GSA DR2017161

Supplement to

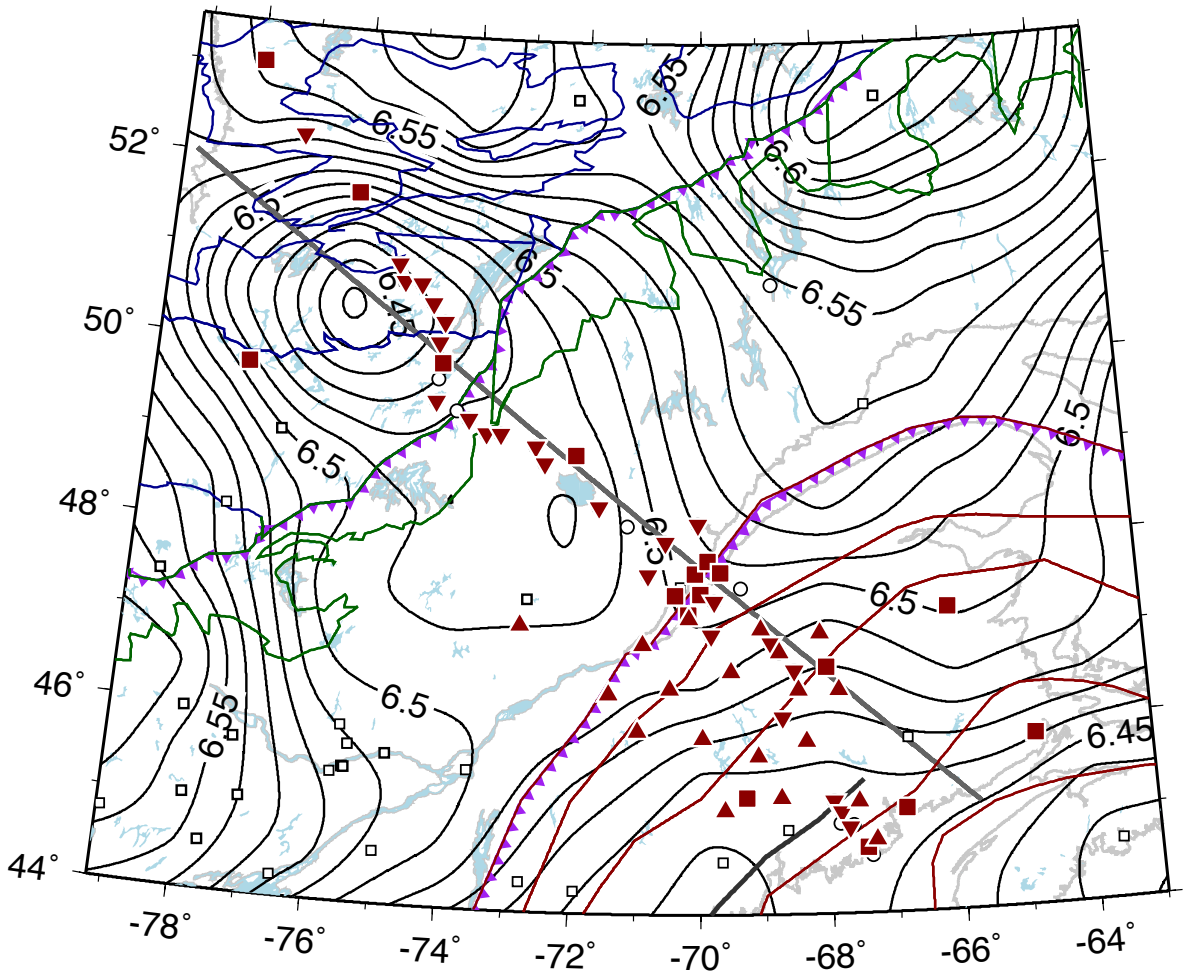
Crust-mantle boundary in eastern North America, from the (oldest) craton to the (youngest) rift.

Vadim Levin1, Andrea Servali1, Jill VanTongeren1, William Menke2, Fiona Darbyshire3

1. Department of Earth and Planetary Sciences, Rutgers University
2. Department of Earth and Environmental Sciences, Columbia University
3. University of Quebec, Montreal

Levin, V., Servali, A., VanTongeren, J., Menke, W., and Darbyshire, F., 2017, Crust-mantle boundary in eastern North America, from the (oldest) craton to the (youngest) rift, in Bianchini, G., Bodinier, J.-L., Braga, R., and Wilson, M., eds., The Crust-Mantle and Lithosphere-Asthenosphere Boundaries: Insights from Xenoliths, Orogenic Deep Sections, and Geophysical Studies: Geological Society of America Special Paper 526, doi:10.1130/2017.2526(06).

Supplementary Figure 1.
Contours of average compressional wave speed (Vp) in the crust adapted from Tesauro et al. (2014).



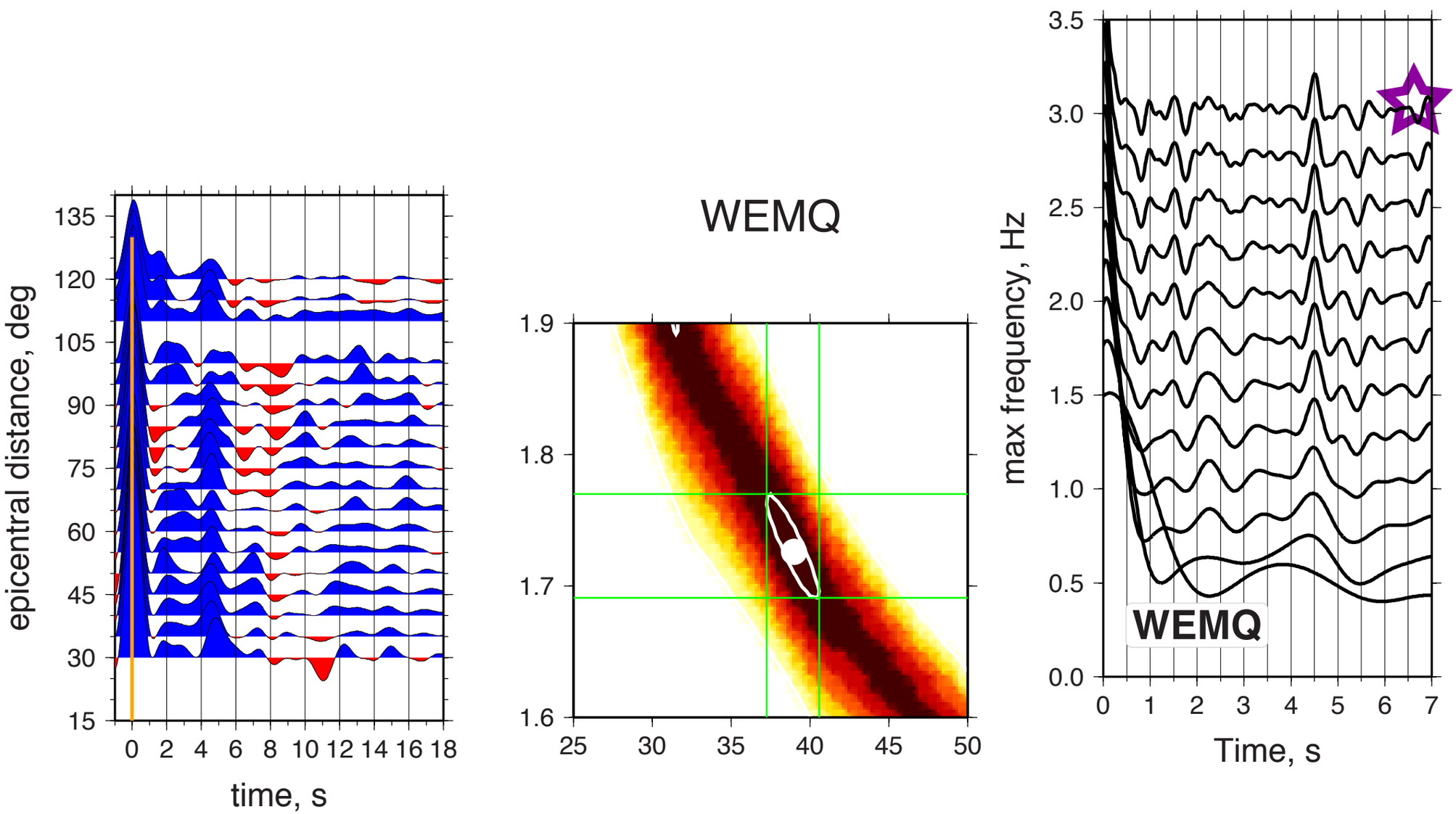
Supplementary Figure 2.

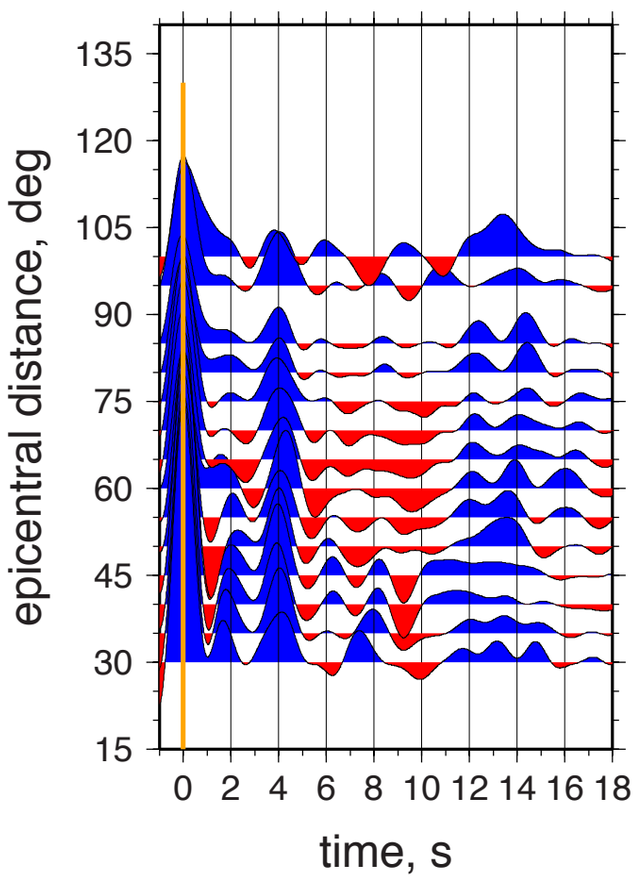
Data plots for all seismic stations included in our analysis.
For every location we show an epicentral gather of receiver functions (left plot), a set of frequency-dependent receiver function beams (right plot), and an H-k stacking result in the form of a shaded surface (center plot).

White dots mark maximum of the stack, the white contours show values at 95% of the maximum. Green lines show min/max values of that contour if they fall within the search box. Exact values of H and k corresponding to the white dot are given in Table 1 of the main text.

Plots are arranged in the order of their appearance on the transect, from NW to SE (see Table 1 of the main text for site names and locations).
Frequency-dependent receiver function beams are constructed for earthquake sources in Central America.

Purple stars mark the timeseries we chose as those with the highest frequency of unmodified PmS phase.


WEMQ
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
WEMQ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90
75
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45
30
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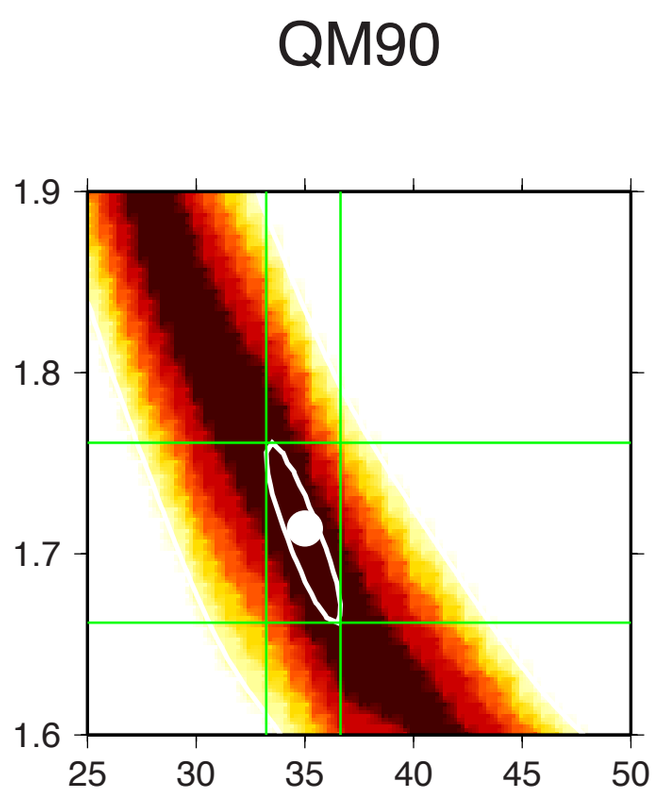
0 2 4 6 8 10 12 14 16 18
time, s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1.8
1.7
1.6
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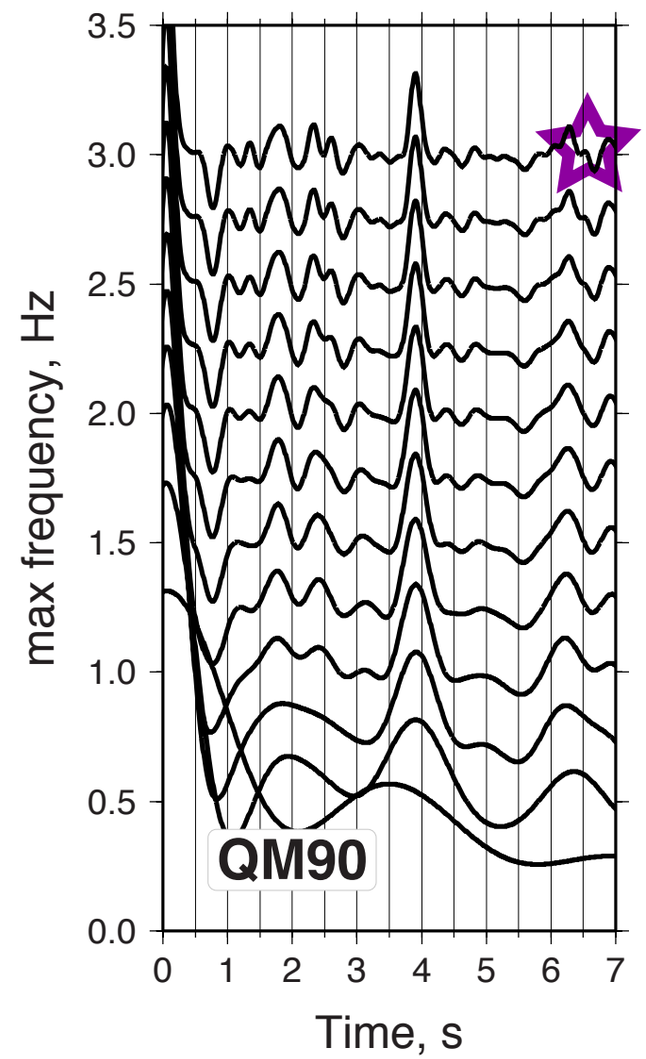
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1.0
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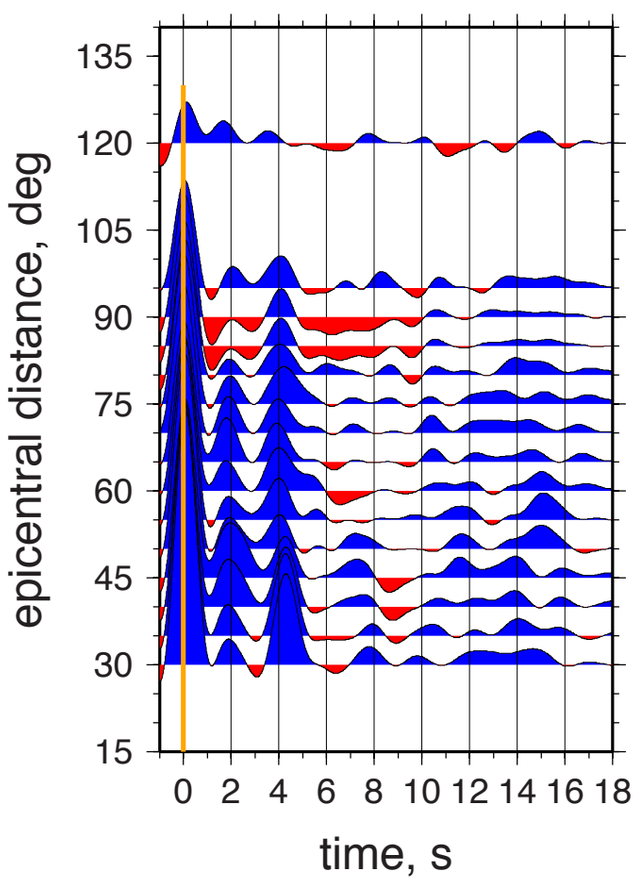
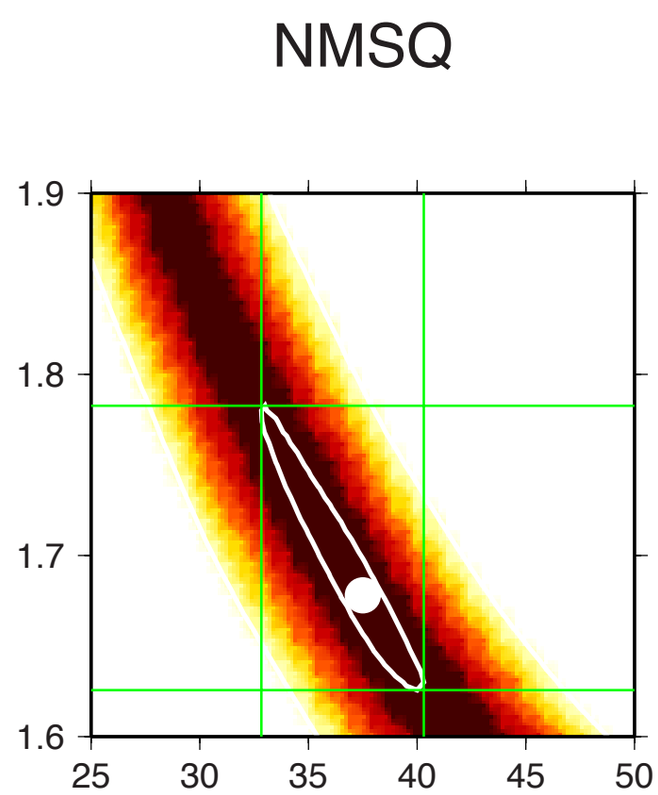
0.0
0 1 2 3 4 5 6 7
Time, s
QM90


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s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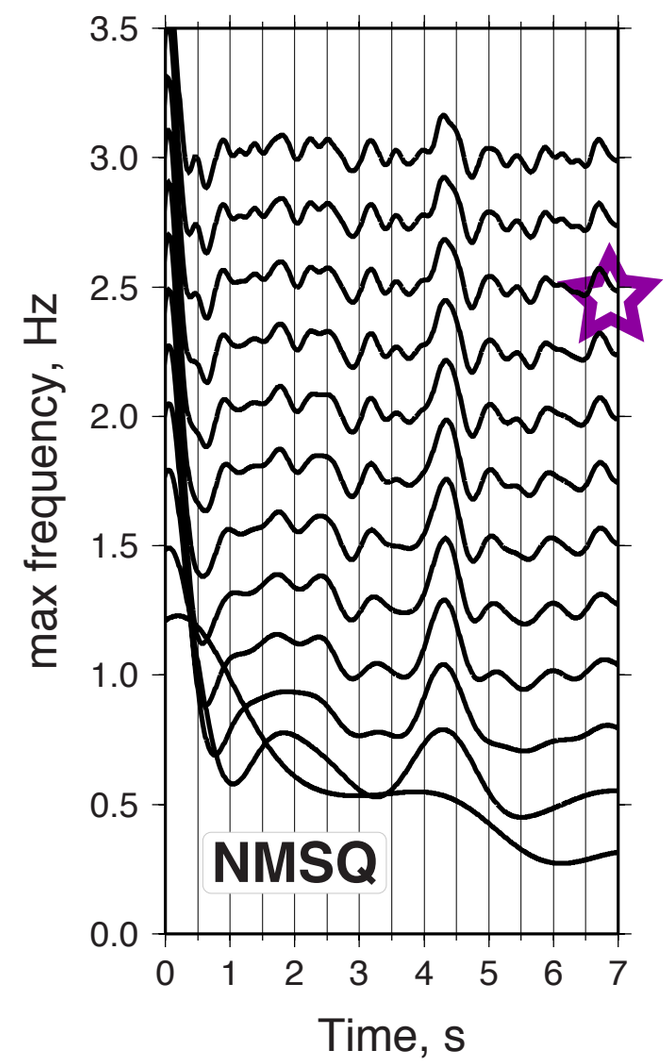
1.8
1.7
1.6
25 30 35 40 45 50


max frequency, Hz
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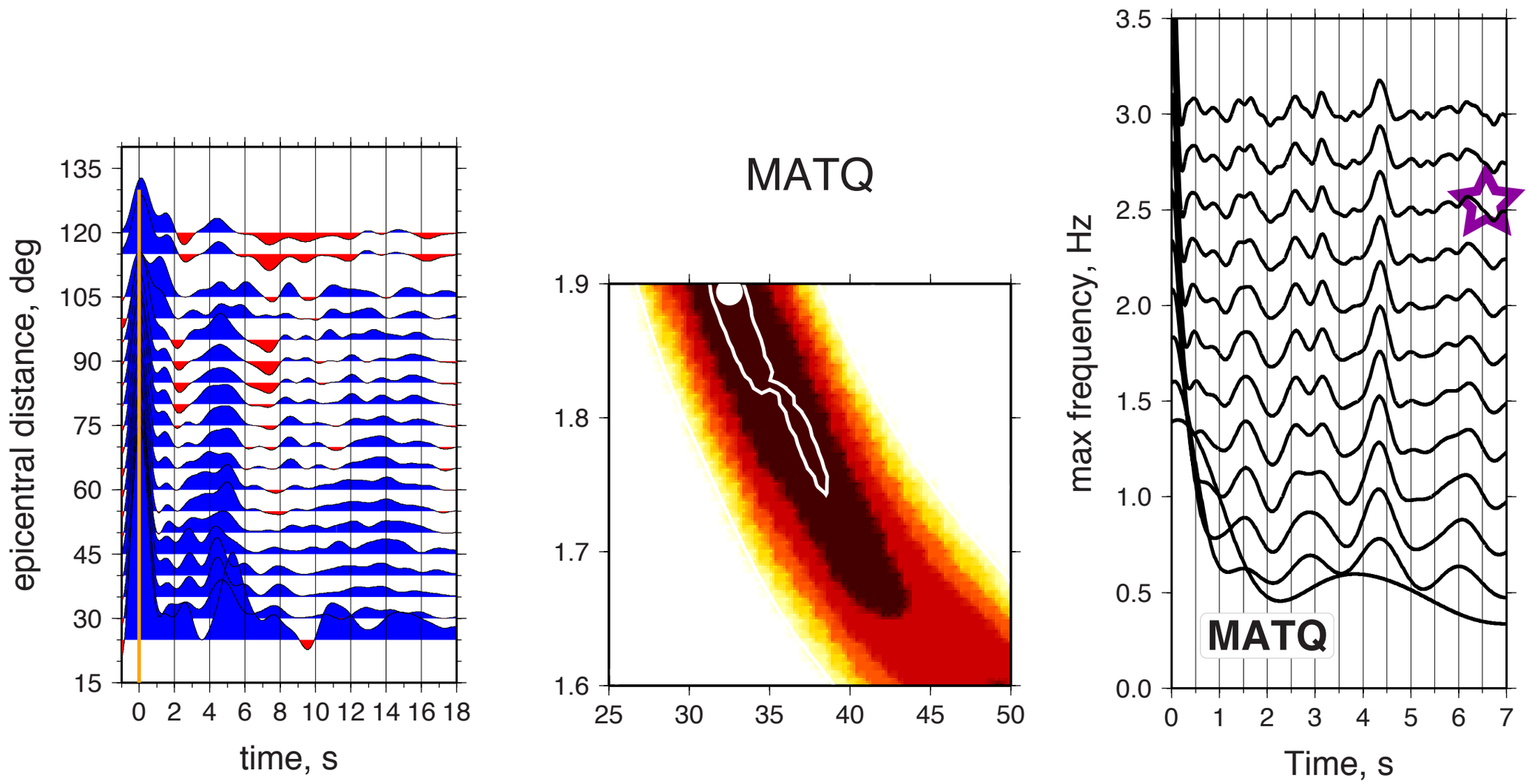
0 1 2 3 4 5 6 7
Time, s
NMSQ


epicentral distance, deg
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120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
MATQ
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1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
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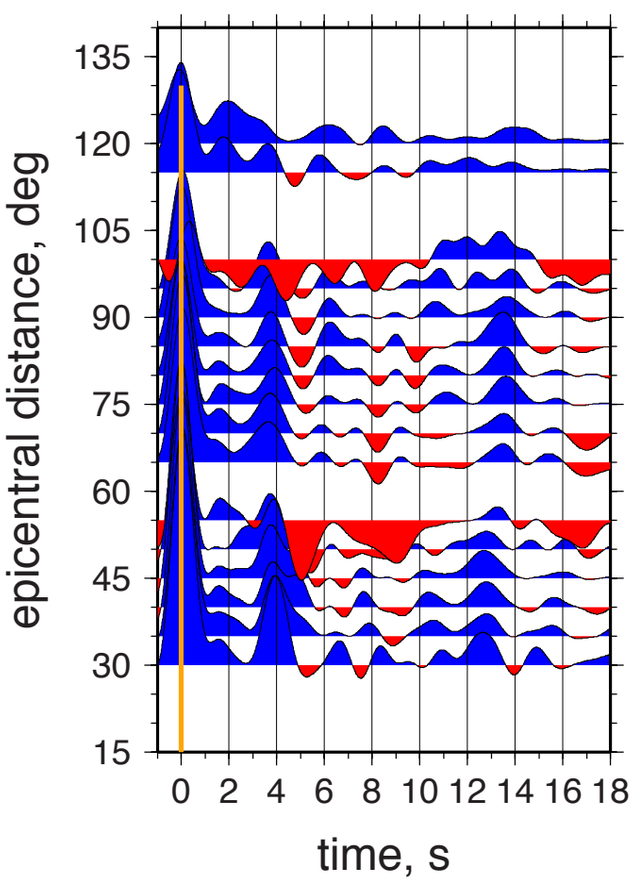
0.0
0 1 2 3 4 5 6 7
Time, s
MATQ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105
90
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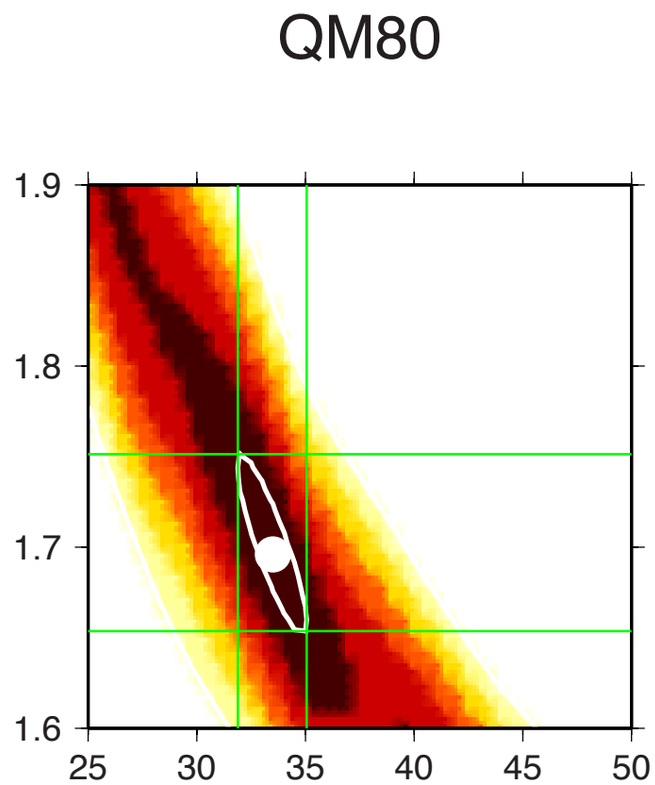
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s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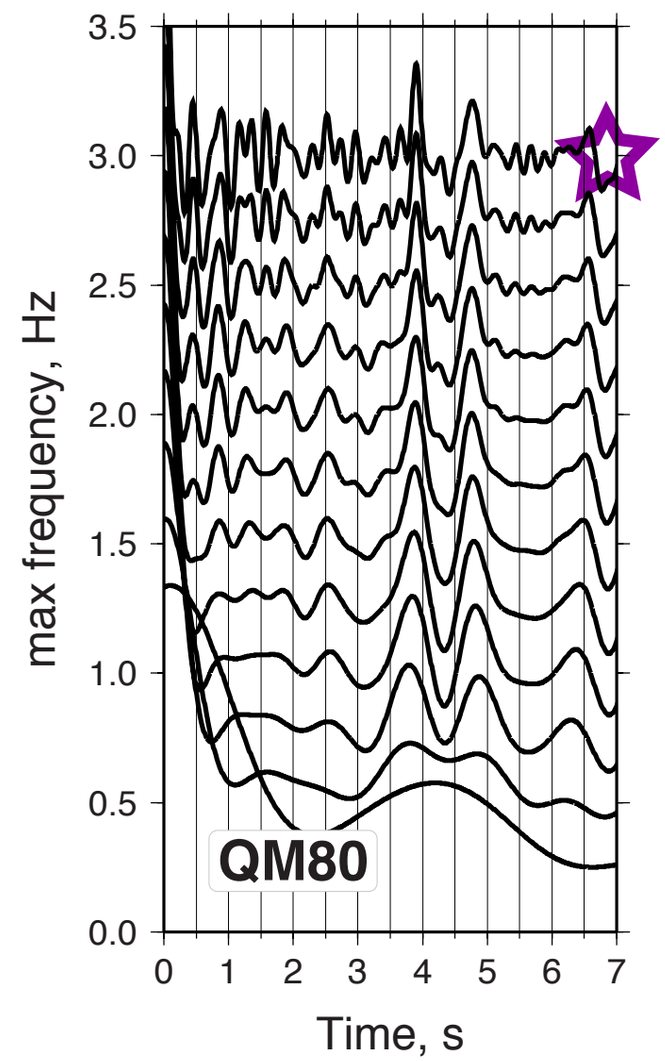
max frequency, Hz
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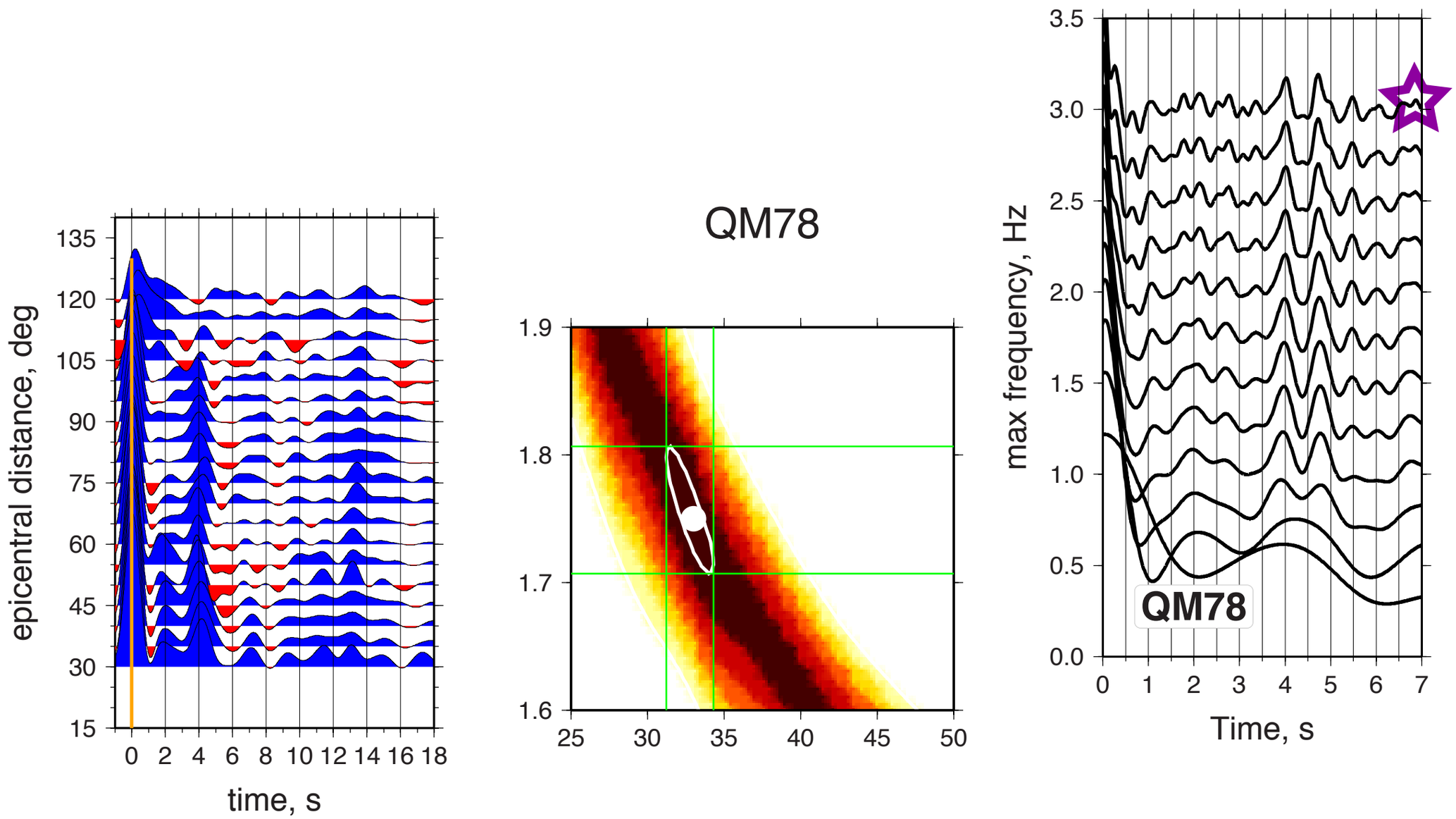
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM80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epicentral distance, deg
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120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
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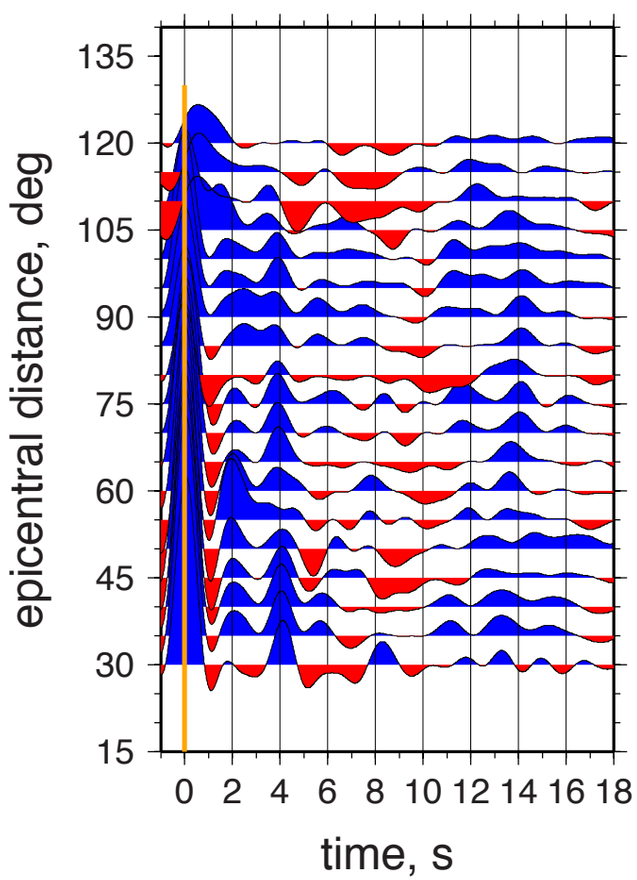
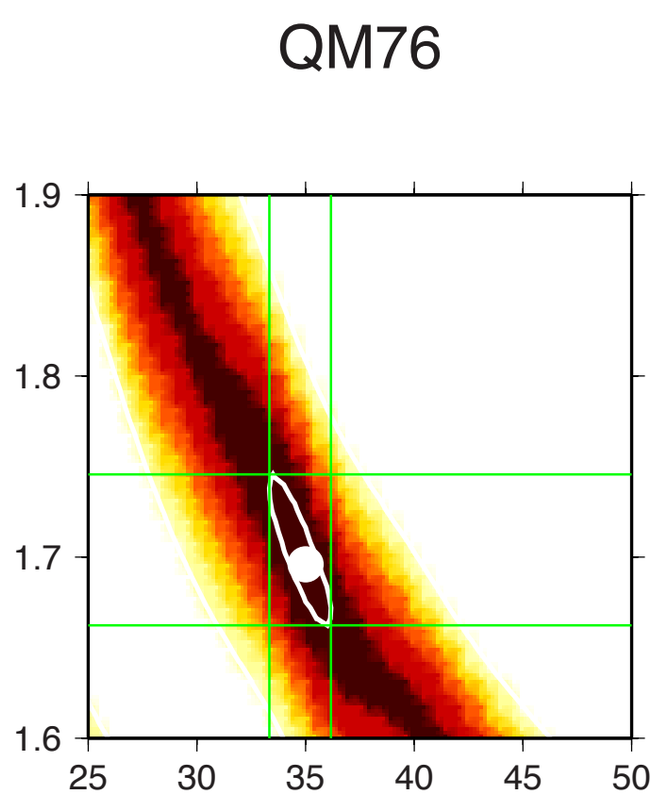
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM78


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s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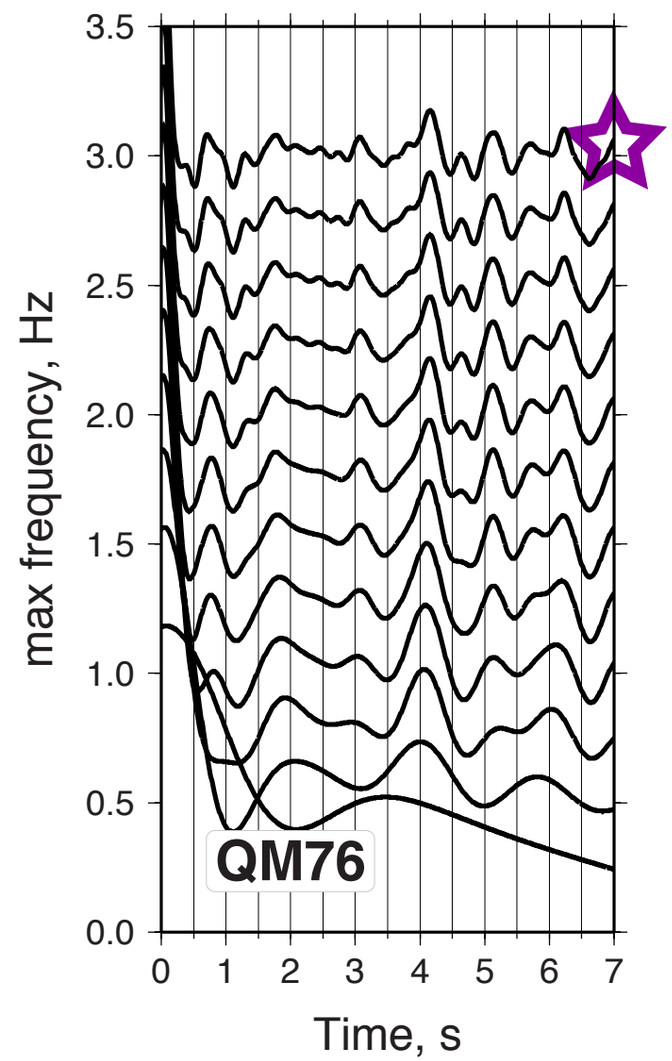
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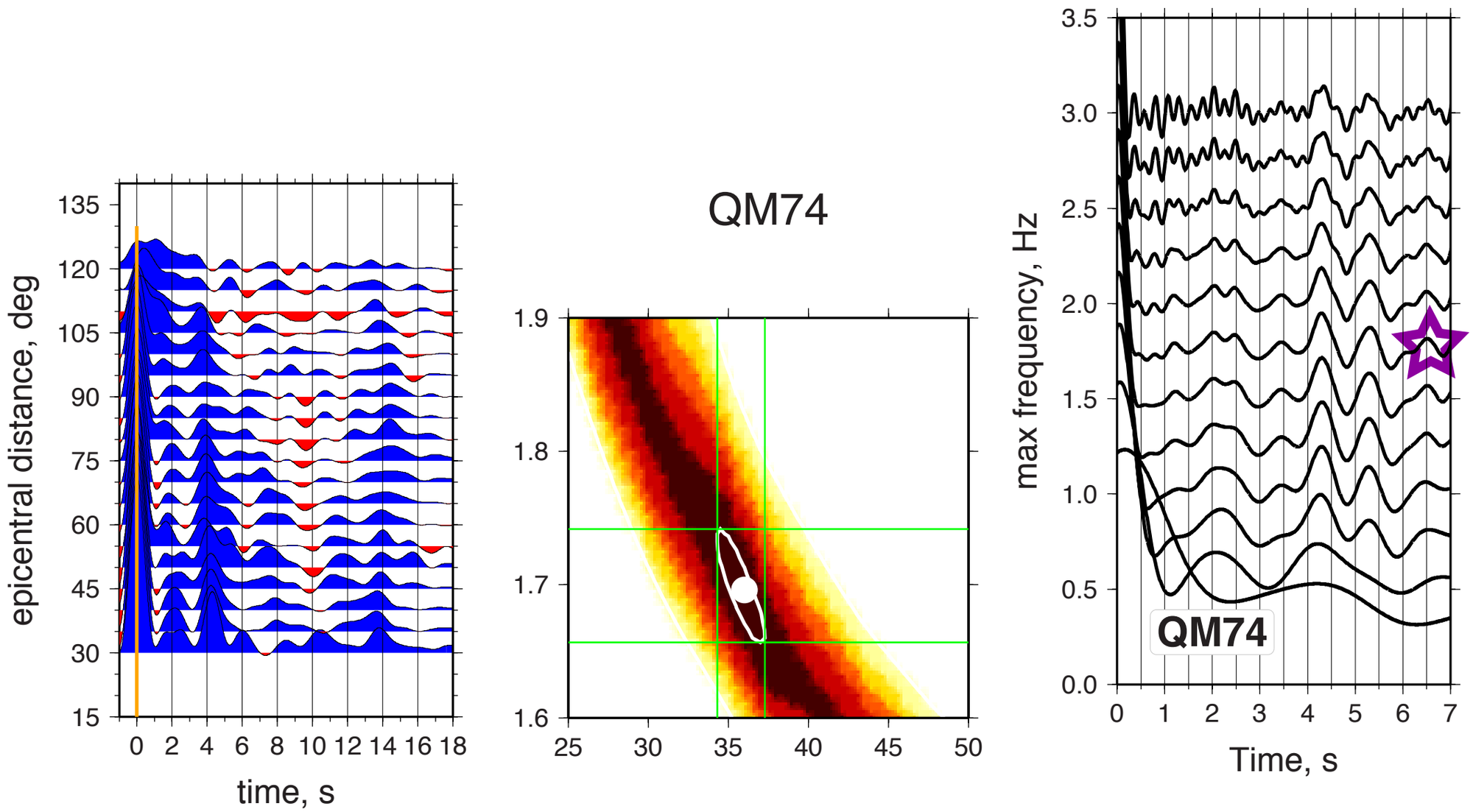
Time, s
QM76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105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
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1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
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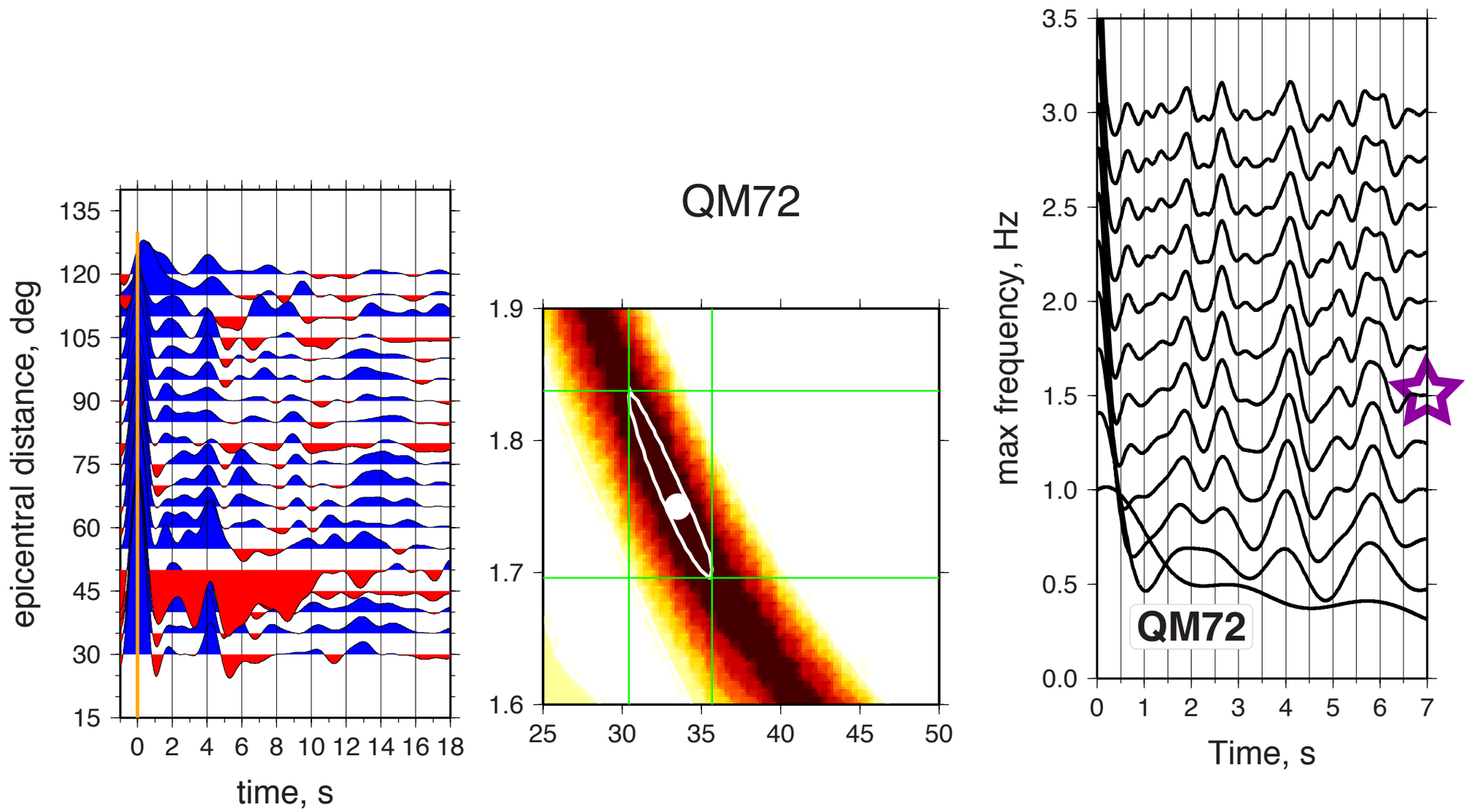
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM74


QM72
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120
105
90
75
60
45
30
15
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time, s
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1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
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2.5
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1.5
1.0
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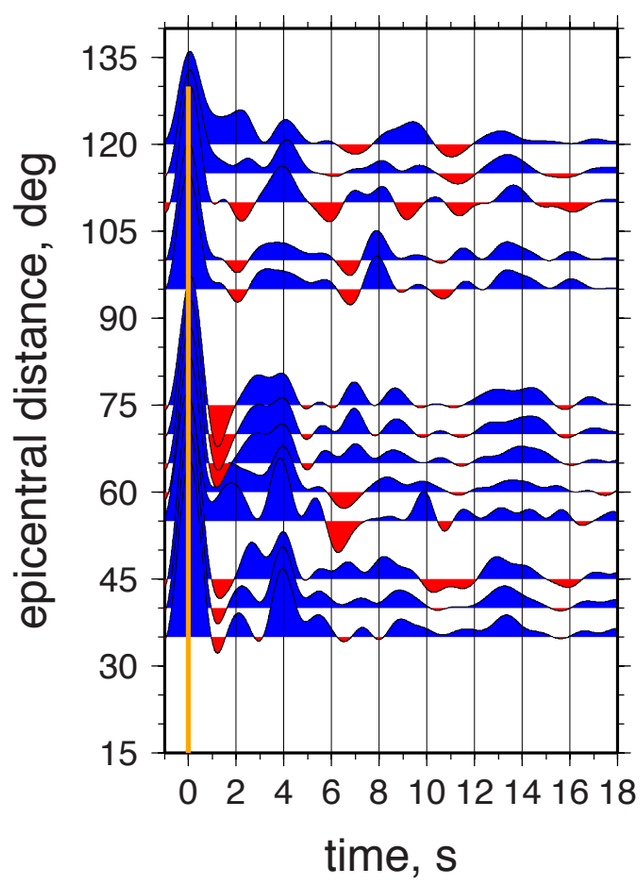
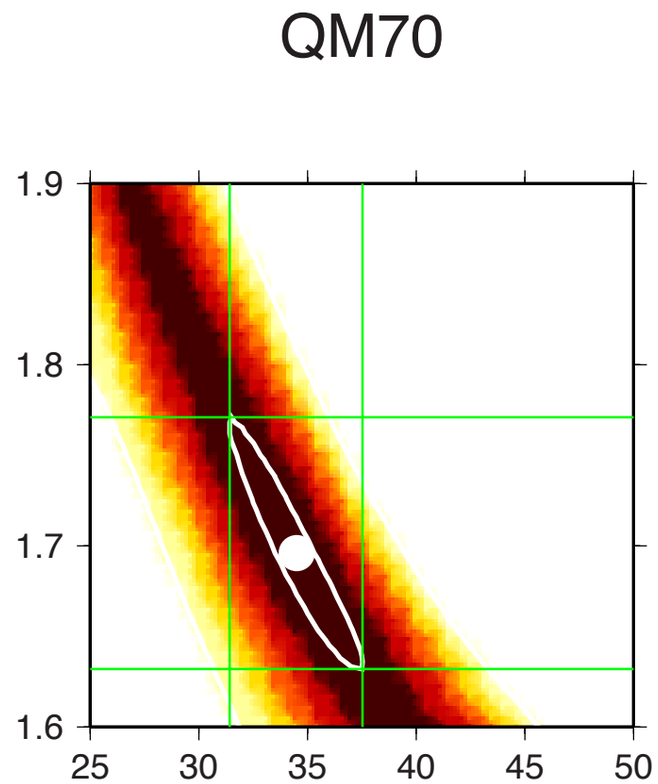
0.0
0 1 2 3 4 5 6 7
Time, s
QM72


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s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1.6
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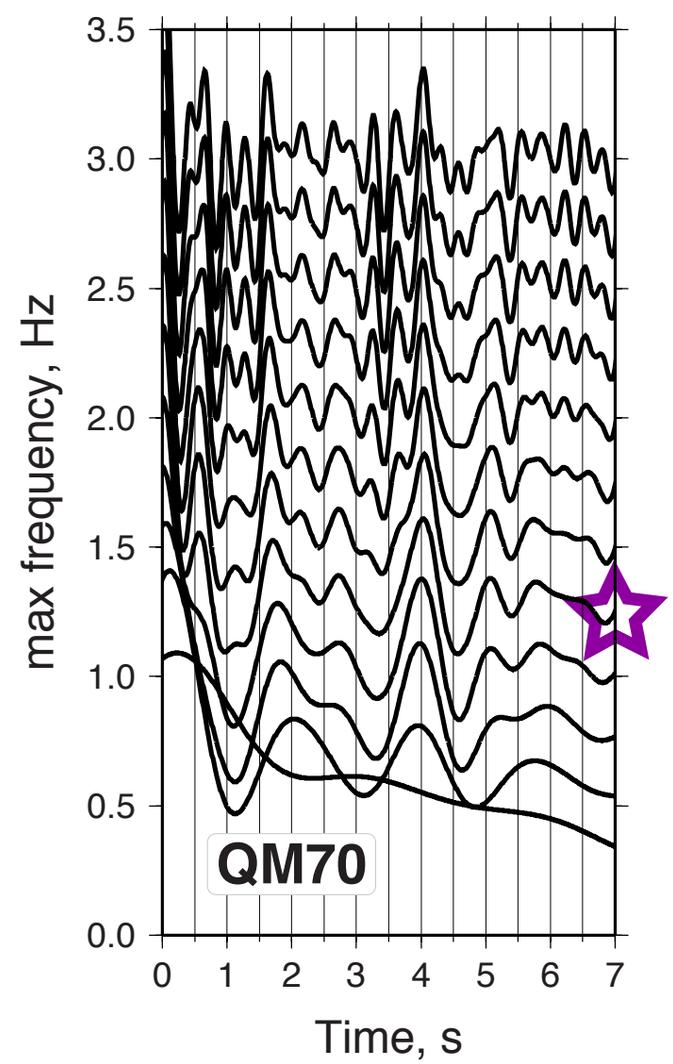
max frequency, Hz
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3.0
2.5
2.0
1.5
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0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM70

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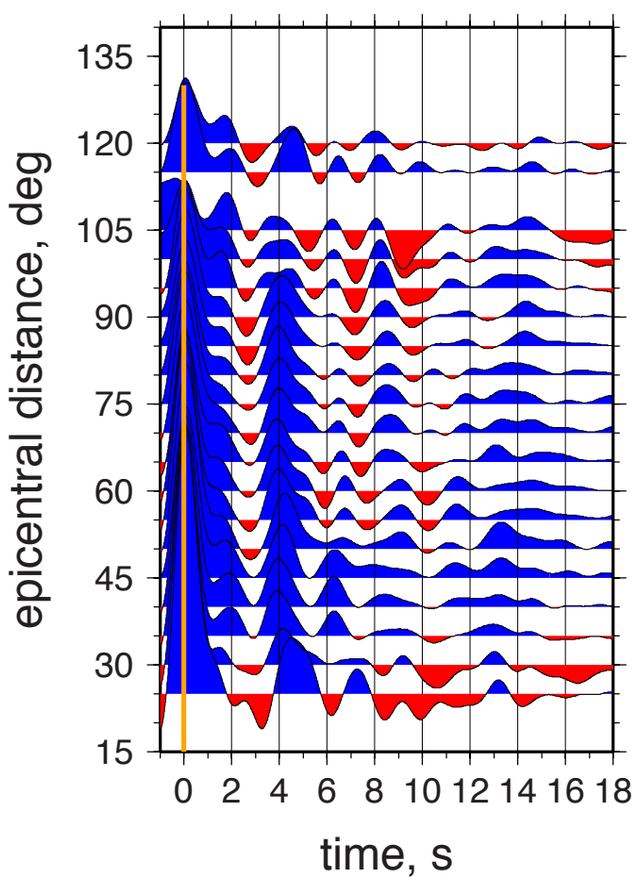

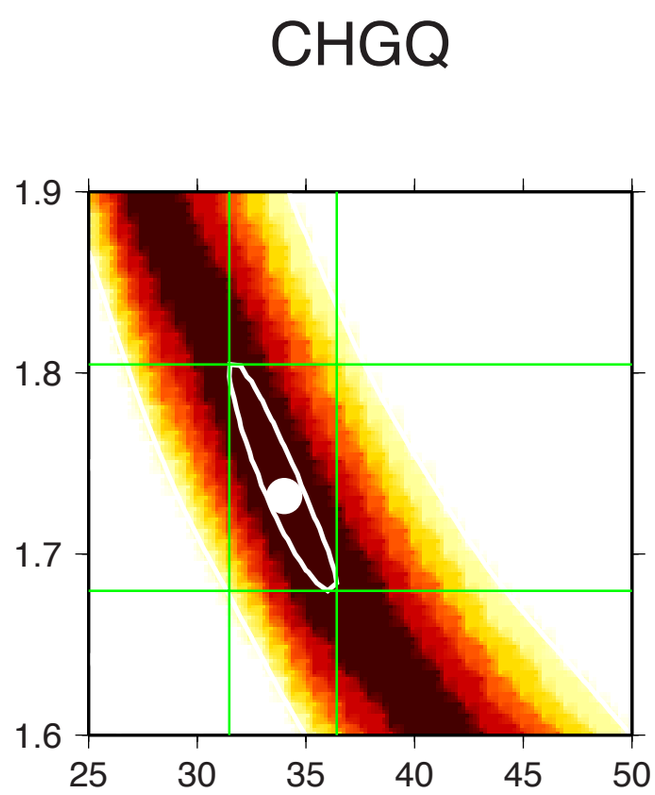

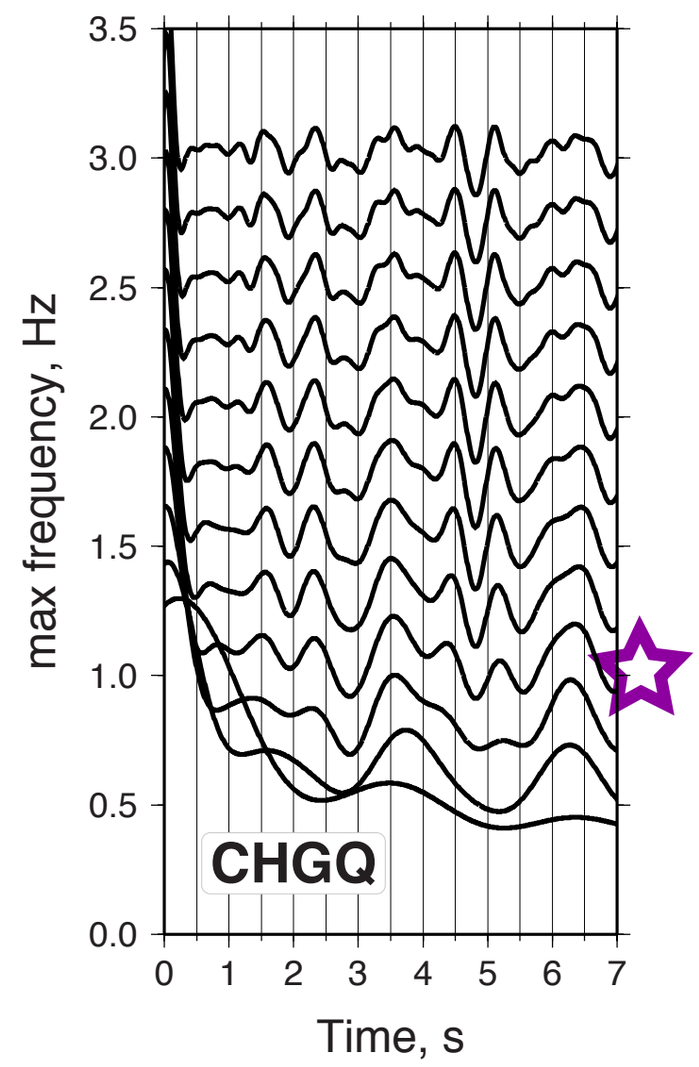

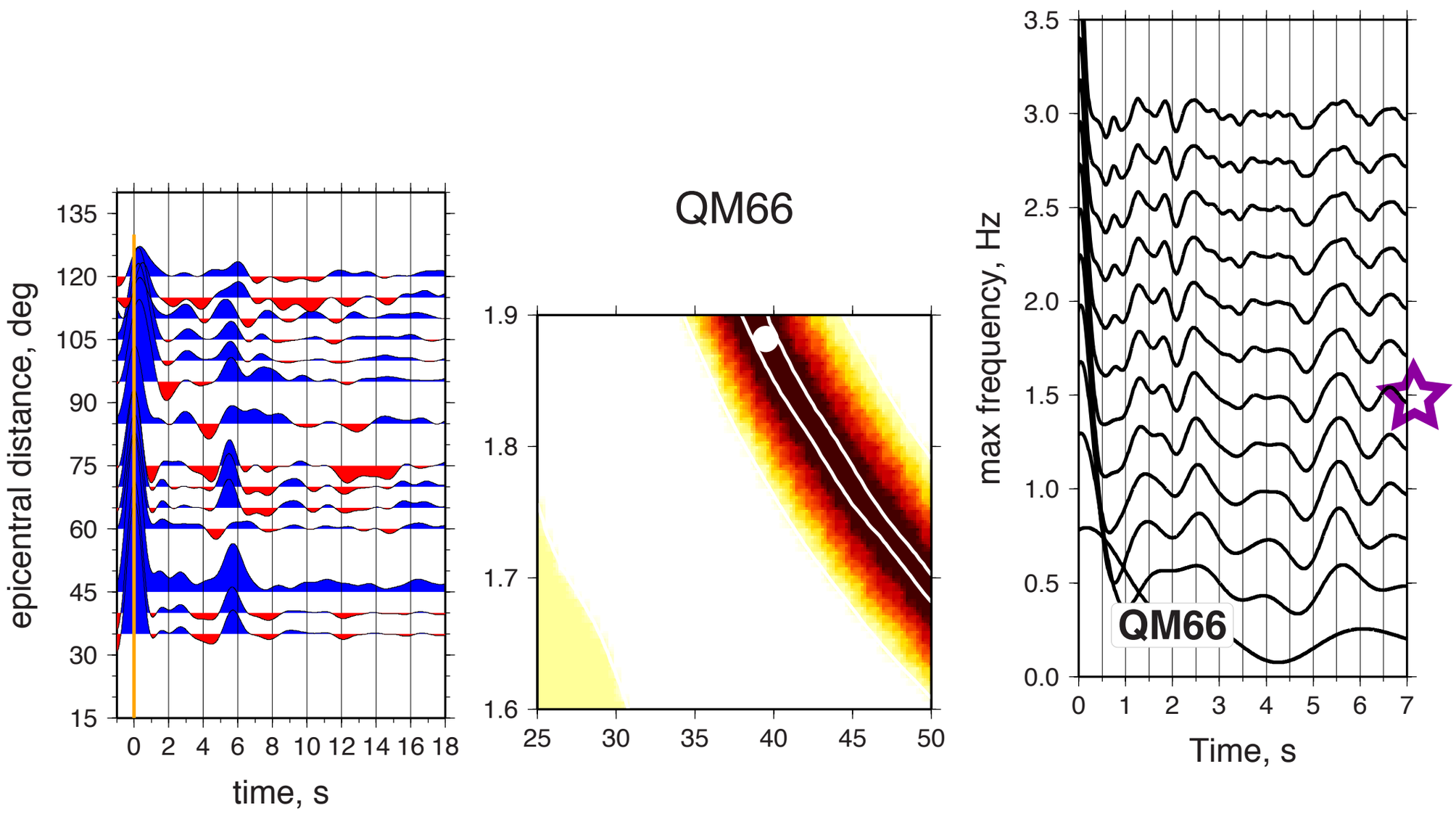
QM66
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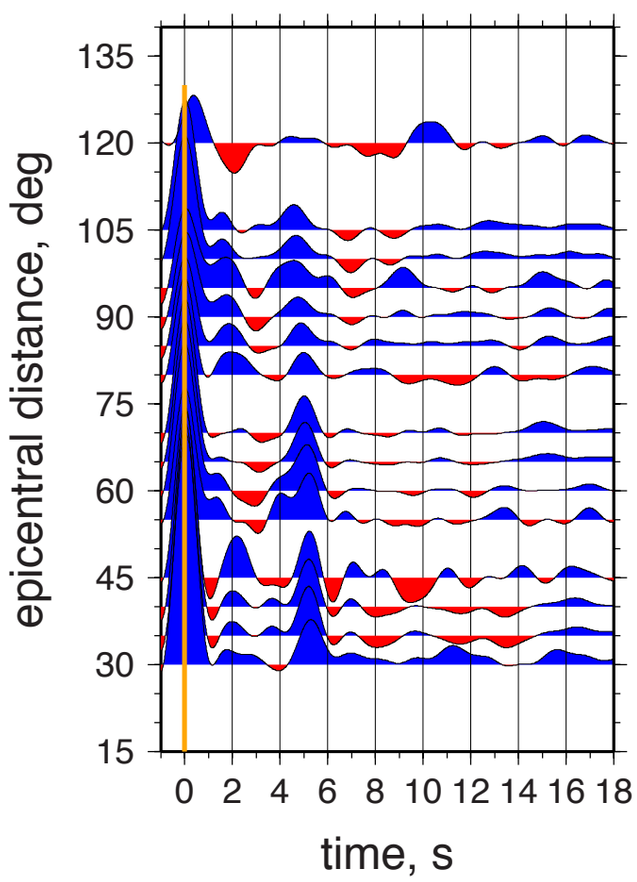
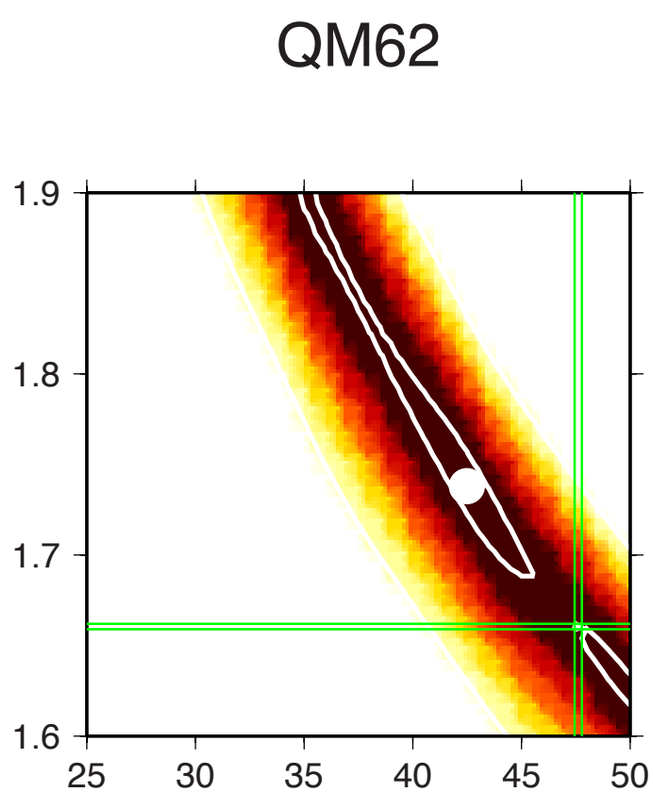
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM66


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s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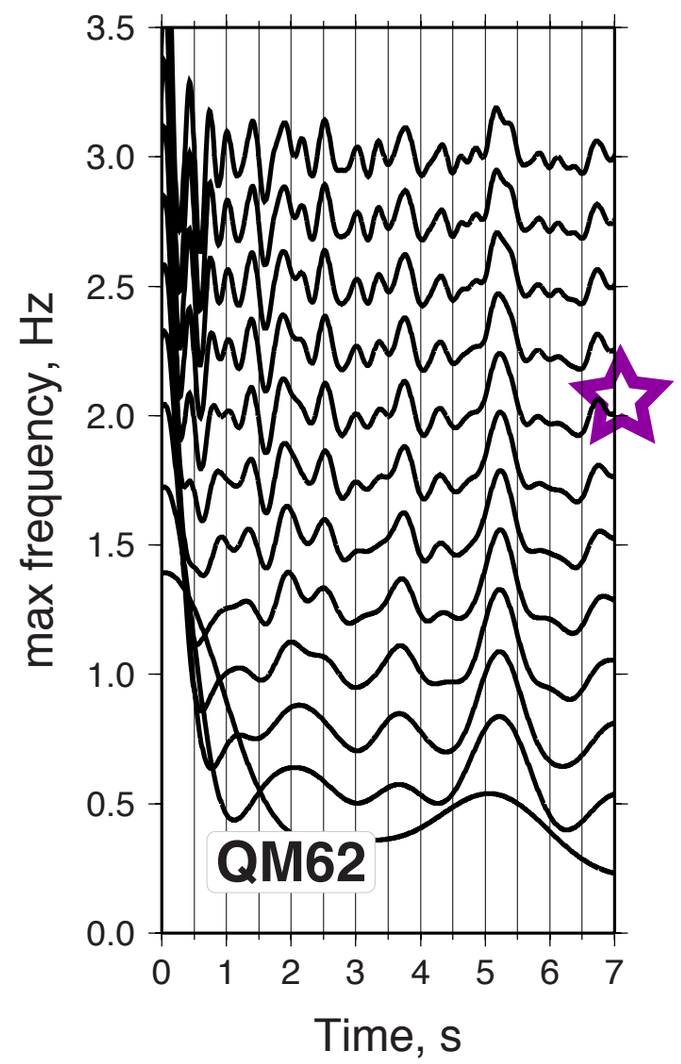
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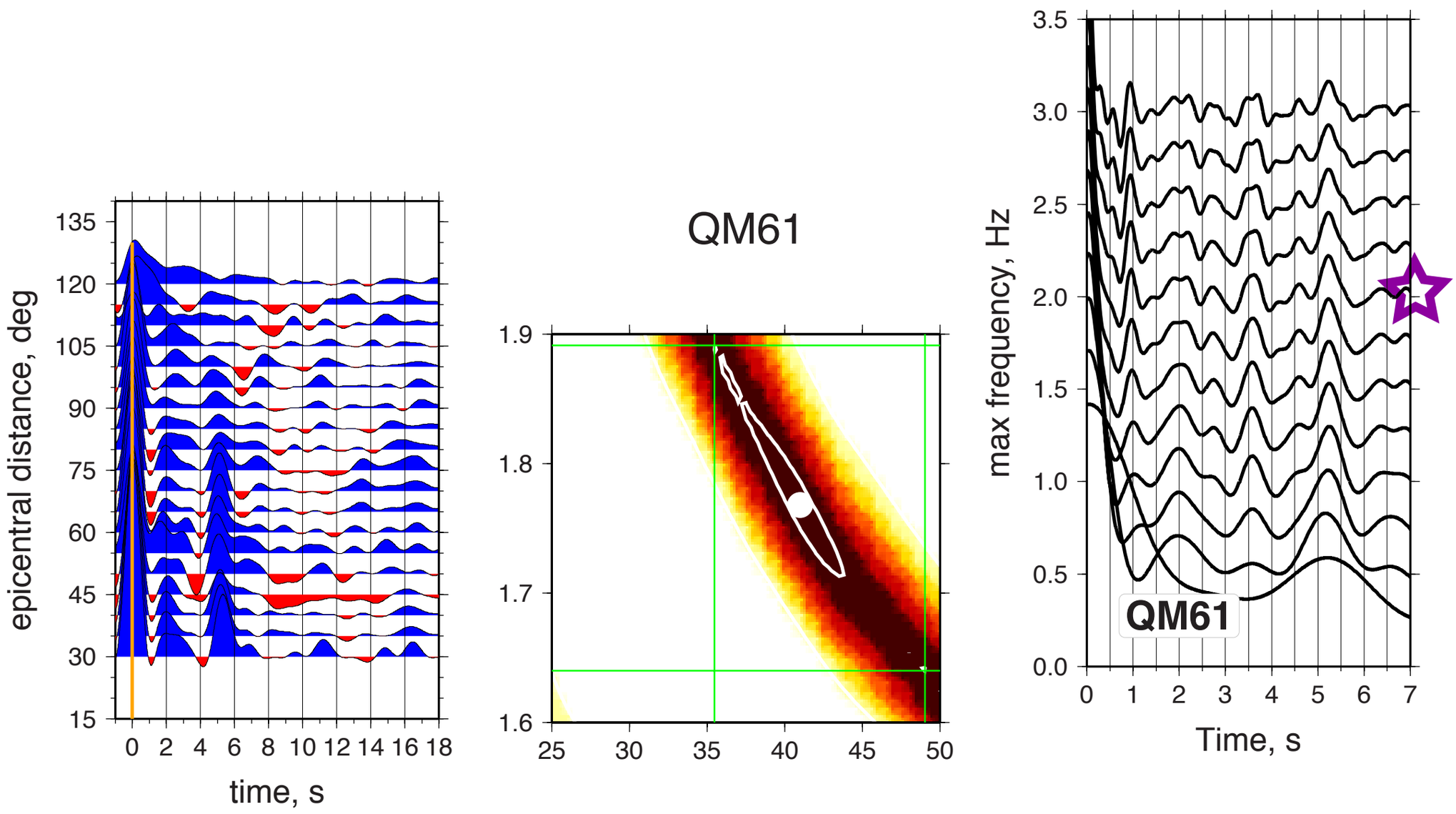
0 1 2 3 4 5 6 7
Time, s
QM62


epicentral distance, deg
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105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
QM61
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1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
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1.5
1.0
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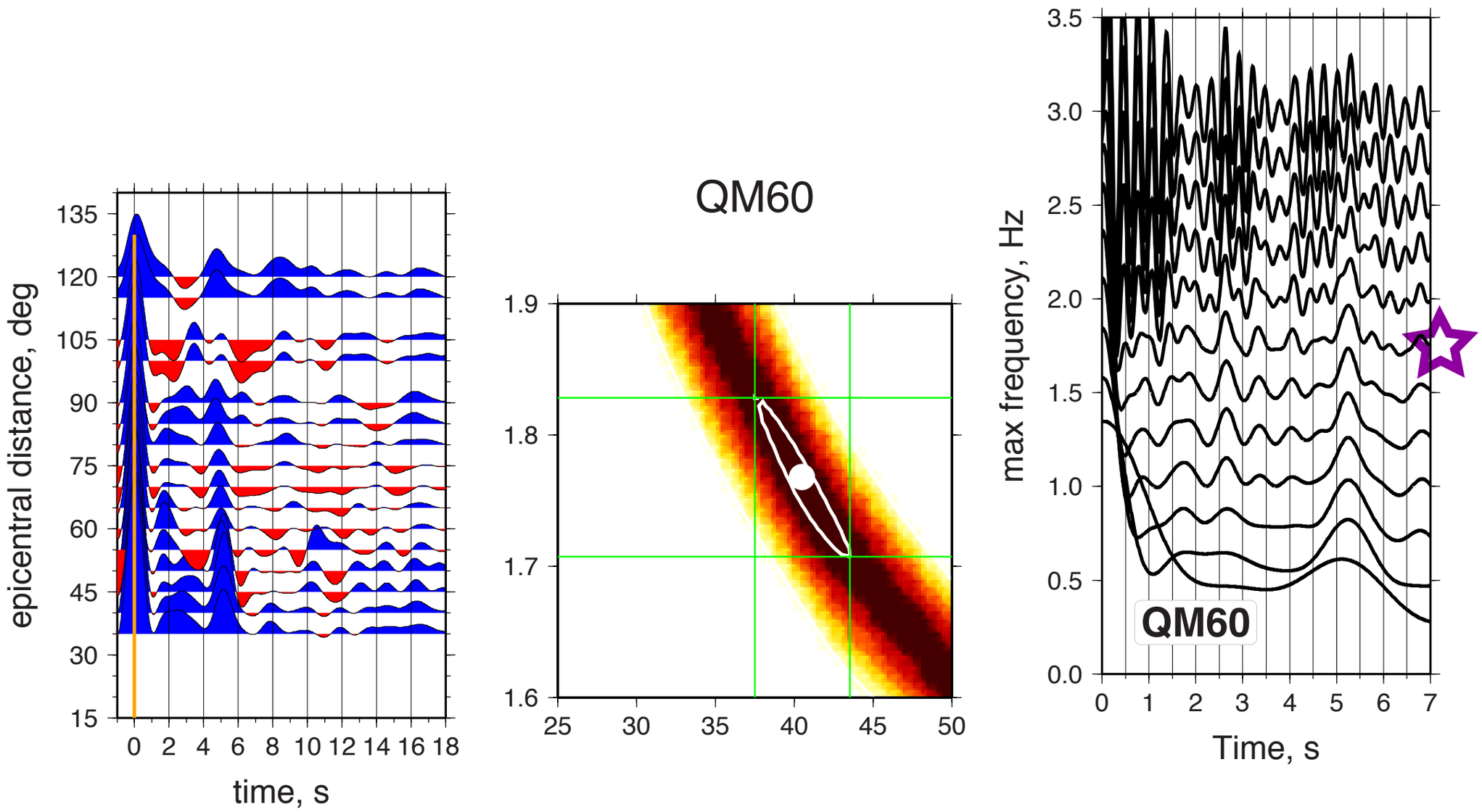
0 1 2 3 4 5 6 7
Time, s
QM61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105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
QM60
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1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
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0.0
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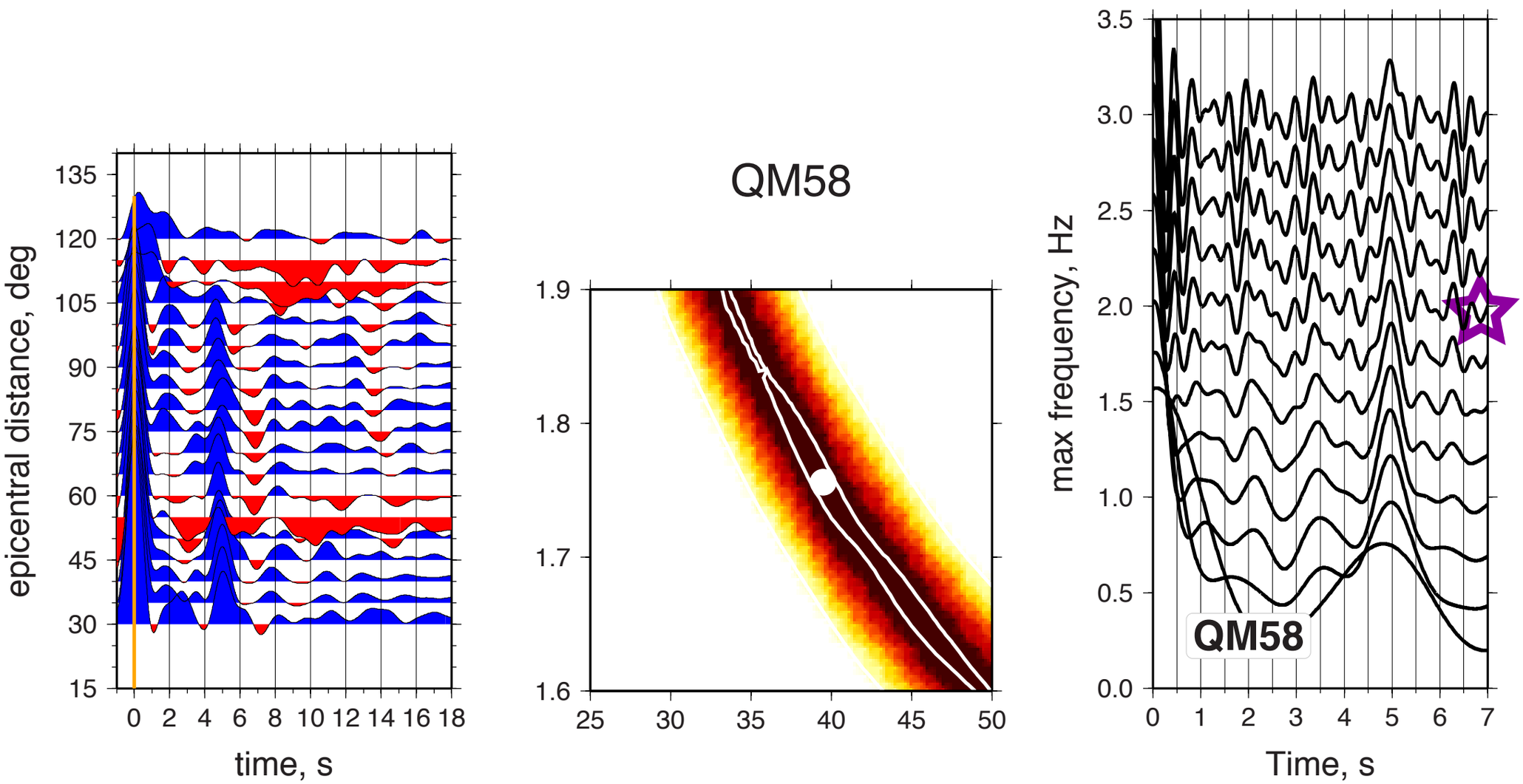
Time, s
QM60


QM58
epicentral distance, deg
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90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
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1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
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2.0
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1.0
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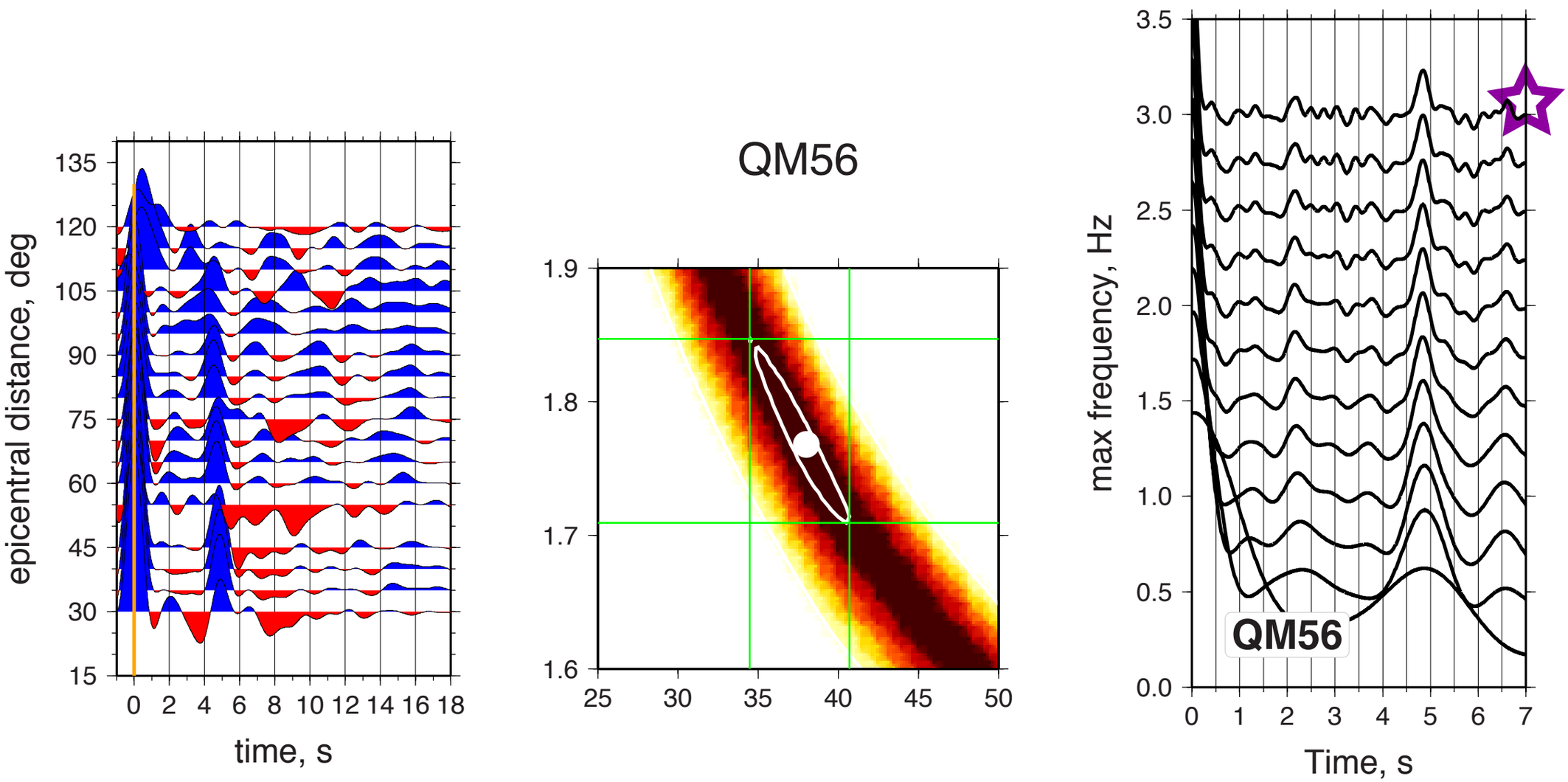
0 1 2 3 4 5 6 7
Time, s
QM58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120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
QM56
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1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
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2.5
2.0
1.5
1.0
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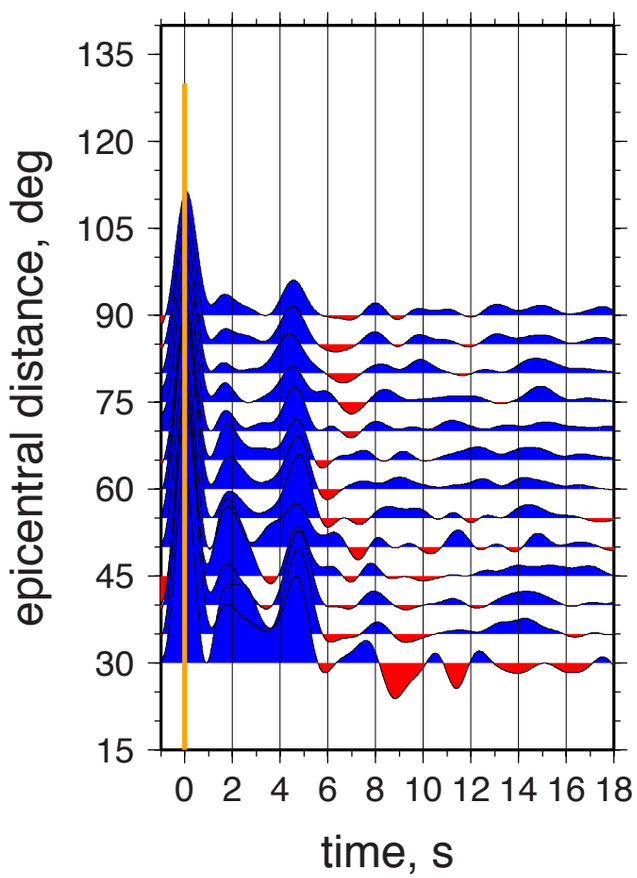
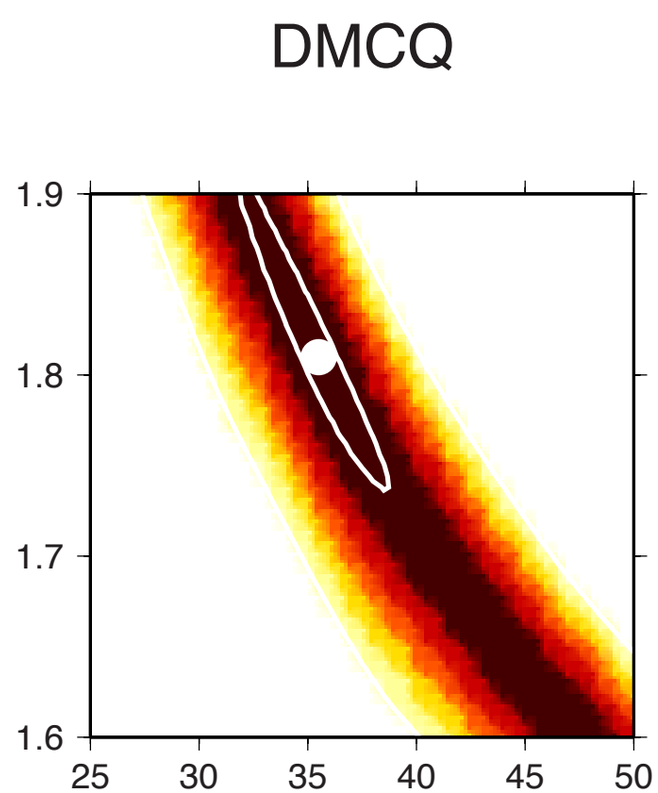
0 1 2 3 4 5 6 7
Time, s
QM56


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s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1.8
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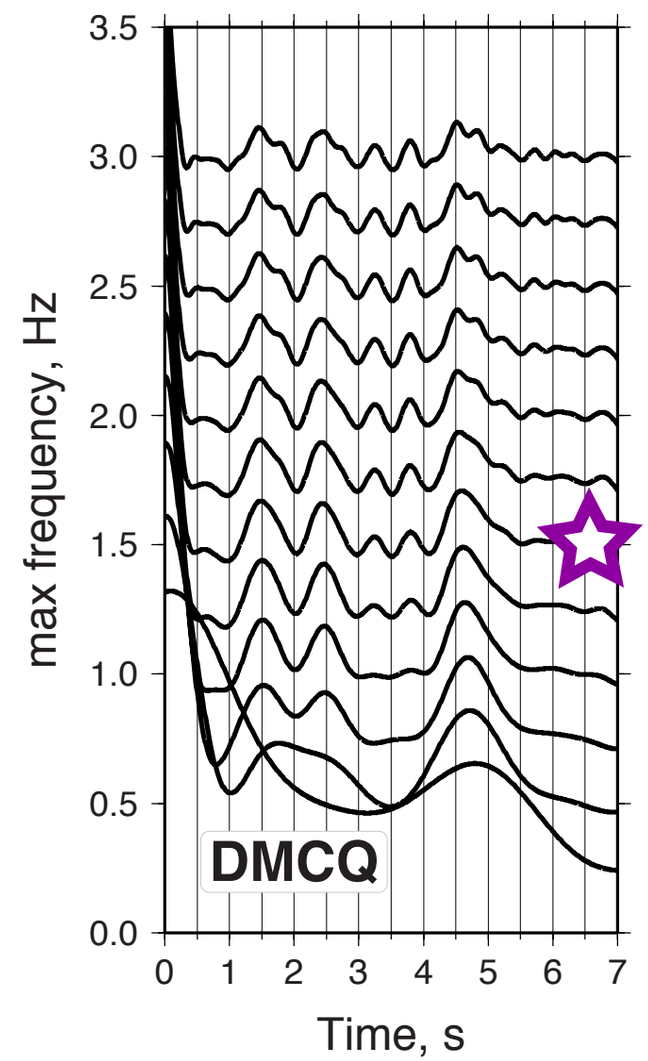
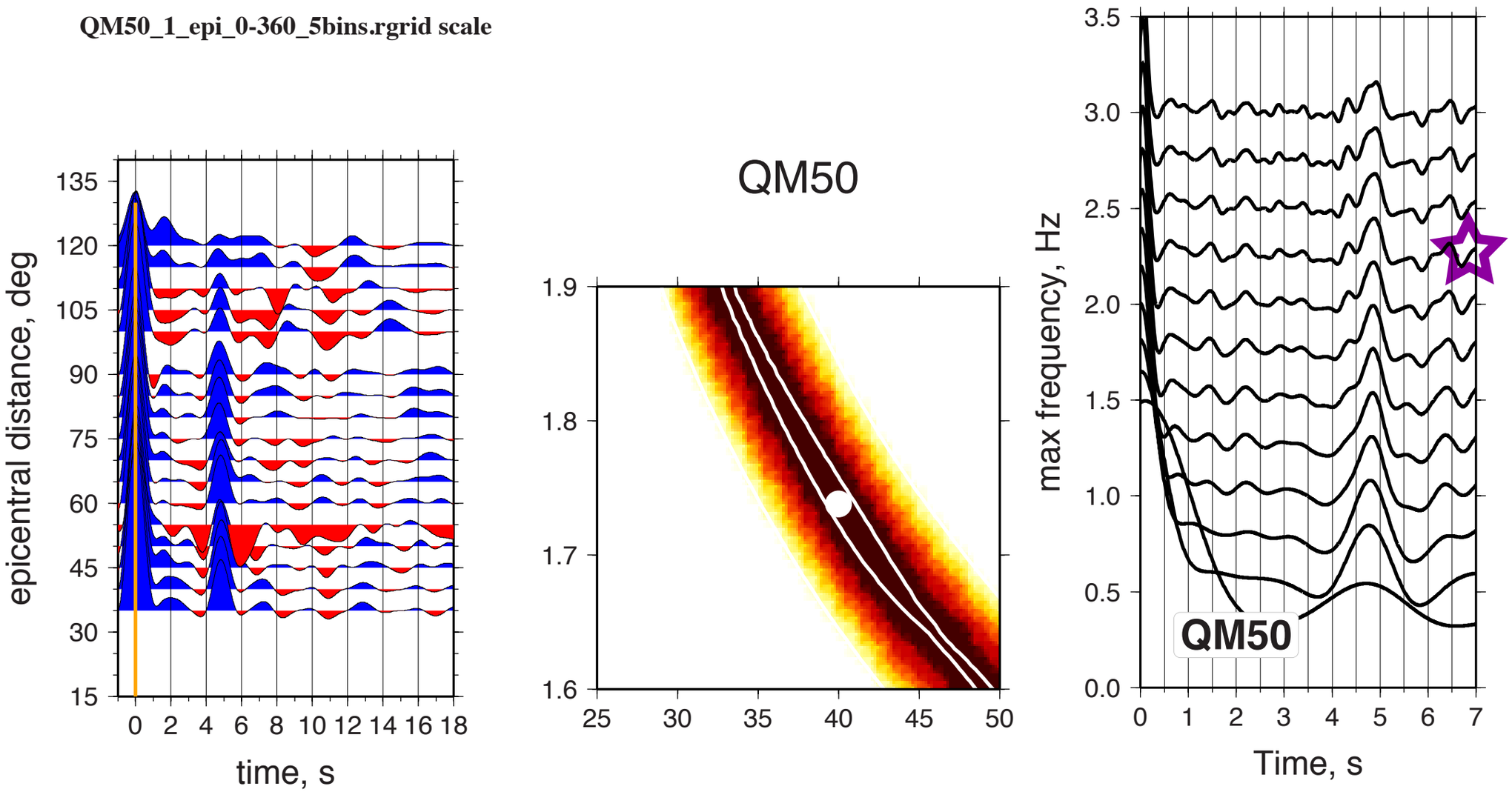
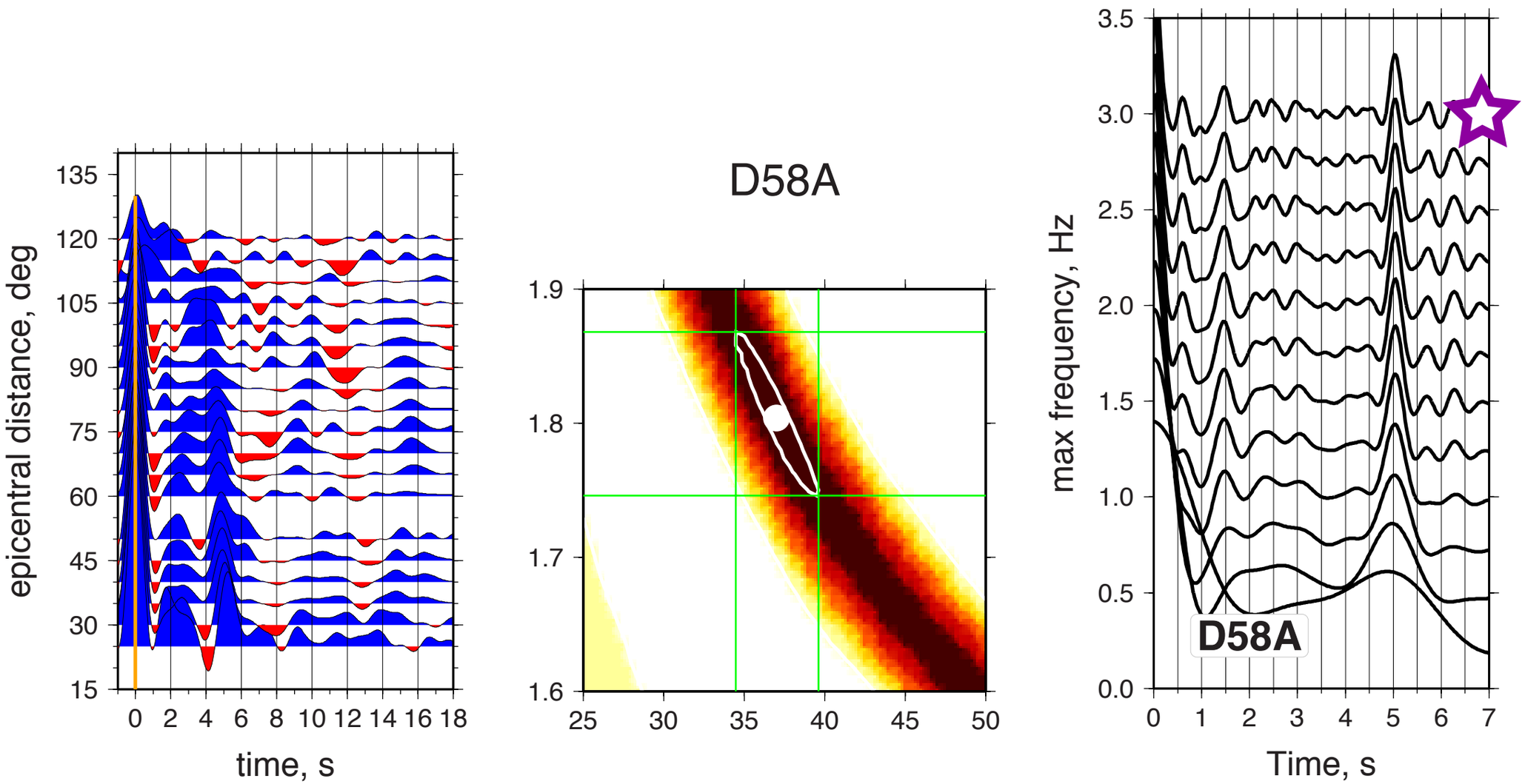
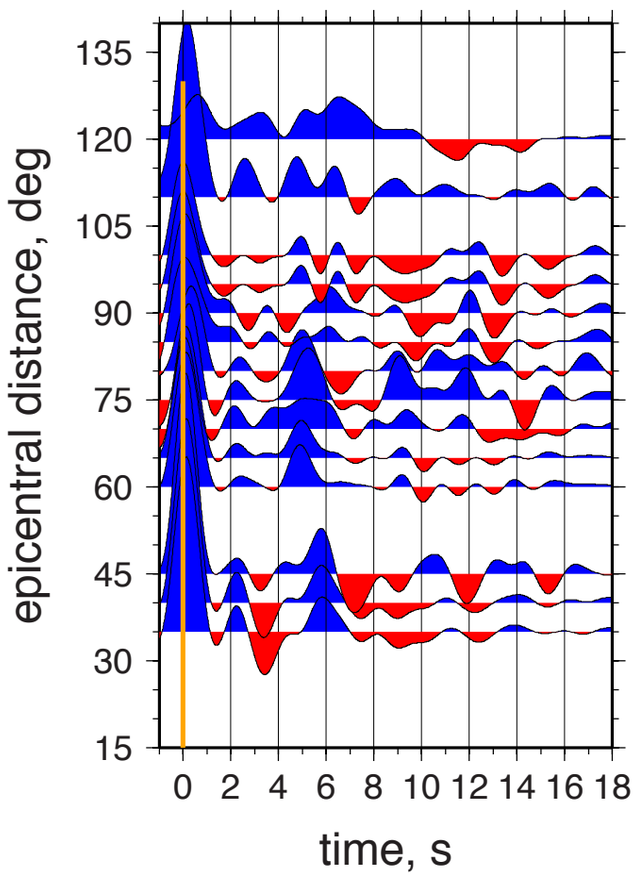
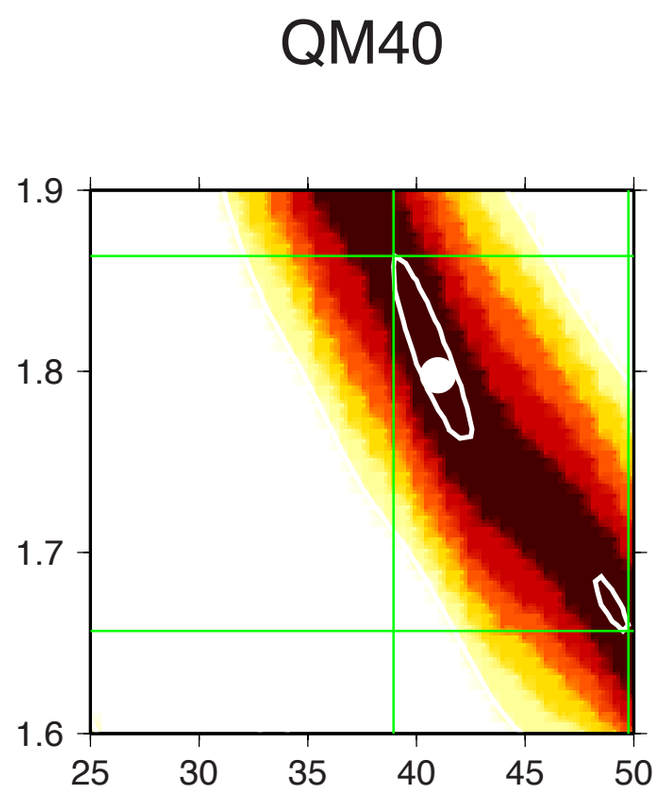
1.6
25 30 35 40 45 50

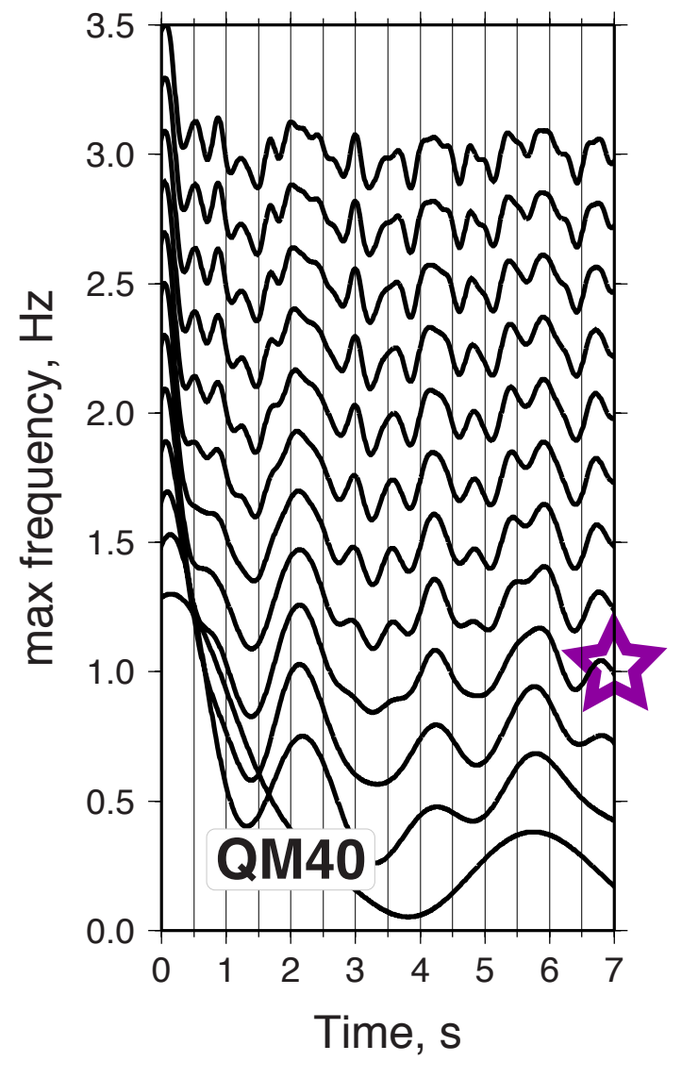

max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
DMCQ


QM50_1_epi_0-360_5bins.rgrid scale
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
QM50
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM50

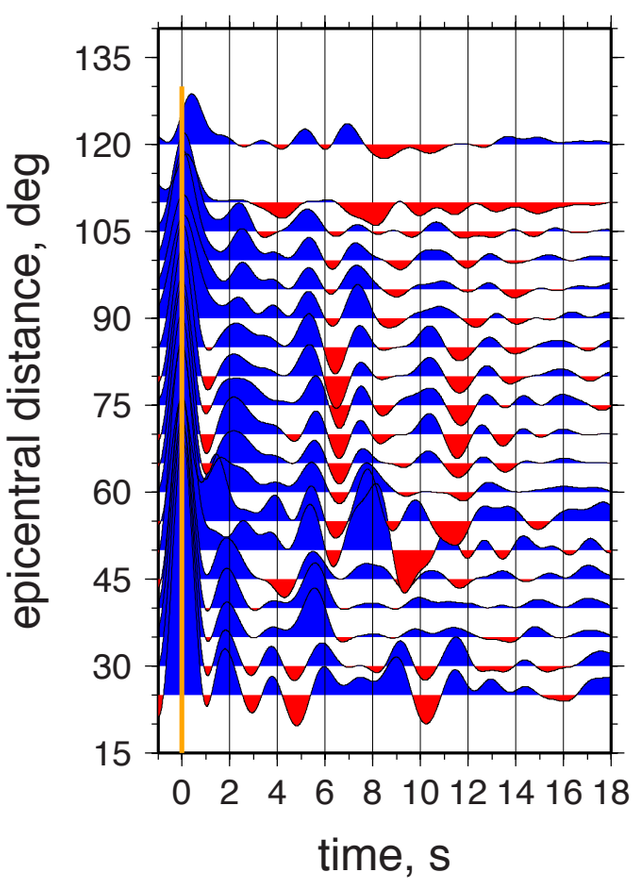

D58A
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
D58A

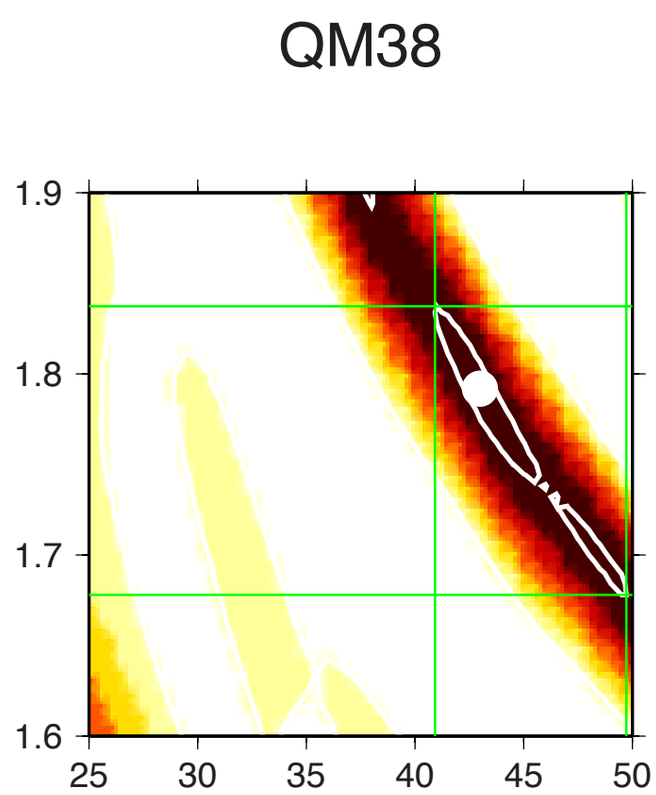

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s

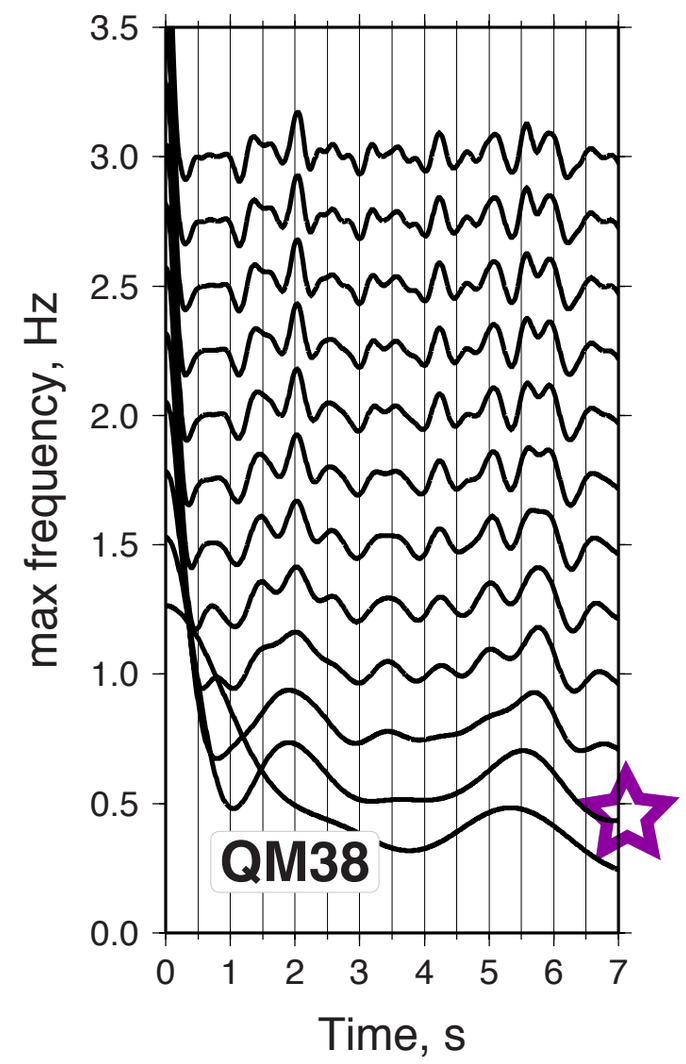

QM40
1.9
1.8
1.7
1.6
25 30 35 40 45 50

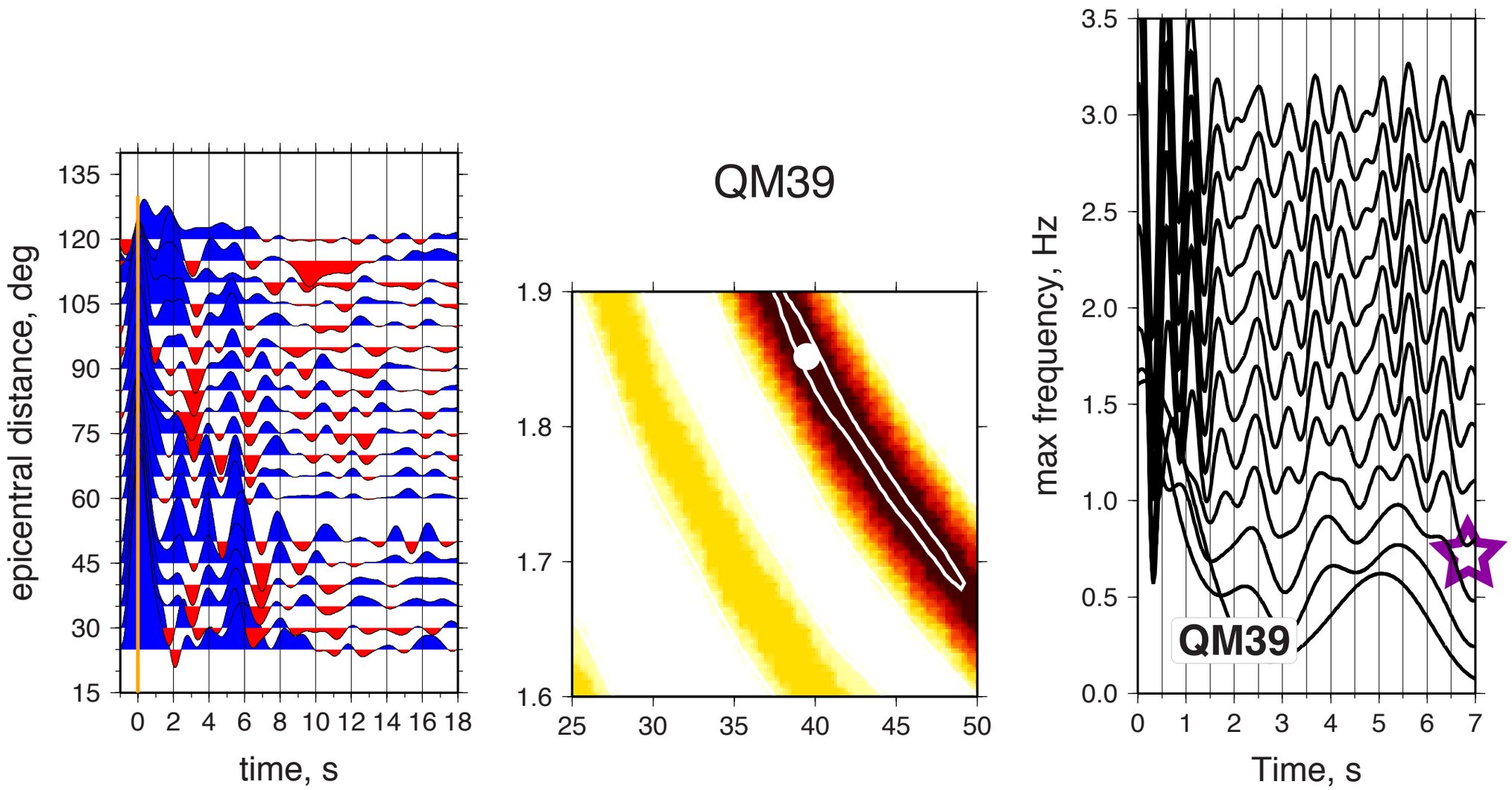

max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM40

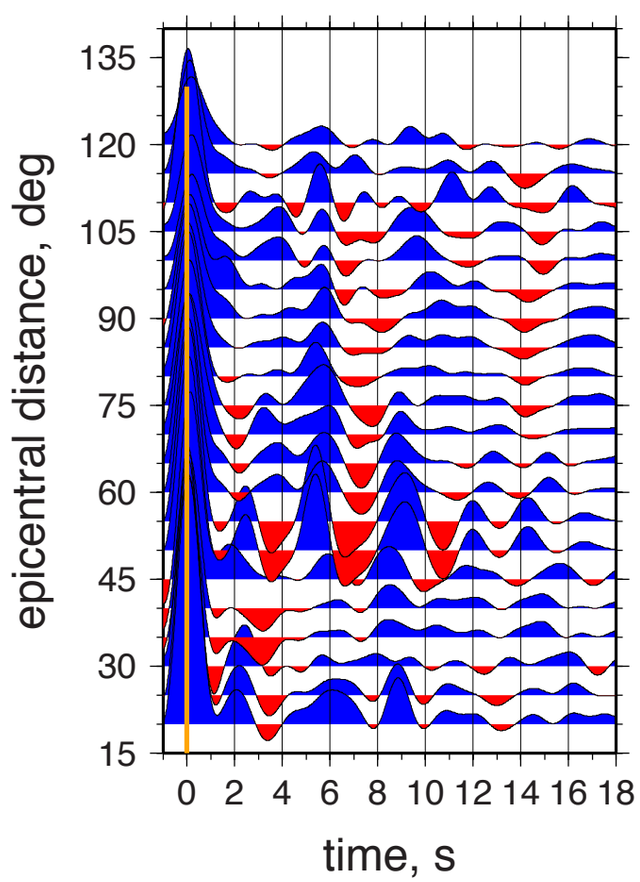
QM38_1_epi_0-360_5bins.rgrid scale

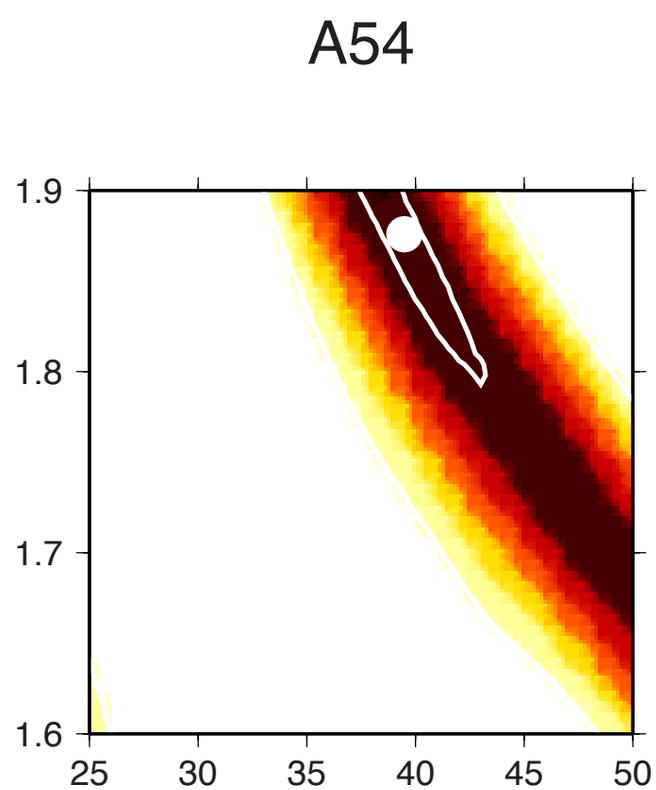


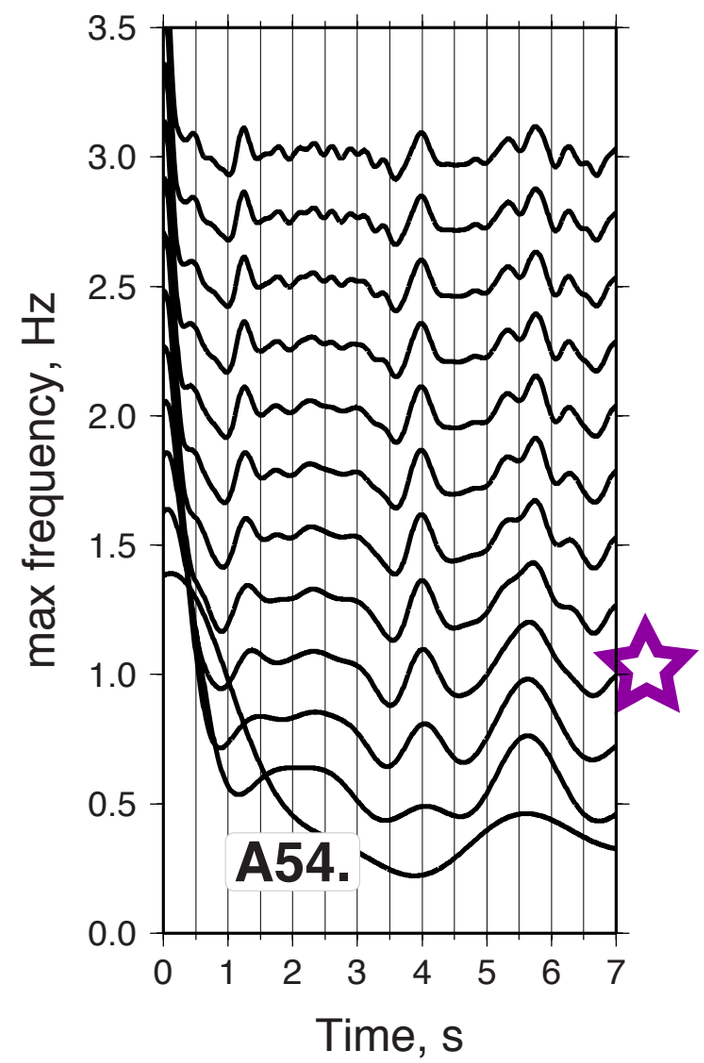


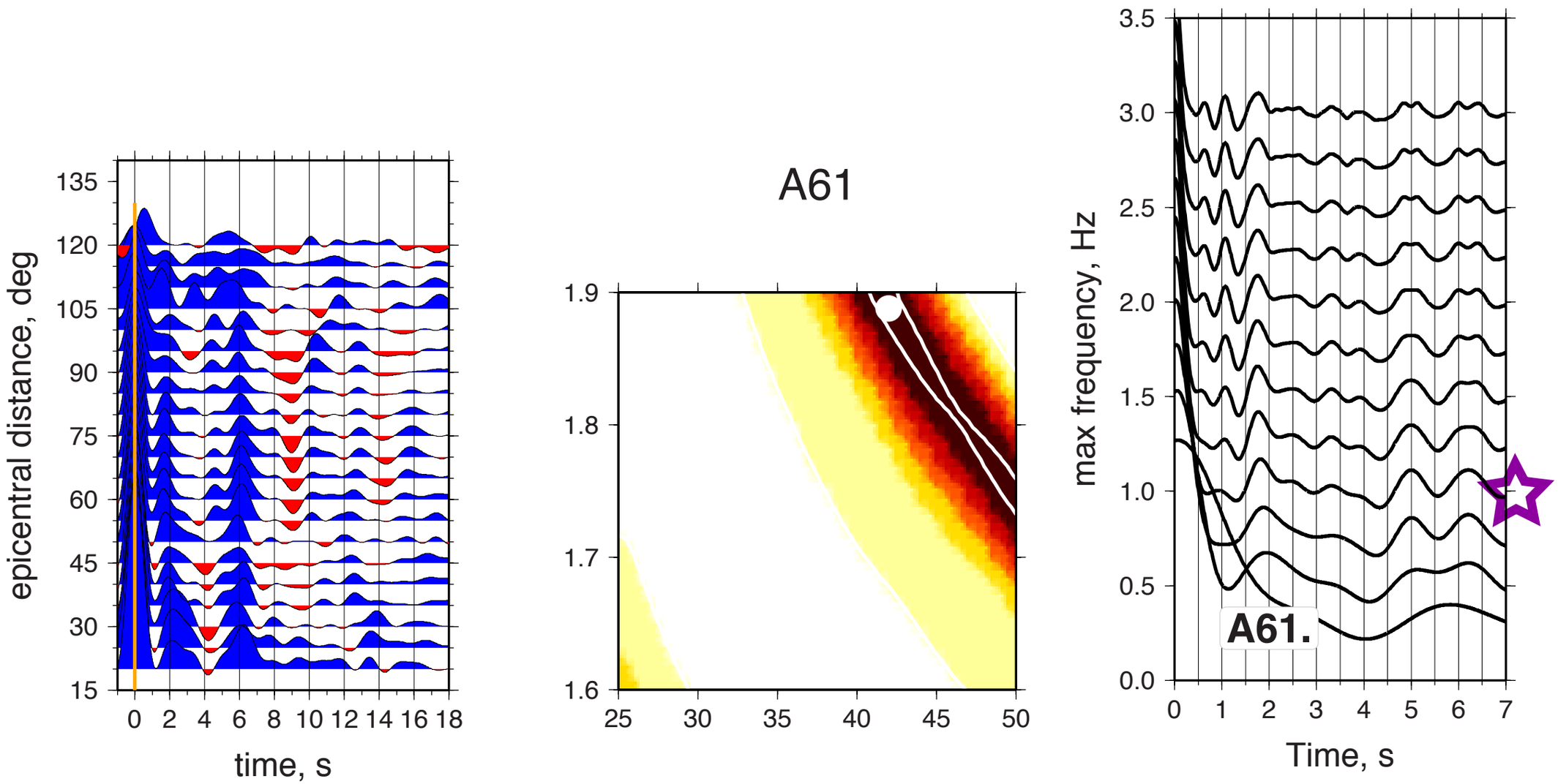


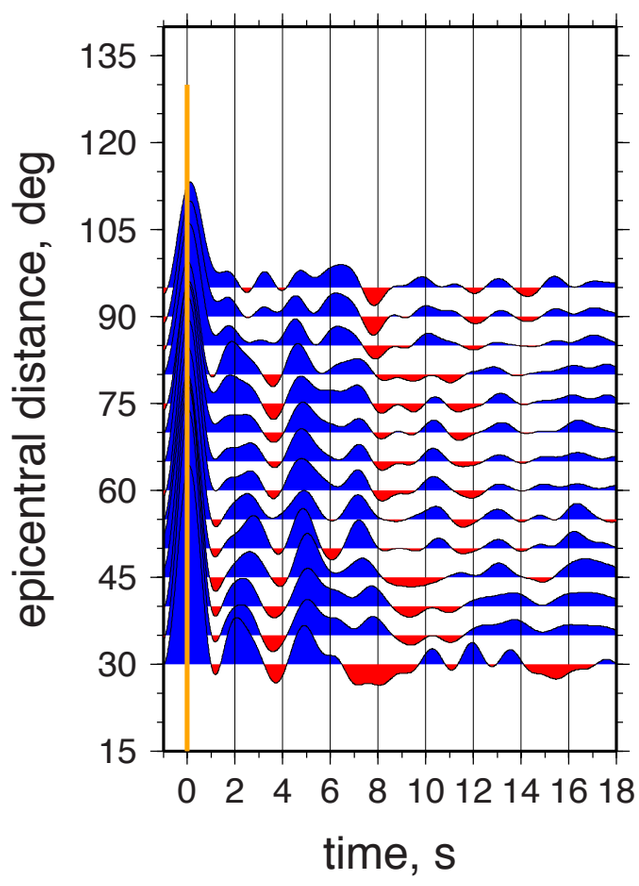

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
QM39
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM39

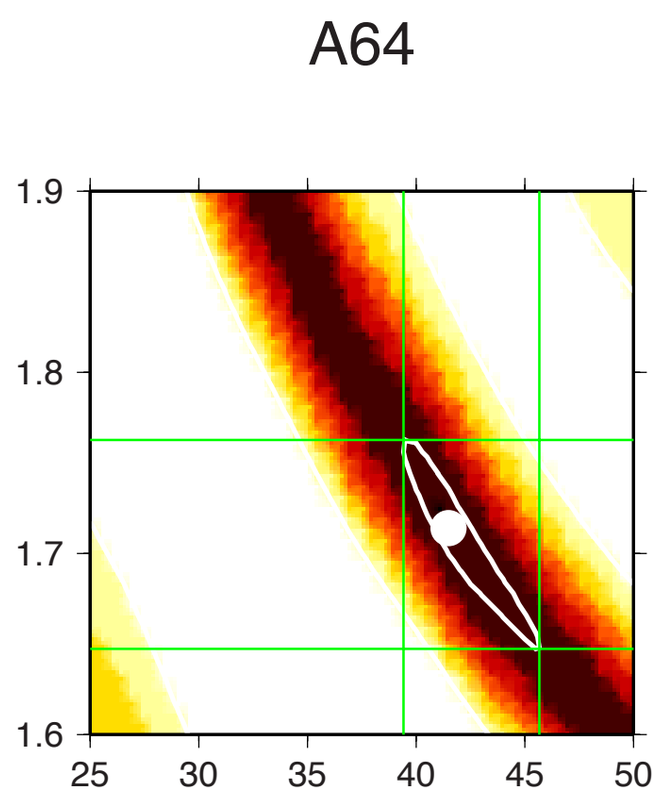

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s

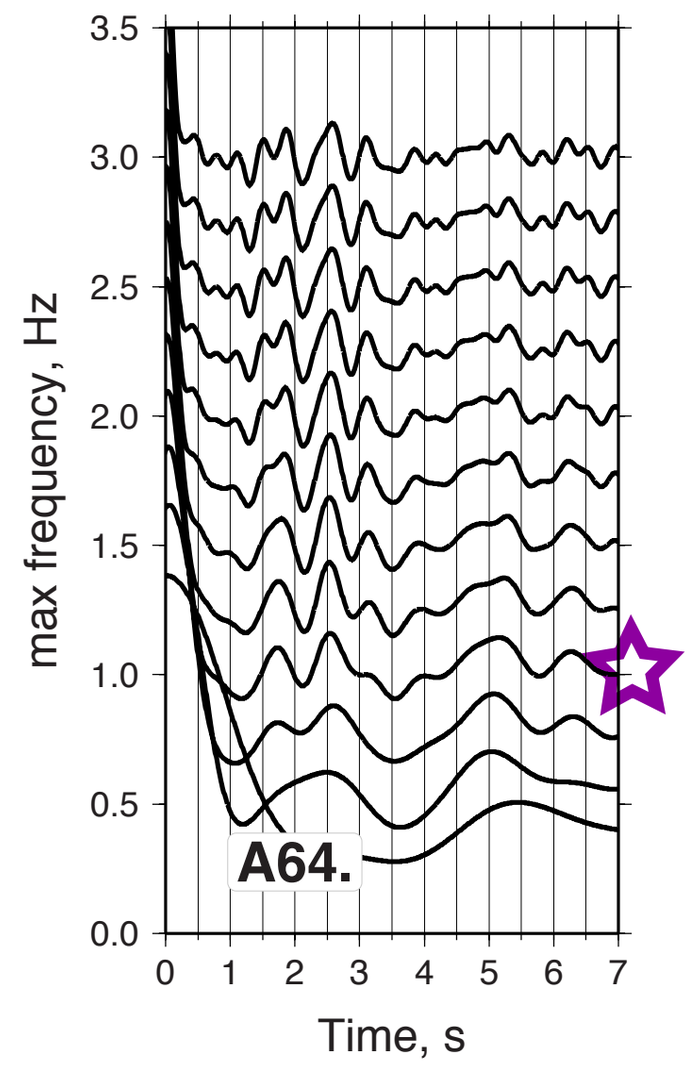

A54
1.9
1.8
1.7
1.6
25 30 35 40 45 50

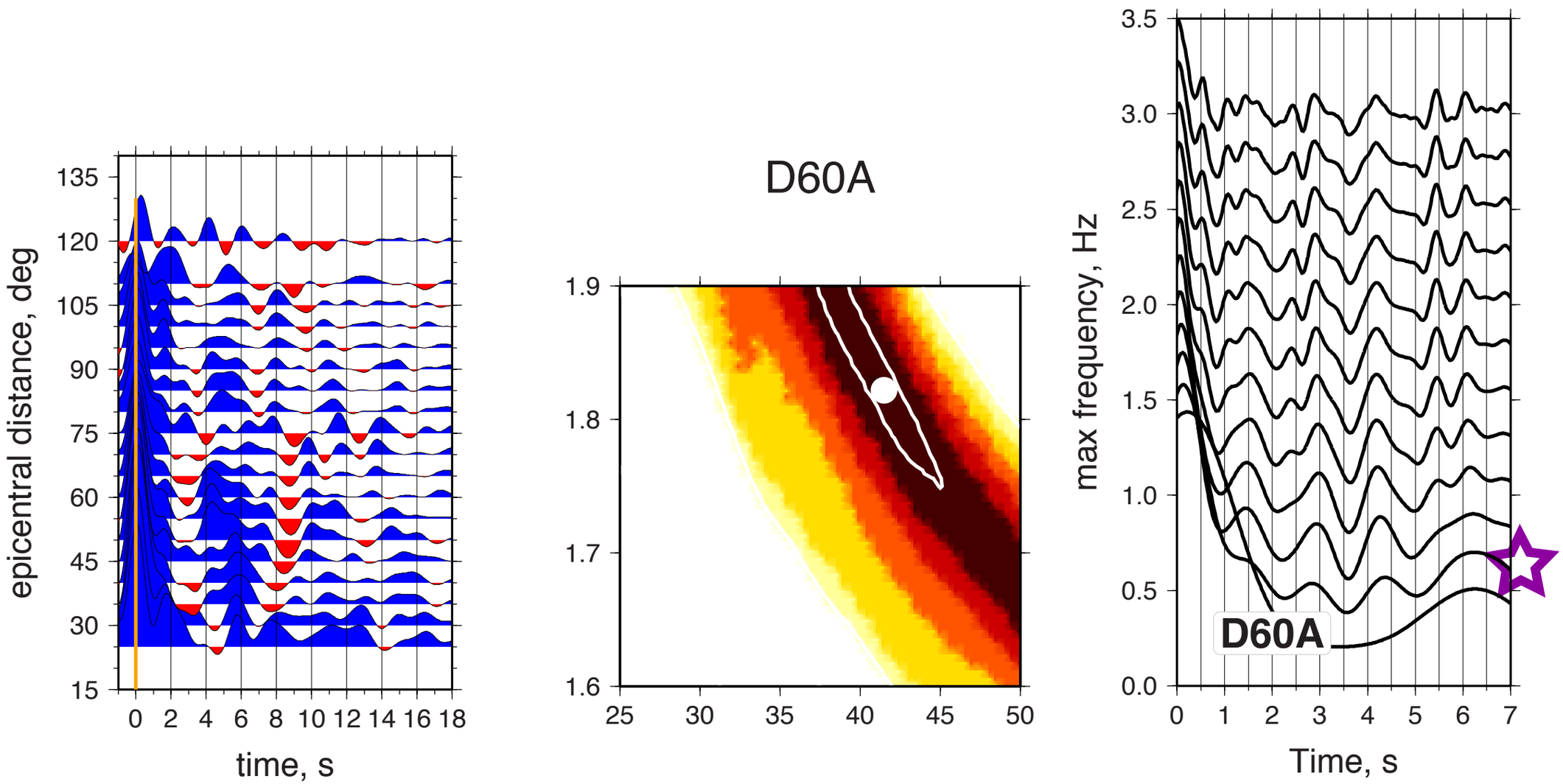

max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
A54.

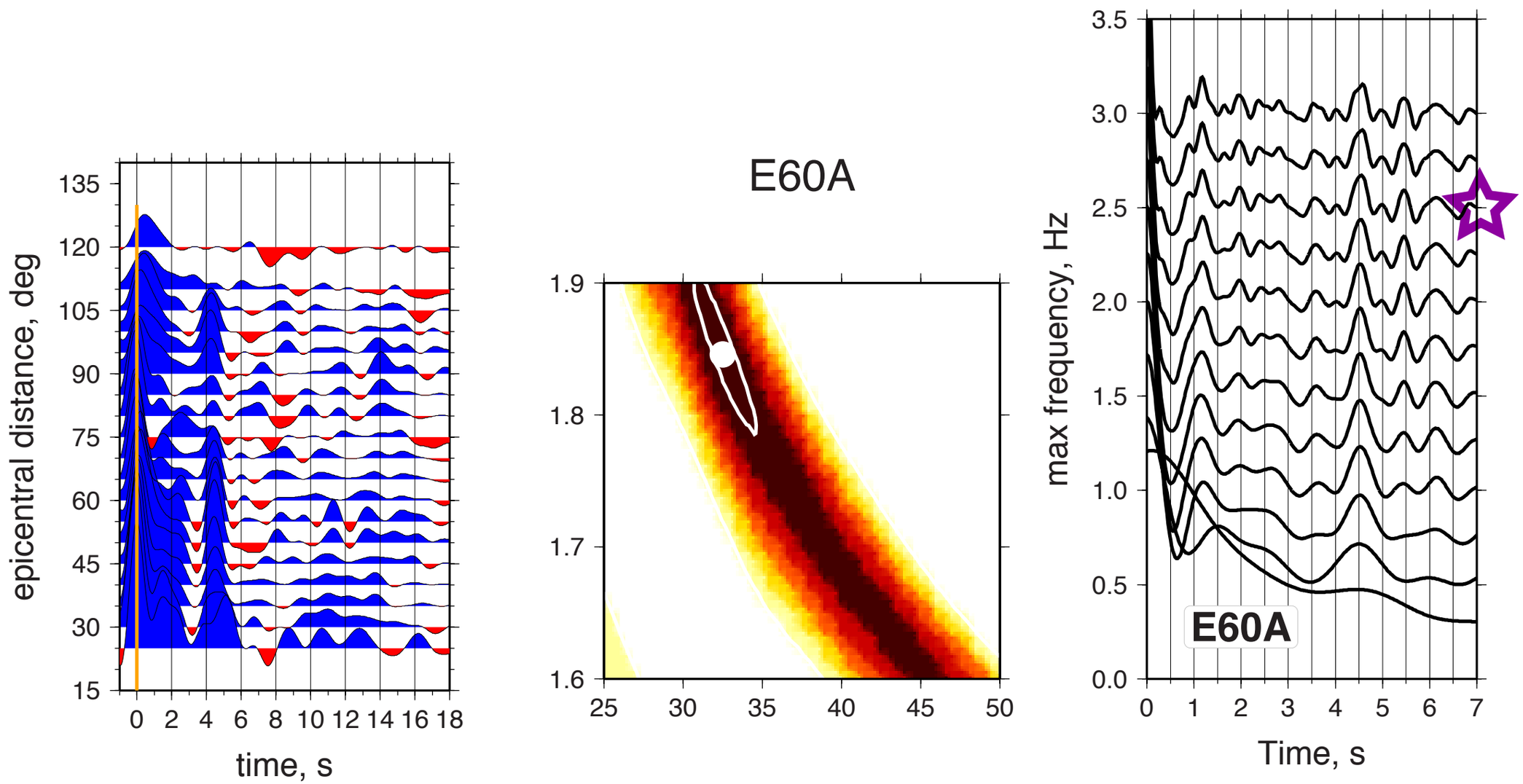

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
A61
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
A61.

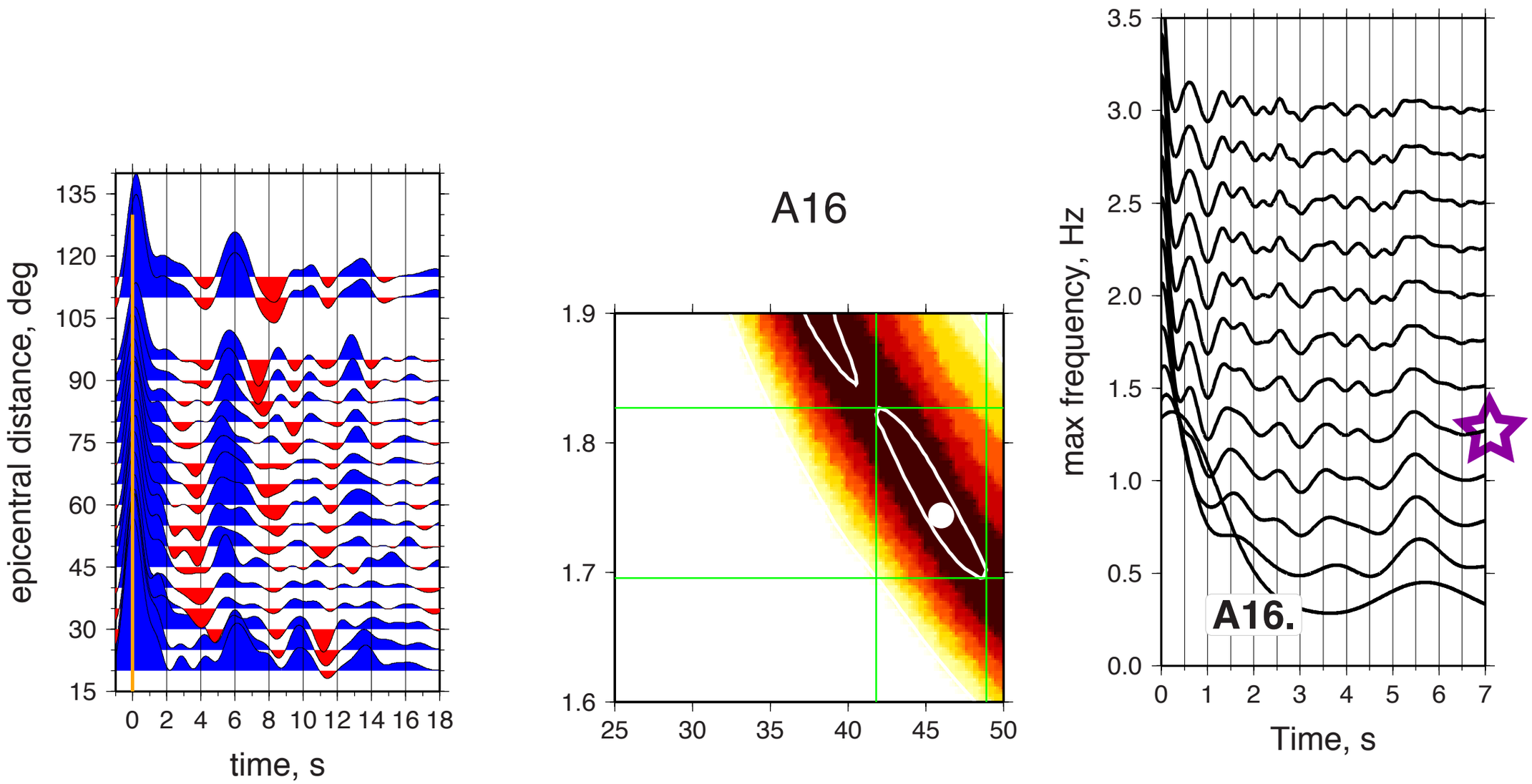

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s

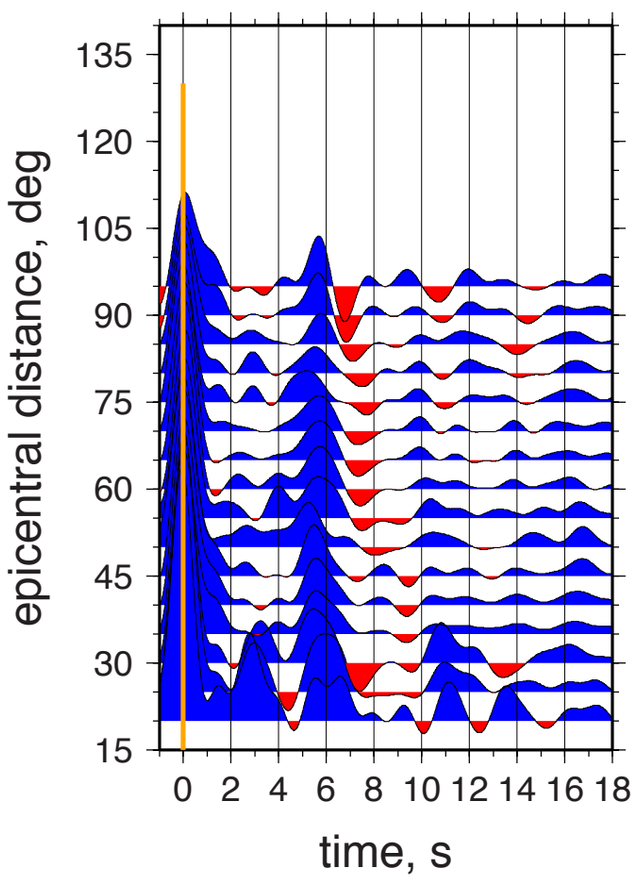

A64
1.9
1.8
1.7
1.6
25 30 35 40 45 50

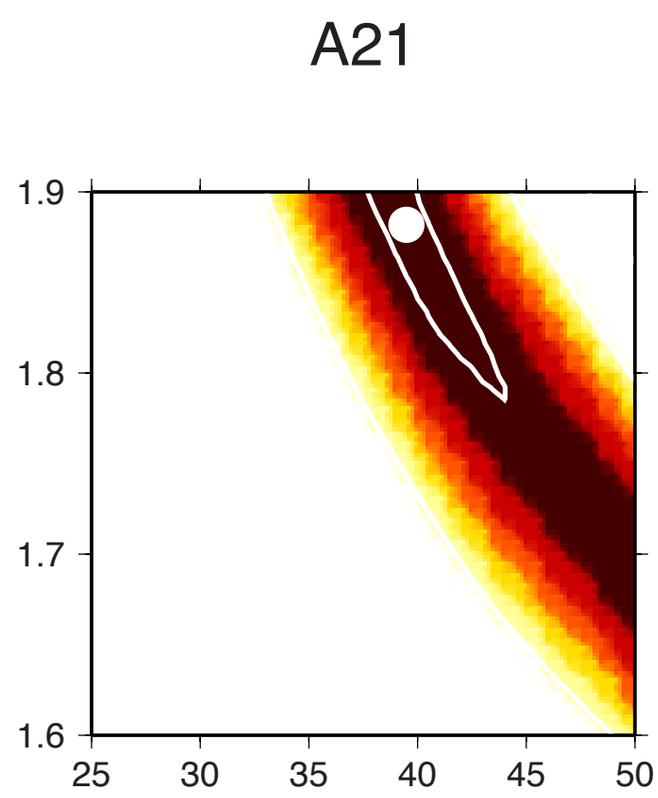

max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
A64.


D60A
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
D60A


E60A
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
E60A


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
A16
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
A16.


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s


A21
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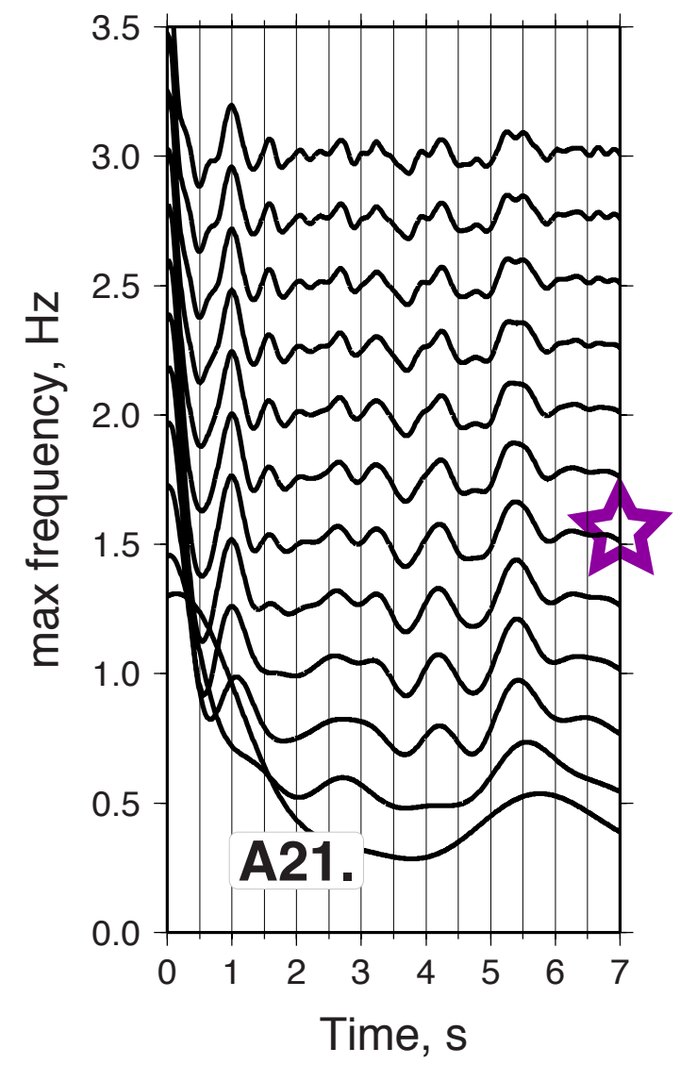
1.8
1.7
1.6
25 30 35 40 45 50


max frequency, Hz
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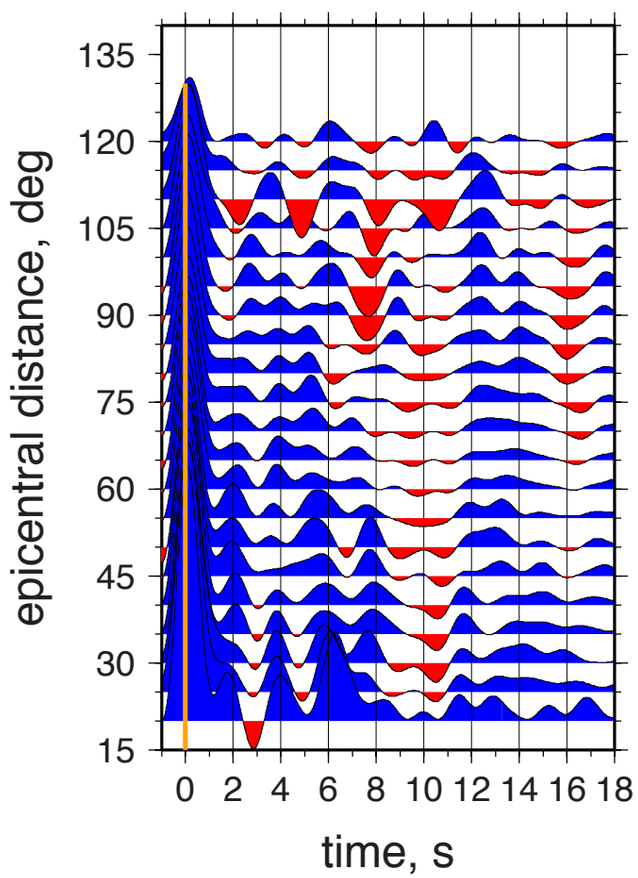
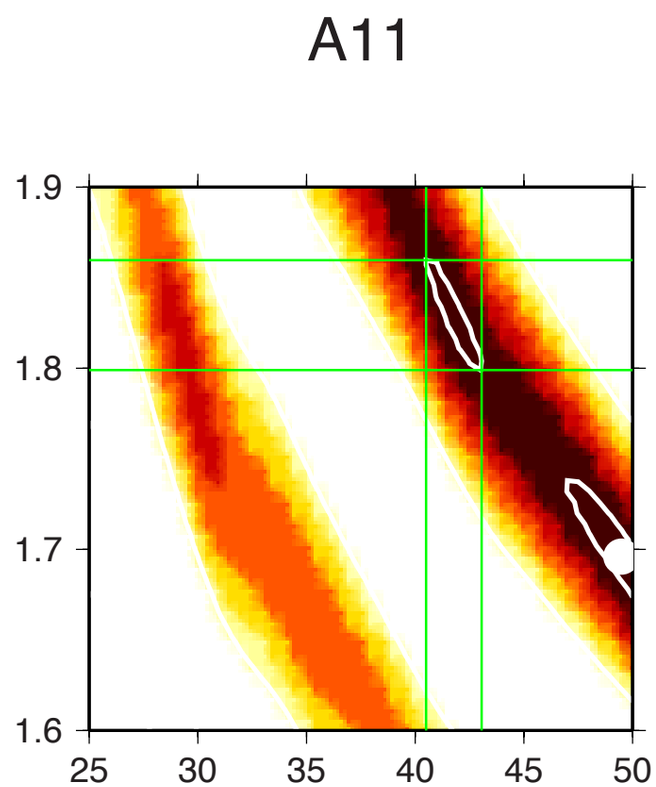
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
A21.


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s


A11
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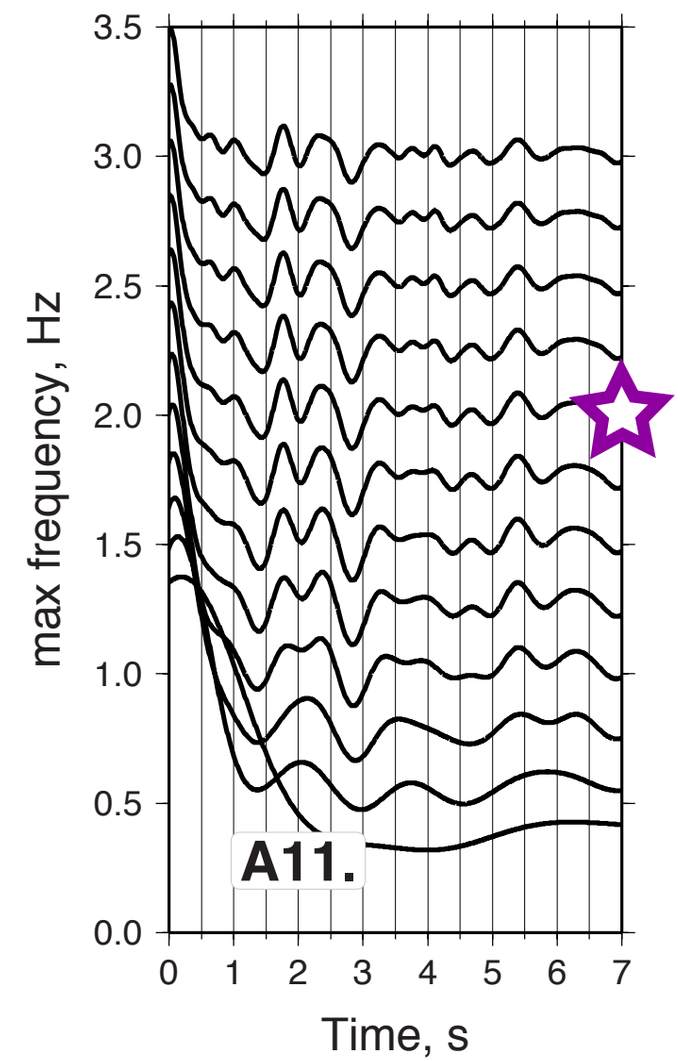
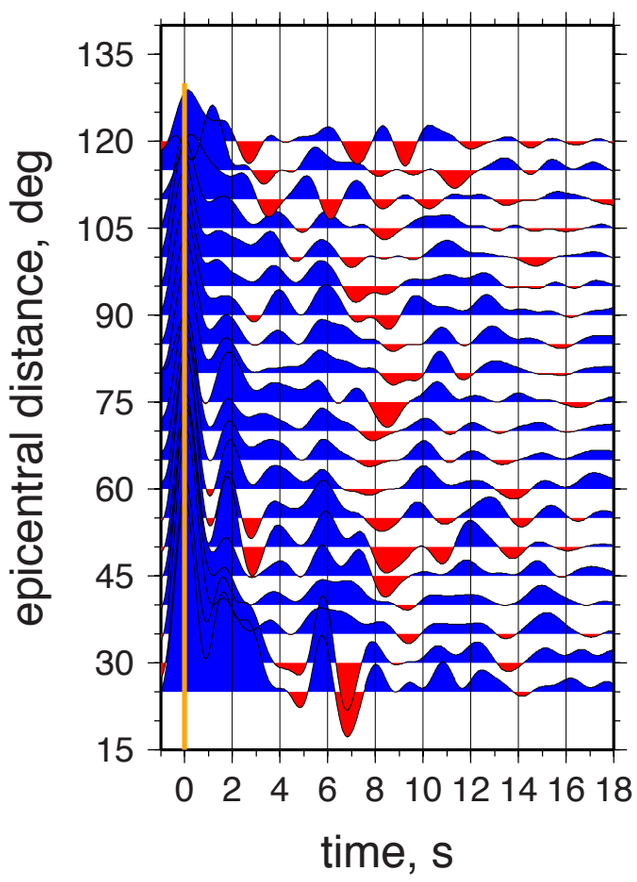
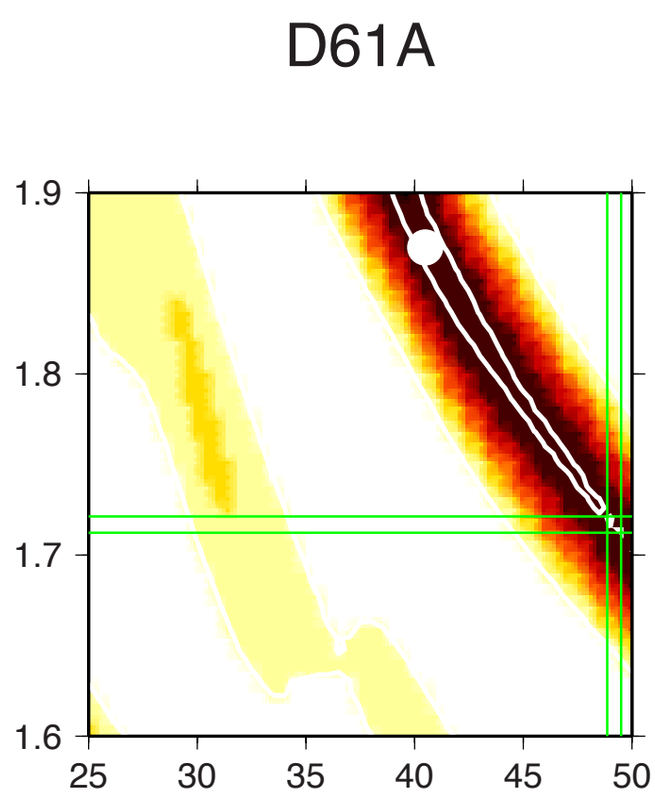
1.8
1.7
1.6
25 30 35 40 45 50


max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
A11.


135
120
105
90
75
60
45
30
15
epicentral distance, deg
0 2 4 6 8 10 12 14 16 18
time, s


D61A
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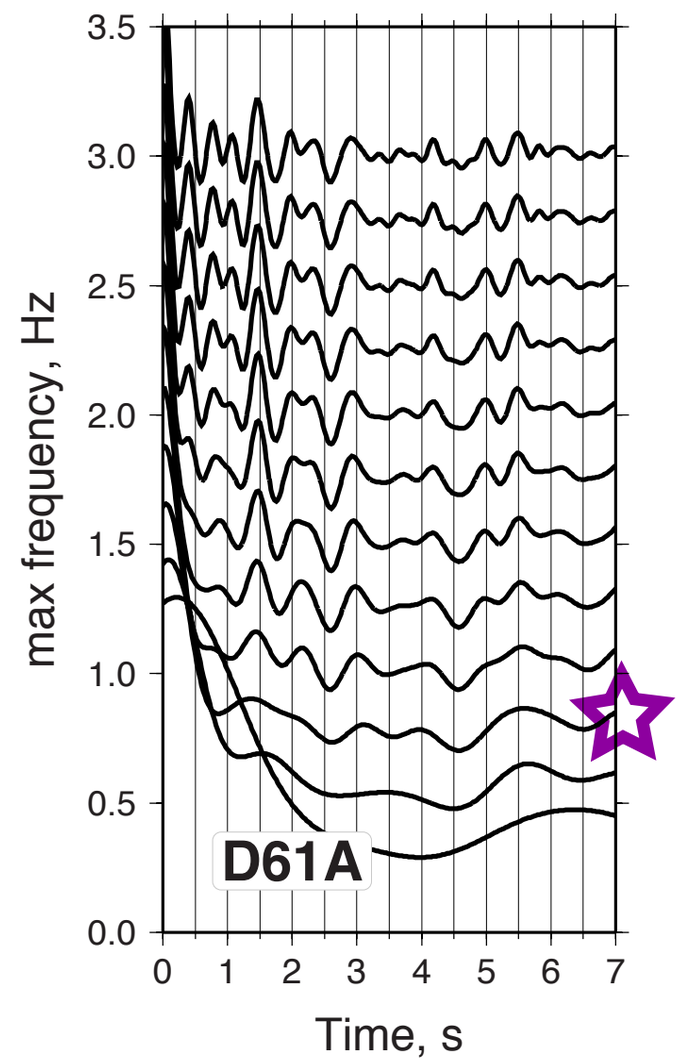
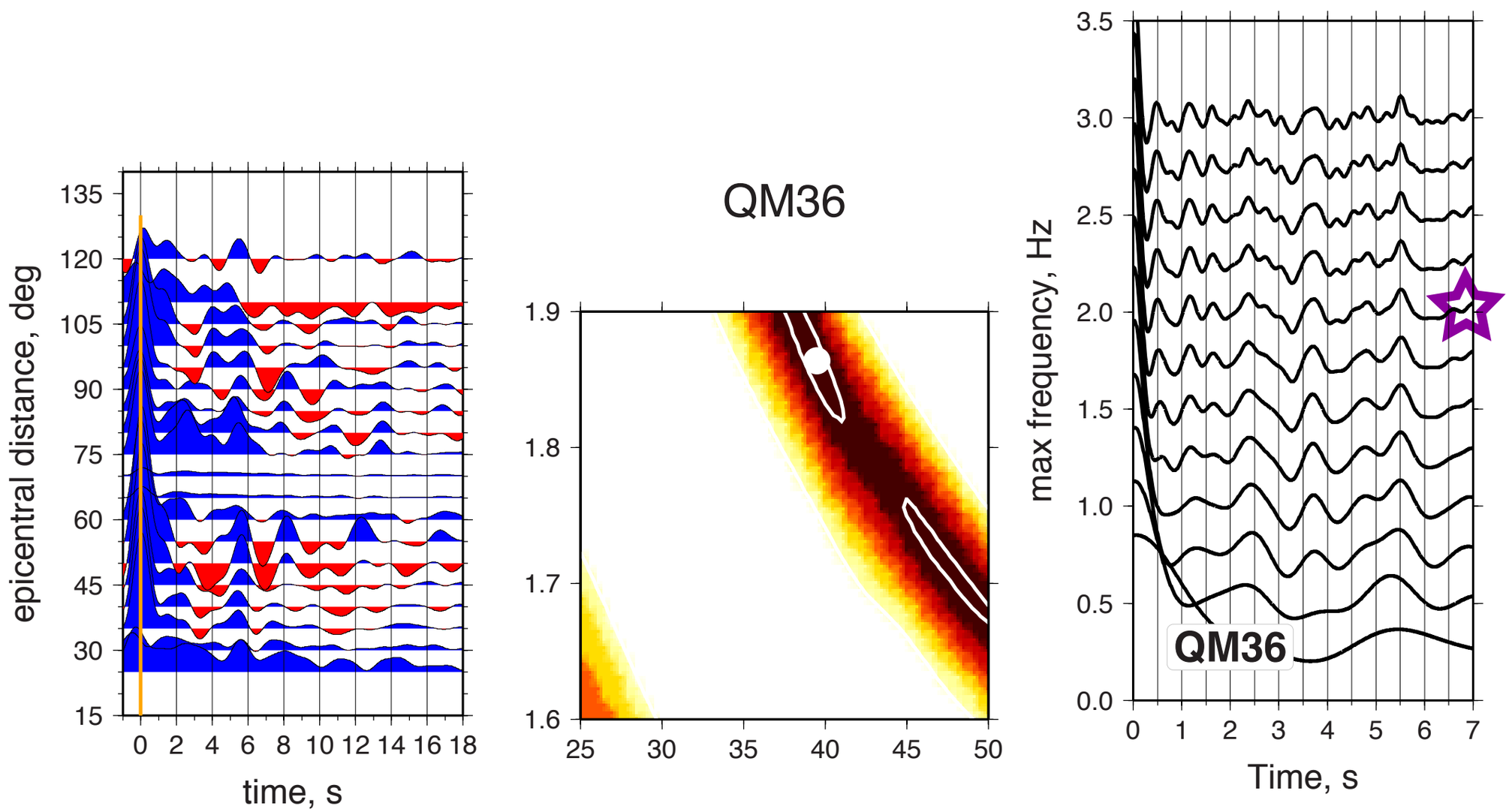
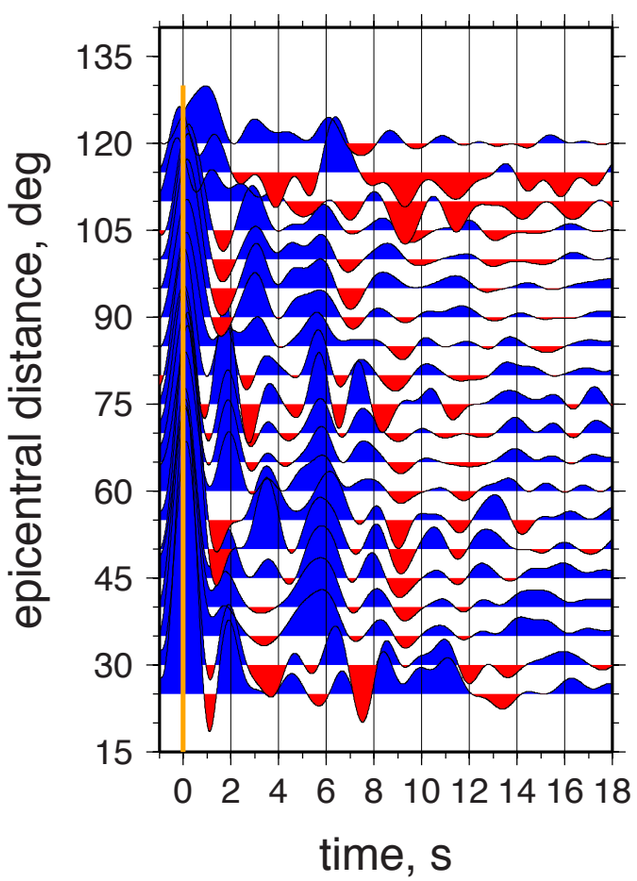
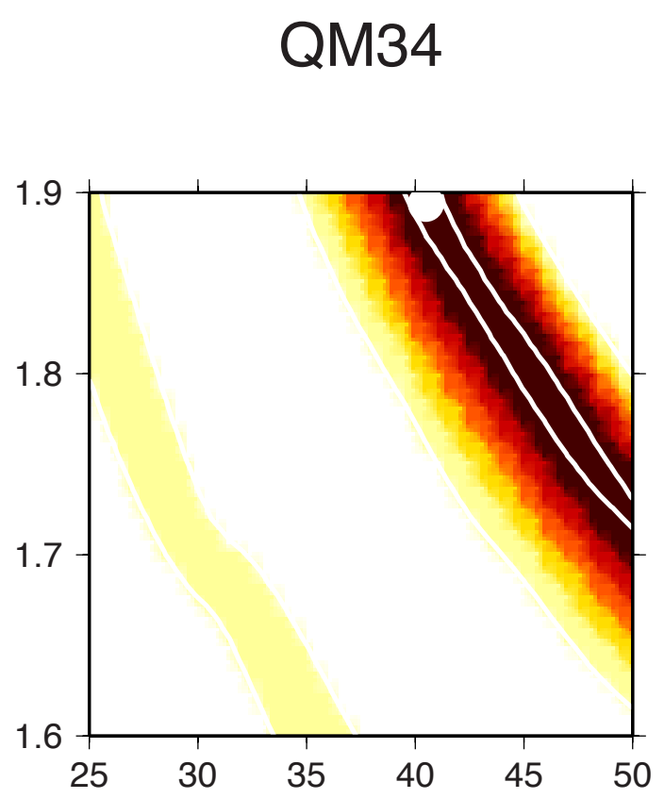
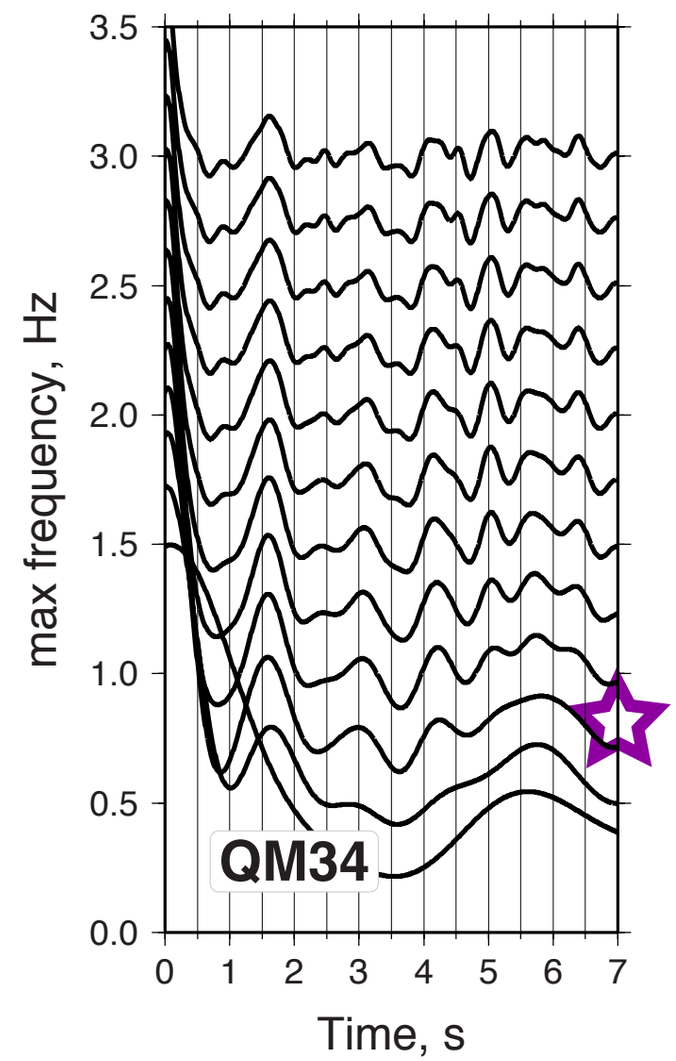
1.8
1.7
1.6
25 30 35 40 45 50

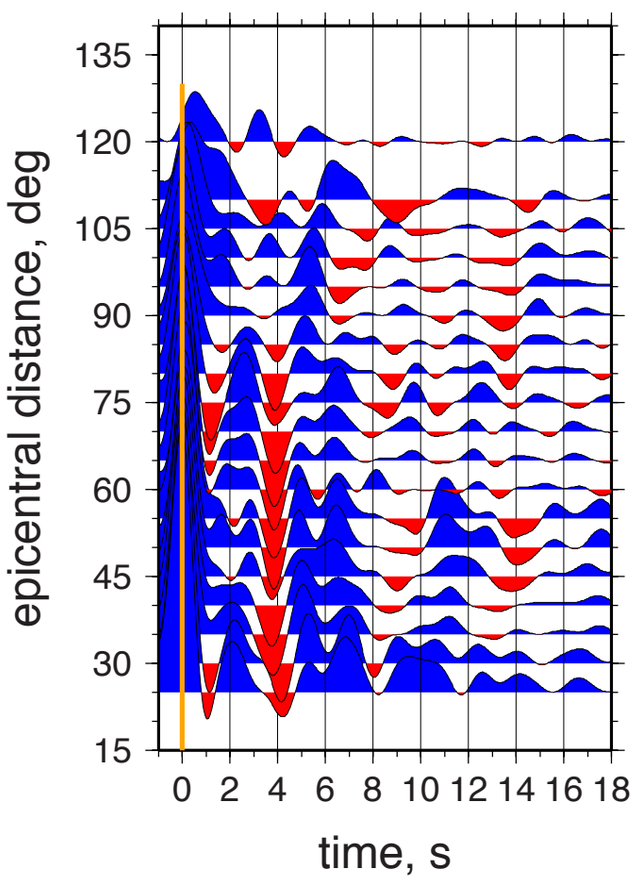

3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
max frequency, Hz
D61A
0 1 2 3 4 5 6 7
Time, s

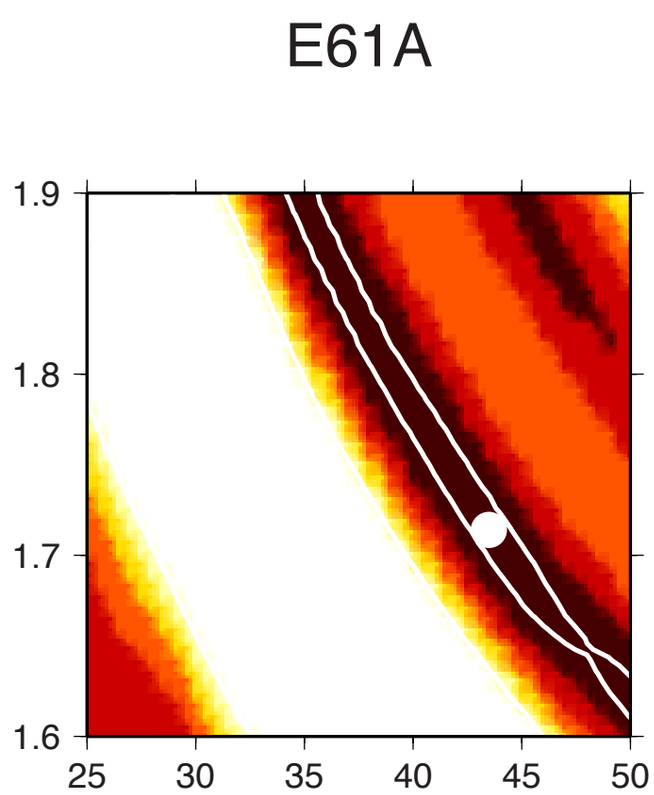

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
QM36
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM36

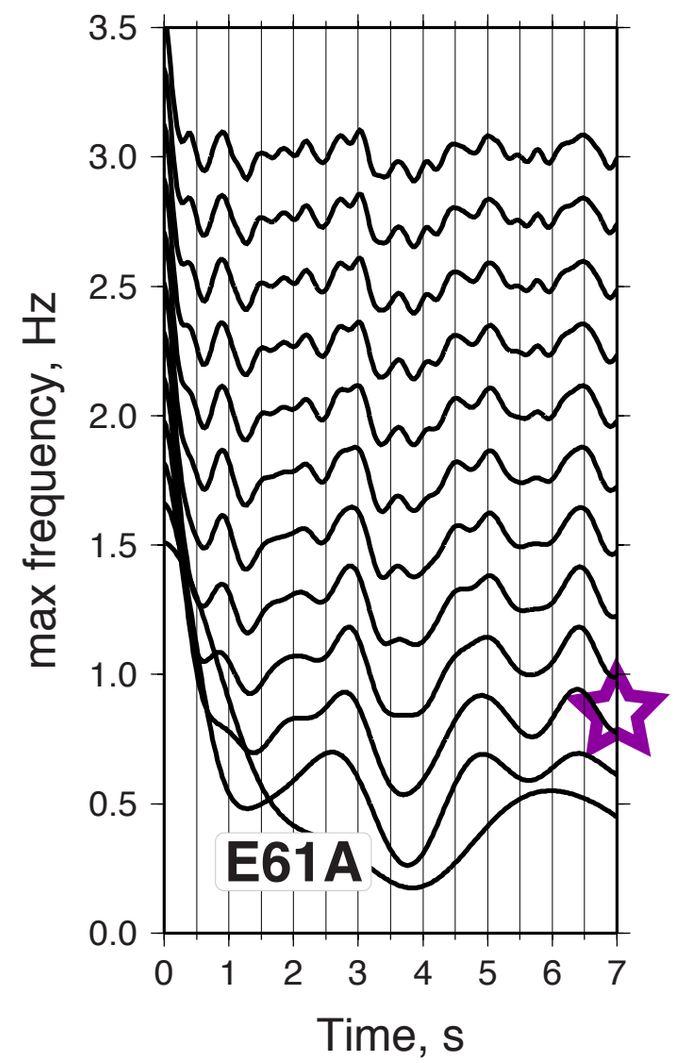

135
120
105
90
75
60
45
30
15
epicentral distance, deg
0 2 4 6 8 10 12 14 16 18
time, s

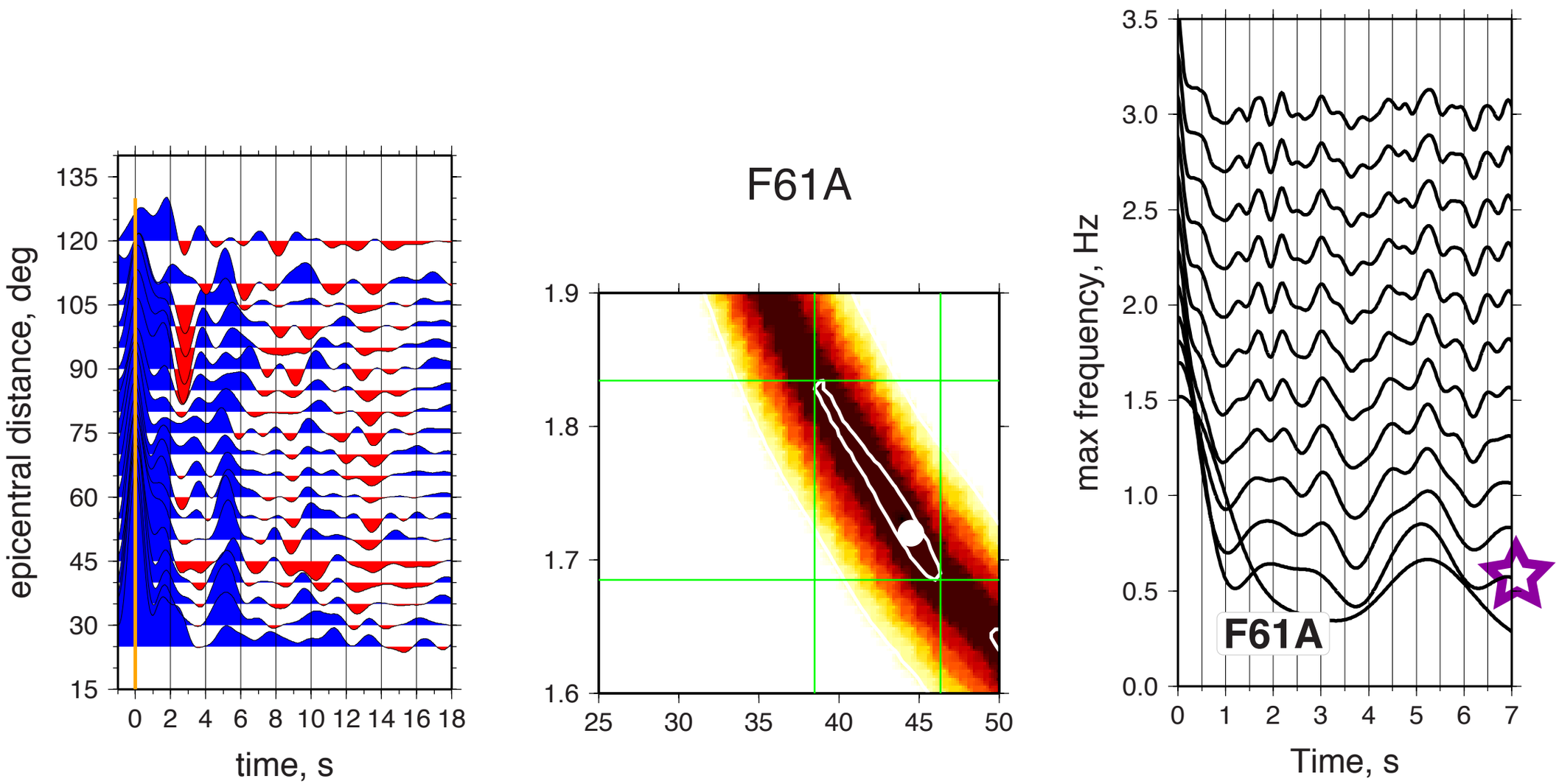

QM34
1.9
1.8
1.7
1.6
25 30 35 40 45 50

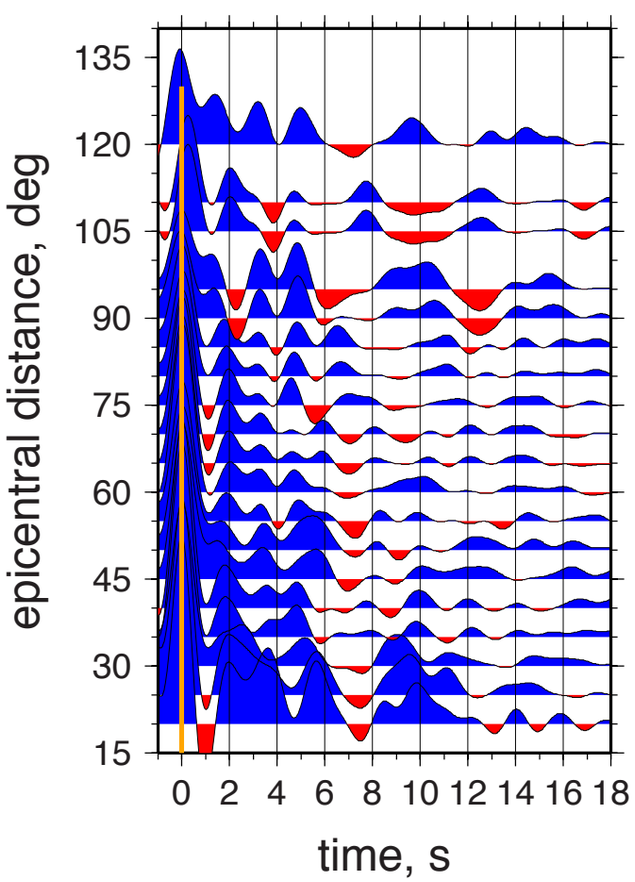

3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
max frequency, Hz
QM34
0 1 2 3 4 5 6 7
Time, s

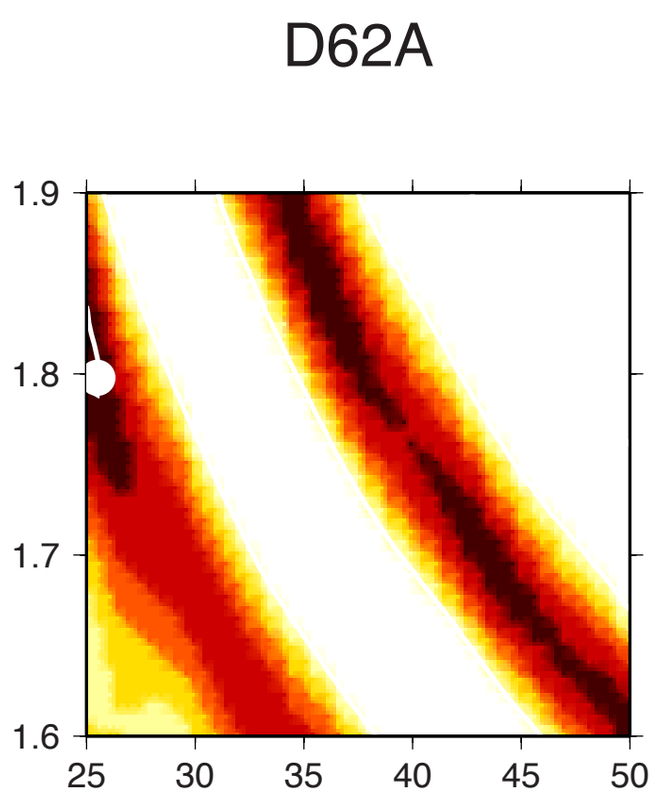

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s

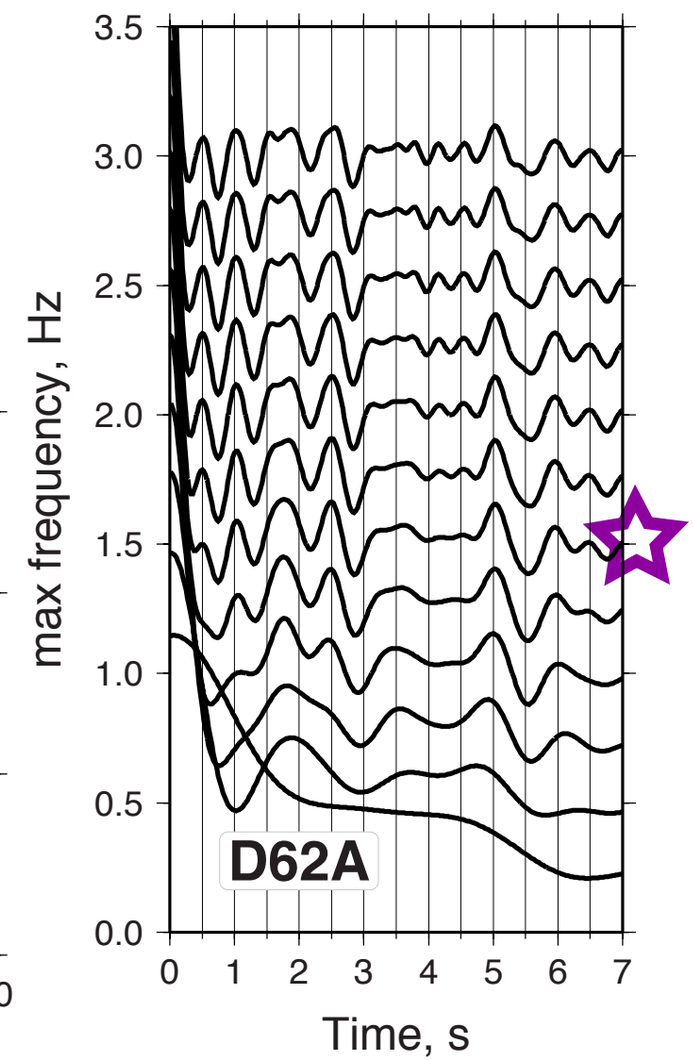

E61A
1.9
1.8
1.7
1.6
25 30 35 40 45 50

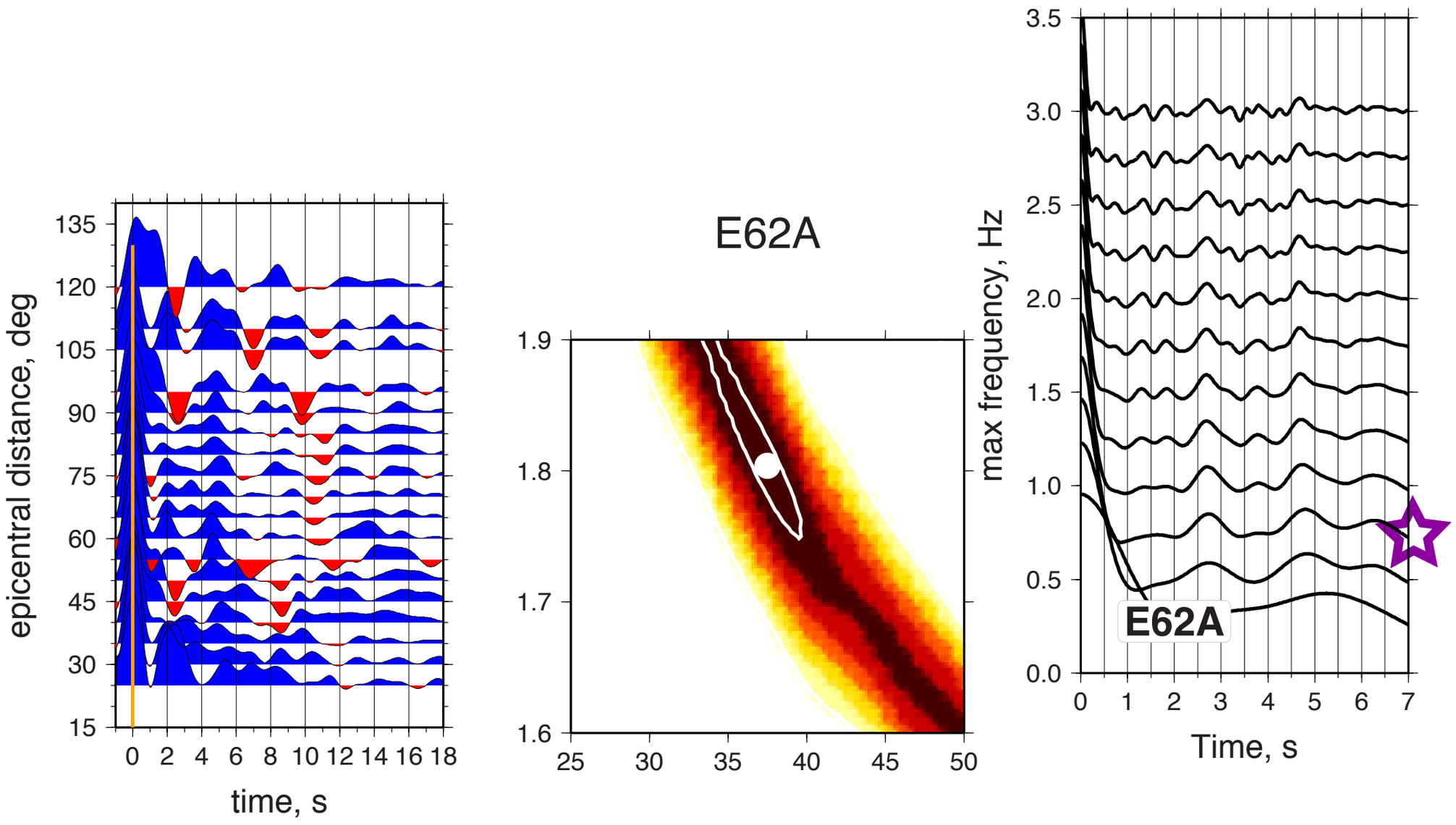

max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
E61A

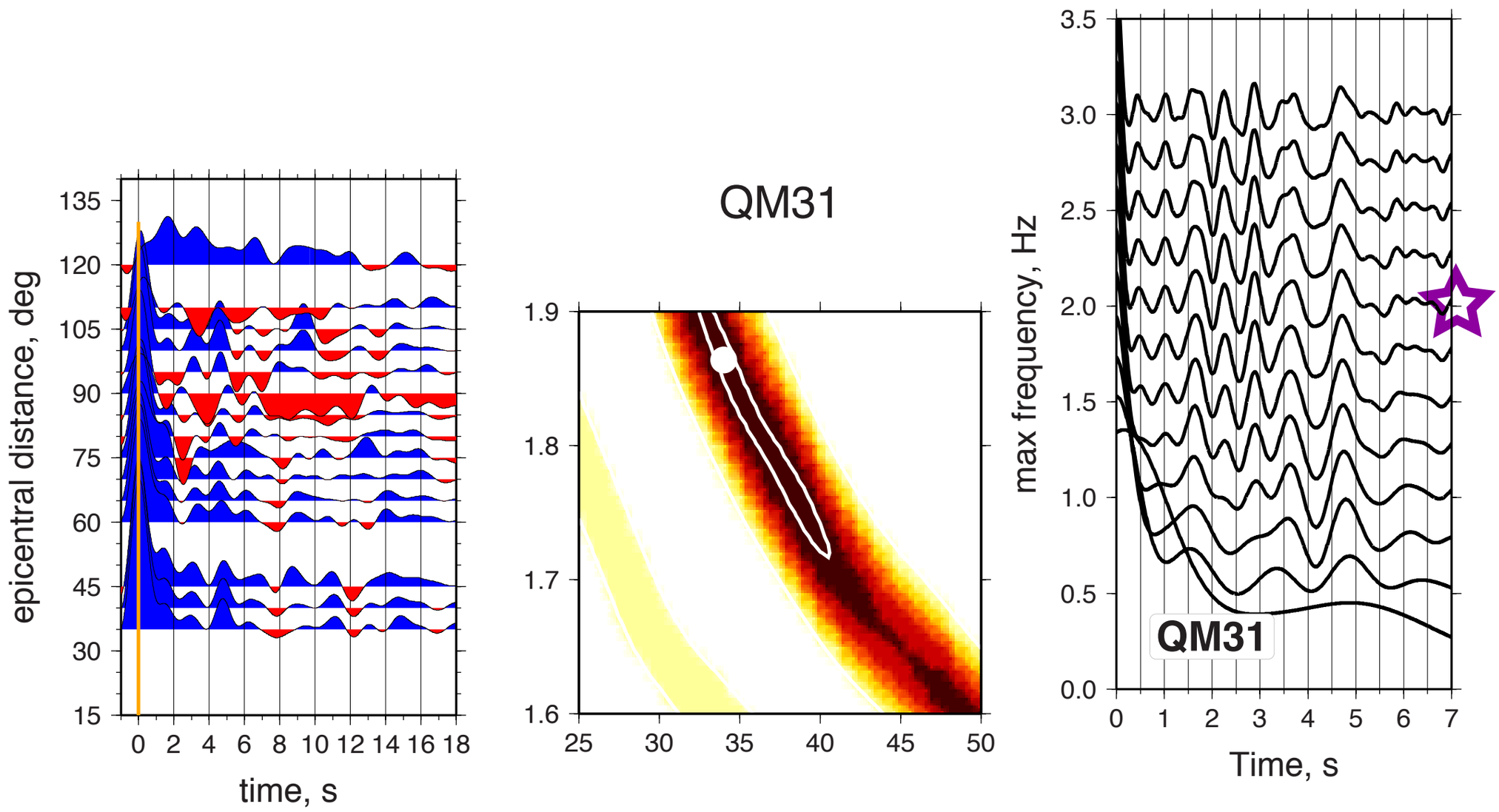

F61A
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
F61A

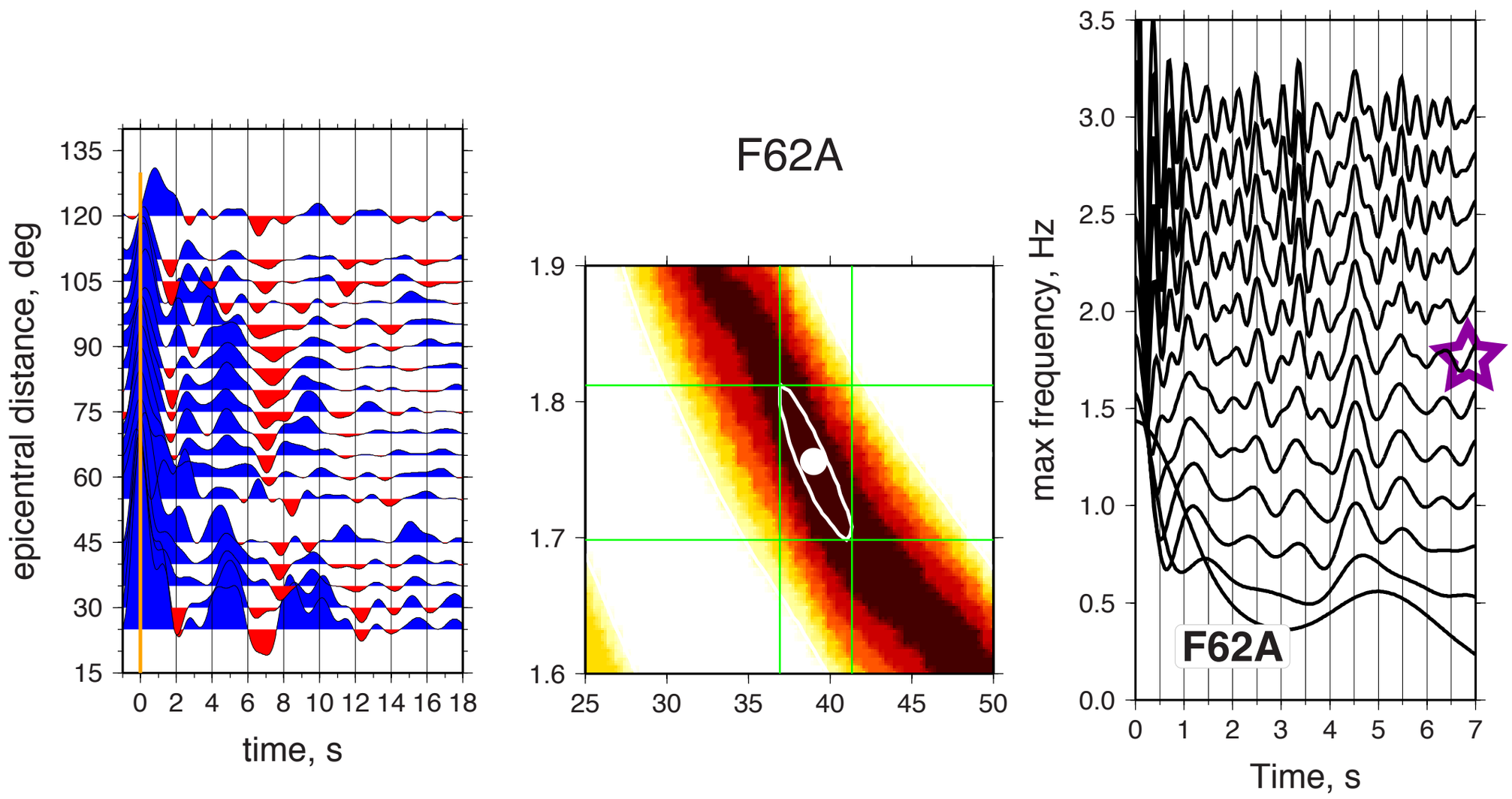

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s

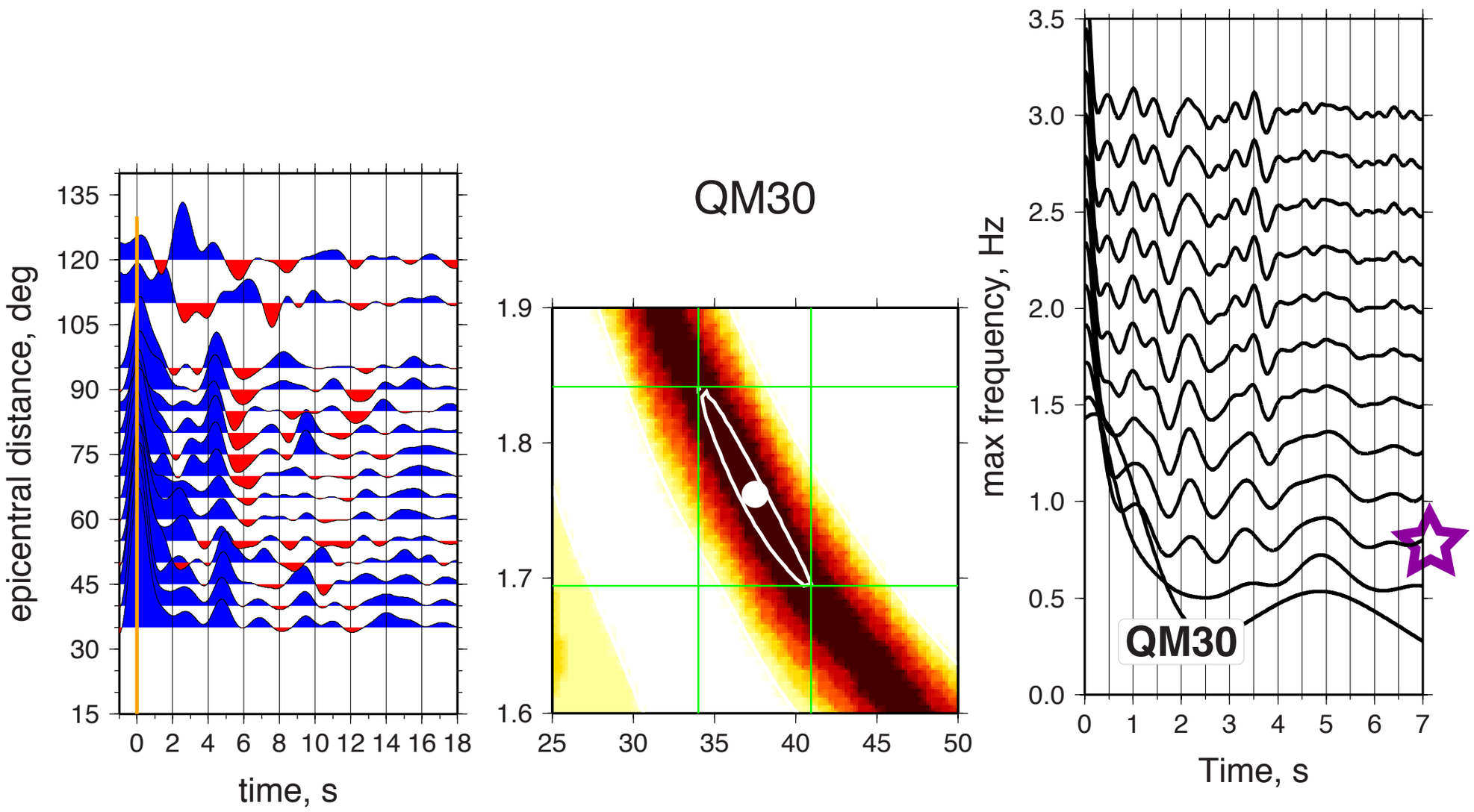

D62A
1.9
1.8
1.7
1.6
25 30 35 40 45 50


max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
D62A


E62A
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
E62A


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
QM31
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM31


F62A
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
F62A


QM30
epicentral distance, deg
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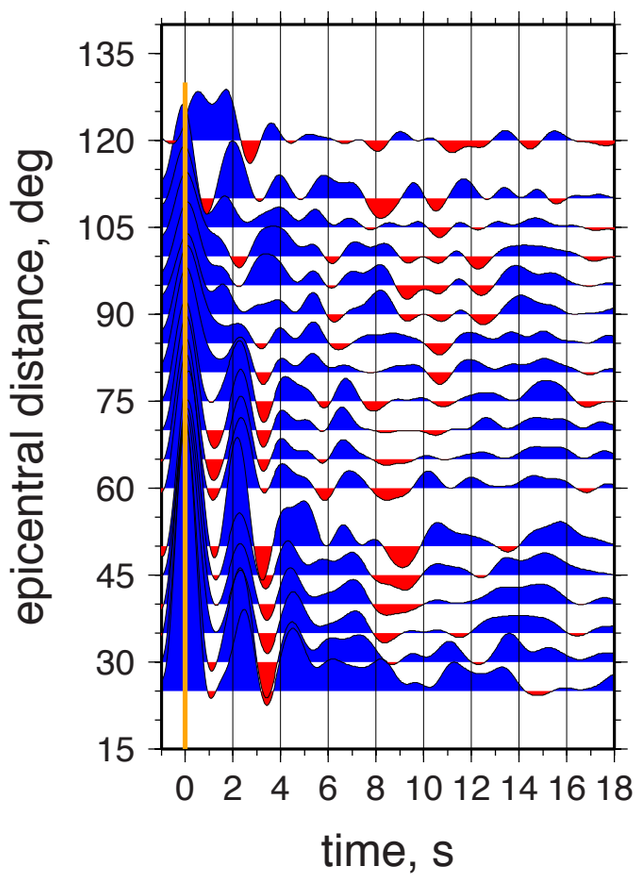
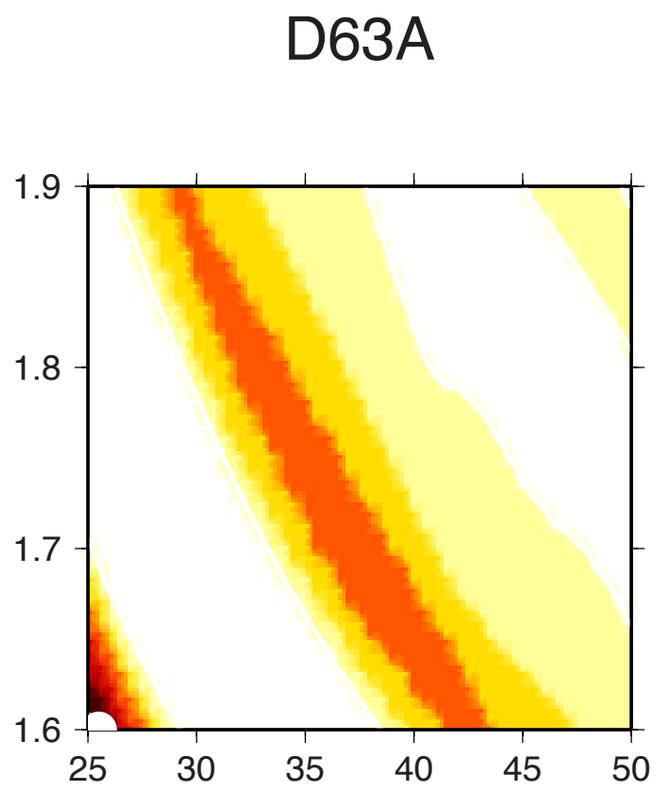
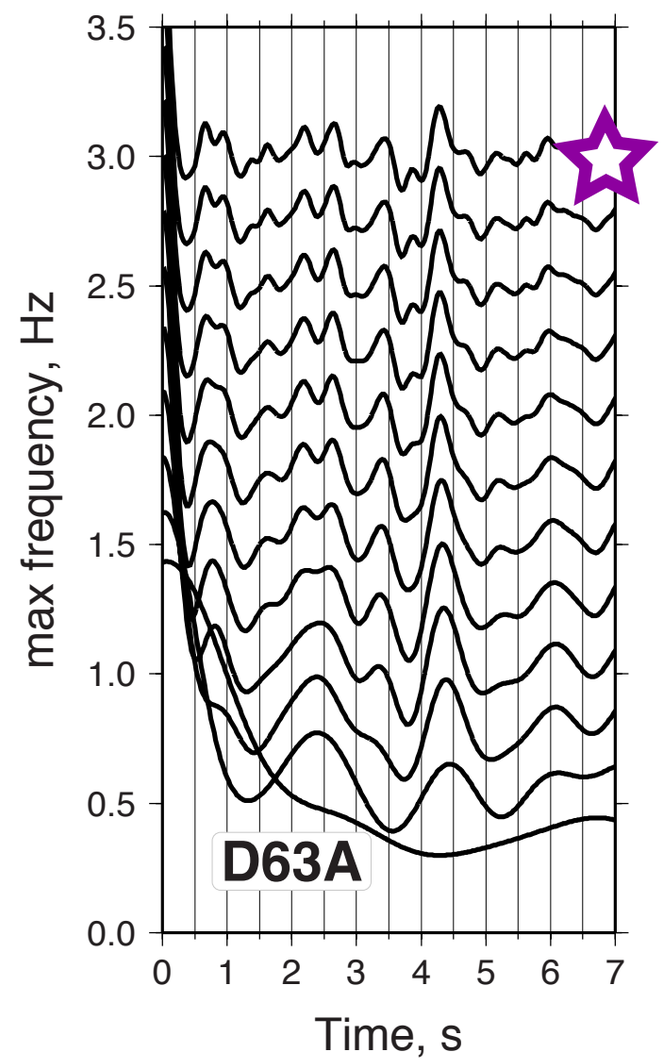
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM30


135
120
105
90
75
60
45
30
15
epicentral distance, deg
0 2 4 6 8 10 12 14 16 18
time, s


D63A
1.9
1.8
1.7
1.6
25 30 35 40 45 50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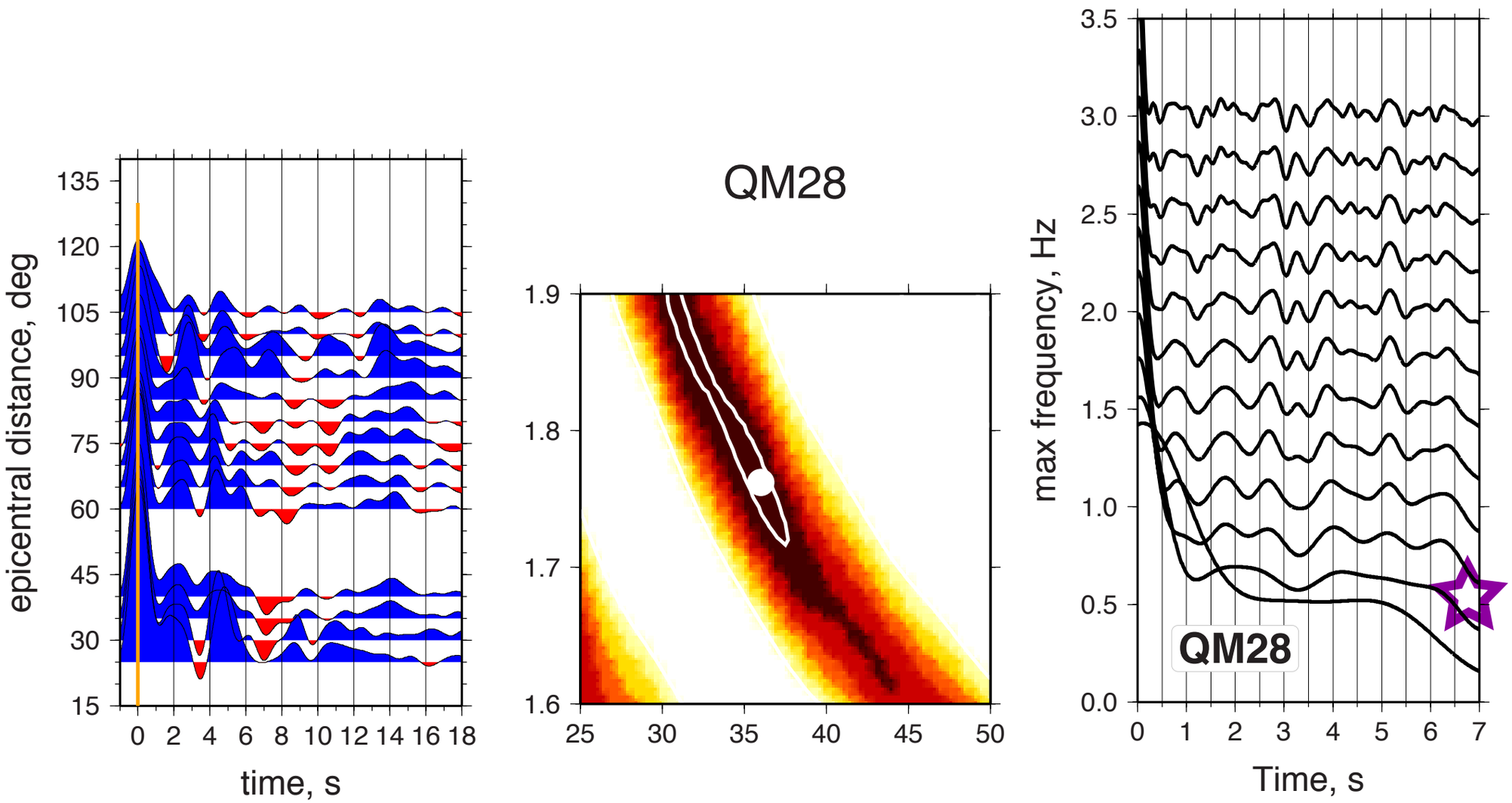
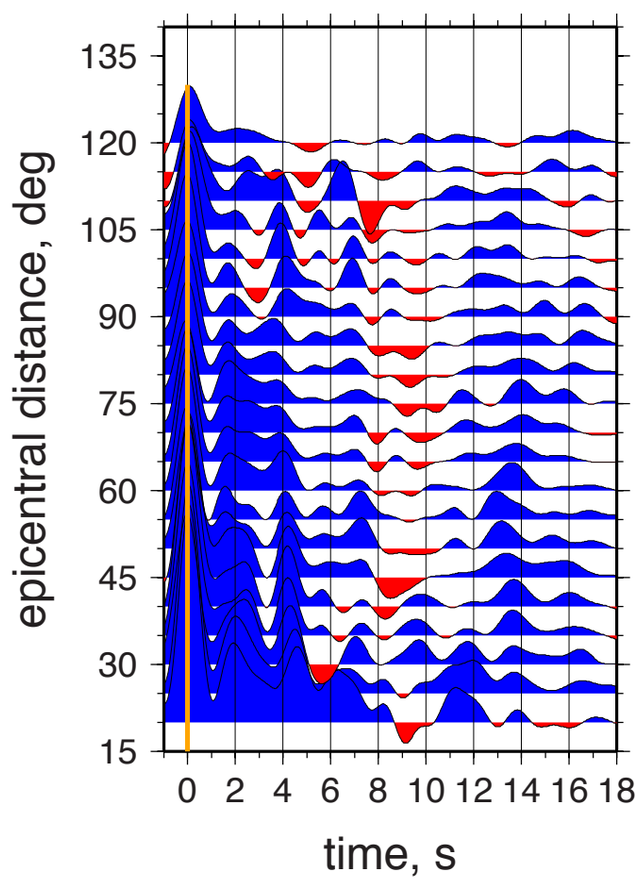
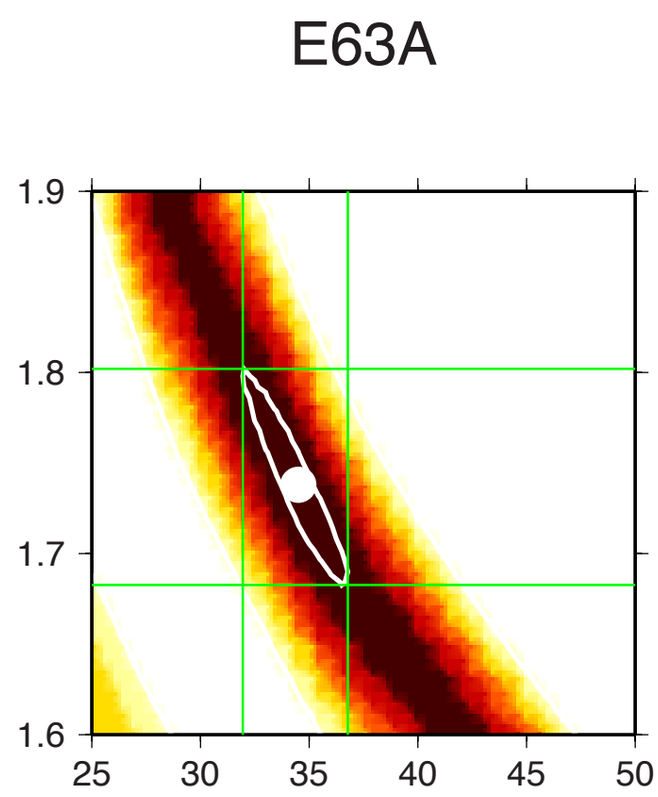
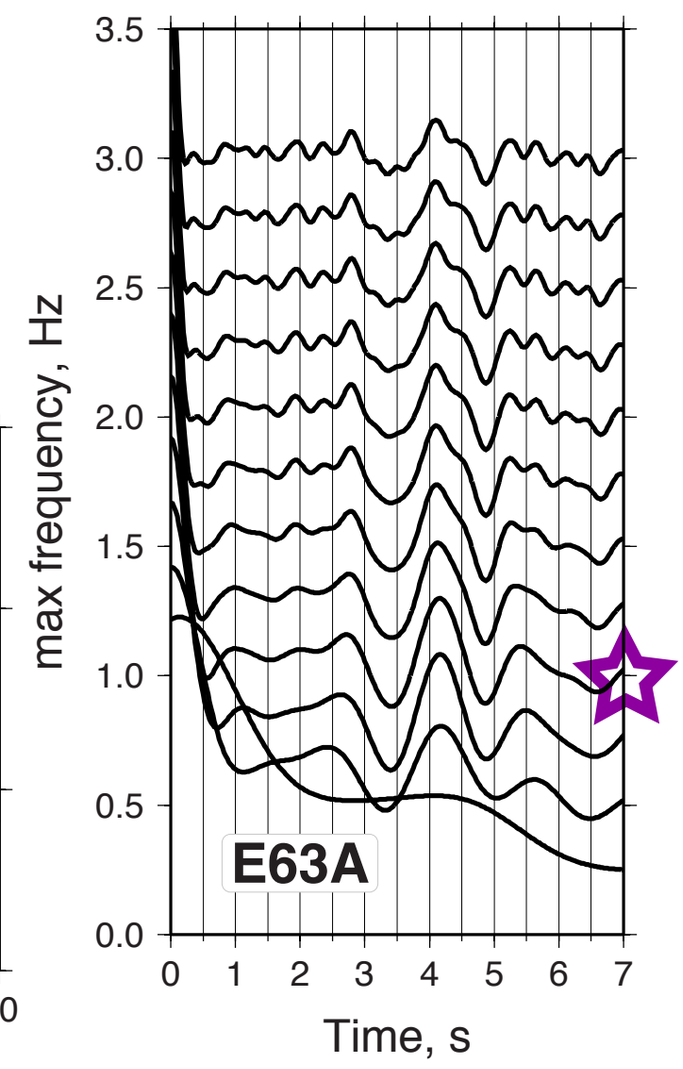
2.5
2.0
1.5
1.0
0.5
0.0
max frequency, Hz
D63A
0 1 2 3 4 5 6 7
Time, s


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
QM28
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM28


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s


E63A
1.9
1.8
1.7
1.6
25 30 35 40 45 50


max frequency, Hz
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2.0
1.5
1.0
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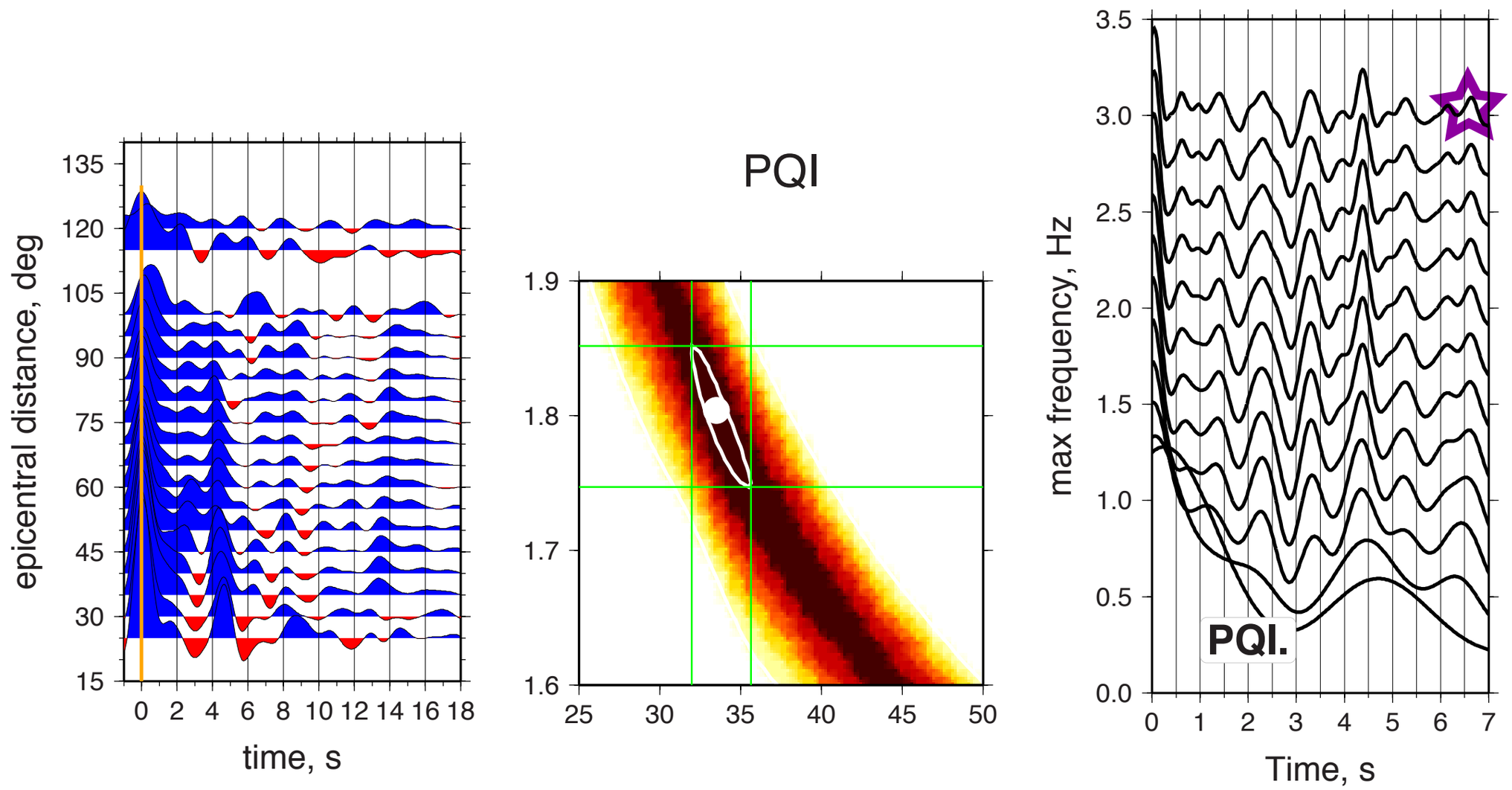
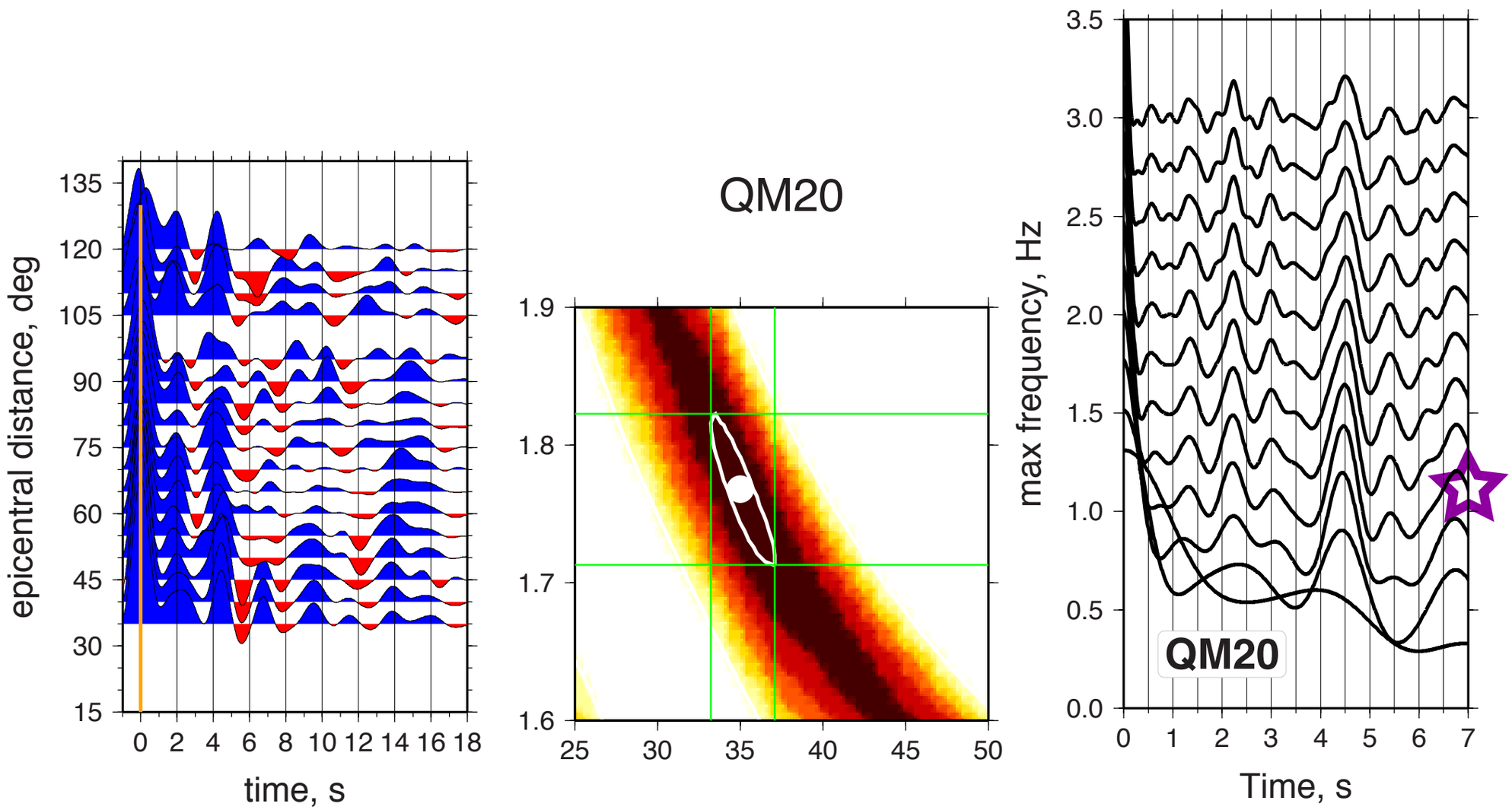
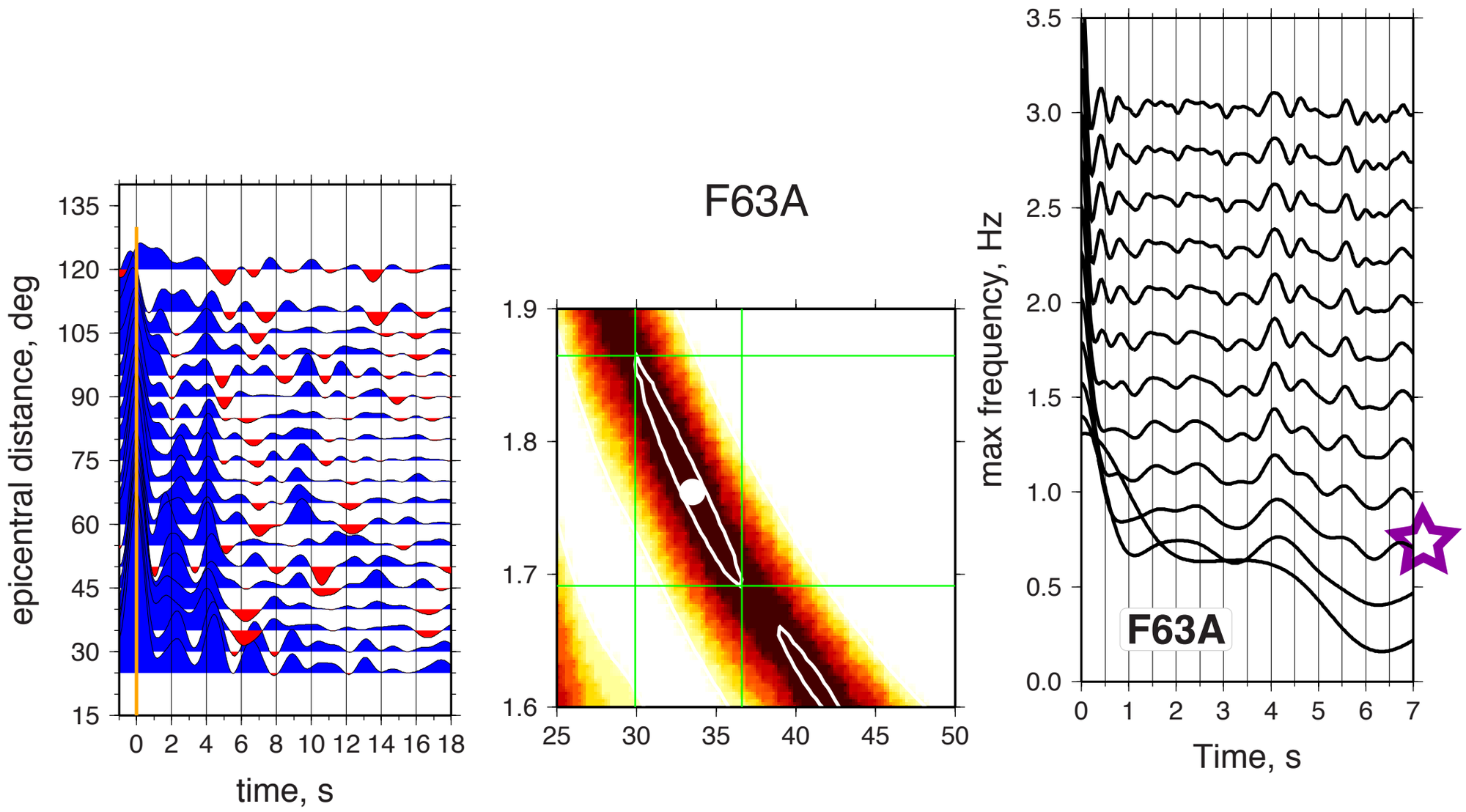
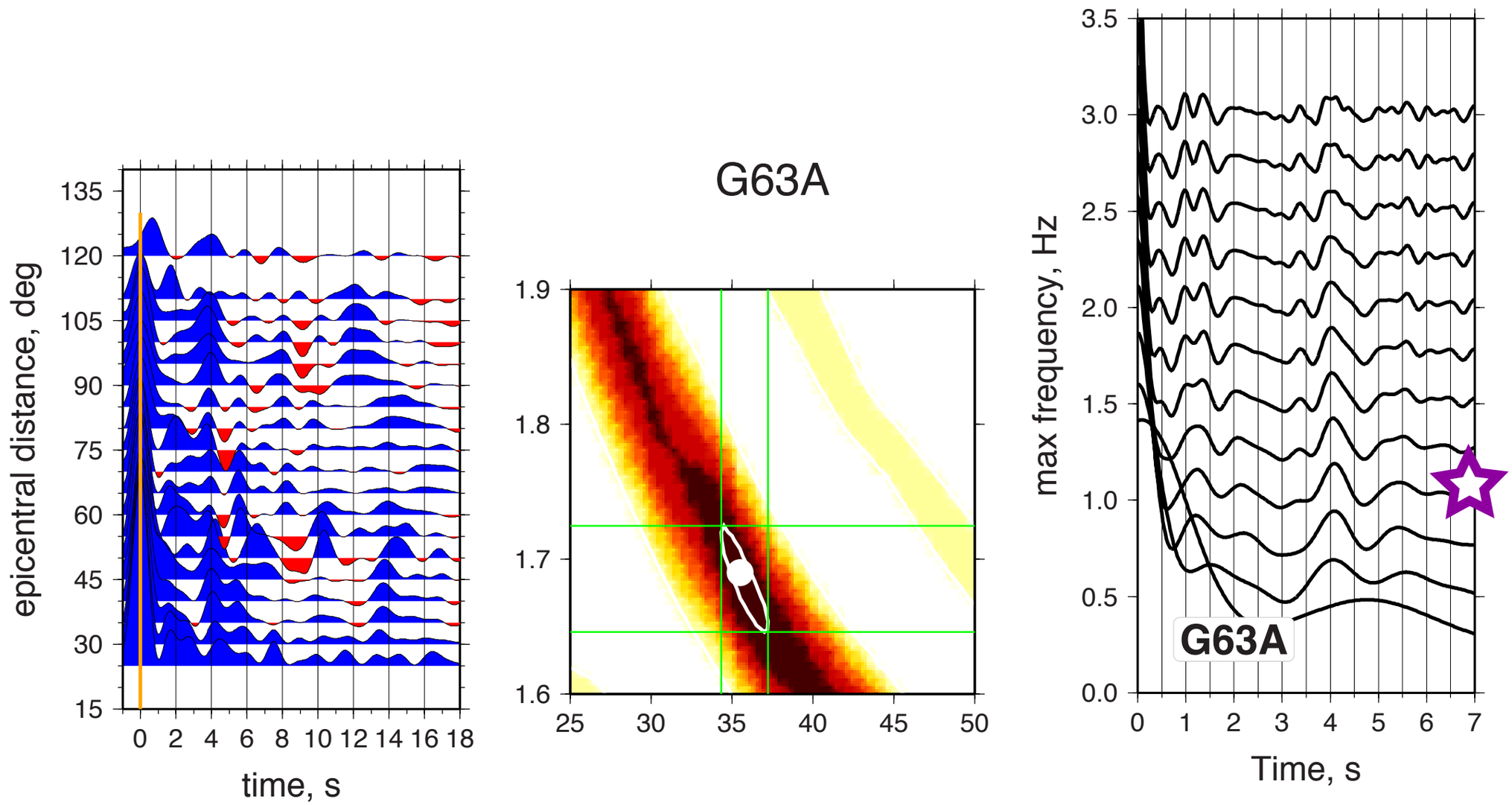
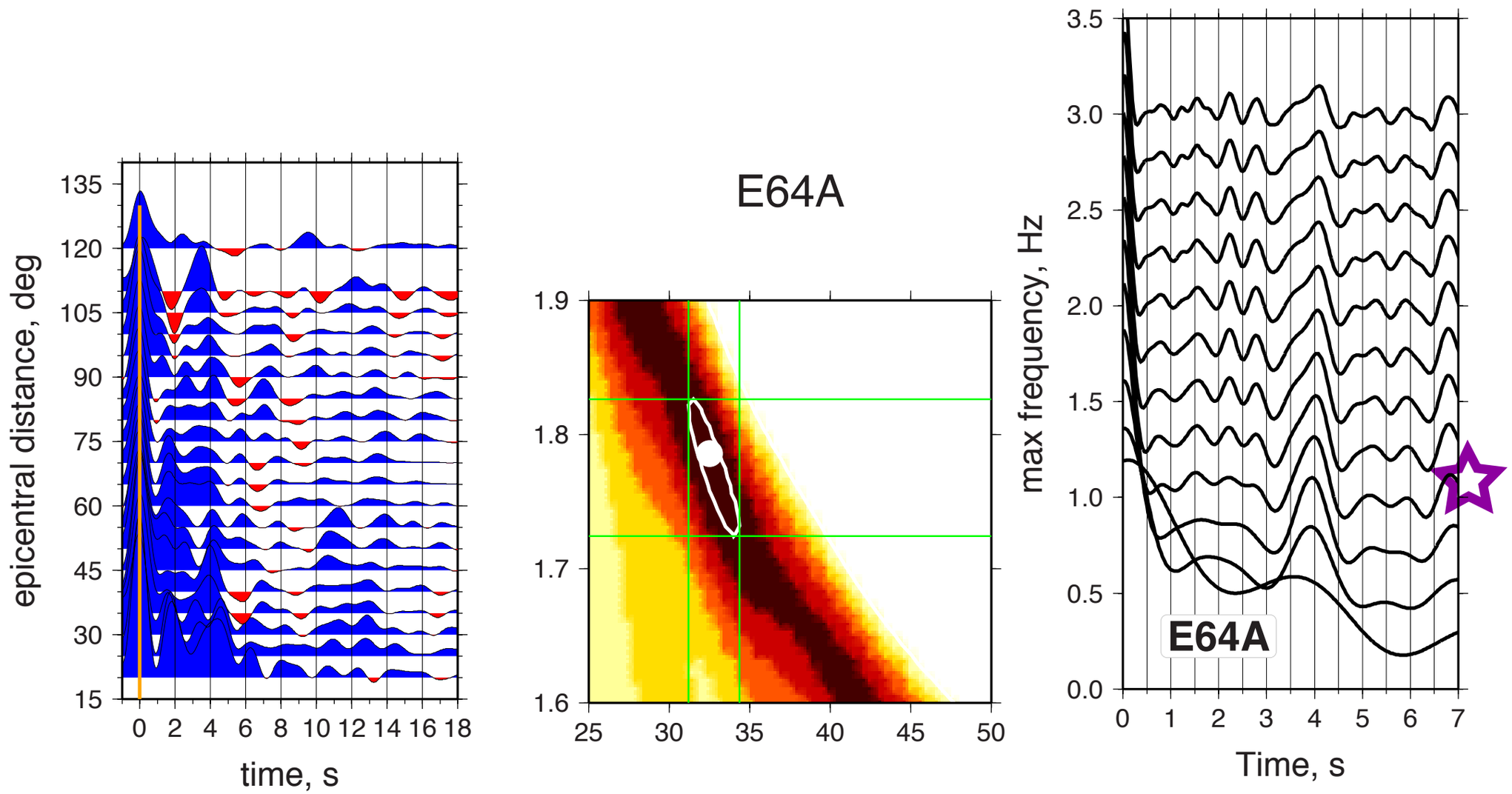
0.0
0 1 2 3 4 5 6 7
Time, s
E63A

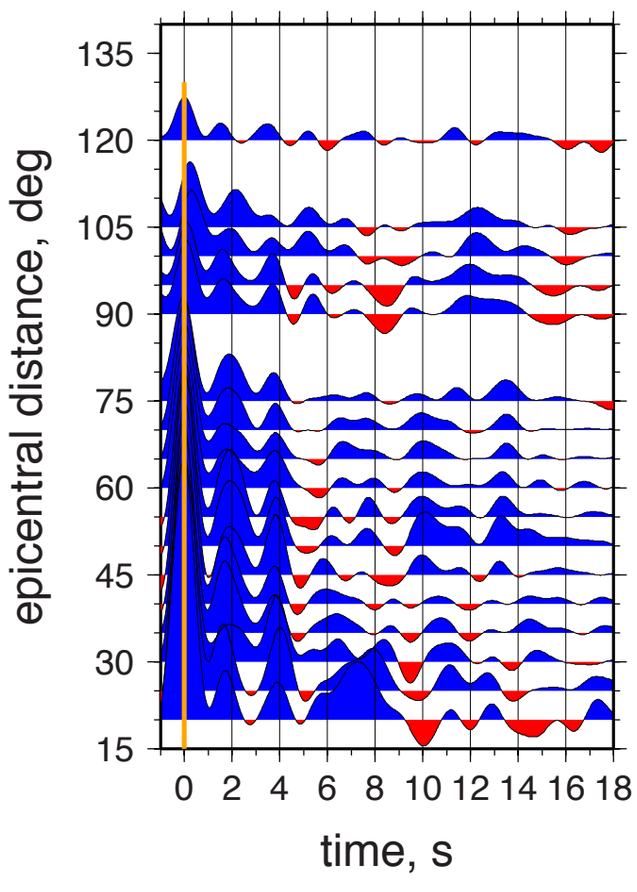

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
PQI
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
PQI.

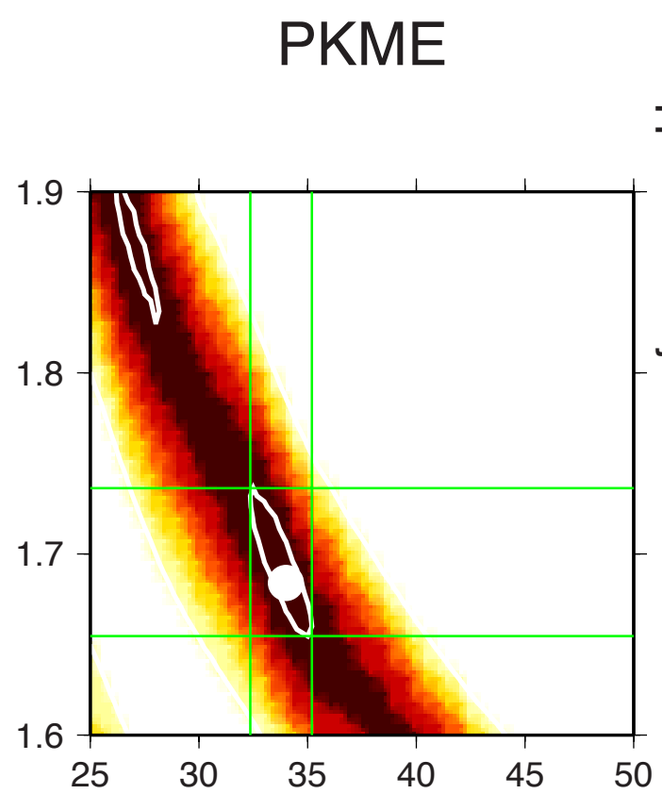

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
QM20
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM20


F63A
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
F63A


G63A
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
G63A


E64A
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
E64A


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s


PKME
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1.7
1.6
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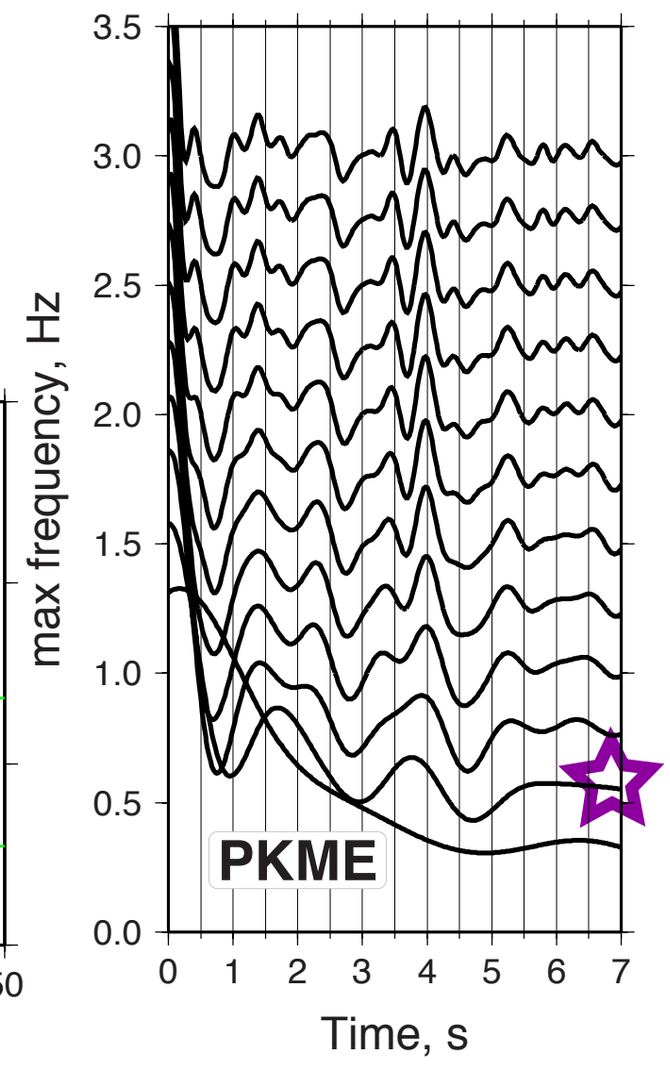
max frequency, Hz
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2.0
1.5
1.0
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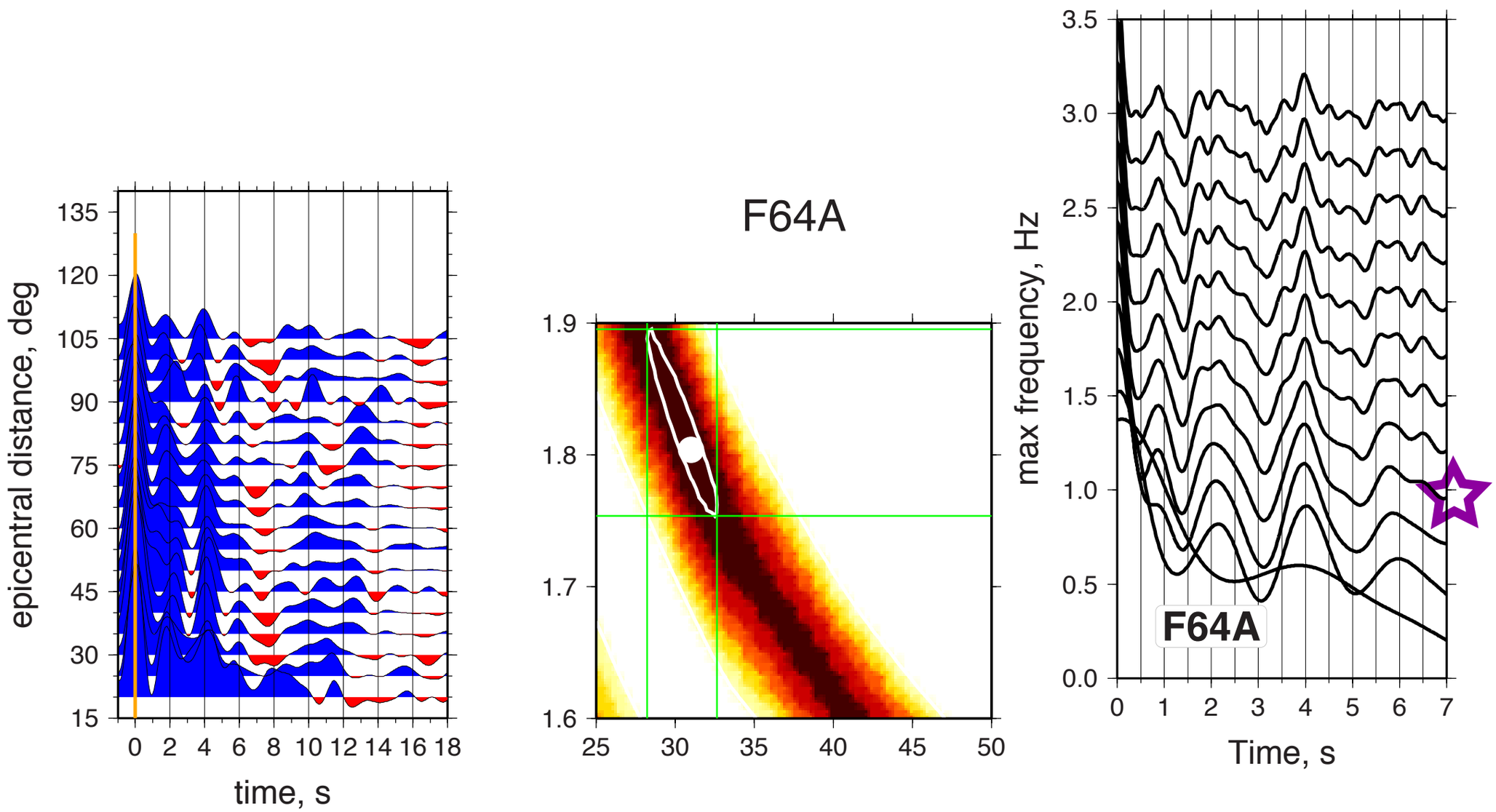
0 1 2 3 4 5 6 7
Time, s
PKME


F64A
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
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2.5
2.0
1.5
1.0
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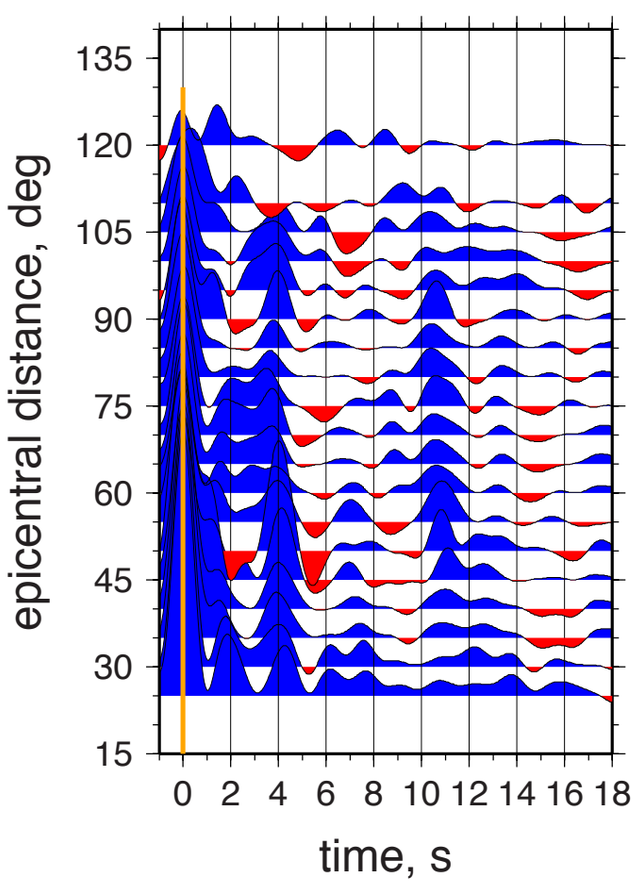
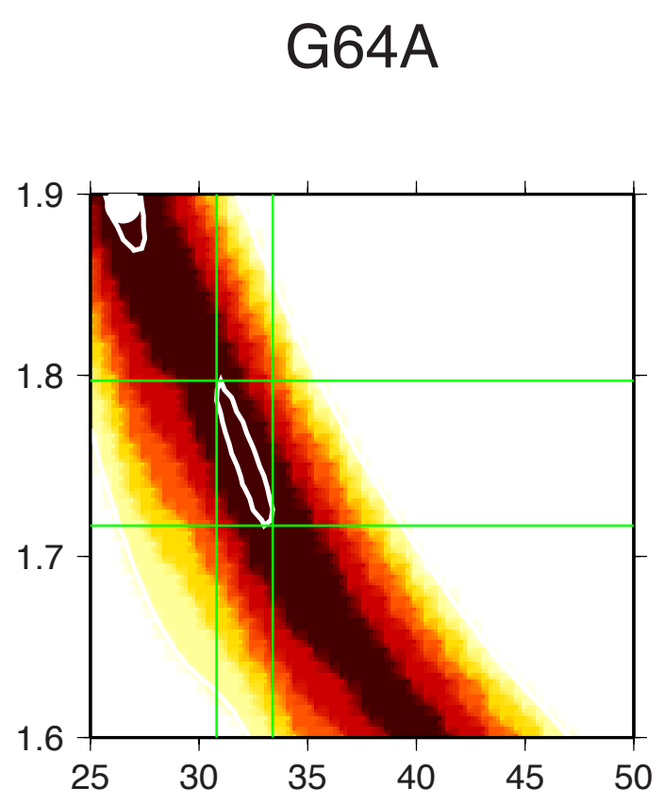
0 1 2 3 4 5 6 7
Time, s
F64A


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s


G64A
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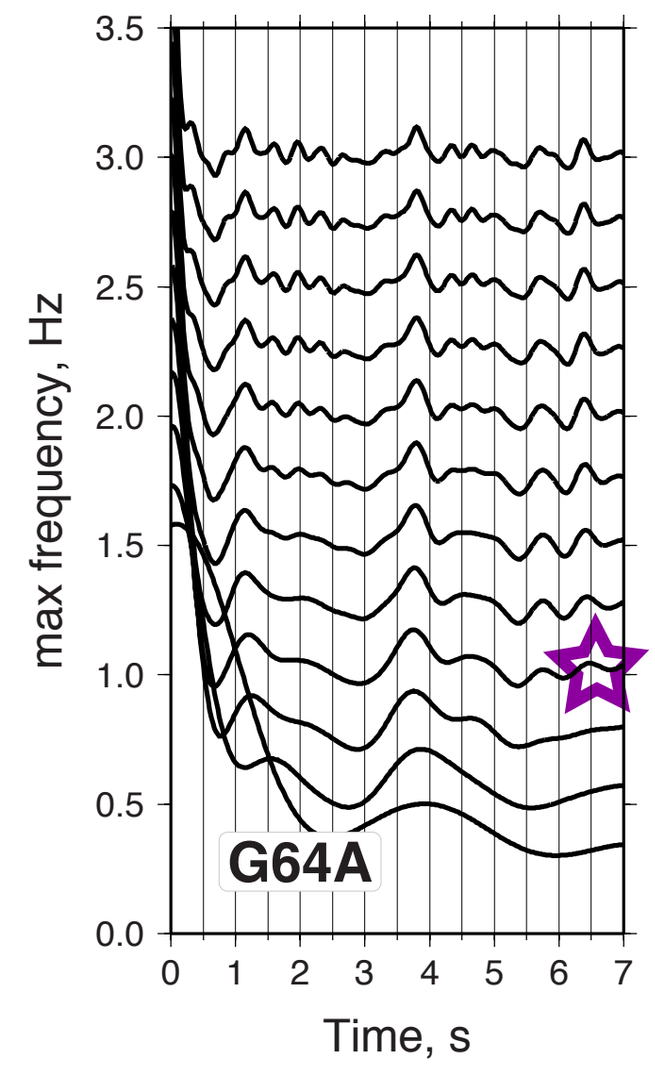
1.7
1.6
25 30 35 40 45 50


max frequency, Hz
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1.5
1.0
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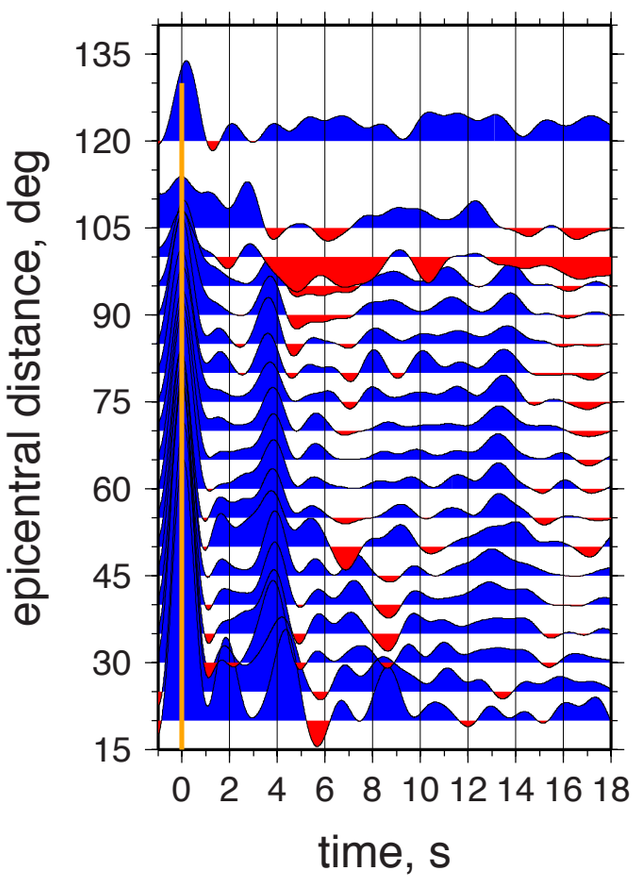
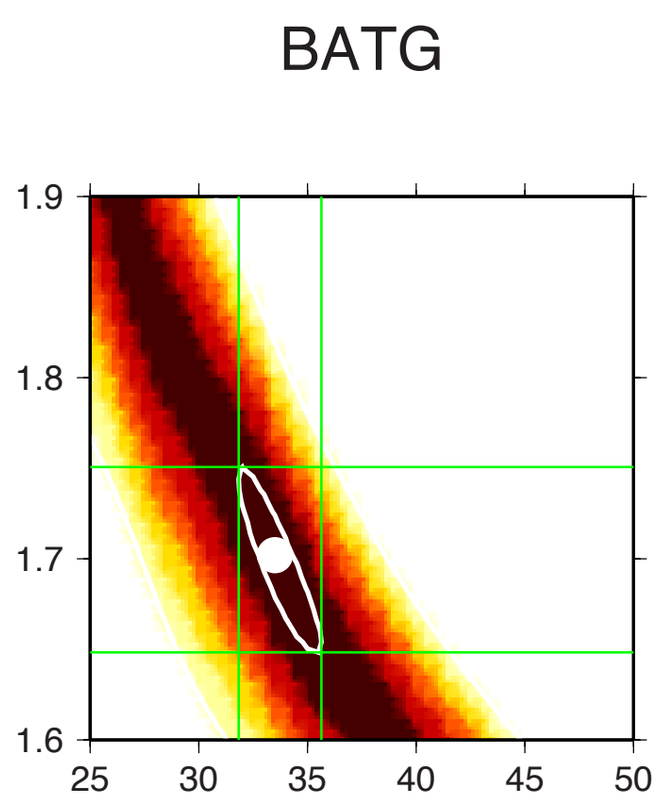
0 1 2 3 4 5 6 7
Time, s
G64A


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s


BATG
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1.6
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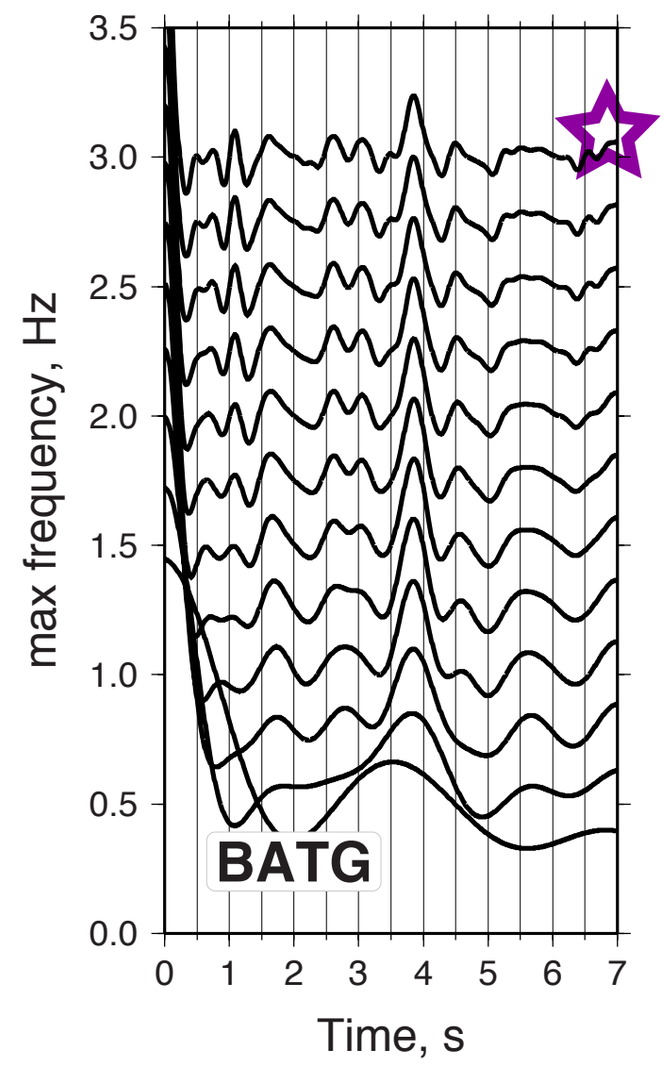
max frequency, Hz
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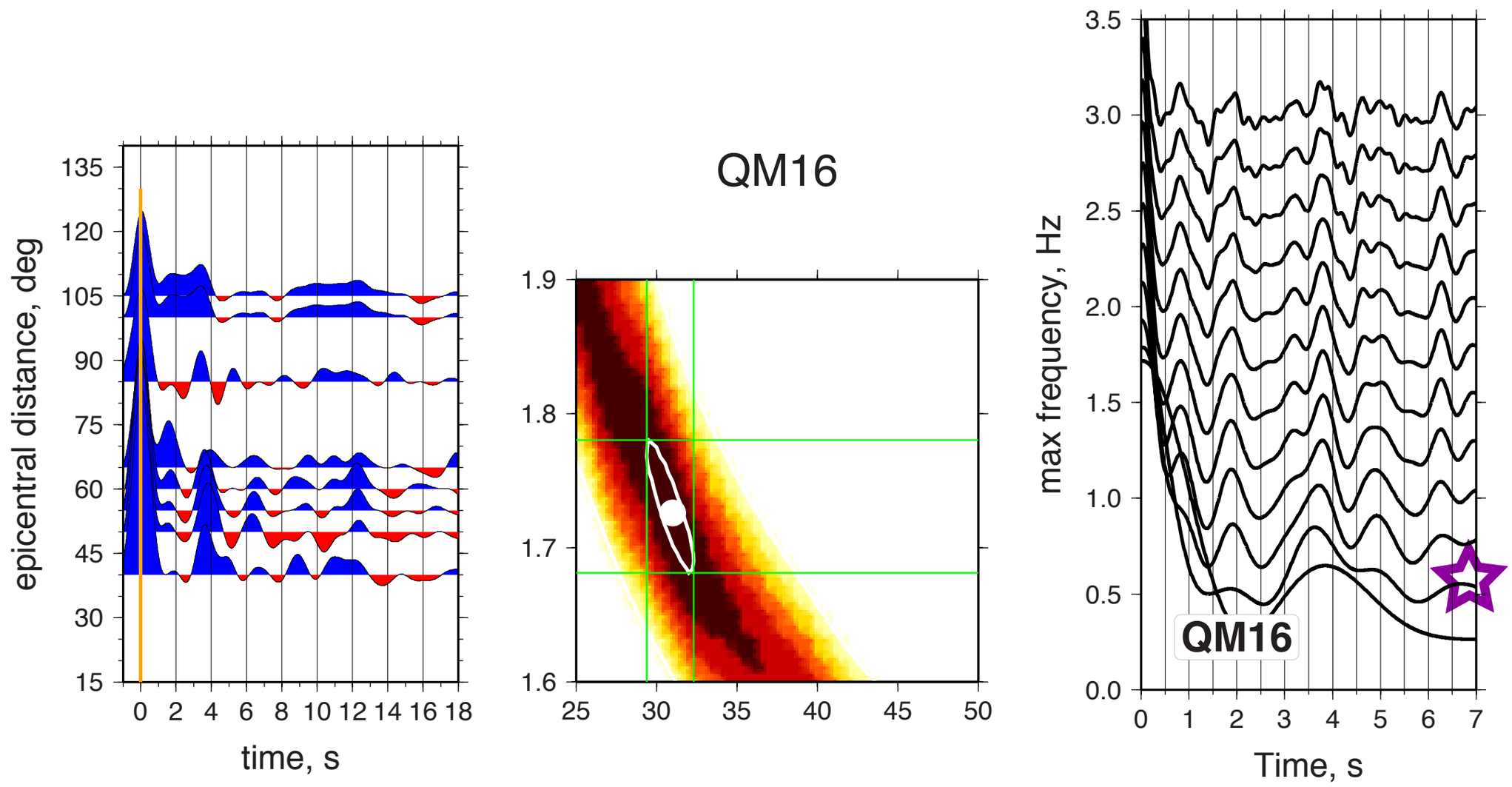
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
BATG


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
QM16
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
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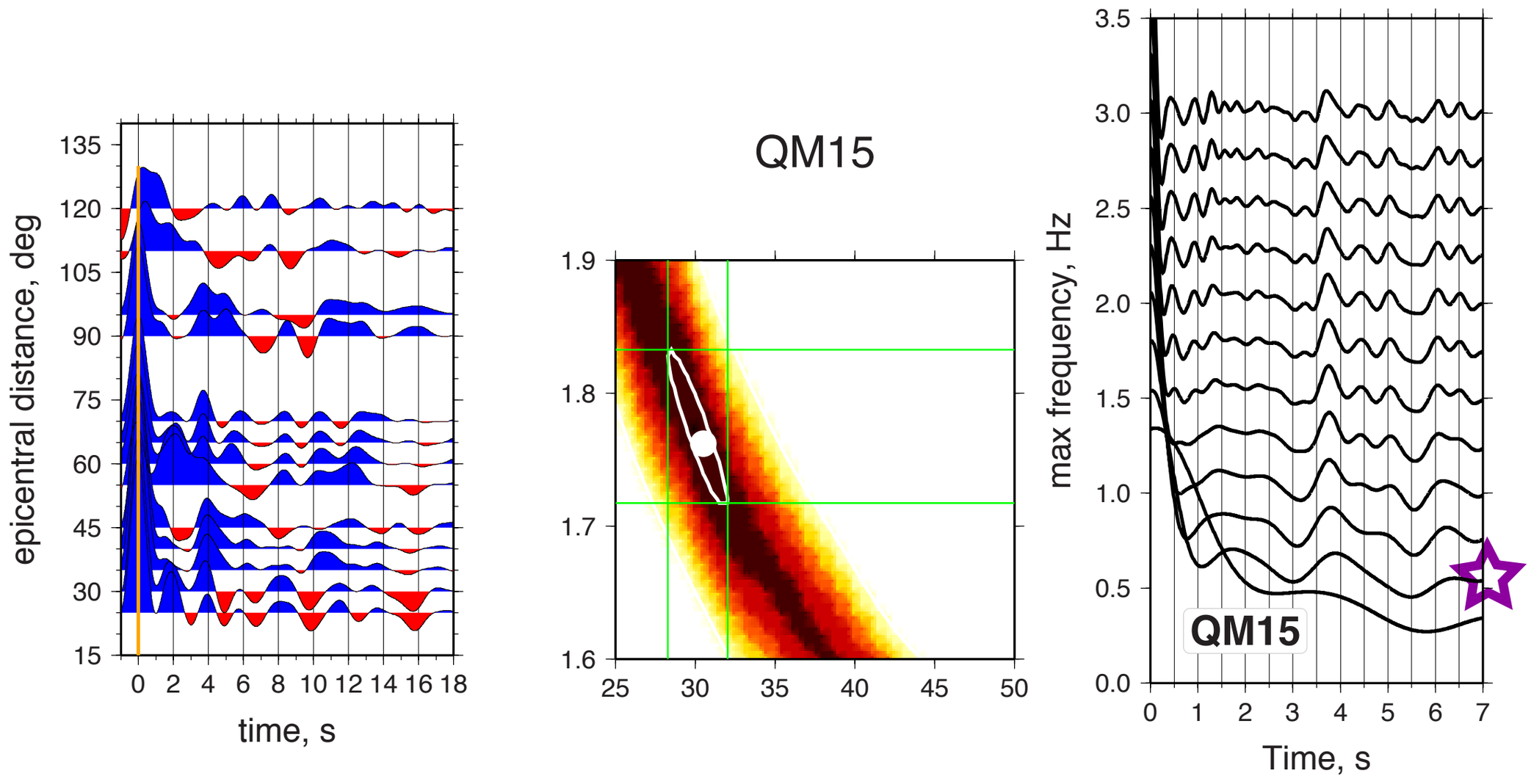
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM16


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
QM15
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
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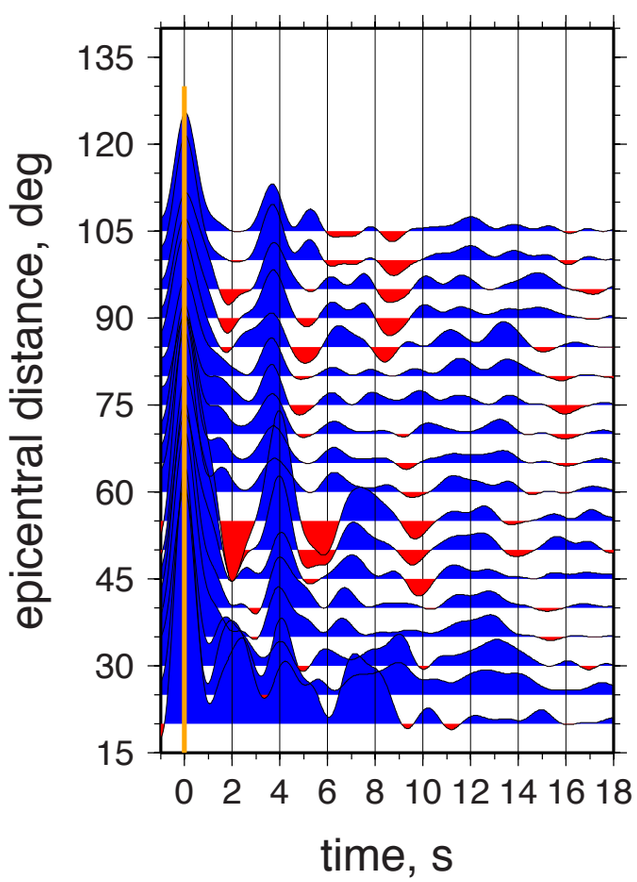
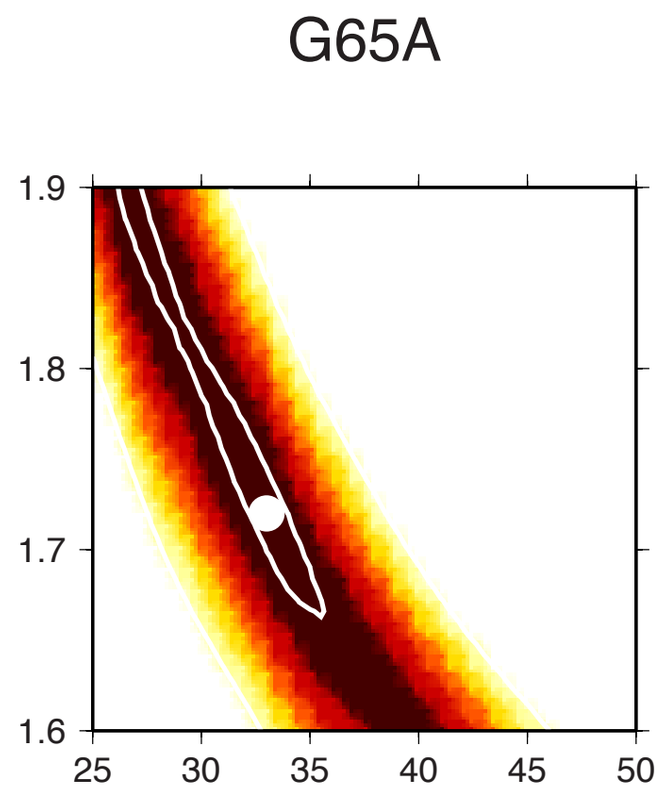
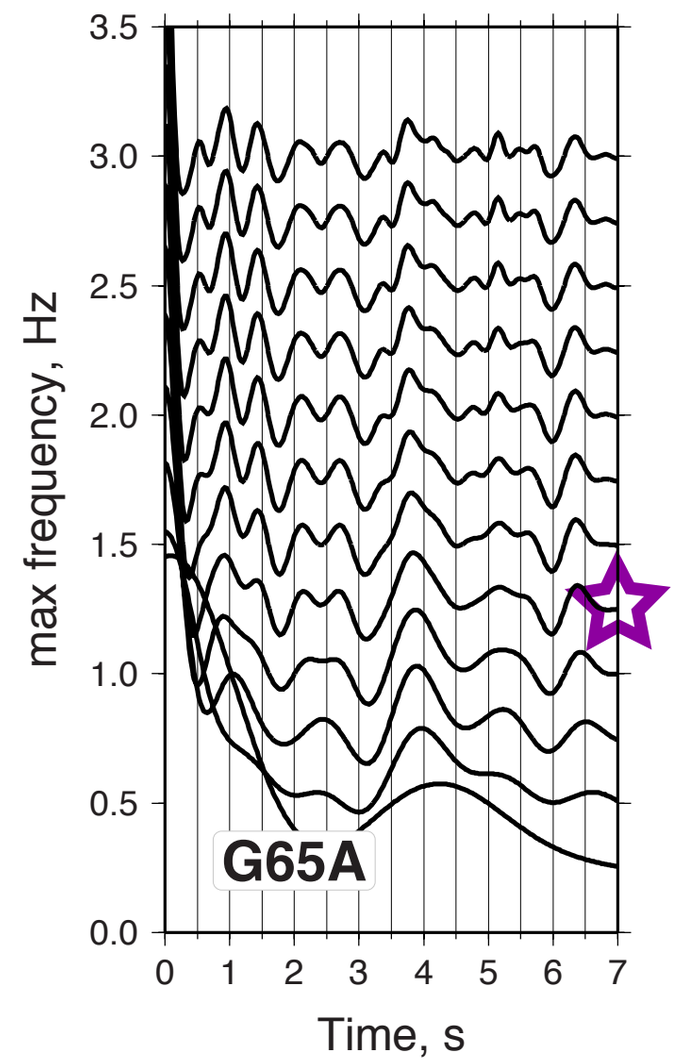
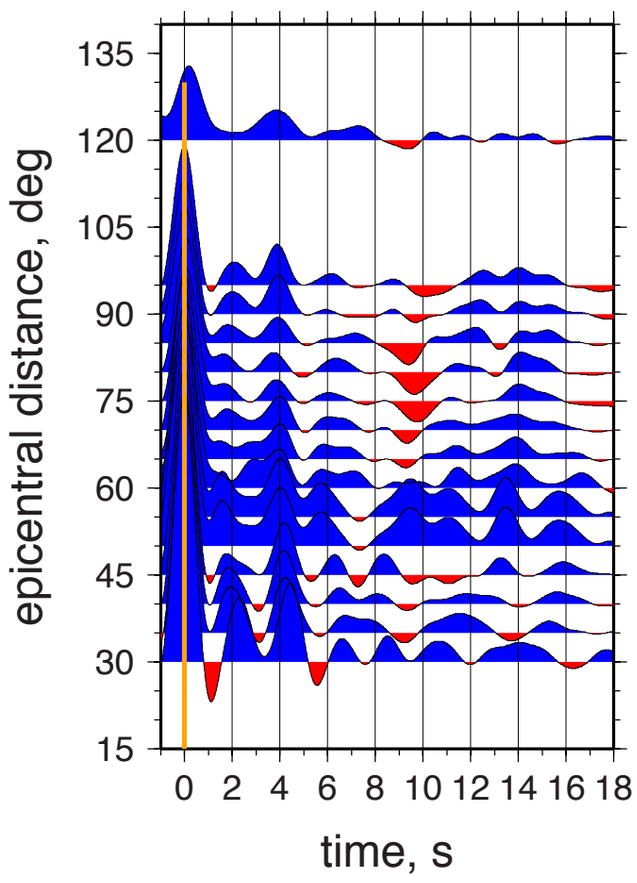
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
QM15

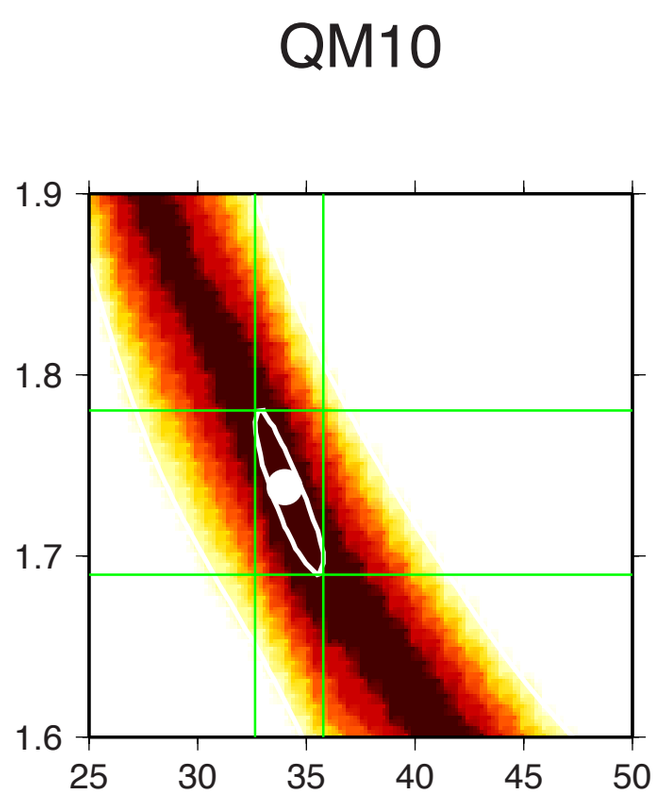

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s

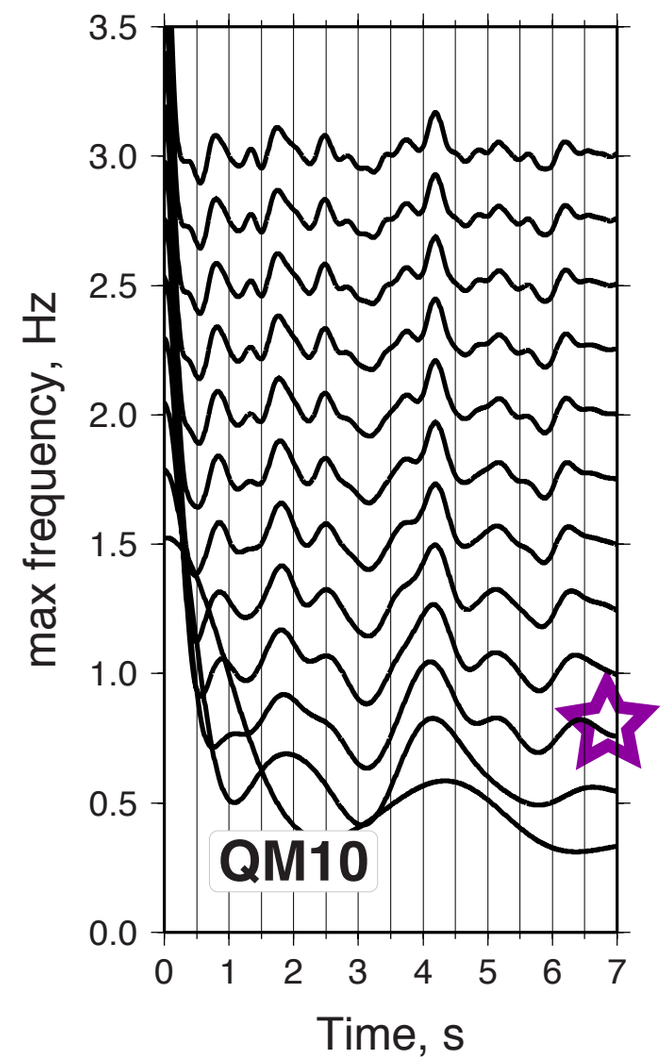

G65A
1.9
1.8
1.7
1.6
25 30 35 40 45 50


max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
G65A

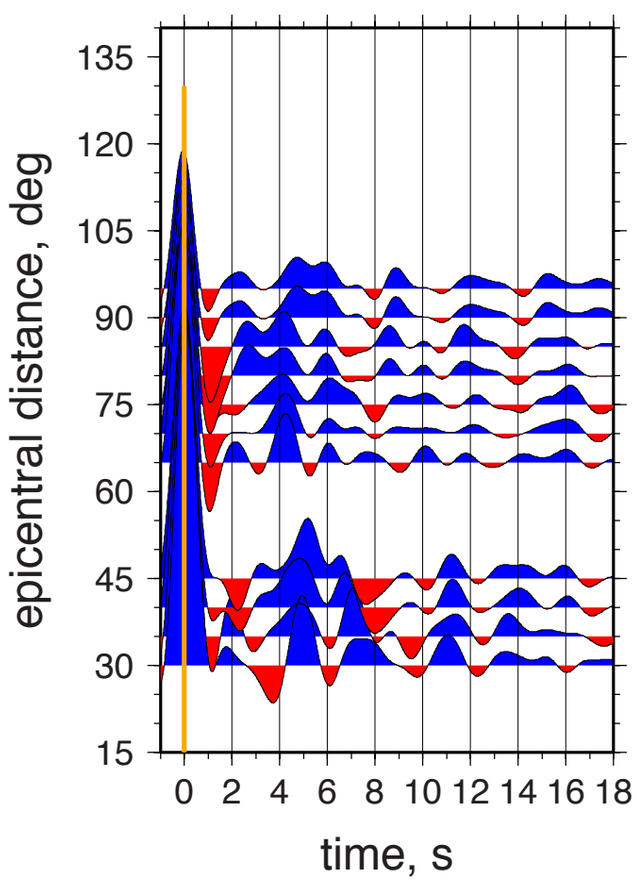
QM10_1_epi_0-360_5bins.rgrid scale

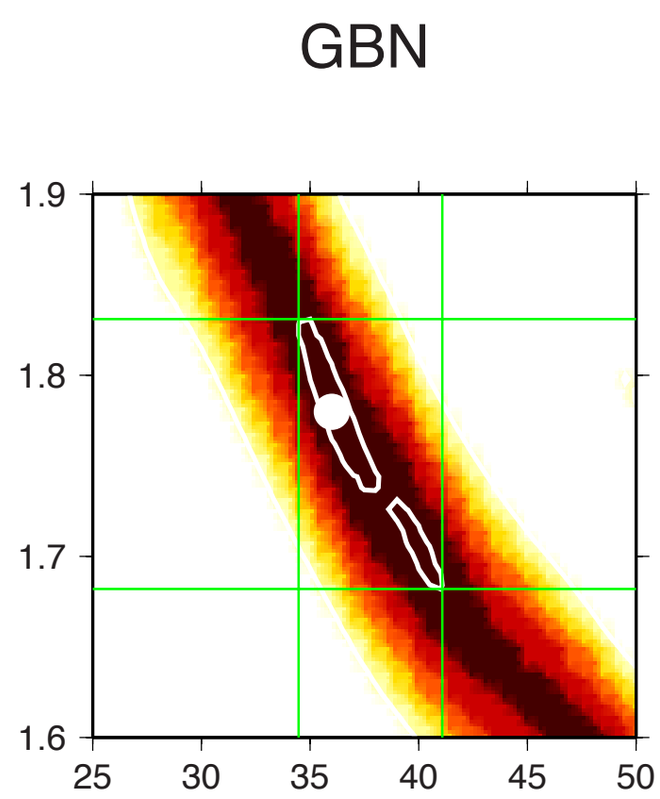


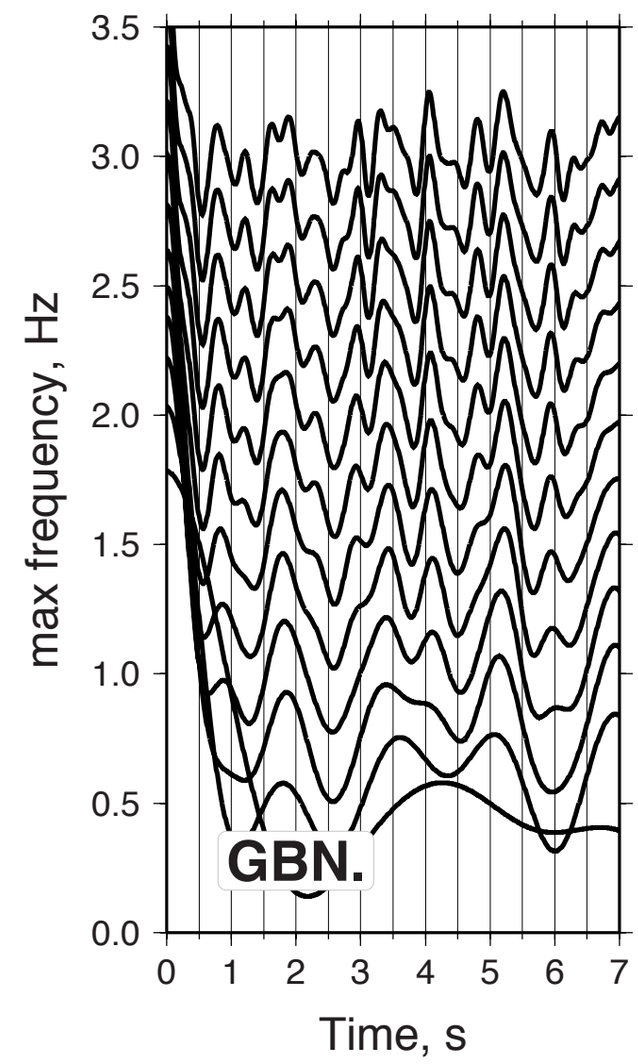


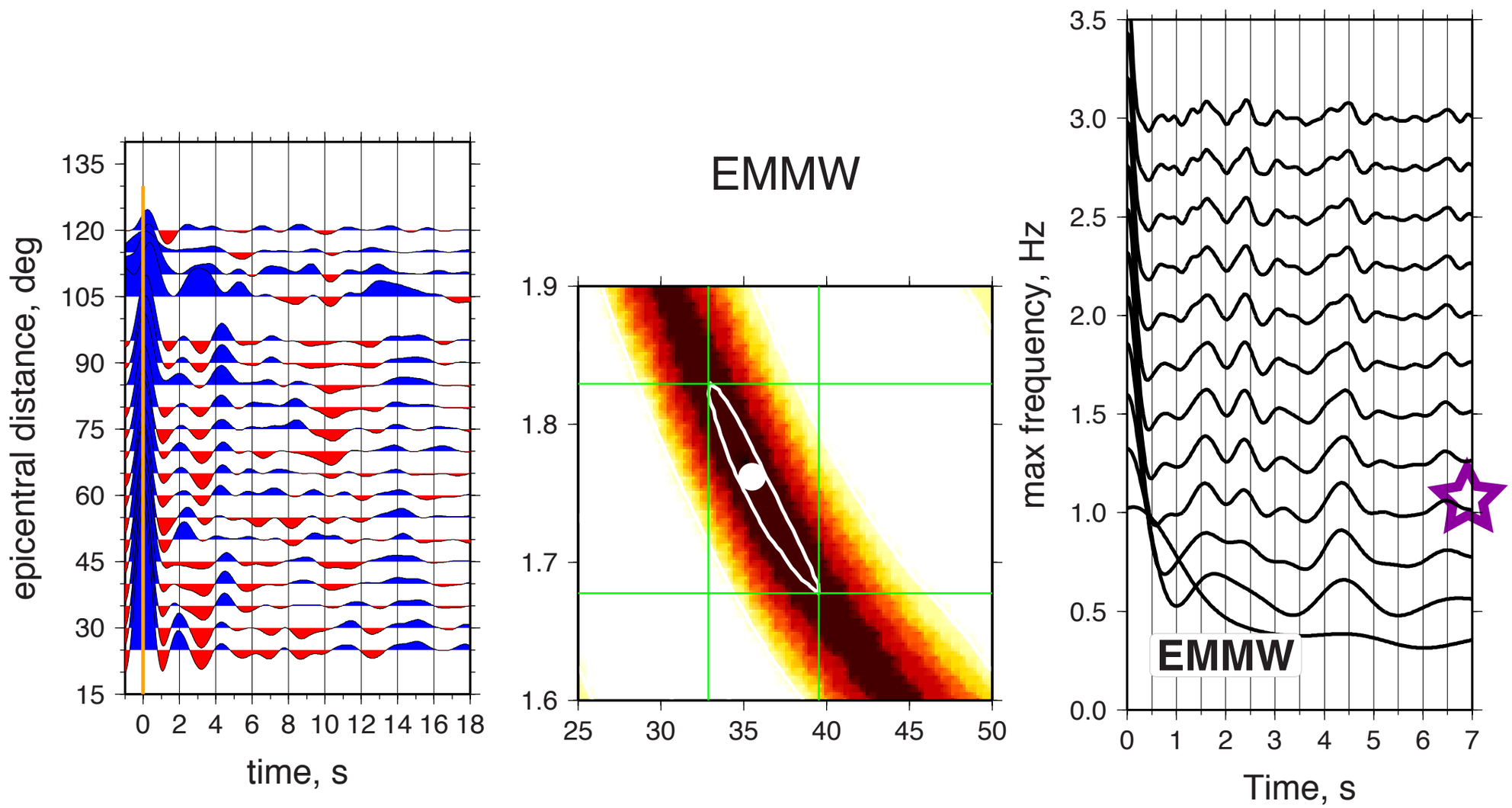


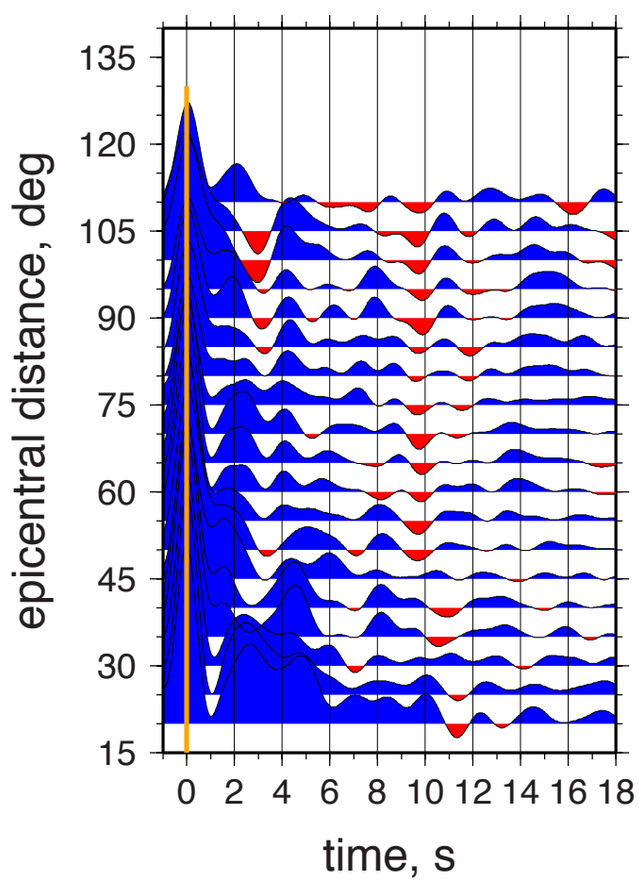
GBN_1_epi_0-360_5bins.rgrid scale








EMMW
epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s
1.9
1.8
1.7
1.6
25 30 35 40 45 50
max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
EMMW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120
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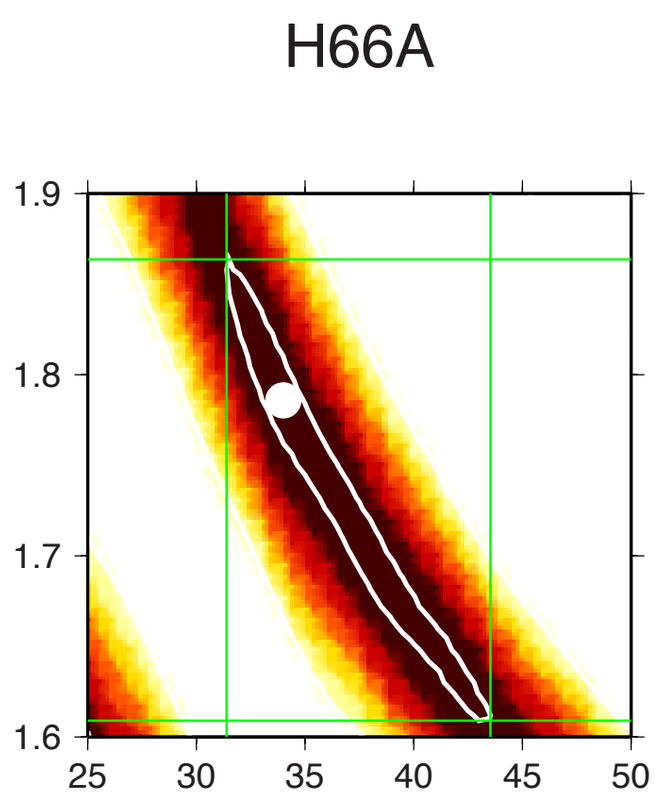
H66A
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1.8
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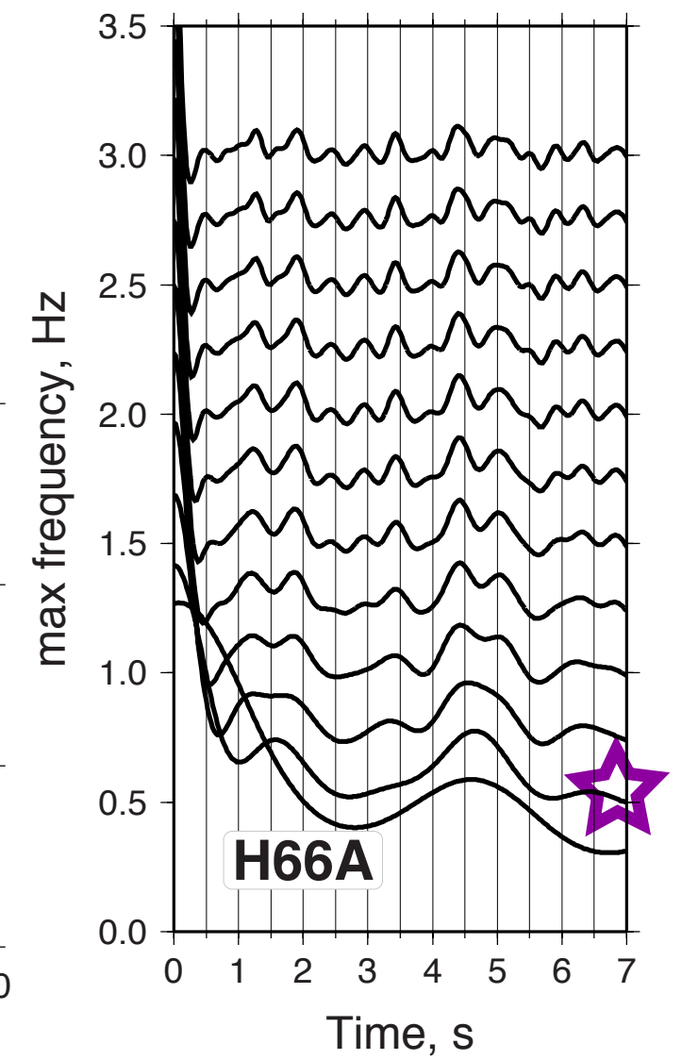
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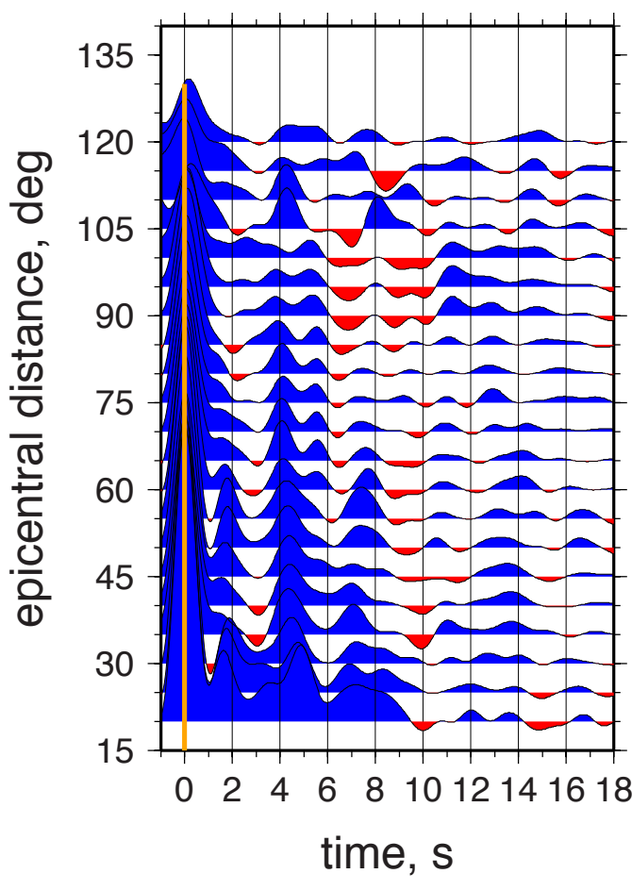
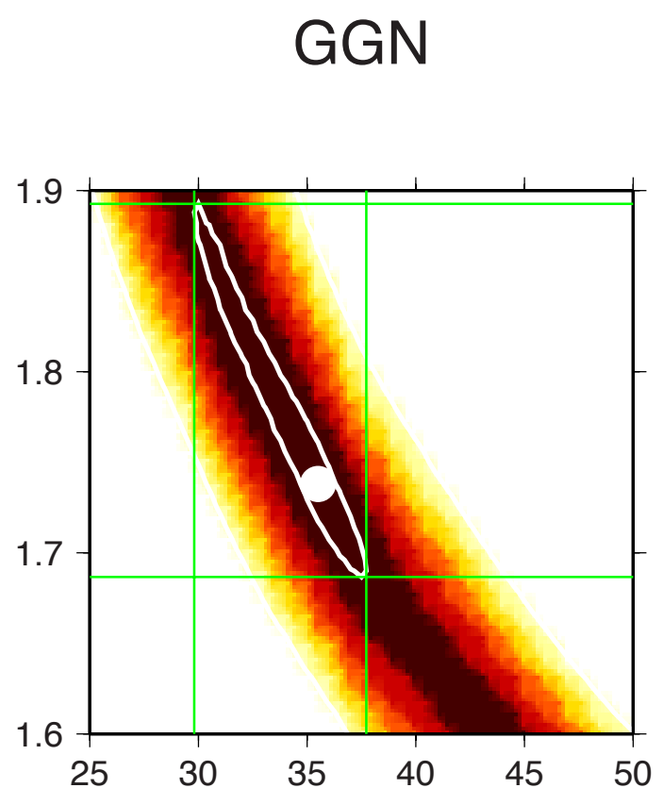
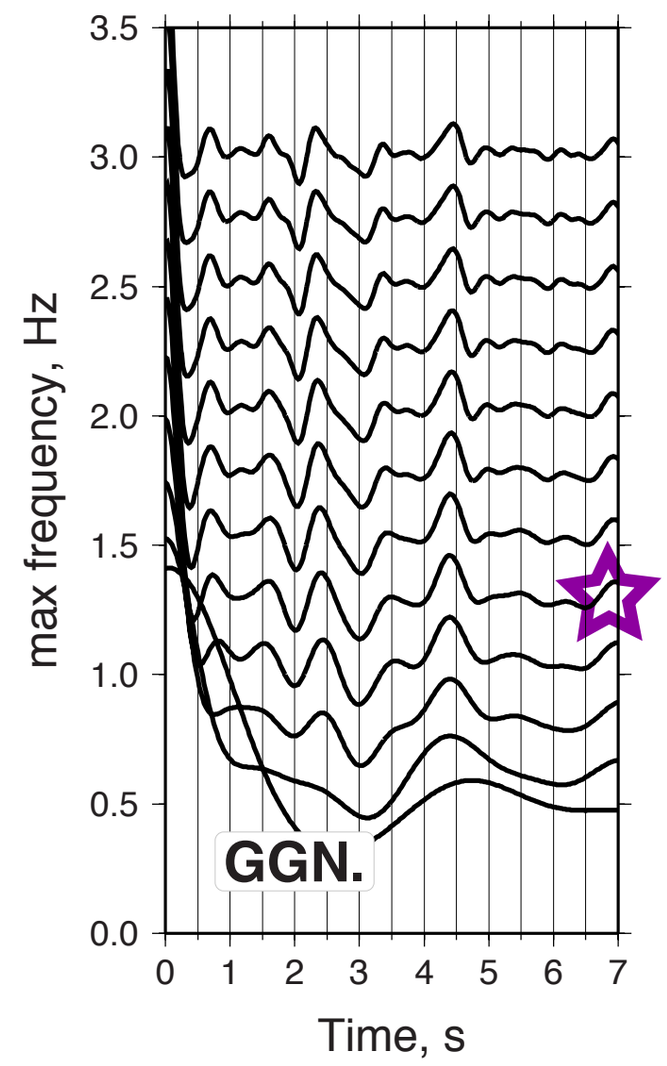

epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s


GGN
1.9
1.8
1.7
1.6
25 30 35 40 45 50


max frequency, Hz
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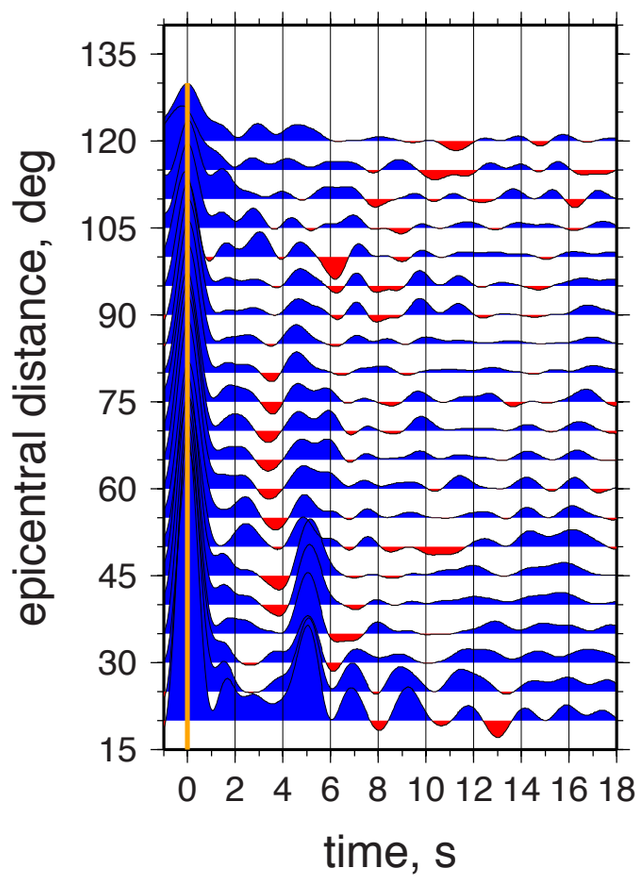
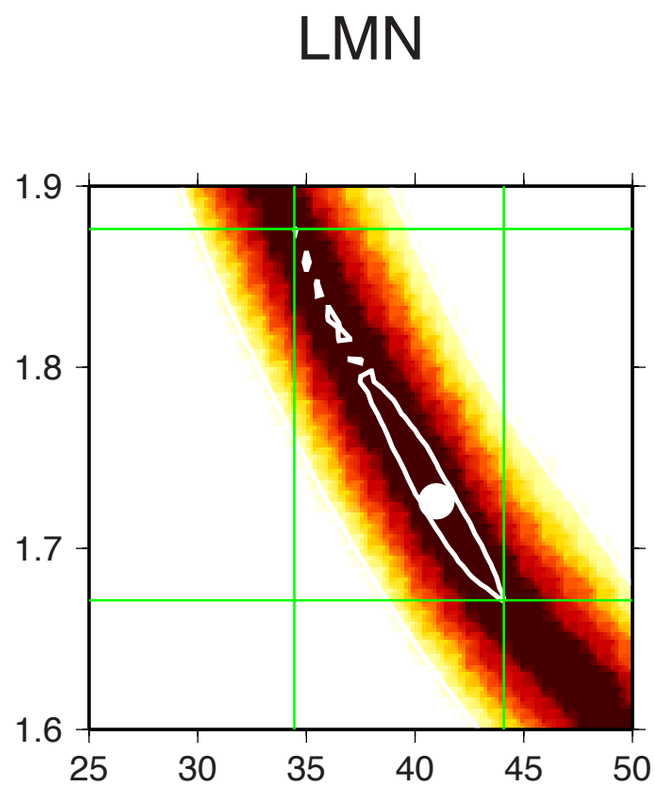
0 1 2 3 4 5 6 7
Time, s
GGN.


epicentral distance, deg
135
120
105
90
75
60
45
30
15
0 2 4 6 8 10 12 14 16 18
time, s


LMN
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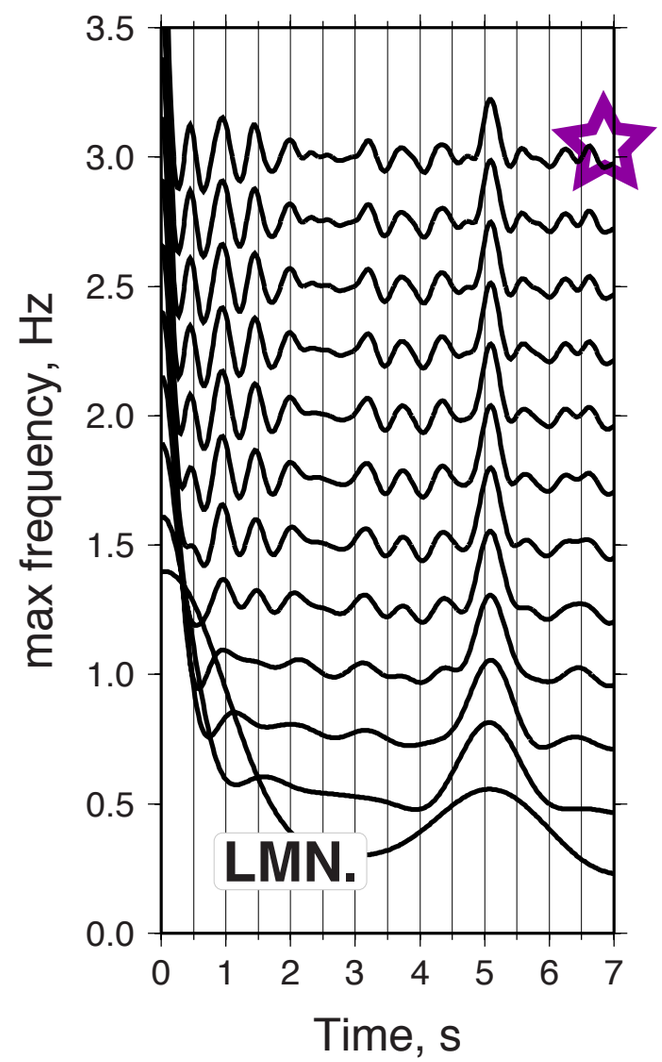
1.8
1.7
1.6
25 30 35 40 45 50


max frequency, Hz
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0 1 2 3 4 5 6 7
Time, s
LMN.