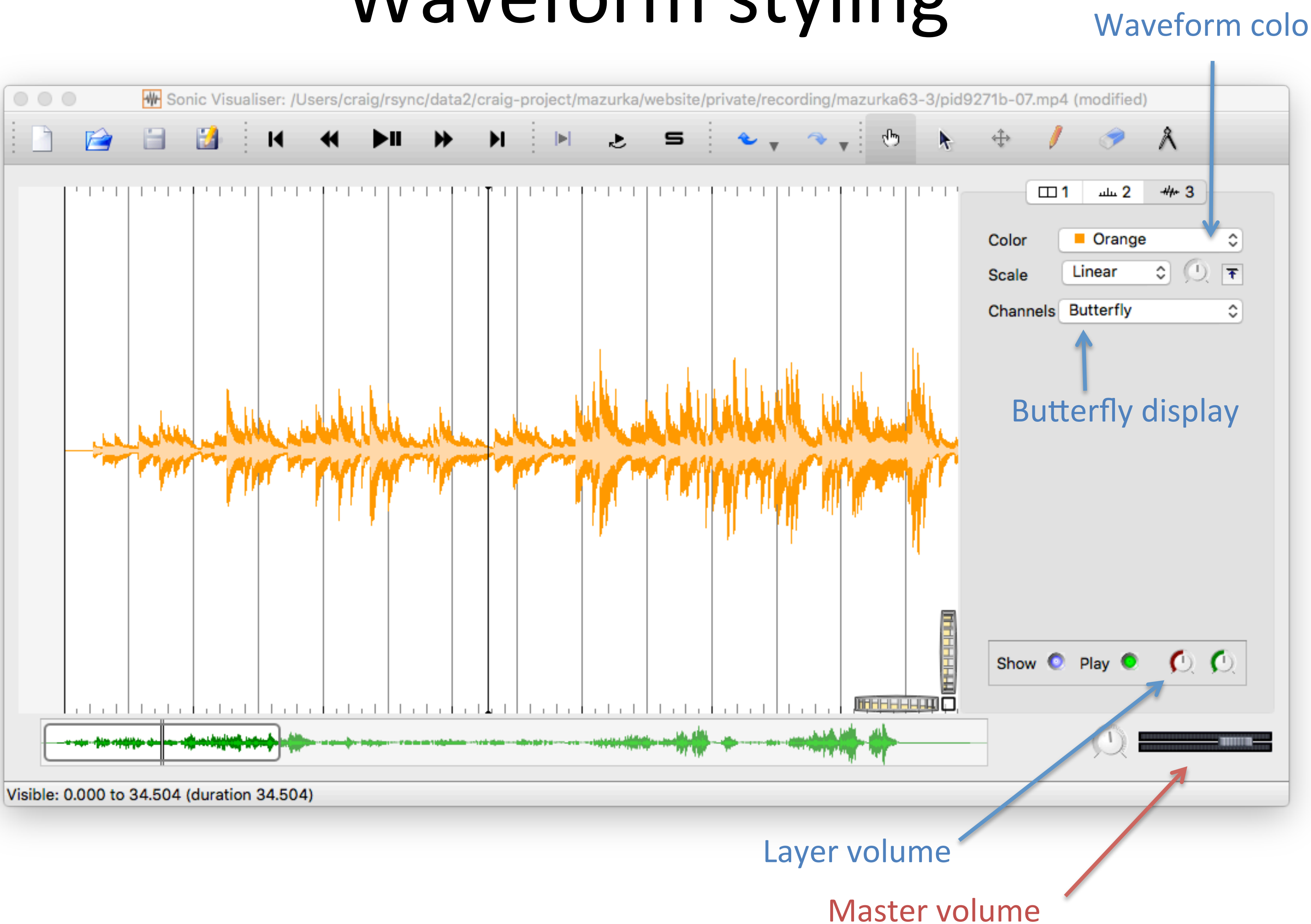
SV window main components



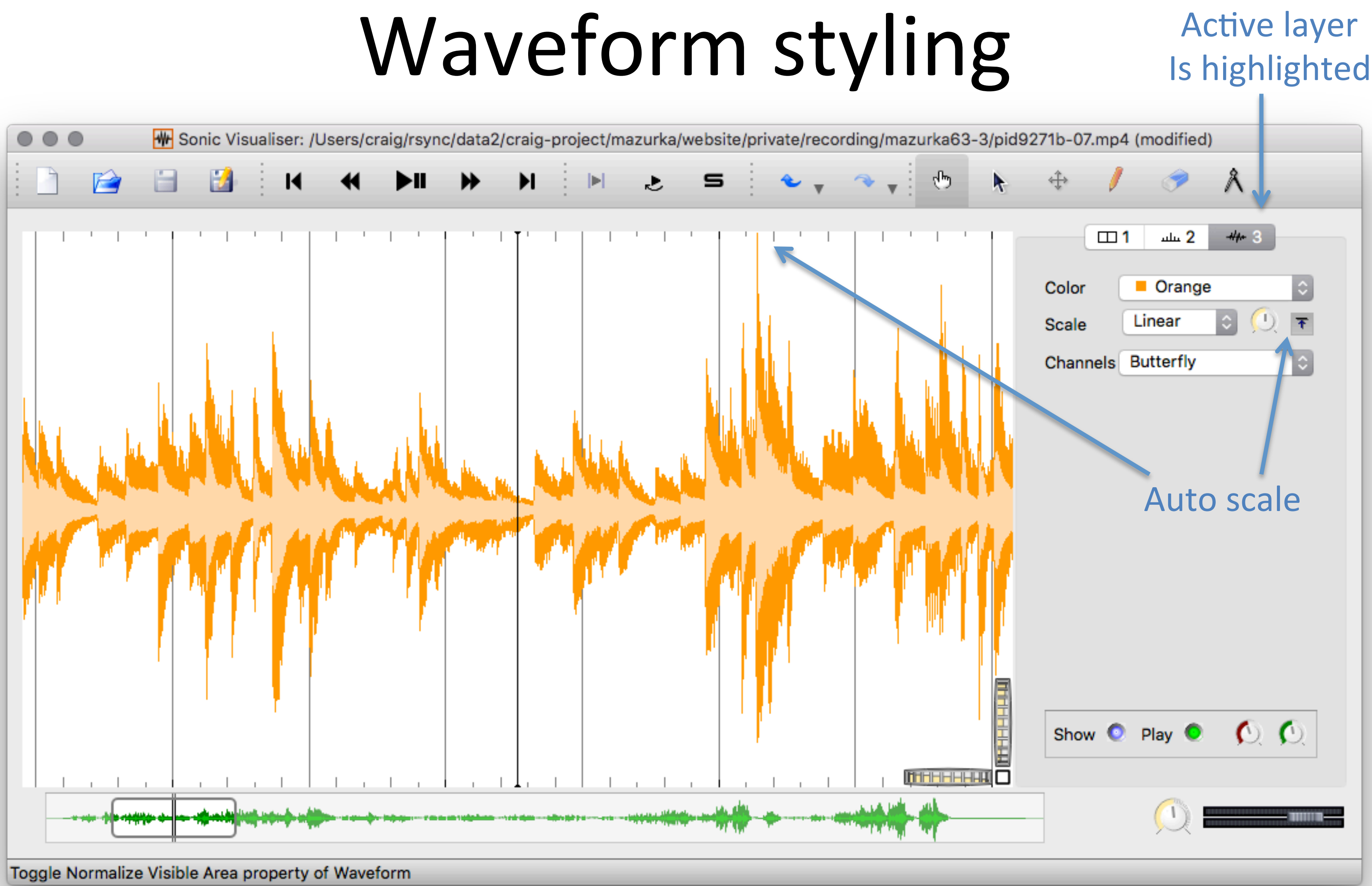
Waveform layer



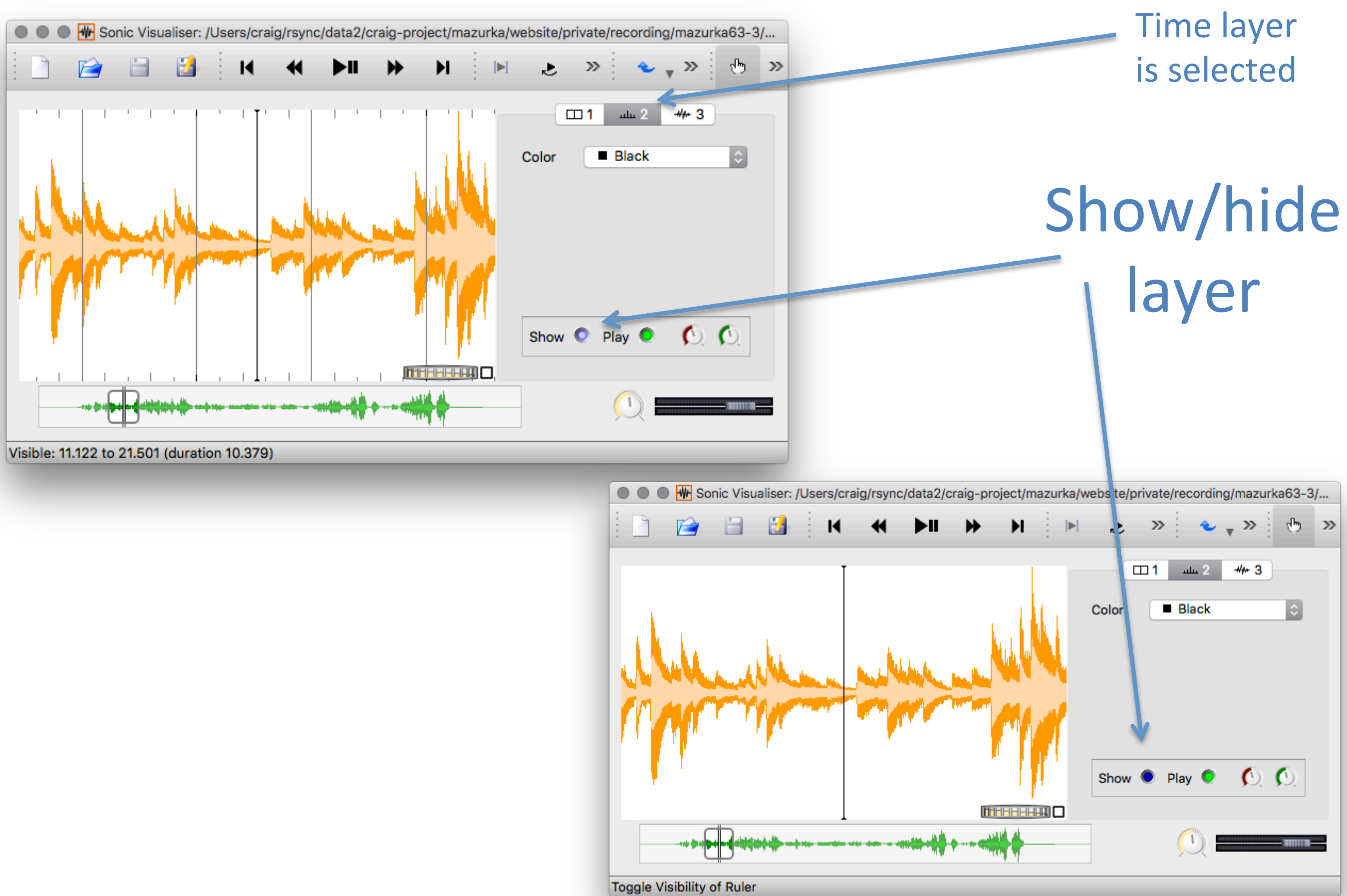
Waveform styling



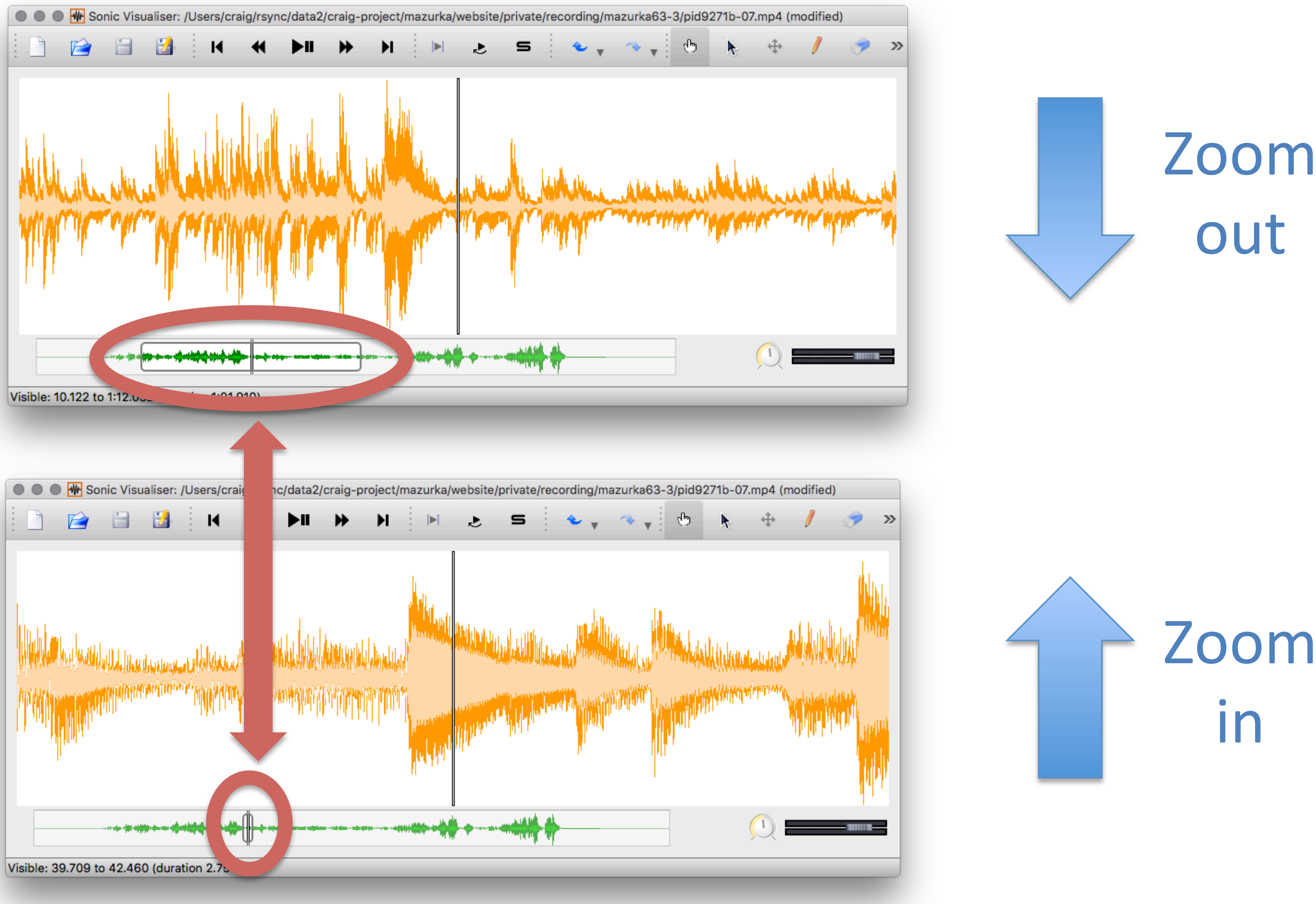
Waveform styling



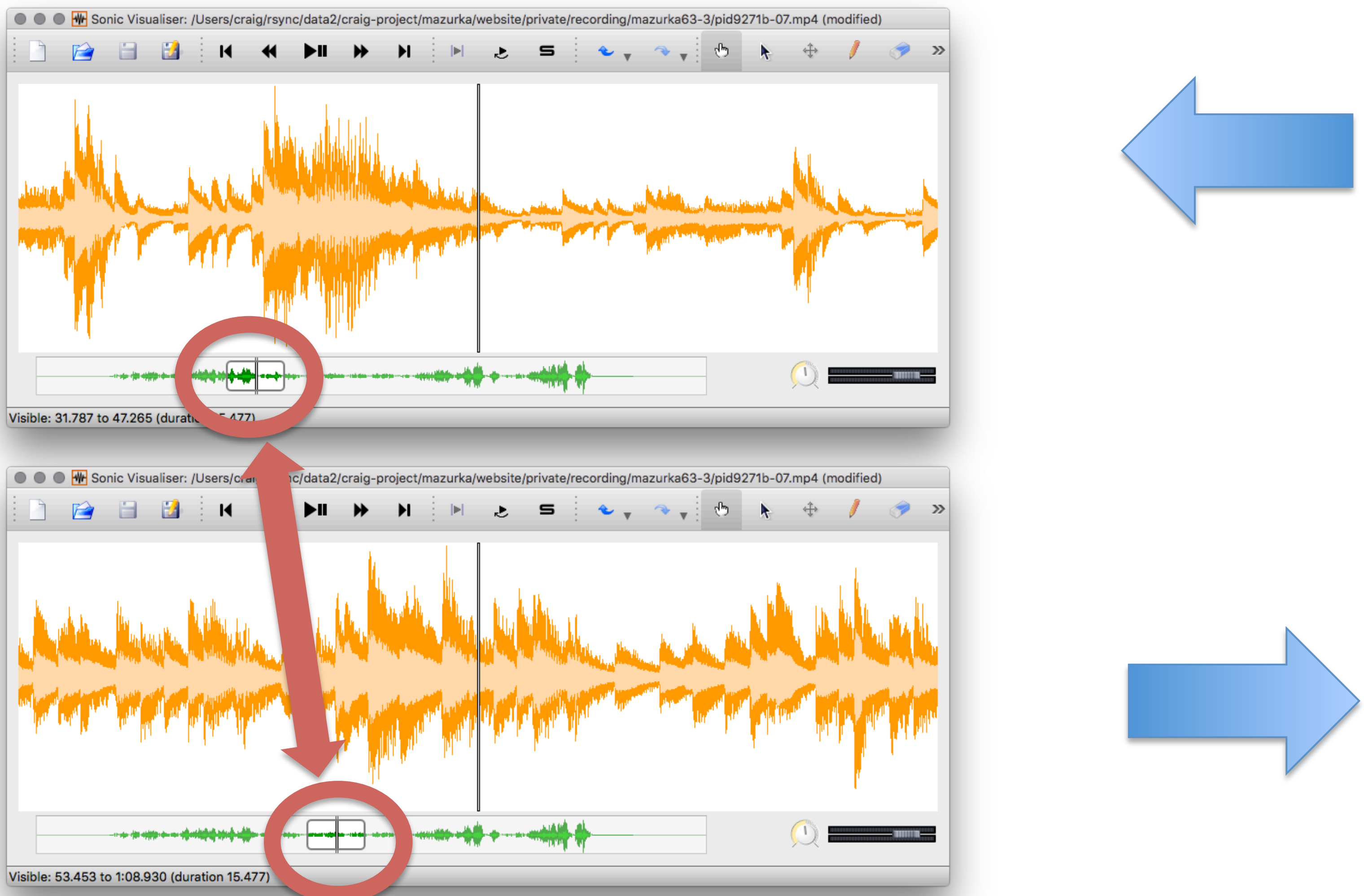
Time-ruler layer



Zoom in/out with arrow keys



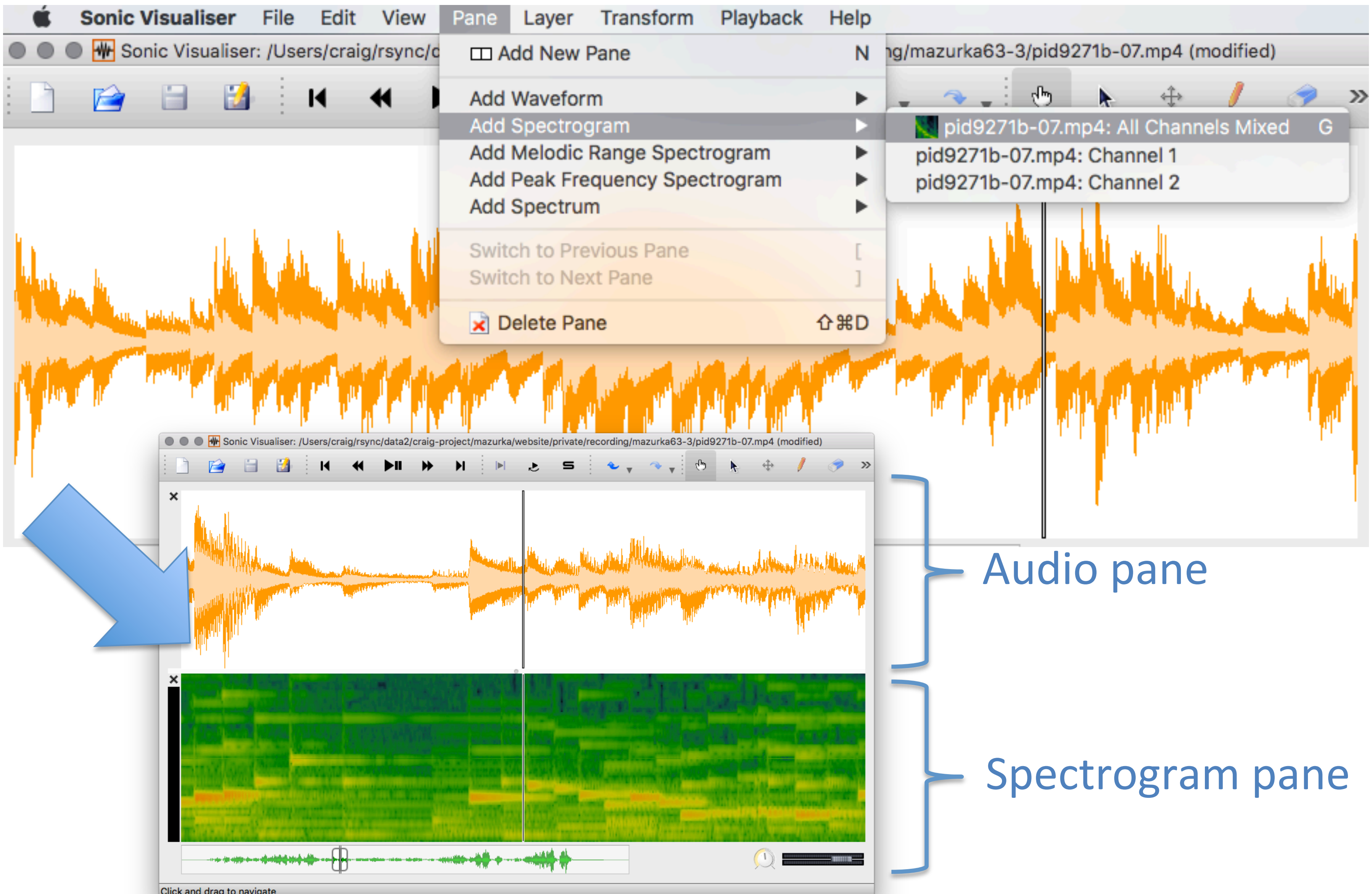
Panning with arrow keys



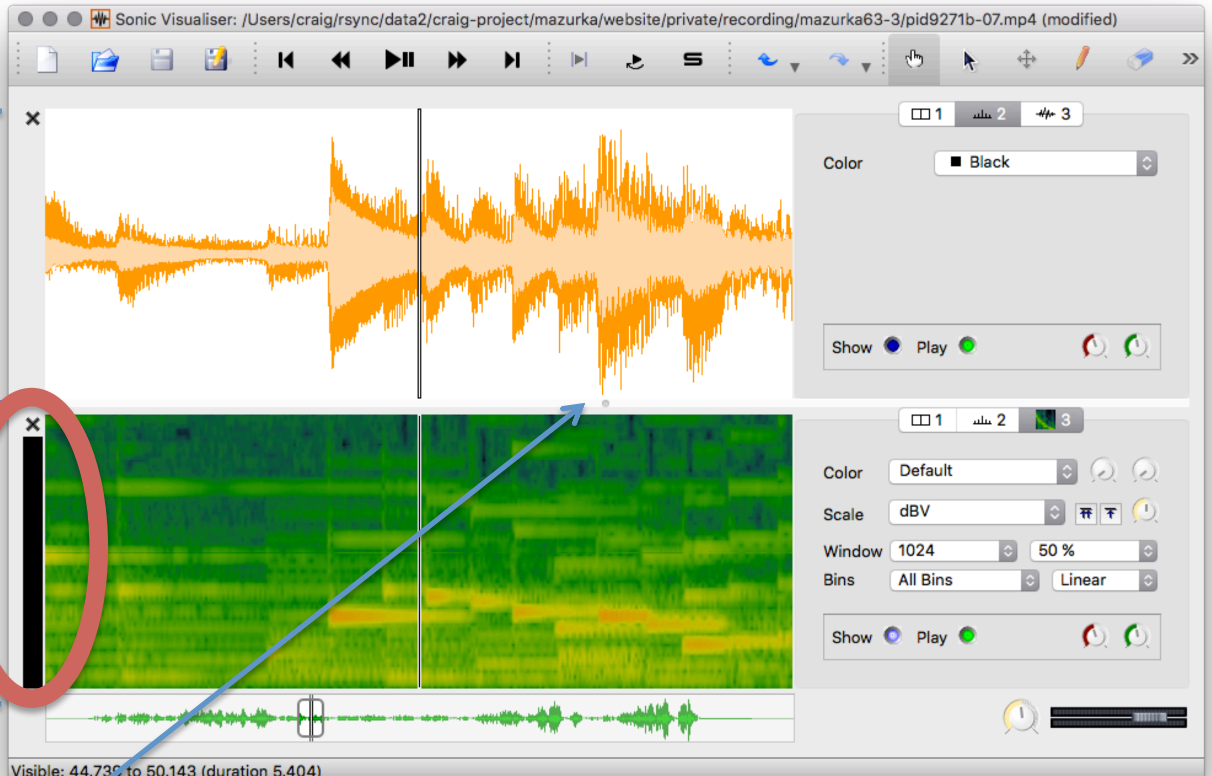
Move left

Move right

Spectrogram



Panes vs. Layers



Pane 1

Pane 2

Active pane

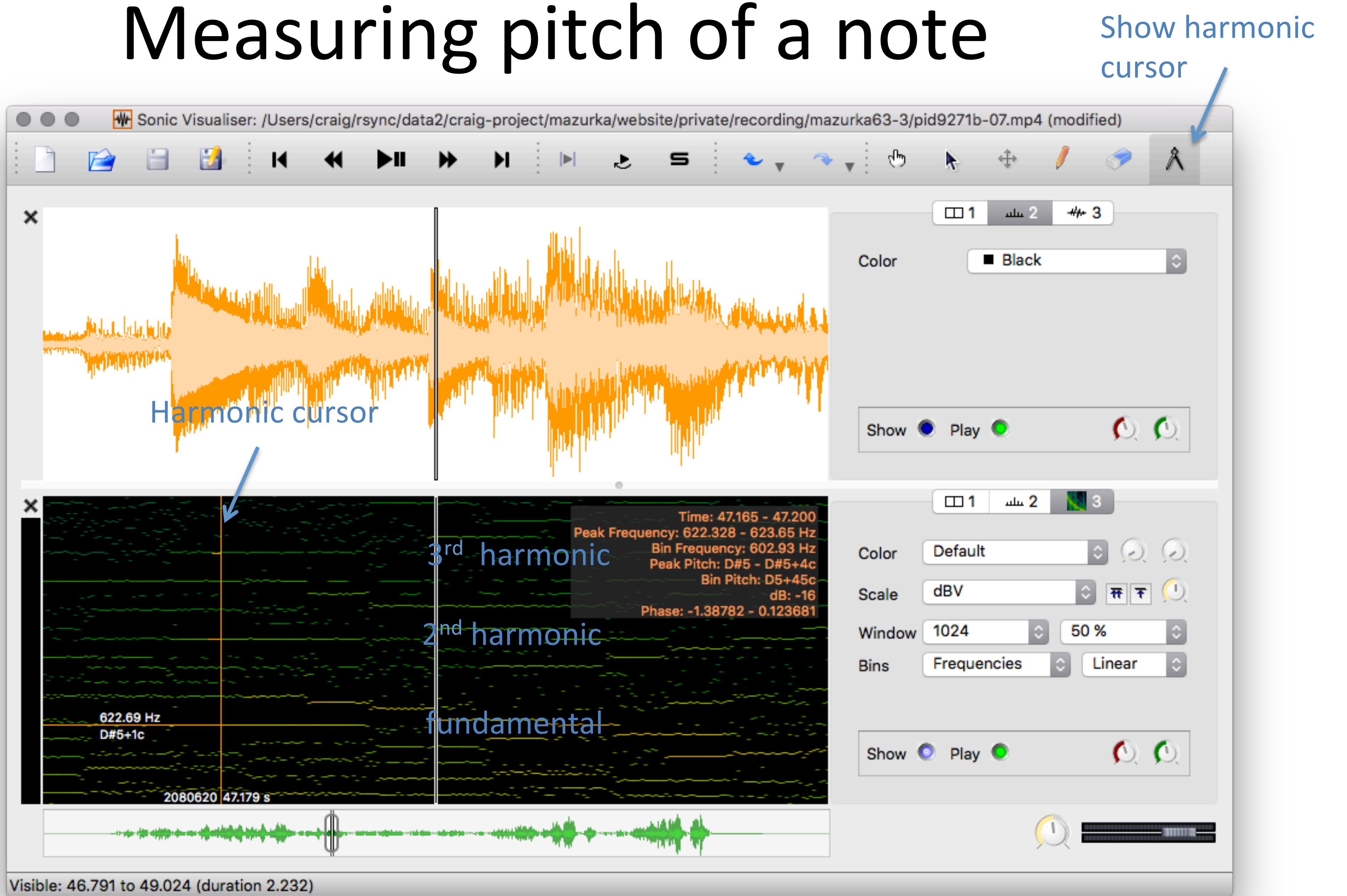
Layer controls for Pane 1

Layer controls for Pane 2

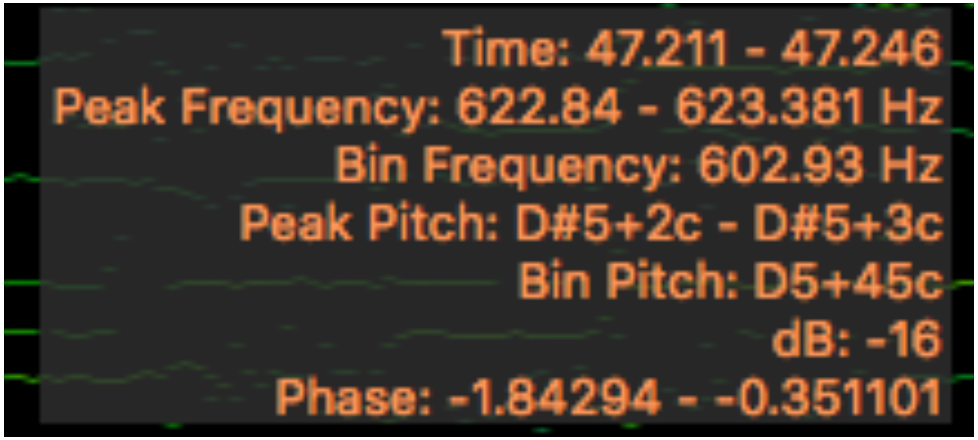
Slider bar to adjust relative height of panes

X key toggles control panel displays

Measuring pitch of a note



Reading pitch



Ignore "Bin Frequency" and "Bin Pitch". Theses are not physical measurements, but rather related to analysis window settings.

Musical Pitch is "Peak Pitch" field

D#5+2c – D#5+3c

Meaning: D#5 (15 semitones above middle C), in the range from +2 center to +3 cents from Equal tempered tuning referenced at A440.

Corresponds to "Peak Frequency: 622.84-623.381 Hz"

Vamp Plugins

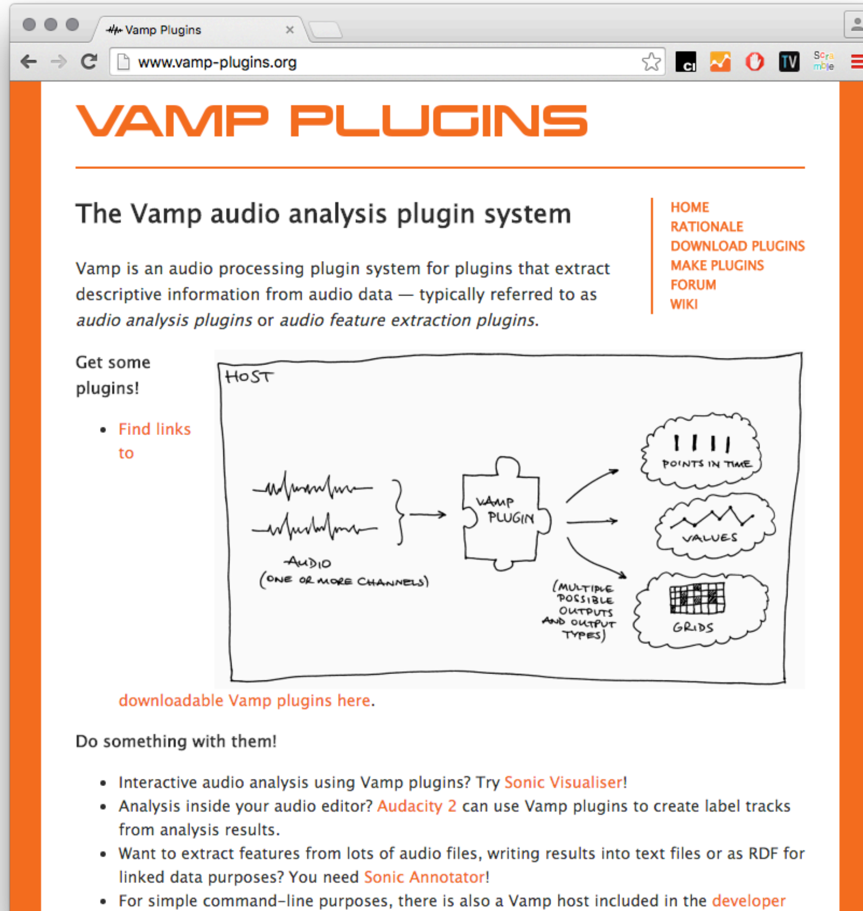
http://www.vamp-plugins.org

Audio processing tools

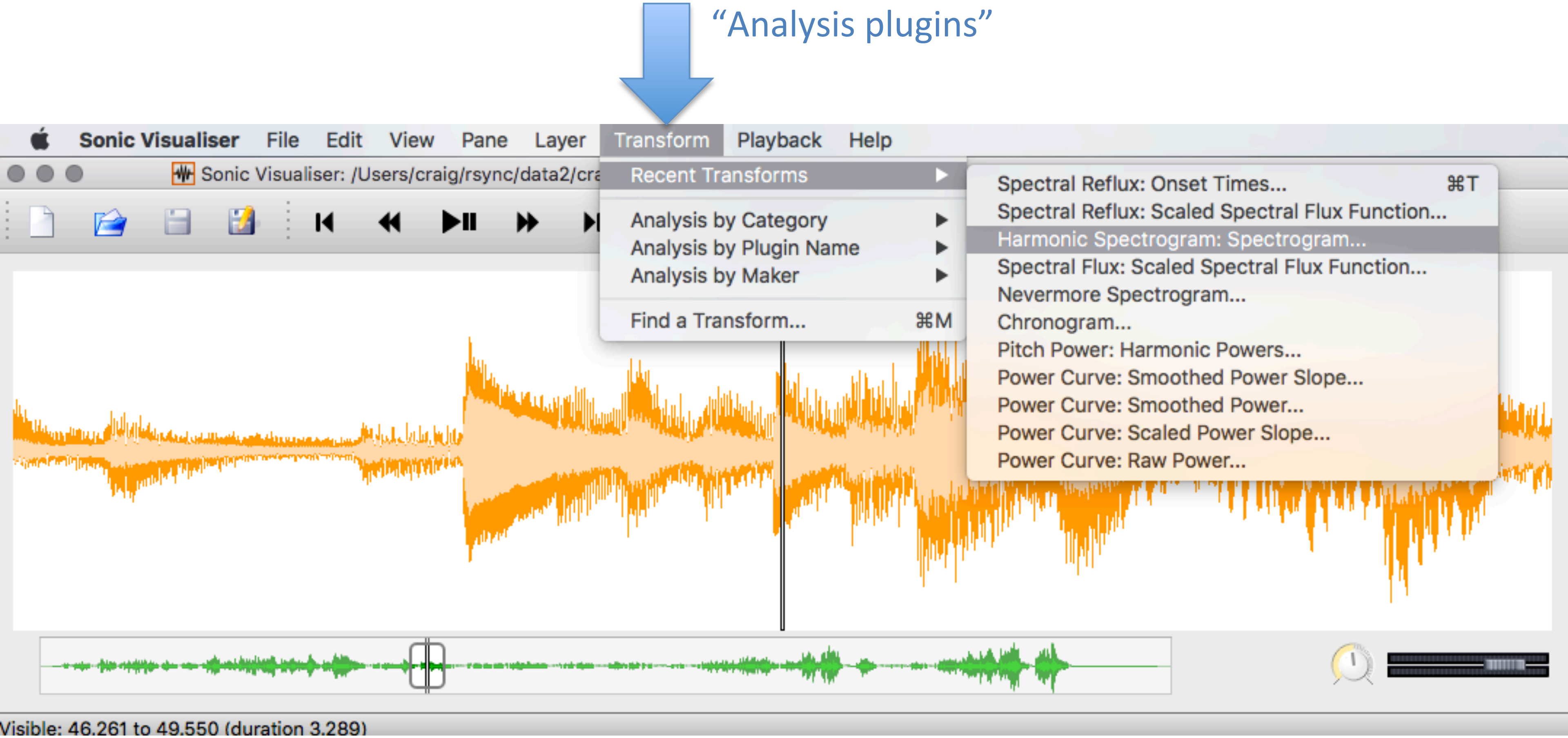
accessed from the "Transform"

menu at the top of the Sonic

Visualiser Window.



Transforms menu



Vamp Plugin installation

http://www.vamp-plugins.org/download.html#install

- OS/X plugins end in “.dylib” and are placed in ~/Library/Audio/PlugIns/Vamp folder
- Windows 64-bit plugins end in “dll” and placed in C:\Program Files\Vamp Plugins
- Windows 32-bit plugins end in “.dll” and placed in C:\Program Files (x86)\Vamp Plugins
- Linux plugins end in “.so” and are placed in ~/vamp

32-bit plugins only work in 32-bit Sonic Visualiser
64-bit plugins only work in 64-bit Sonic Visualiser

Mazurka Plugins

http://sv.mazurka.org.uk

- Designed for performance data extraction in piano music
  (for the Mazurka Project at CHARM (2005–2007)

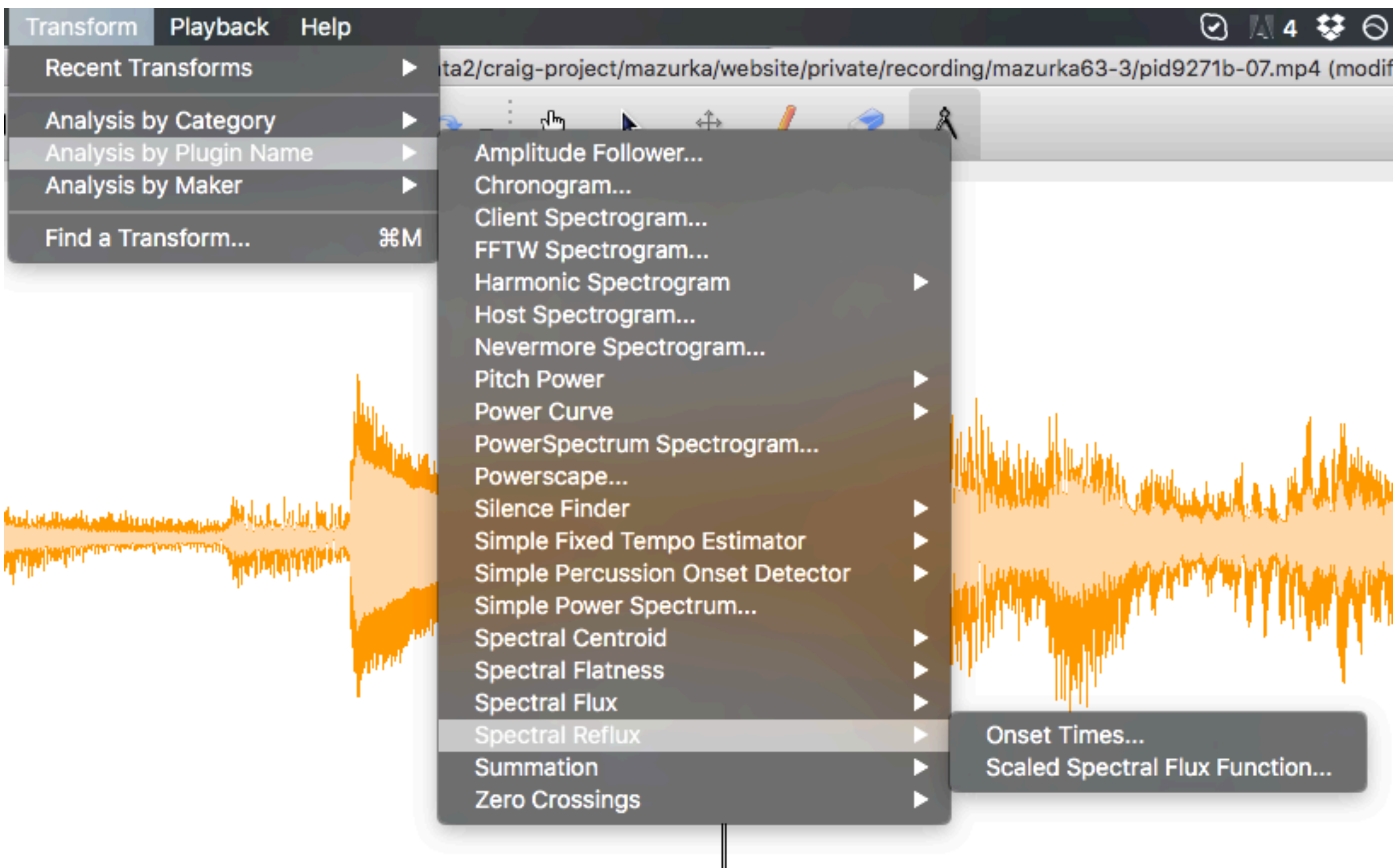
- Main data-entry plugins:
  - MzSpectralReflux – note onset detector
  - MzHarmonicSpectrum – spectrum with de-emphasis of harmonics
  - MzPowerCurve – loudness measurements (used instead of spectral reflux plugin in noisy recordings)

- Basic discussion of data entry at:
  http://wiki.ccarh.org/wiki/Op27

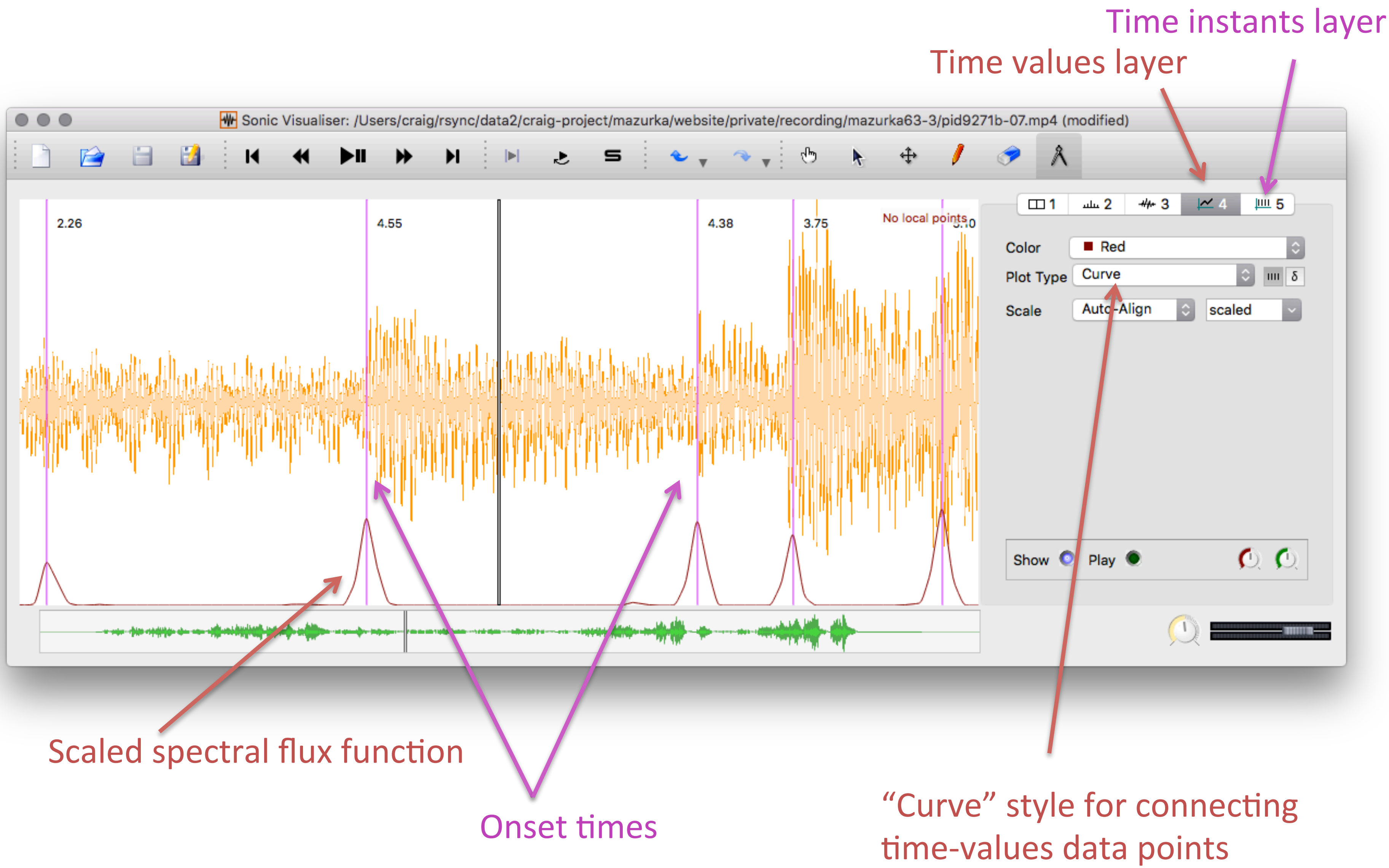
SpectralReflux plugin

Two outputs:

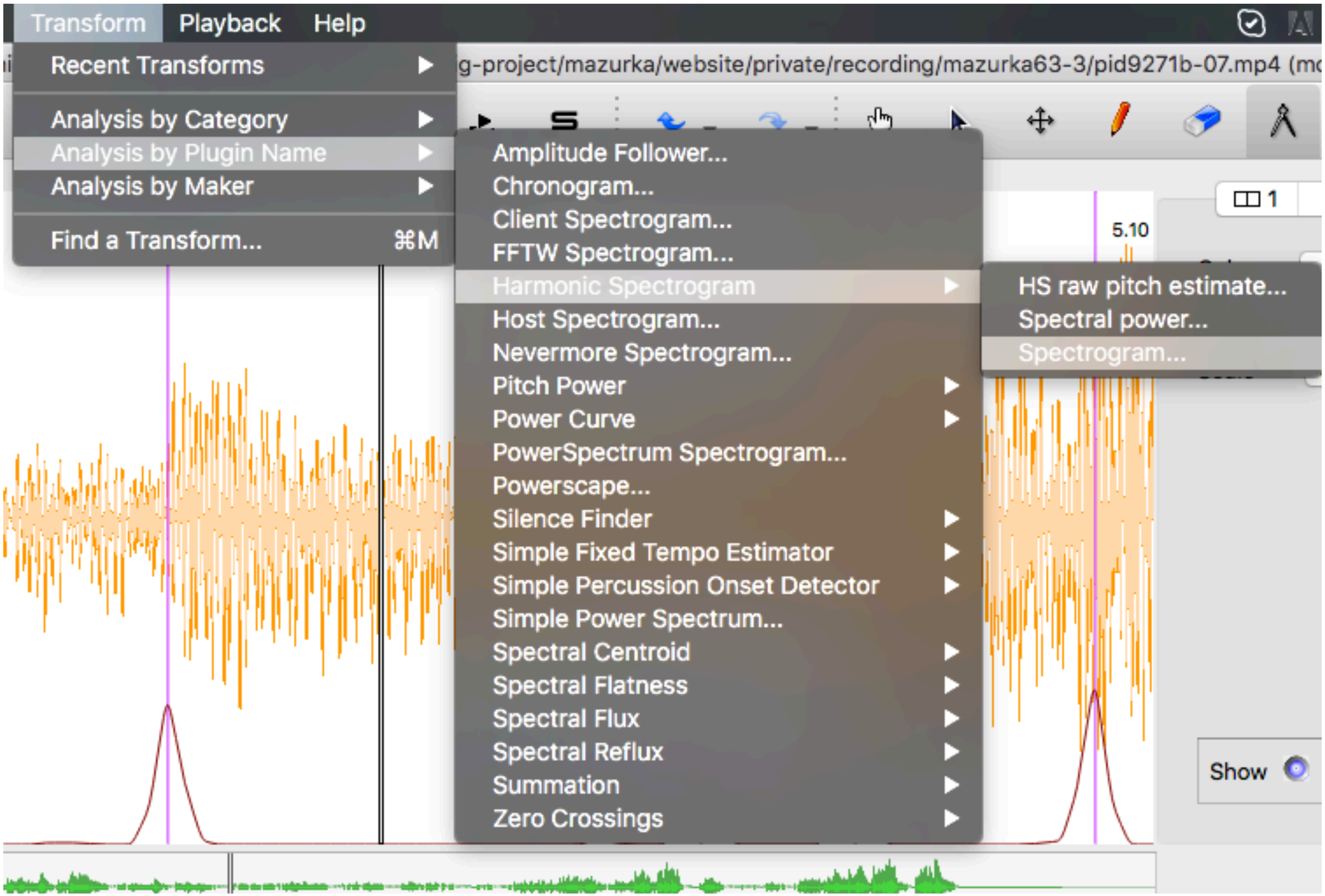
1. “Onset Times” – generates a “time instant” layer with marks at start of notes.
2. “Scaled Spectral Flux Fuction” – generates “Time values” layer which is the flux function with peaks being the detected onsets.



SpectralReflux plugin outputs



Harmonic Spectrogram plugin

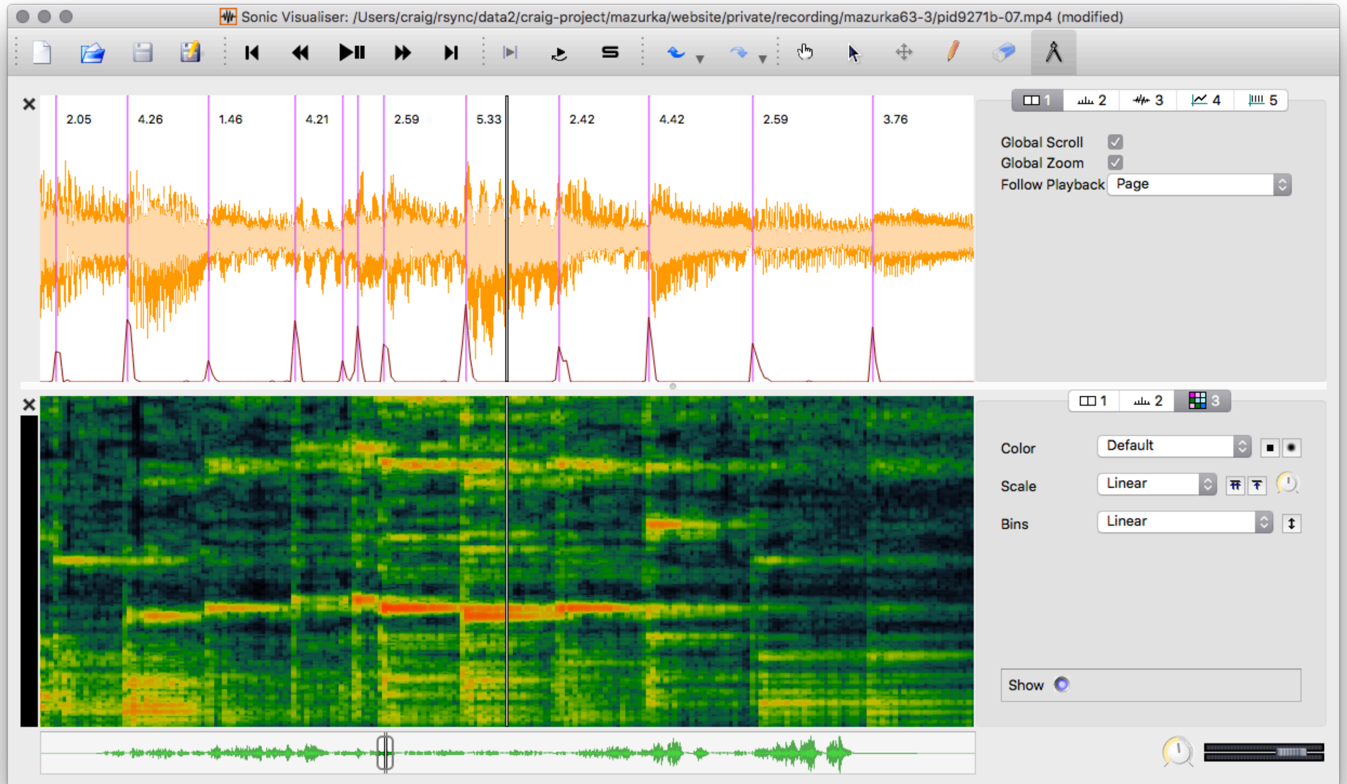


Harmonic Spectrogram: spectrogram output

1) Create new pane
(Pane → Add new pane)

2) Run Harmonic Spectrogram plugin with output "spectrogram"

3) Set the scale to "Linear" in the layer controls (usually looks better than "Log" scale).

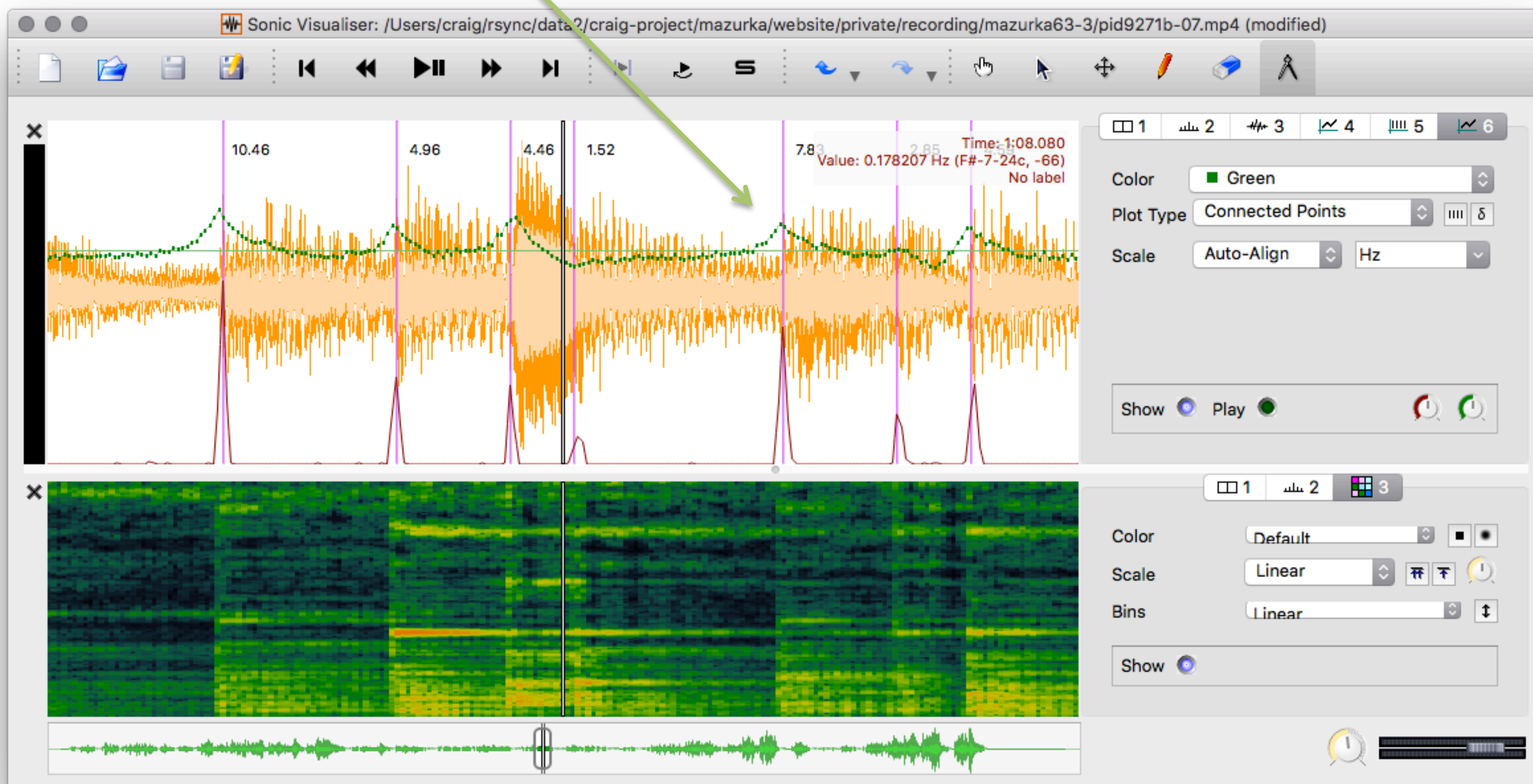


HS is useful for following the melody line and keeping track of basic pitch information.

Noisy recordings

For noisy recordings, use PowerCurve: scaled power slope plugin is useful for onset IDs.

PowerCurve: scaled power slope



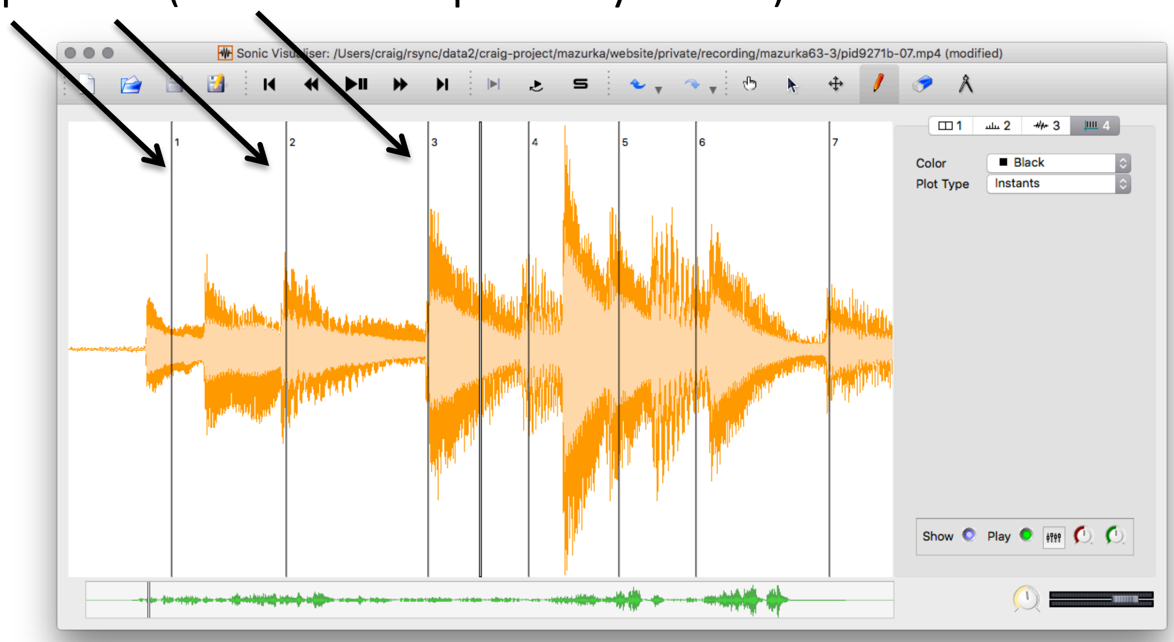
Tapping

Users can insert time instants while listening to the audio.

Press “;” key to insert a time instant at the current audio position.

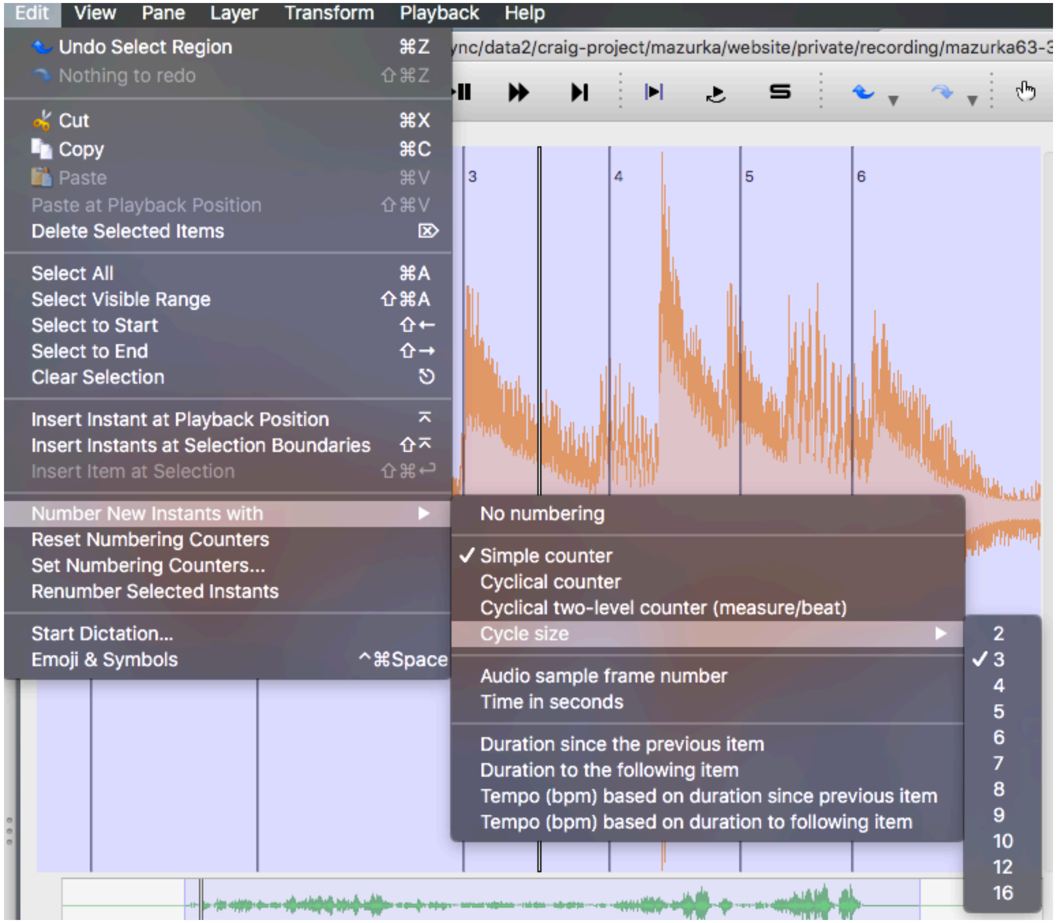
Usually best to create empty time instant layer first
(but one will be auto-created at time of first tap).

Tap marks (numbered sequentially from 1)



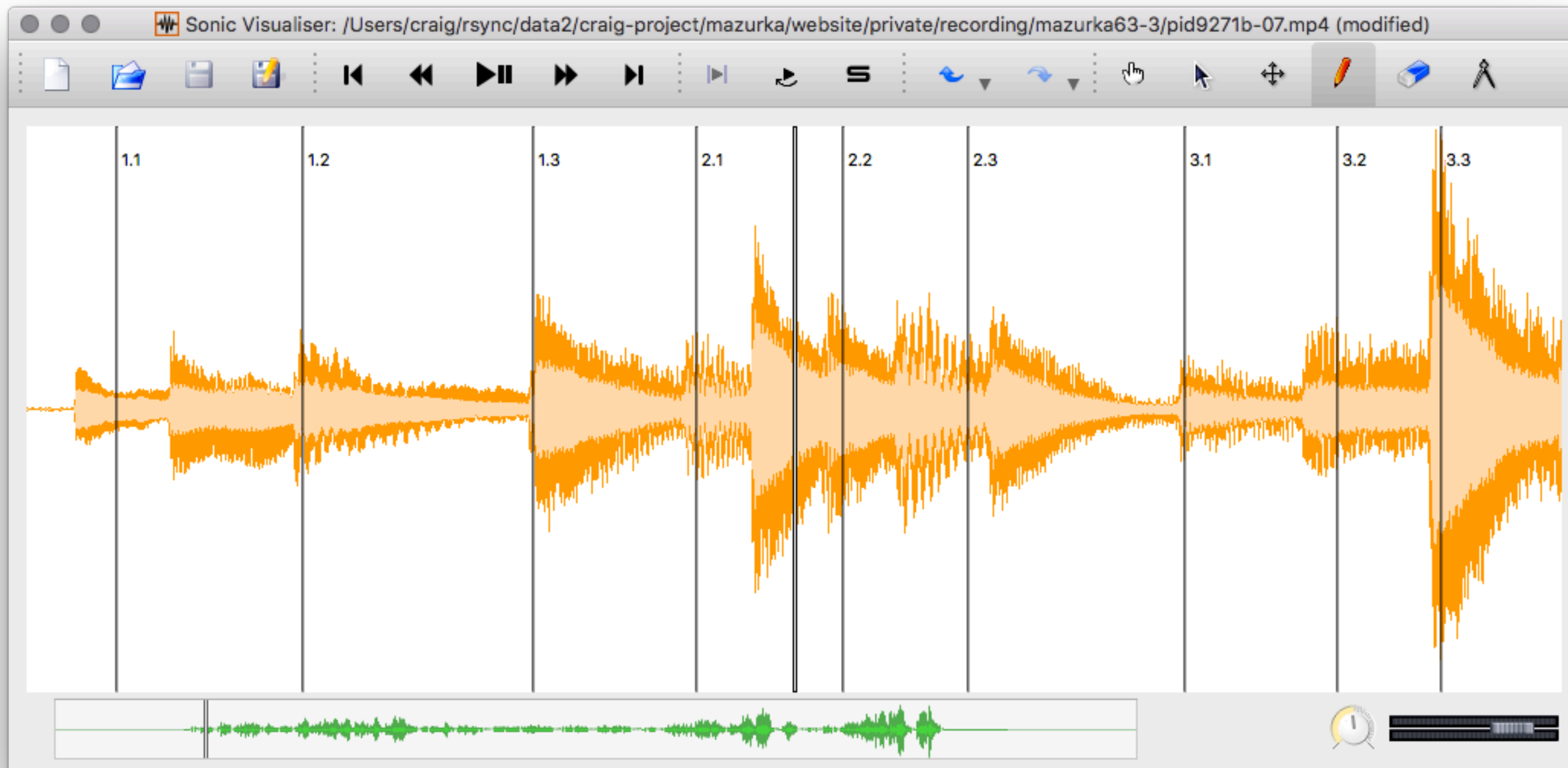
Cyclical counter labels

Choose cycle size: Edit → Number New Instants with → Cycle size → 3

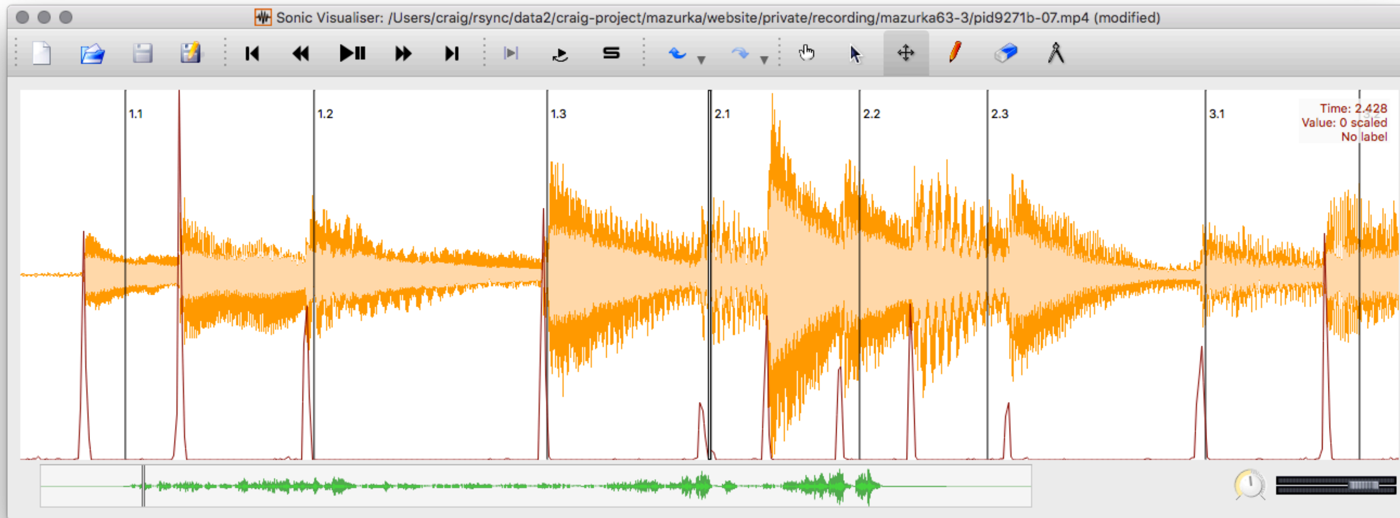


Cyclical counter labels

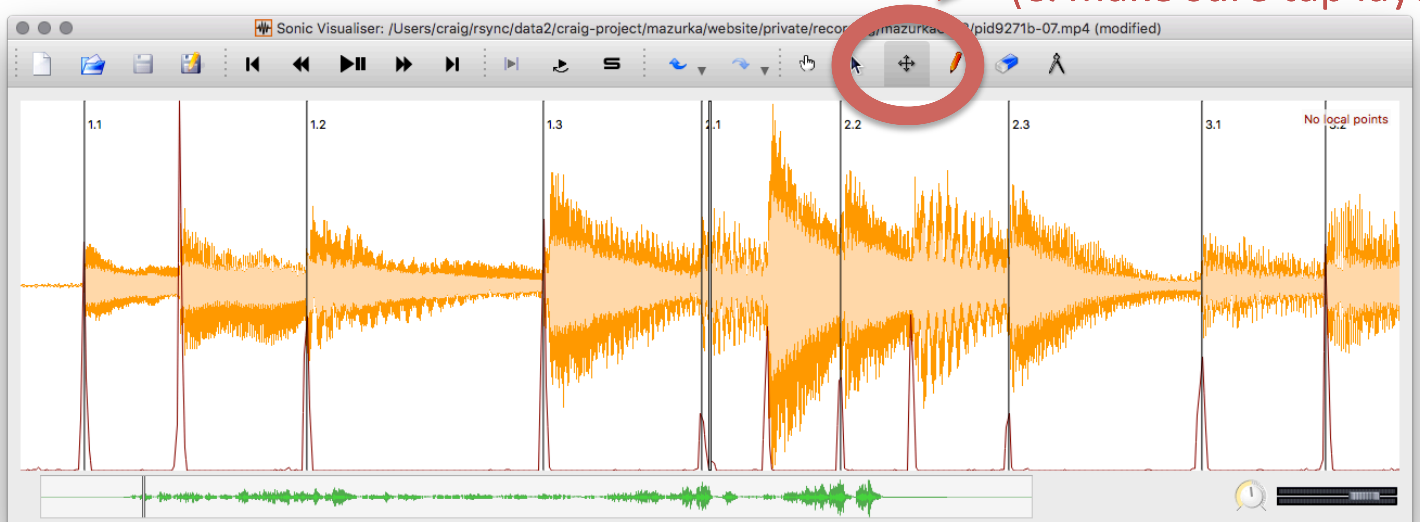
Choose cycle size: Edit → Number New Instants with → Cycle size → 3
Then select: Edit → Number New Instants → Cyclical two-level counter (measure/beat)
Then select all time instants in layer (Control-A or Command-A)
Then choose: Edit → Renumber Selected Instants



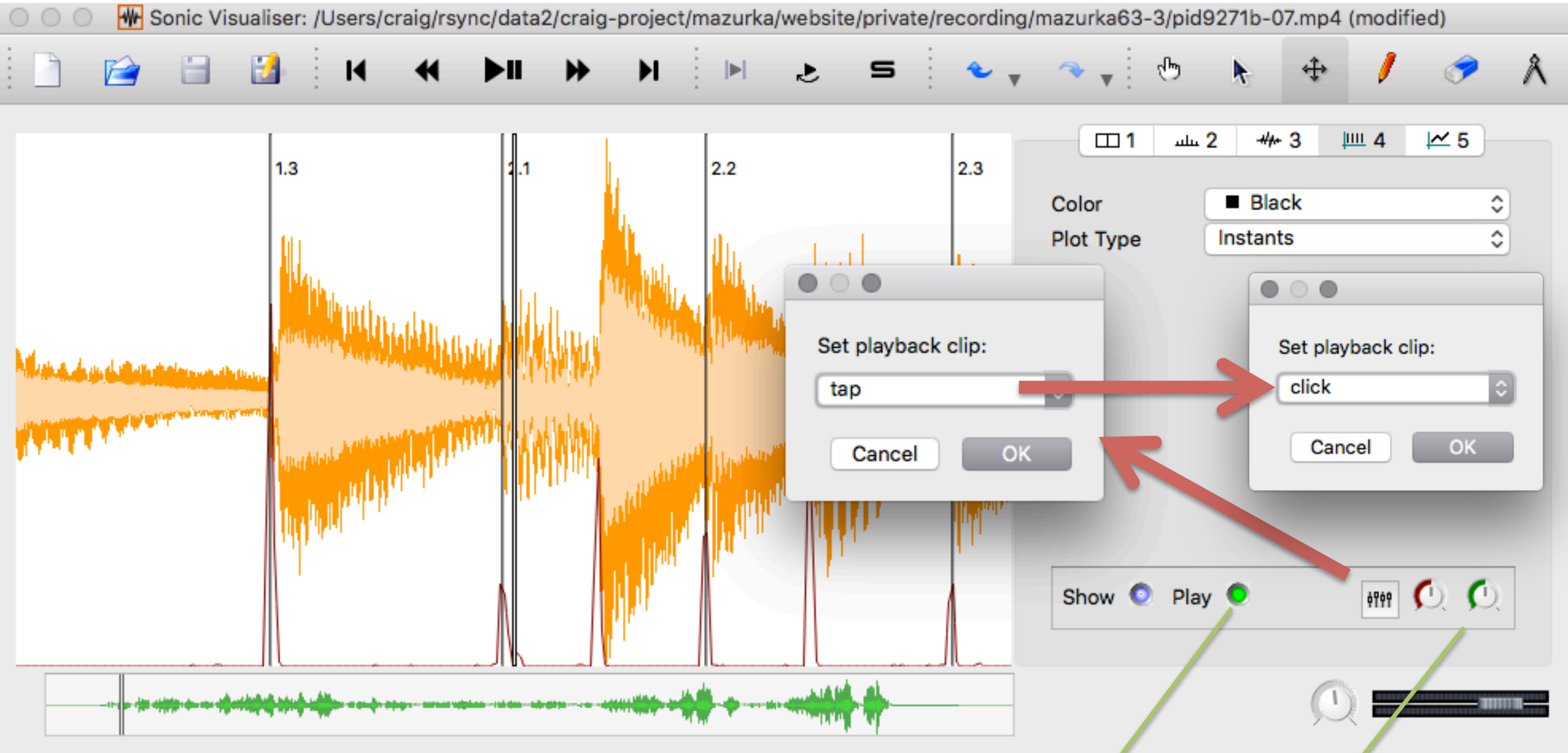
Correct taps with analysis plugins



Select move tool to change timings
(& make sure tap layer is active)



Tap proof-listening

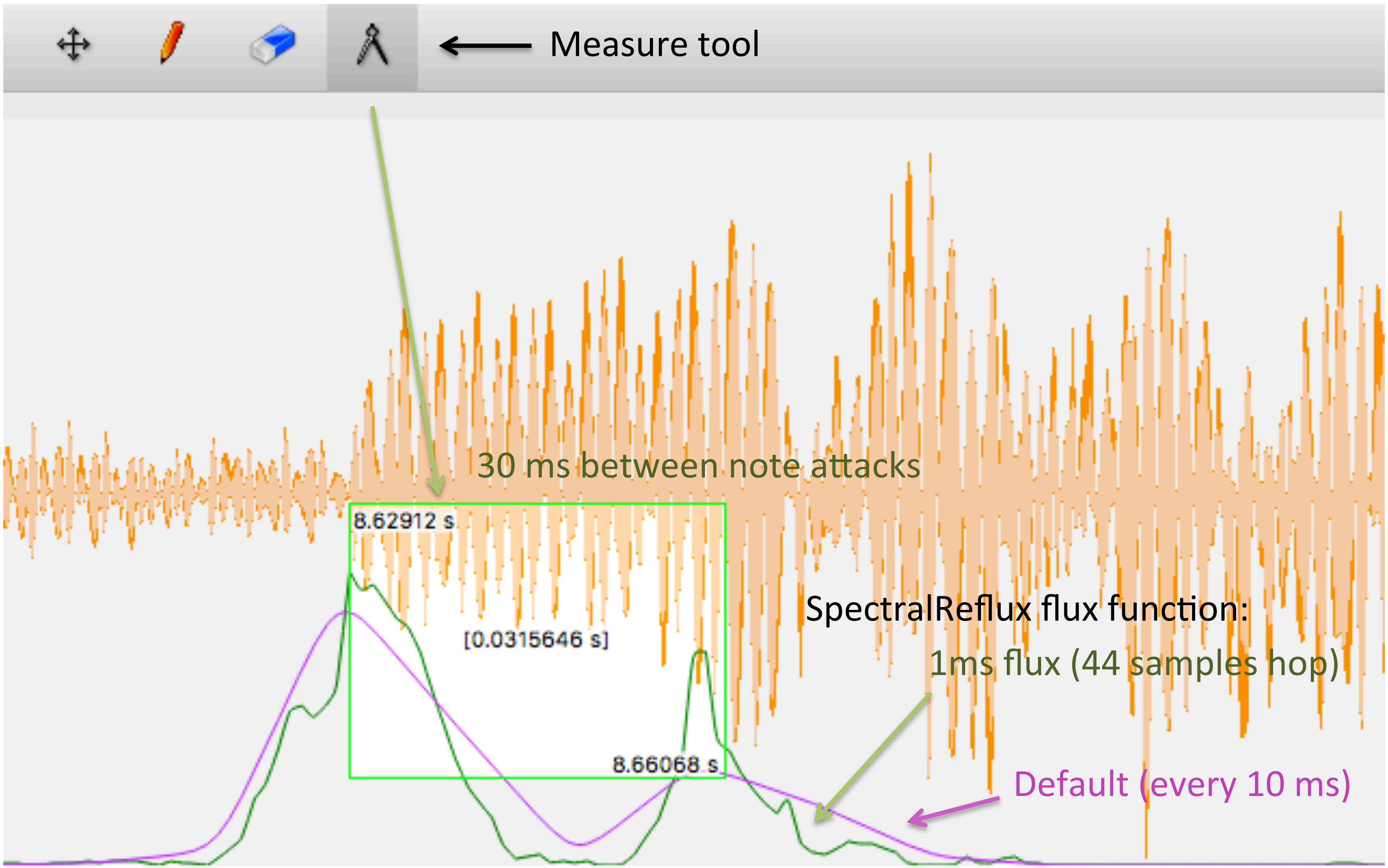


Mute taps

Use “click” sound to avoid going deaf.

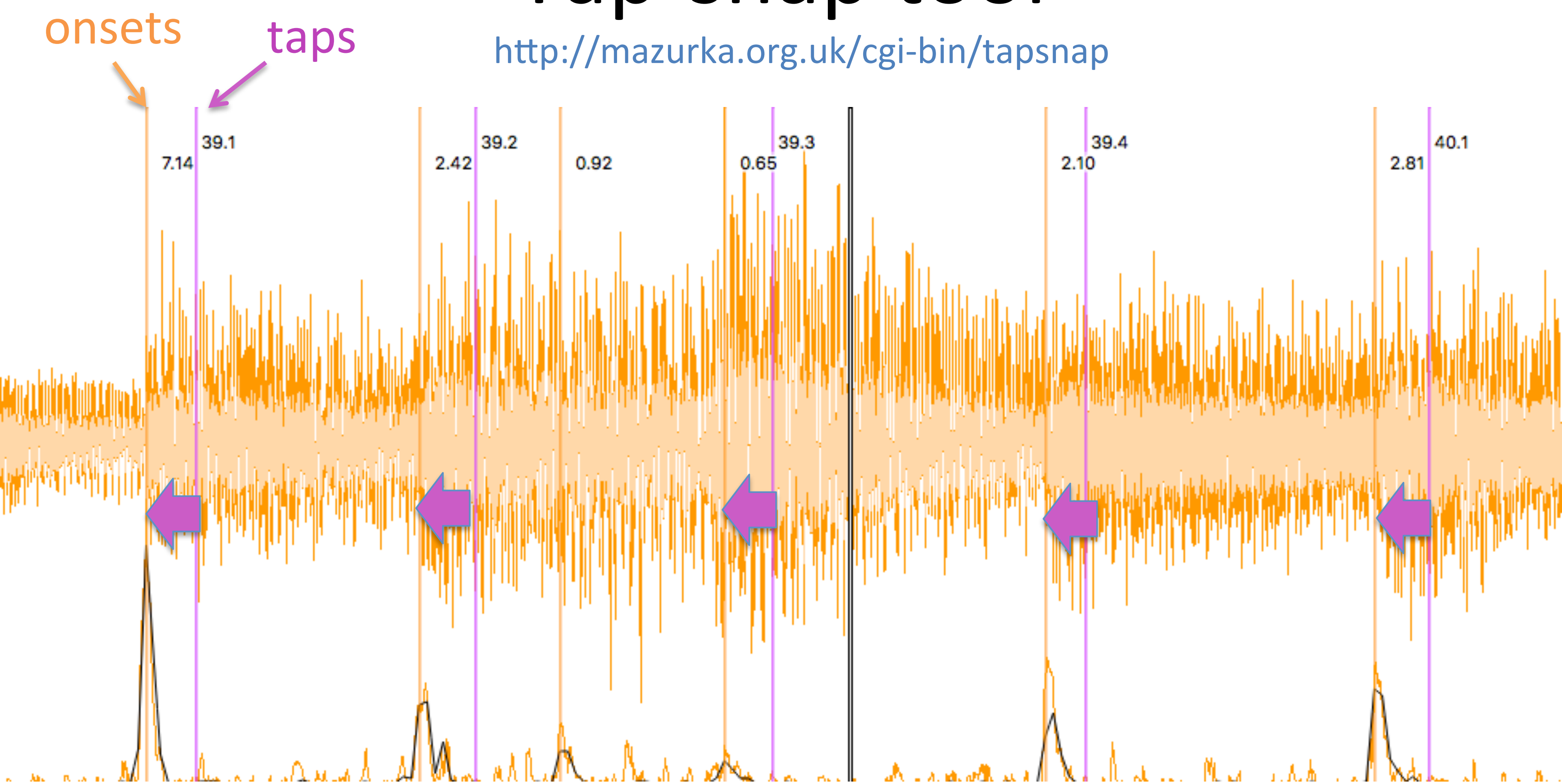
Can pan taps to one channel
And audio to another channel

Fine-resolution timing



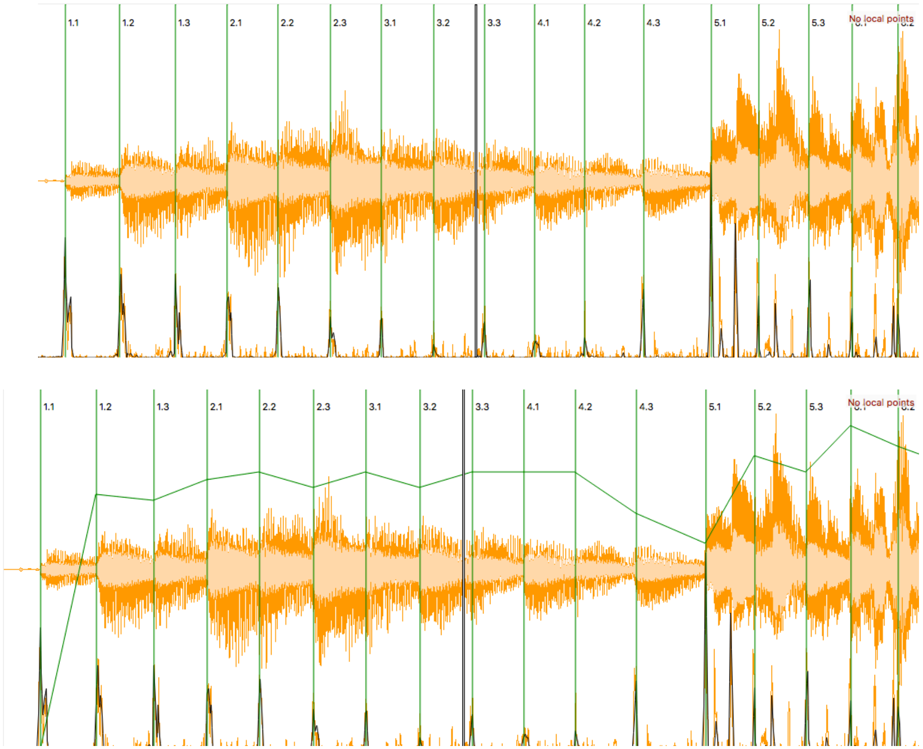
Tap-snap tool

http://mazurka.org.uk/cgi-bin/tapsnap

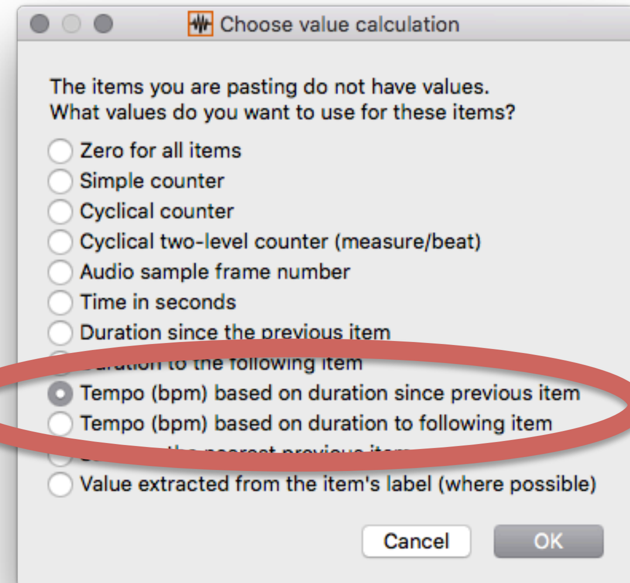


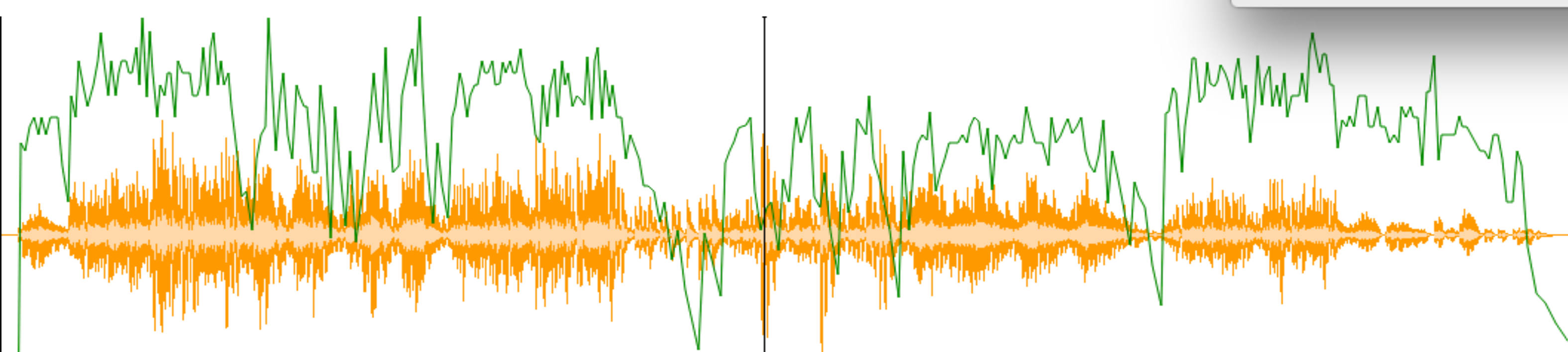
Move taps to the nearest onset (within a certain tolerance)

Taps to tempo curve within SV

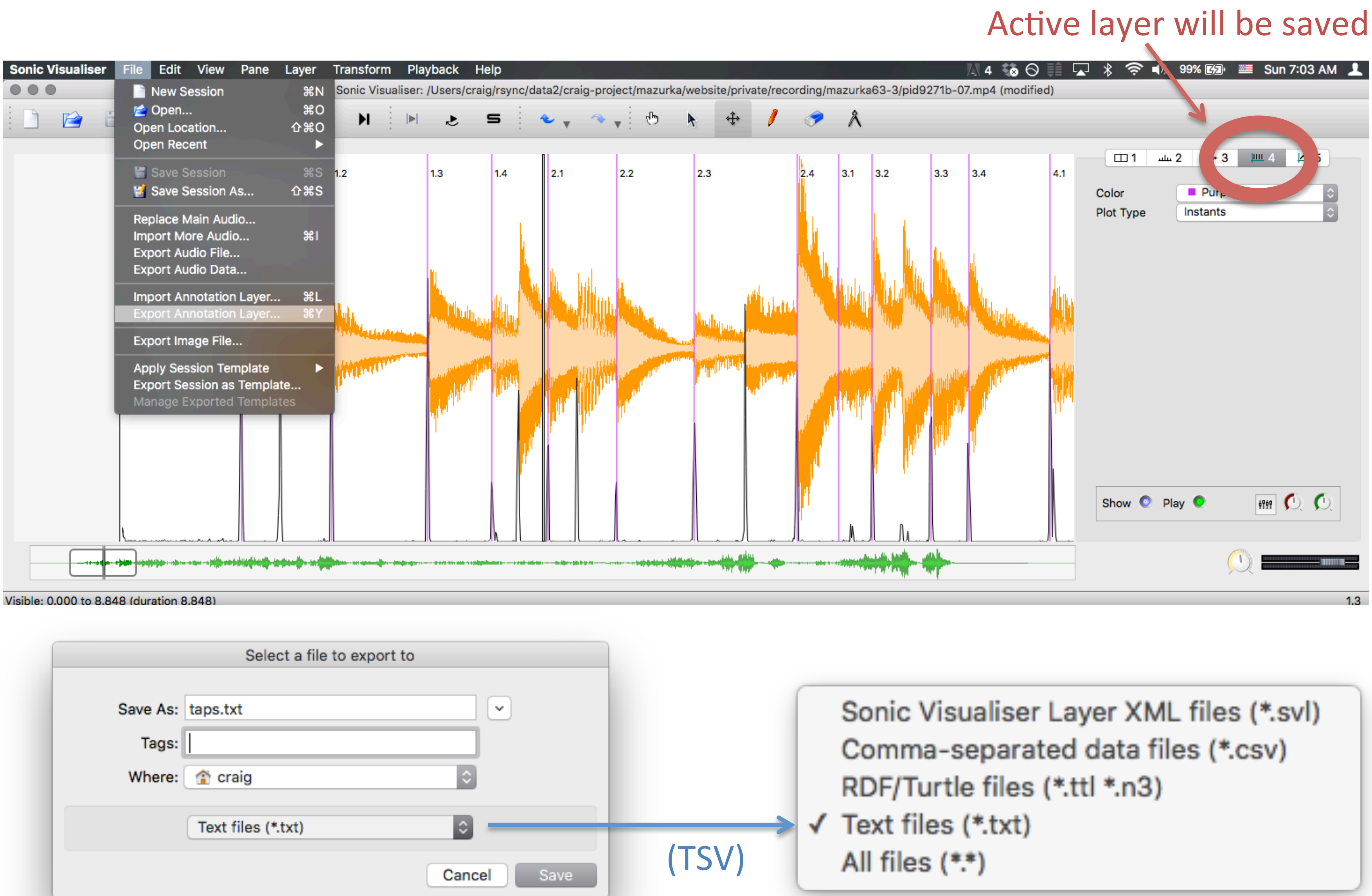


1. Select all time instants in layer (command/control-A)
2. Copy (command/control-C)
3. Past into new Time Values layer.
4. Choose tempo for paste:



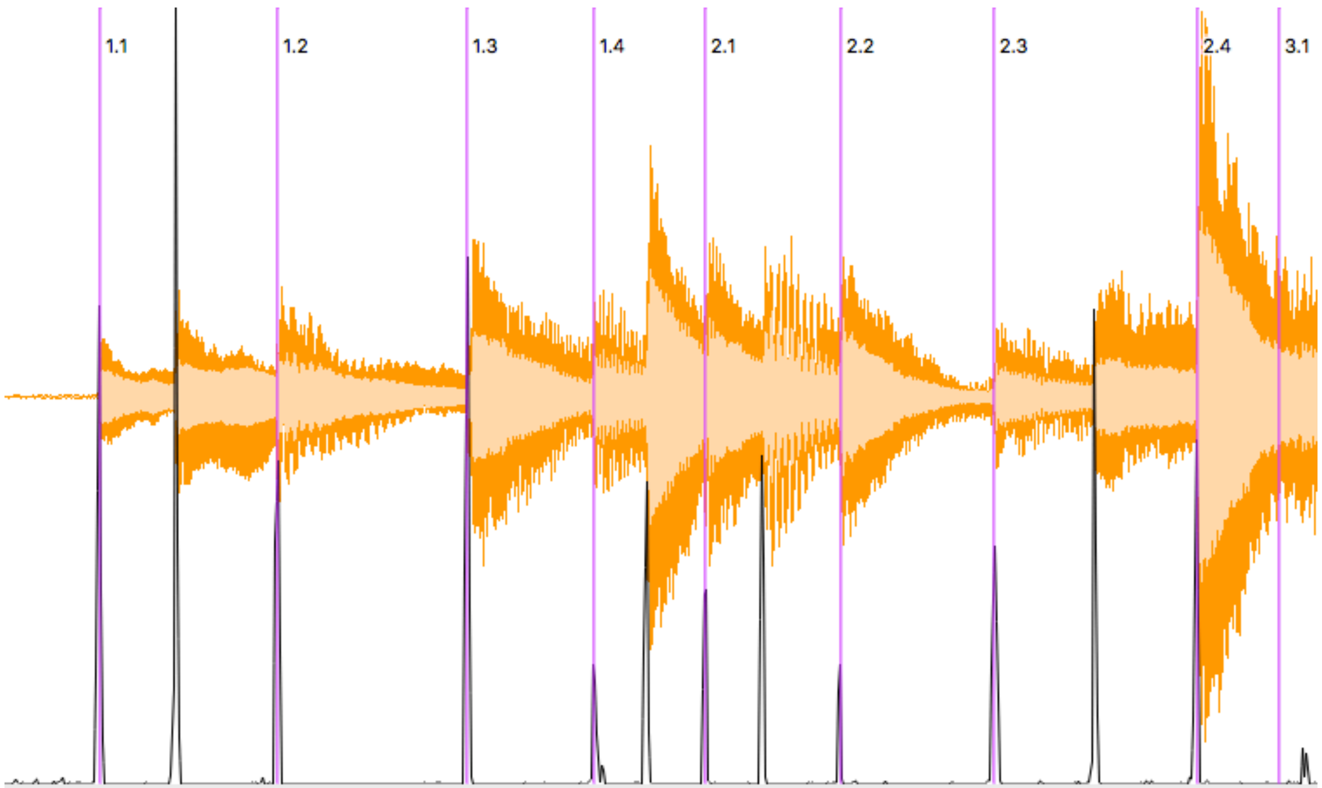


Saving annotations



Annotation layer data (time instants)

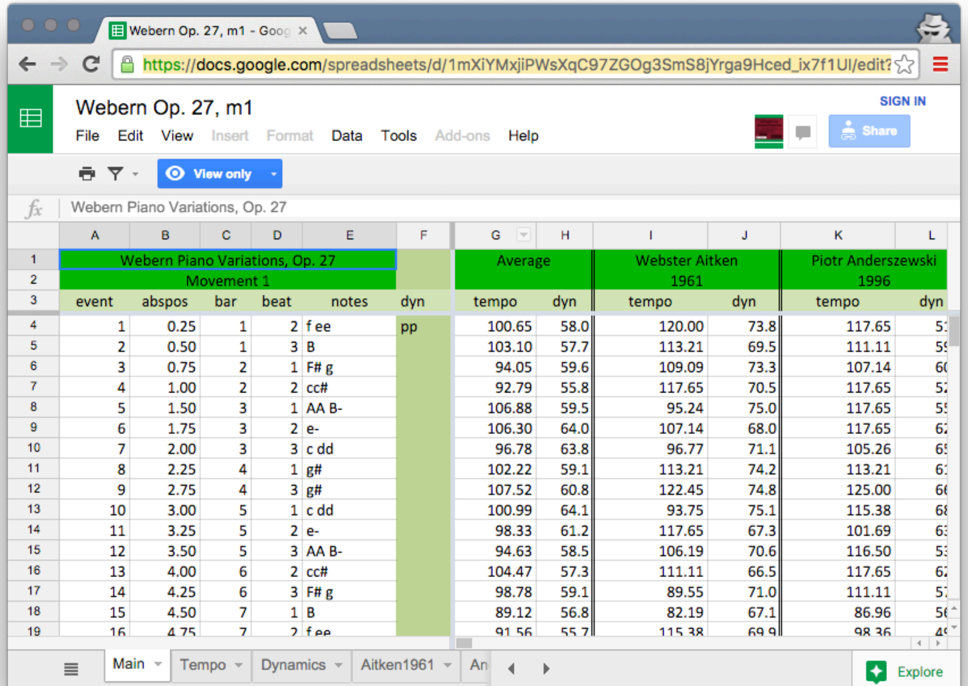
Time	Label
1.128344671	1.1
1.965714285	1.2
2.856780045	1.3
3.451065759	1.4
3.972063492	2.1
4.604807256	2.2
5.330430839	2.3
6.280997732	2.4
6.663401360	3.1
6.977596371	3.2
7.526167800	3.3
7.870839002	3.4
8.627664399	4.1
9.137233560	4.2
9.727392290	4.3
10.302086167	4.4
11.062358276	5.1
11.806122448	5.2
12.315510204	5.3



Webern Op 27 performance data

Movement 1

https://docs.google.com/spreadsheets/d/1mXiYMxjiPWsXqC97ZGOg3SmS8jYrga9Hced_ix7f1UI



Webern Piano Variations, Op. 27 Movement 1						Average		Webster Aitken 1961		Piotr Anderszewski 1996	
event	abspos	bar	beat	notes	dyn	tempo	dyn	tempo	dyn	tempo	dyn
1	0.25	1	2	f ee	pp	100.65	58.0	120.00	73.8	117.65	5
2	0.50	1	3	B		103.10	57.7	113.21	69.5	111.11	5
3	0.75	2	1	F# g		94.05	59.6	109.09	73.3	107.14	6
4	1.00	2	2	cc#		92.79	55.8	117.65	70.5	117.65	5
5	1.50	3	1	AA B-		106.88	59.5	95.24	75.0	117.65	5
6	1.75	3	2	e-		106.30	64.0	107.14	68.0	117.65	6
7	2.00	3	3	c dd		96.78	63.8	96.77	71.1	105.26	6
8	2.25	4	1	g#		102.22	59.1	113.21	74.2	113.21	6
9	2.75	4	3	g#		107.52	60.8	122.45	74.8	125.00	6
10	3.00	5	1	c dd		100.99	64.1	93.75	75.1	115.38	6
11	3.25	5	2	e-		98.33	61.2	117.65	67.3	101.69	6
12	3.50	5	3	AA B-		94.63	58.5	106.19	70.6	116.50	5
13	4.00	6	2	cc#		104.47	57.3	111.11	66.5	117.65	6
14	4.25	6	3	F# g		98.78	59.1	89.55	71.0	111.11	5
15	4.50	7	1	B		89.12	56.8	82.19	67.1	86.96	5
16	4.75	7	2	f ee		91.56	55.7	115.38	69.9	98.36	4

67 Performances of Anton Webern's *Variations for Piano*, Op. 27,

Movement 2

https://docs.google.com/spreadsheets/d/1N87jdFioxj_Dbz8SKq2TE7xFAKay1v0CW4IhIQXQqoA

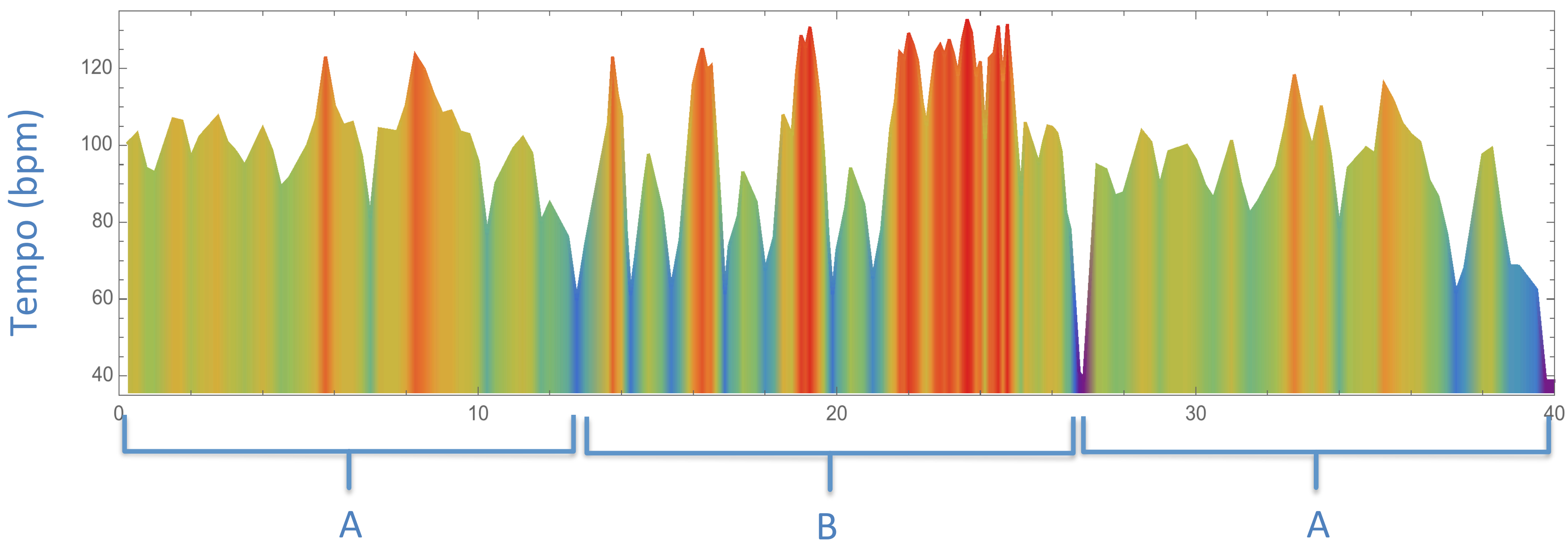
Movement 3

https://docs.google.com/spreadsheets/d/1hoTwcjsiVFM1OBtK-Km_GQ7htSfbpg--12uKWvzlLX0

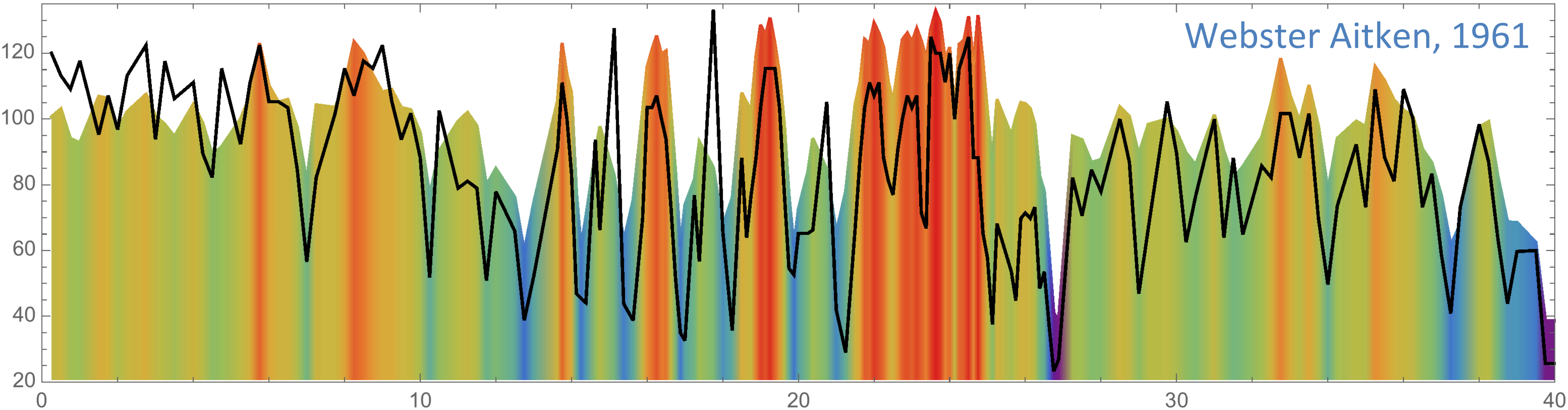
Webern Op 27

Webern data is event-based rather than beat based:

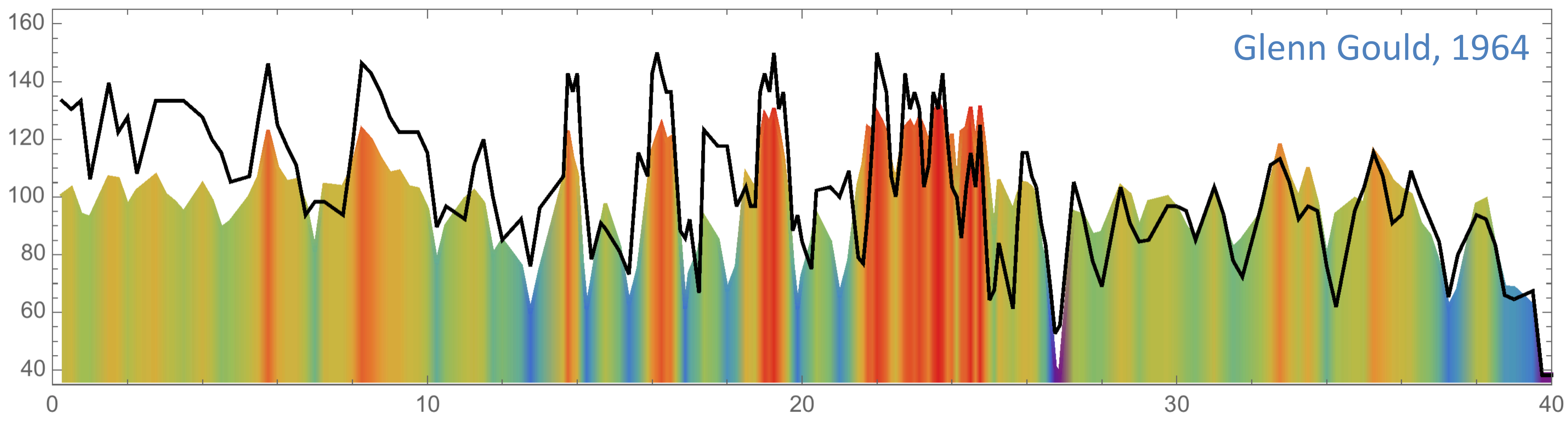
Average performance:



Webern Op. 27



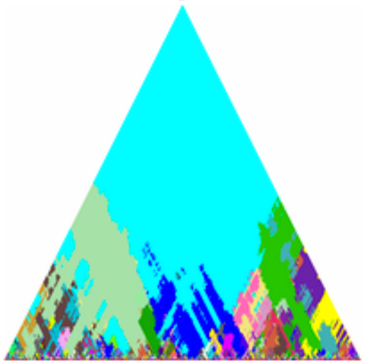
- Starts out faster than average, but plays slower than average in return of A section.
- Plays slower than average in B section, except for reversing accel. magnitudes of phrases



Performance similarity

Chopin Op. 24/2

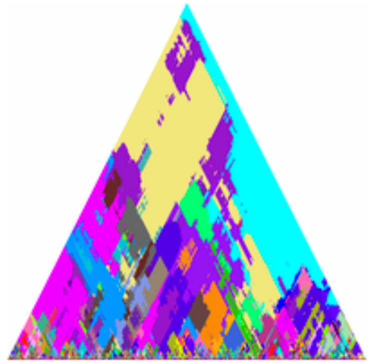
full tempo curve



Poblocka 1999

54.0%	Ezaki 2006
14.8%	Czerny 1949
5.4%	Magin 1975
5.3%	BenOr 1989
2.2%	Luisada 1990
2.1%	Shebanova 2002
1.8%	Kilenyi 1937
1.7%	Brailowsky 1960
1.4%	Horowitz 1971
1.3%	Coop 1987
1.3%	Falvay 1989
1.1%	Wasowski 1980
0.74	Czerny 1949
0.73	Ezaki 2006
0.72	Shebanova 2002
0.64	Czerny 1949b
0.63	BenOr 1989
0.63	Coop 1987
0.61	Magin 1975
0.60	Weissenberg 1971
0.60	Fou 1978
0.60	Kilenyi 1937
0.58	Falvay 1989
0.58	Kapell 1951
0.57	Chiu 1999

global beat dynamics



Poblocka 1999

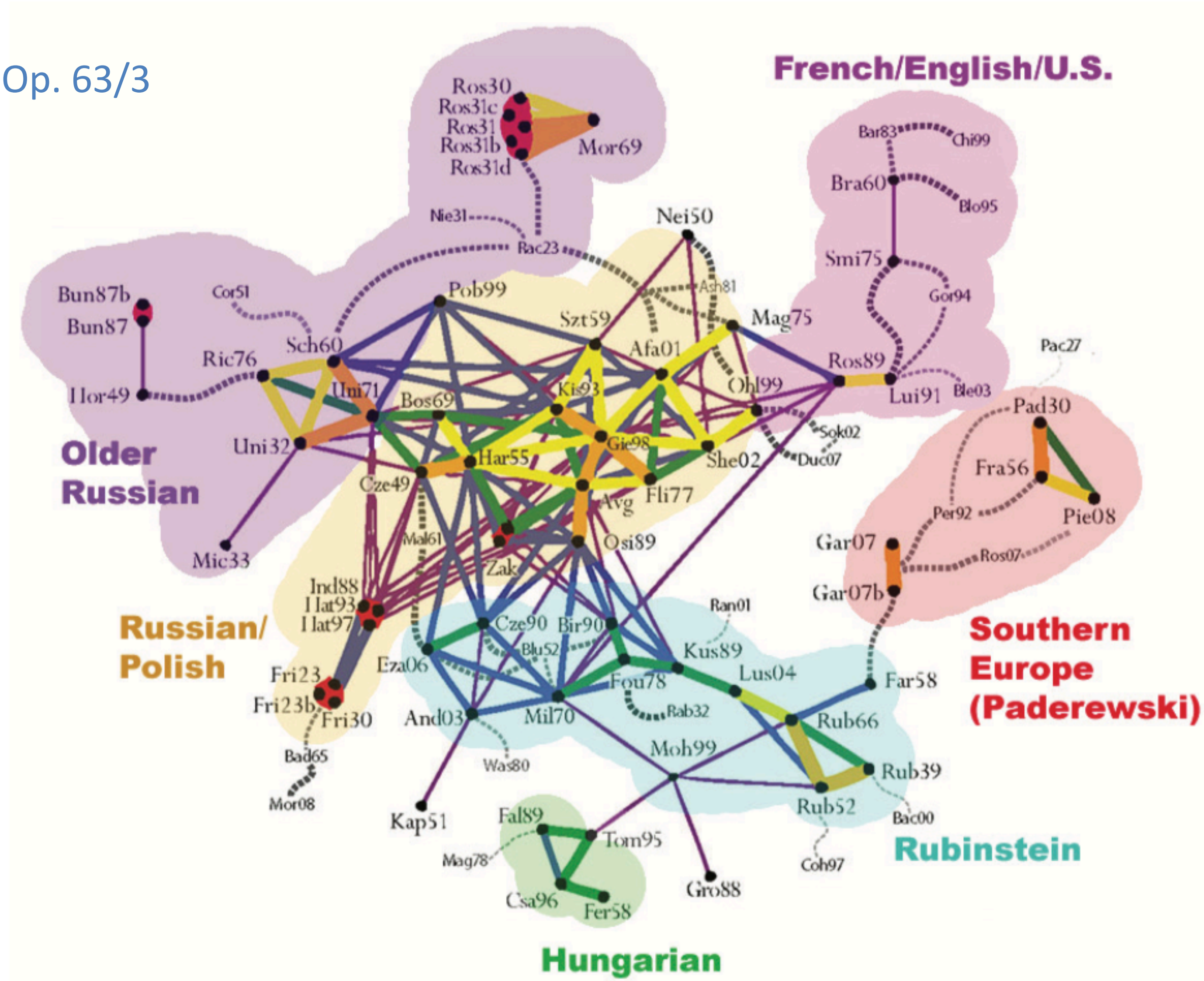
21.1%	Coop 1987
14.7%	Ezaki 2006
9.7%	Ashkenazy 1981
9.3%	Weissenberg 1971
6.0%	Magaloff 1977
5.2%	Osinska 1989
4.7%	Biret 1990
2.8%	Olejniczak 1991
2.3%	Fou 1978
2.1%	Magaloff 1977b
1.5%	Rubinstein 1952
1.5%	Milkina 1970
1.4%	Shebanova 2002
1.2%	Kissin 1993
1.2%	Falvay 1989
1.2%	Szpilman 1948
1.1%	Wasowski 1980
1.0%	Magin 1975
0.70	Coop 1987
0.68	Biret 1990
0.68	Osinska 1989
0.64	Ashkenazy 1981
0.63	Kilenyi 1937
0.63	Weissenberg 1971
0.59	Ezaki 2006
0.59	Kissin 1993
0.58	Magaloff 1977

Ezaki was a student of Pobłocka

mazurka.org.uk/ana/pcor-all/mazurka24-2-noavg

Performance similarity map

Chopin Op. 63/3



Notated performance data

http://mazurka.org.uk/webern/notation/Aitken1961

- dark = loud; light = soft

Animated scores

Recordings aligned to scores:

http://musicbox.sapp.org/examples/chopin/op28n01

http://musicbox.sapp.org/examples/chopin/op24n2

http://www.ccarh.org/chopin/op24n2

Haydn string quartet in F minor, Op. 20, No. 5

http://www.ccarh.org/haydn/op20n5/mvmt1
http://www.ccarh.org/haydn/op20n5/mvmt2
http://www.ccarh.org/haydn/op20n5/mvmt3
http://www.ccarh.org/haydn/op20n5/mvmt4

Video versions

http://www.ccarh.org/haydn/op20n5/mvmt1v
http://www.ccarh.org/haydn/op20n5/mvmt2v
http://www.ccarh.org/haydn/op20n5/mvmt3v
http://www.ccarh.org/haydn/op20n5/mvmt4v

Further reading

Tools developed for the CHARM Mazurka Project:

http://www.charm.rhul.ac.uk/analysing/p9_4.html

Computational methods for analysis of musical structure

https://searchworks.stanford.edu/view/9238521

CH1: pp. 21–40, CH5, CH6

Mazurka Plugins source code on Github (C++):

https://github.com/craigsapp/MazurkaPlugins

Webern Op 27 data entry notes:

http://wiki.ccarh.org/wiki/Op27