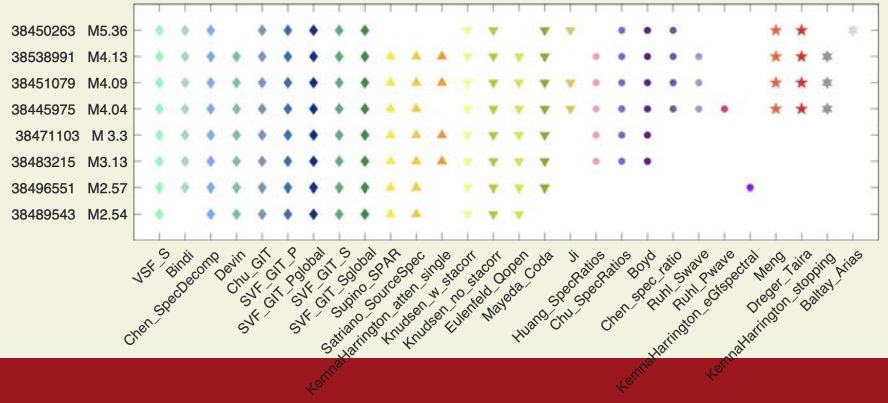
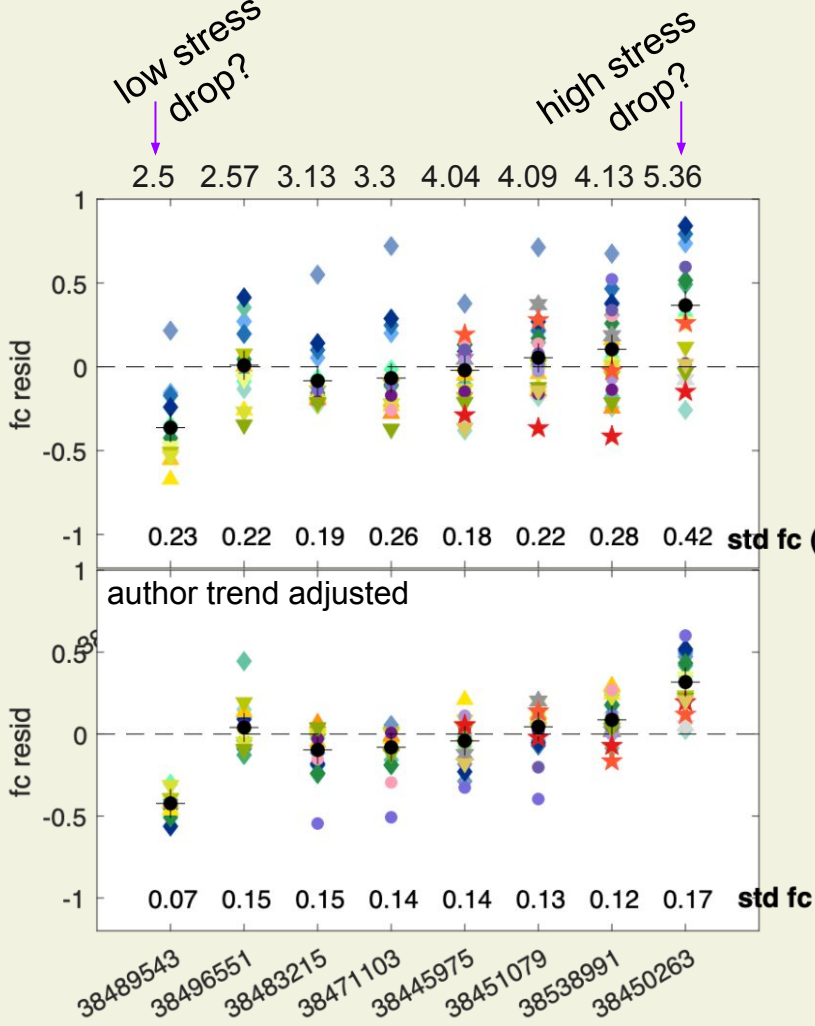
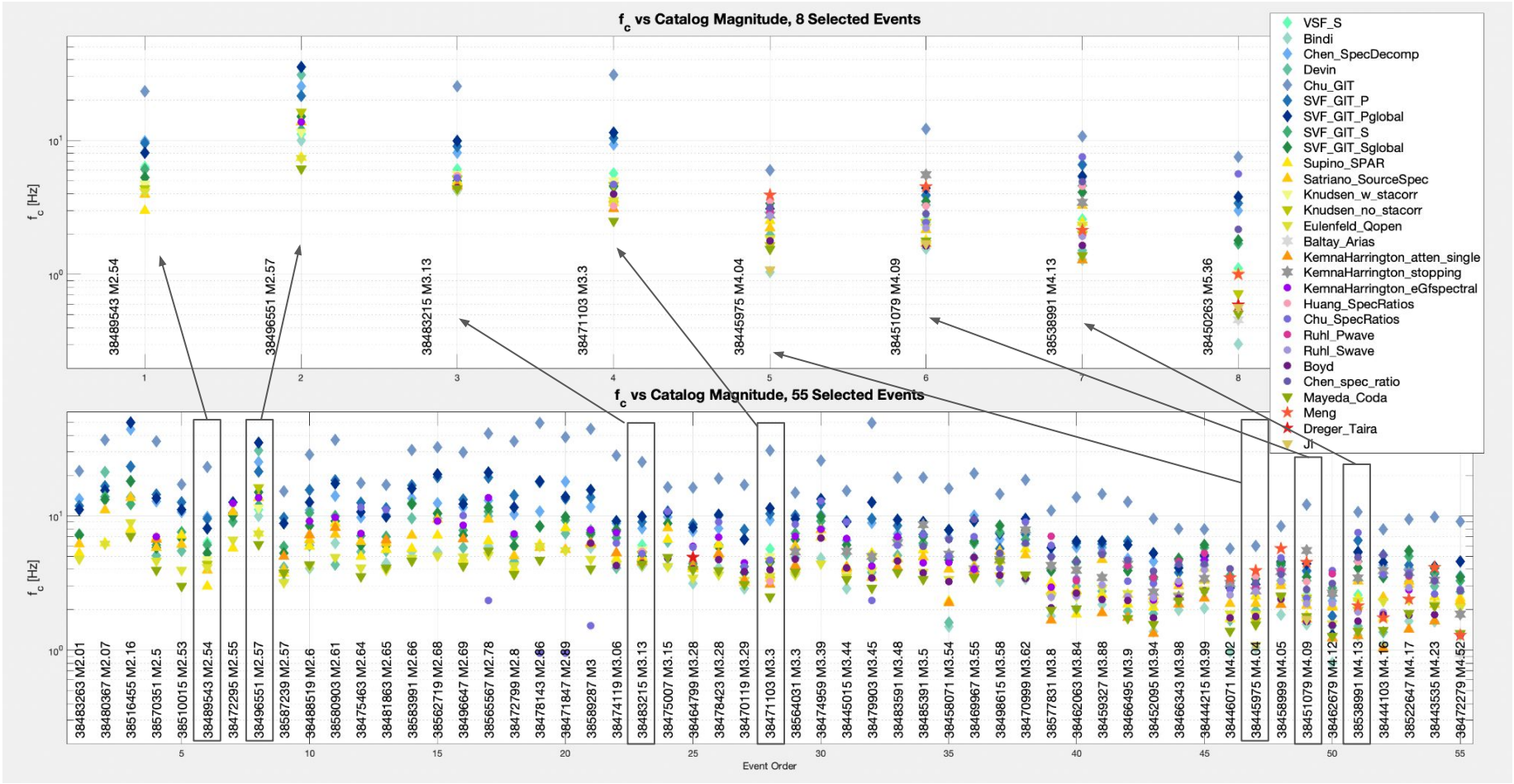
Details of 8 selected events

ID	Depth	Mag	date	time	mean fc all	std fc all	std fc b.mk
38450263	7.23	5.36	5-Jul-19	11:07:53	1.5213	0.4207	
38538991	2.768	4.13	11-Jul-19	23:45:18	3.1021	0.2623	0.04
38451079	7.340	4.09	5-Jul-19	12:38:30	3.0099	0.2246	0.11
38445975	2.301	4.04	5-Jul-19	0:18:01	2.4547	0.1795	0.06
38471103	7.778	3.3	7-Jul-19	3:23:26	5.5412	0.2772	0.05
38483215	7.751	3.13	8-Jul-19	5:02:10	6.2095	0.2043	0.05
38496551	10.117	2.57	9-Jul-19	5:17:45	14.8342	0.2183	0.08
38489543	2.839	2.54	8-Jul-19	17:30:03	6.1105	0.2316	0.03

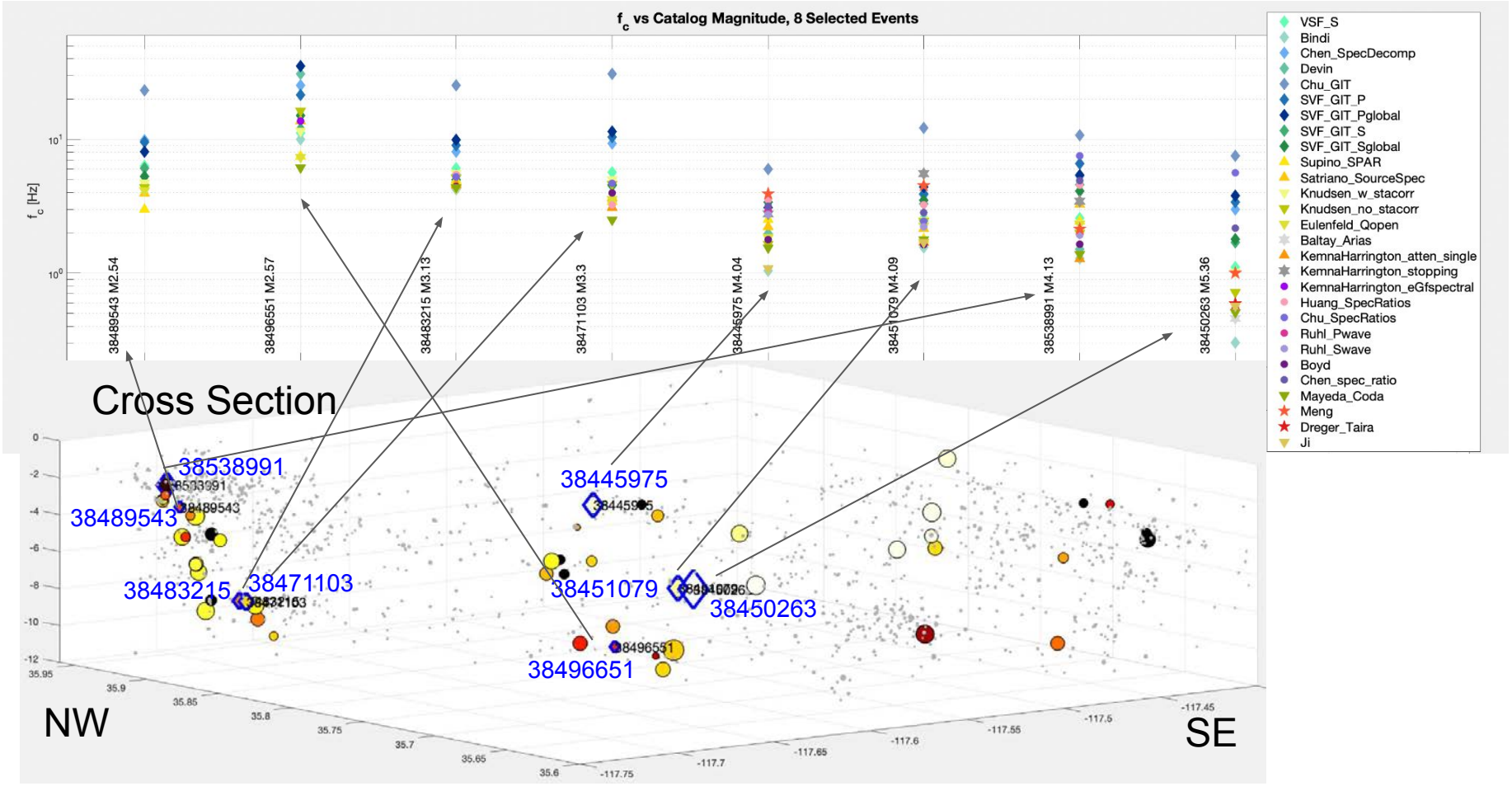




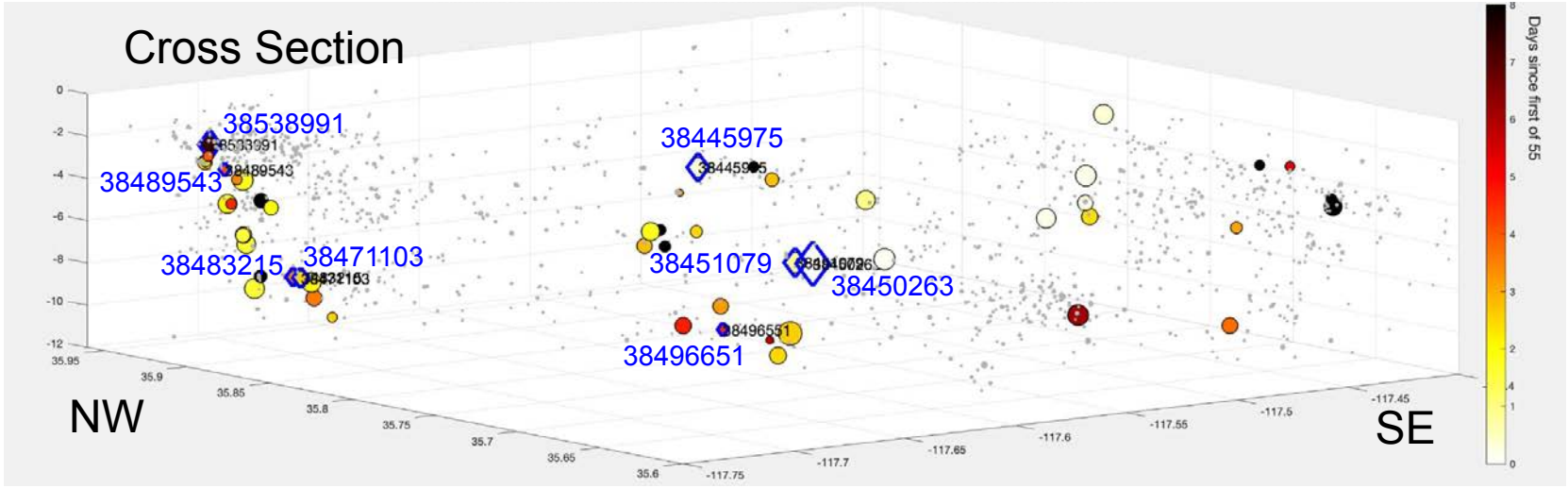
All Results fc and Cat Mag for 8 and 55 Events

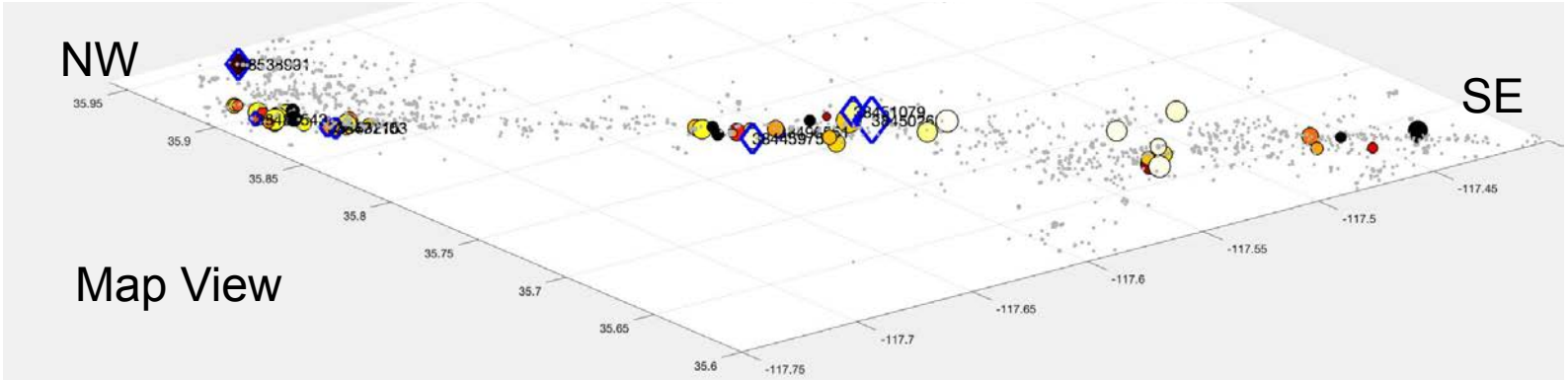


All Results fc and Cat Mag for 8 and 55 Events



Events Selected for Detailed Study: 55 and 8

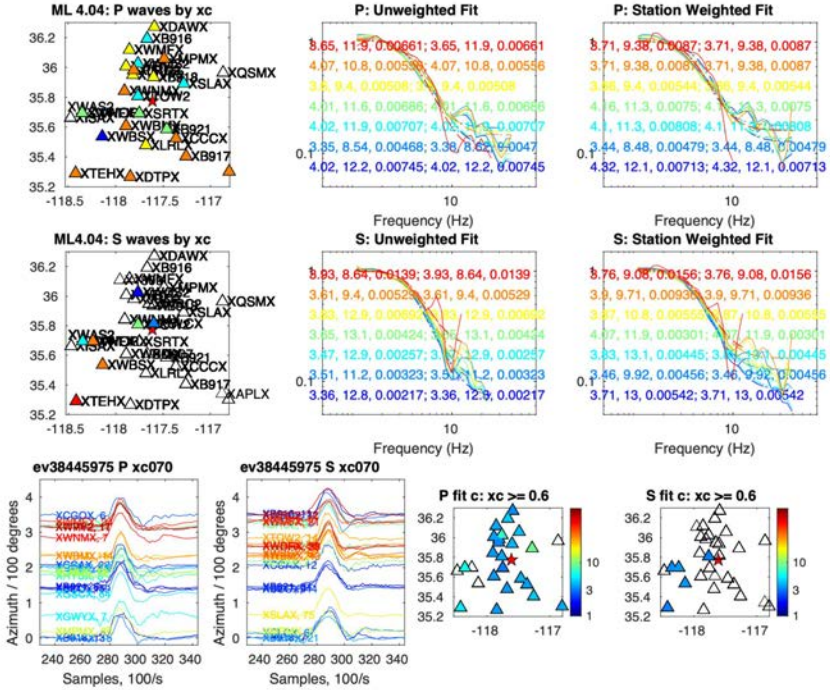




Rachel EGF Spectral Ratios - Intro to Method

0.5 NSEC = 2.85 s

fc1, fc2, variance (no constraints)
fc1, fc2, variance (limits on fc2)



Follow methods of Abercrombie et al. 2017, 2020
Find all Small events within
2 km epicentral distance
1.2 and 2.5 M units < main
(both ranges iteratively decreased IF >>200 EGFs found)

Define time window NSEC = constant * $M0^{1/3}$
Try 0.5NSEC to get more P waves for close stations

Cross correlations and Depth range thresholds:
Minimum cross correlation =

[0.5 0.5 0.6 0.7 0.7 0.8 0.9]

Max depth difference to main =

[10 1 10 10 1 10 10]

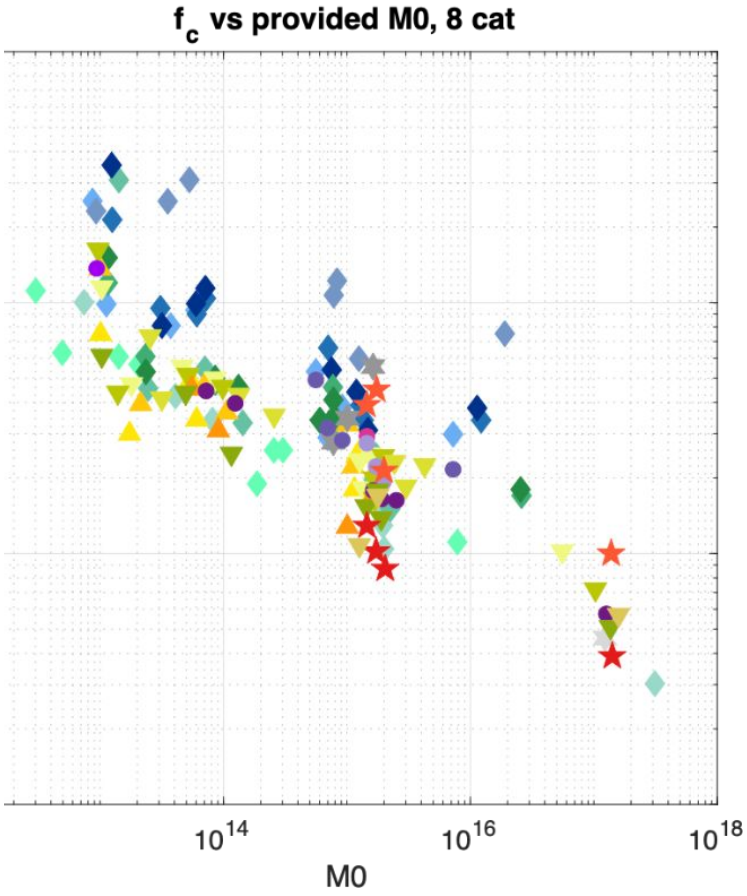
np

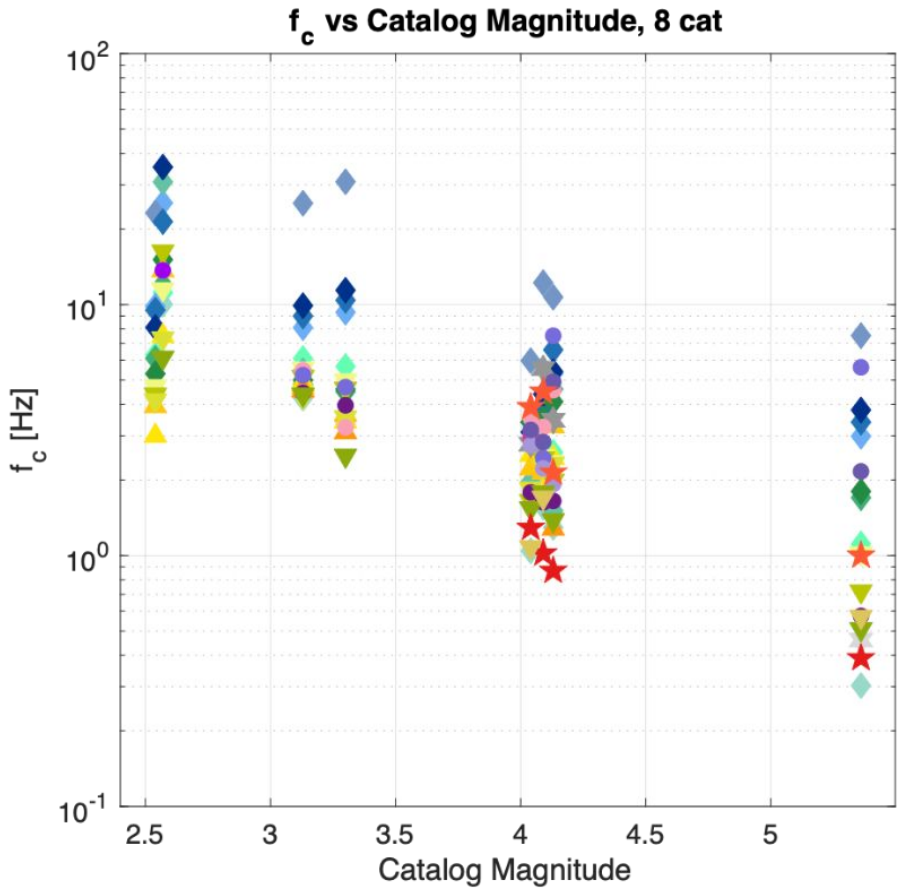
pec
_atten_single
rr
orr

s

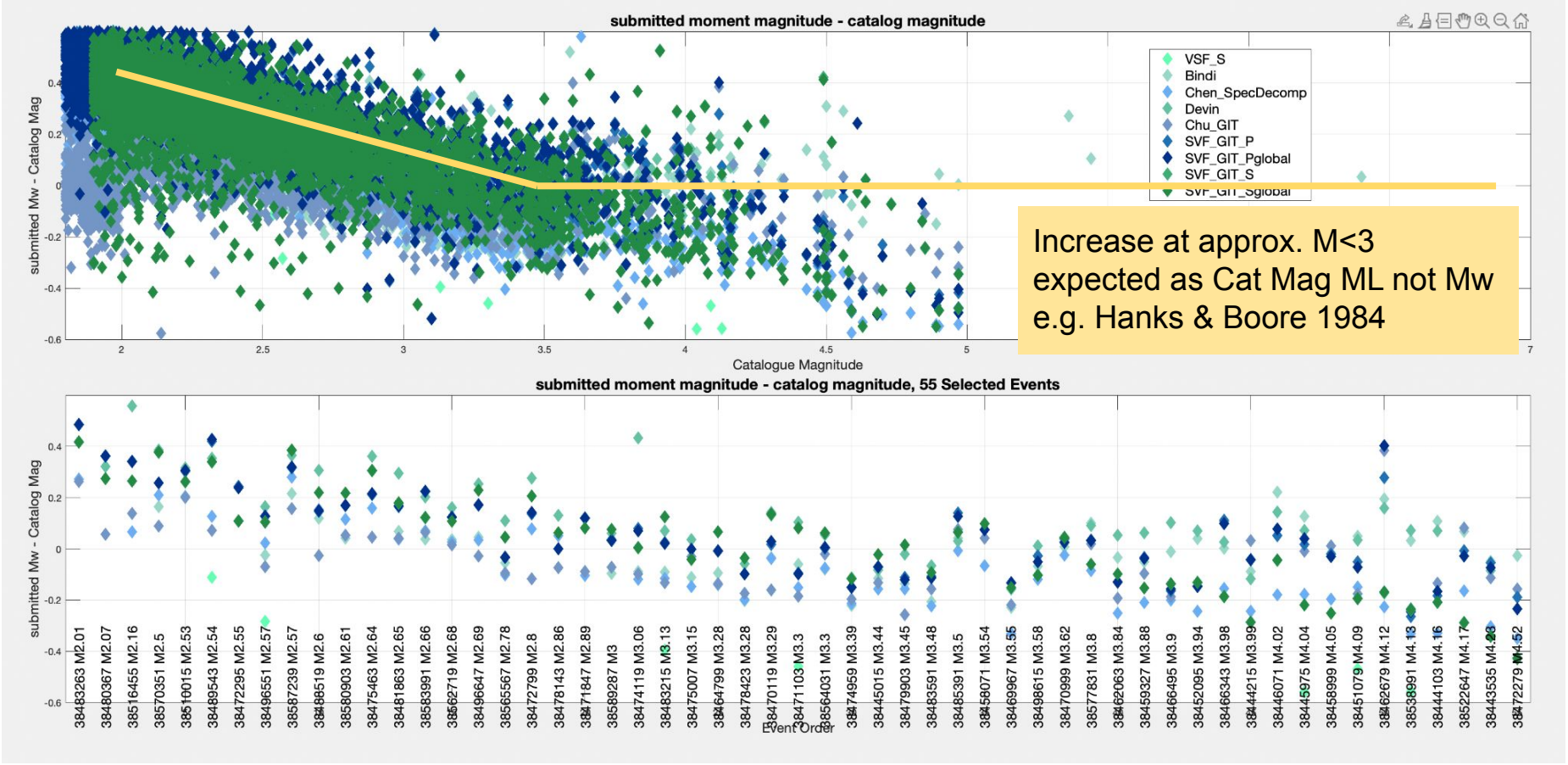
_eGfspectral

_stopping





Generalised Inversion P and S Calculated M0 and Cat Mag



PRELIMINARY COLLATED RESULTS JANUARY 2023

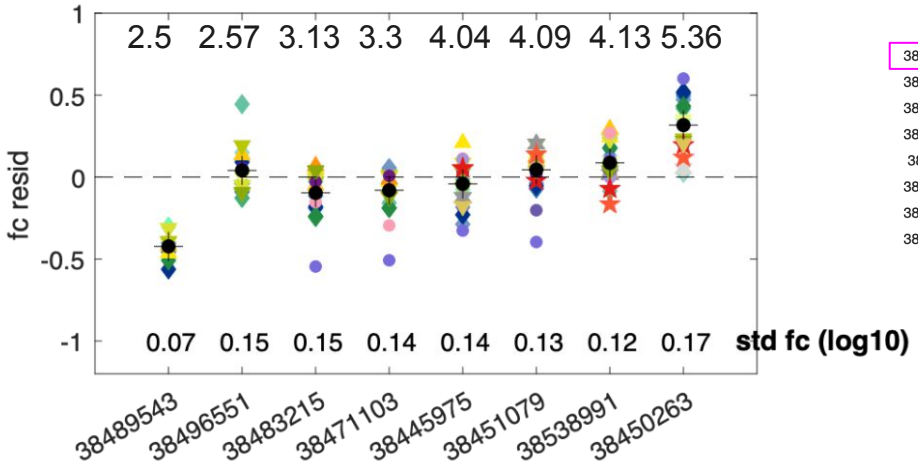
Please note that all the following are preliminary - generously shared for comparison, but should not be cited, or copied or included in anything without prior direct consent of the authors.

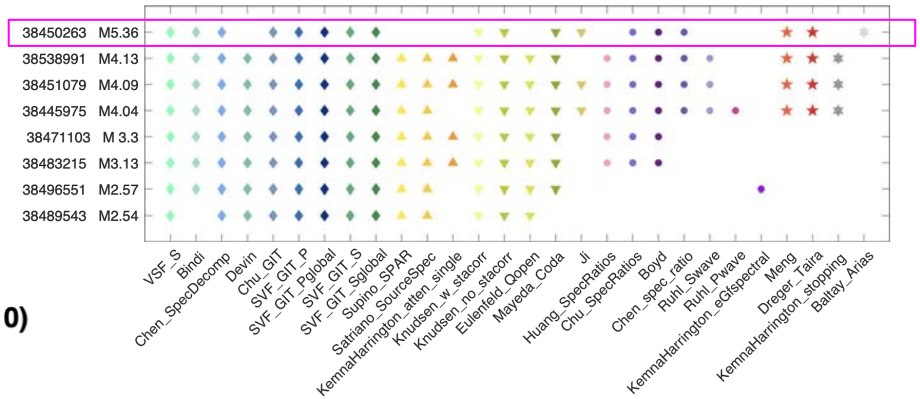
If anyone has any questions - please contact Annemarie Baltay or Rachel Abercrombie directly

abaltay@usgs.gov

rea@bu.edu

M5.37 38450263





All submitted results

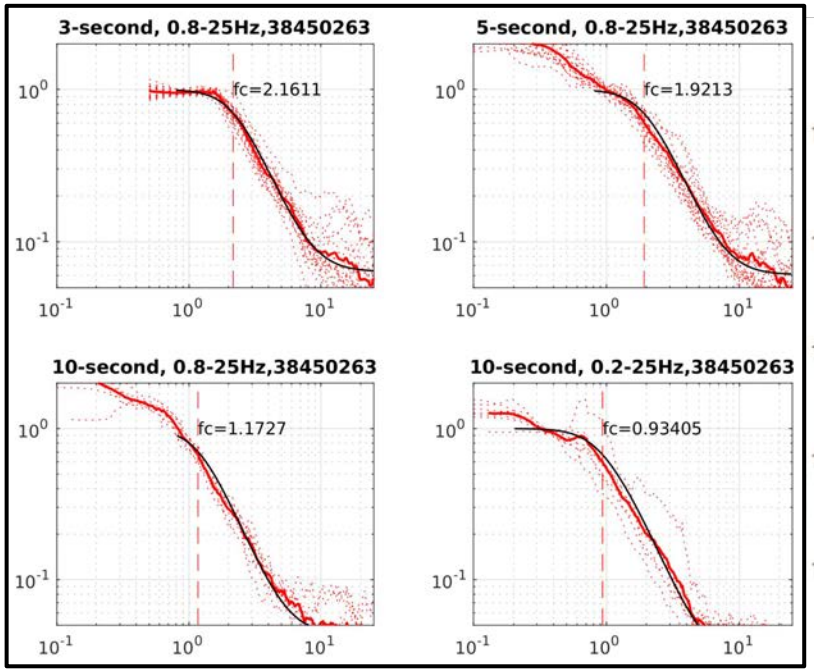
M5.37 38450263

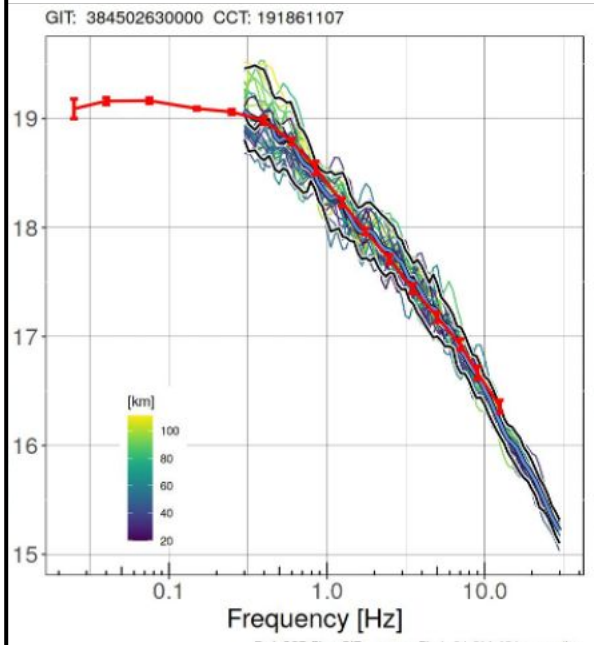
high stress drop?

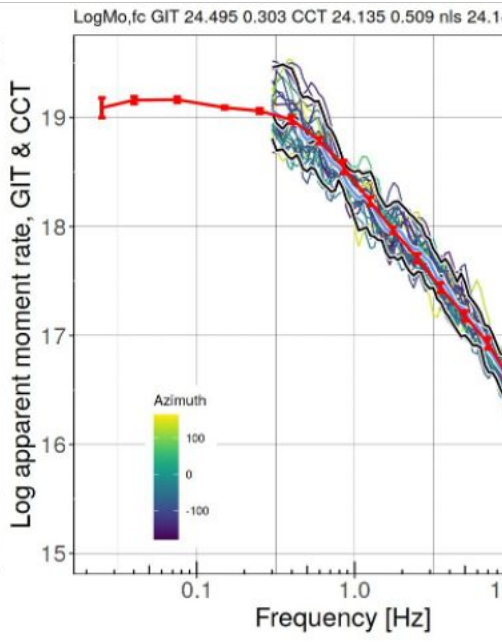
Mayeda, Bindi et al.

Pennington: very variable fits with window/bandwidth

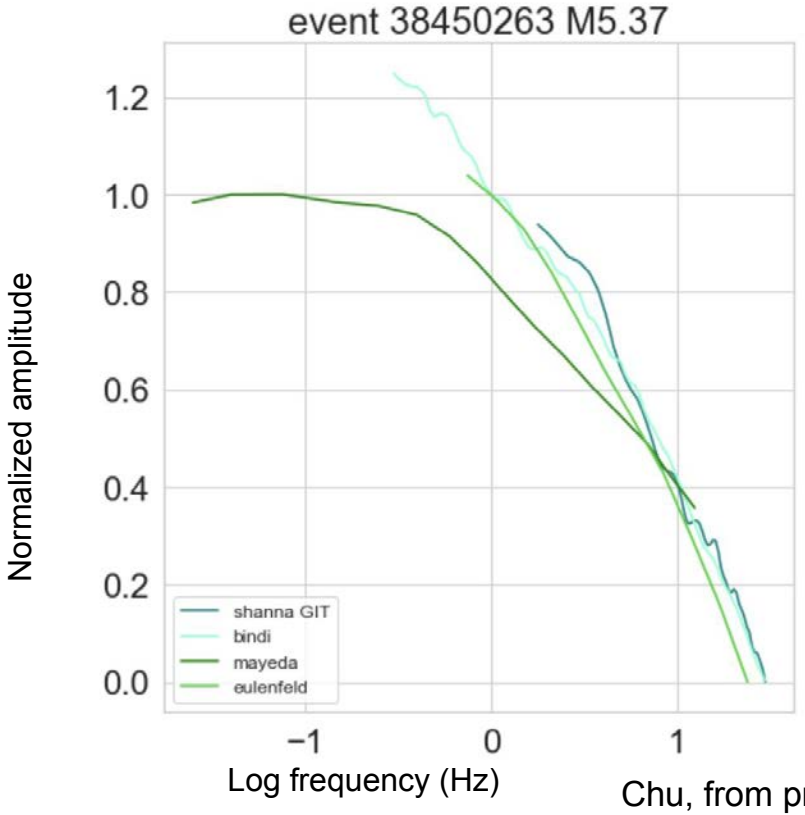
38450263 fc: 0.9-2.2



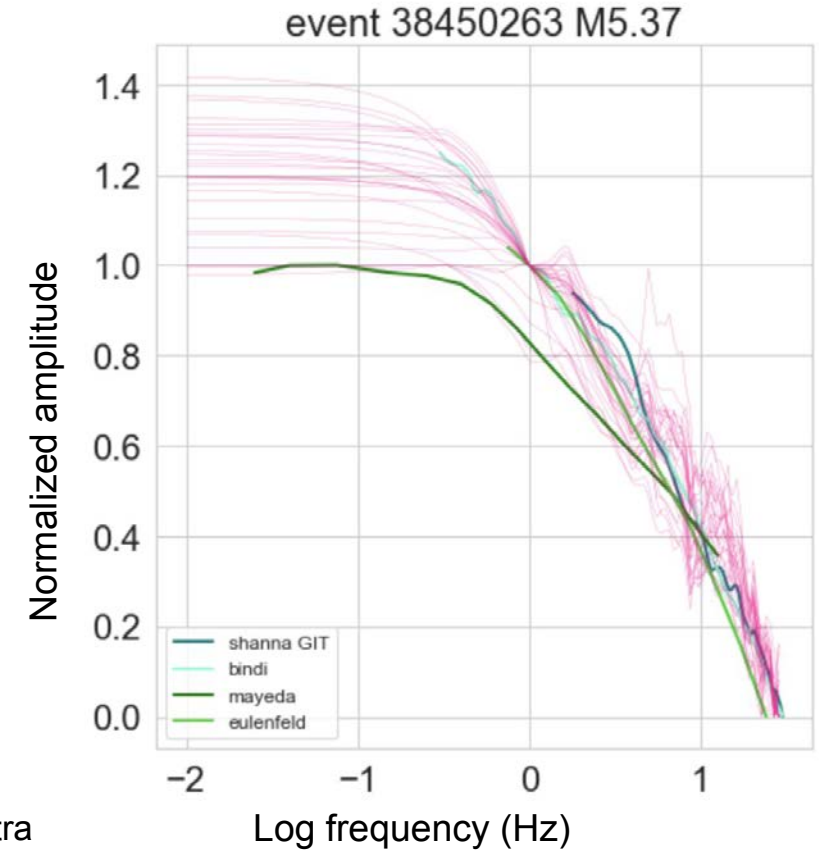




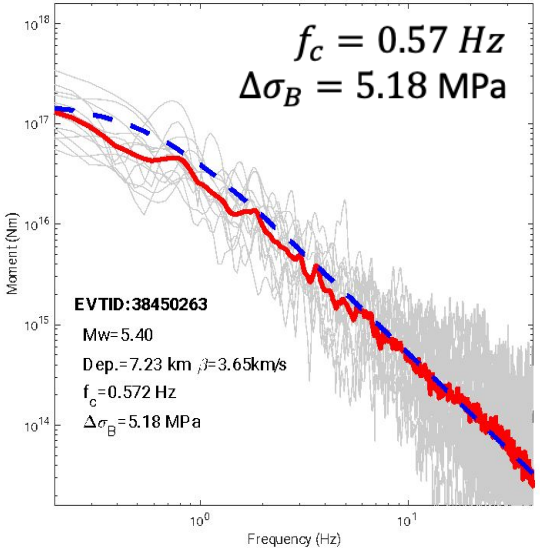
Chen & Pennington



Chu, from provided spectra

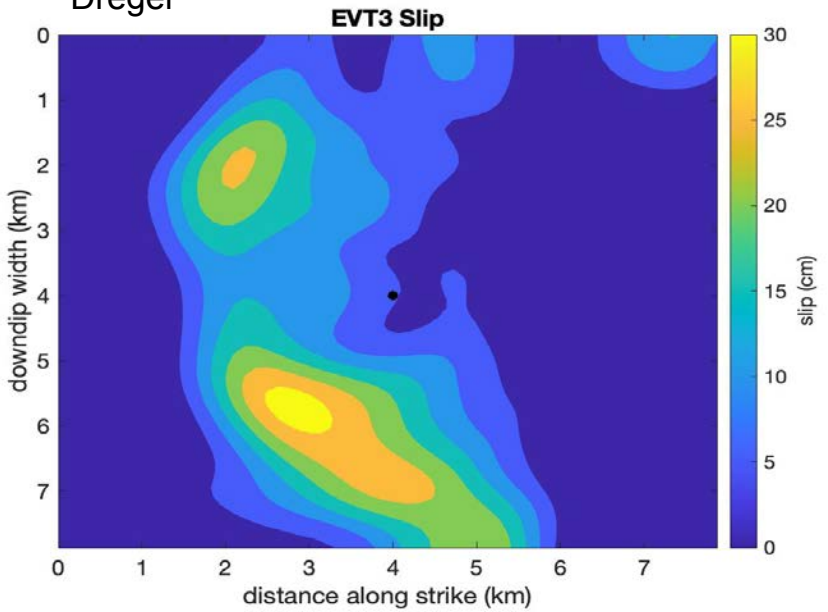


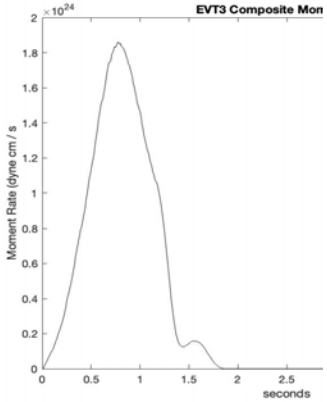
M5.37 38450263

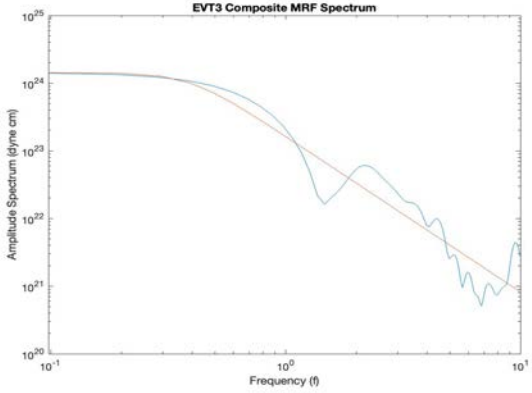


Ji, Archleta, Peyton

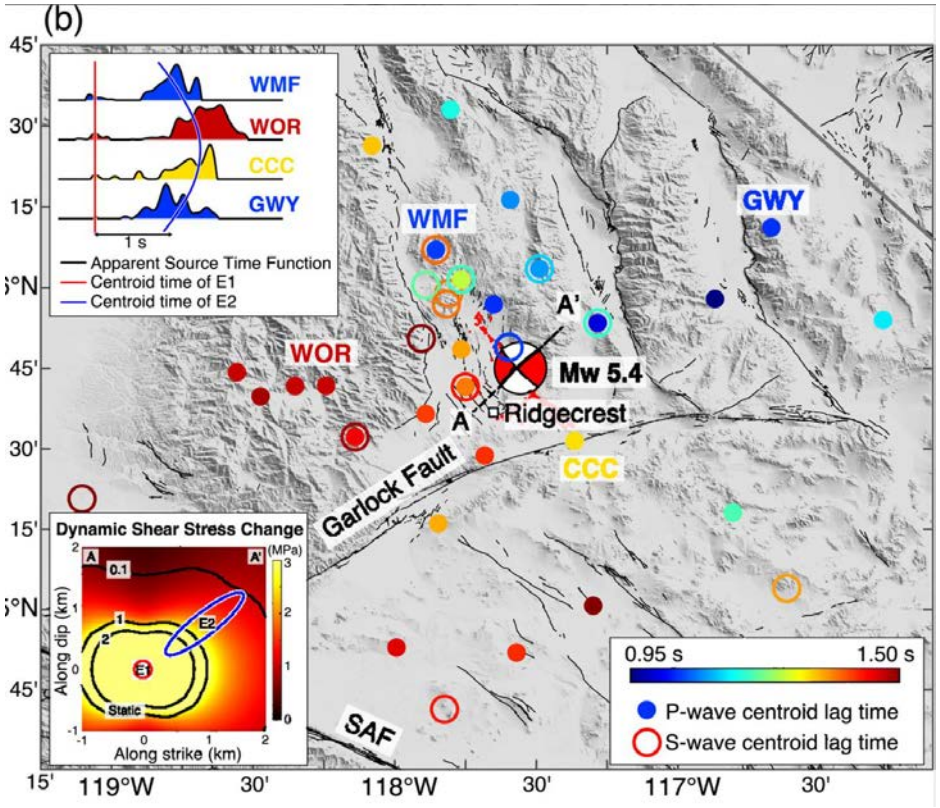
Dreger







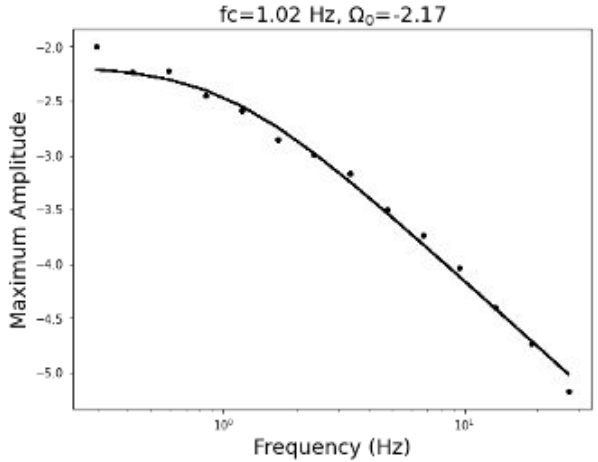
M5.37 38450263



Meng, H., & Fan, W. (2021). Immediate foreshocks indicating cascading rupture developments for 527 M 0.9 to 5.4 Ridgecrest earthquakes. *Geophysical Research Letters*, 48, e2021GL095704. https://doi.org/10.1029/2021GL095704

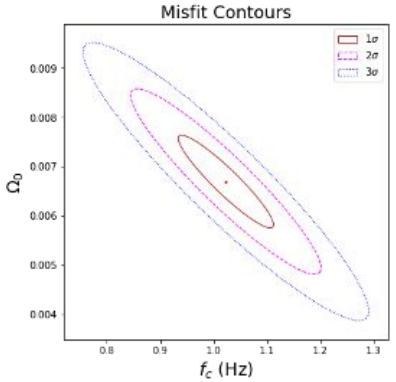
July 5 11:07 Mcat 5.36 ID 38450263

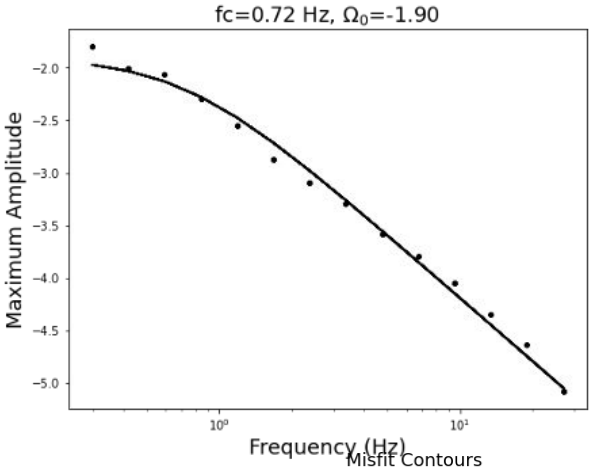
Knudsen and Ellsworth



With station terms

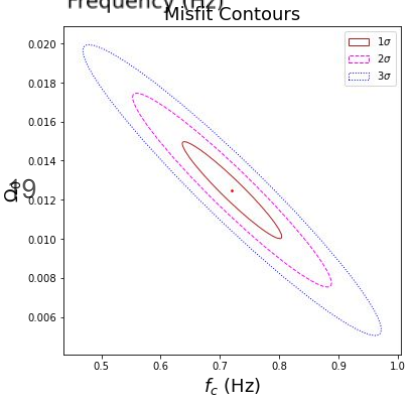
Mw 5.13
fc 1.02 Hz
s.d. 65 MPa



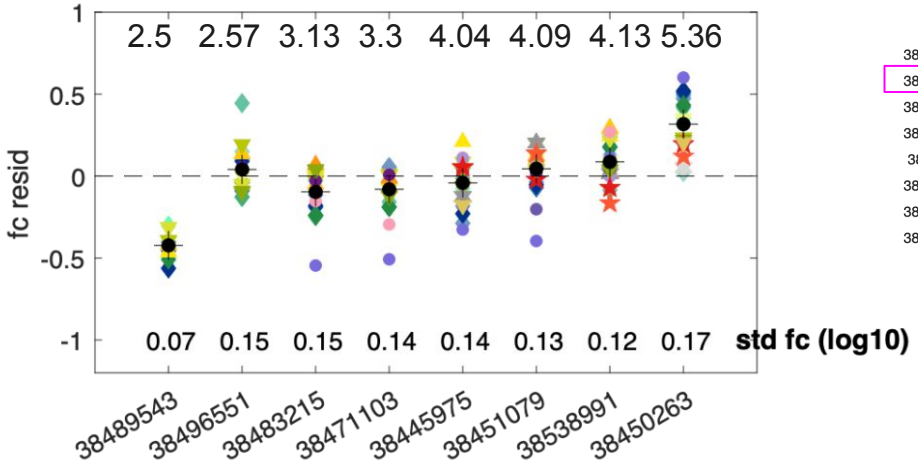


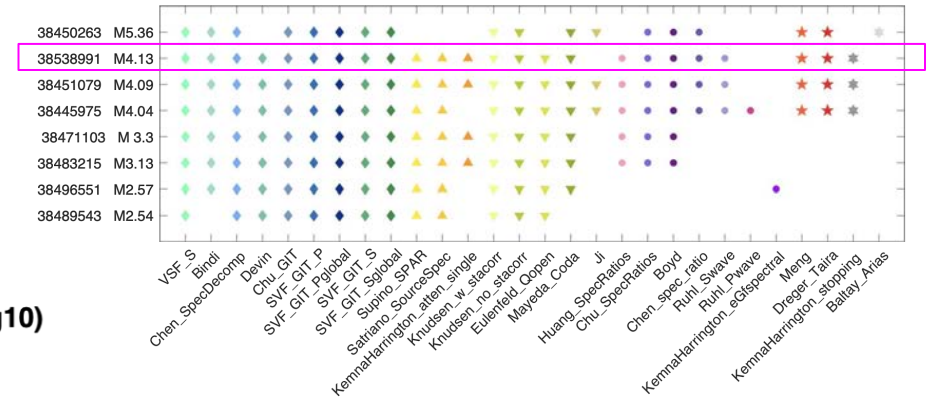
Without station terms

Mw 5.31
fc 0.72 Hz
s.d. 42 MPa



M4.14 38538991



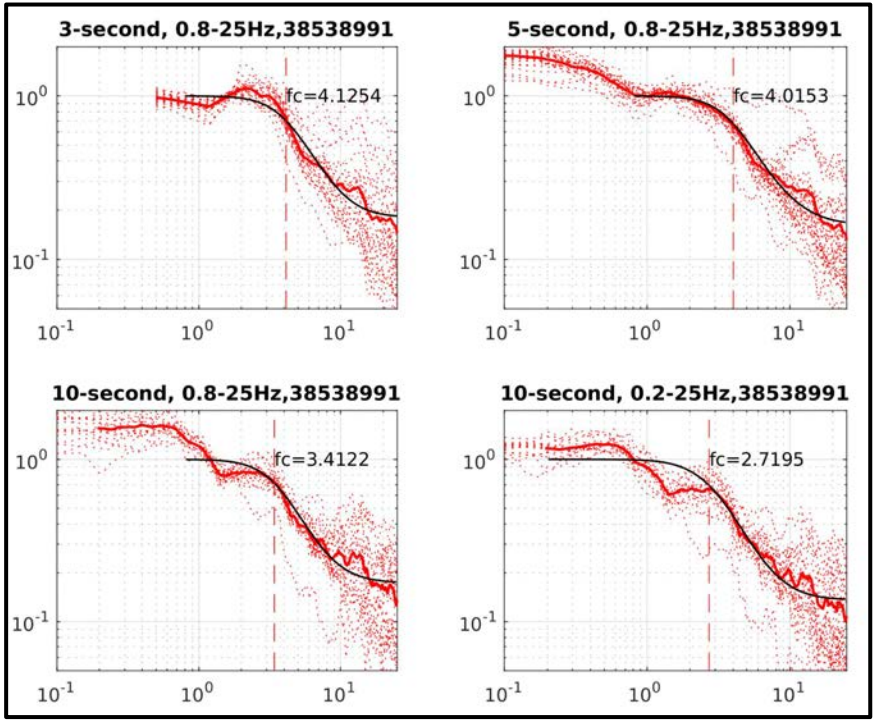


All submitted results

M4.14 38538991

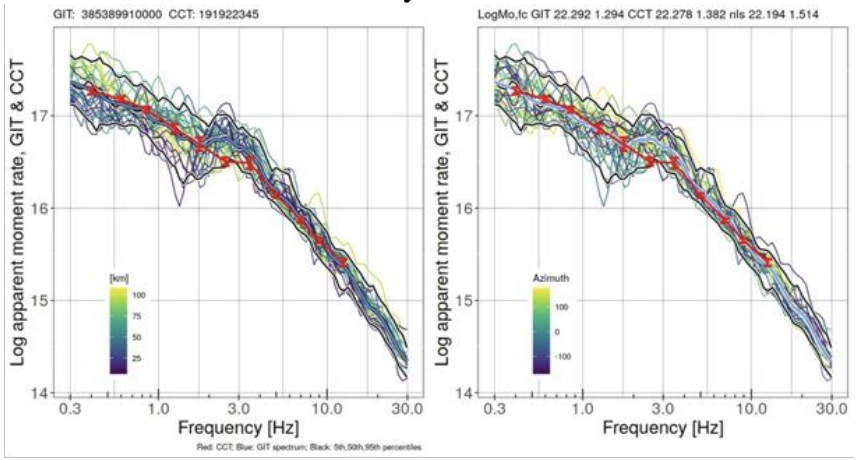
Shanna: Strong azimuthal dependence
Pennington: very variable (esp. Mo) with window/bandwidth

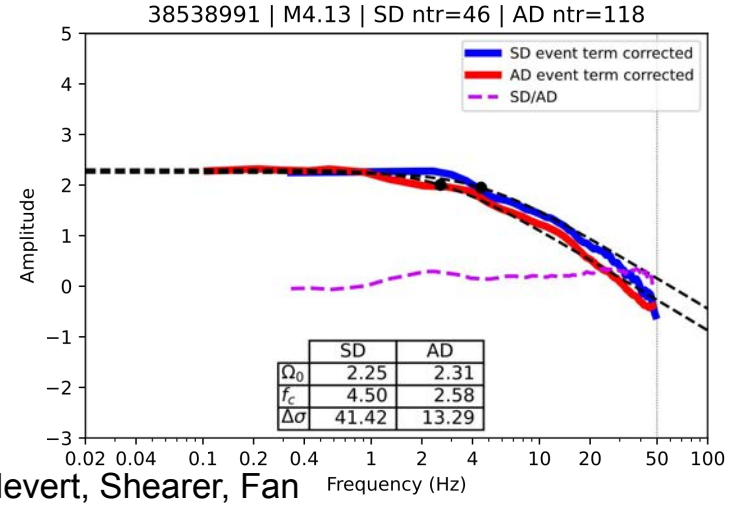
38538991 fc: 2.7-4.1



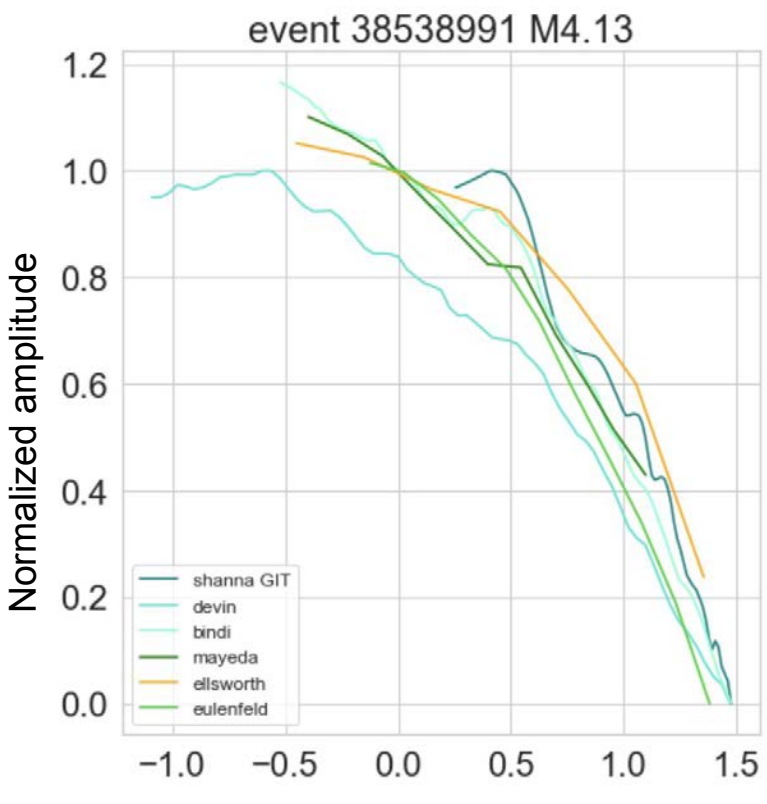
Chen & Pennington

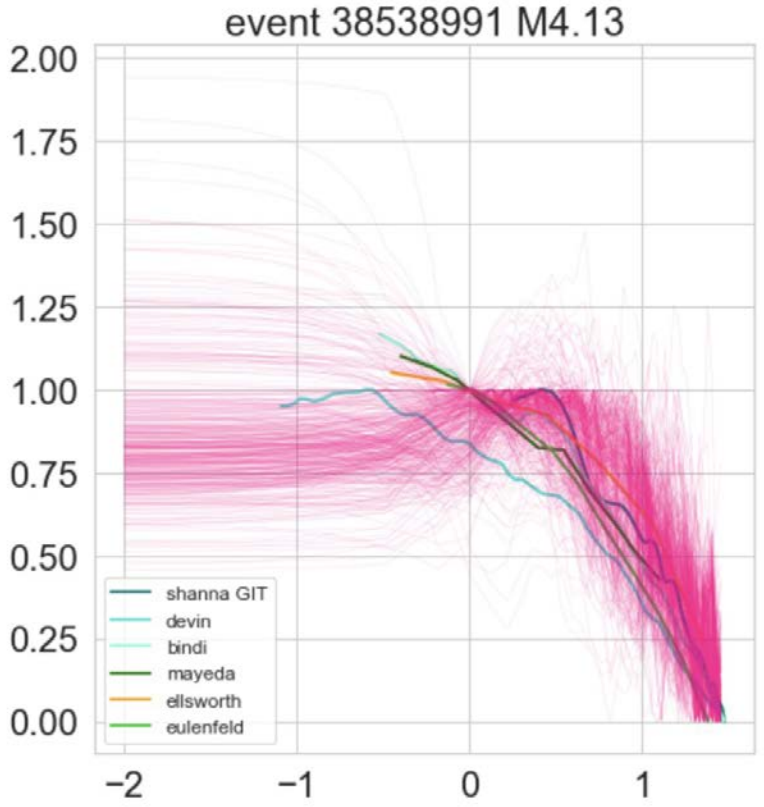
Mayeda, Bindi et al.





Vandevert, Shearer, Fan





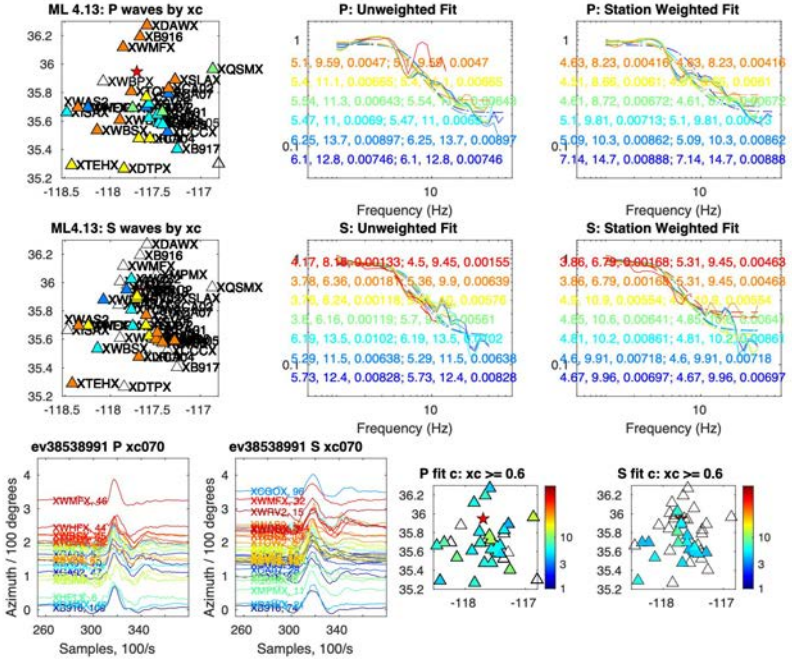
Chu, from provided spectra

38538991 M4.13

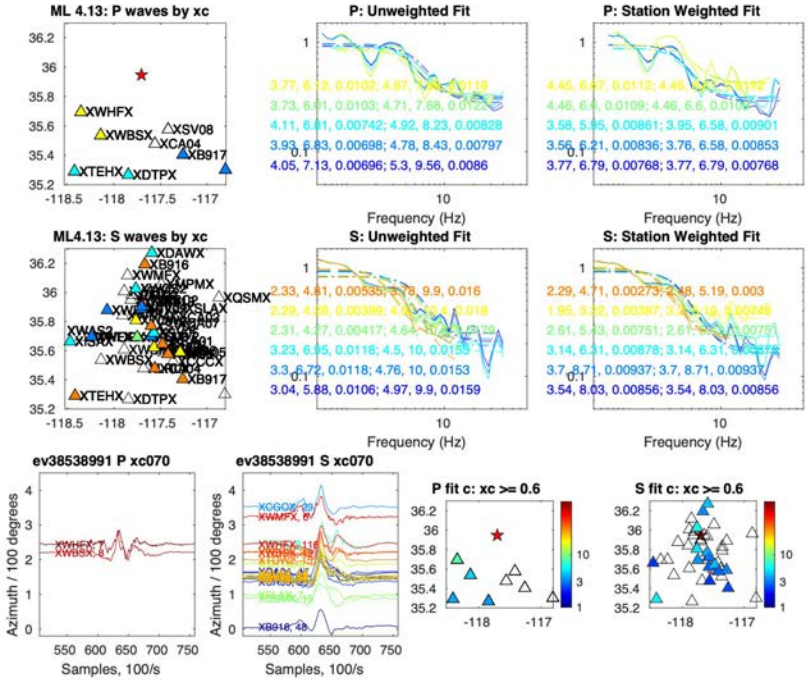
Abercrombie

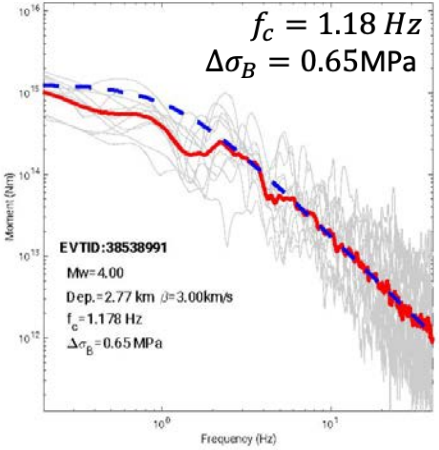
Minimum cross correlation =
[0.5 0.5 0.6 0.7 0.7 0.8 0.9]
Max depth difference to main =
[10 1 10 10 1 10 10]

0.5 NSEC = 3.15 s



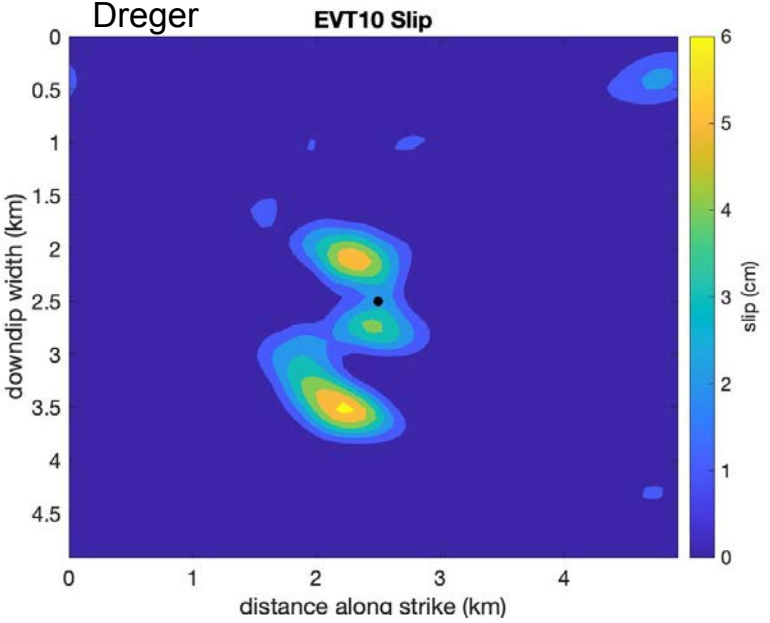
1 NSEC = 6.3 s

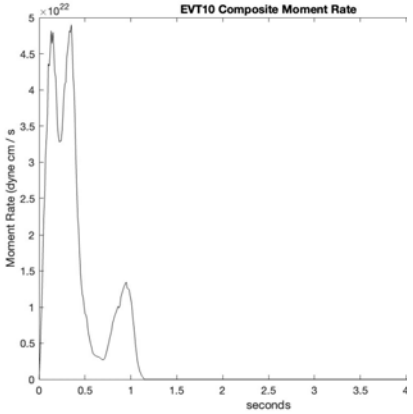


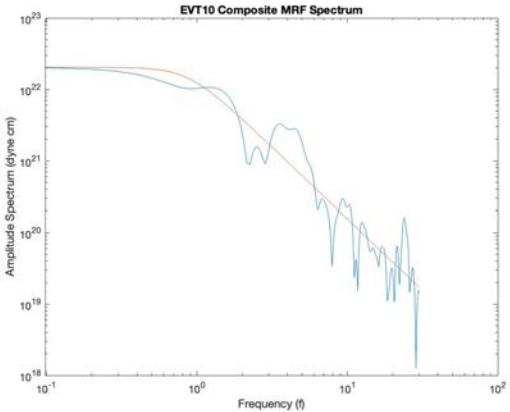


Ji, Archleta, Peyton

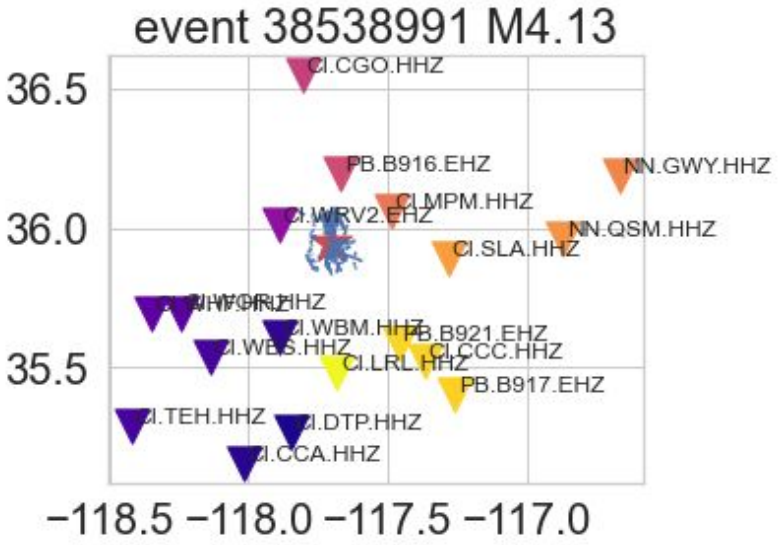
Dreger







Chu


event 38538991 M4.13
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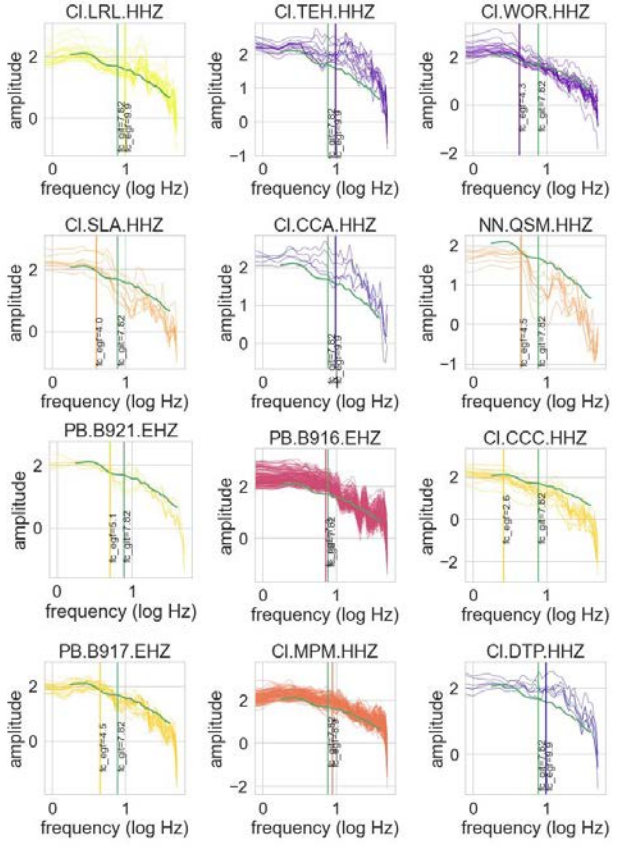
PB.B916.EHZ
NN.GWY.HHZ
CI.MPM.HHZ
CI.WRV2.EHZ
NN.QSM.HHZ
CI.SLA.HHZ
CI.WBM.HHZ
PB.B921.EHZ
CI.WBS.HHZ
CI.CCC.HHZ
CI.LRL.HHZ
PB.B917.EHZ
CI.TEH.HHZ
CI.DTP.HHZ
CI.CCA.HHZ
36.5
36.0
35.5
−118.5 −118.0 −117.5 −117.0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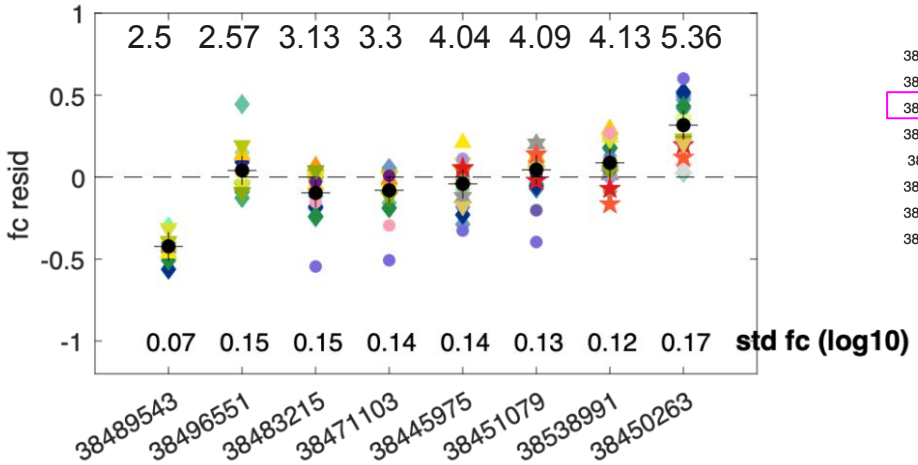
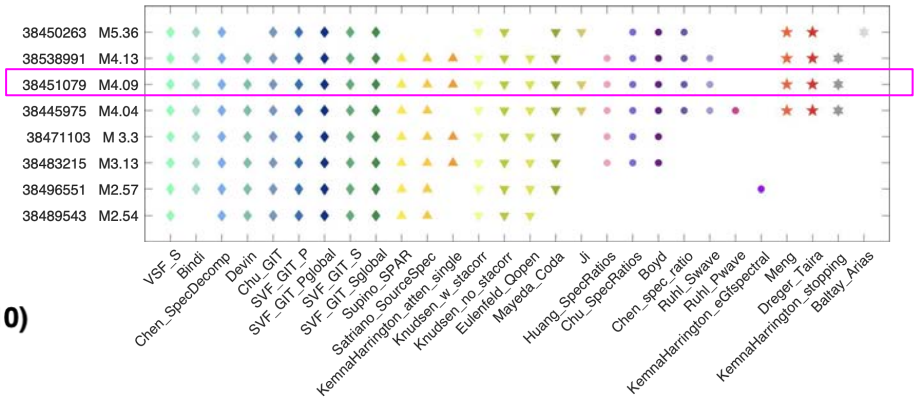
PB.B916.EHZ
CI.CCC.HHZ
PB.B917.EHZ
CI.MPM.HHZ
CI.DTP.HHZ
amplitude
frequency (log Hz)

M4.09 38451079

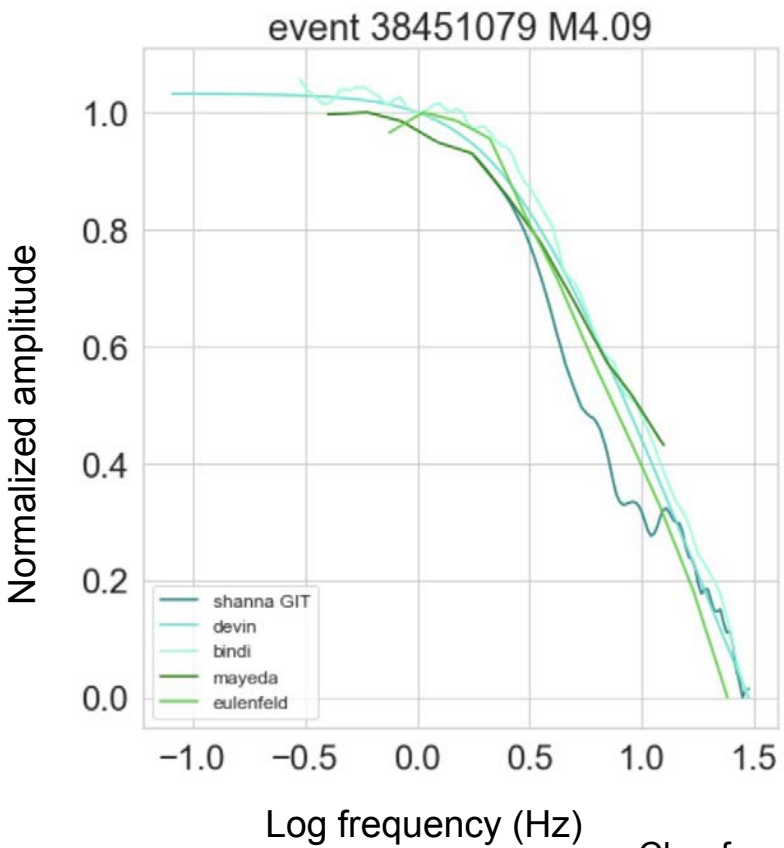


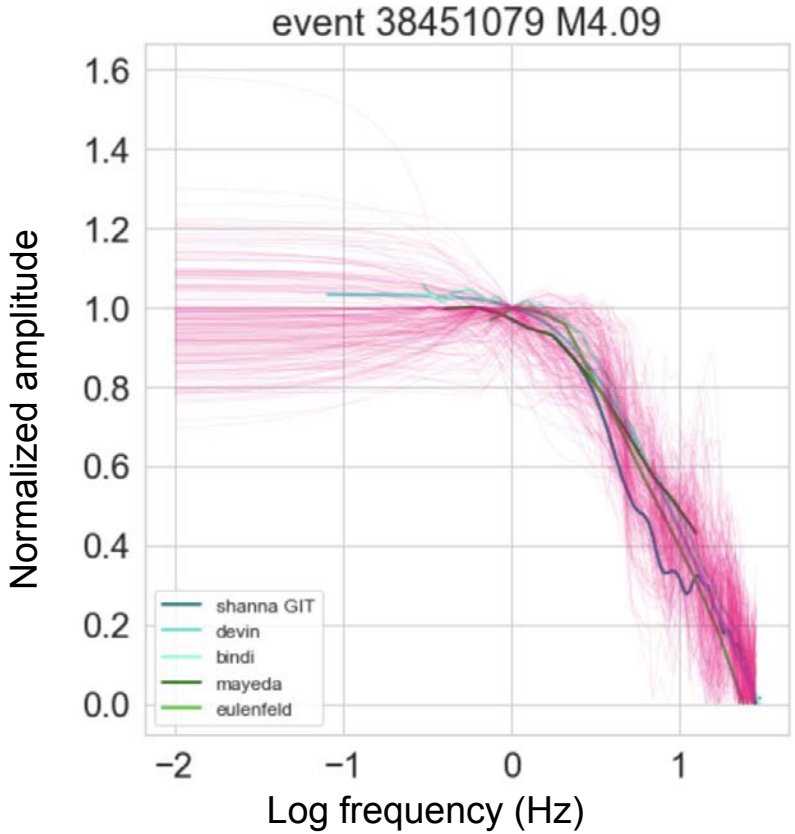


All submitted results

8 event spectra

Pennington: more variable spectra with different windows





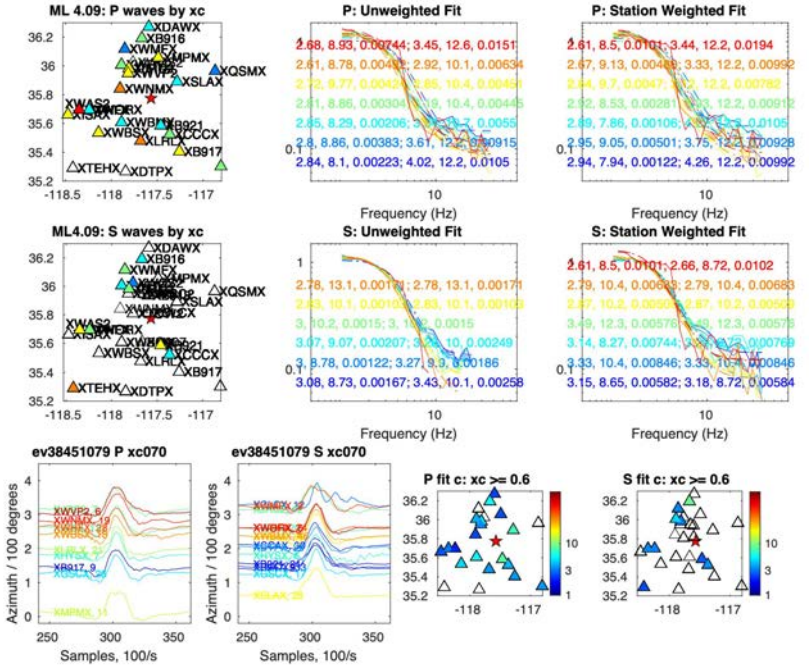
Chu, from provided spectra

Abercrombie

Rachel EGF Spectra: 38451079 M4.09

Minimum cross correlation =
[0.5 0.5 0.6 0.7 0.7 0.8 0.9]
Max depth difference to main =
[10 1 10 10 1 10 10]

0.5 NSEC = 3 s



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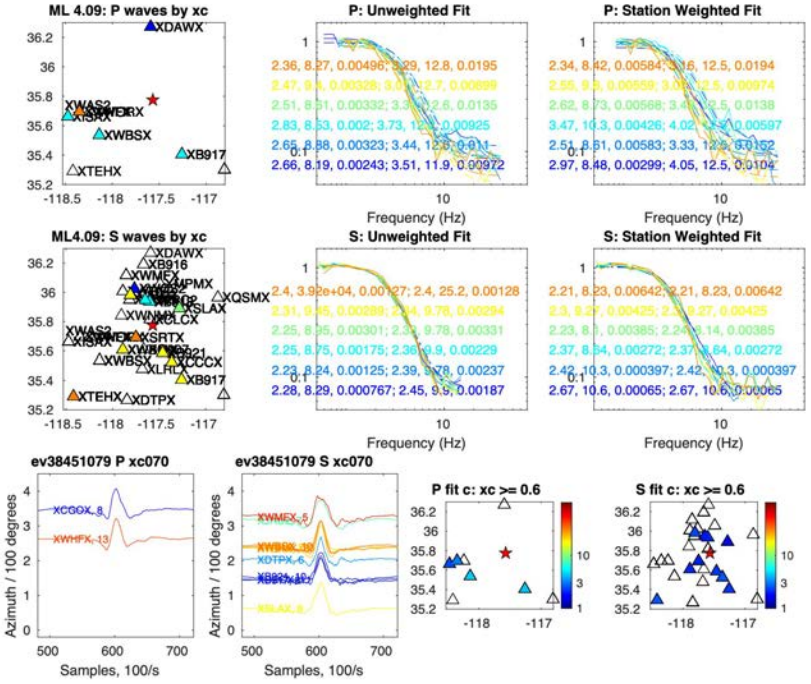
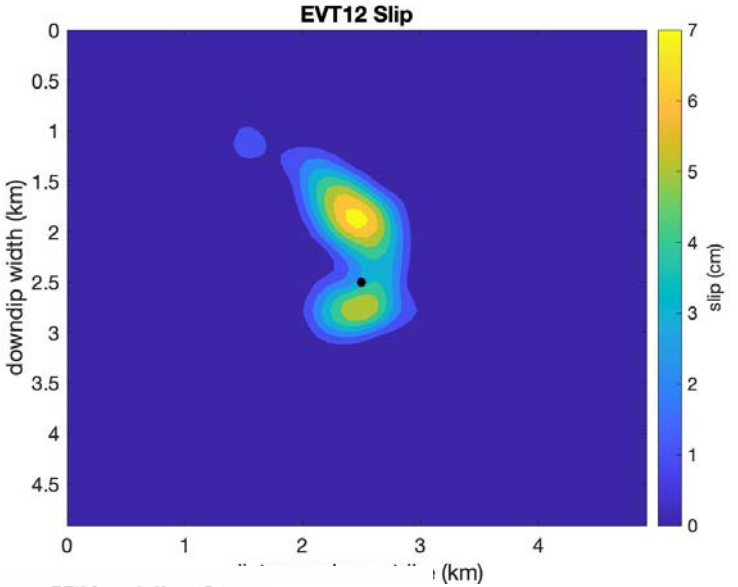
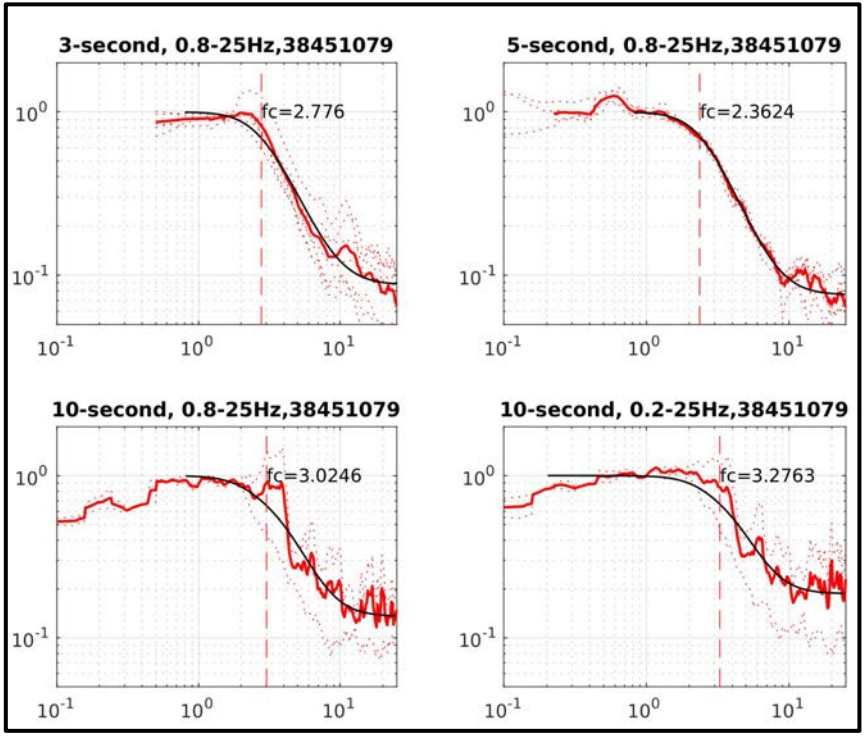


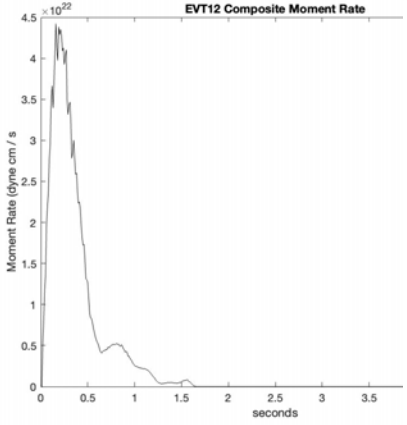
Dreger

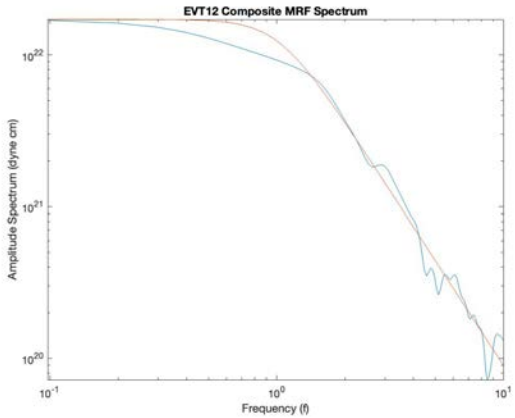


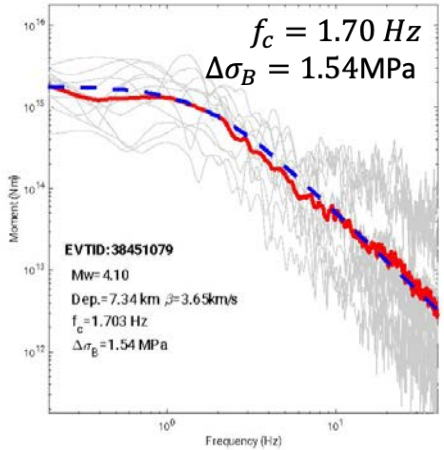
38451079 fc: 2.3-3.2



Chen & Pennington

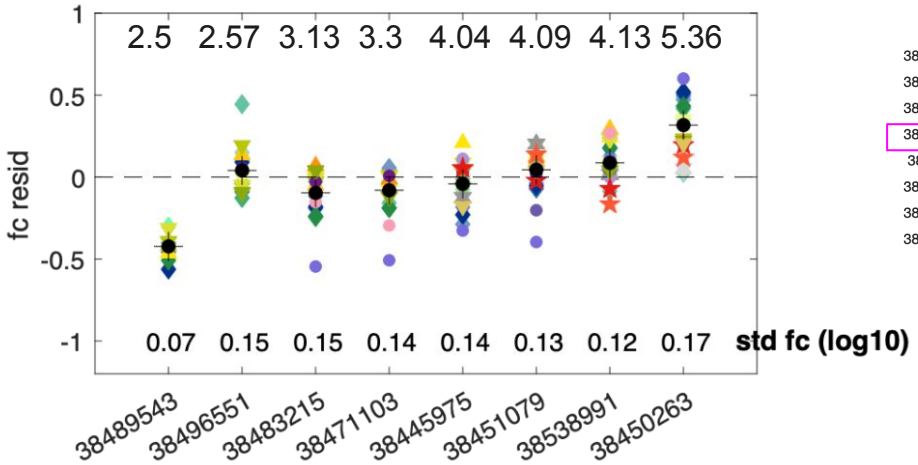


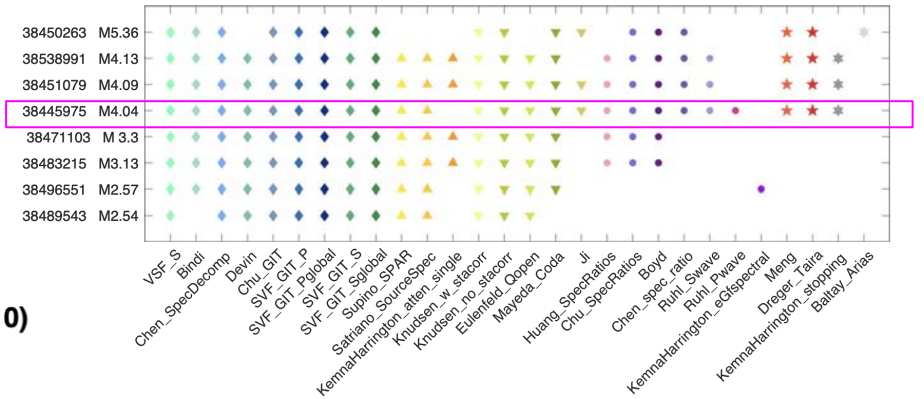




Ji, Archuleta, Peyton

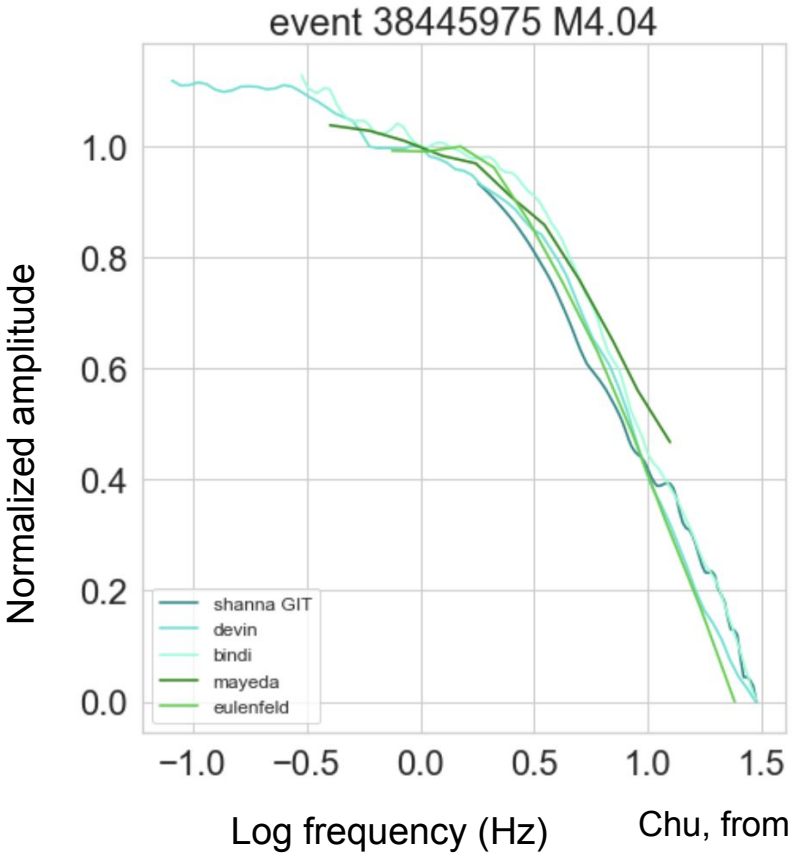
M4.04 38445975

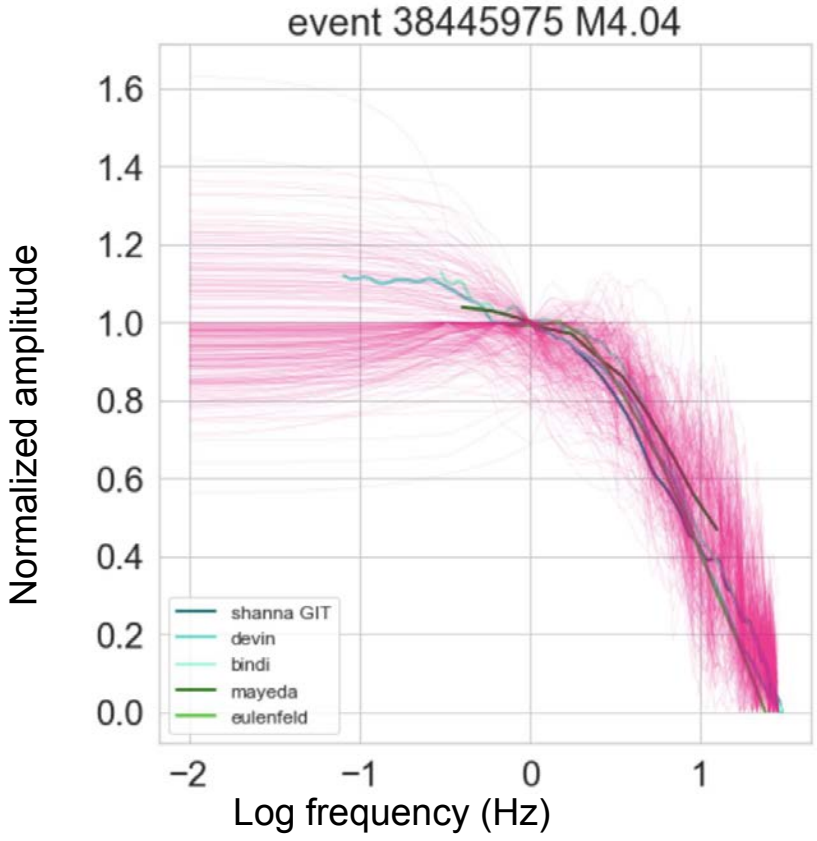




All submitted results

Knudsen/Ellsworth: not well fit with Brune
Shanna: Strong azimuthal dependence
Pennington: stable regardless of window/bandwidth





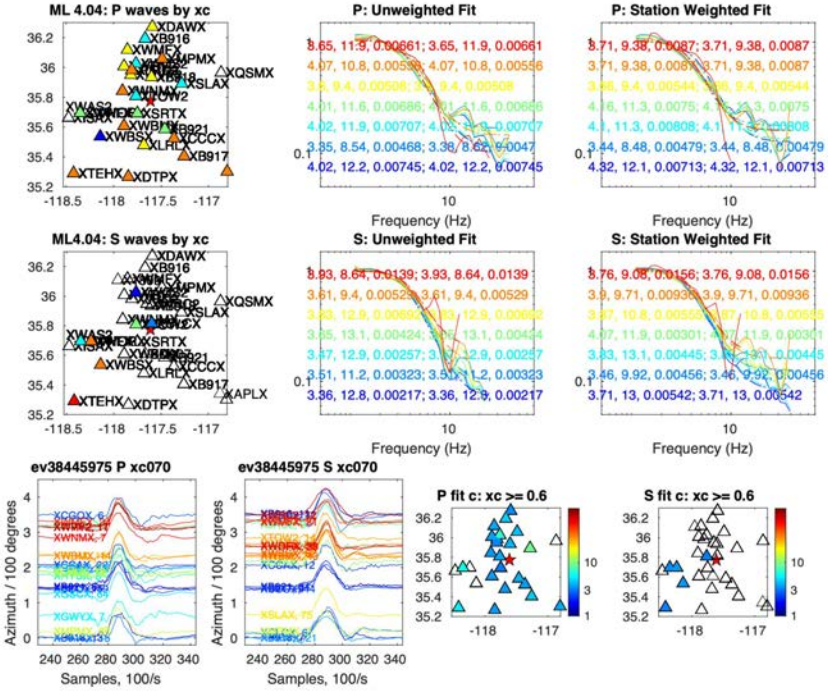
Chu, from provided spectra

Abercrombie

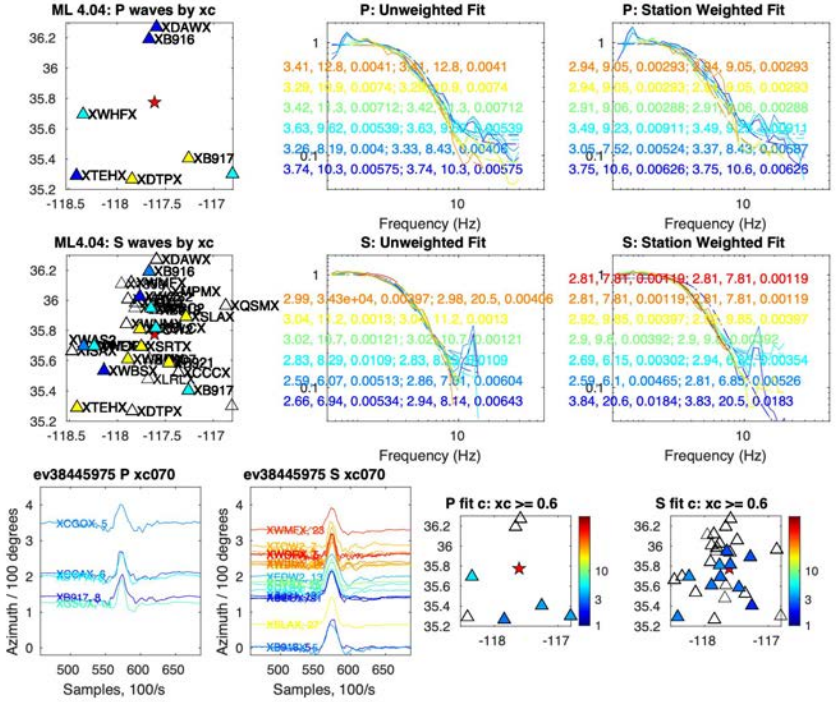
Rachel EGF Spectra: 38445975 M4.04

Minimum cross correlation =
[0.5 0.5 0.6 0.7 0.7 0.8 0.9]
Max depth difference to main =
[10 1 10 10 1 10 10]

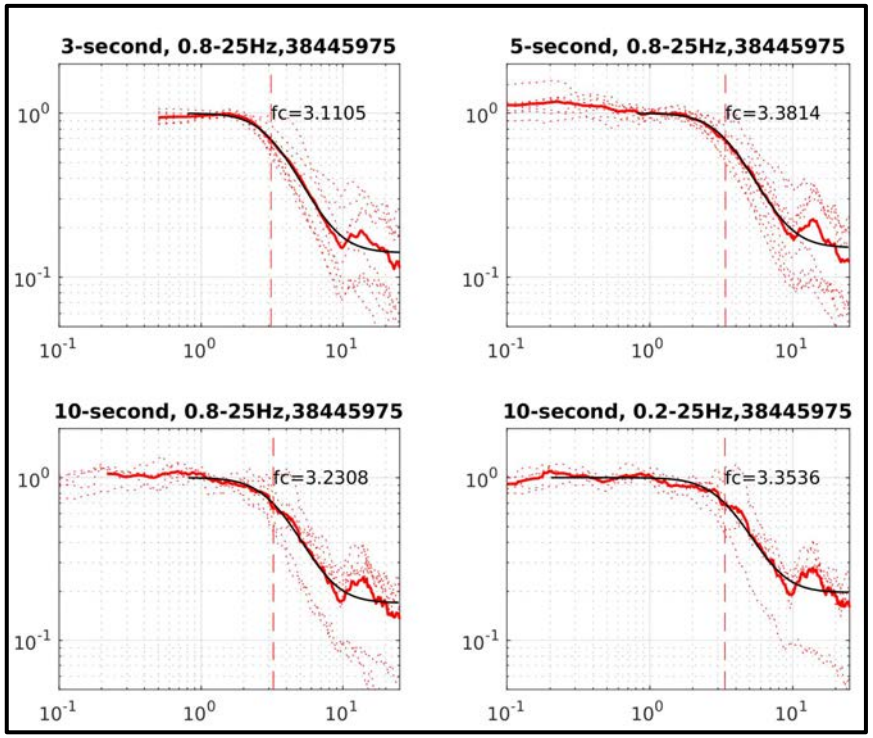
0.5 NSEC = 2.85 s



1 NSEC = 5.70 s

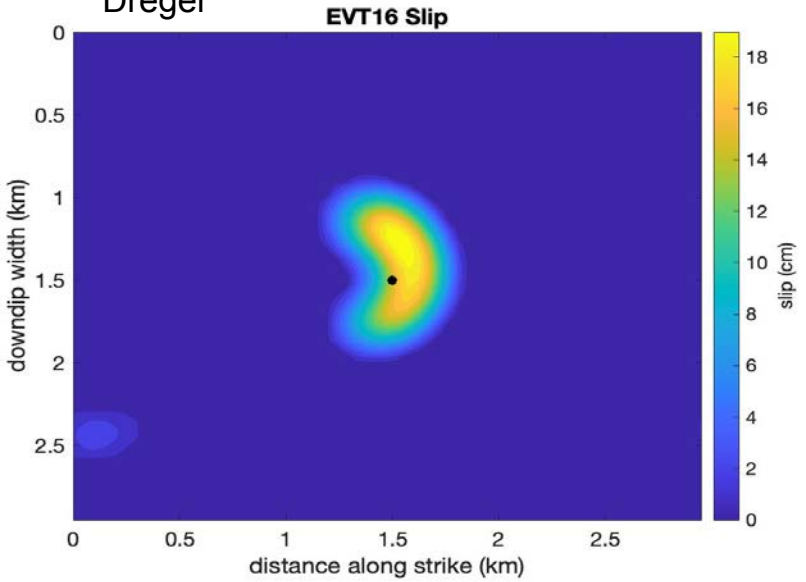


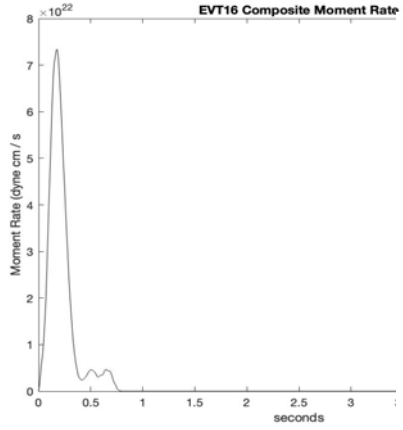
38445975 fc: 3.1-3.4

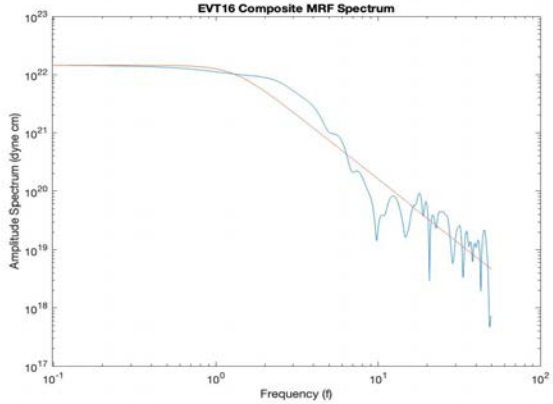


Chen & Pennington

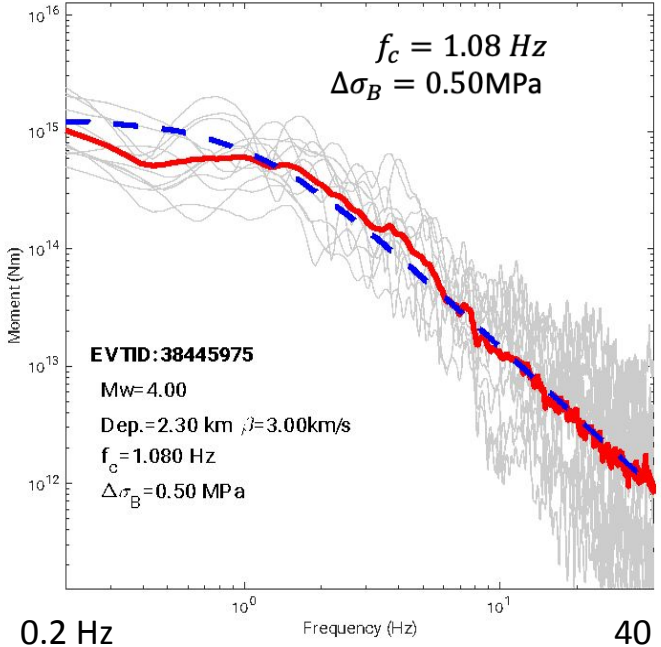
Dreger





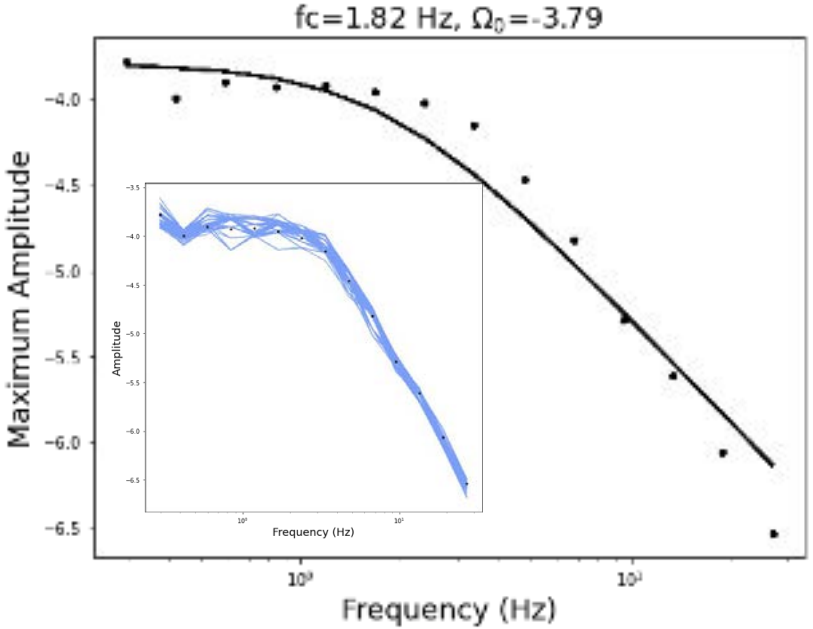


Butterworth highpass filter (f_h =0.1 Hz)



0.2 Hz 40 Hz

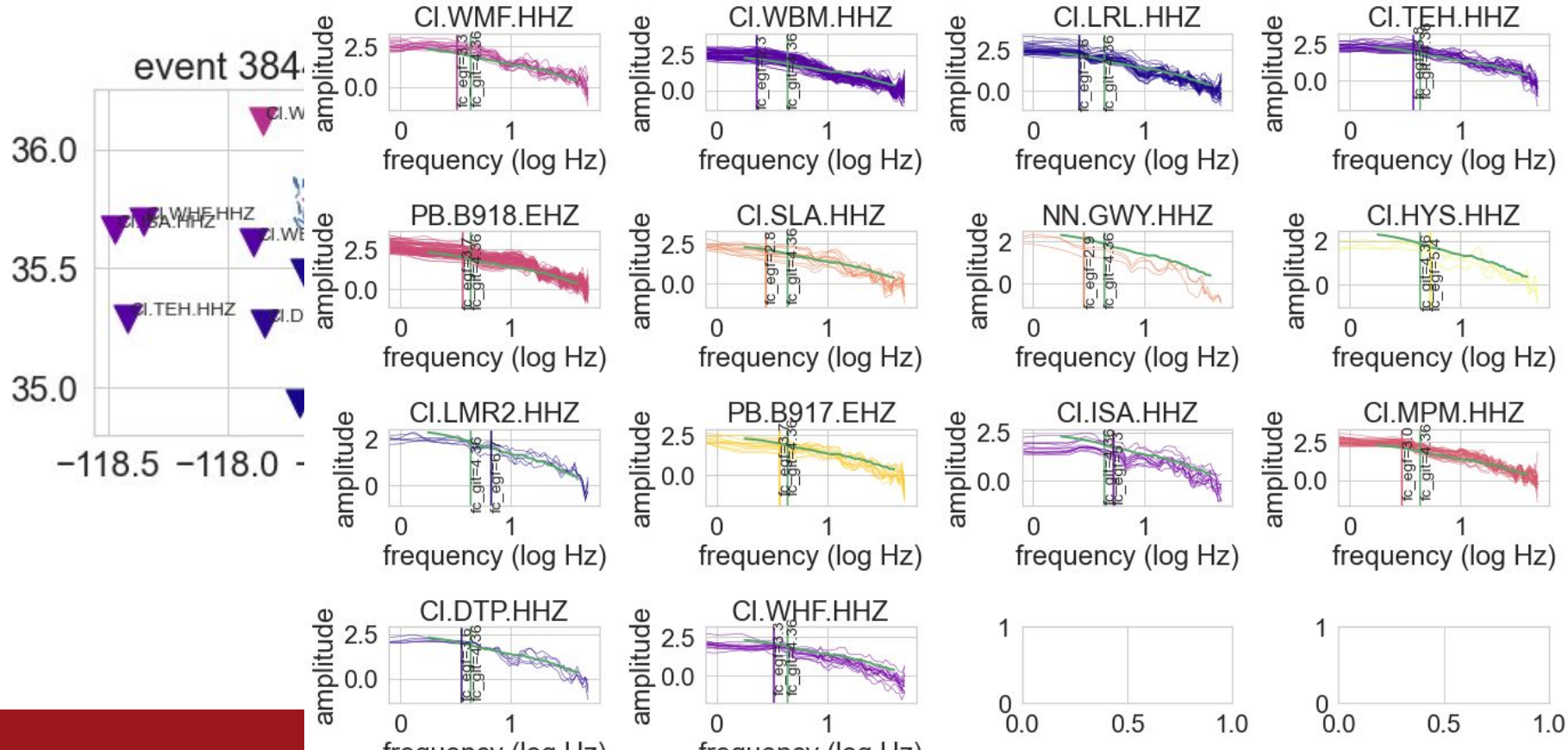
Ji, Archuleta, Peyton



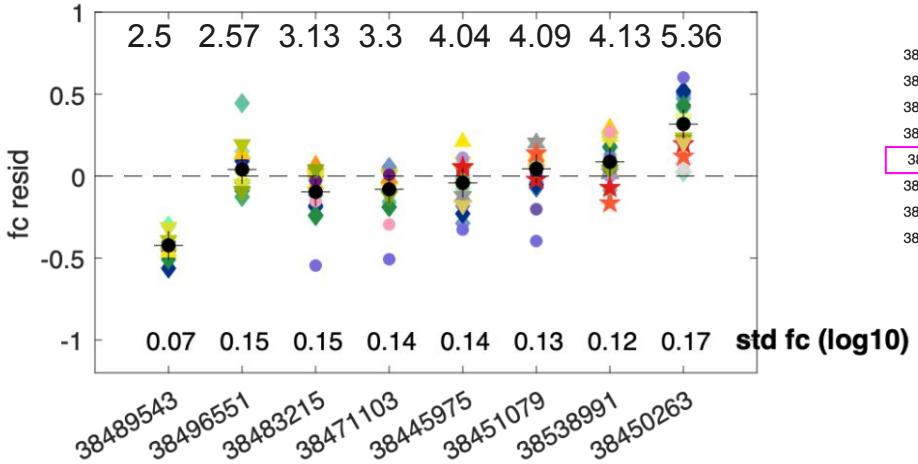
Knudsen, Ellsworth

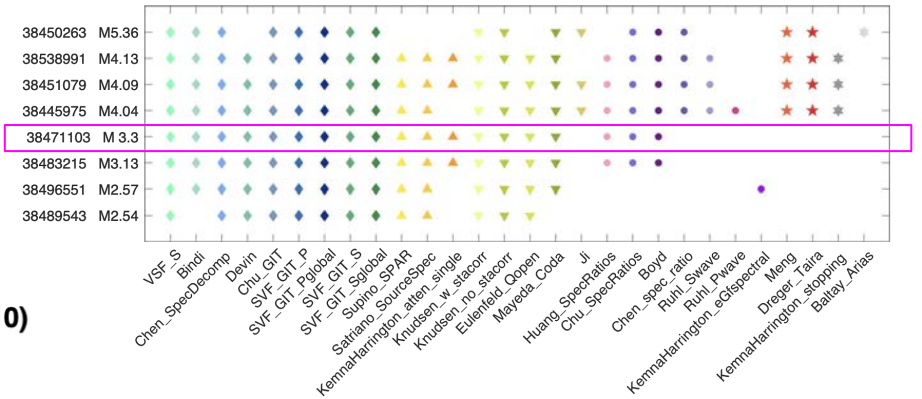
F_c ~ 4.3 with GIT and 2.9-5.7 Hz with eGf method. The two methods are closest at PB (borehole) stations.

Chu



M3.3 38471103





All submitted results

38471103 M3.3

Abercrombie

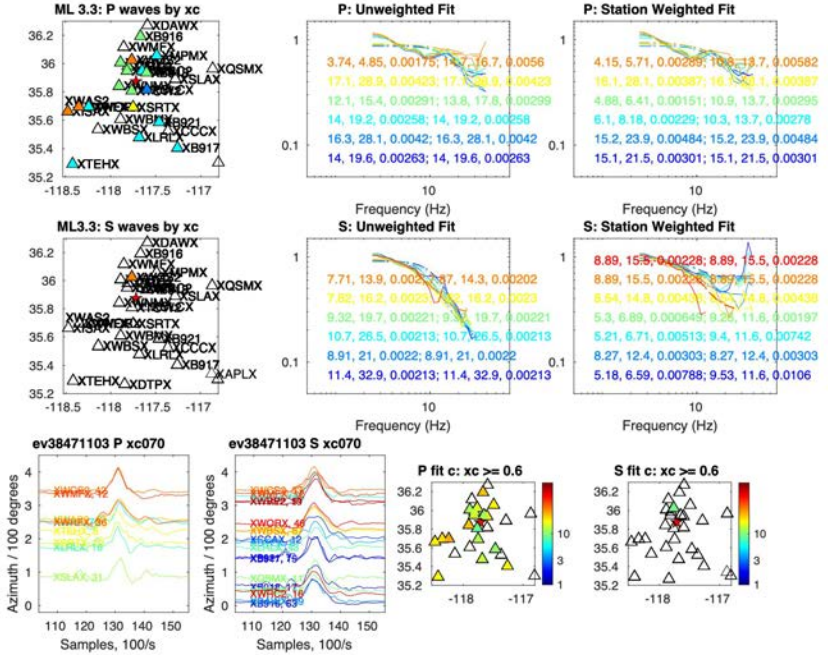
1 NSEC = 1.28 s

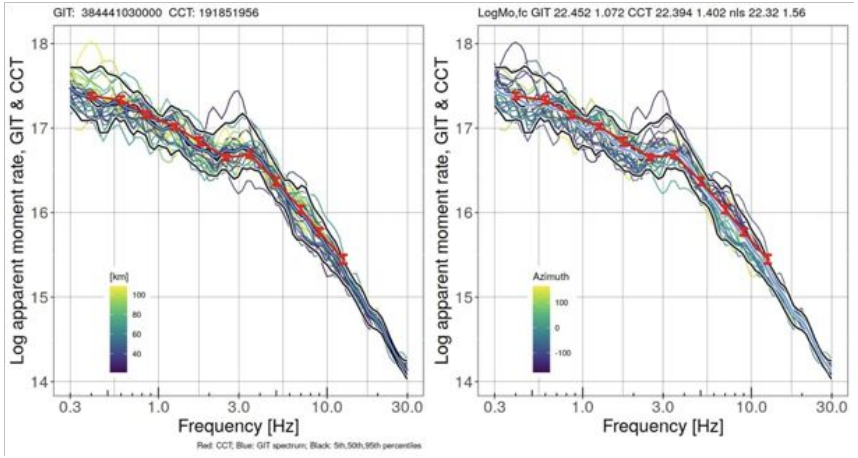
Minimum cross correlation =

[0.5 0.5 0.6 0.7 0.7 0.8 0.9]

Max depth difference to main =

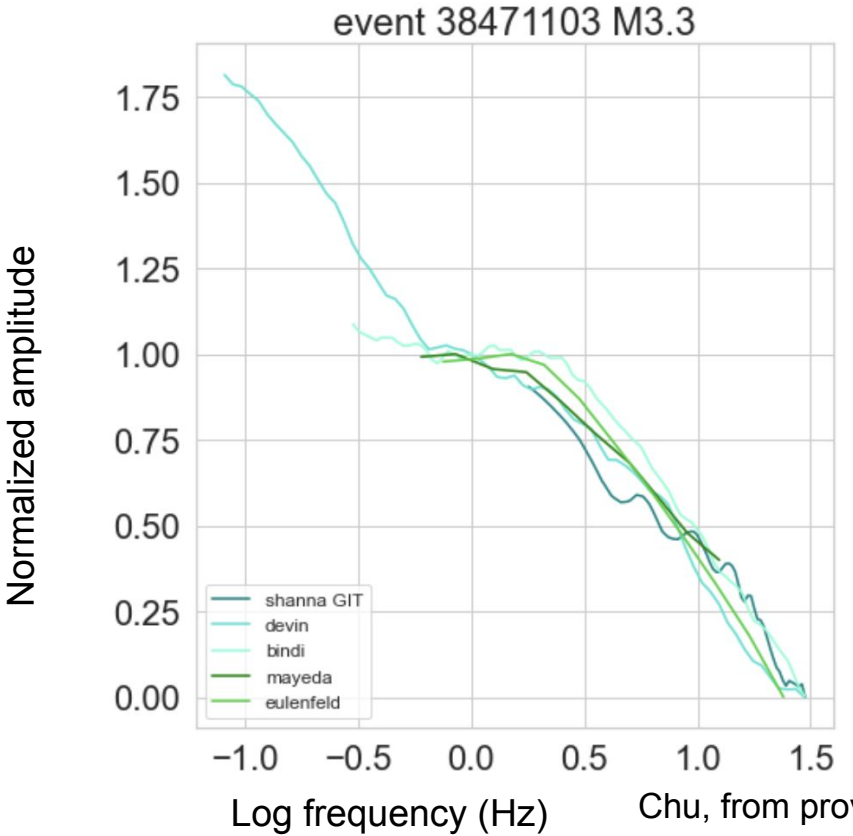
[10 1 10 10 1 10 10]

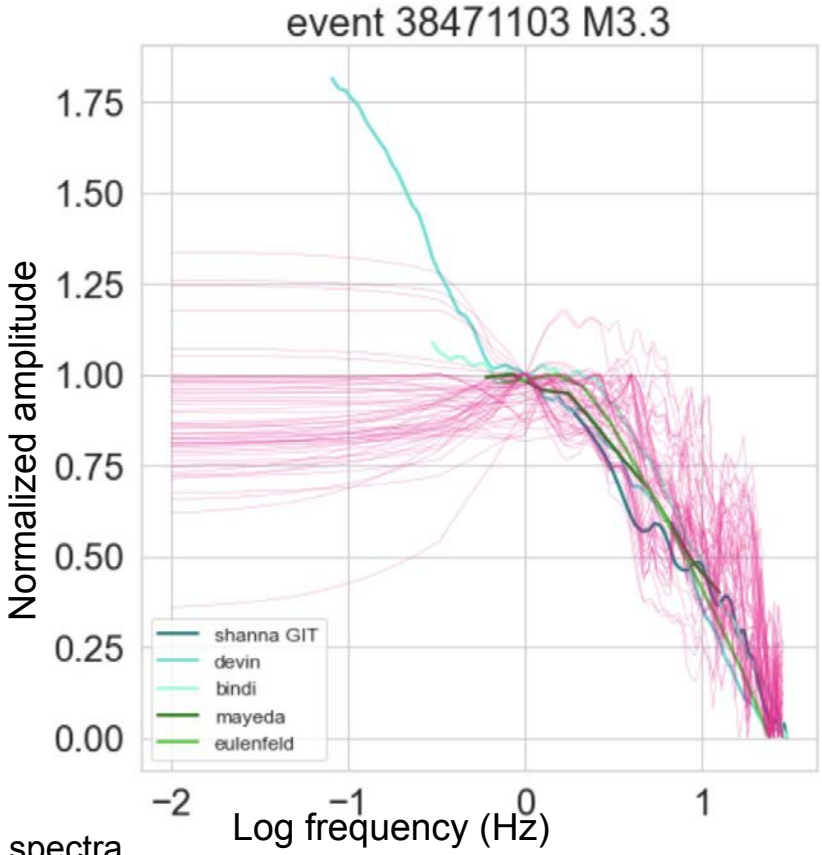




Mayeda, Bindi et al.

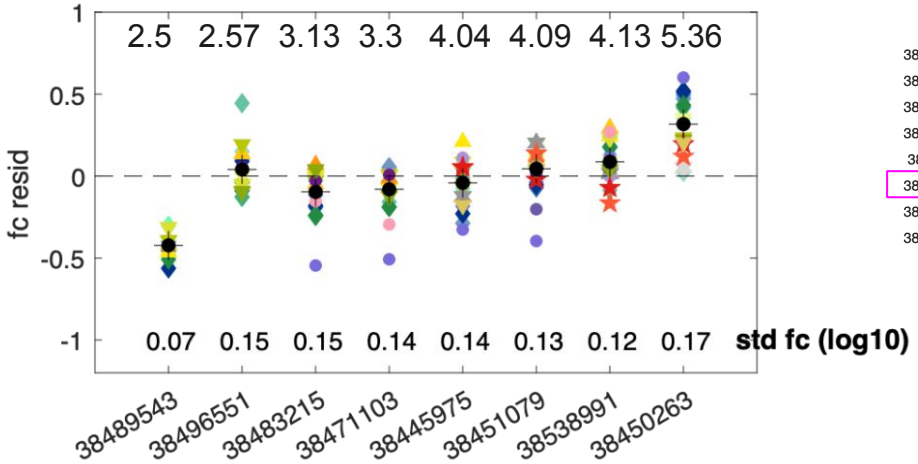
M3.3



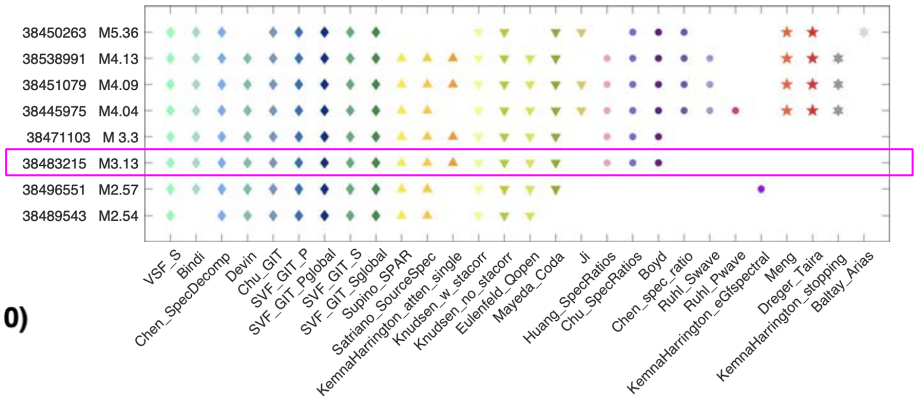


Chu, from provided spectra

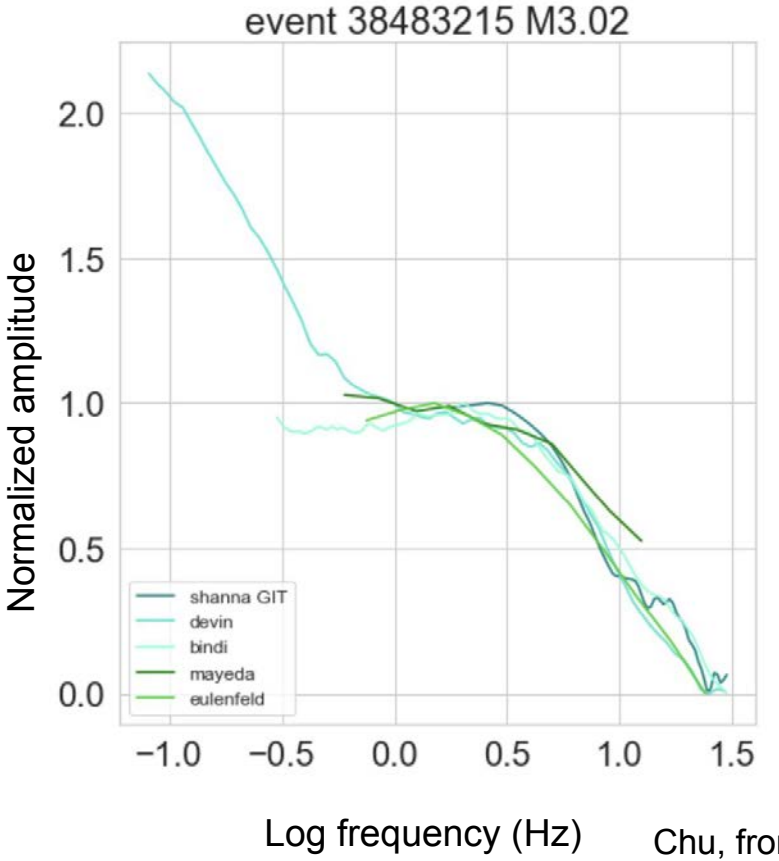
M3.13 38483215



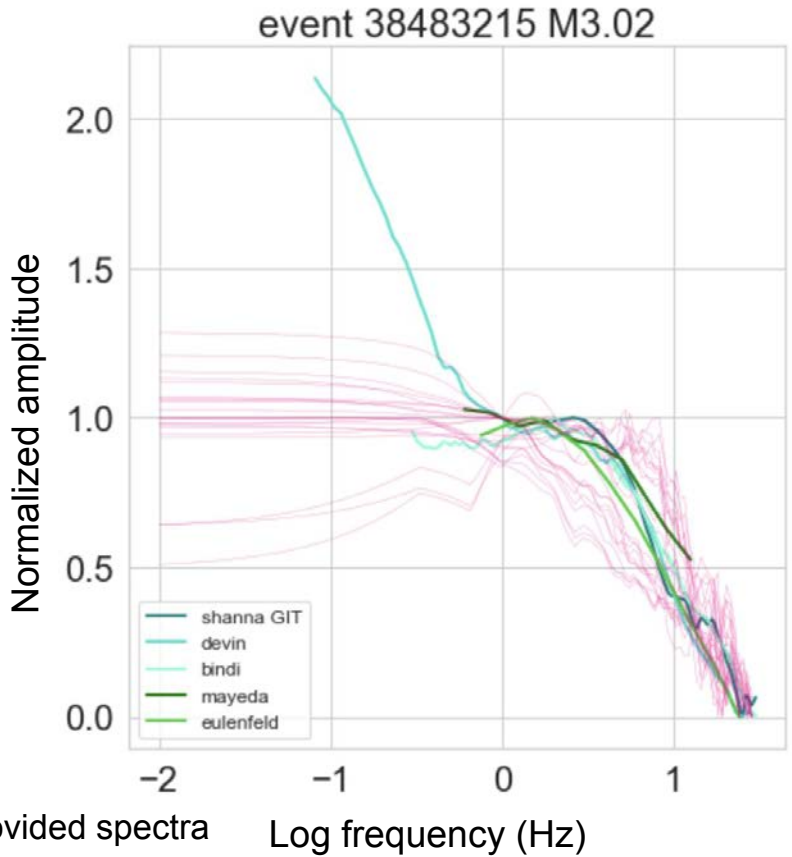
All submitted results



M3.x



Chu, from provided spectra

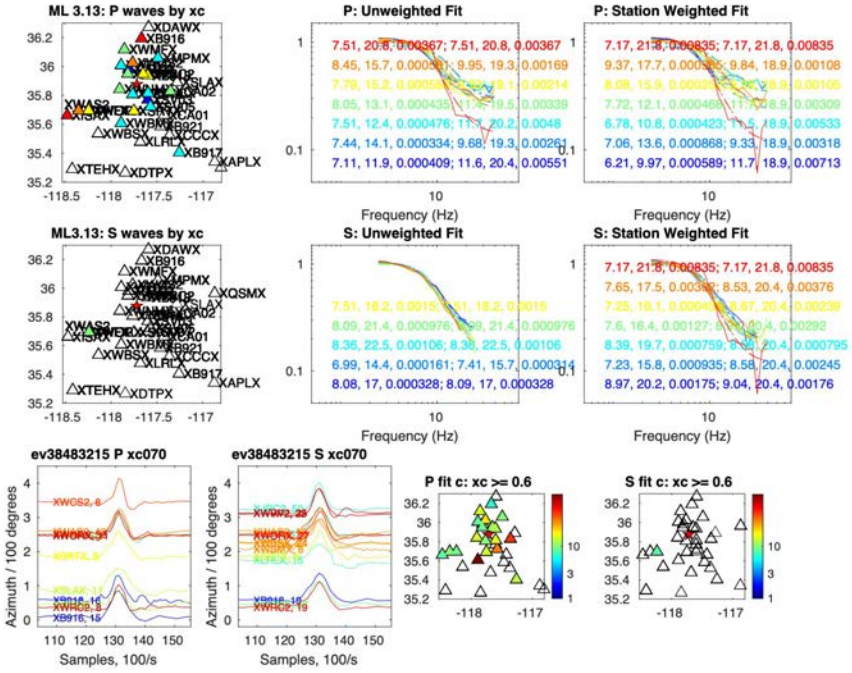


Abercrombie

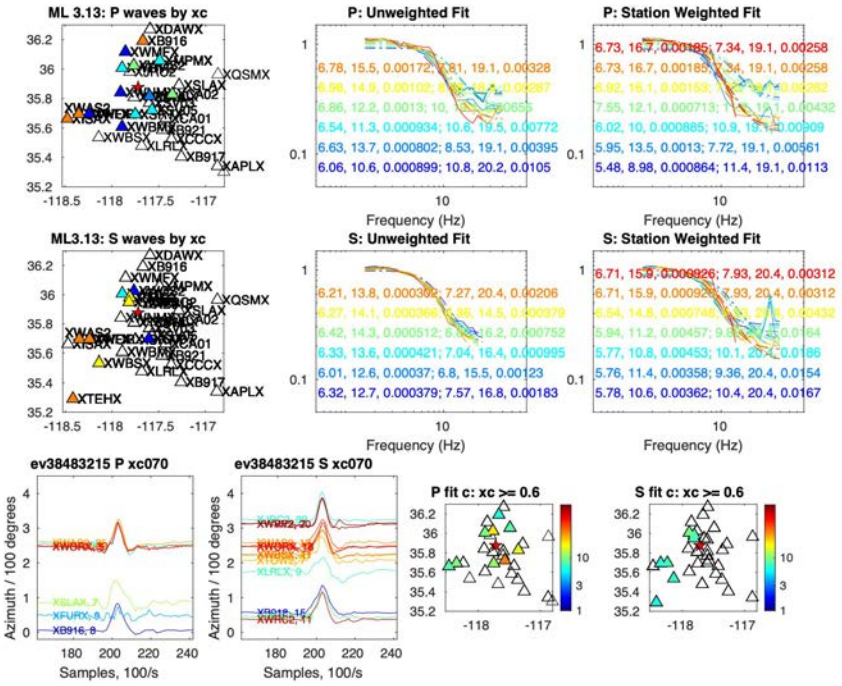
Rachel EGF Spectra: 38483215 M3.13

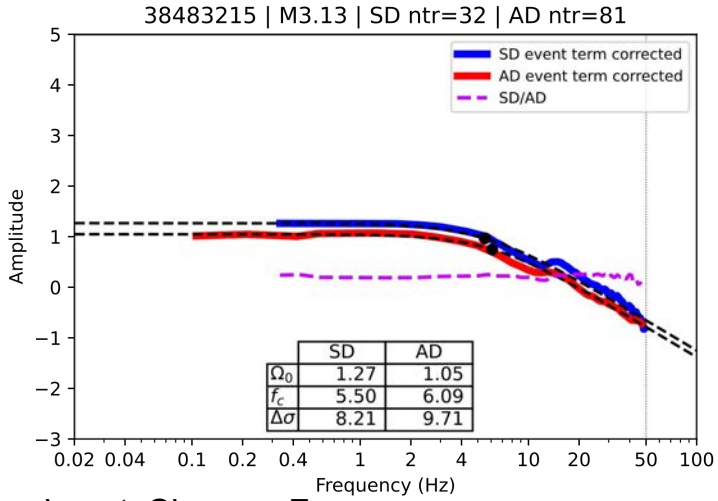
Minimum cross correlation =
[0.5 0.5 0.6 0.7 0.7 0.8 0.9]
Max depth difference to main =
[10 1 10 10 1 10 10]

0.5 NSEC = 1.28 s



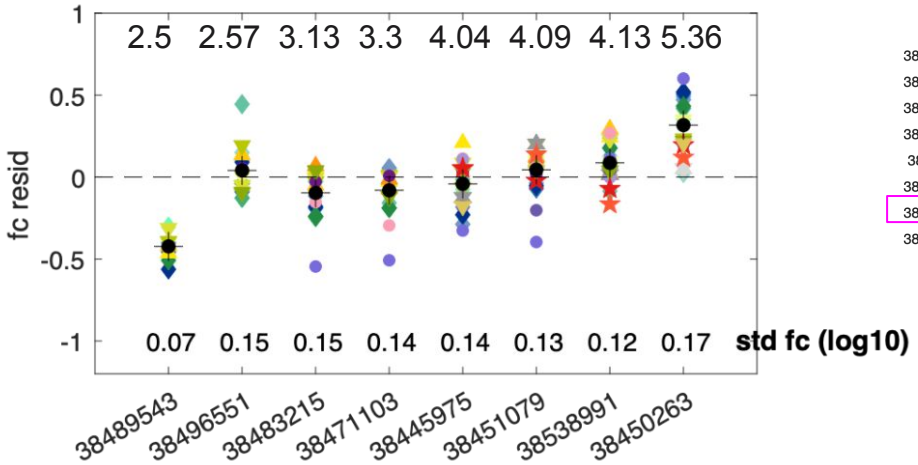
1 NSEC = 2 s

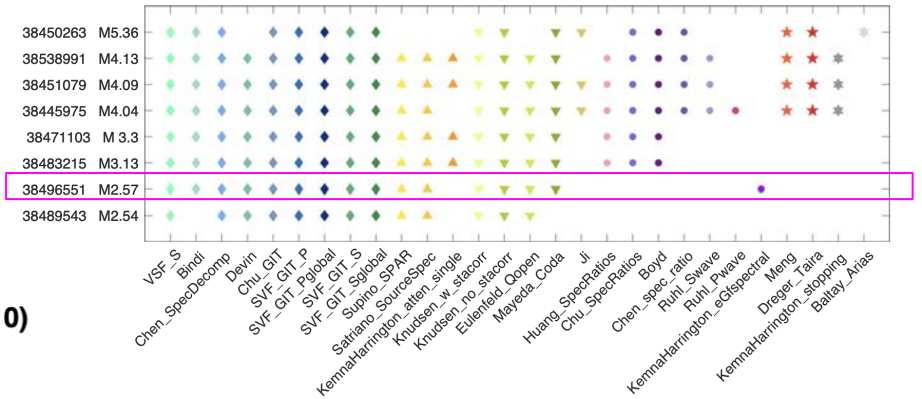




Vandevert, Shearer, Fan

M2.57 38496551





All submitted results

38496551 M2.57

Abercrombie

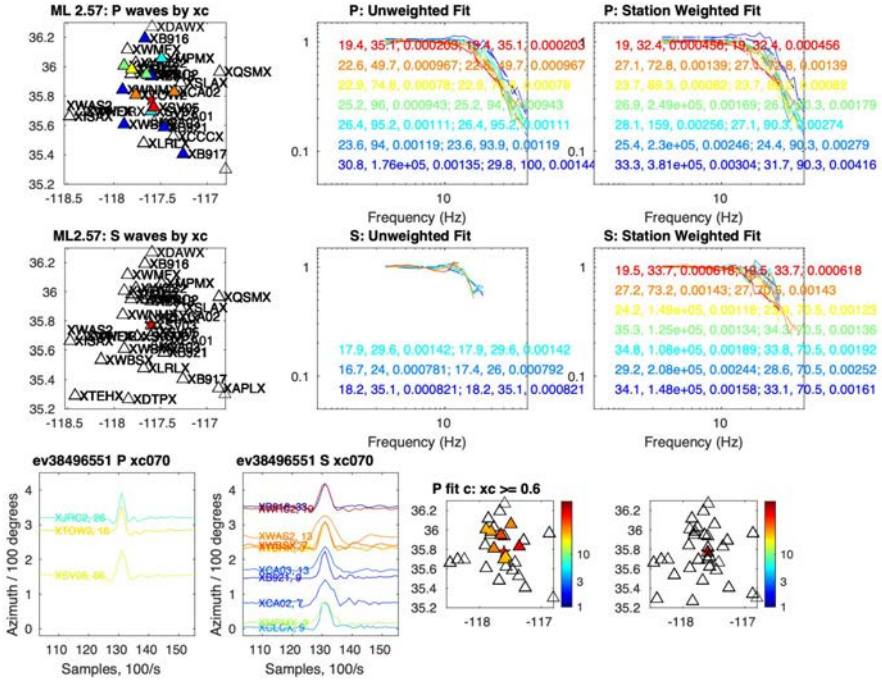
Minimum cross correlation =

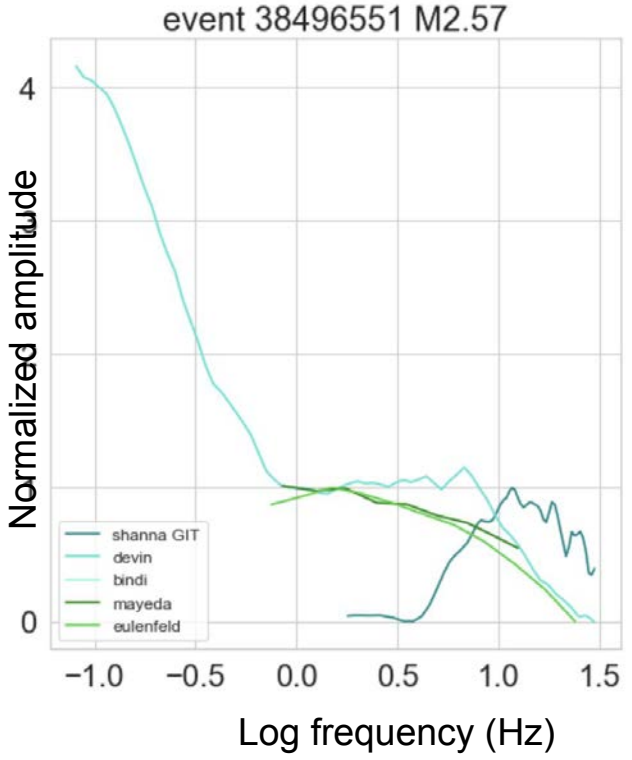
[0.5 0.5 0.6 0.7 0.7 0.8 0.9]

Max depth difference to main =

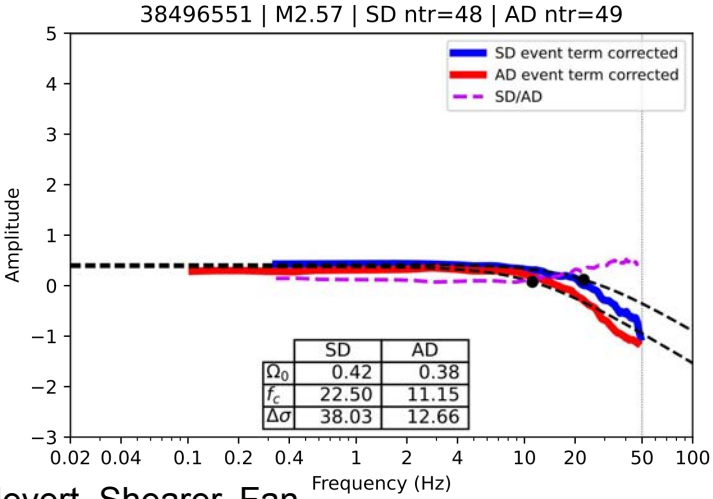
[10 1 10 10 1 10 10]

1 NSEC = 1.28 s





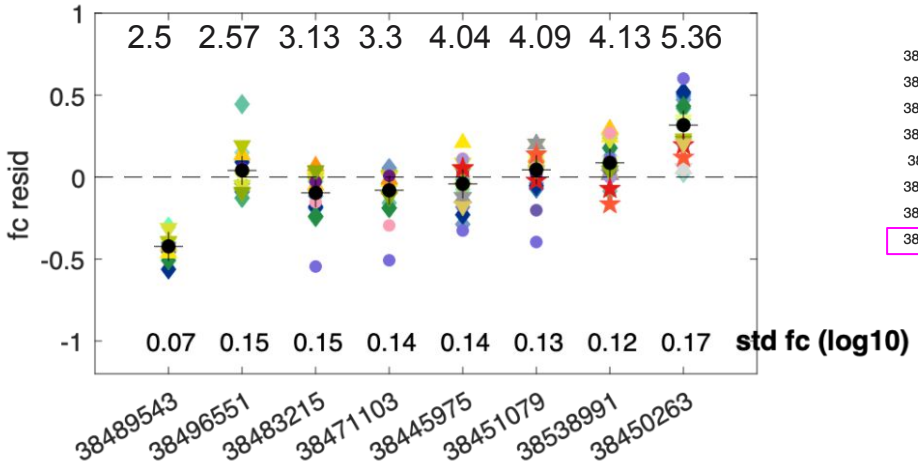
Chu, from provided spectra

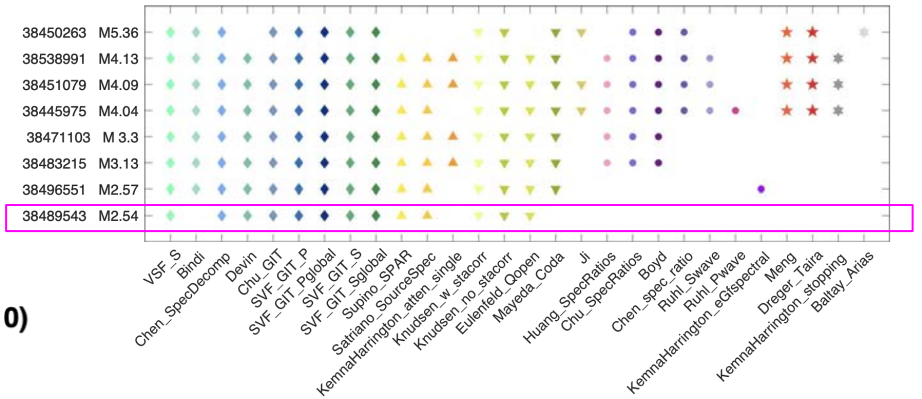


Vandevert, Shearer, Fan

low stress drop?

M2.54 38489543





All submitted results

38489543 M2.54

Abercrombie

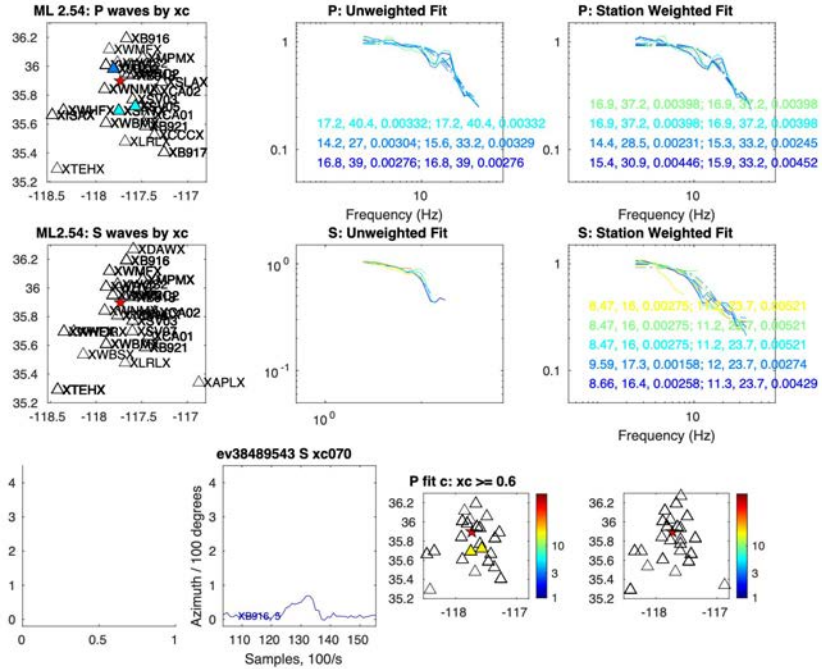
Minimum cross correlation =

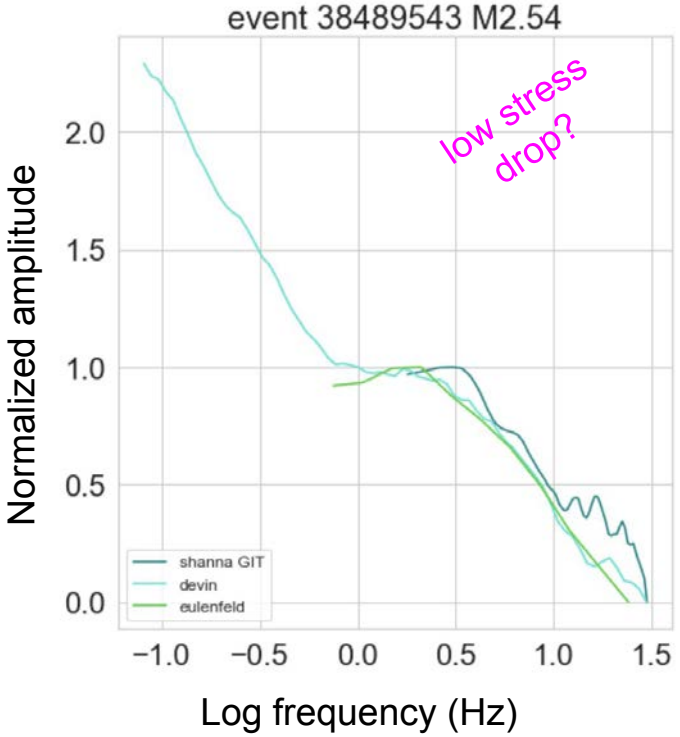
[0.5 0.5 0.6 0.7 0.7 0.8 0.9]

Max depth difference to main =

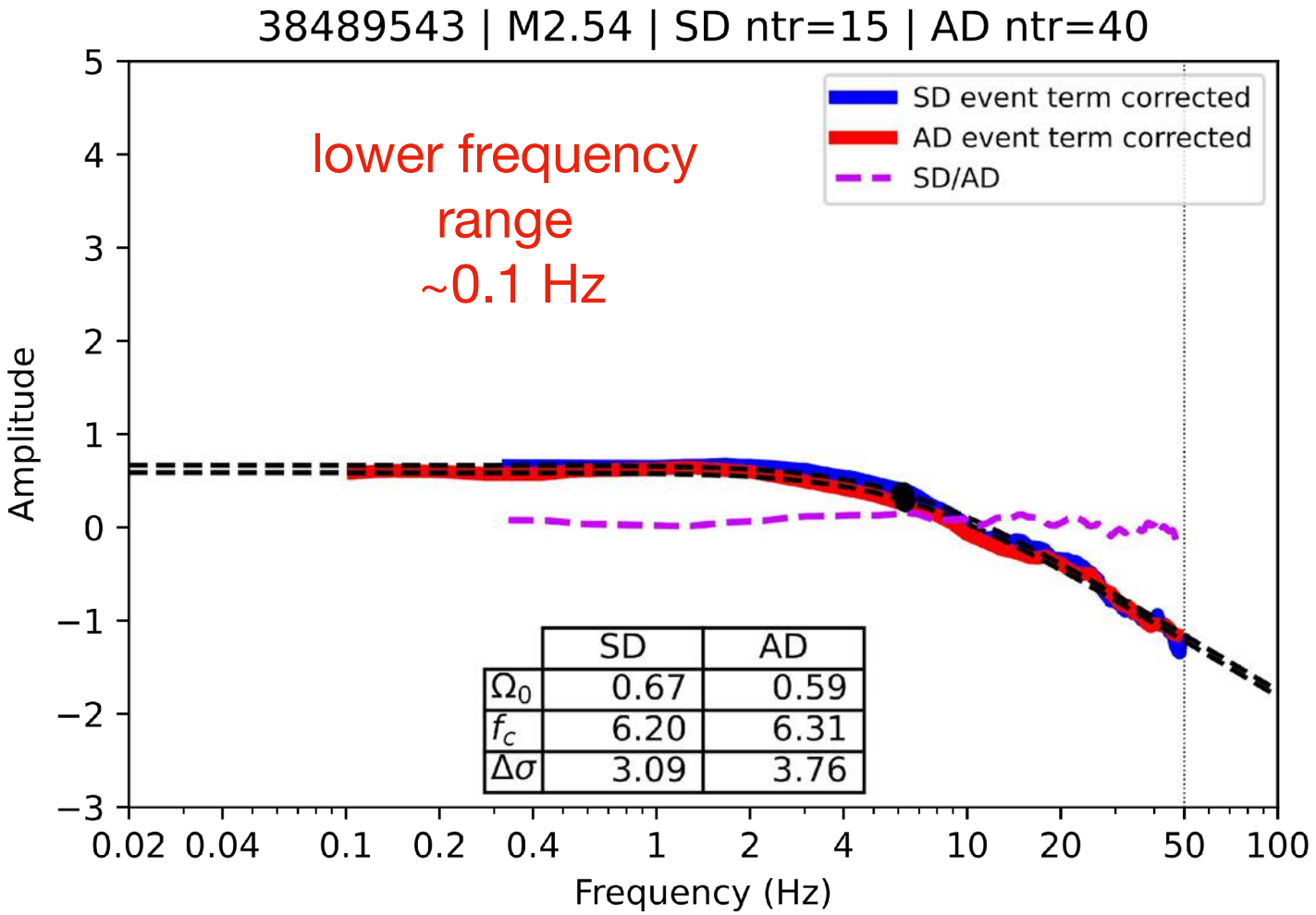
[10 1 10 10 1 10 10]

1 NSEC = 1.28 s





Chu, from provided spectra


38489543 | M2.54 | SD ntr=15 | AD ntr=40
SD event term corrected
AD event term corrected
SD/AD
lower frequency range ~0.1 Hz
Amplitude
Frequency (Hz)
5
4
3
2
1
0
−1
−2
−3
0.02
0.04
0.1
0.2
0.4
1
2
4
10
20
50
100
SD
AD
Ω_0 0.67 0.59
f_c 6.20 6.31
$\Delta\sigma$ 3.09 3.76