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**L**

**A**

**M**

**P**

**I**

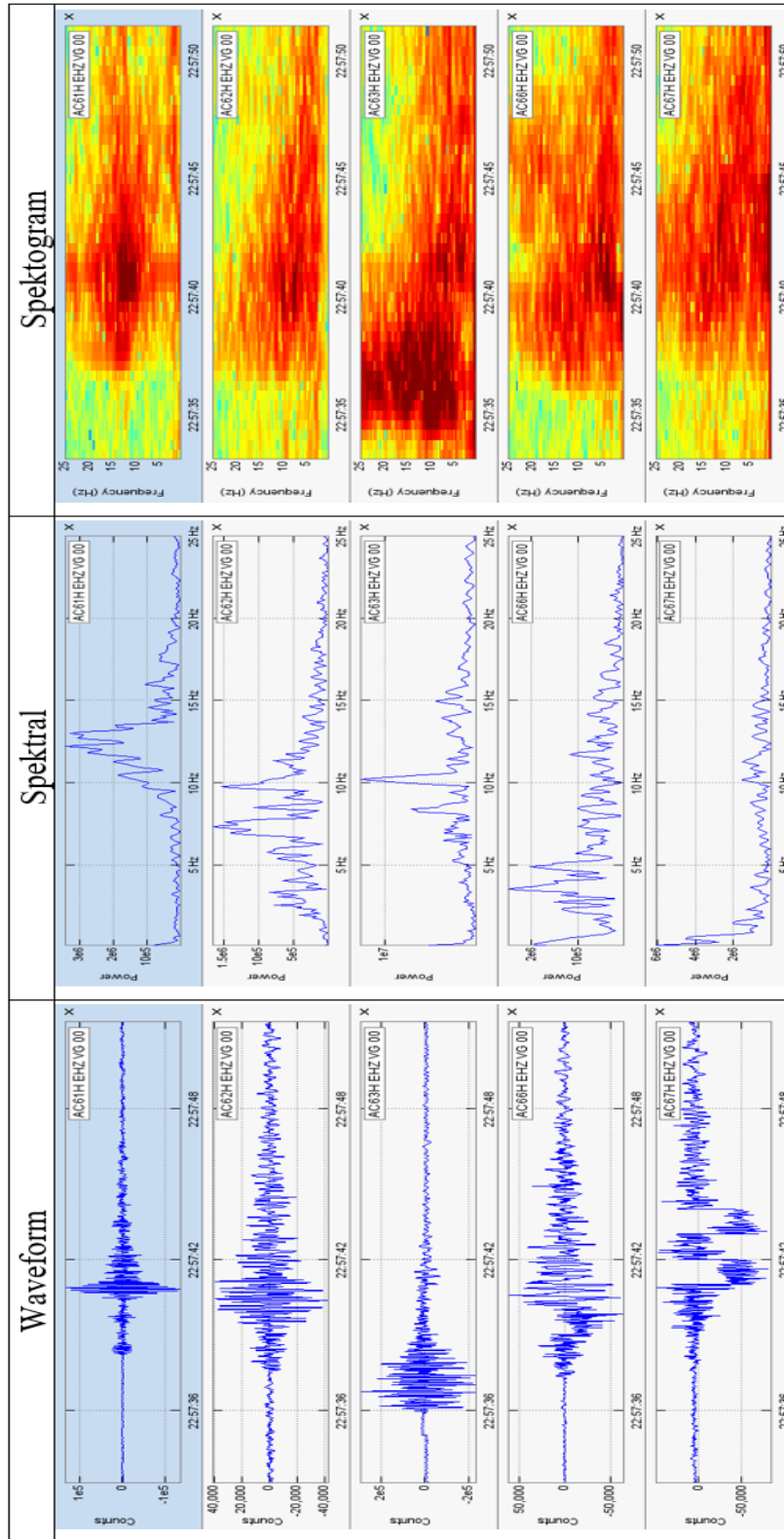
**R**

**A**

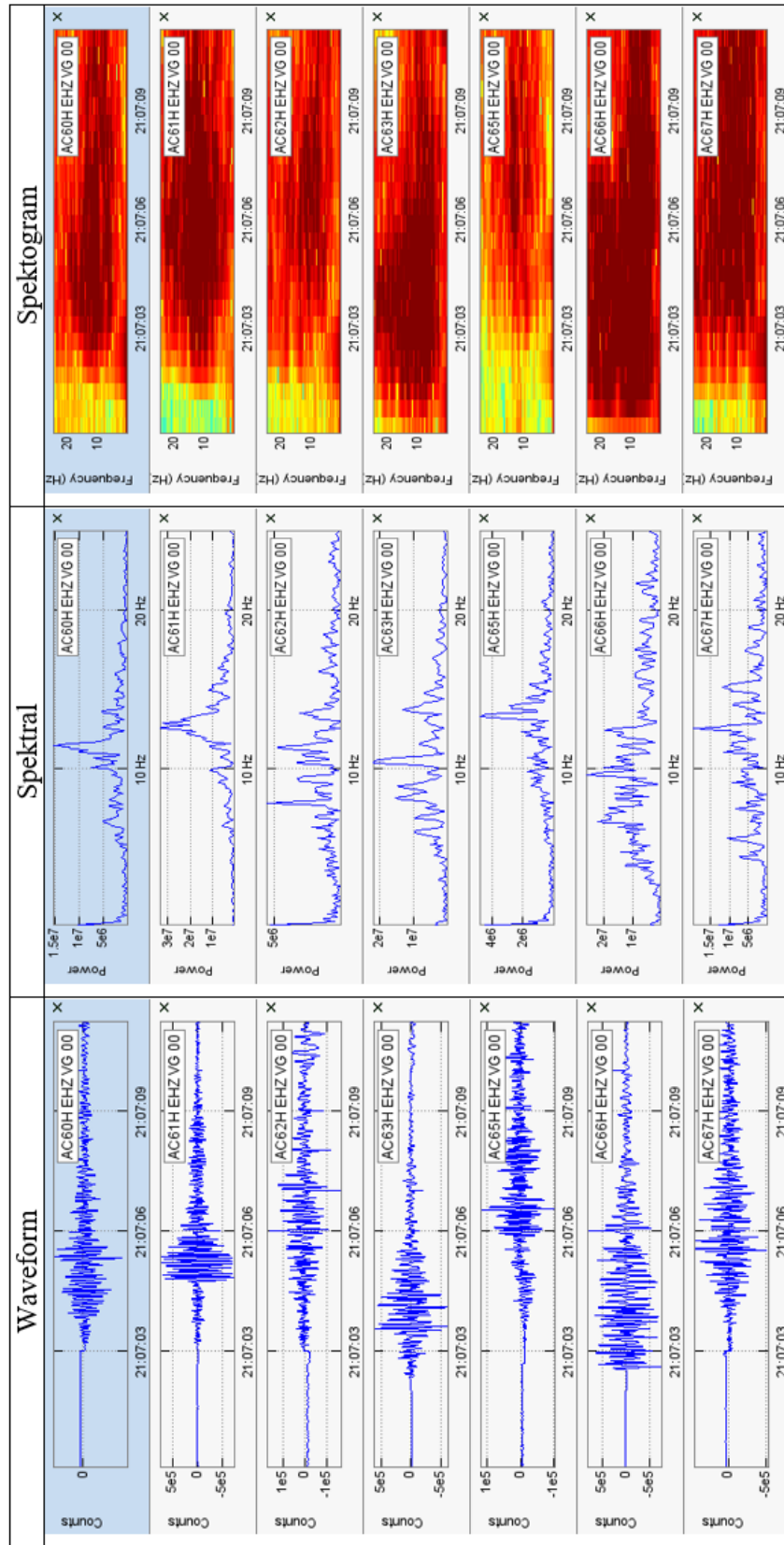
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# Lampiran 1 : Hasil Klasifikasi Gempa Gunung Sinabung

2009072257 – Gempa Vulkanik Dalam (VTA)

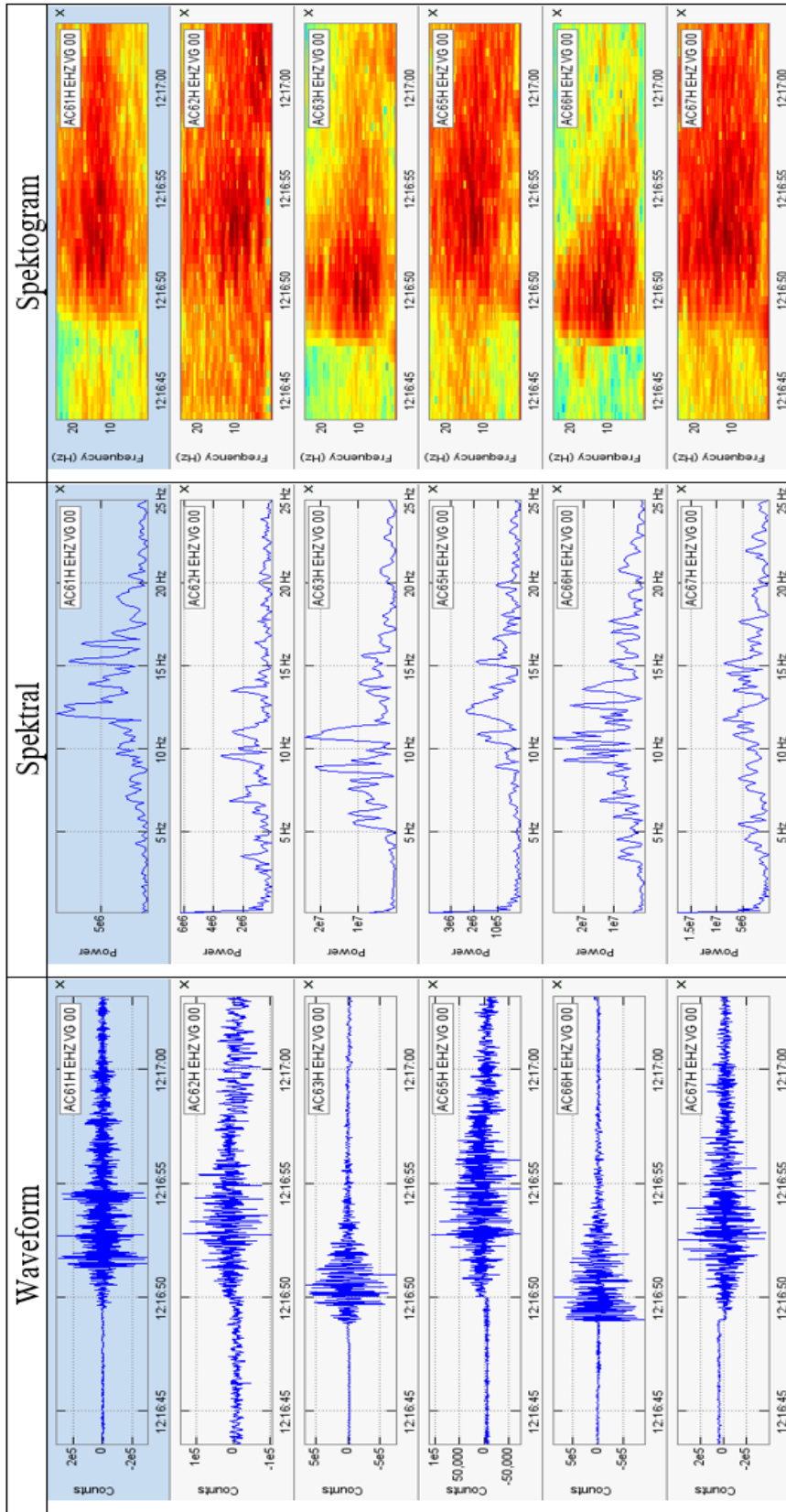


2009082107 – Gempa Vulkanik Dalam (VTA)

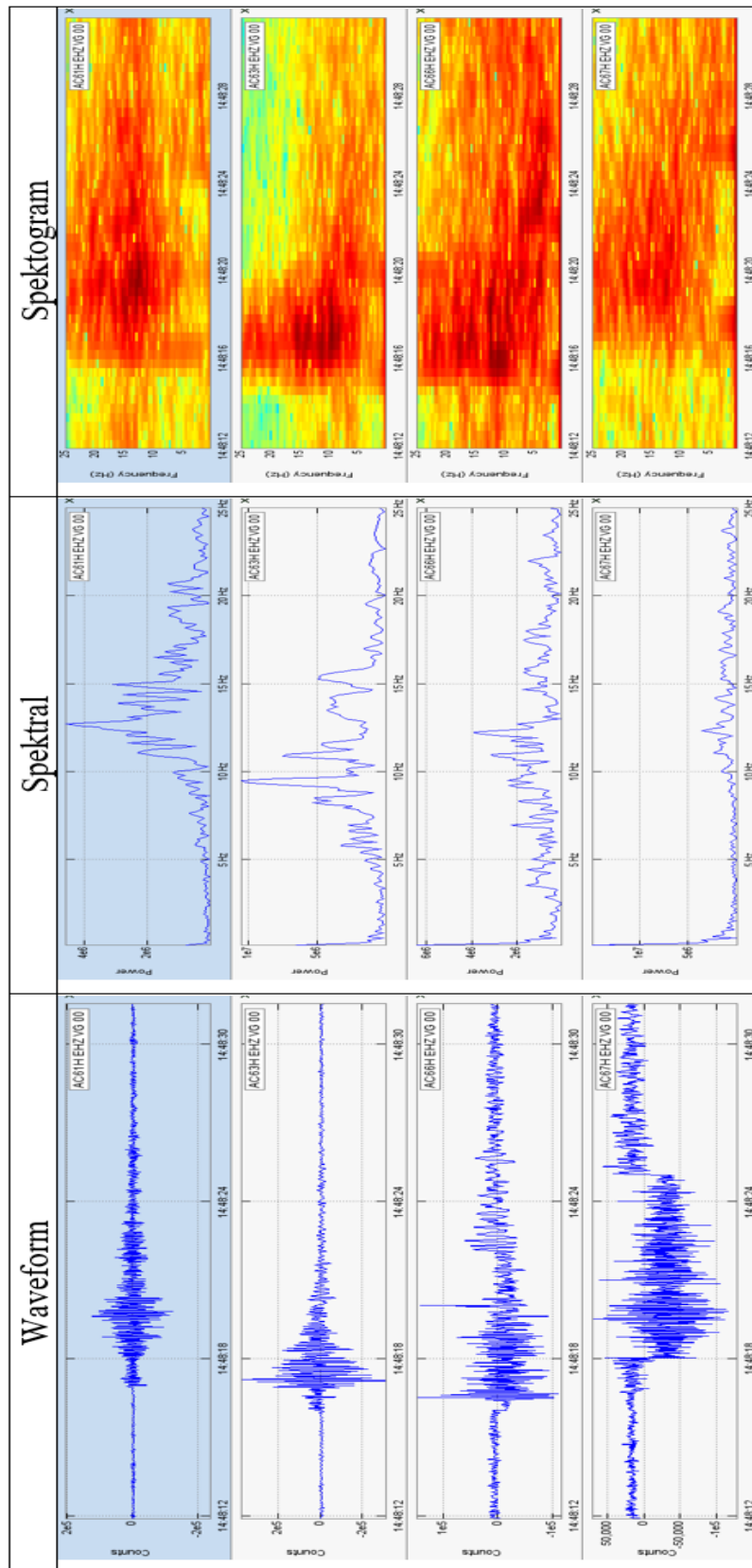




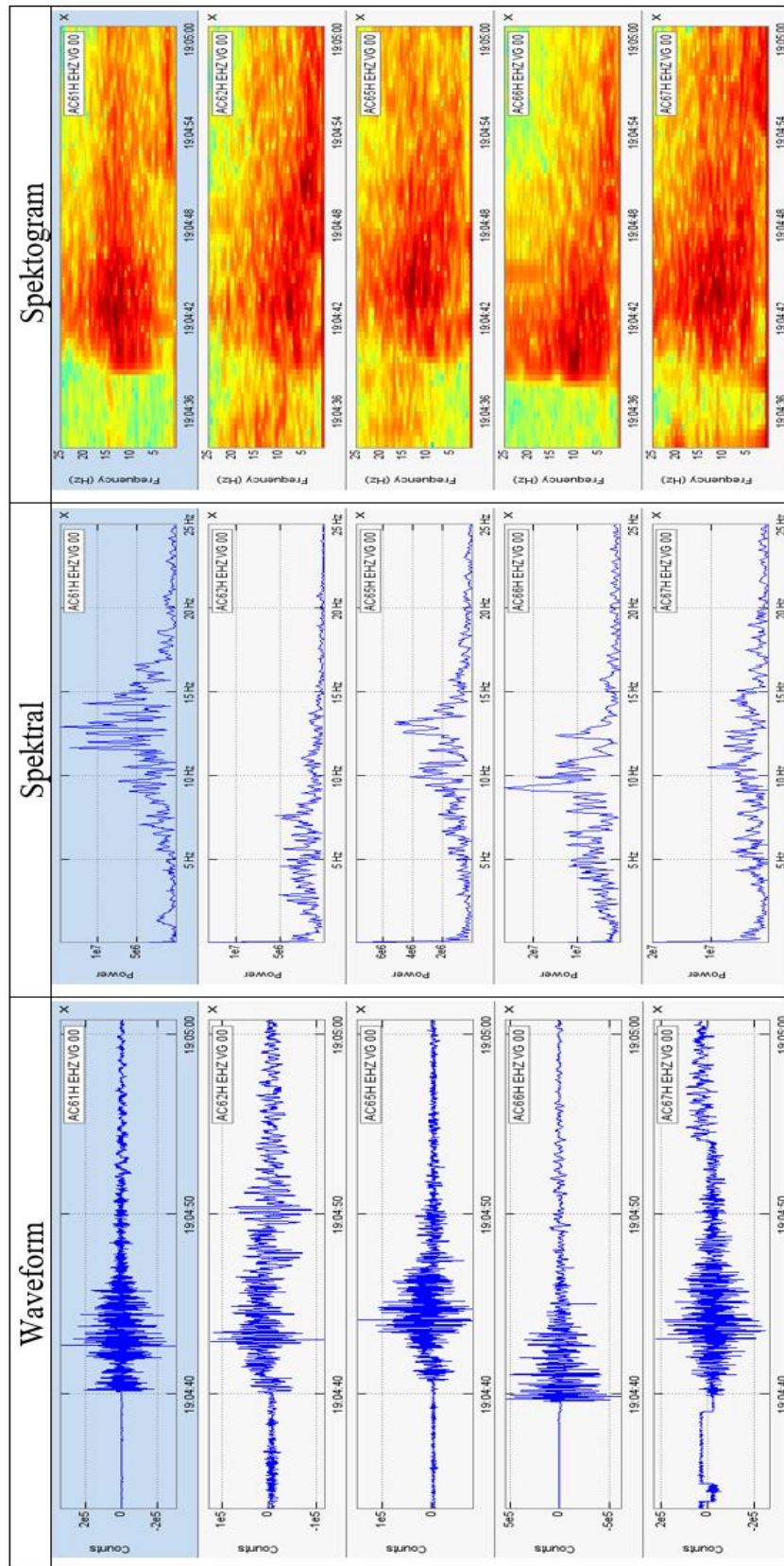
2009191216 – Gempa Vulkanik Dalam (VTA)



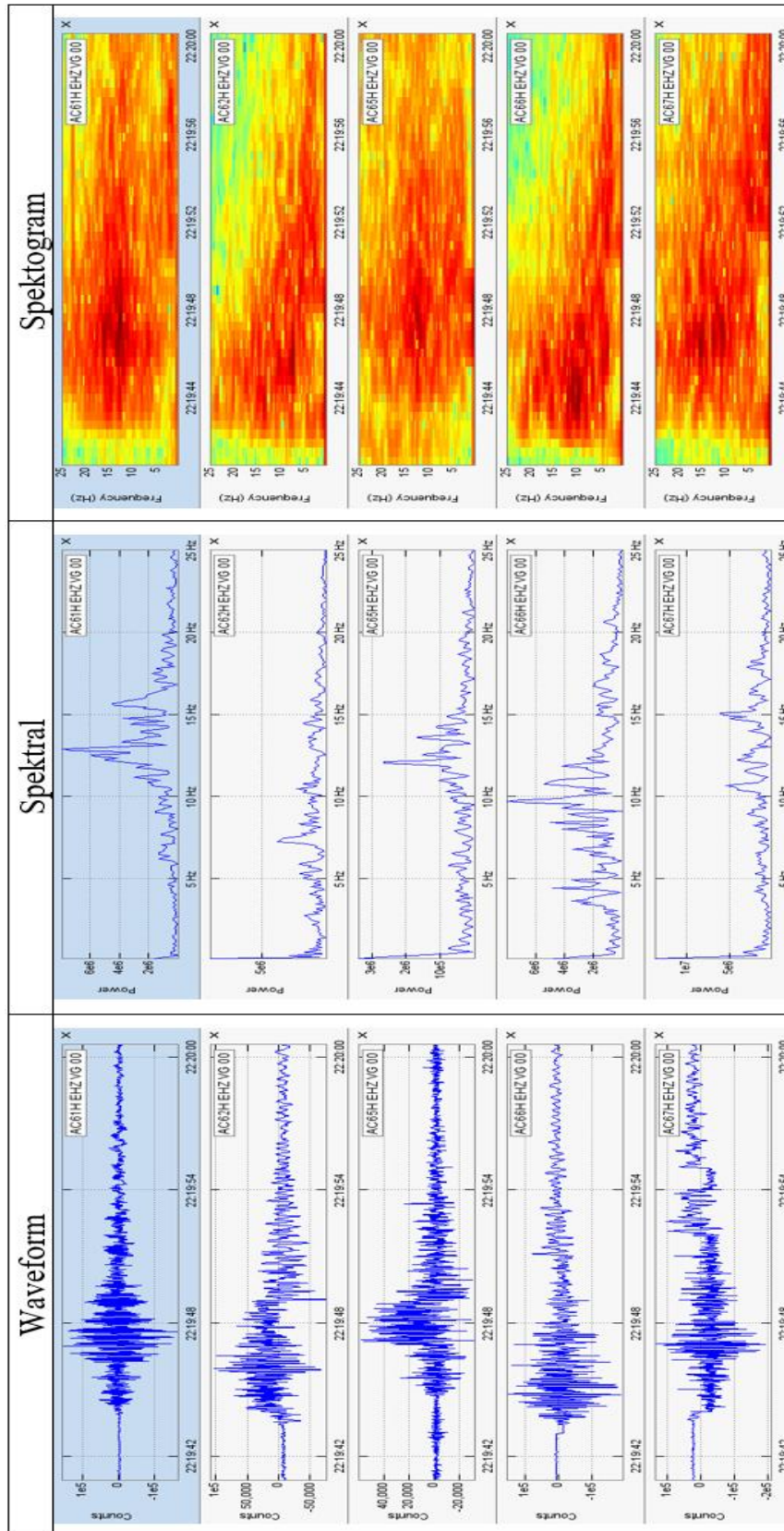
2009201448 – Gempa Vulkanik Dalam (VTA)



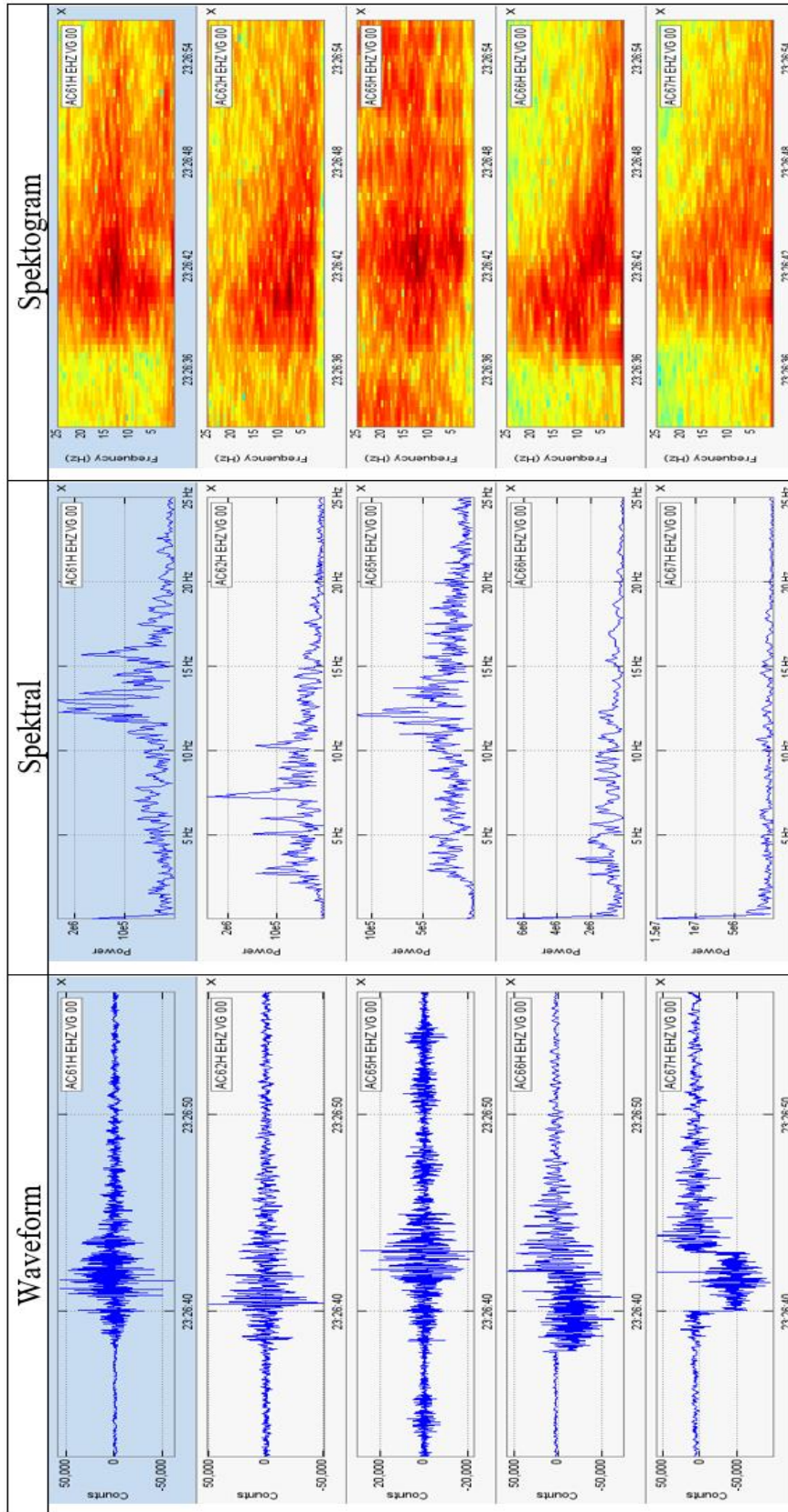
2009271904 – Gempa Vulkanik Dangkal (VTB)



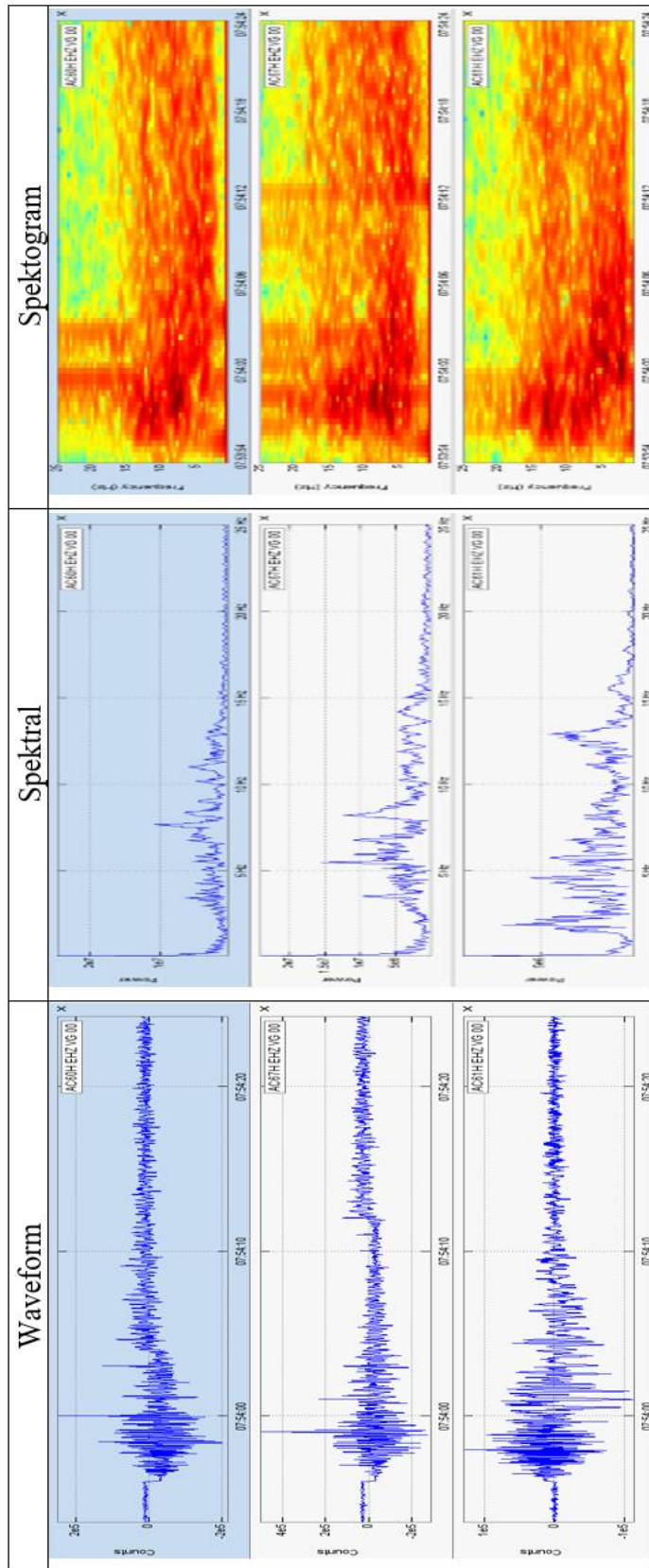
2009282219 – Gempa Vulkanik Dangkal (VTB)

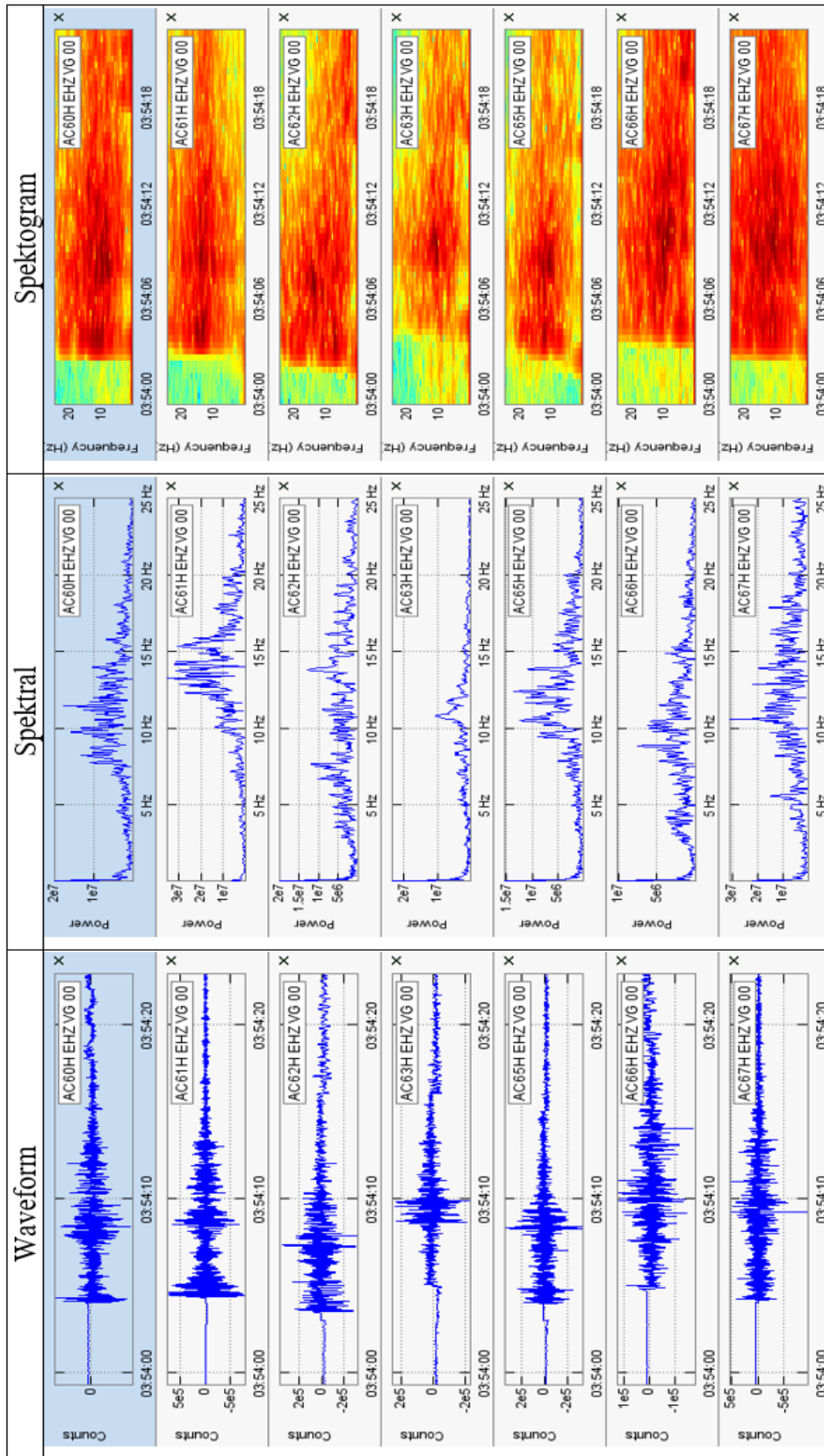


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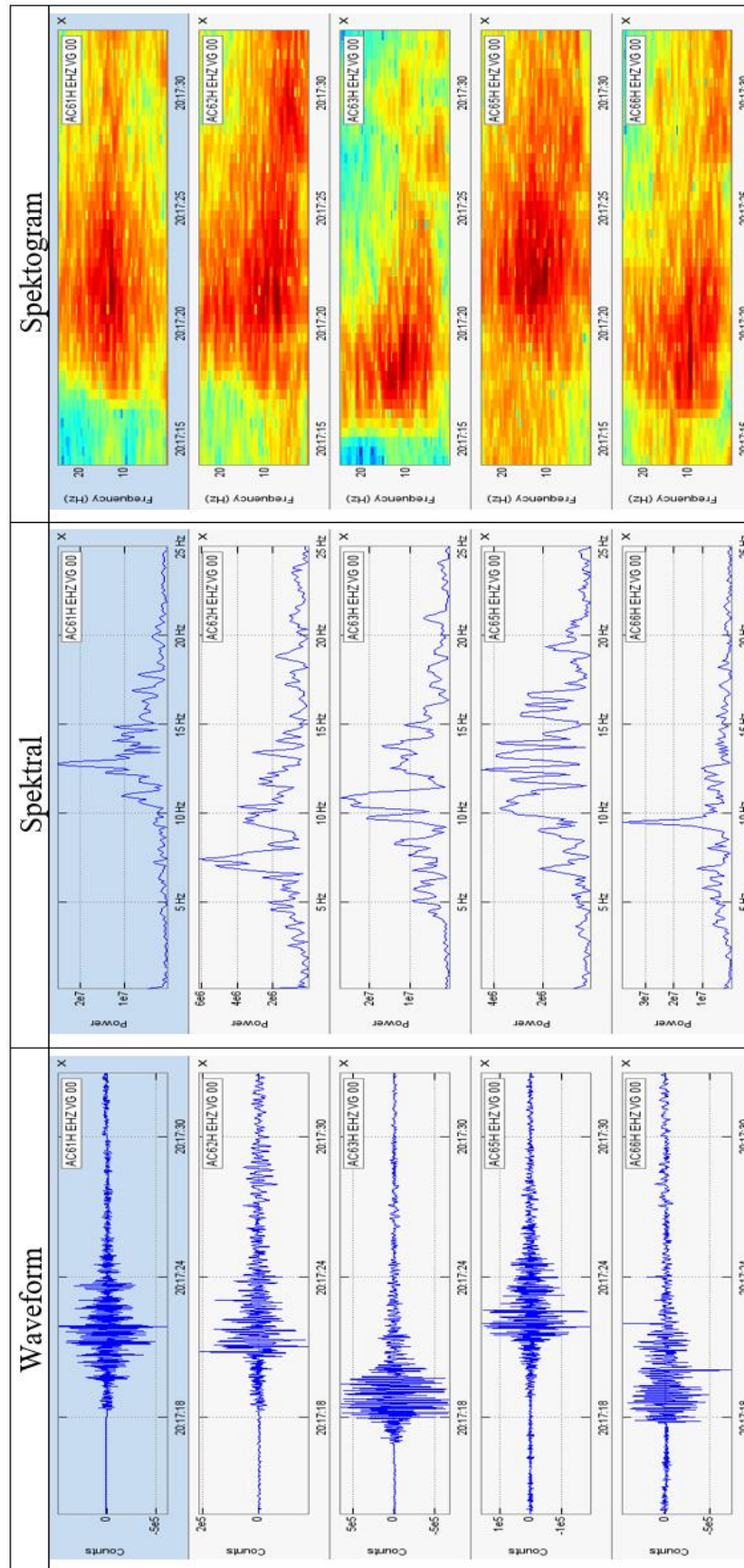


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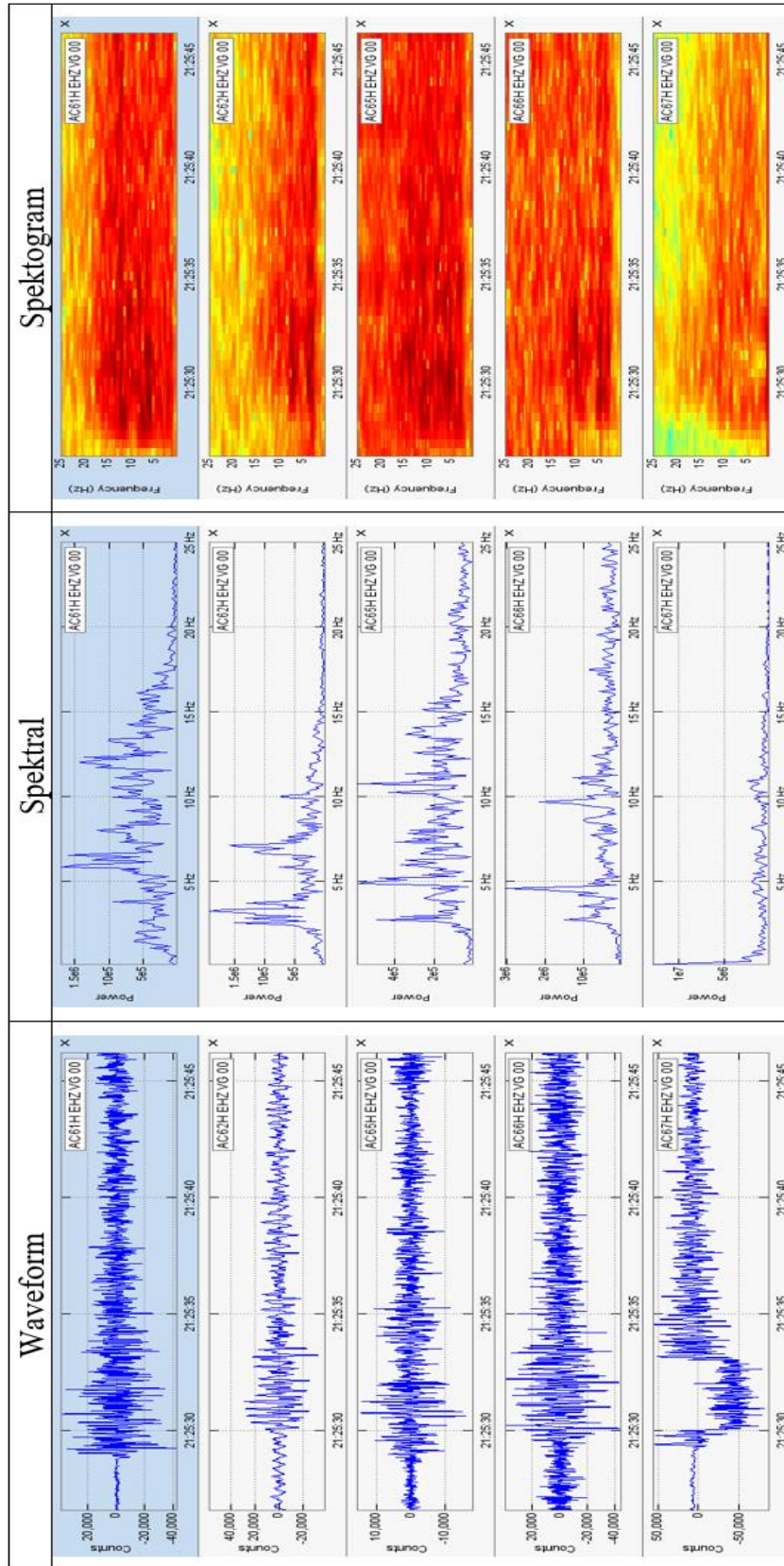


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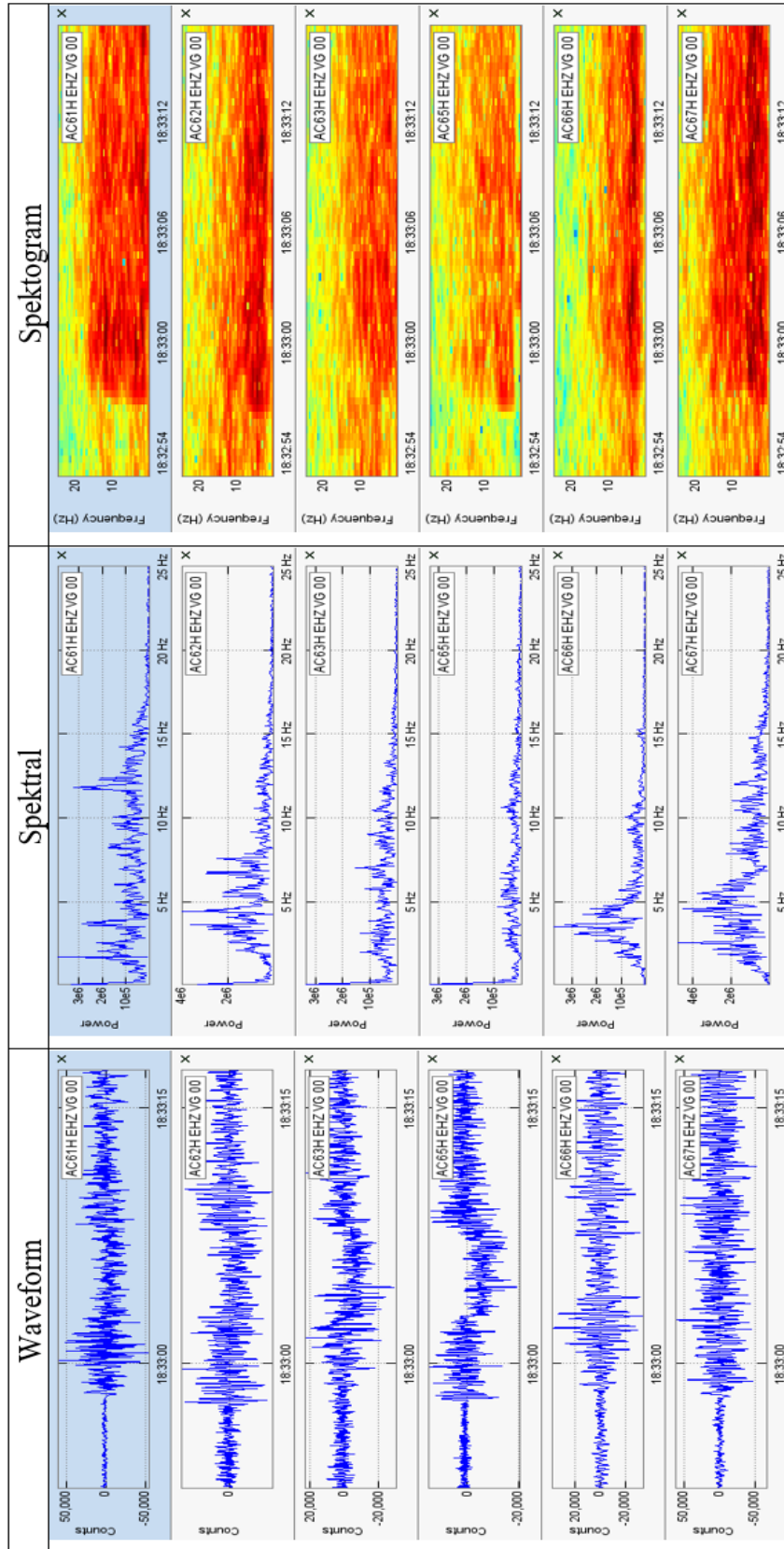


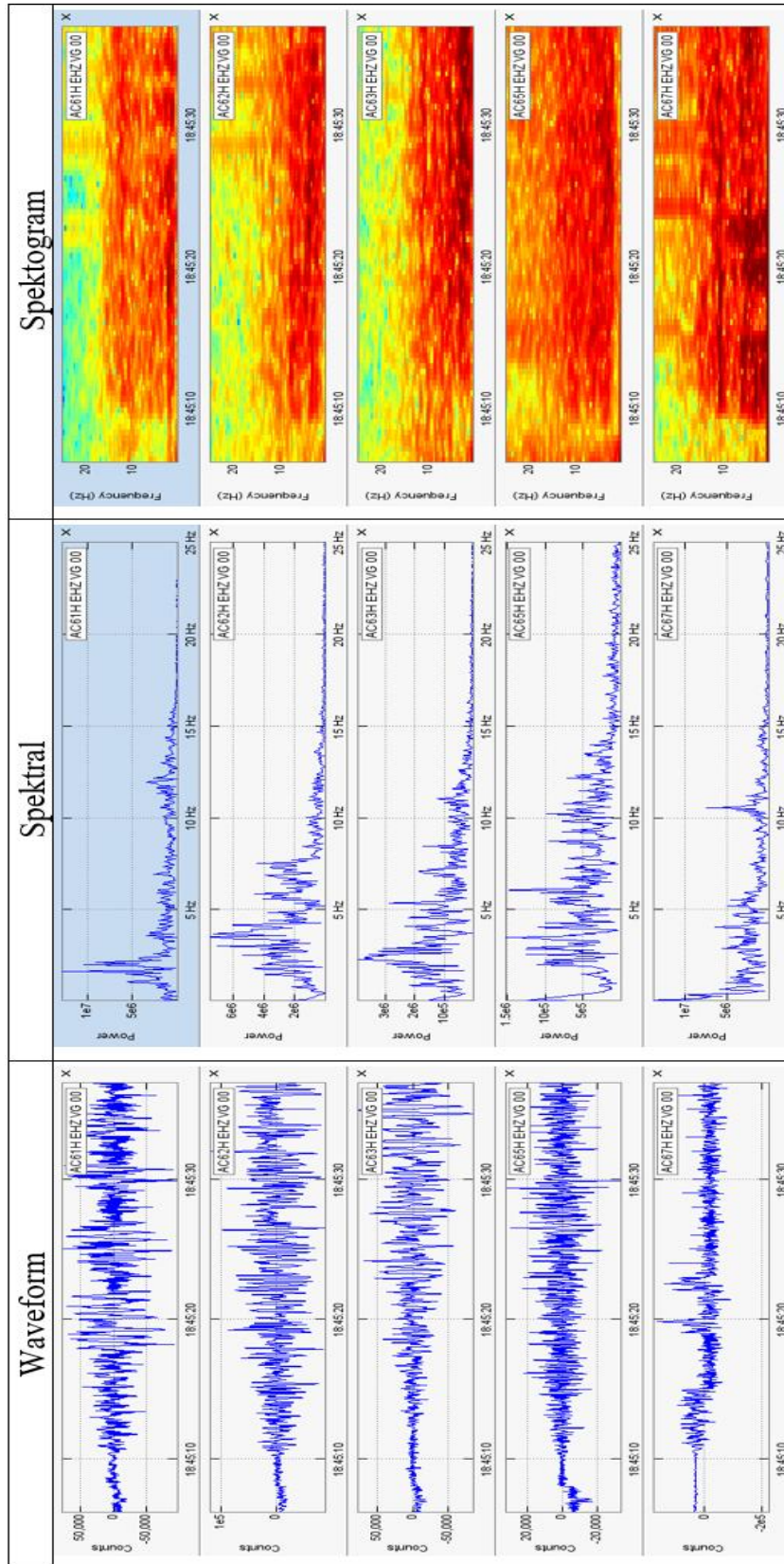


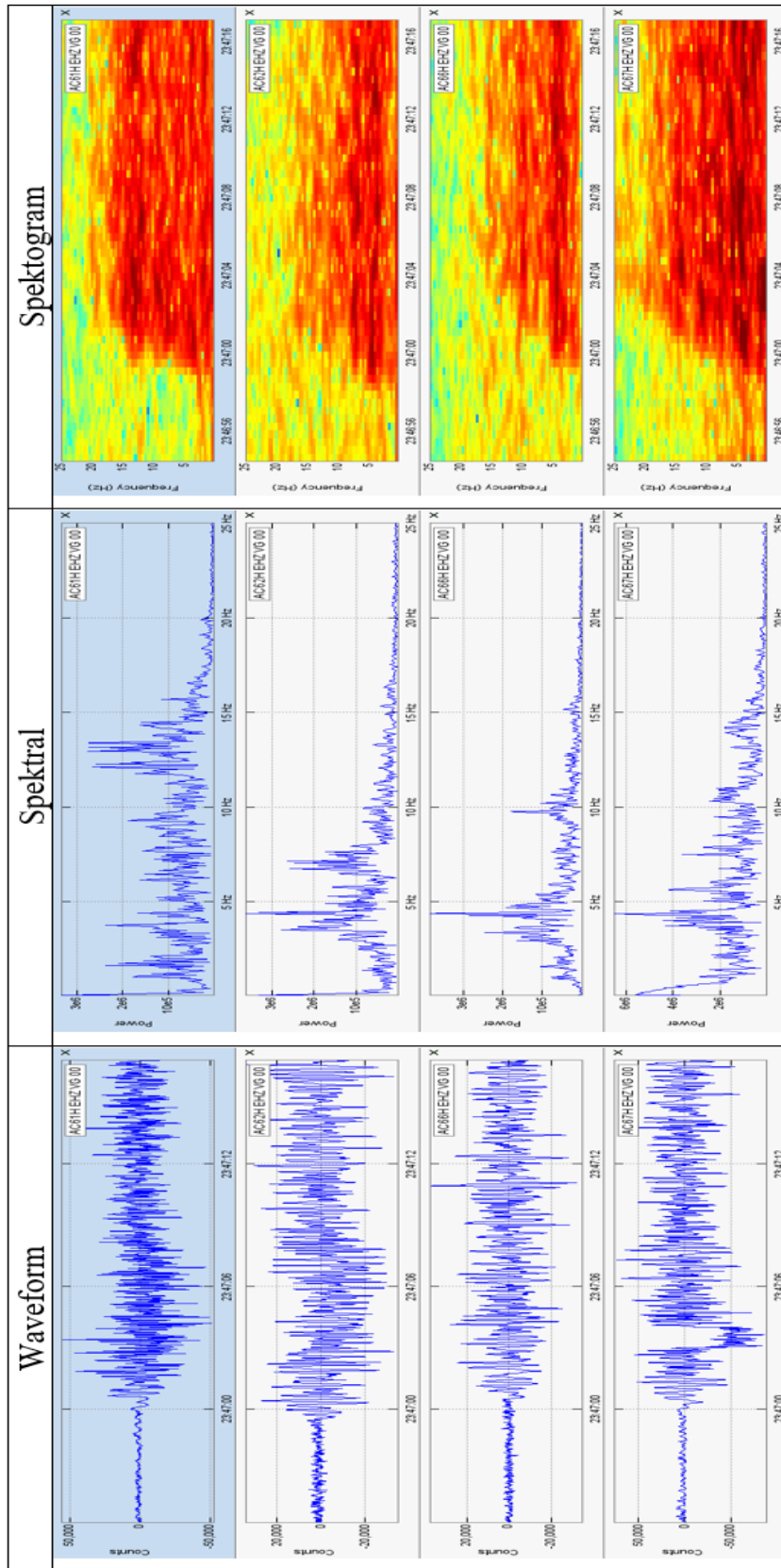
2009032125 – Gempa Hembusan



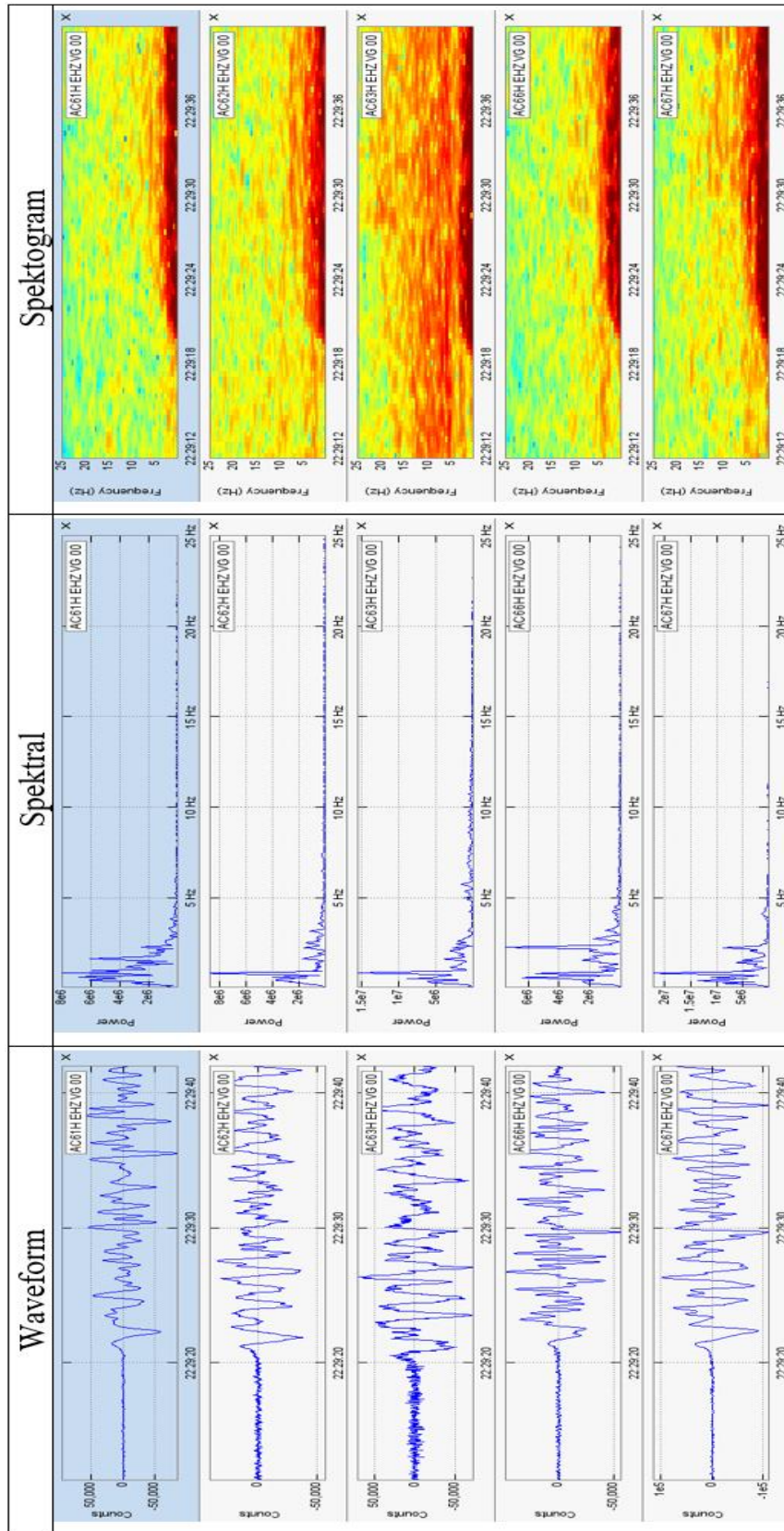
2009041833 – Gempa Guguran



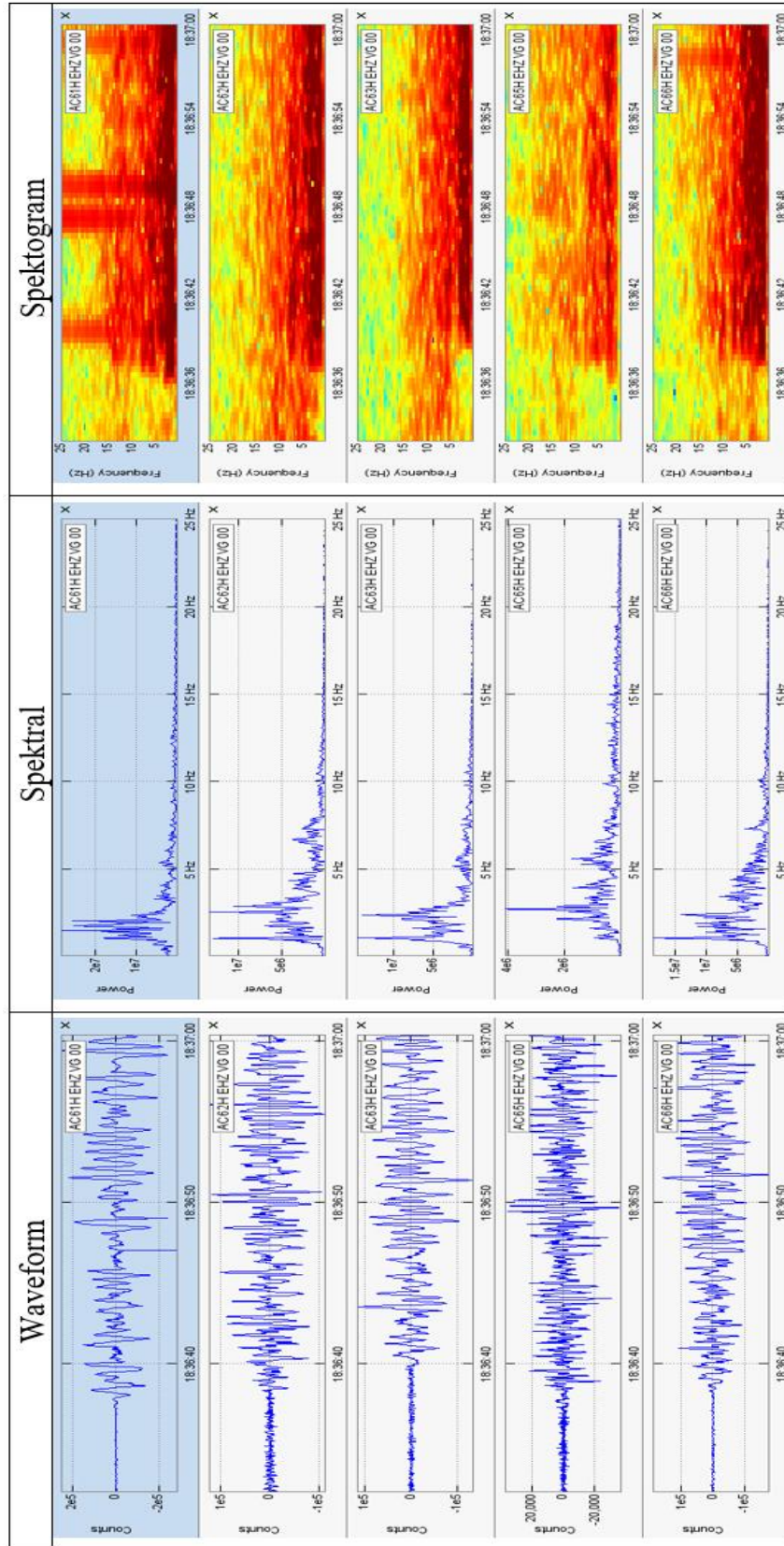




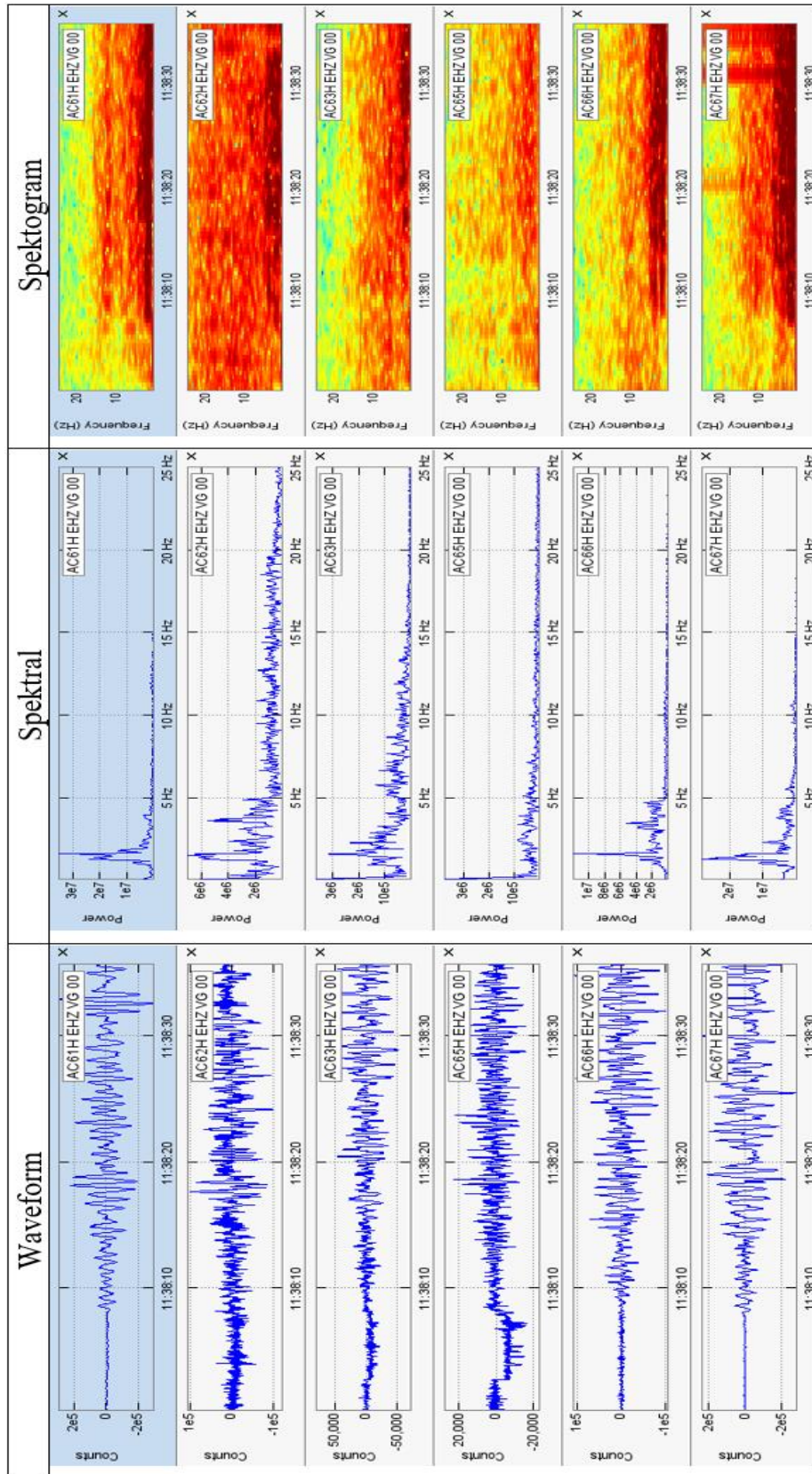
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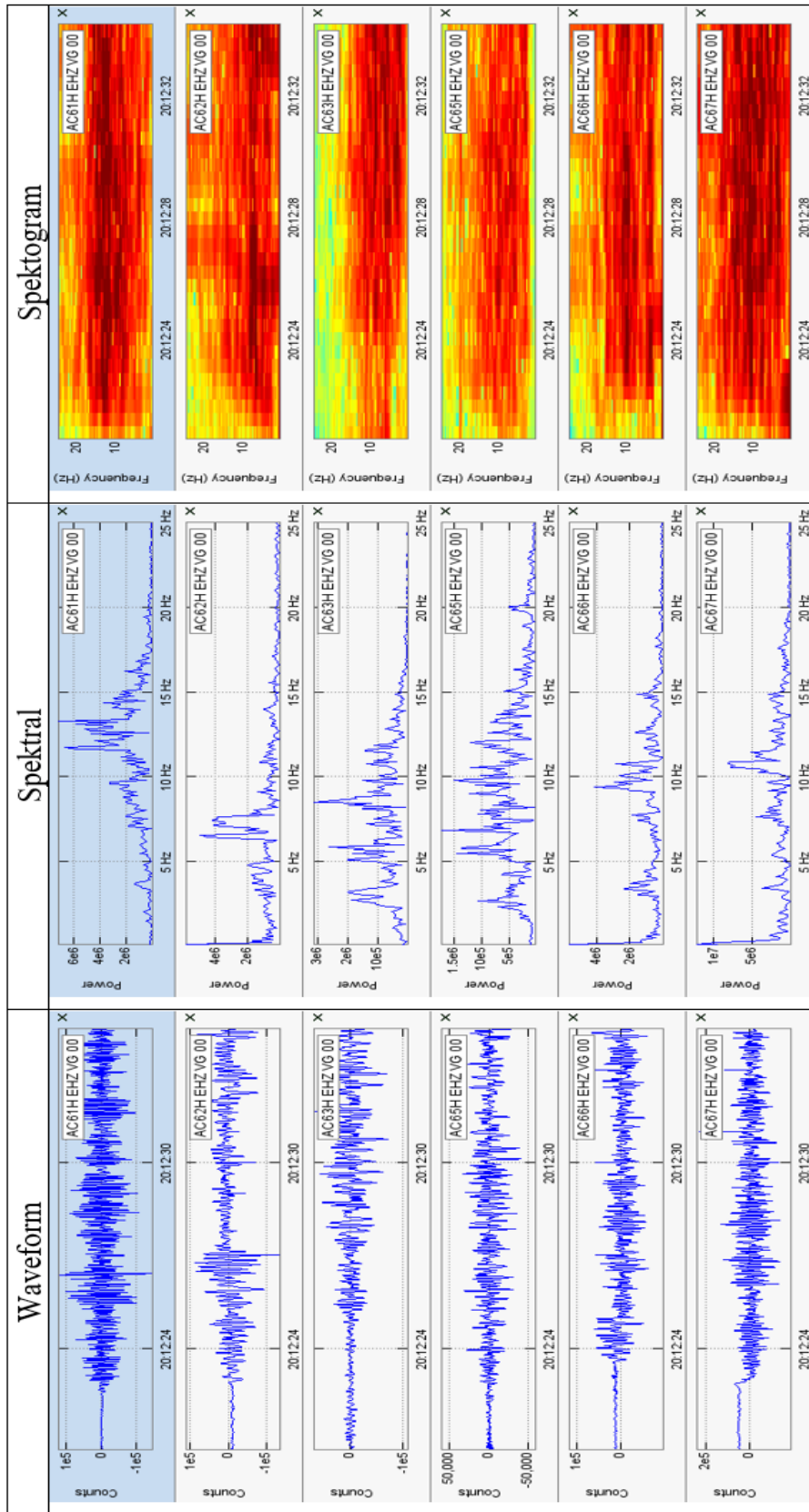
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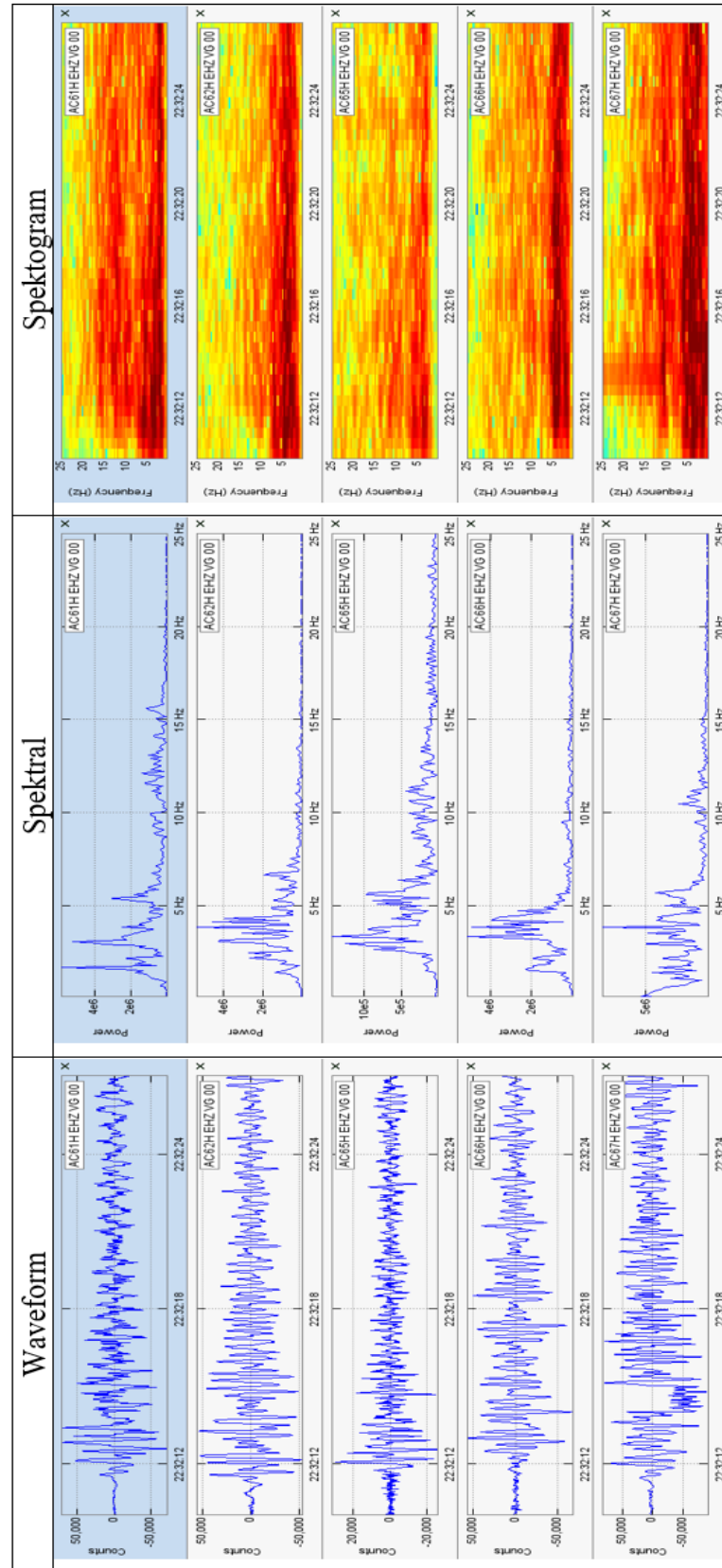
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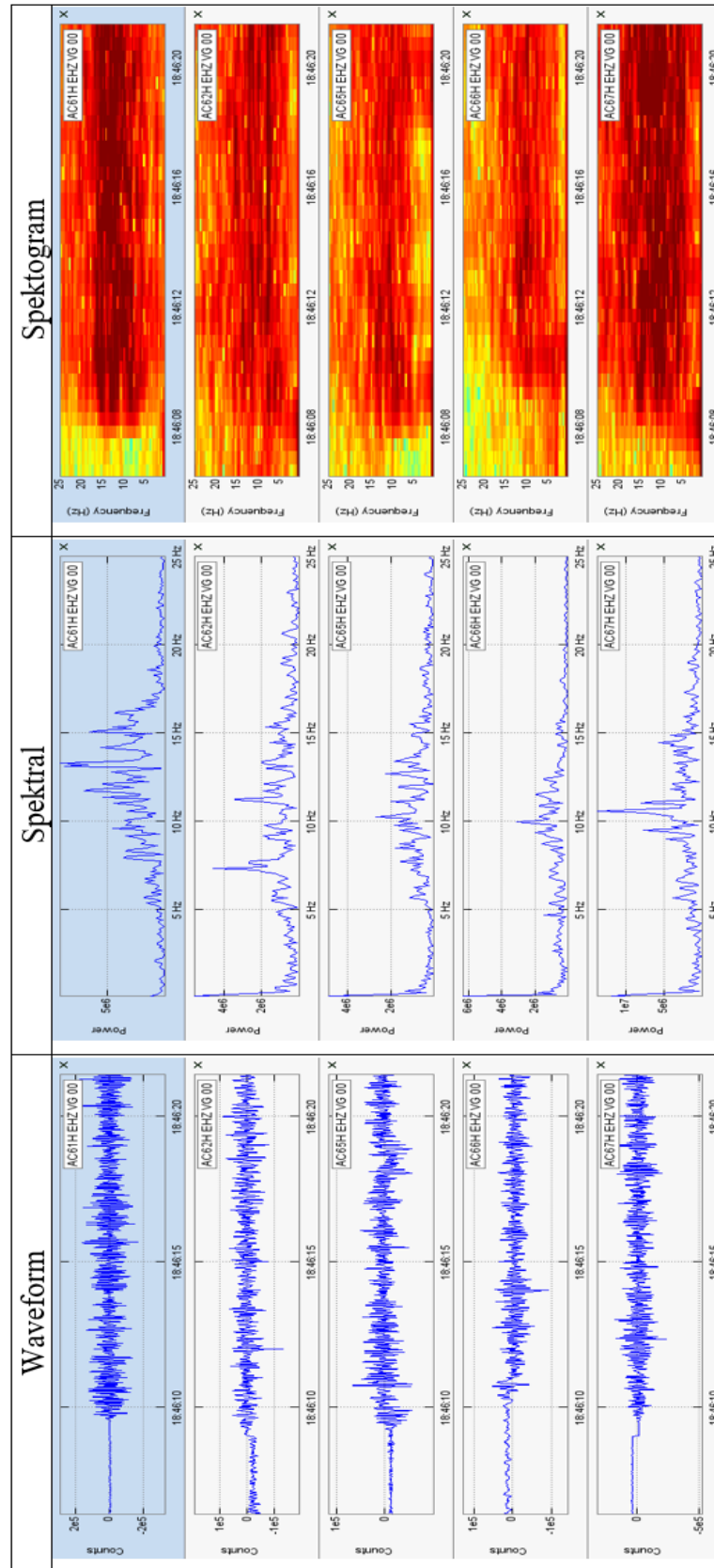
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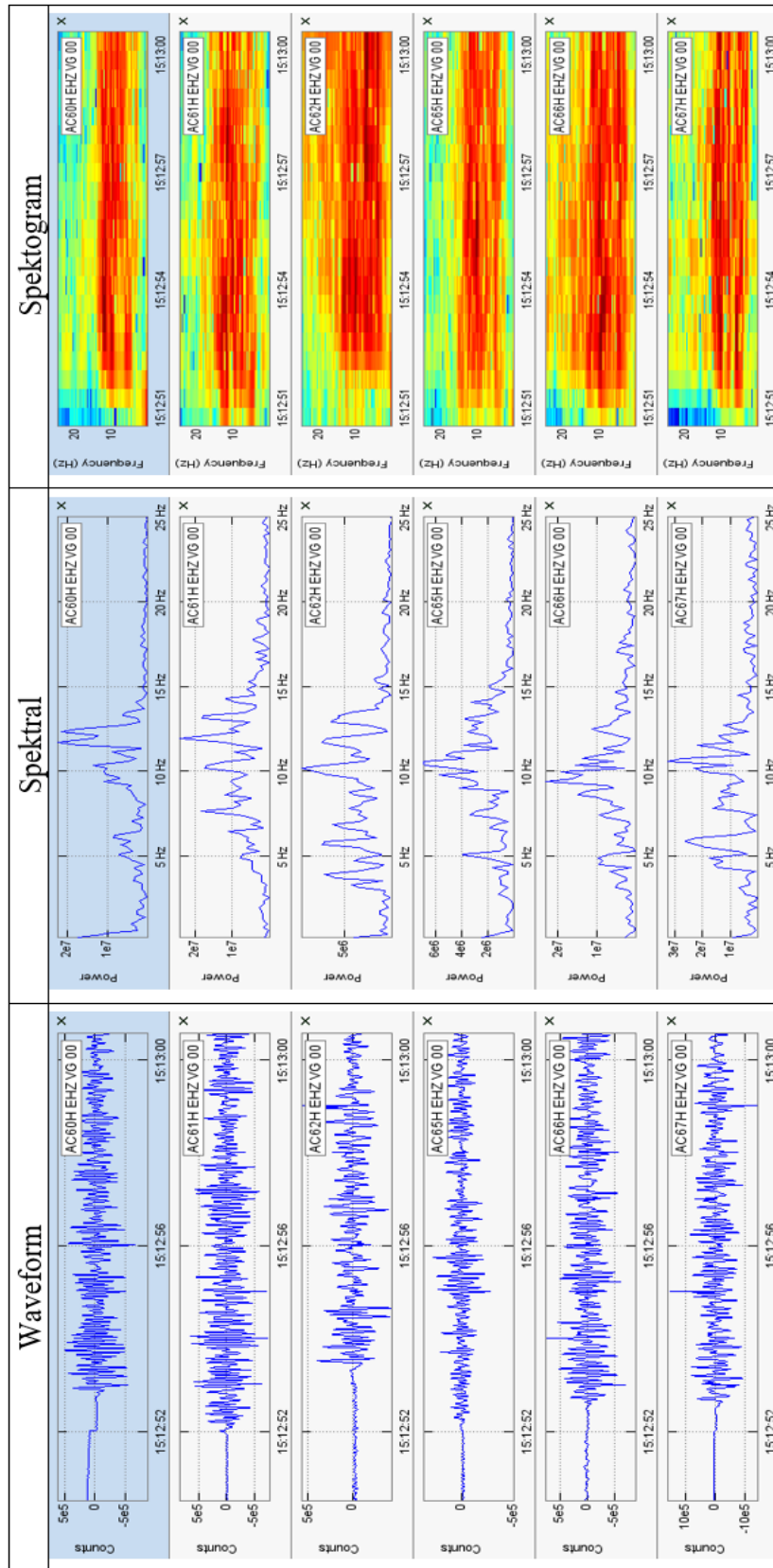


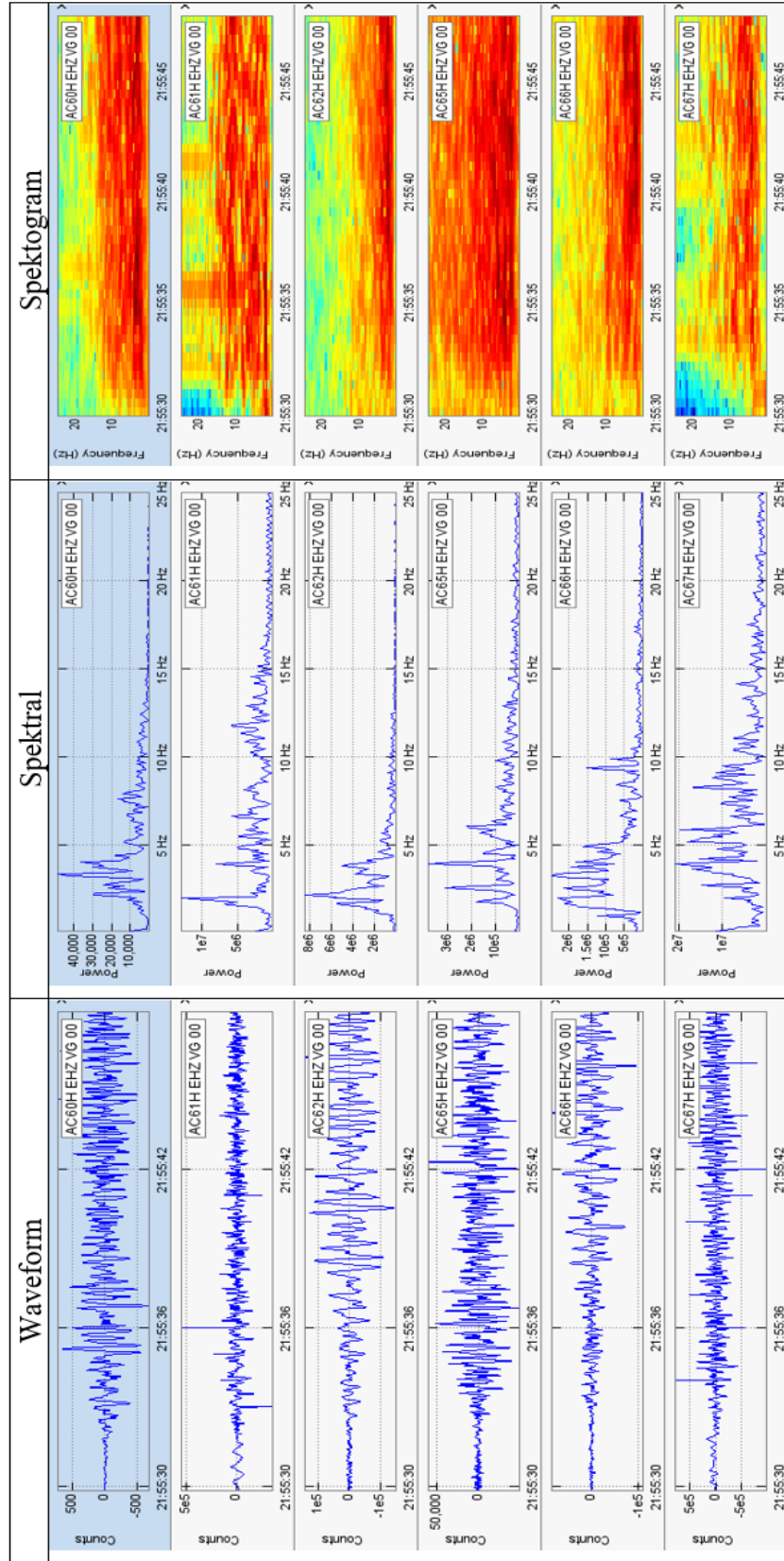


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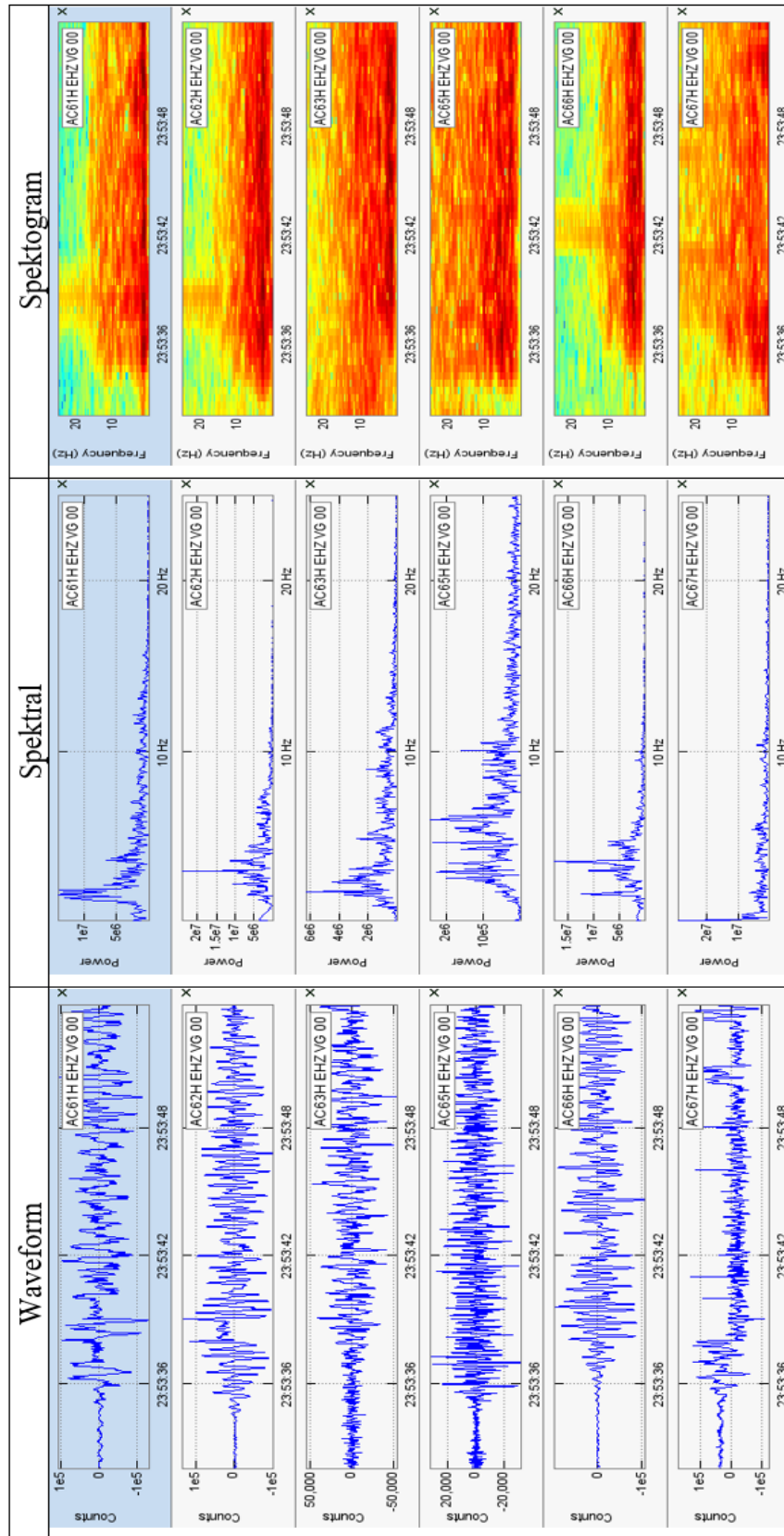


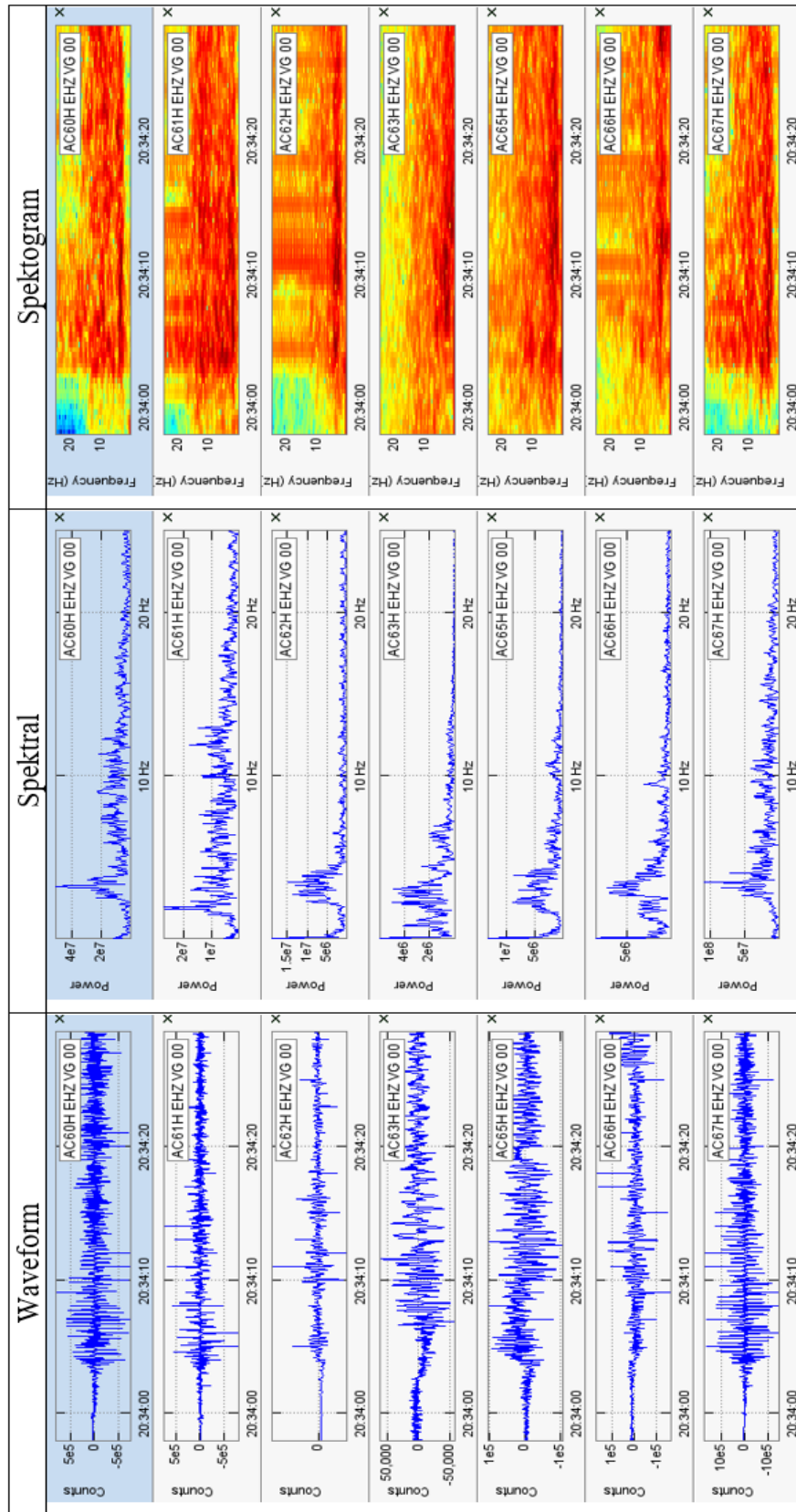
2009281513 – Gempa Hembusan



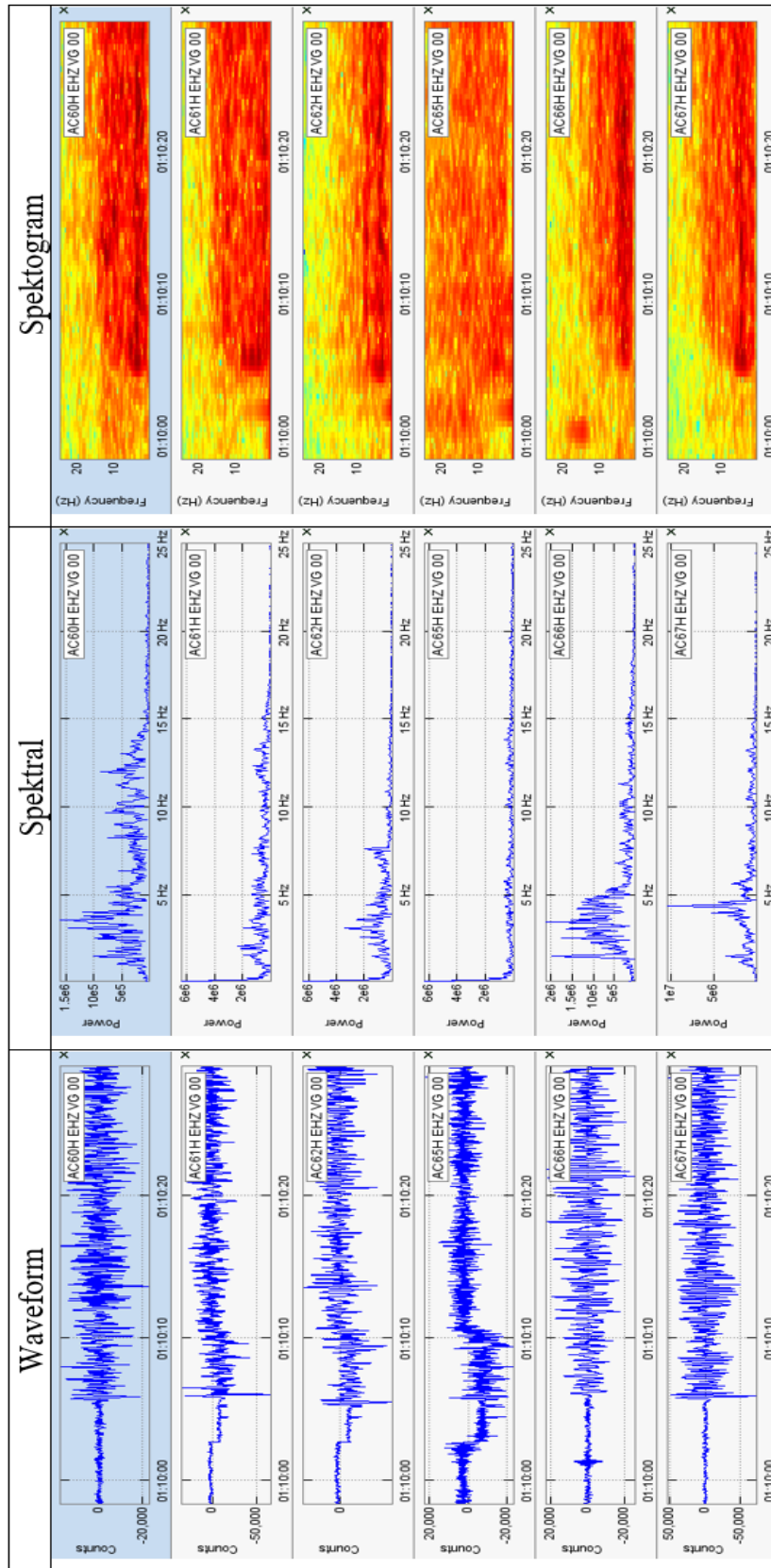


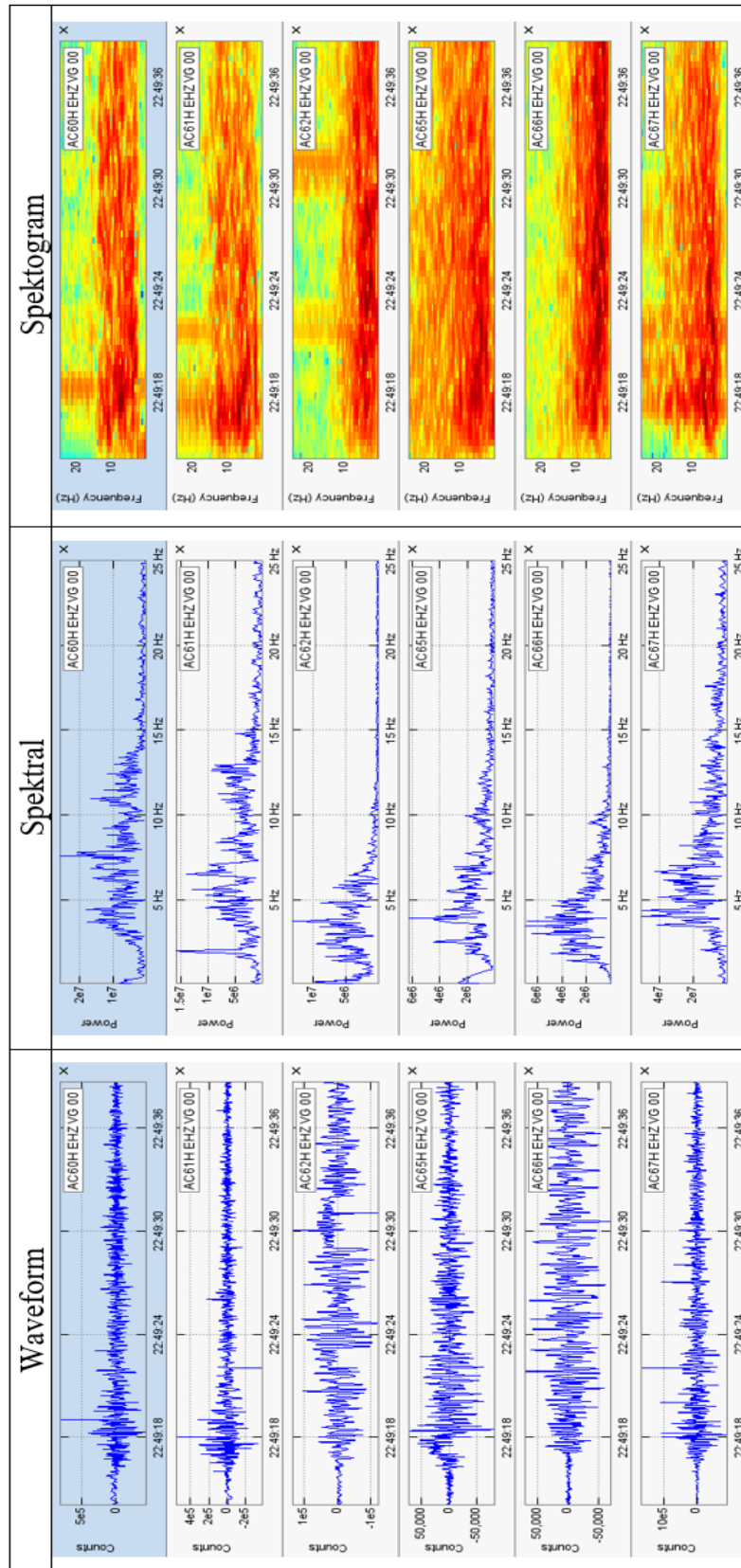
2010152353 – Gempa Hybrid





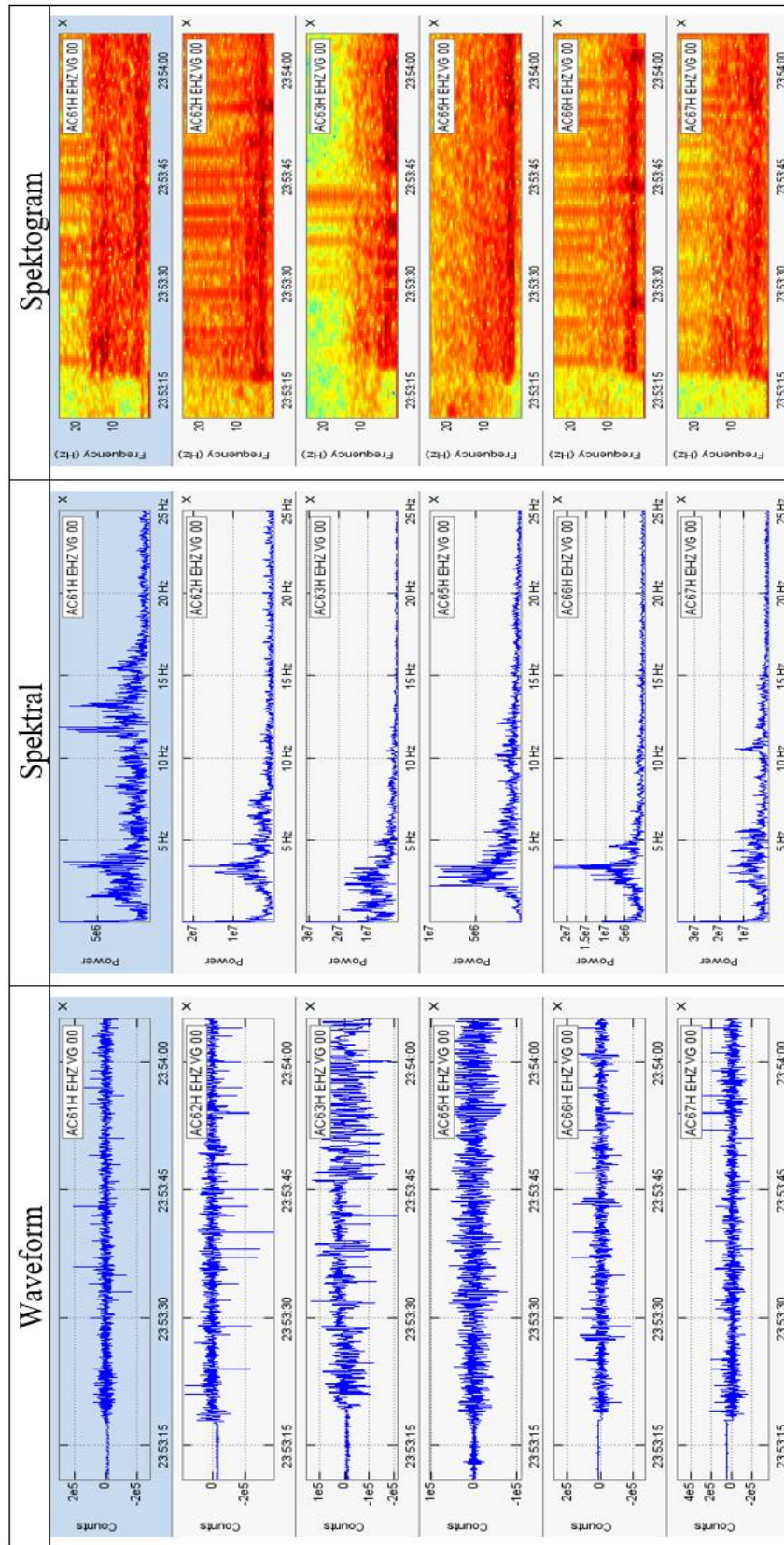
2011010110 – Gempa Hybrid



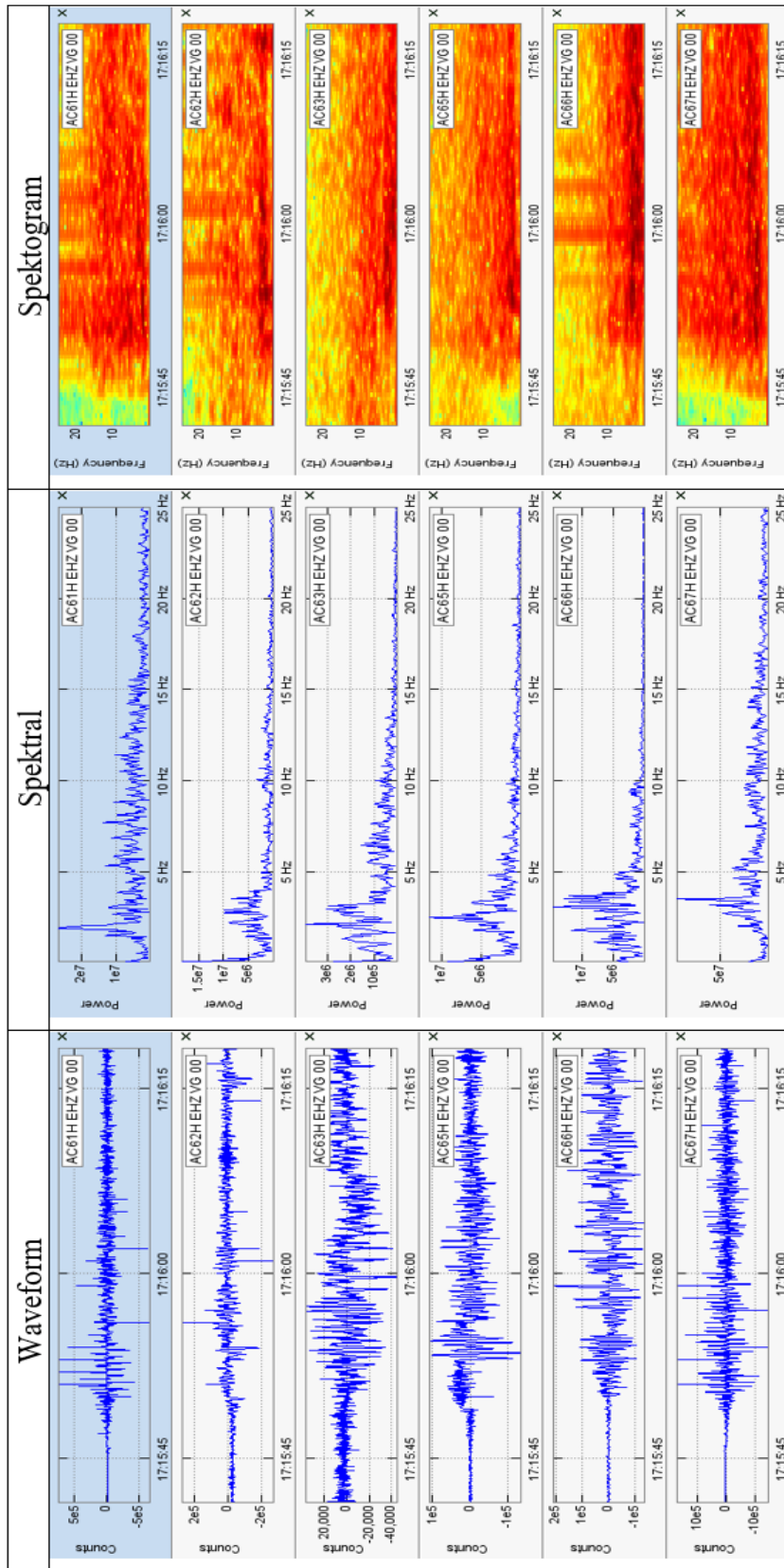


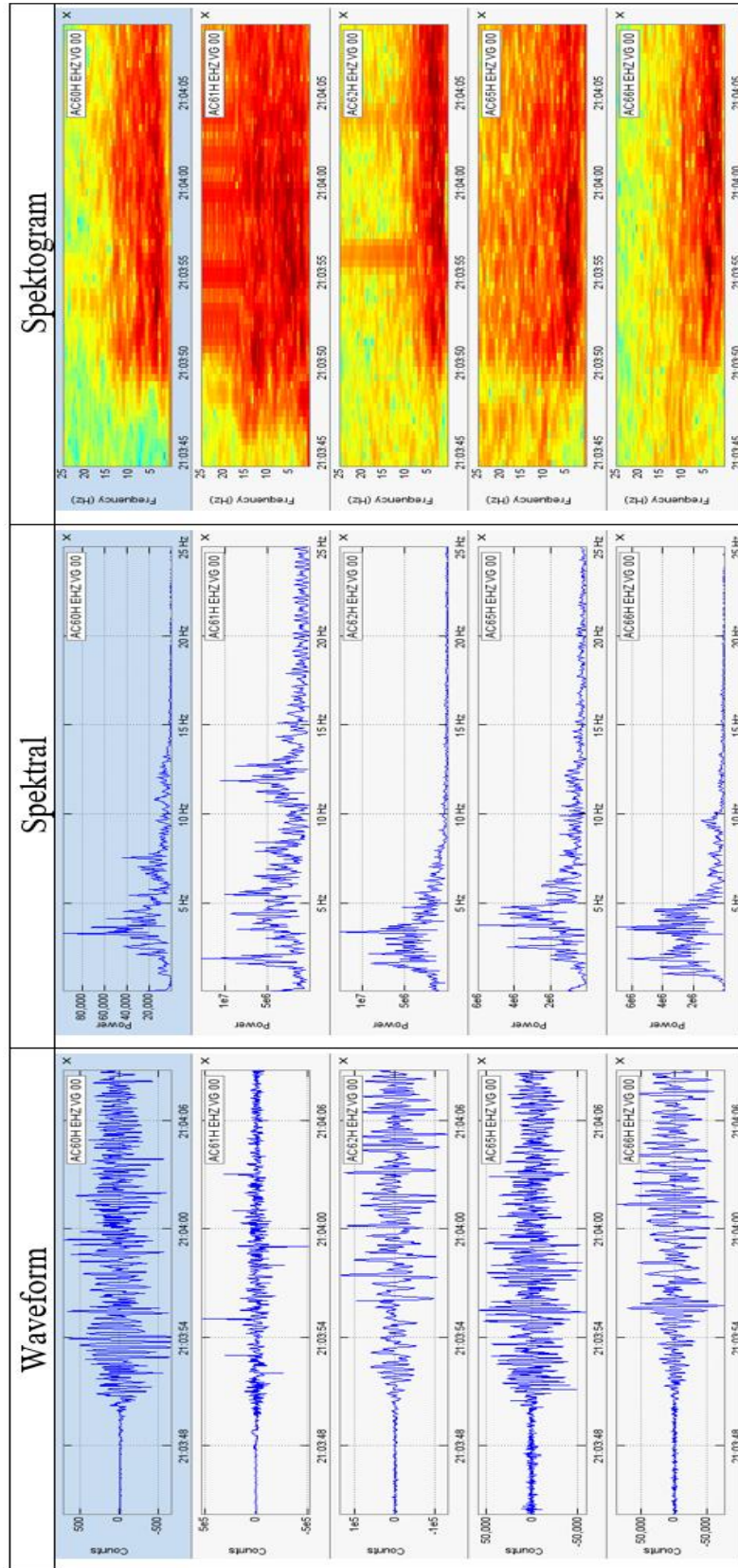


2011032353 – Gempa Low Frequency

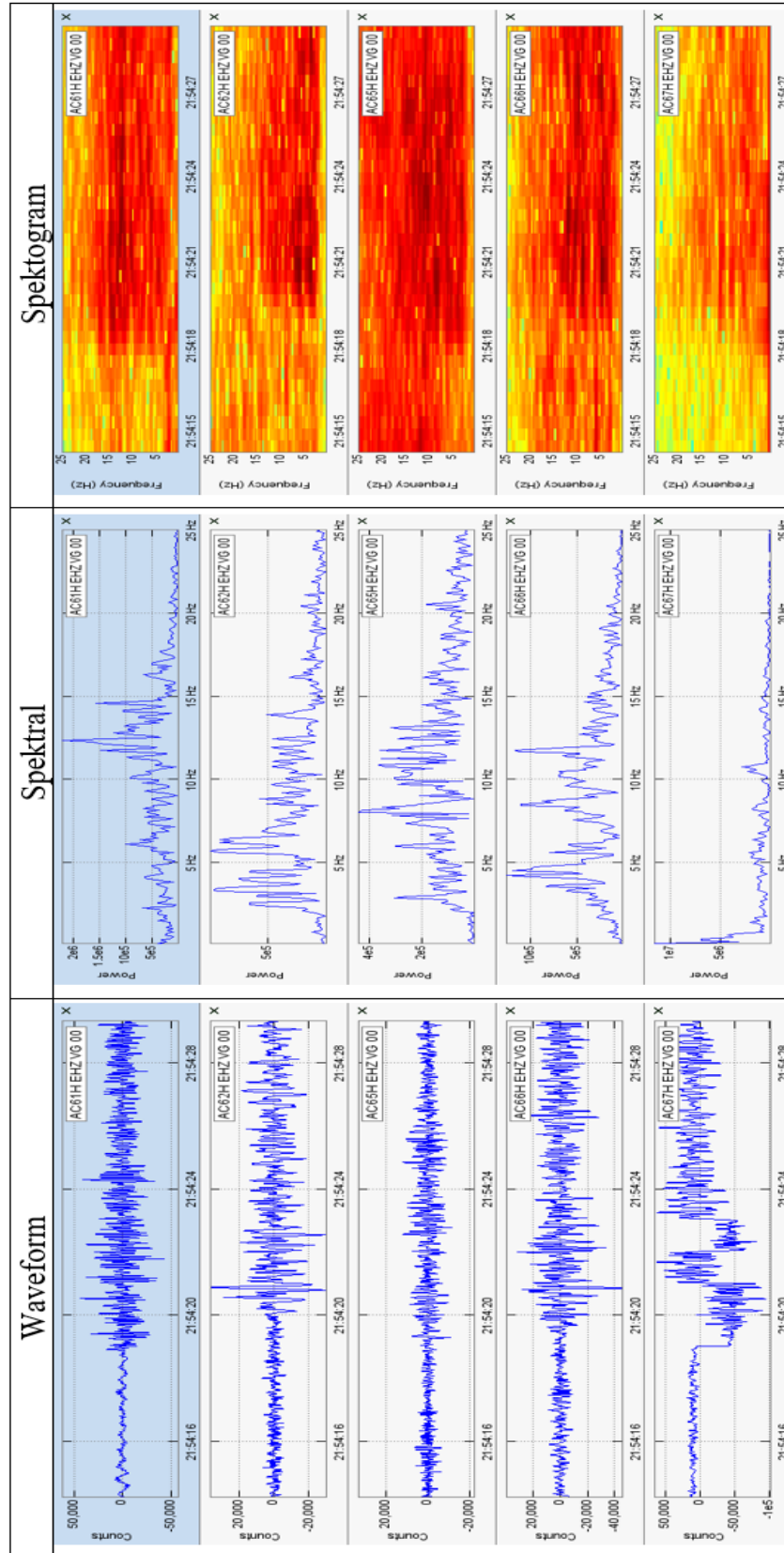


2011031715 – Gempa Low Frequency





2009052154 – Gempa Hembusan



## Lampiran 2 : Hasil Picking Waktu Tiba Gempa VTA dan VTB

2009072257, SKN, 99.990, +, I, 99.990, I  
2009072257, LKW, 99.990, +, I, 99.990, I  
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2009072257, MDD, 99.990, +, I, 99.990, I  
2009072257, GBR, 37.547, -, I, 39.439, I  
2009072257, SBY, 35.878, -, I, 37.000, E  
2009072257, KBY, 37.276, +, I, 40.078, I

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2009072214, GBR, 02.751, -, I, 04.210, I  
2009072214, SBY, 01.572, +, I, 02.127, E  
2009072214, KBY, 02.951, +, I, 04.430, I

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2009082107, KBY, 99.990, +, I, 99.990, I

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2009271904, SGR, 99.990, +, I, 99.990, I  
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2009271904, GBR, 40.066, +, I, 40.854, I  
2009271904, SBY, 99.990, +, I, 99.990, I  
2009271904, KBY, 39.546, +, I, 39.610, I

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2009281859, MDD, 36.035, +, I, 37.410, E  
2009281859, GBR, 99.990, +, I, 99.990, I  
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2010232059, SGR, 28.941, +, I, 30.782, I  
2010232059, MDD, 99.990, +, I, 99.990, I  
2010232059, GBR, 99.990, +, I, 99.990, I  
2010232059, SBY, 27.709, +, I, 29.189, E  
2010232059, KBY, 28.000, -, I, 28.782, I

2011052017, SKN, 99.990, +, I, 99.990, I  
2011052017, LKW, 18.304, -, I, 21.059, E  
2011052017, SGR, 99.990, +, I, 99.990, I  
2011052017, MDD, 99.990, +, I, 99.990, I  
2011052017, GBR, 18.258, -, I, 20.692, I  
2011052017, SBY, 16.858, +, I, 17.950, I  
2011052017, KBY, 99.990, +, I, 99.990, I

2009102117, SKN, 99.990, +, I, 99.990, I  
2009102117, LKW, 99.990, +, I, 99.990, I  
2009102117, SGR, 39.333, +, I, 41.060, E  
2009102117, MDD, 99.990, +, I, 99.990, I  
2009102117, GBR, 39.582, +, I, 41.632, I  
2009102117, SBY, 37.643, -, I, 38.450, E  
2009102117, KBY, 38.143, -, I, 40.421, I

2009191757, SKN, 99.990, +, I, 99.990, I  
2009191757, LKW, 33.755, +, I, 35.823, I  
2009191757, SGR, 33.422, +, I, 35.000, E  
2009191757, MDD, 99.990, +, I, 99.990, I  
2009191757, GBR, 99.990, +, I, 99.990, I  
2009191757, SBY, 31.653, -, I, 32.486, I  
2009191757, KBY, 99.990, +, I, 99.990, I

2009191216, SKN, 99.990, +, I, 99.990, I  
2009191216, LKW, 49.476, +, I, 51.242, I  
2009191216, SGR, 49.415, +, I, 51.079, I  
2009191216, MDD, 99.990, +, I, 99.990, I  
2009191216, GBR, 99.990, +, I, 99.990, I  
2009191216, SBY, 48.834, +, I, 49.641, I  
2009191216, KBY, 99.990, +, I, 99.990, I

2009201448, SKN, 99.990, +, I, 99.990, I  
2009201448, LKW, 16.887, +, I, 18.720, I  
2009201448, SGR, 16.662, +, I, 18.000, I  
2009201448, MDD, 99.990, +, I, 99.990, I  
2009201448, GBR, 99.990, +, I, 99.990, I  
2009201448, SBY, 15.894, +, I, 16.880, E  
2009201448, KBY, 16.000, -, I, 16.410, I

2009282312, SKN, 99.990, +, I, 99.990, I  
2009282312, LKW, 42.871, +, I, 45.400, I  
2009282312, SGR, 42.782, +, I, 45.000, E  
2009282312, MDD, 99.990, +, I, 99.990, I  
2009282312, GBR, 42.571, +, I, 43.550, E  
2009282312, SBY, 99.990, +, I, 99.990, I  
2009282312, KBY, 42.592, +, I, 43.179, I

2009282119, SKN, 99.990, +, I, 99.990, I  
2009282119, LKW, 43.845, +, I, 46.200, E  
2009282119, SGR, 99.990, +, I, 99.990, I  
2009282119, MDD, 99.990, +, I, 99.990, I  
2009282119, GBR, 43.434, -, I, 44.670, I  
2009282119, SBY, 99.990, +, I, 99.990, I  
2009282119, KBY, 43.405, +, I, 44.170, I

2009282326, SKN, 99.990, -, I, 99.990, I  
2009282326, LKW, 99.990, -, I, 99.990, I  
2009282326, SGR, 99.990, -, I, 99.990, I  
2009282326, MDD, 38.452, +, I, 39.910, I  
2009282326, GBR, 38.041, -, I, 39.980, E  
2009282326, SBY, 99.990, -, I, 99.990, I  
2009282326, KBY, 37.912, +, I, 38.620, I

2010142140, SKN, 99.990, +, I, 99.990, I  
2010142140, LKW, 99.990, +, I, 99.990, I  
2010142140, SGR, 30.973, +, I, 32.763, I  
2010142140, MDD, 99.990, +, I, 99.990, I  
2010142140, GBR, 30.592, -, I, 32.824, I  
2010142140, SBY, 29.001, +, I, 29.770, E  
2010142140, KBY, 30.634, +, I, 32.282, E

2010300753, SKN, 56.335, -, I, 57.411, I  
2010300753, LKW, 56.235, -, I, 57.042, I  
2010300753, SGR, 56.000, -, I, 57.531, E  
2010300753, MDD, 99.990, +, I, 99.990, I  
2010300753, GBR, 99.990, +, I, 99.990, I  
2010300753, SBY, 99.990, +, I, 99.990, I  
2010300753, KBY, 99.990, +, I, 99.990, I

2011010354, SKN, 04.029, -, I, 05.023, I  
2011010354, LKW, 04.284, +, I, 05.669, I  
2011010354, SGR, 99.990, +, I, 99.990, I  
2011010354, MDD, 99.990, +, I, 99.990, I  
2011010354, GBR, 03.428, +, I, 04.267, E  
2011010354, SBY, 99.990, +, I, 99.990, I  
2011010354, KBY, 04.690, +, I, 05.697, E

9999999999

### Lampiran 3 : Result Software GAD

```

nst      : 7
Station List
  SKN    2.485   .523  -1.468
  LKW    -.592   2.275 -1.467
  MDD   -2.680  -1.271 -1.178
  SBY   12.398   7.558 -2.014
  GBR    5.082  -1.815 -1.207
  SGR    1.921   1.644 -1.460
  KBY    3.996   5.548 -1.479
nZLayer: 6
zLayer :  -2.000  -1.000   .000   2.000   6.000
Vp      :    2.360   2.630   2.840   3.080   3.480   4.340
Vs      :    1.360   1.520   1.640   1.860   2.010   2.510

```

#### Hypocenter

```

Date 20 9 7 Time 22:57
  Focal Element Probable Error
  X 13.974      .528
  Y  3.417      .236
  Z  1.526      .694
  T 33.849      .230

```

Travel time residual rms= .142sec.

ST	P	S	Cal	(Obs-Cal)
SBY	35.878		35.819	.059
GBR	37.547		37.367	.180
SGR	37.985		38.008	-.023
KBY	37.276		37.407	-.131
SBY		37.000	37.191	-.191
GBR		39.439	39.743	-.304
SGR		40.789	40.860	-.071
KBY		40.078	39.821	.257

```

Date 20 9 7 Time 22:14
  Focal Element Probable Error
  X 12.503      .030
  Y  3.140      .030
  Z  1.659      .030
  T  -.499      .029

```

Travel time residual rms= .293sec.

ST	P	S	Cal	(Obs-Cal)
SBY	1.572		1.492	.080
GBR	2.751		2.588	.163
KBY	2.951		2.640	.311
SBY		2.127	2.878	-.751
GBR		4.210	4.677	-.467
KBY		4.430	4.776	-.346



Date 20 9 8 Time 21: 7  
 Focal Element Probable Error  
 X 6.143 .026  
 Y 5.681 .026  
 Z 1.248 .026  
 T .500 .025  
 Travel time residual rms= .279sec.

ST	P	S	Cal	(Obs-Cal)
SKN	3.201		2.815	.386
LKW	3.173		3.195	-.022
GBR	3.096		3.129	-.033
SGR	2.883		2.665	.218
SKN		3.841	4.406	-.565
LKW		4.739	5.040	-.301
GBR		4.161	4.918	-.757
SGR		4.351	4.155	.196

Date 20 9 27 Time 19: 4  
 Focal Element Probable Error  
 X 3.218 .529  
 Y 2.888 .415  
 Z .140 .582  
 T 38.154 .140  
 Travel time residual rms= .255sec.

ST	P	S	Cal	(Obs-Cal)
MDD	40.715		40.608	.107
GBR	40.066		39.917	.149
KBY	39.546		39.265	.281
MDD		41.751	42.290	-.539
GBR		40.854	41.145	-.291
KBY		39.610	40.065	-.455

Date 20 9 28 Time 18:59  
 Focal Element Probable Error  
 X .637 .020  
 Y 5.754 .020  
 Z 1.608 .020  
 T 33.577 .020  
 Travel time residual rms= .281sec.

ST	P	S	Cal	(Obs-Cal)
LKW	35.644		35.186	.458
MDD	36.035		36.290	-.255
SGR	35.551		35.347	.204
KBY	35.184		35.108	.076
LKW		36.260	36.295	-.035
MDD		37.410	38.131	-.721
SGR		36.341	36.566	-.225
KBY		35.760	36.164	-.404

Date 20 10 23 Time 20:59  
 Focal Element Probable Error  
 X 8.104 .068  
 Y 7.558 .071  
 Z 1.773 .072  
 T 25.728 .058  
 Travel time residual rms= .255sec.

ST	P	S	Cal	(Obs-Cal)
LKW	29.149		29.275	-.126
SBY	27.709		27.709	.000
SGR	28.941		28.783	.158
KBY	28.000		27.607	.393
LKW		31.000	31.708	-.708
SBY		29.189	29.085	.104
SGR		30.782	30.861	-.079
KBY		28.782	28.897	-.115

Date 20 11 5 Time 20:17  
 Focal Element Probable Error  
 X 7.888 .028  
 Y 7.990 .028  
 Z 1.104 .029  
 T 14.841 .025  
 Travel time residual rms= .099sec.

ST	P	S	Cal	(Obs-Cal)
LKW	18.304		18.379	-.075
SBY	16.858		16.767	.091
GBR	18.258		18.298	-.040
LKW		21.059	20.782	.277
SBY		17.950	18.117	-.167
GBR		20.692	20.635	.057

Date 20 9 10 Time 21:17  
 Focal Element Probable Error  
 X 9.861 .069  
 Y 6.791 .074  
 Z 1.454 .077  
 T 36.074 .057  
 Travel time residual rms= .209sec.

ST	P	S	Cal	(Obs-Cal)
SBY	37.643		37.595	.048
GBR	39.582		39.437	.145
SGR	39.333		39.387	-.054
KBY	38.143		38.315	-.172
SBY		38.450	38.660	-.210
GBR		41.632	41.710	-.078
SGR		41.060	41.639	-.579
KBY		40.421	39.854	.567

Date 20 9 19 Time 17:57  
 Focal Element Probable Error  
 X 8.737 .044  
 Y 8.164 .044  
 Z .920 .045  
 T 29.896 .041  
 Travel time residual rms= .218sec.

ST	P	S	Cal	(Obs-Cal)
LKW	33.755		33.684	.071
SBY	31.653		31.562	.091
SGR	33.422		33.167	.255
LKW		35.823	36.254	-.431
SBY		32.486	32.738	-.252
SGR		35.000	35.396	-.396

Date 20 9 19 Time 12:16  
 Focal Element Probable Error  
 X 6.358 .036  
 Y 8.749 .037  
 Z .930 .037  
 T 46.192 .036  
 Travel time residual rms= .299sec.

ST	P	S	Cal	(Obs-Cal)
LKW	49.476		49.487	-.011
SBY	48.834		48.581	.253
SGR	49.415		49.125	.290
LKW		51.242	51.731	-.489
SBY		49.641	50.249	-.608
SGR		51.079	51.131	-.052

Date 20 9 20 Time 14:48  
 Focal Element Probable Error  
 X 8.585 .035  
 Y 4.357 .036  
 Z 1.278 .036  
 T 13.751 .034  
 Travel time residual rms= .292sec.

ST	P	S	Cal	(Obs-Cal)
LKW	16.887		17.037	-.150
SBY	15.894		15.832	.062
SGR	16.662		16.336	.326
KBY	16.000		15.597	.403
LKW		18.720	19.274	-.554
SBY		16.880	17.284	-.404
SGR		18.000	18.108	-.108
KBY		16.410	16.873	-.463

Date 20 9 28 Time 23:12  
 Focal Element Probable Error  
 X 7.024 .465  
 Y 2.888 .297  
 Z 2.340 .601  
 T 40.514 .252  
 Travel time residual rms= .291sec.

ST	P	S	Cal	(Obs-Cal)
LKW	42.871		43.307	-.436
GBR	42.571		42.518	.053
SGR	42.782		42.645	.137
KBY	42.592		42.343	.249
LKW		45.400	45.241	.159
GBR		43.550	43.895	-.345
SGR		45.000	44.116	.884
KBY		43.179	43.606	-.427

Date 20 9 28 Time 21:19  
 Focal Element Probable Error  
 X 5.157 .053  
 Y 2.380 .052  
 Z .924 .054  
 T 41.929 .047  
 Travel time residual rms= .190sec.

ST	P	S	Cal	(Obs-Cal)
LKW	43.845		44.034	-.189
GBR	43.434		43.483	-.049
KBY	43.405		43.331	.074
LKW		46.200	45.489	.711
GBR		44.670	44.558	.112
KBY		44.170	44.310	-.140

Date 20 9 28 Time 23:26  
 Focal Element Probable Error  
 X 2.121 .029  
 Y 2.444 .029  
 Z .821 .029  
 T 36.347 .027  
 Travel time residual rms= .154sec.

ST	P	S	Cal	(Obs-Cal)
MDD	38.452		38.461	-.009
GBR	38.041		38.192	-.151
KBY	37.912		37.803	.109
MDD		39.910	39.912	-.002
GBR		39.980	39.465	.515
KBY		38.620	38.822	-.202

Date 20 10 14 Time 21:40  
 Focal Element Probable Error  
 X 12.217 .212  
 Y 4.414 .189  
 Z 1.713 .243  
 T 27.303 .113  
 Travel time residual rms= .255sec.

ST	P	S	Cal	(Obs-Cal)
SBY	29.001		28.968	.033
GBR	30.592		30.545	.047
SGR	30.973		30.985	-.012
KBY	30.634		30.263	.371
SBY		29.770	30.145	-.375
GBR		32.824	32.753	.071
SGR		32.763	33.517	-.754
KBY		32.282	32.296	-.014

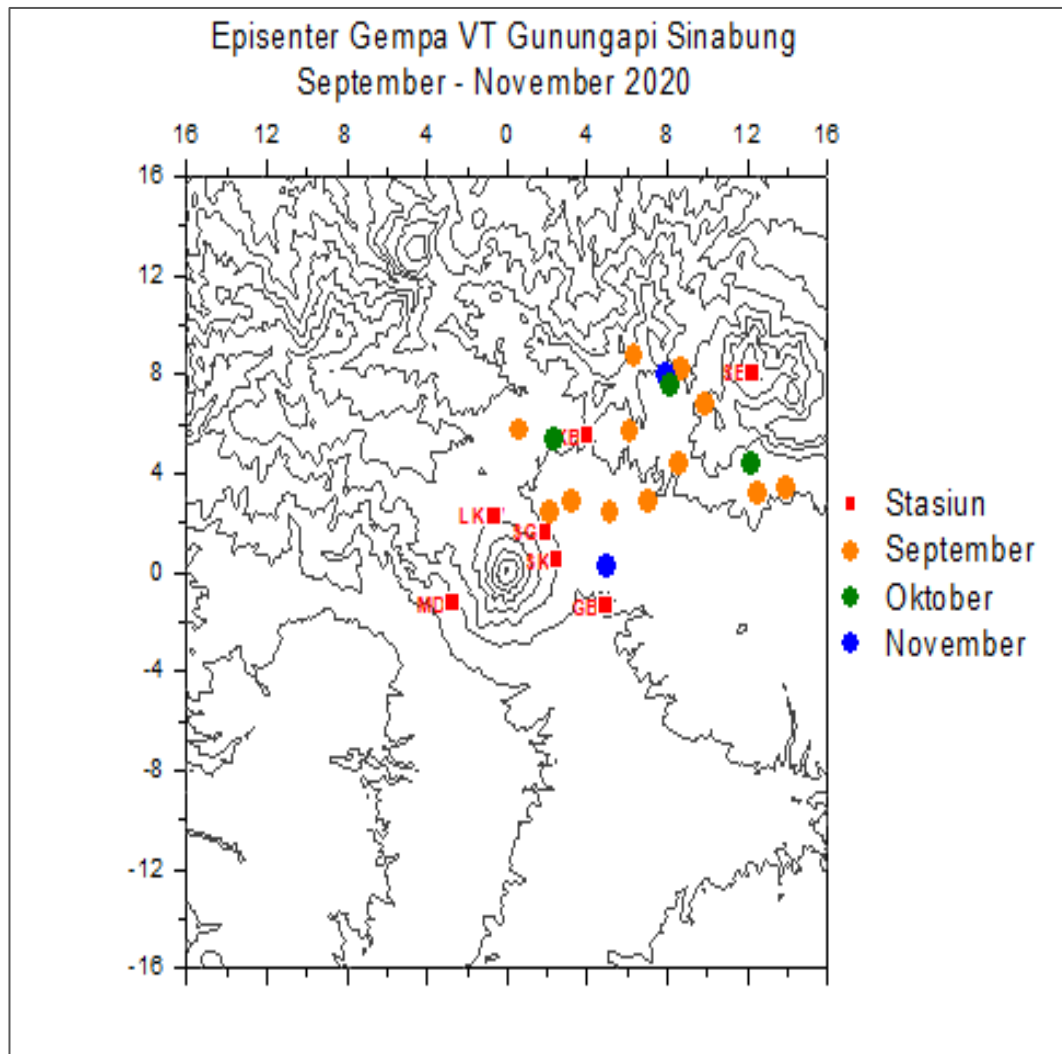
Date 20 10 30 Time 7:53  
 Focal Element Probable Error  
 X 2.336 .048  
 Y 5.390 .046  
 Z .414 .048  
 T 54.553 .042  
 Travel time residual rms= .152sec.

ST	P	S	Cal	(Obs-Cal)
SKN	56.335		56.339	-.004
LKW	56.235		56.151	.084
SGR	56.000		55.992	.008
SKN		57.411	57.591	-.180
LKW		57.042	57.277	-.235
SGR		57.531	57.010	.521

Date 20 11 1 Time 3:54  
 Focal Element Probable Error  
 X 4.939 .104  
 Y .201 .102  
 Z .958 .112  
 T 2.523 .081  
 Travel time residual rms= .284sec.

ST	P	S	Cal	(Obs-Cal)
SKN	4.029		3.693	.336
LKW	4.284		4.680	-.396
GBR	3.428		3.495	-.067
KBY	4.690		4.535	.155
SKN		5.023	4.512	.511
LKW		5.669	6.170	-.501
GBR		4.267	4.170	.097
KBY		5.697	5.929	-.232

**Lampiran 4 : Distribusi Episenter Gempa VT Gunung Sinabung**



Lampiran 5 : Distribusi Kedalaman Hiposenter Gempa VT Gunung Sinabung (Penampang Utara – Selatan)

