October 2001

Seismic Reflection Transect from Cruise EW9709 along ca. 56 Ma Crust, Central Tropical Pacific Ocean:

Part of a Site Survey for Ocean Drilling Program Leg 199

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1 October 2001

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1. Introduction

The data data presented here were collected on the EW9709 cruise of the R/V Ewing, from 12 December 1997 to 17 January 1998. They represent a combination of seismic profiles shot underway between drillsite surveys. The cruise was funded to survey possible drill sites for ODP Leg 199, "a Paleogene Equatorial APC Transect". Data from individual site surveys (filled circles marked on Figure 1) have been sent to the Ocean Drilling Program Site Survey Data Bank as part of the Site survey package for ODP Leg 199 and can be accessed there.

Assembling these data transects is described in more detail in Knappenberger (2000). The data were divided to form transects roughly along seafloor crust of equal age. One transect runs primarily along 56 Ma crust, while the second runs primarily along 40 Ma crust. The 40 Ma transect goes from the equator to the Clarion Fracture Zone at about 16 deg N. The 56 Ma transect goes from the equator to about 26 deg N. It jogs to the E between the Clarion and Molokai fracture zones, and back to the west north of the Molokai fracture zone.
. The data here were checked, restacked, and migrated by Mitchell Lyle in July 2001. Included with this data package are SEG-Y files used to make the images shown here. Also included is a PDF copy of Knappenberger's thesis and her picks for Neogene seismic horizons (Mayer et al., 1985) relative to a seafloor arbitrarily set at 500 msec. These data are in tab-delimited ascii format.

Seismic Reflection Parameters

Most of the data were recorded while the ship was underway between survey sites at 10 knots using an 80 cubic inch water gun as the seismic source. They were recorded on the Ewing's Digicon seismic acquisition system using a 2 msec sample spacing. An analog high-cut filter at 180 Hz was in place during recording. Because of the the generally high speed along the transect, significant of noise was generated by the streamer ("streamer strum") in a window of around 15-20 Hz. For this reason I used a relatively high low cut filter on the data.

The data are stacked 4-channel data, processed using the following parameters: 1) static shift to account for recording delay of 5 seconds from shot 2) NMO moveout correction using 1500 m/sec velocity 3) minimum phase band pass filter (ramp up from 20-40 Hz, ramp down from 200-400 Hz) 4) The data were then stacked using a diversity stack algorithm based on the power within a sliding gate of 100 ms. 5) removal of static and storage of 2.5 seconds of data. 6) write data SEG-Y format using 4-byte IBM floating point numbers.

Data were then migrated in the following manner: 1) static shift to plus 5 seconds to bring to true depth; 2) spectral shaping (15 Hz = 0%, 30 Hz= 100%, 120 Hz = 100%, 240 Hz = 0%) and 3) memory stolt F-K migration using 1500 m/sec constant velocity and stolt stretch factor of 1. Because of the length of the transects, the data were broken up into 5 blocks. The following table lists the pertinent information about each block.

Block Name	# of CDP's	Start lat	Start long	End lat	End long
40B1	12230	16.115	-137.768	9.295	-135.435
40B2	22528	9.294	-135.435	0.028	-138.750
56B3	22446	26.152	-147.733	13.902	-144.062
56B2	8420	13.889	-143.734	9.789	-142.640
56B1	22919	9.788	-142.640	0.074	-138.787

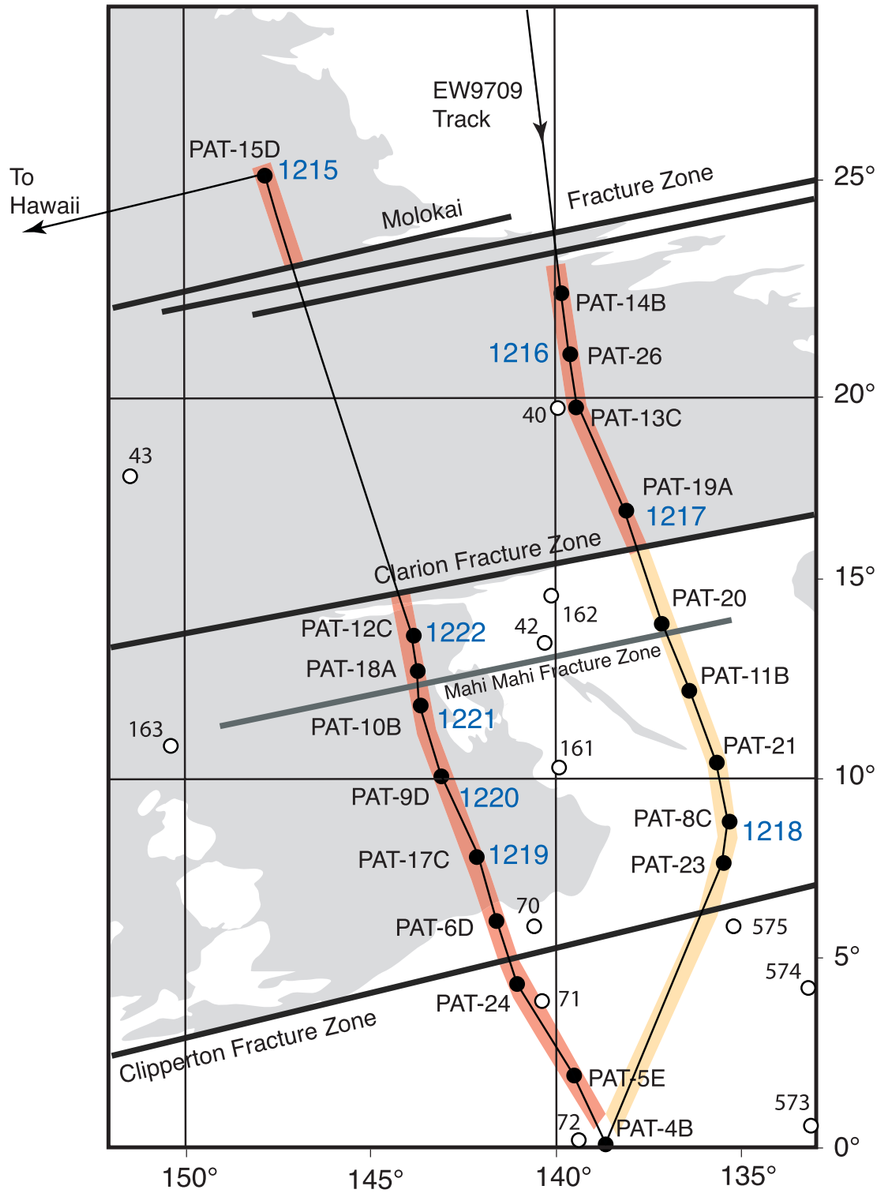

Figure 1: EW9709 Trackline, showing 56 Ma and 40 Ma transects, as well as drillsites surveyed for ODP Leg 199

Navigation, center beam depth (CBD or CBdepth in header), and time of shot have been recorded in the SEG-Y binary header in the locations in the following table. Latitude and longitude have been multiplied by 10**6 to make them integer values. Negative longitude indicates west. JD refers to the Julian day of the year (number of days since the beginning of the year). Center beam depth is the depth measured by the hydrosweep swathmapping system beneath the Ewing. It is recorded in uncorrected meters, i.e., assuming 1500 m/sec sound velocity in water.

Parameter	# of Bytes	Byte position in header
CBdepth	4R (IBM)	61
Longitude	4I	73
Latitude	4I	77
Year	2I	157
Julian Day	2I	159
Hour	2I	161
Minute	2I	163
Second	2I	165

References

Knappenberger, M., Sedimentation rates and Pacific plate motion calculated using seismic cross sections of the Neogene equatorial sediment bulge, MSc. thesis, Boise State University, Boise, ID, 2000.

Mayer, L.A., T.H. Shipley, F. Theyer, R.H. Wilkens, and E.L. Winterer, Seismic modeling and paleoceanography at Deep Sea Drilling Project Site 574, in *Initial Reports of the Deep Sea Drilling Project, 85*, edited by L.A. Mayer, F. Theyer, and Leg 85 Shipboard-Party, pp. 947-970, U.S. Government Printing Office, Washington, 1985.

Figure 2: The seismic reflection data were collected on Cruise EW9709 of R/V Maurice Ewing, operated by Lamont Doherty Earth Observatory.

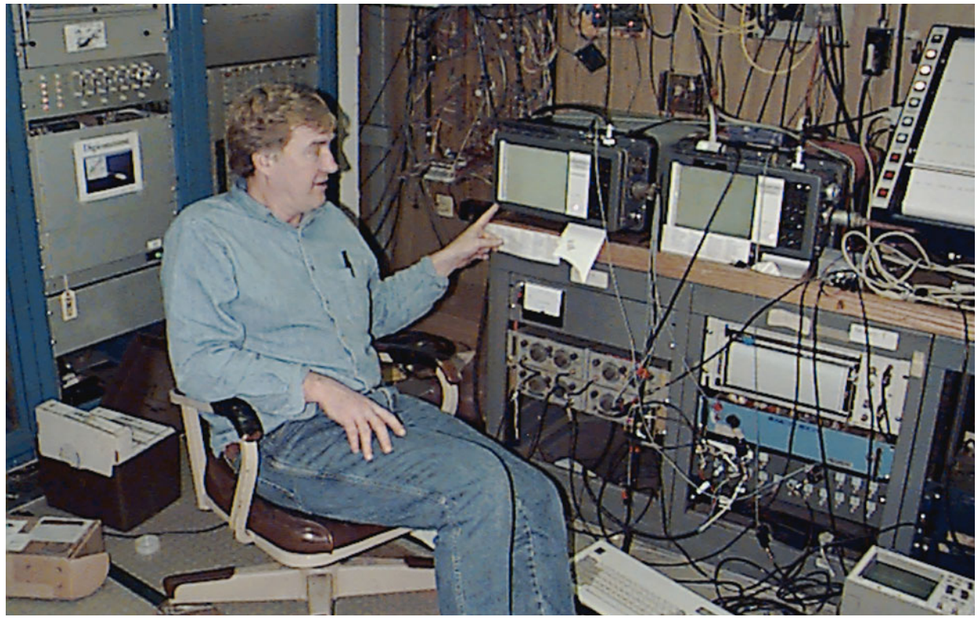

Figure 3: Mitch Lyle and digital recording setup for 80 c.i. watergun and for 3.5 kHz sub-bottom profiler

S

PAT-15 Region

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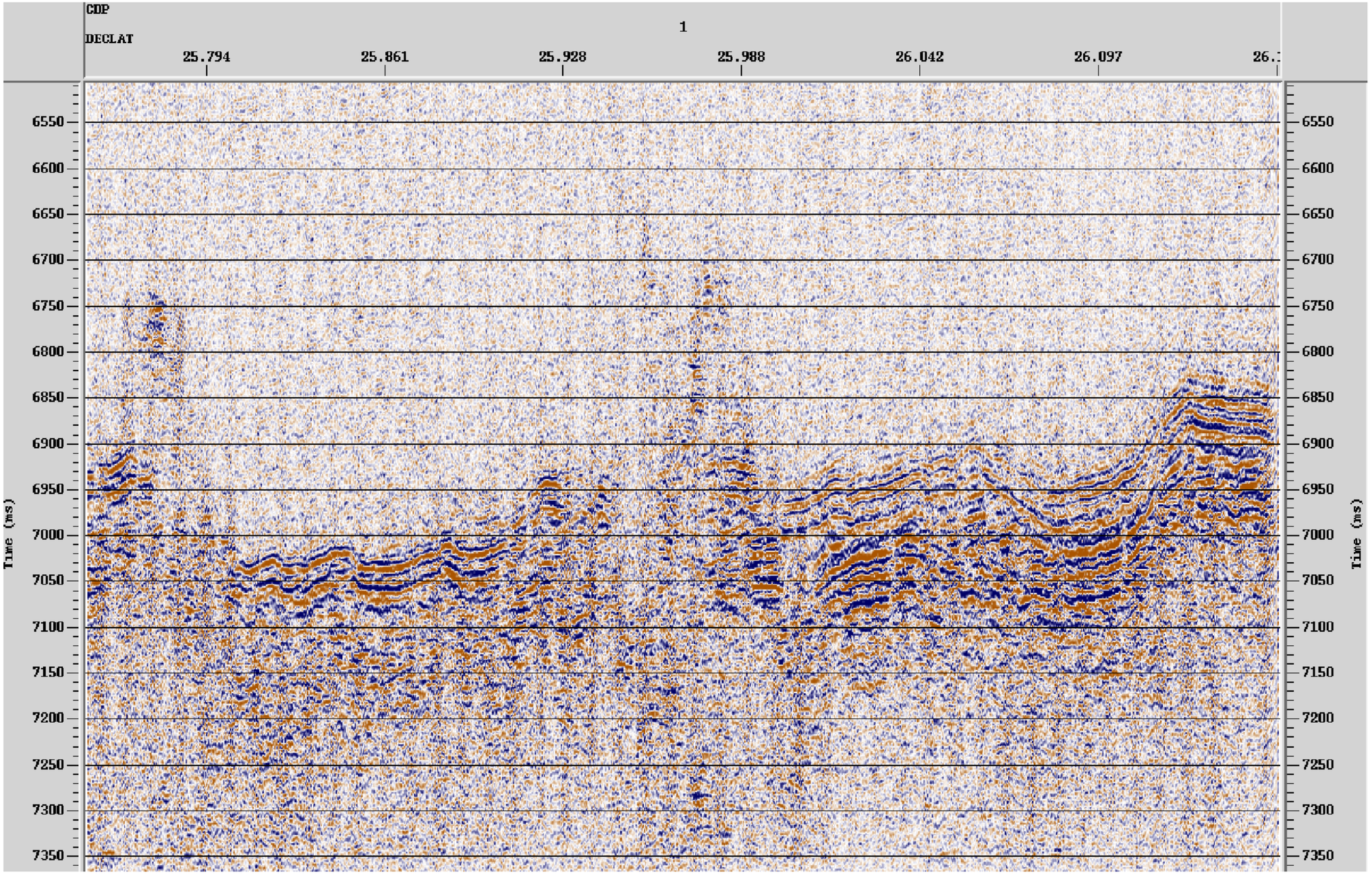

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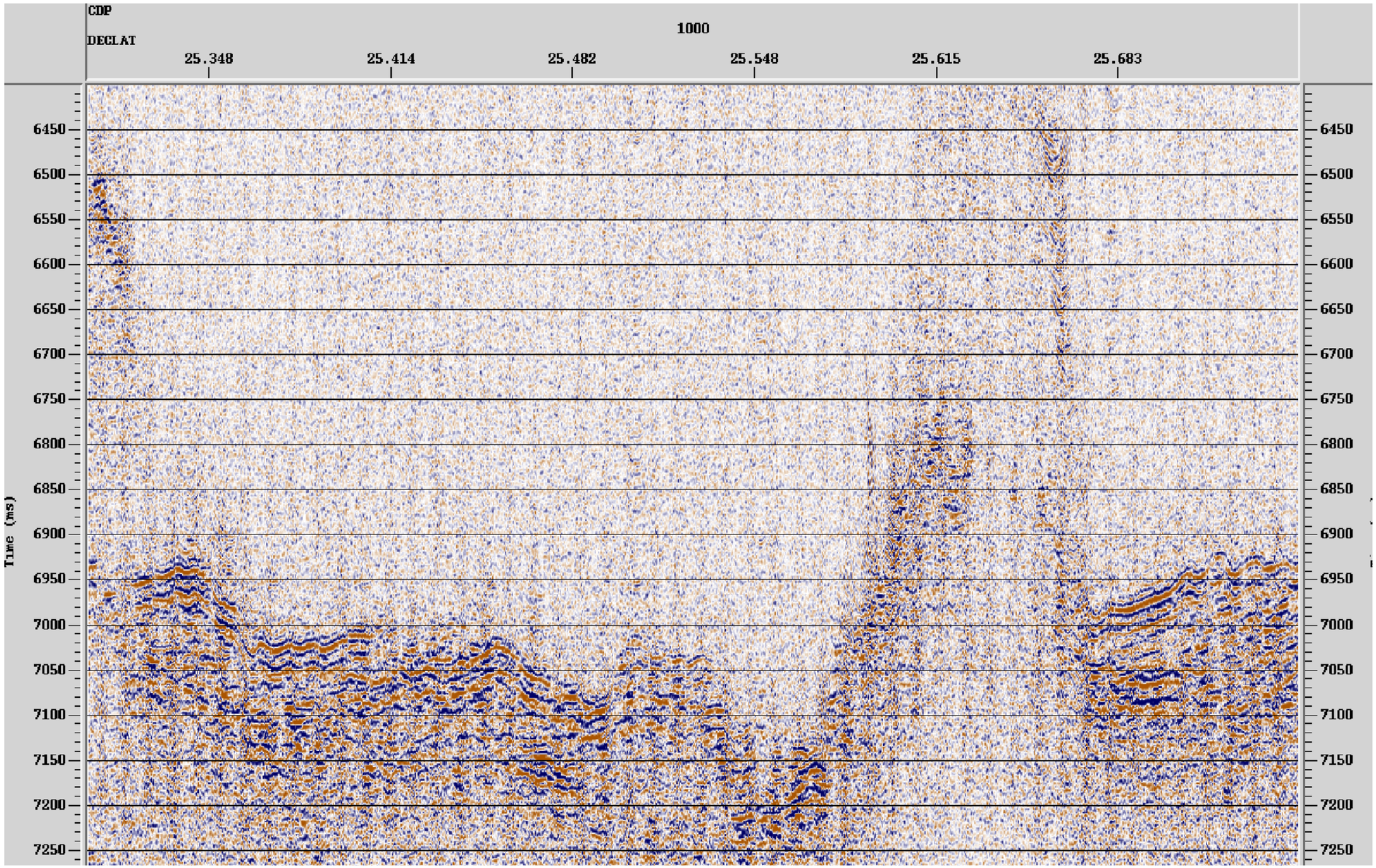
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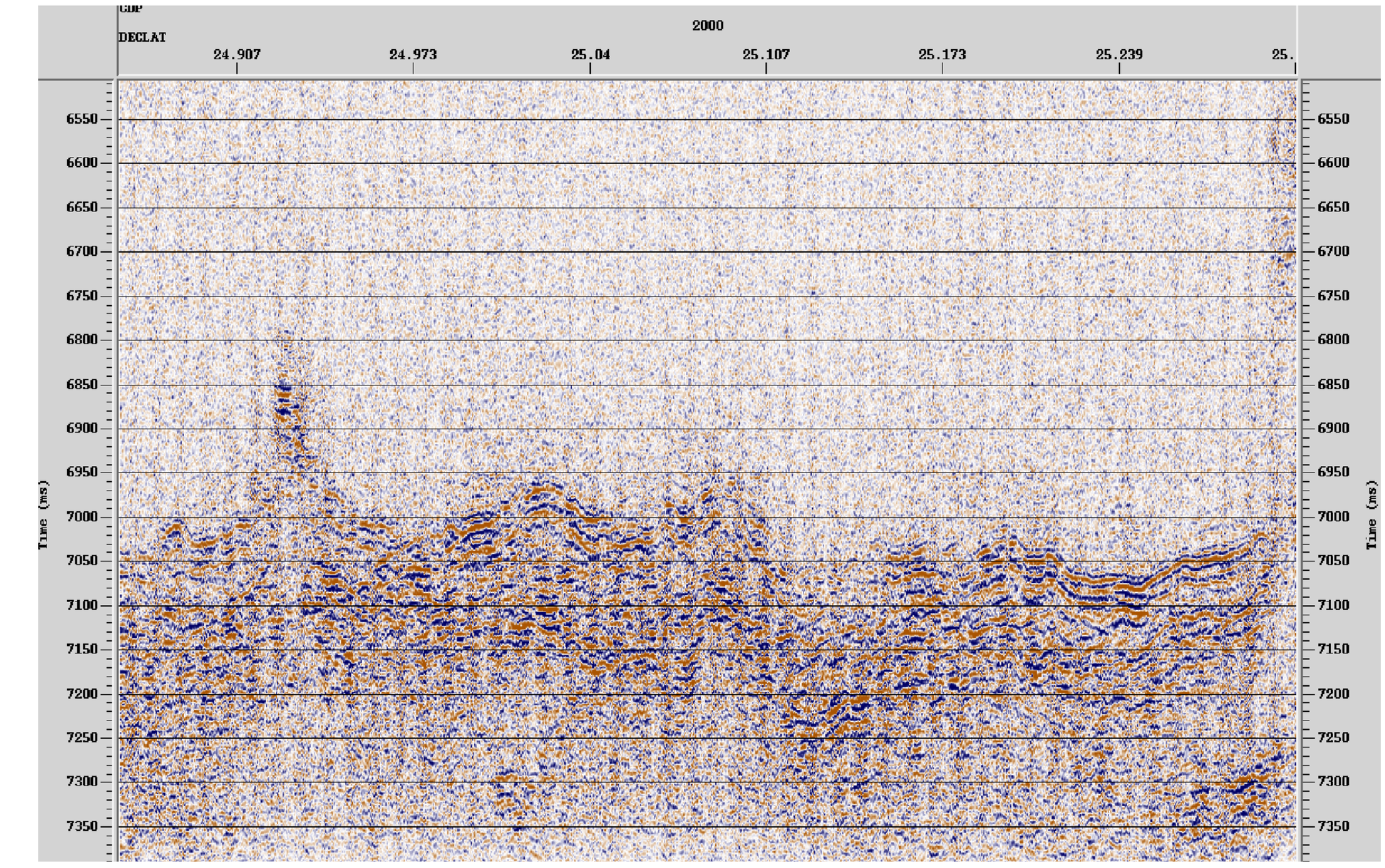
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6750
6800
6850
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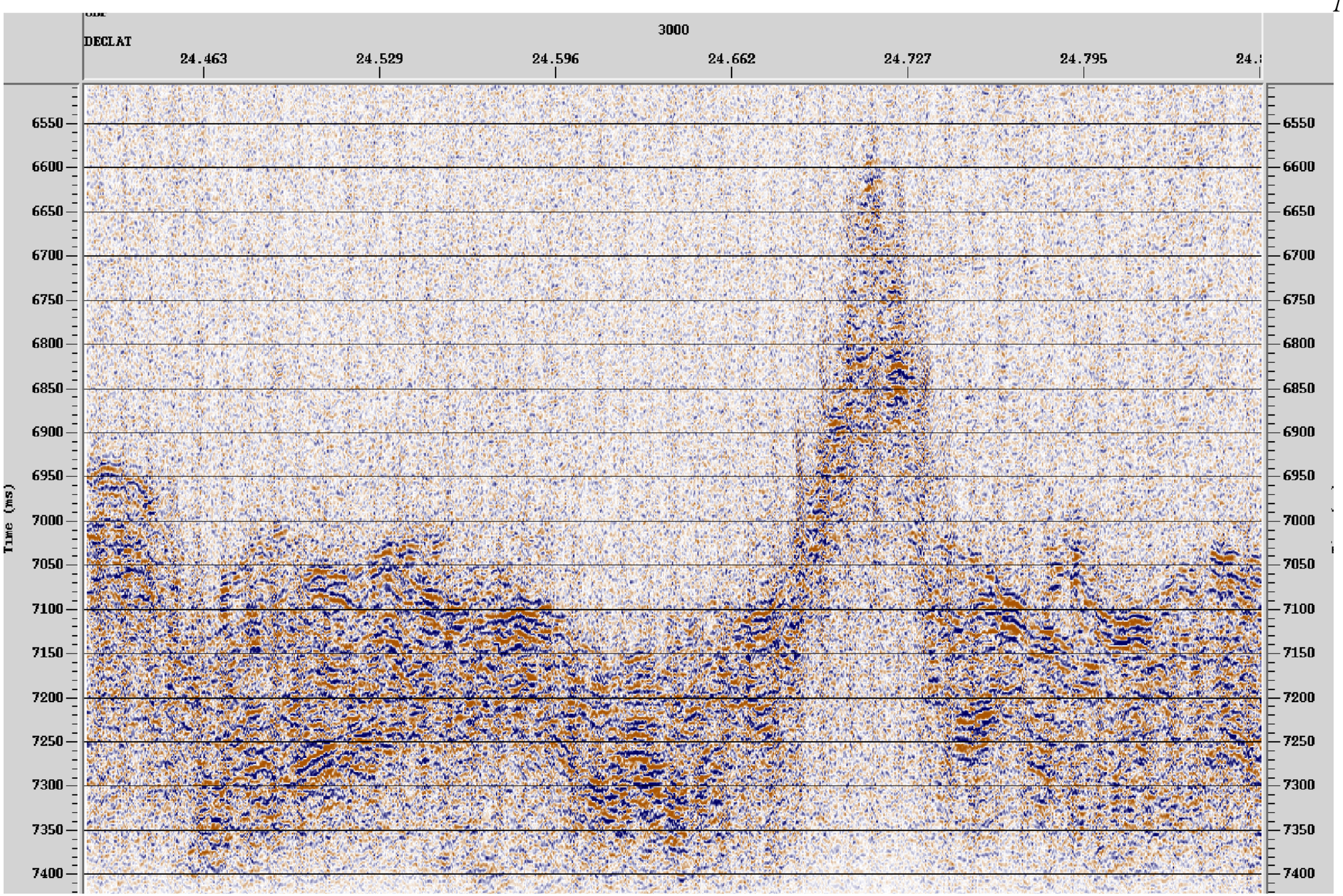
7250
7300
7350
Time (ms)
Time (ms)

S

N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7350
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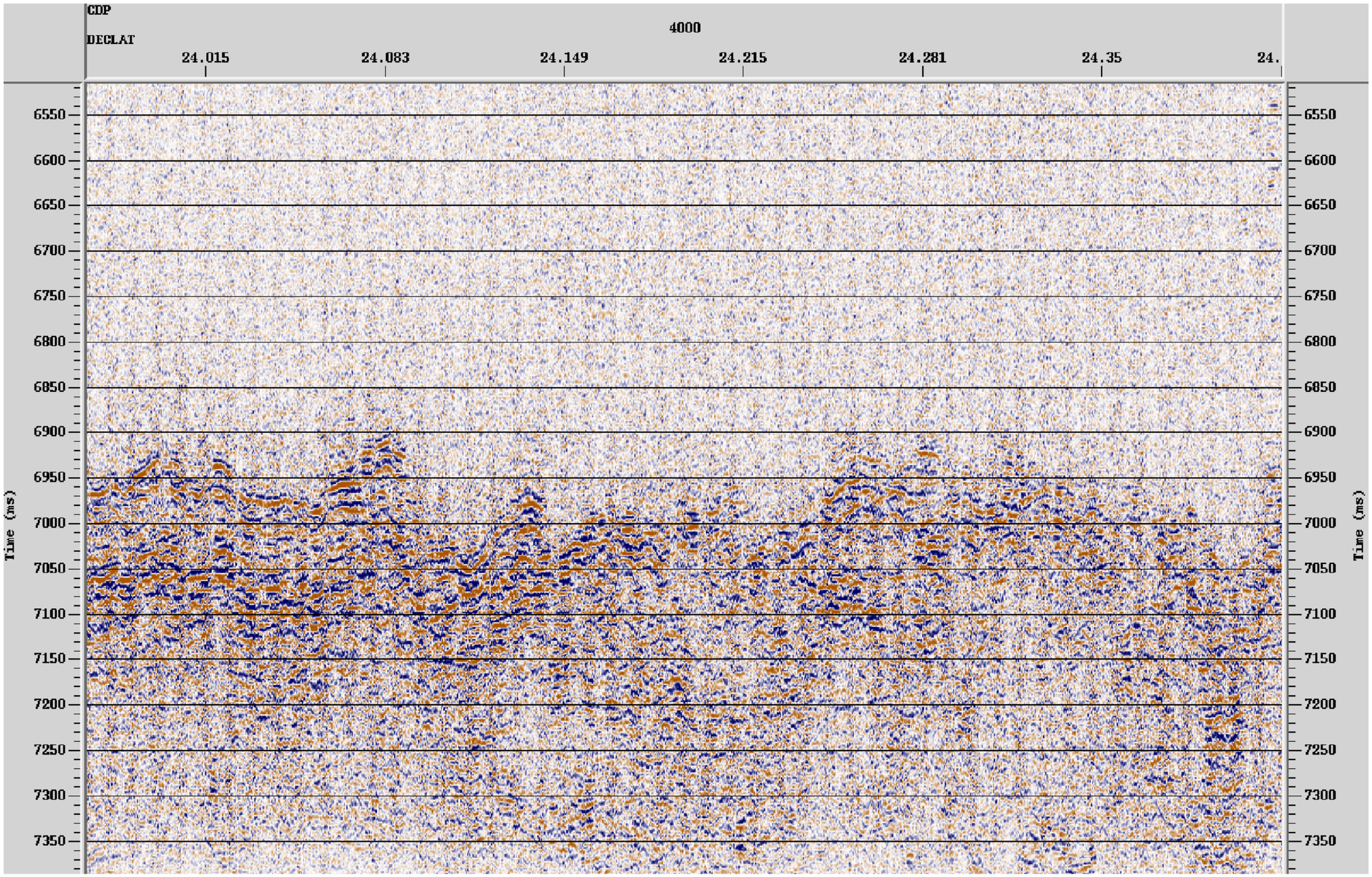
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Time (ms)

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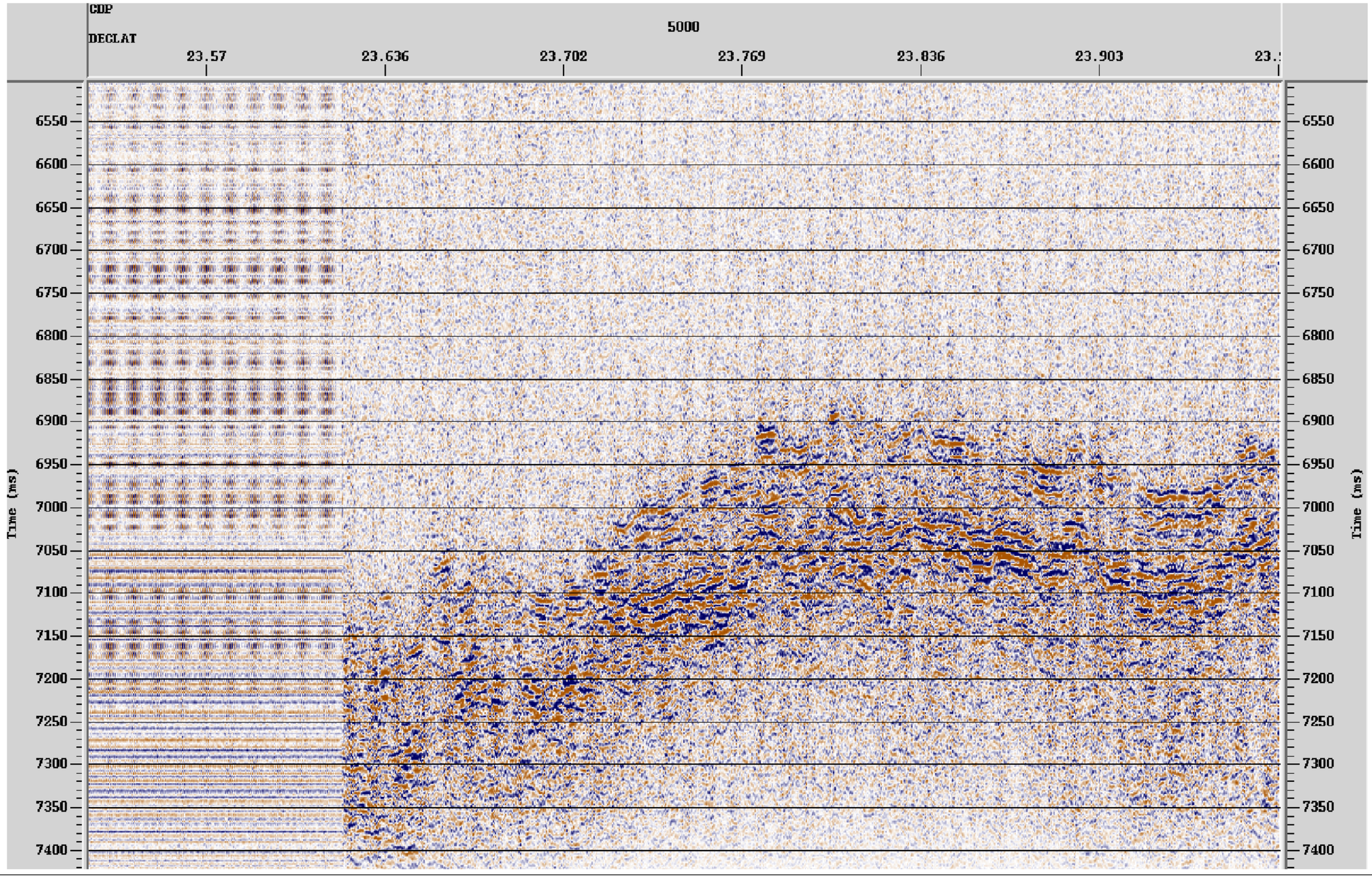
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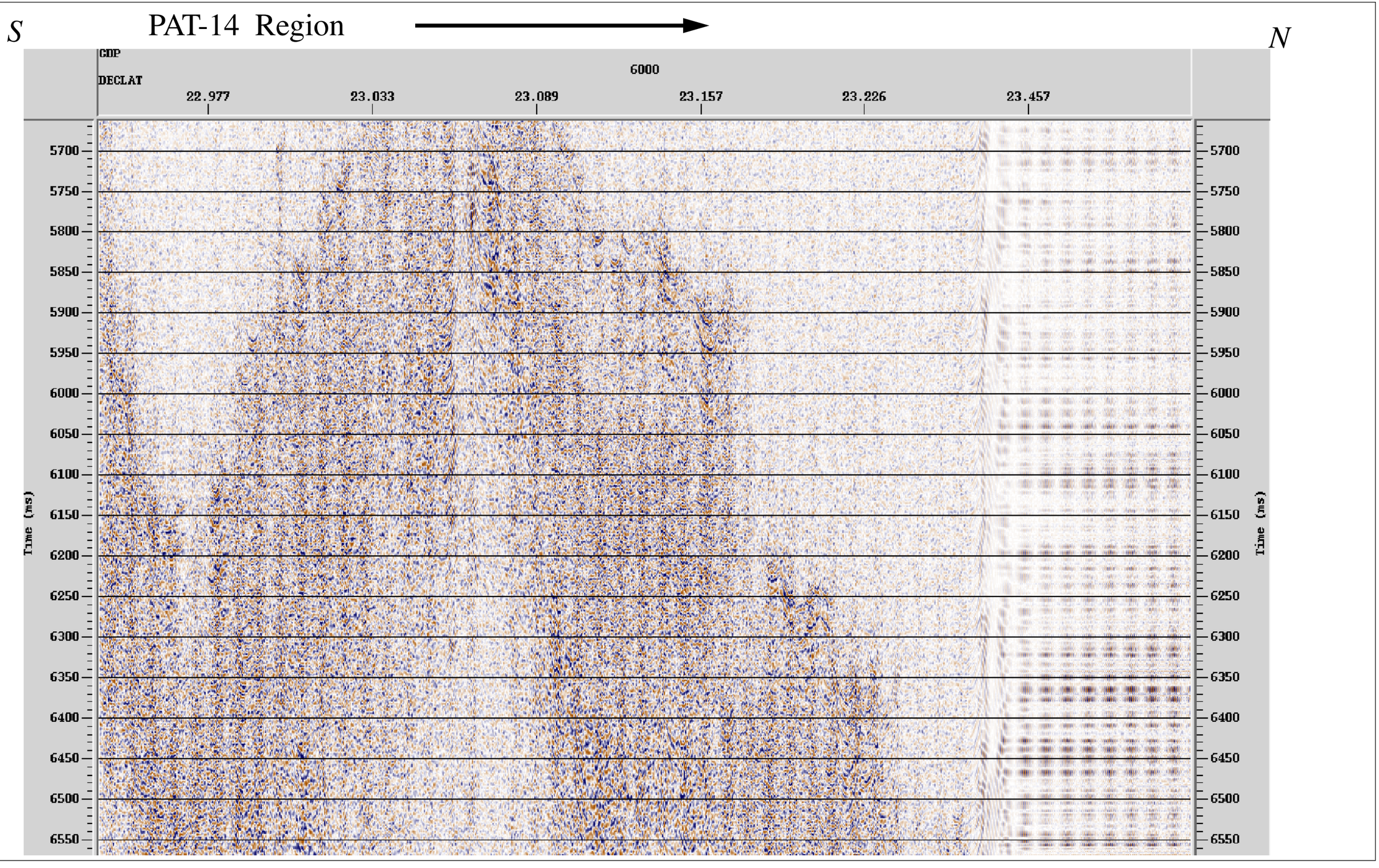
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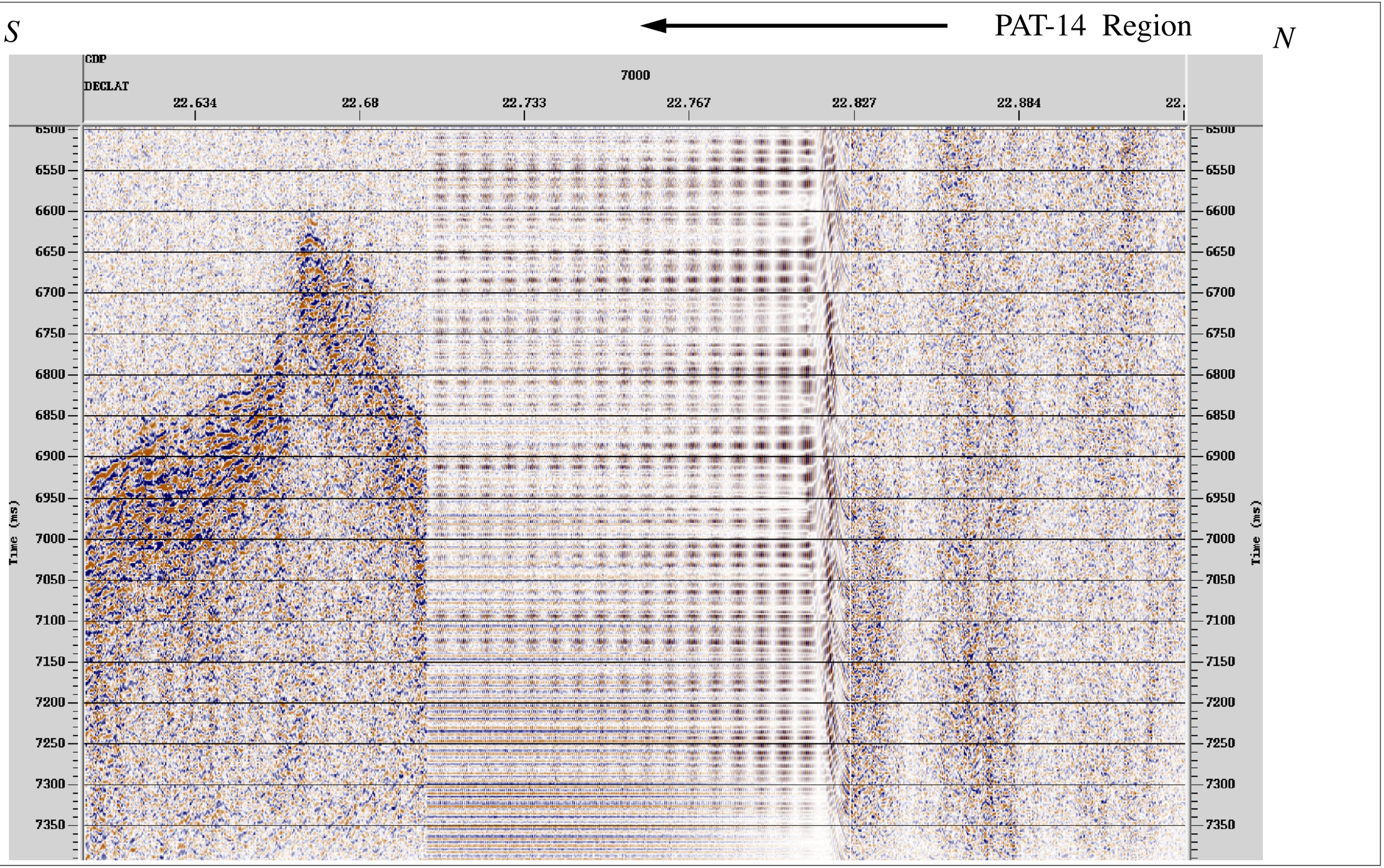
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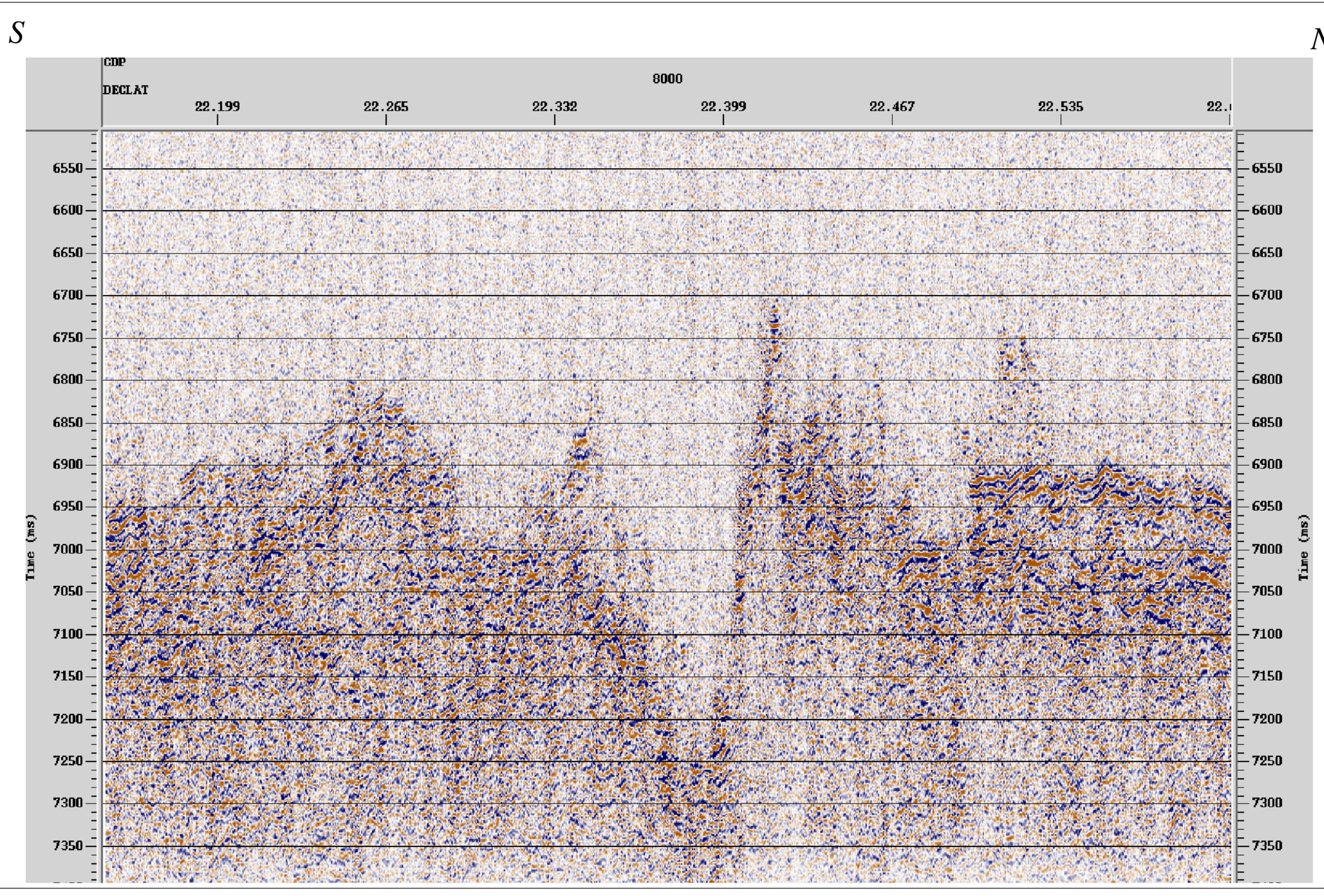
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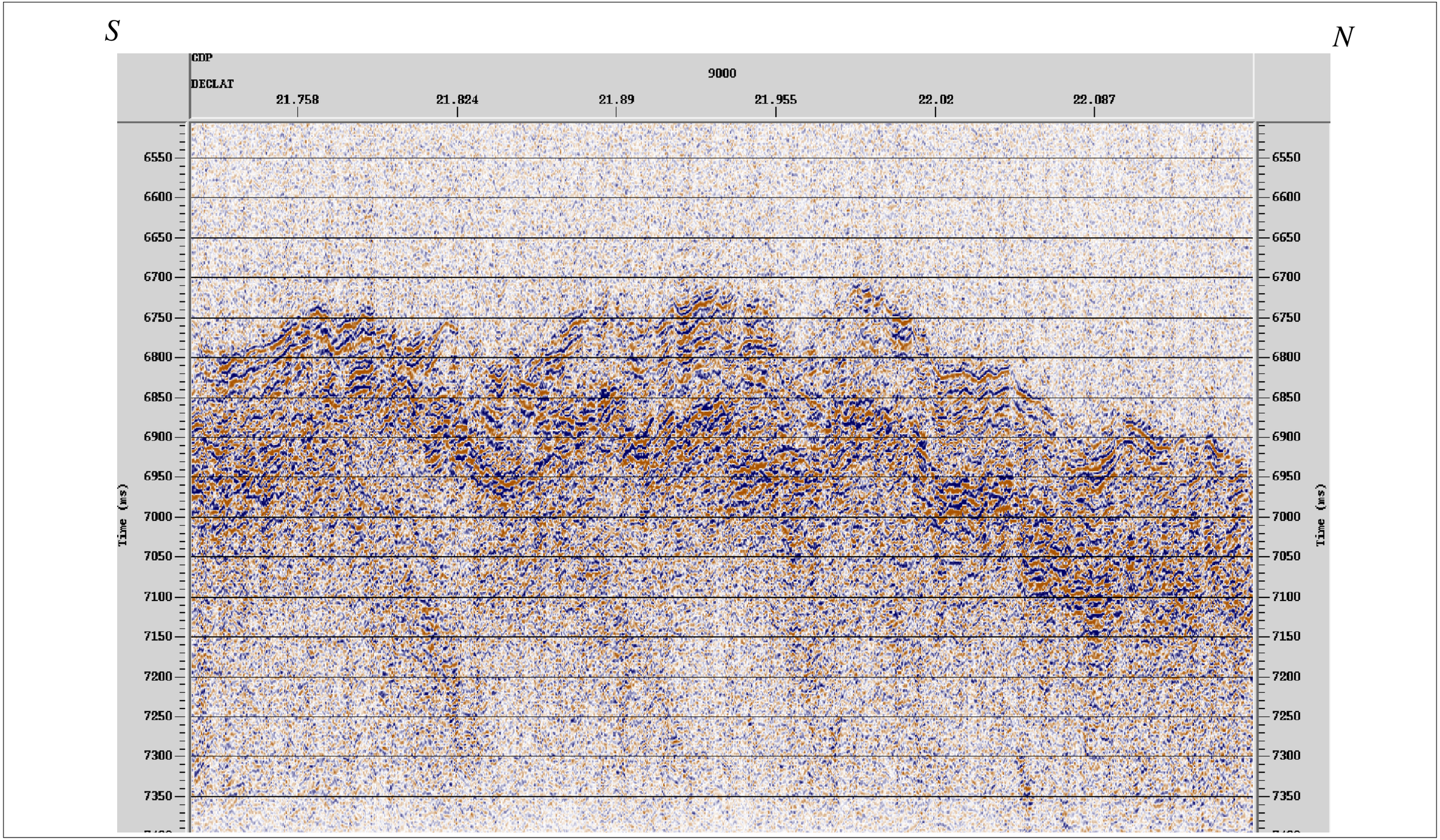
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PAT-26 Region

S

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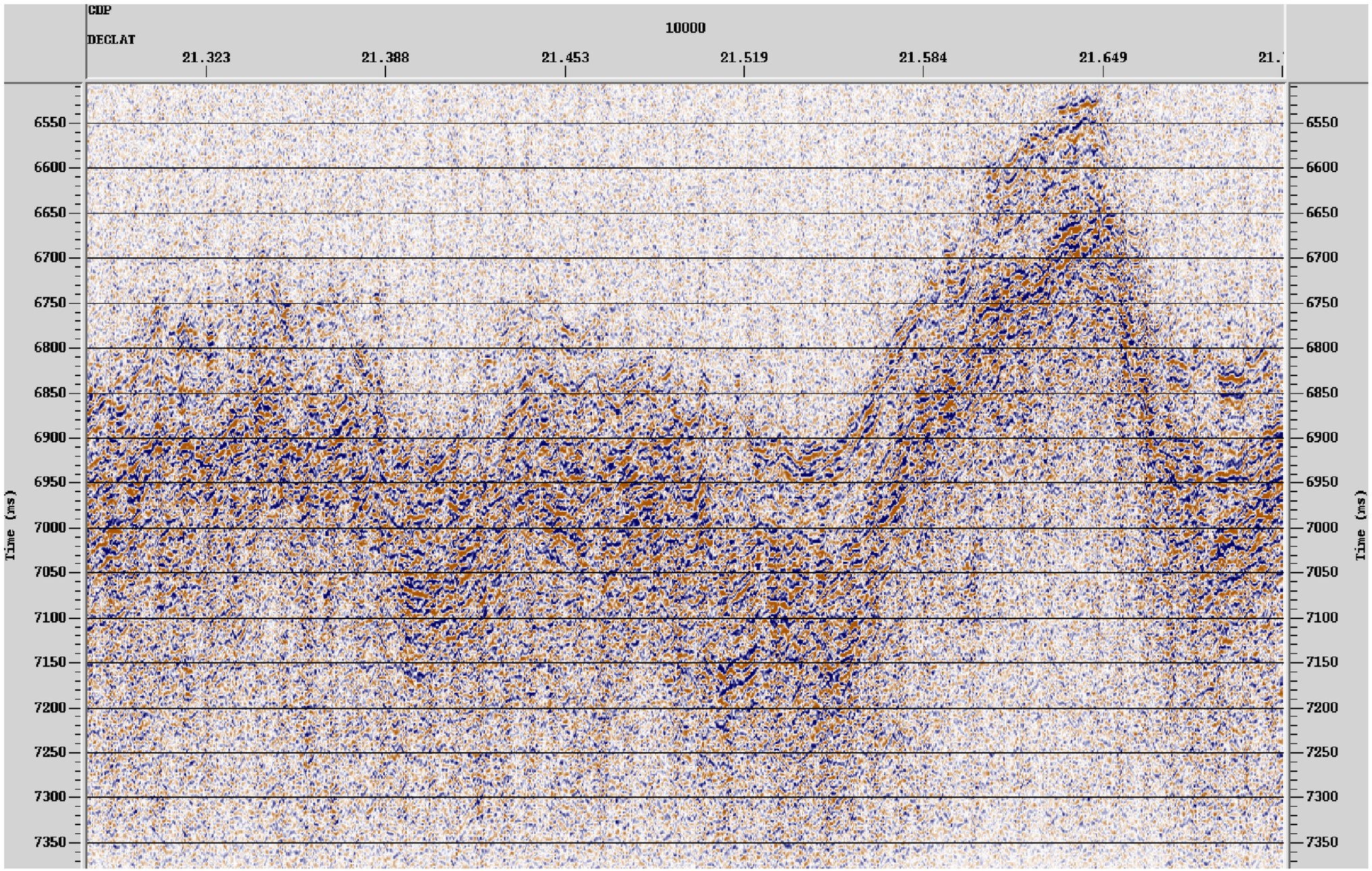

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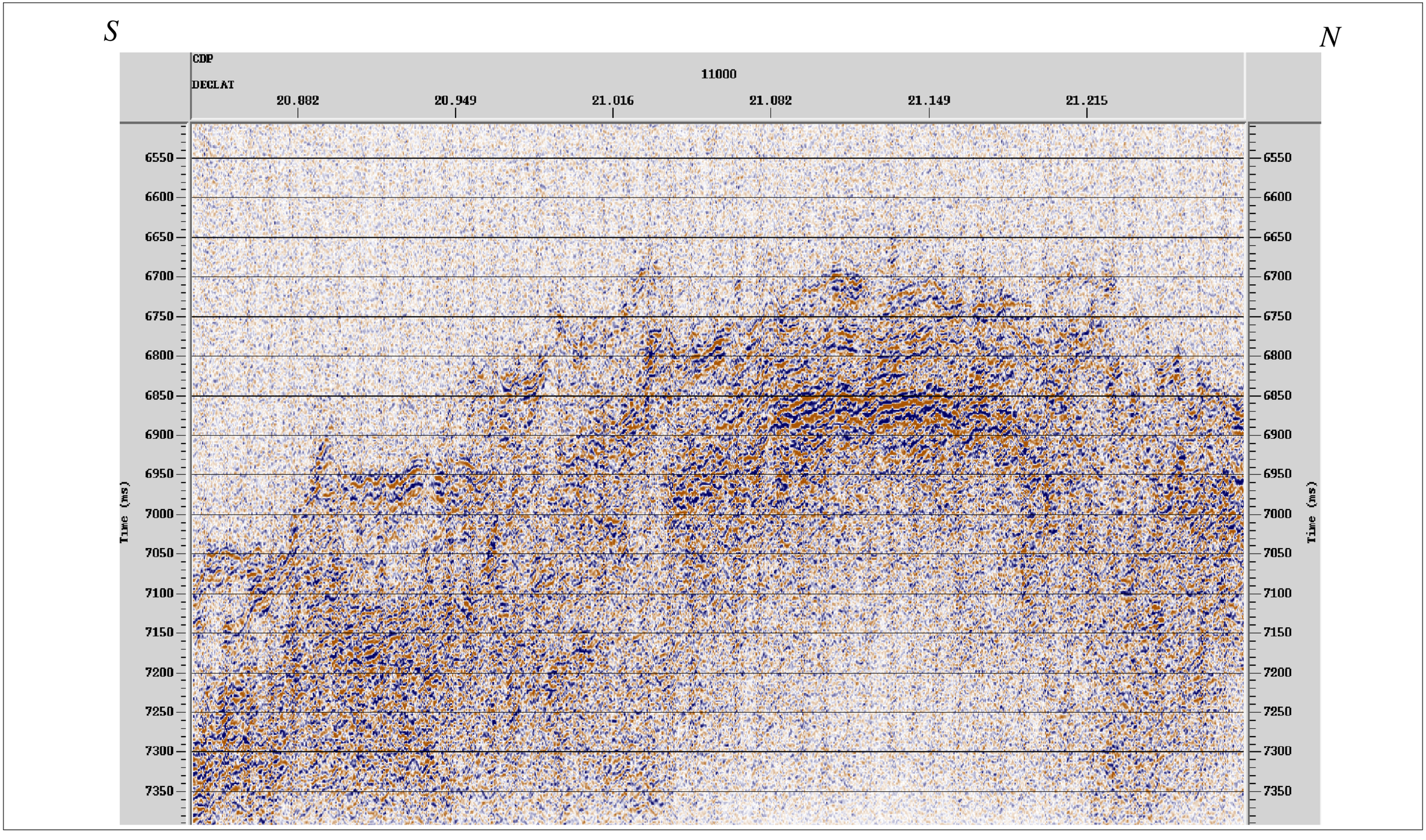
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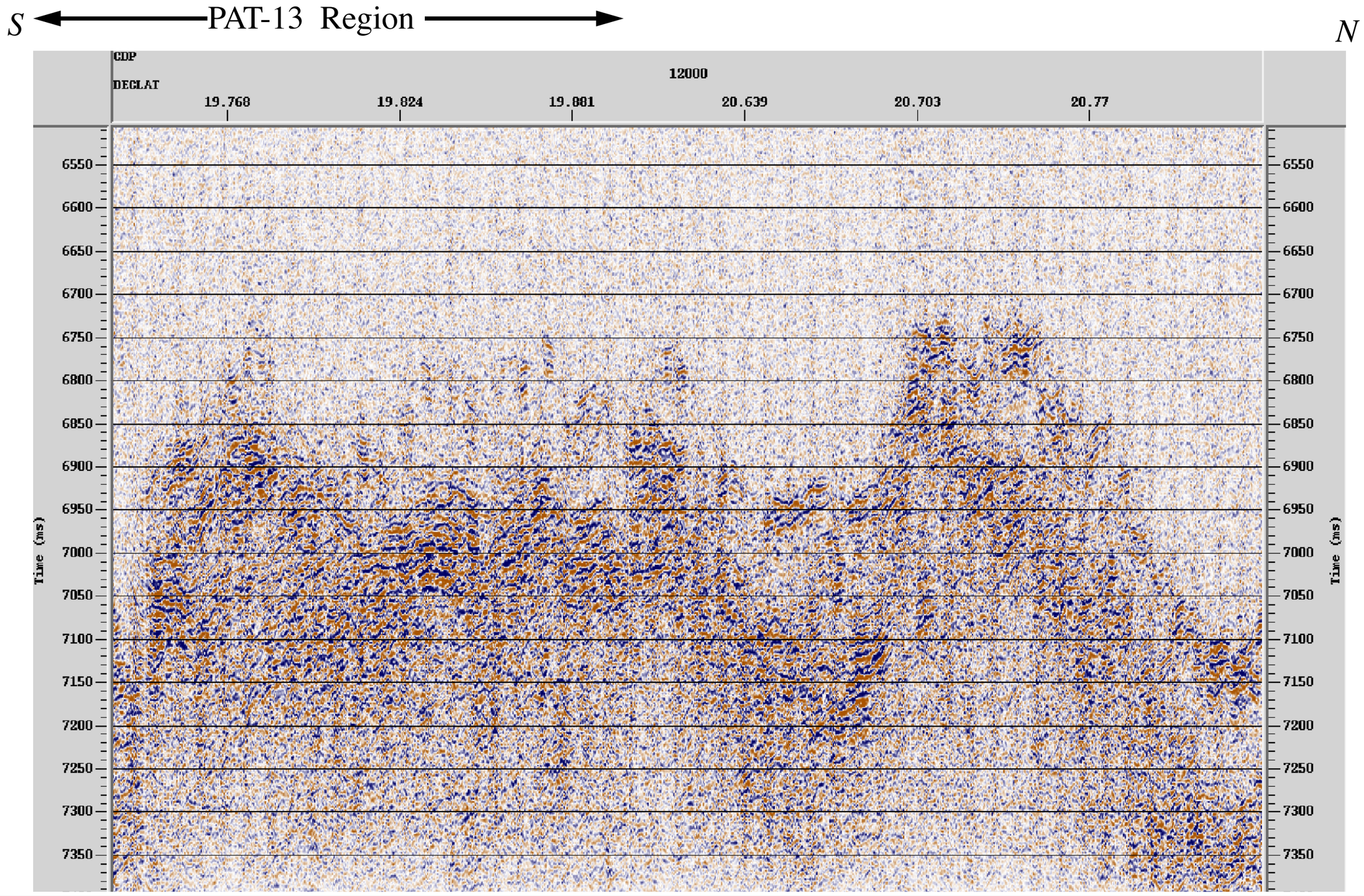
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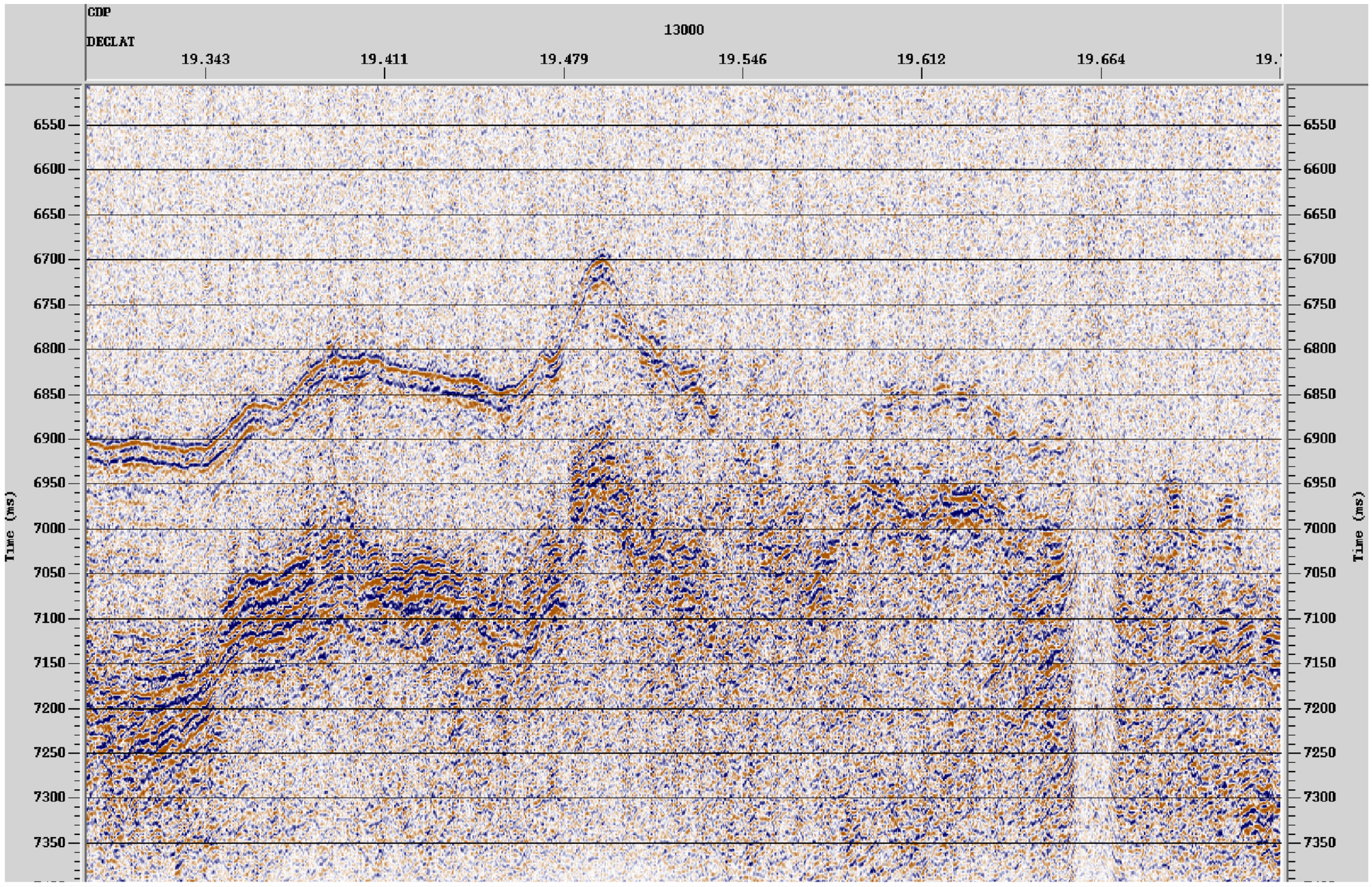
S N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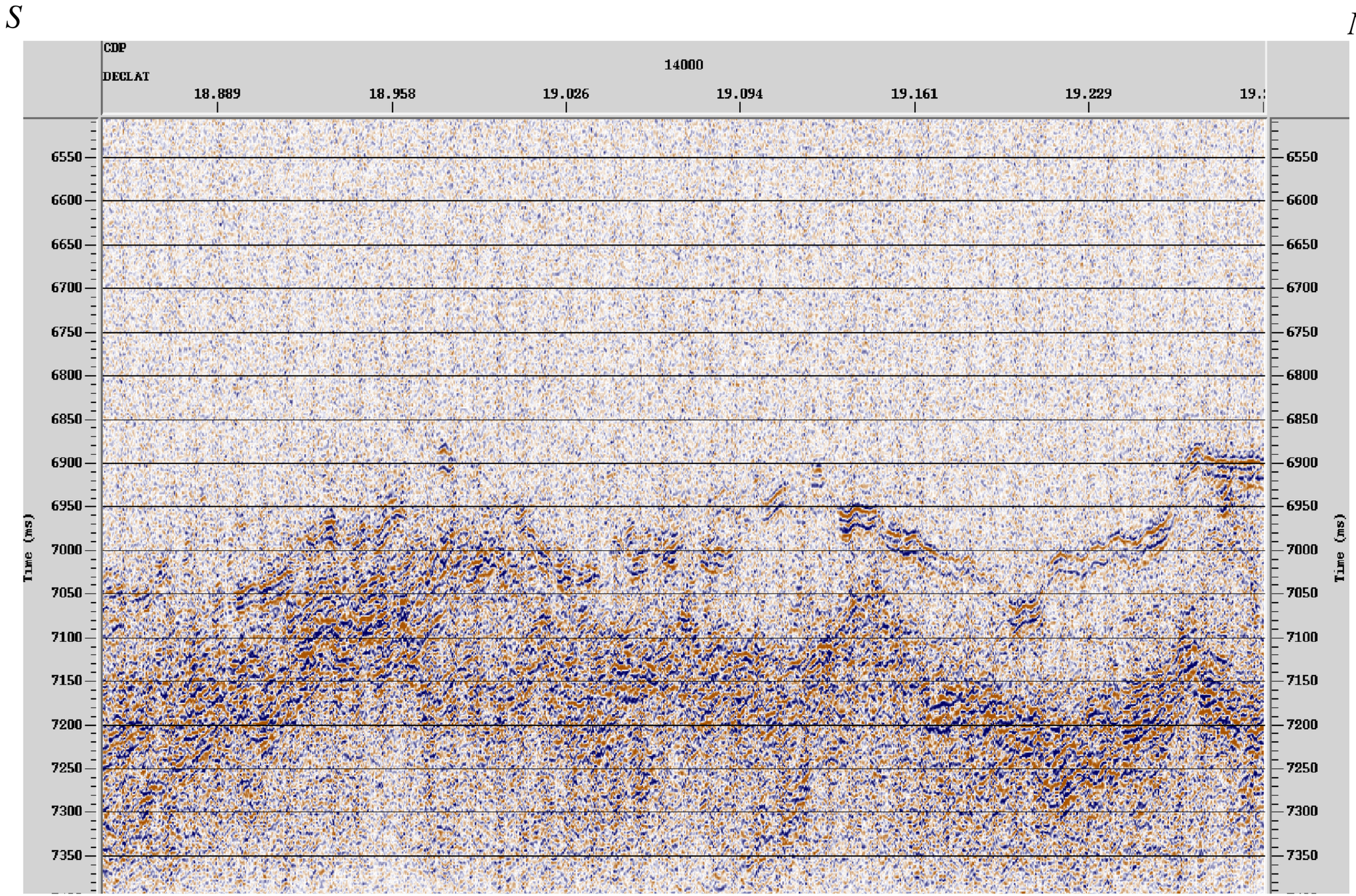
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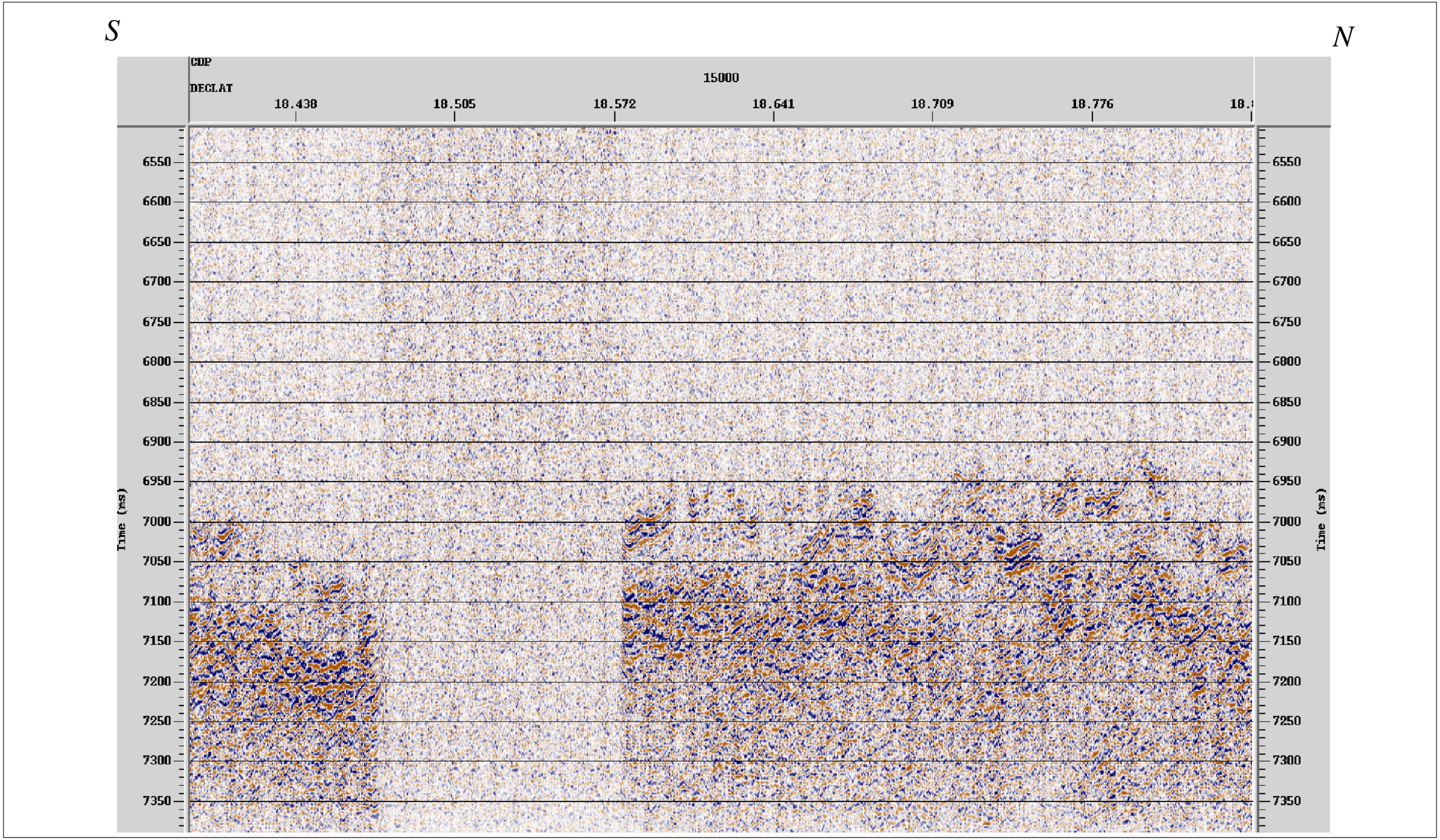
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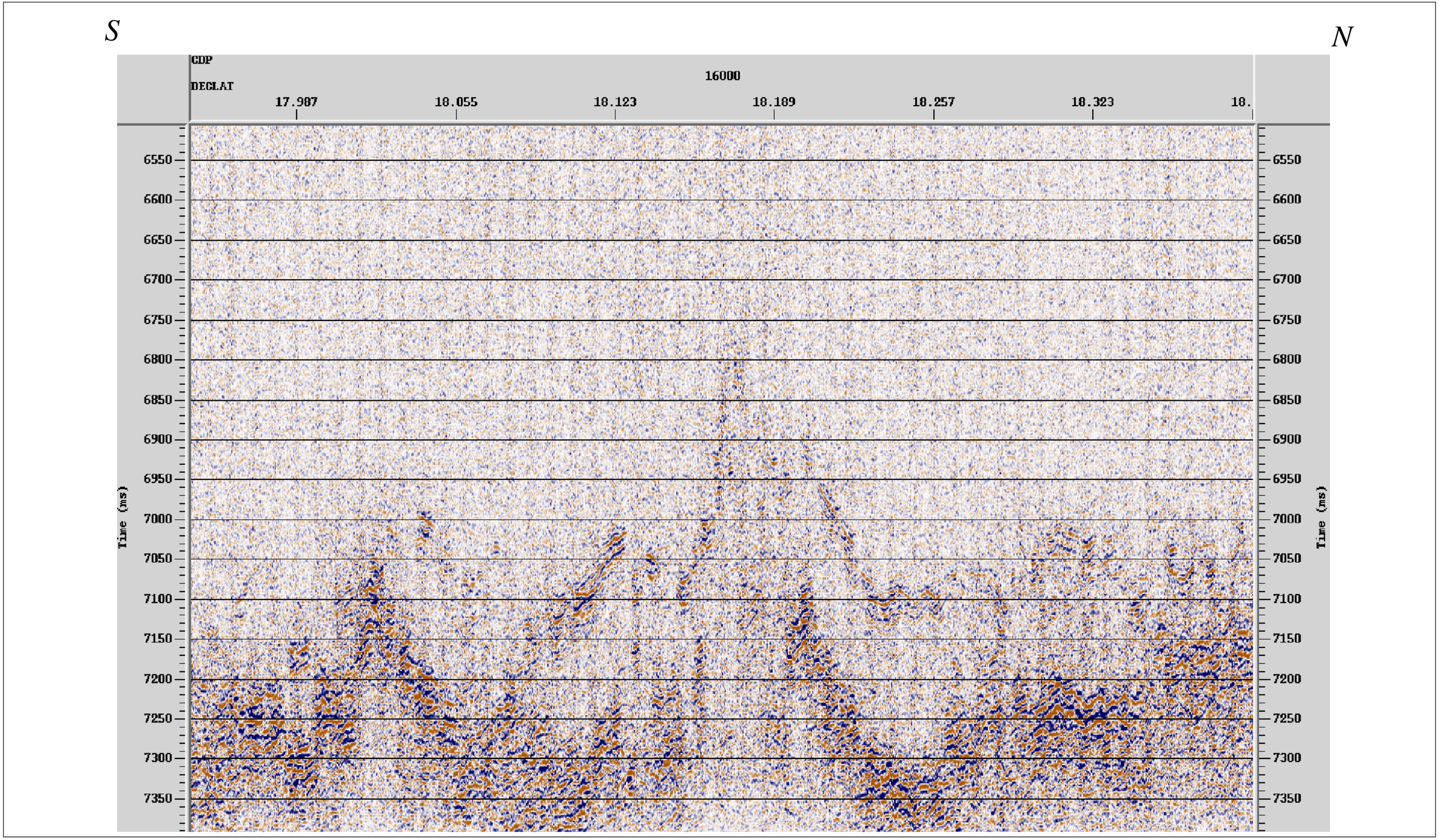
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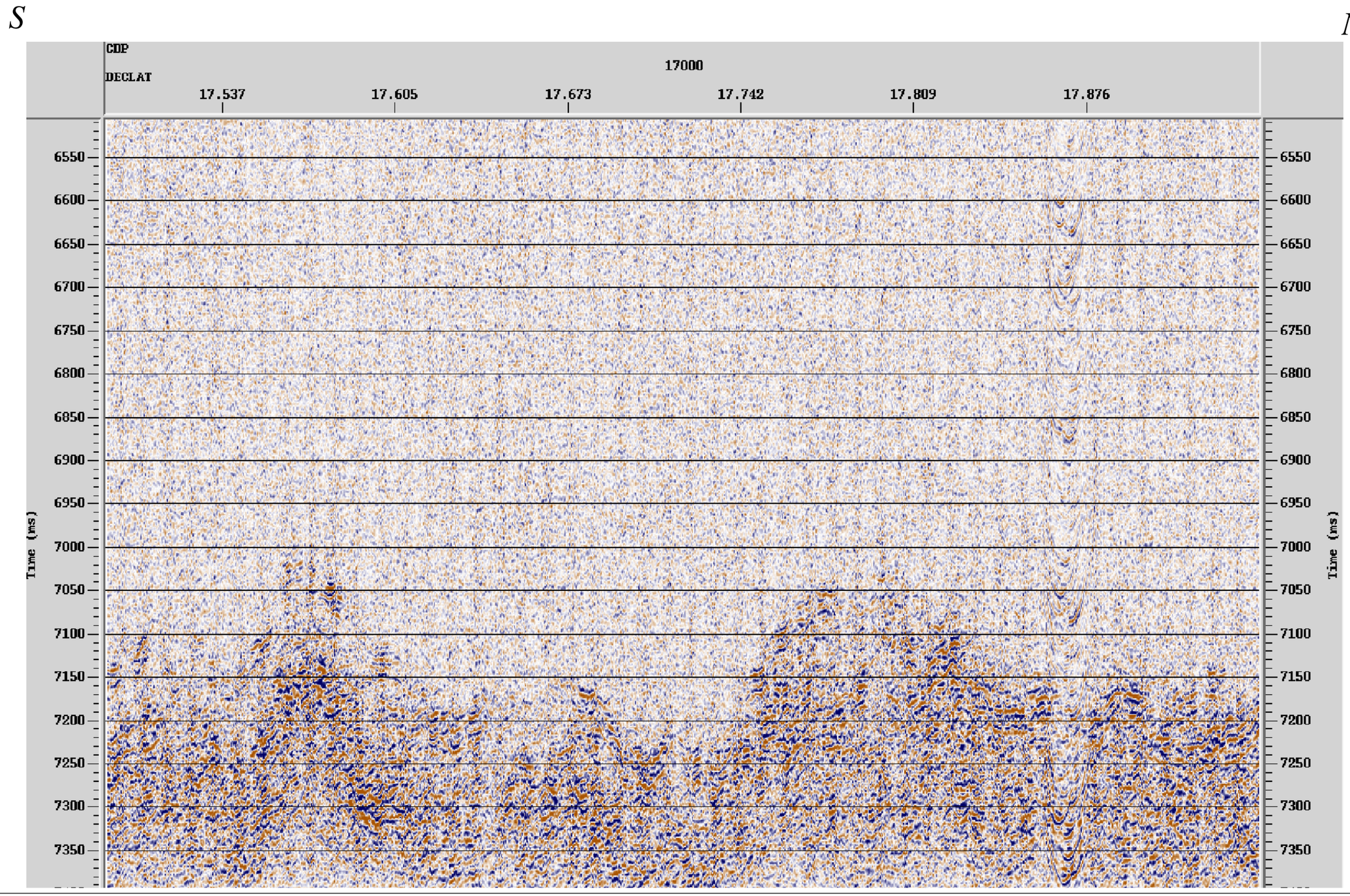
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S

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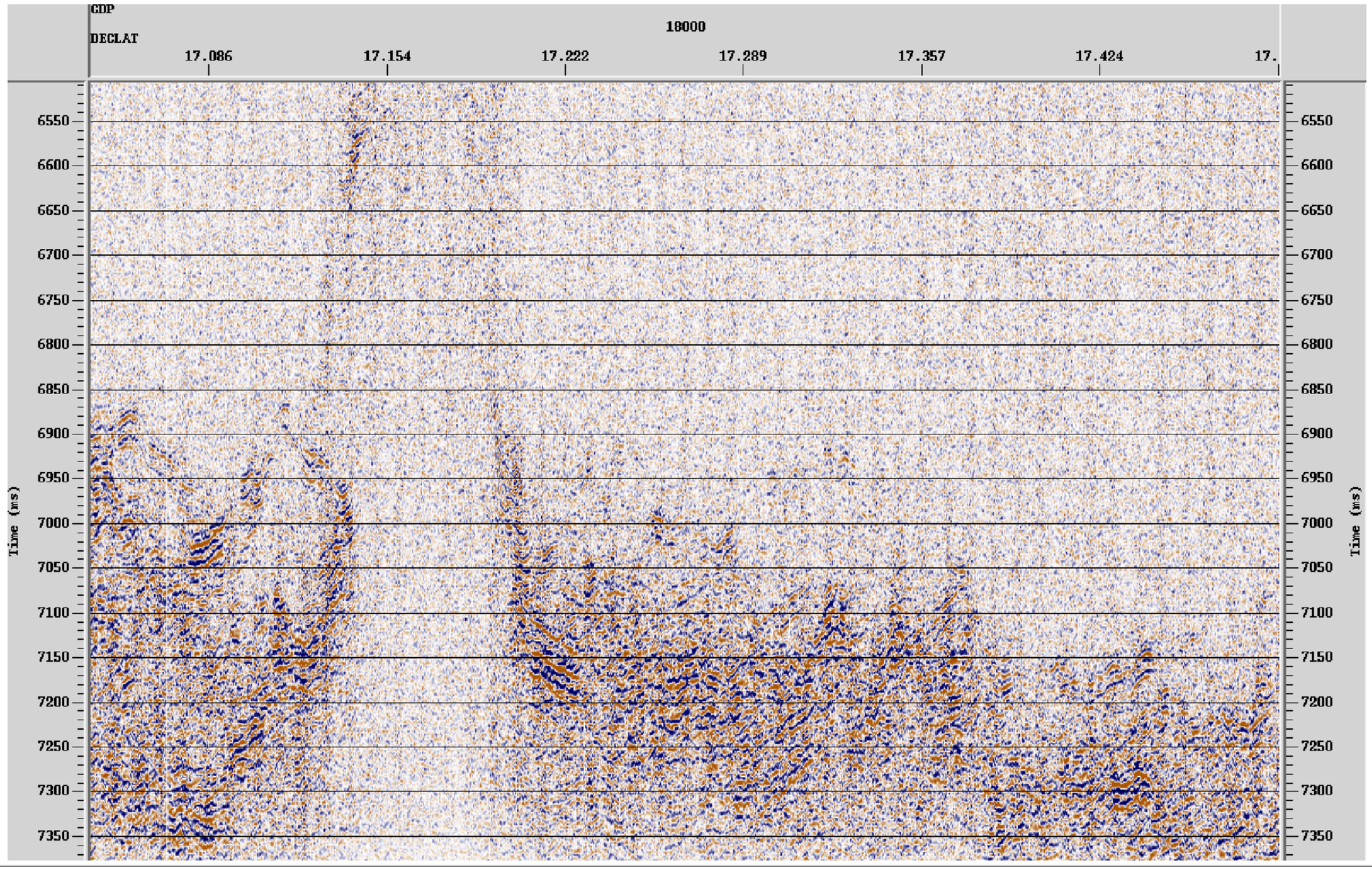
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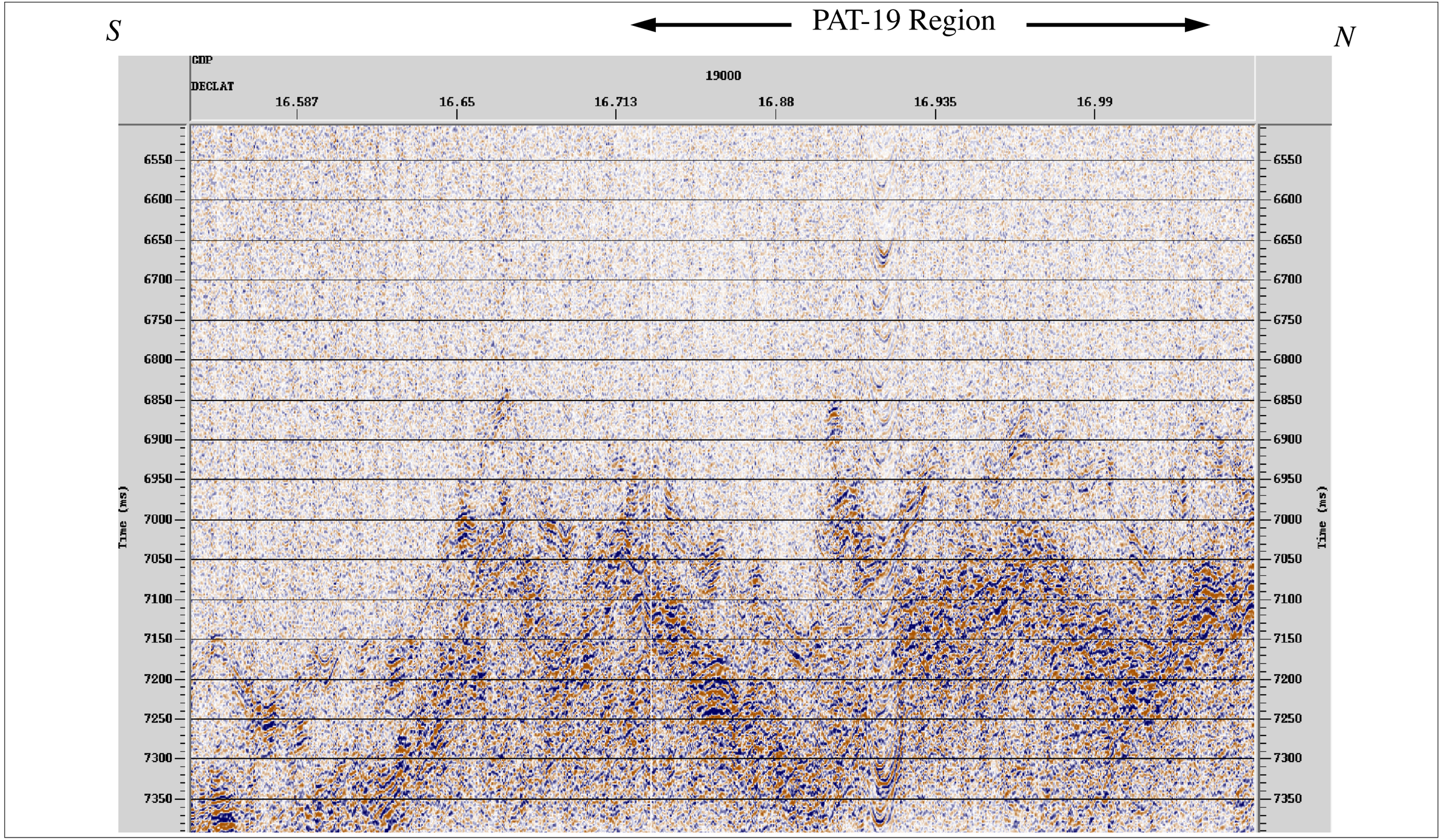
Time (ms)
Time (ms)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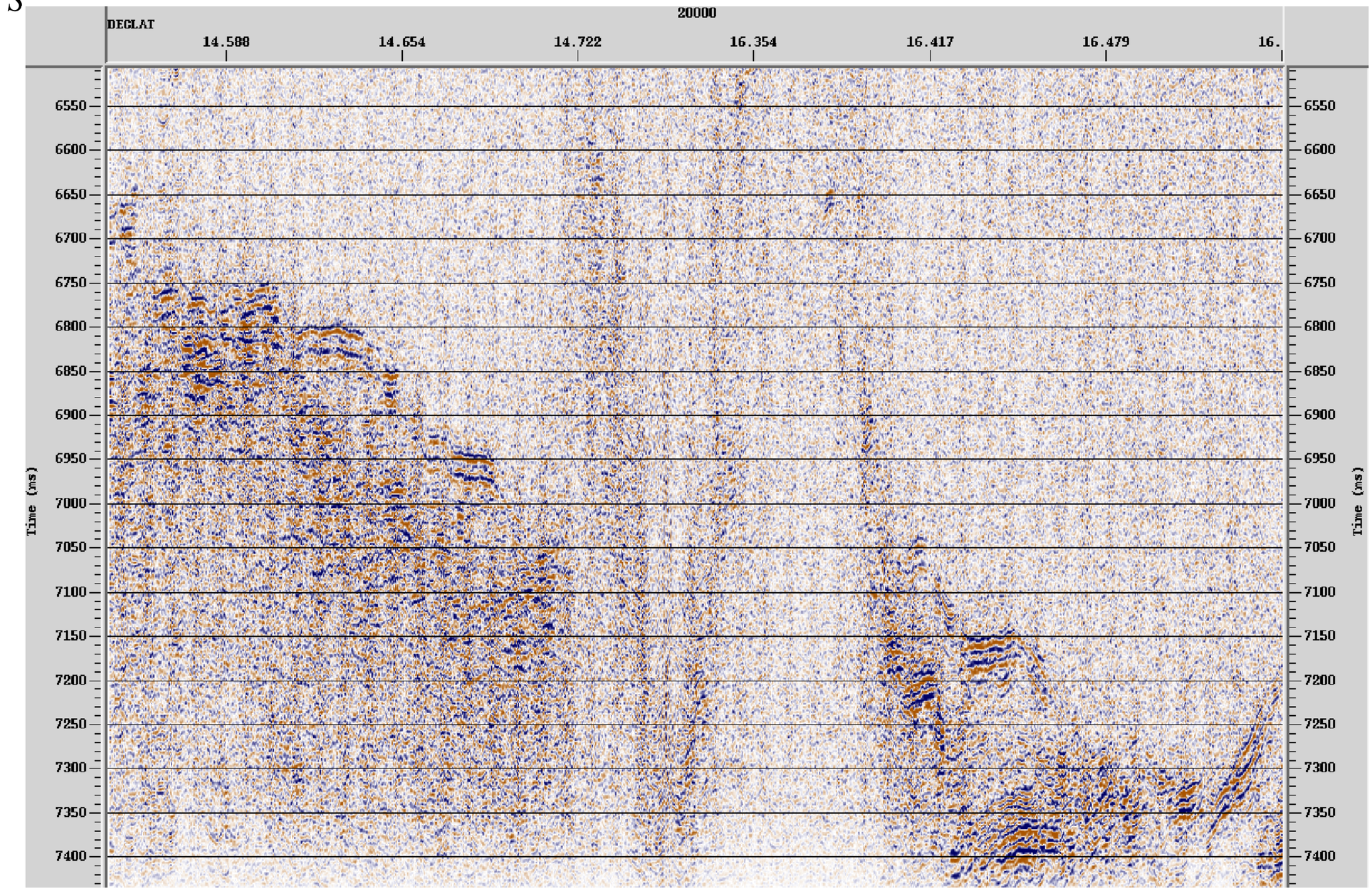
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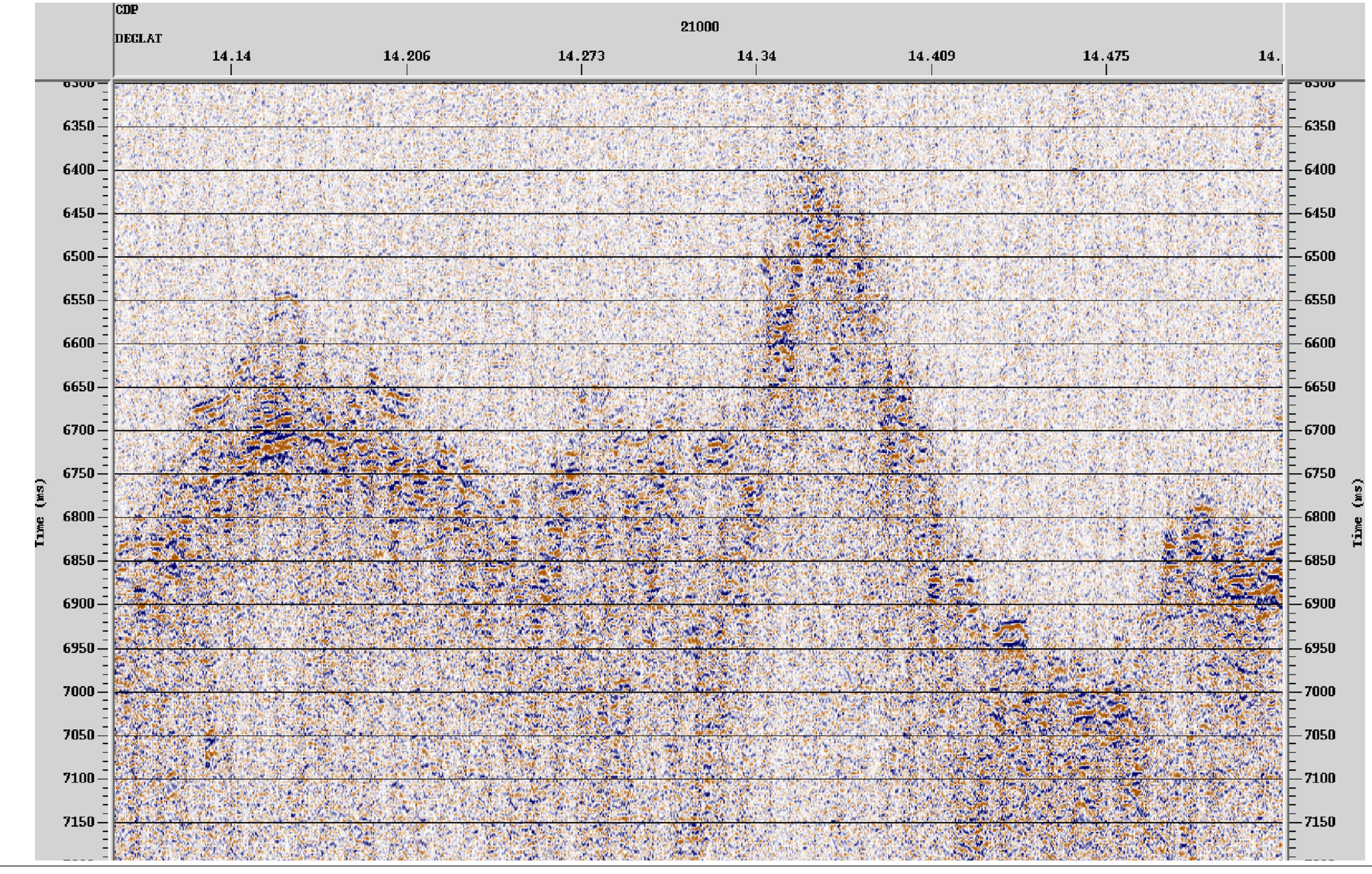
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7150

S

PAT-12 Region

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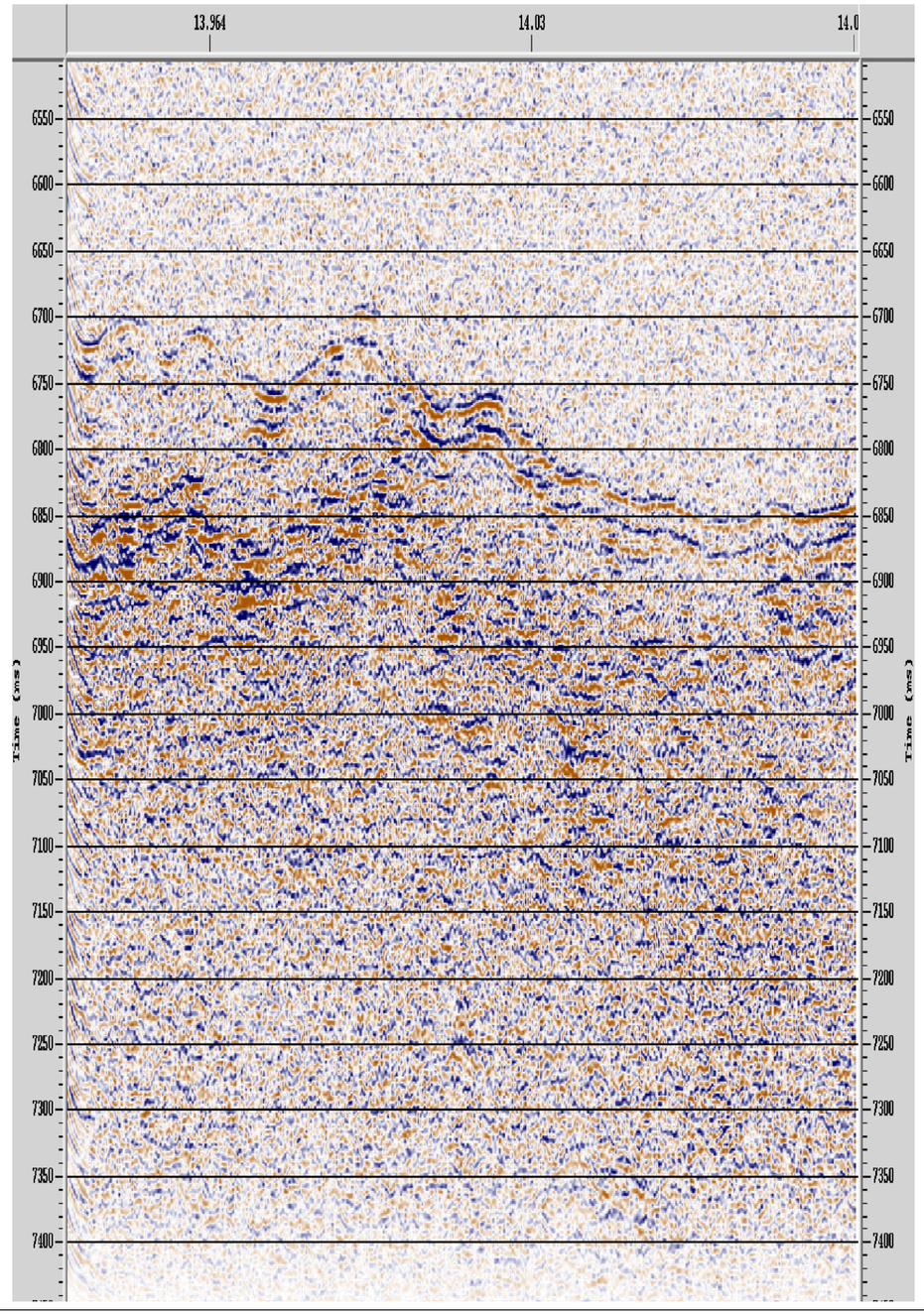

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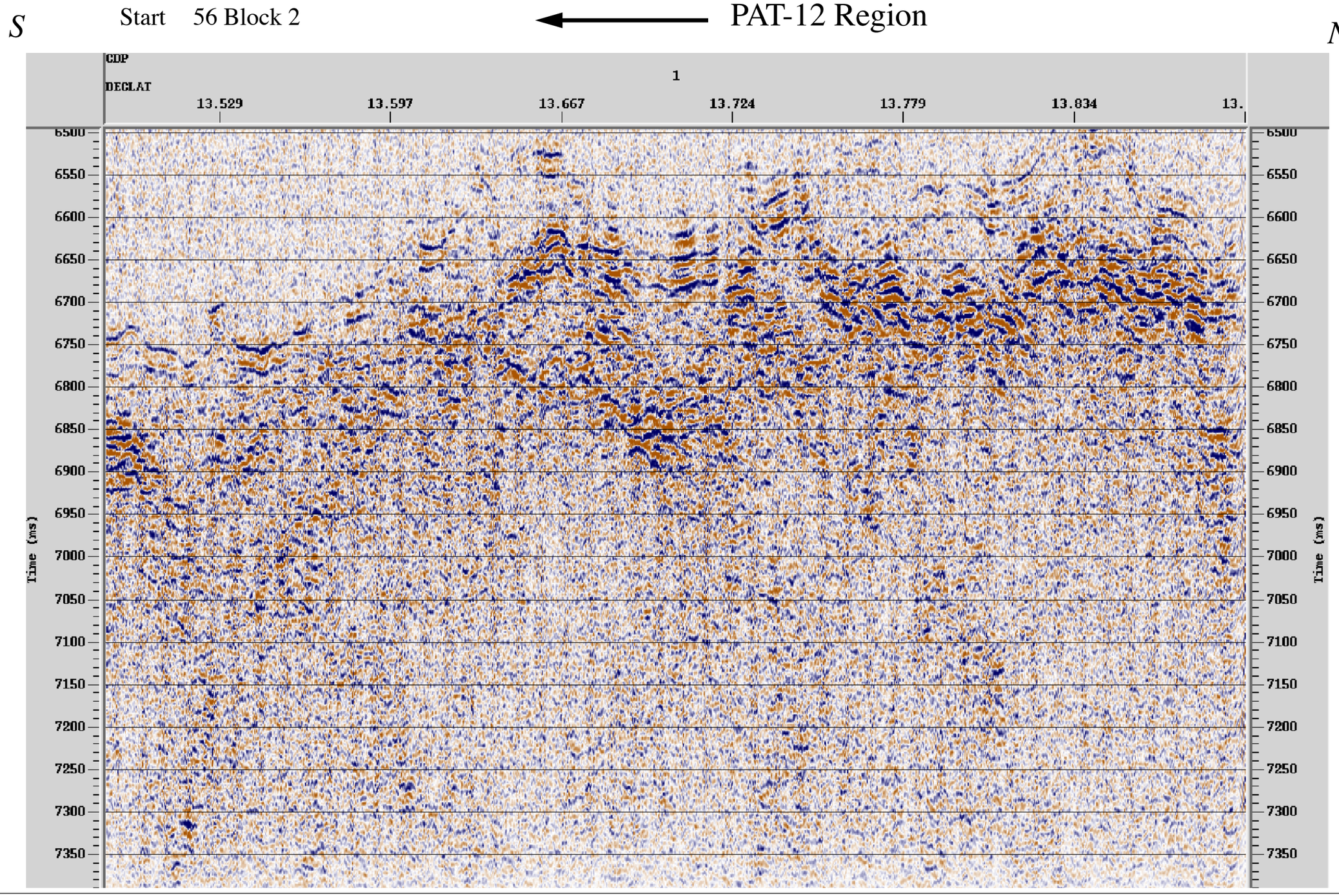
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Start 56 Block 2
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Time (ms)
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6600
6650
6700
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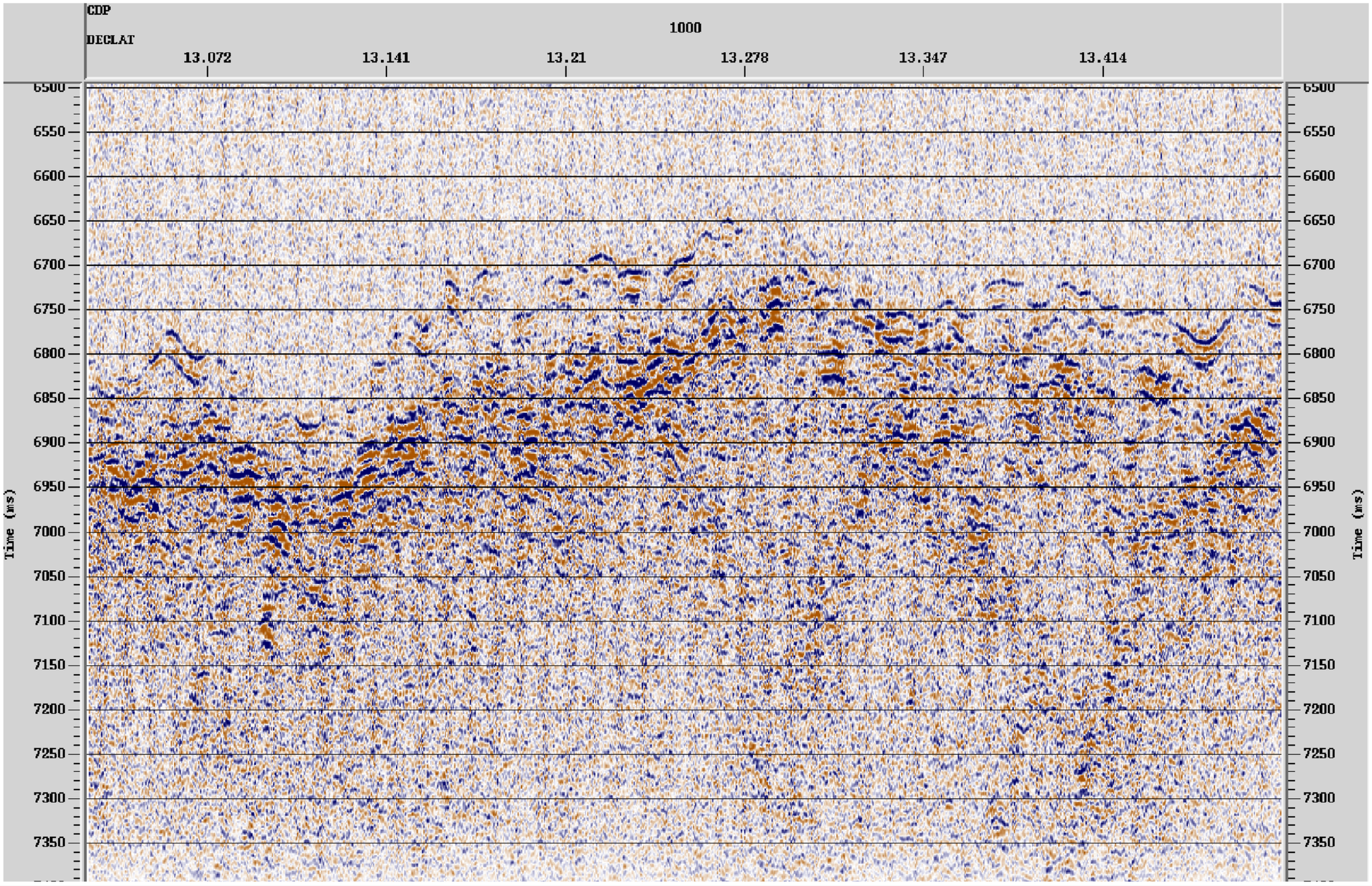
7100
7150
7200
7250
7300
7350

S N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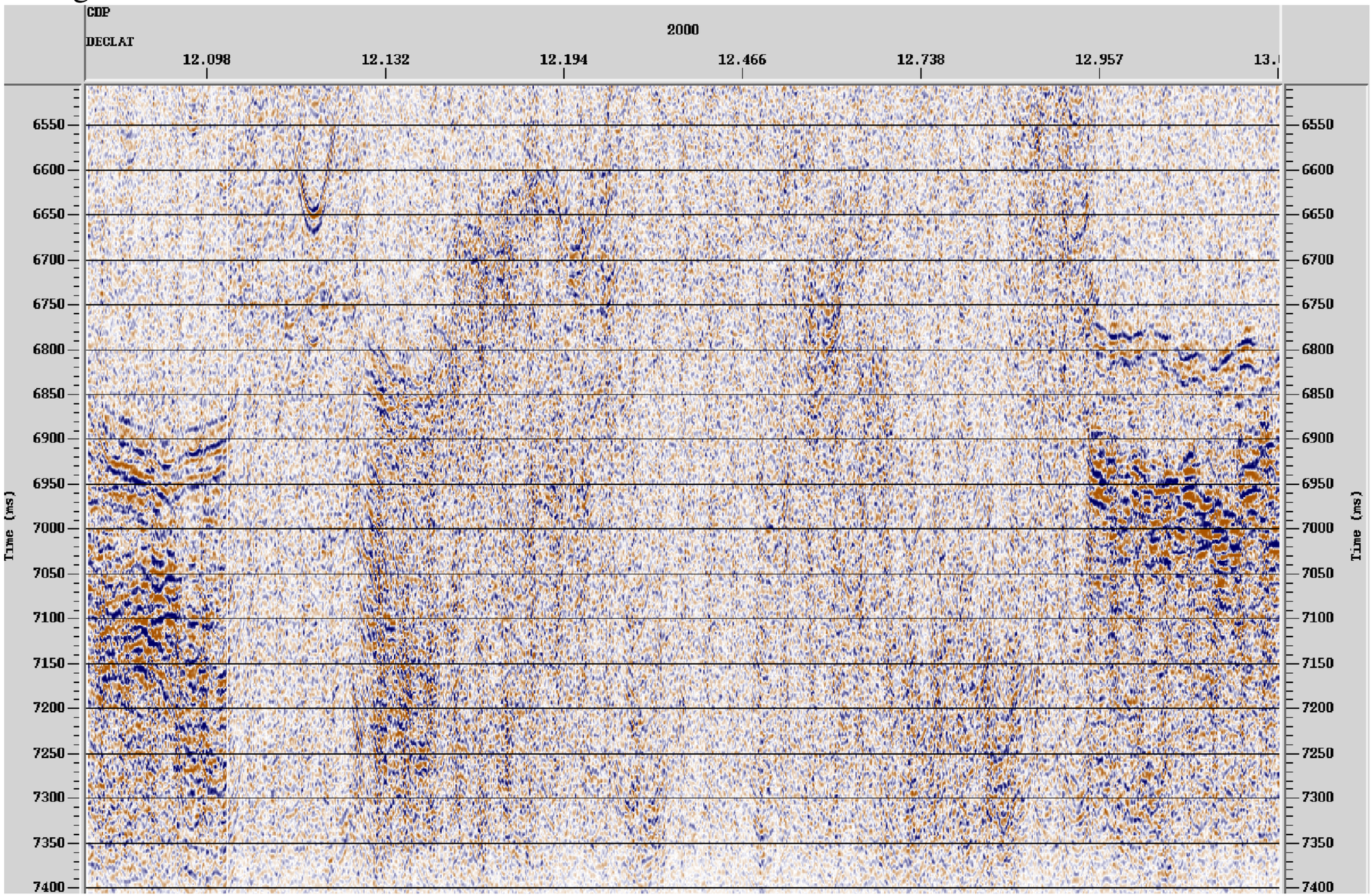
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200
7250
7300
7350

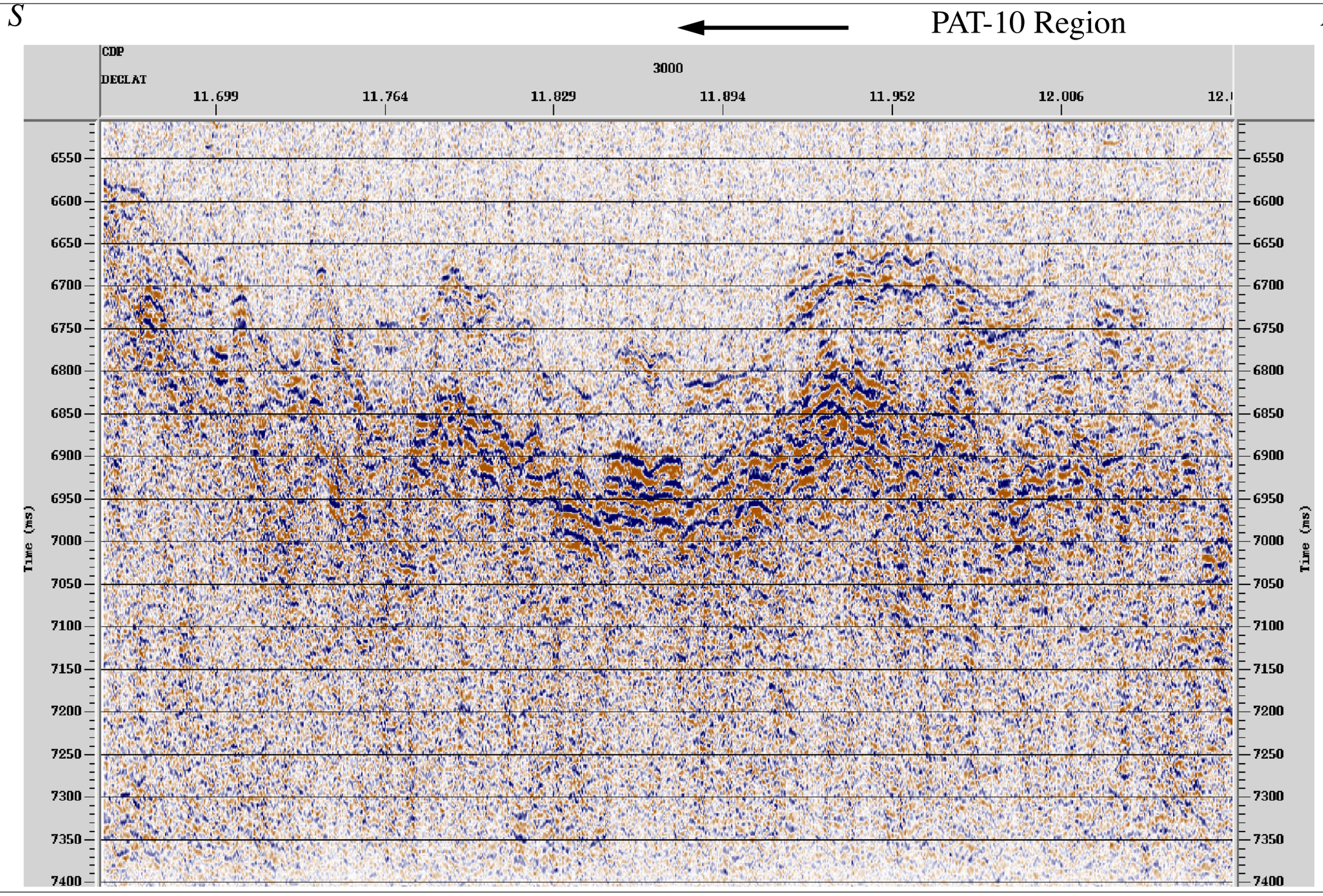
PAT-10 Region

S

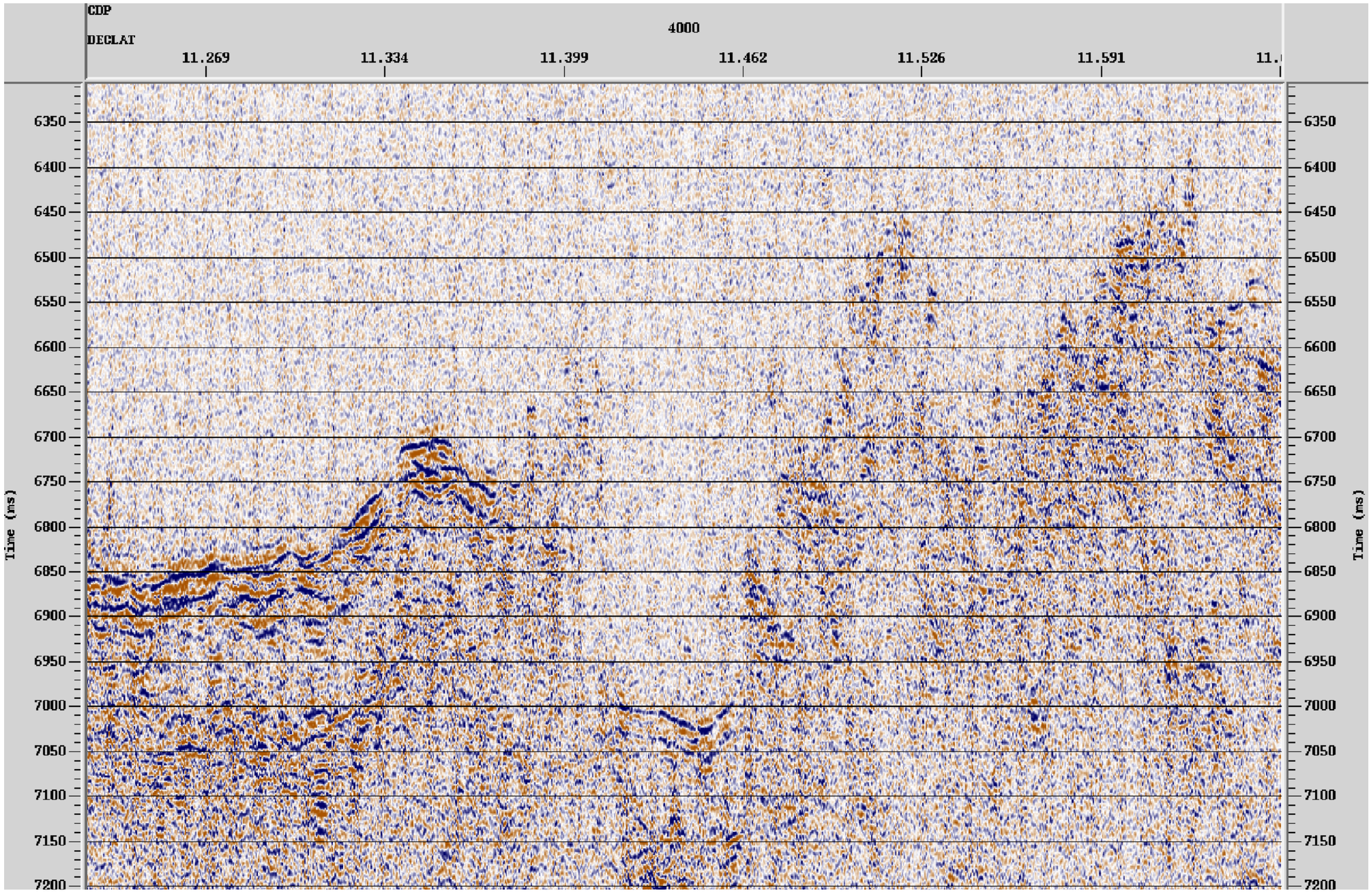
PAT-18 Region

N

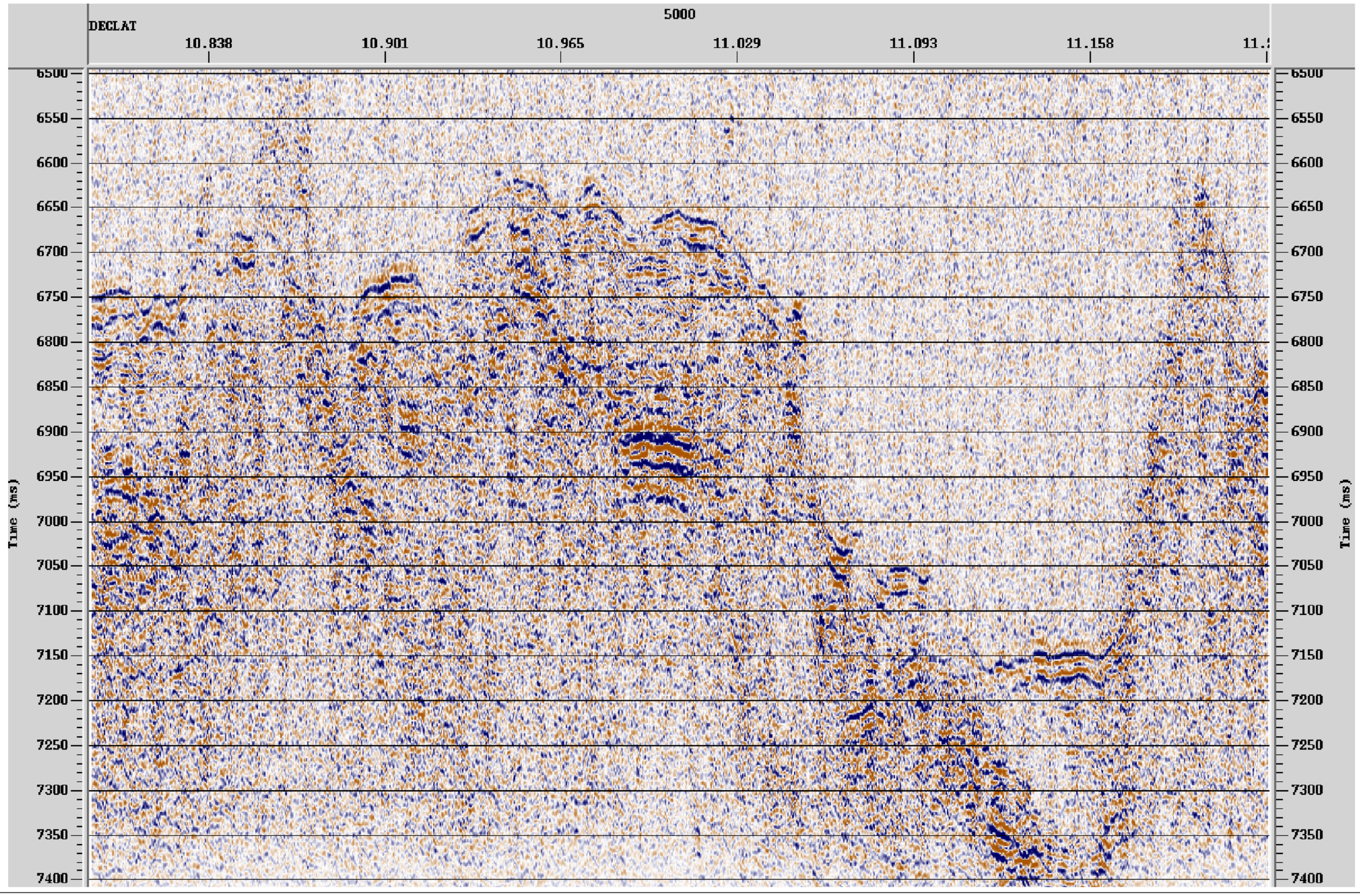



S
PAT-10 Region
N
CDP
3000
DECLAT
11.699
11.764
11.829
11.894
11.952
12.006
Time (ms)
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200
7250
7300
7350
7400

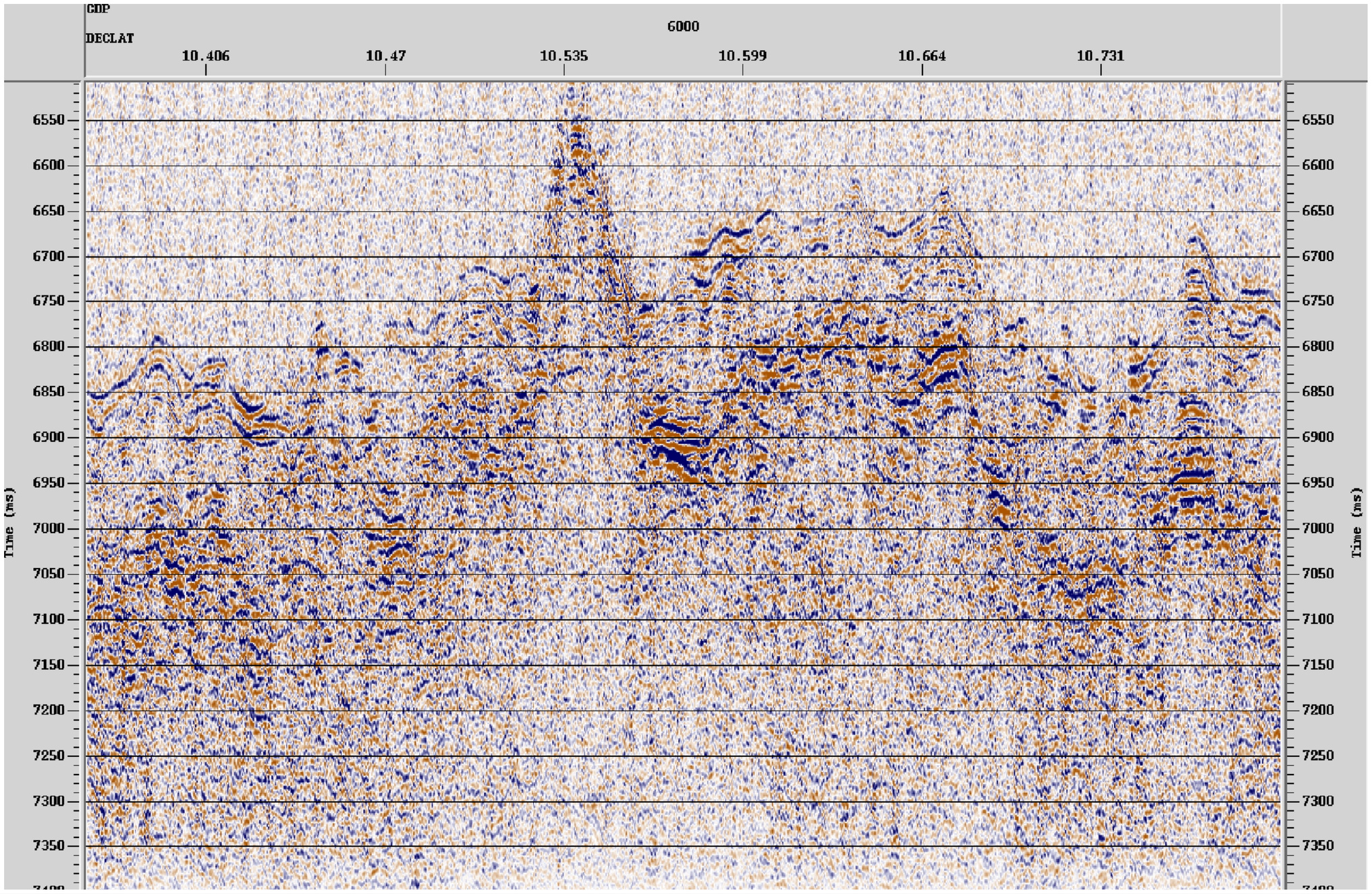
S N


CDP
4000
DECLAT
11.269
11.334
11.399
11.462
11.526
11.591
Time (ms)
6350
6400
6450
6500
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200

S N


5000
DECLAT
10.838
10.901
10.965
11.029
11.093
11.158
6500
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200
7250
7300
7350
7400
Time (ms)

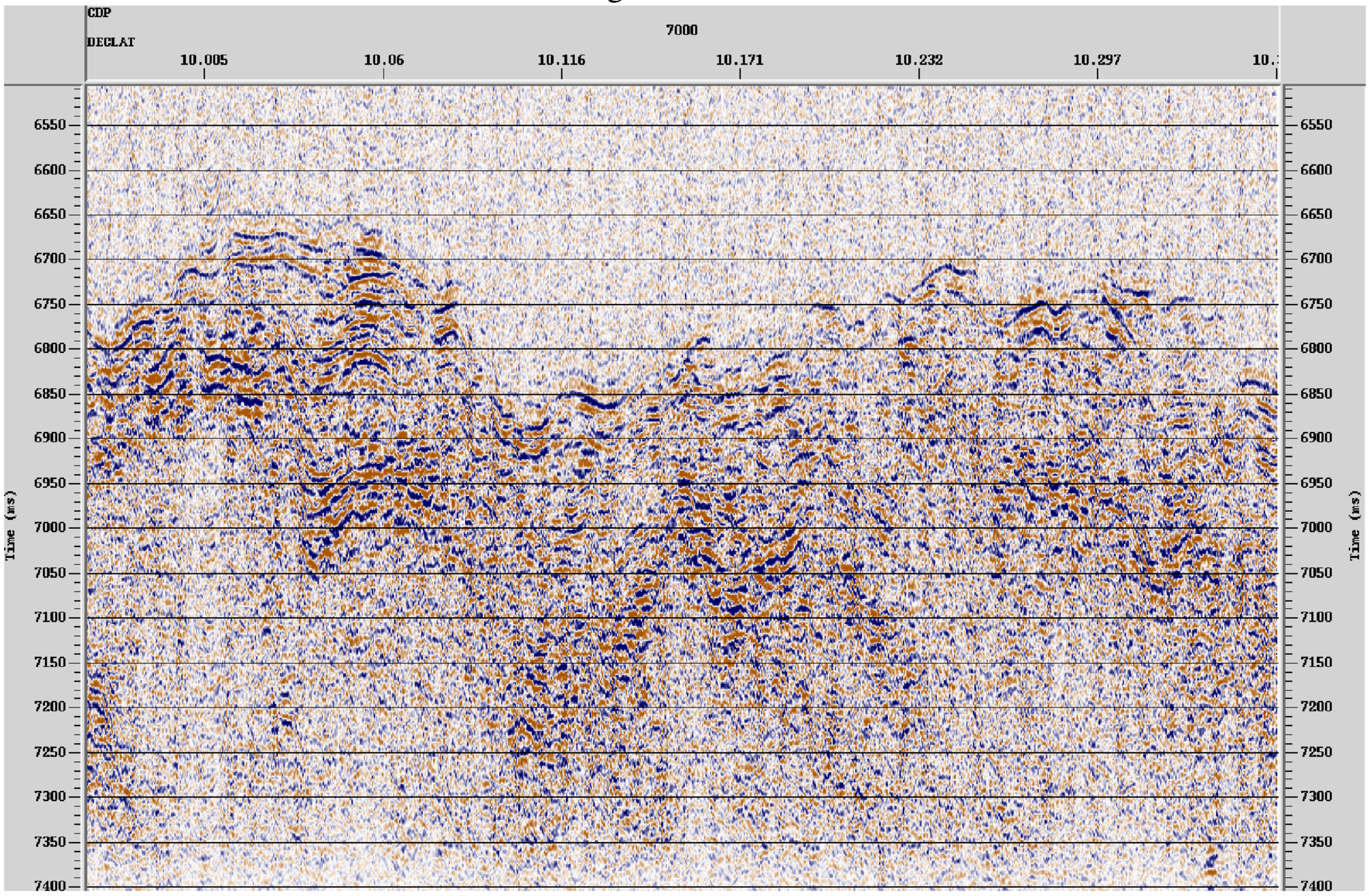
S N


CDP
6000
DECLAT
10.406
10.47
10.535
10.599
10.664
10.731
Time (ms)
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200
7250
7300
7350

S

PAT-9 Region

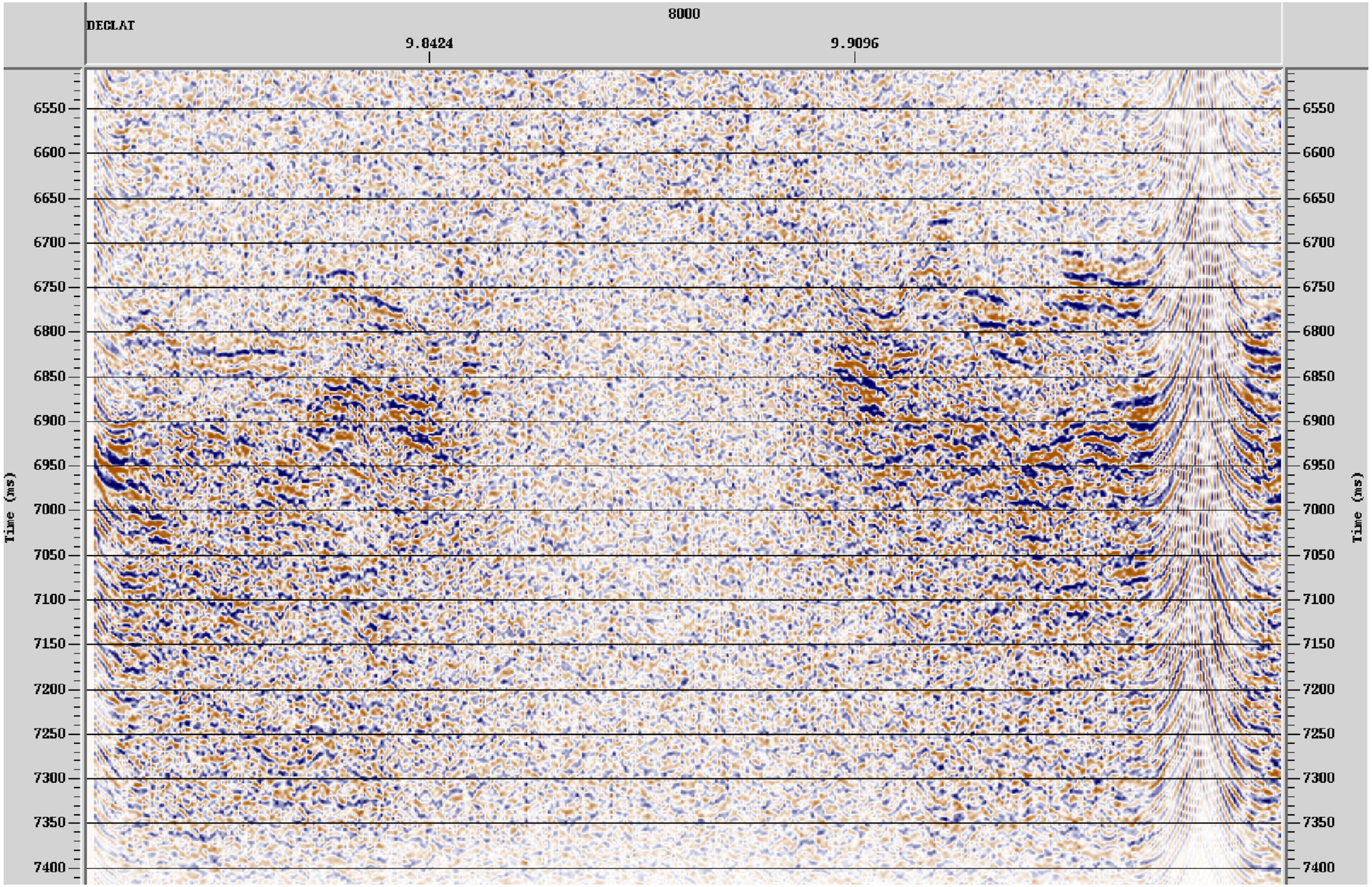
N



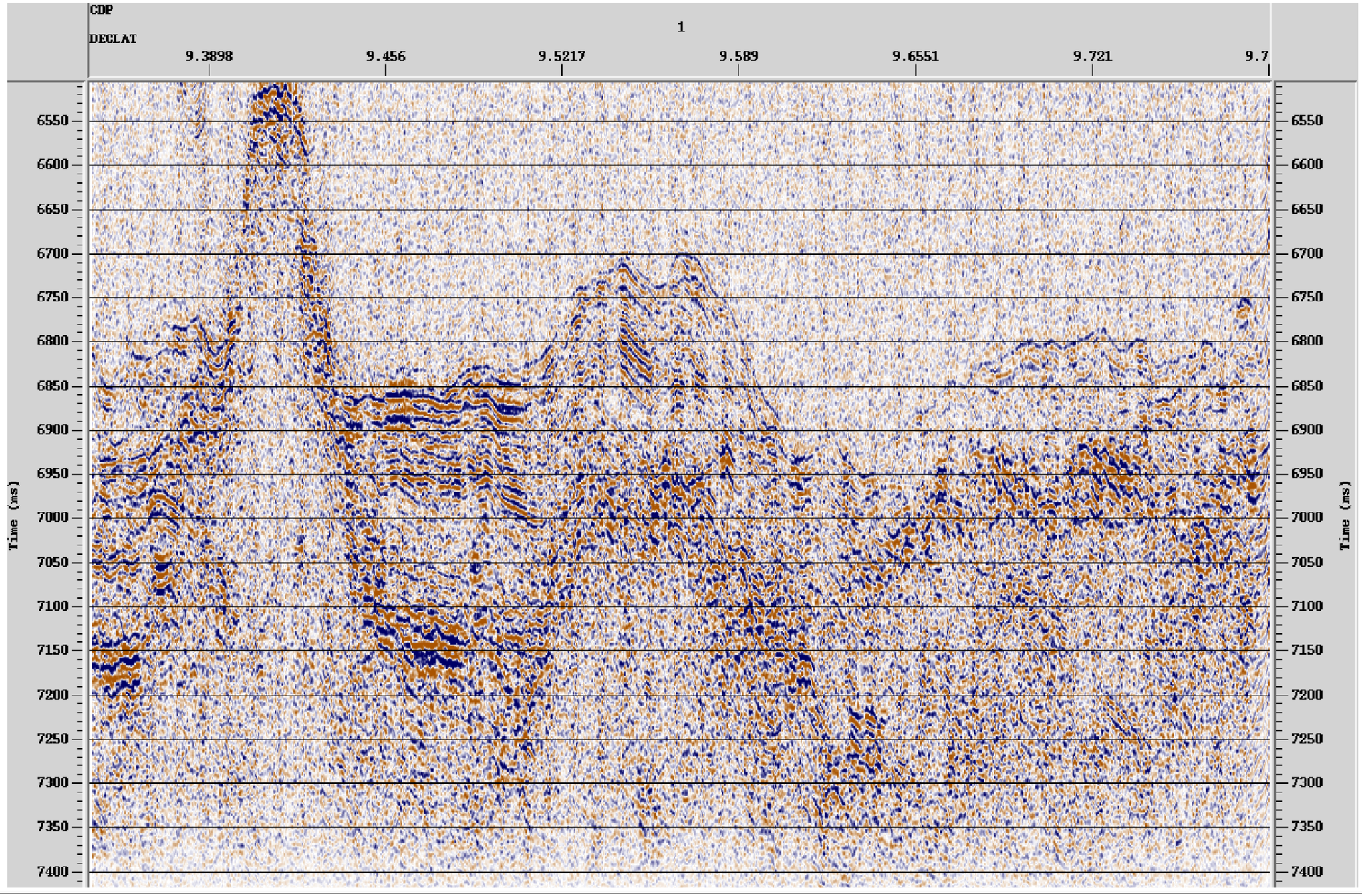
S

End 56 Block 2

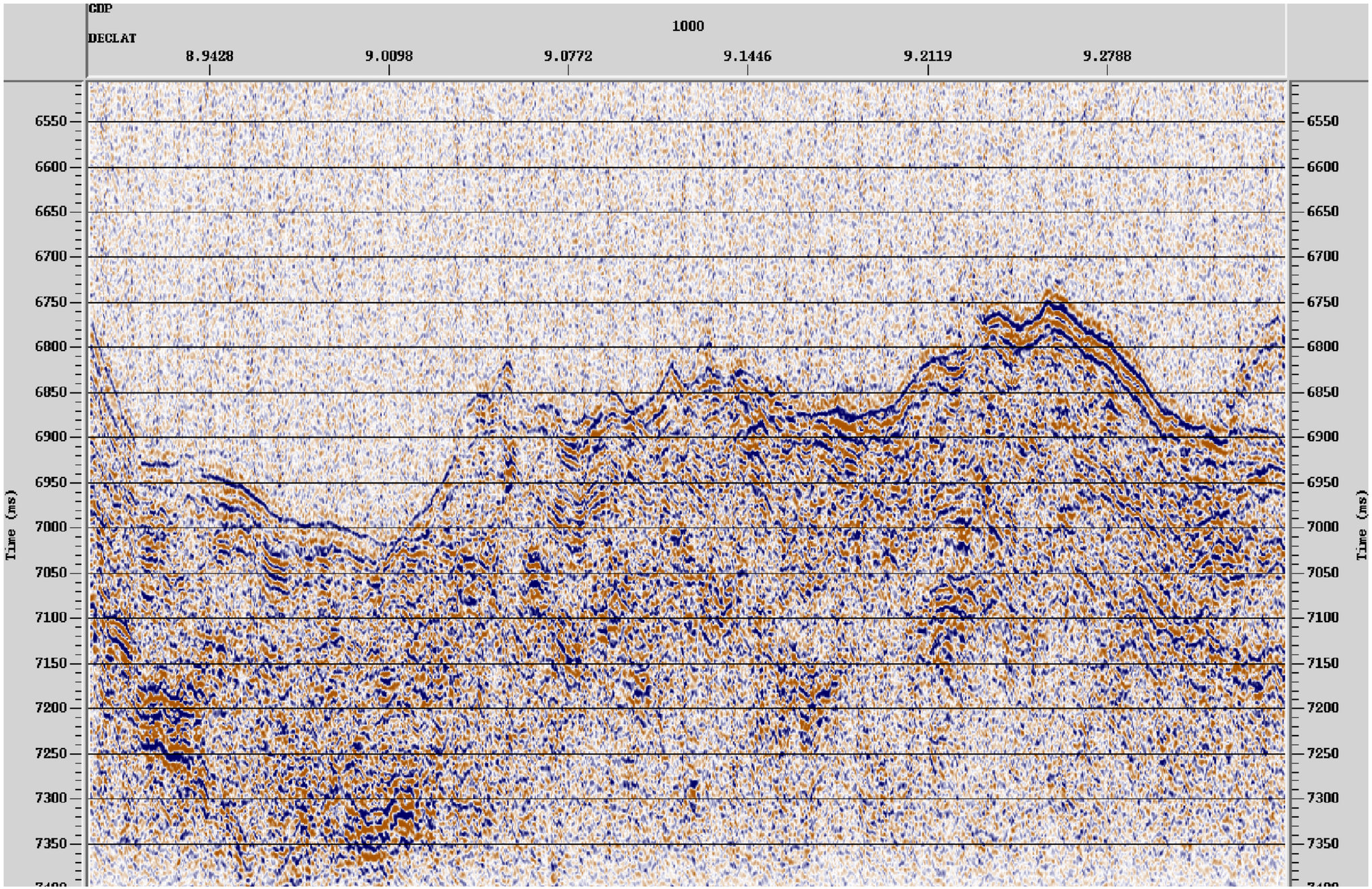
N



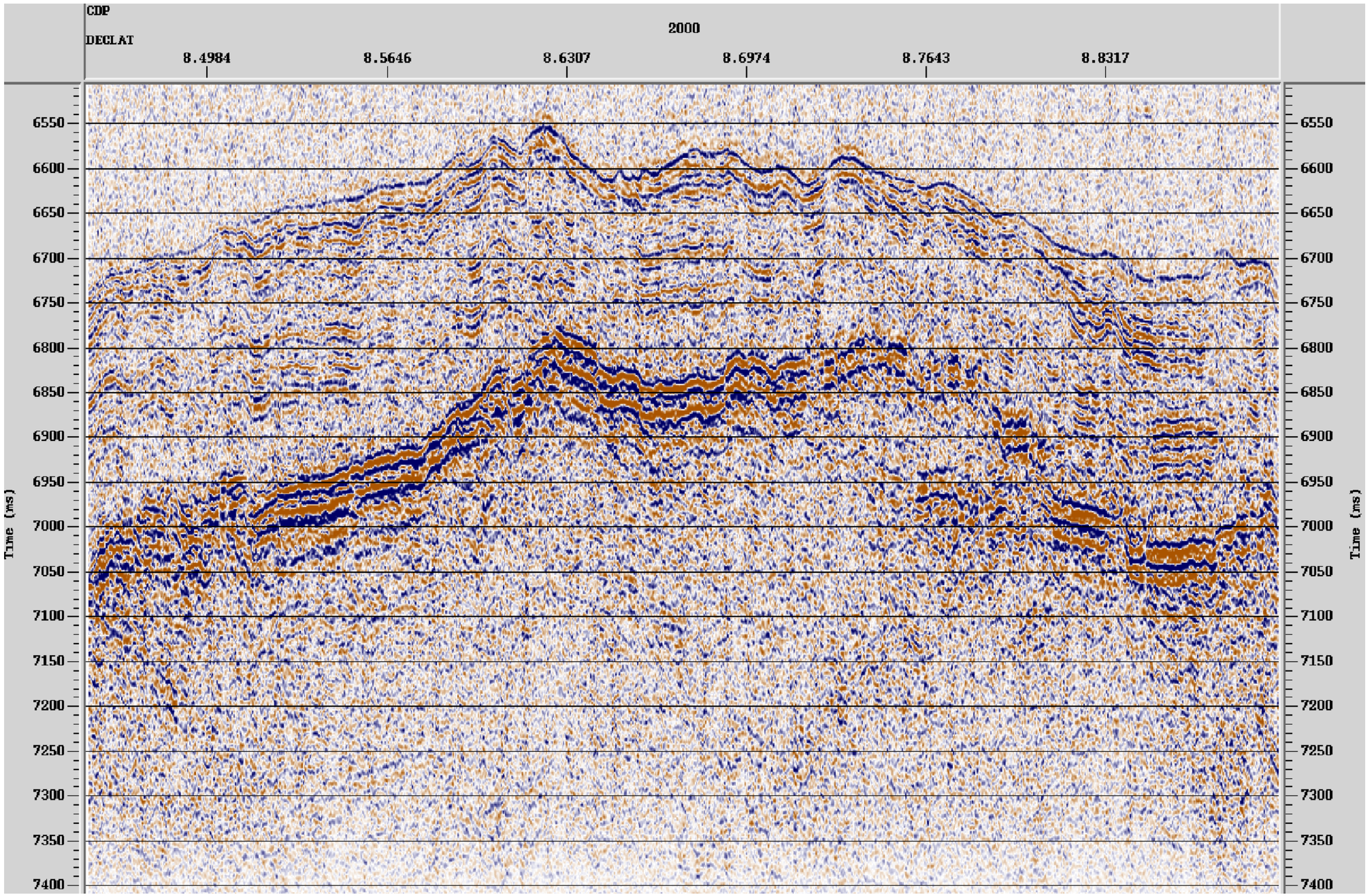
S Start 56 Block 1 N



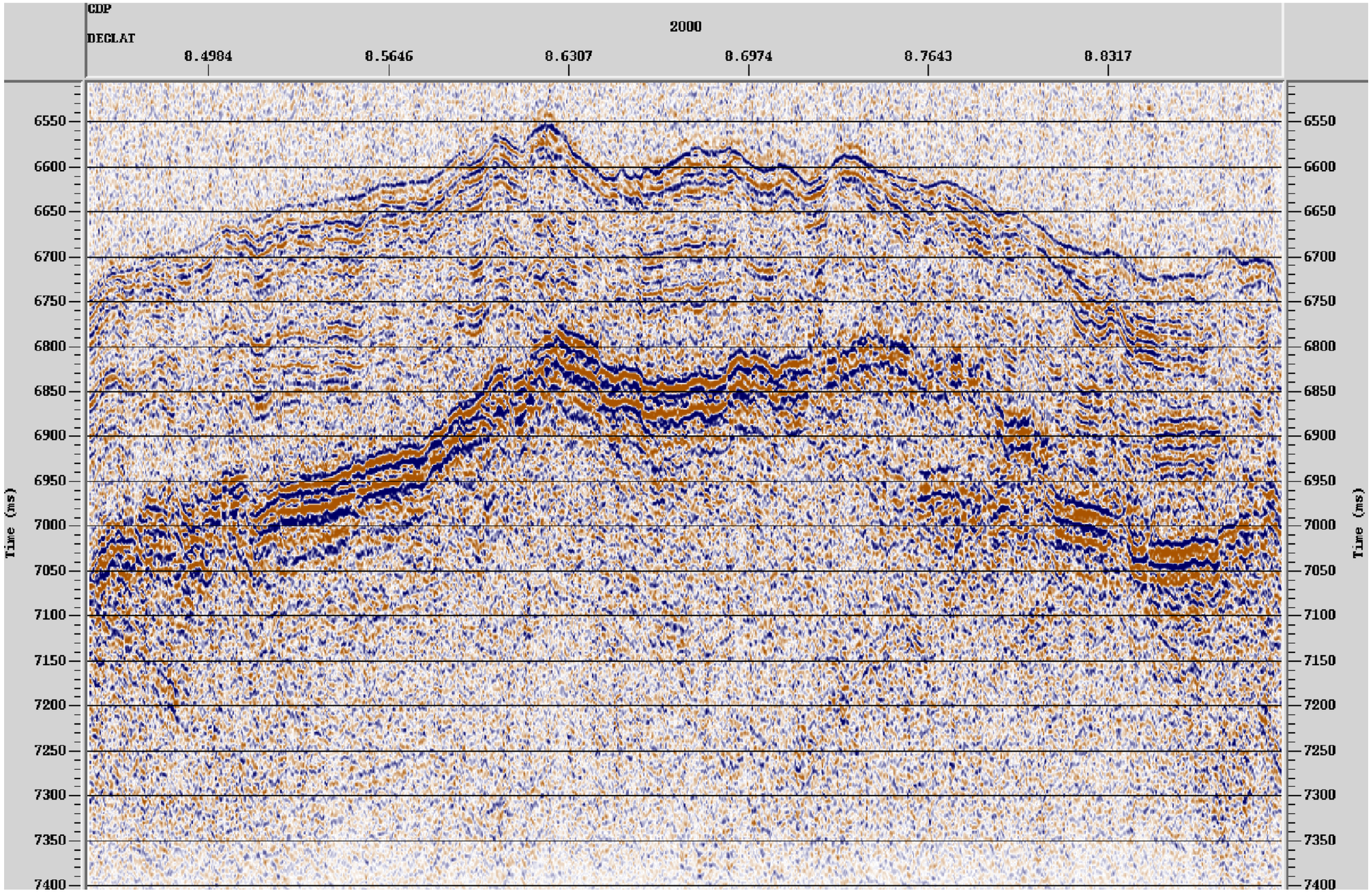
S *N*


CDP
1000
DECLAT
8.9428
9.0098
9.0772
9.1446
9.2119
9.2788
Time (ms)
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200
7250
7300
7350

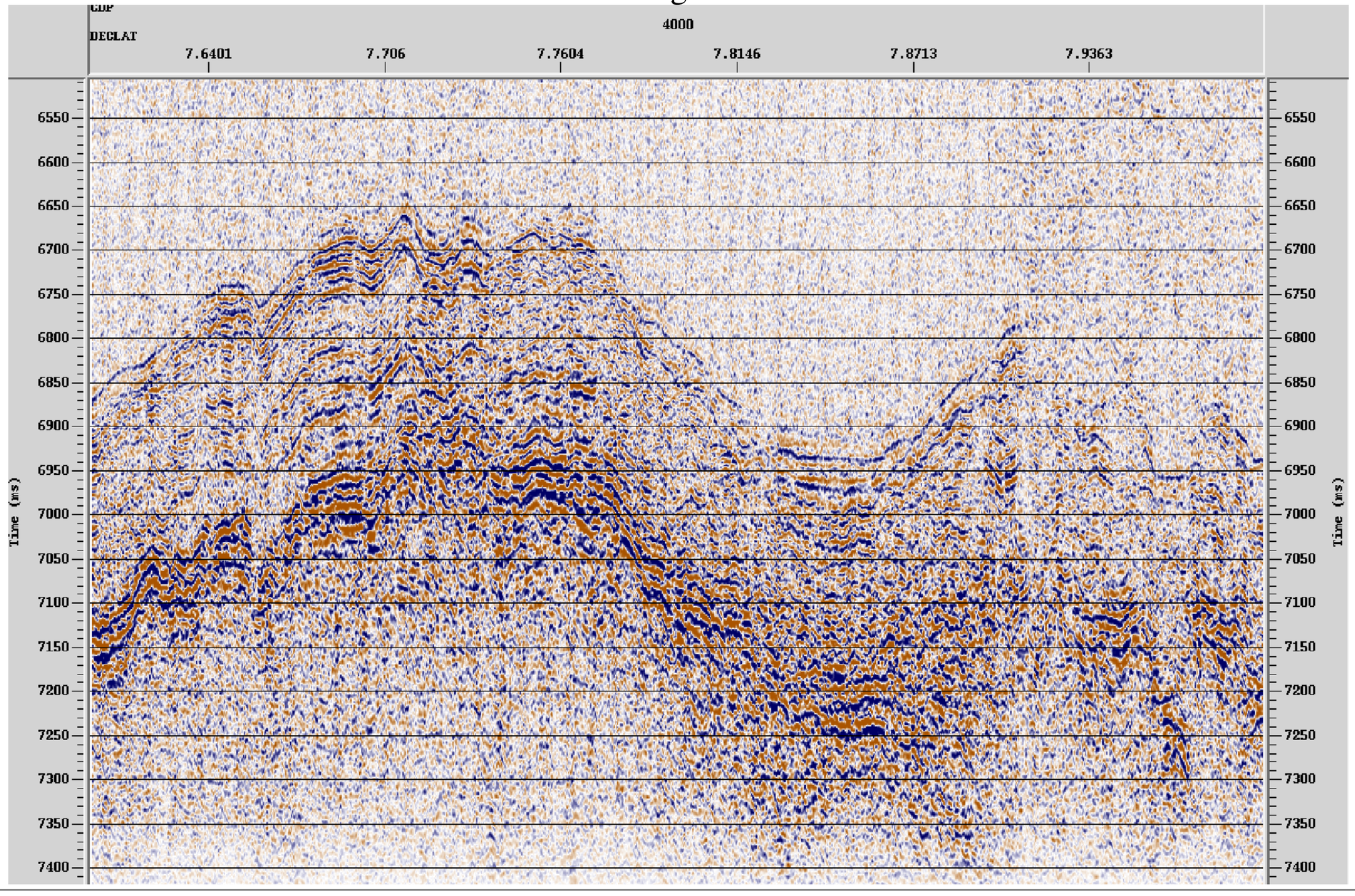
S N


CDP
2000
DECLAT
8.4984
8.5646
8.6307
8.6974
8.7643
8.8317
Time (ms)
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200
7250
7300
7350
7400

S N

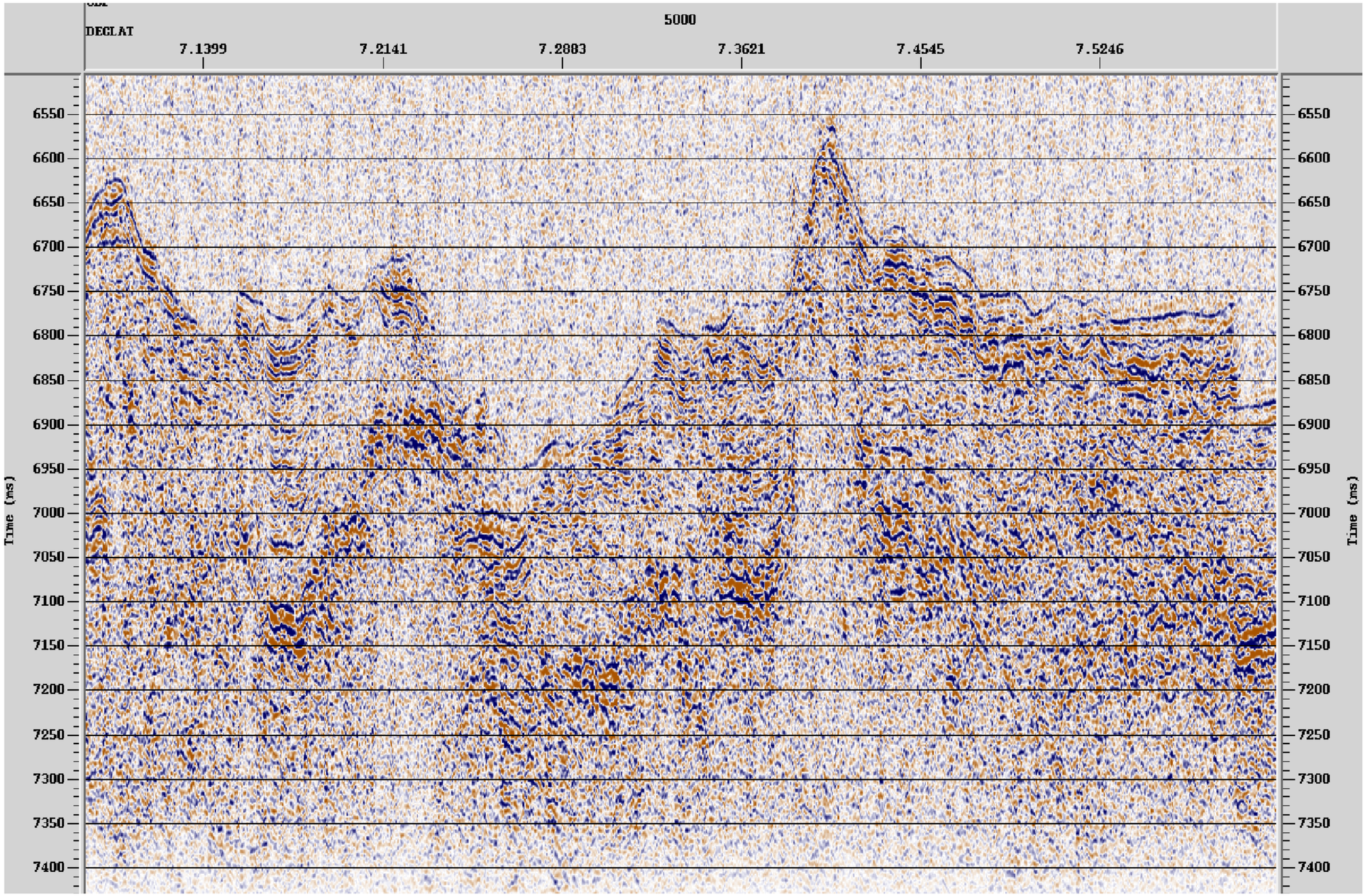

CDP
2000
DEGLAT
0.4984
0.5646
0.6307
0.6974
0.7643
0.8317
Time (ms)
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200
7250
7300
7350
7400

S PAT-17 Region N

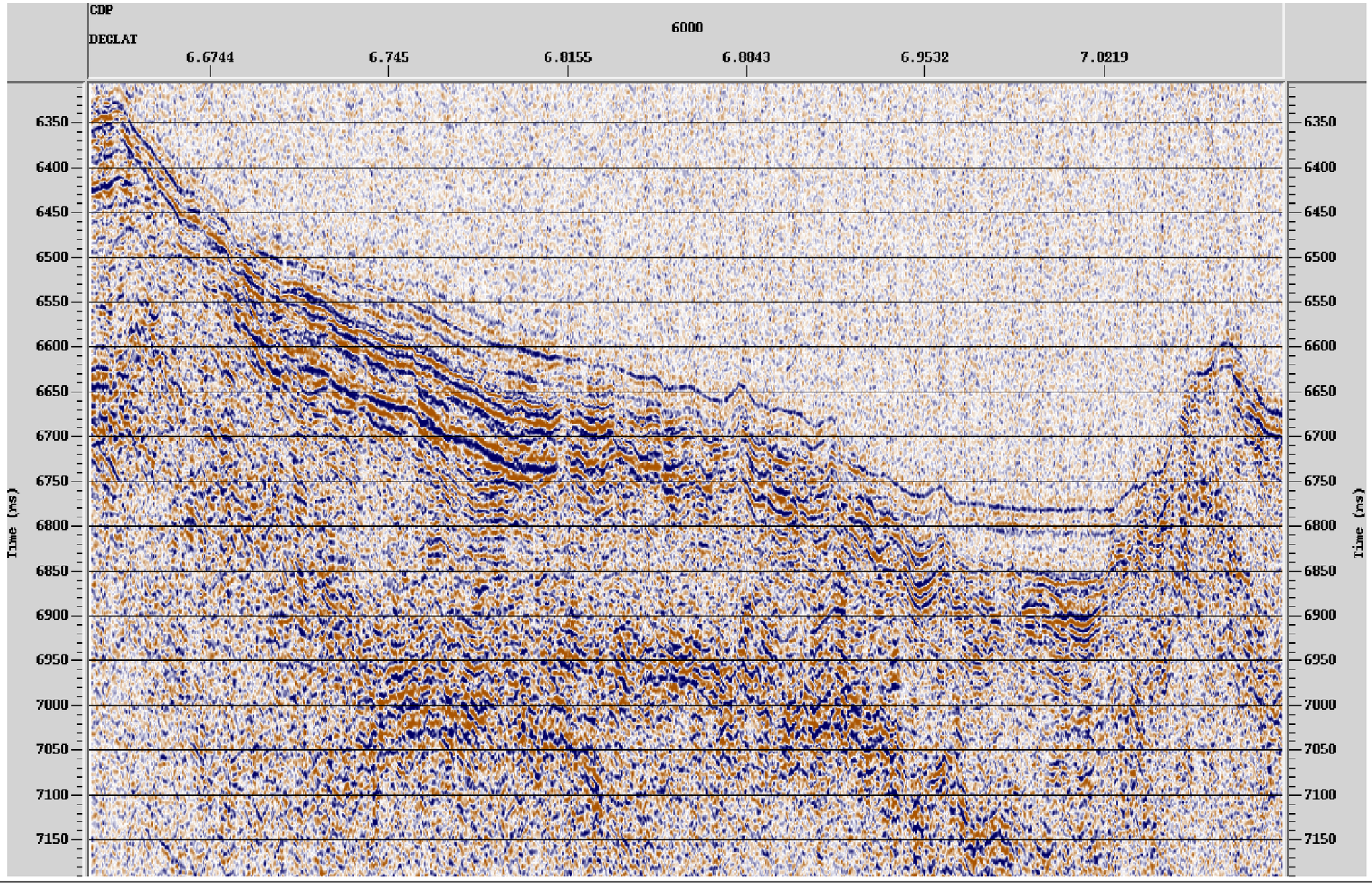


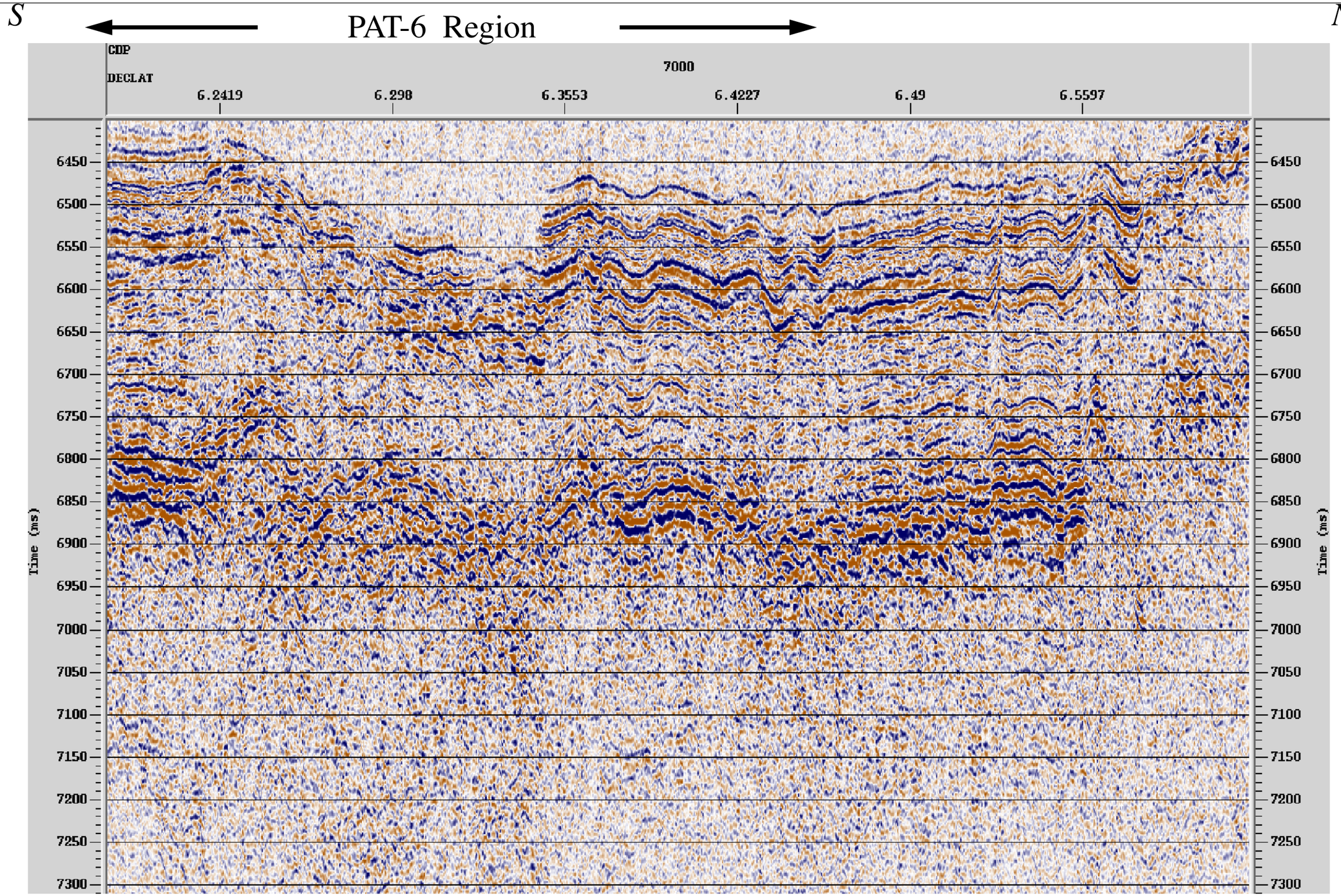
S

N

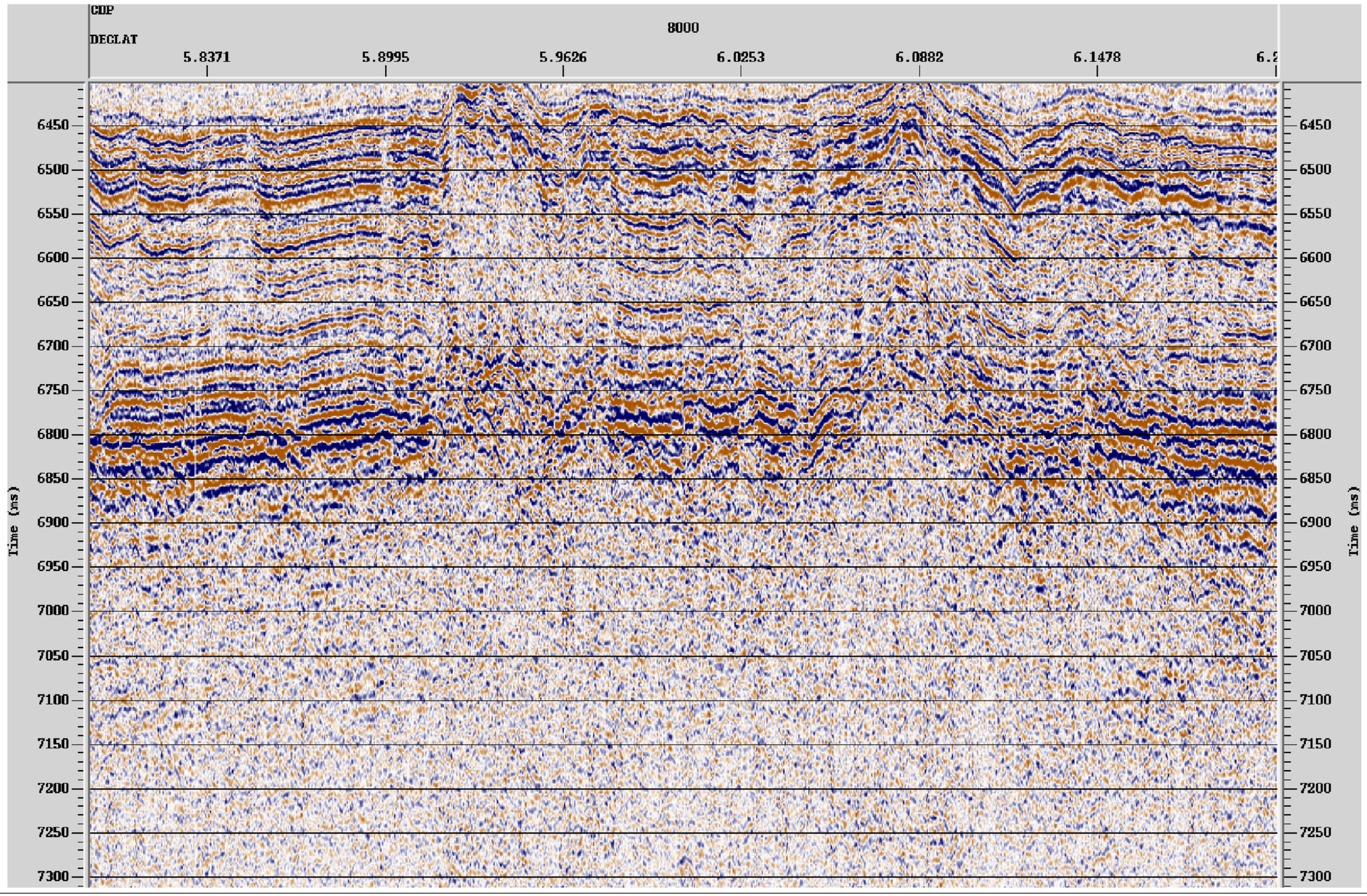

5000
DECLAT
7.1399
7.2141
7.2883
7.3621
7.4545
7.5246
Time (ms)
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200
7250
7300
7350
7400

S N

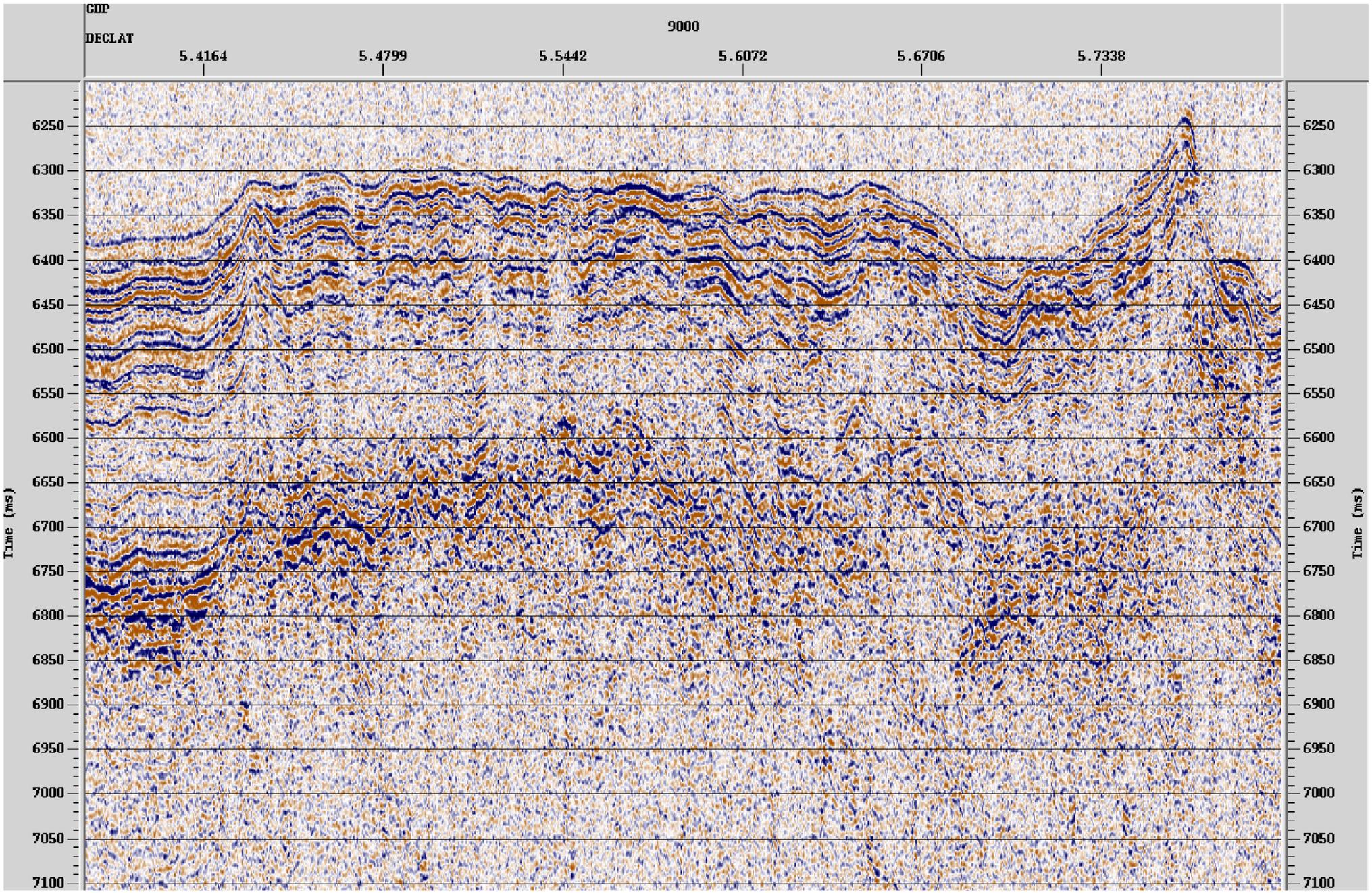

CDP
6000
DECLAT
6.6744
6.745
6.8155
6.8843
6.9532
7.0219
Time (ms)
6350
6400
6450
6500
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150


S
PAT-6 Region
N
CDP
DECLAT
7000
6.2419
6.298
6.3553
6.4227
6.49
6.5597
Time (ms)
6450
6500
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200
7250
7300

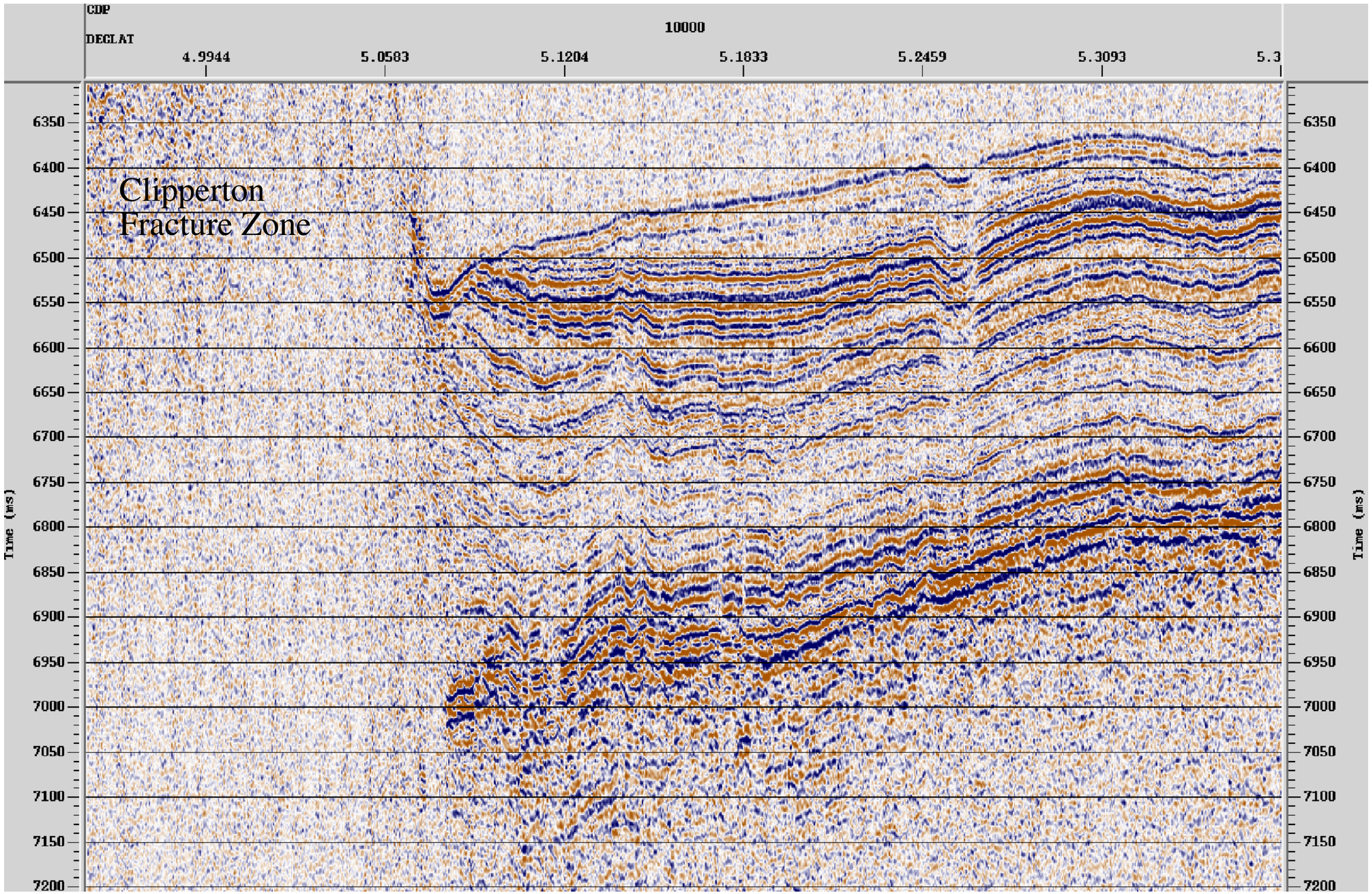
S N


CDP
8000
DECLAT
5.8371
5.8995
5.9626
6.0253
6.0882
6.1478
6.2
Time (ms)
6450
6500
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200
7250
7300

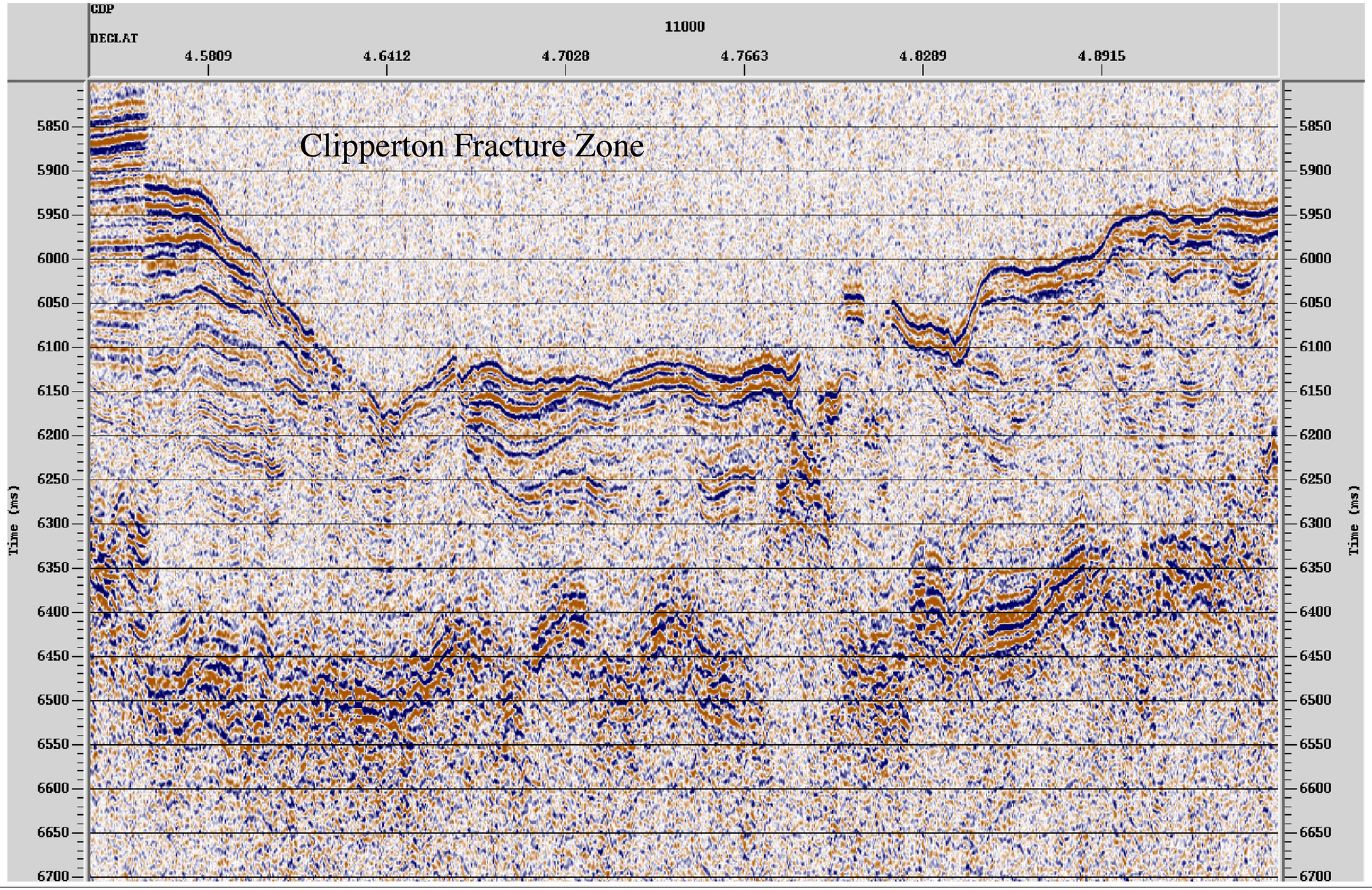
S N


CDP
DECLAT
9000
5.4164
5.4799
5.5442
5.6072
5.6706
5.7338
Time (ms)
6250
6300
6350
6400
6450
6500
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100

S N


CDP
10000
DECLAT
4.9944
5.0583
5.1204
5.1833
5.2459
5.3093
5.3
Clipperton
Fracture Zone
Time (ms)
6350
6400
6450
6500
6550
6600
6650
6700
6750
6800
6850
6900
6950
7000
7050
7100
7150
7200

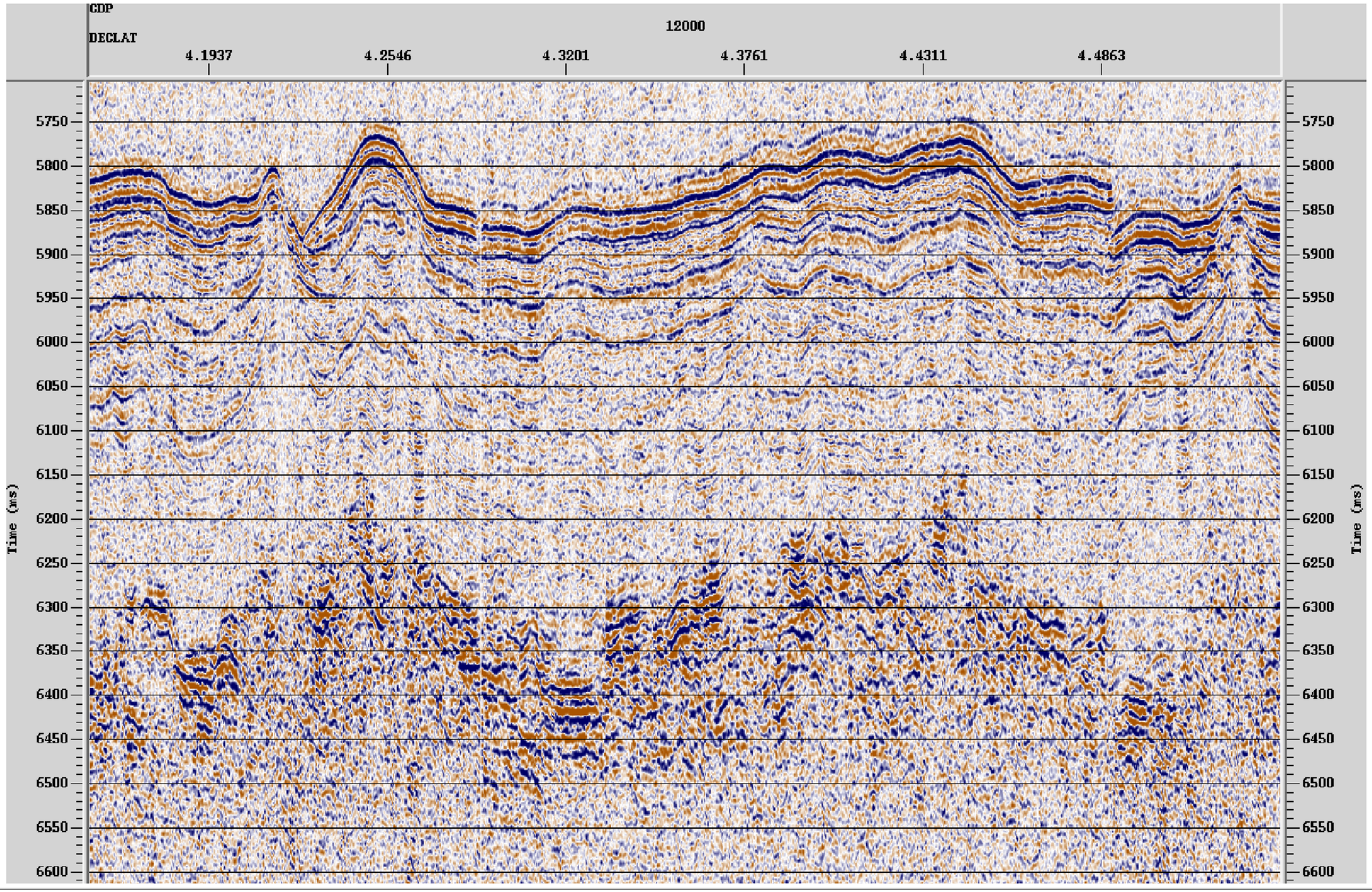
S N


CDP
11000
DEGLAT
4.5809
4.6412
4.7028
4.7663
4.8289
4.8915
Clipperton Fracture Zone
Time (ms)
5850
5900
5950
6000
6050
6100
6150
6200
6250
6300
6350
6400
6450
6500
6550
6600
6650
6700

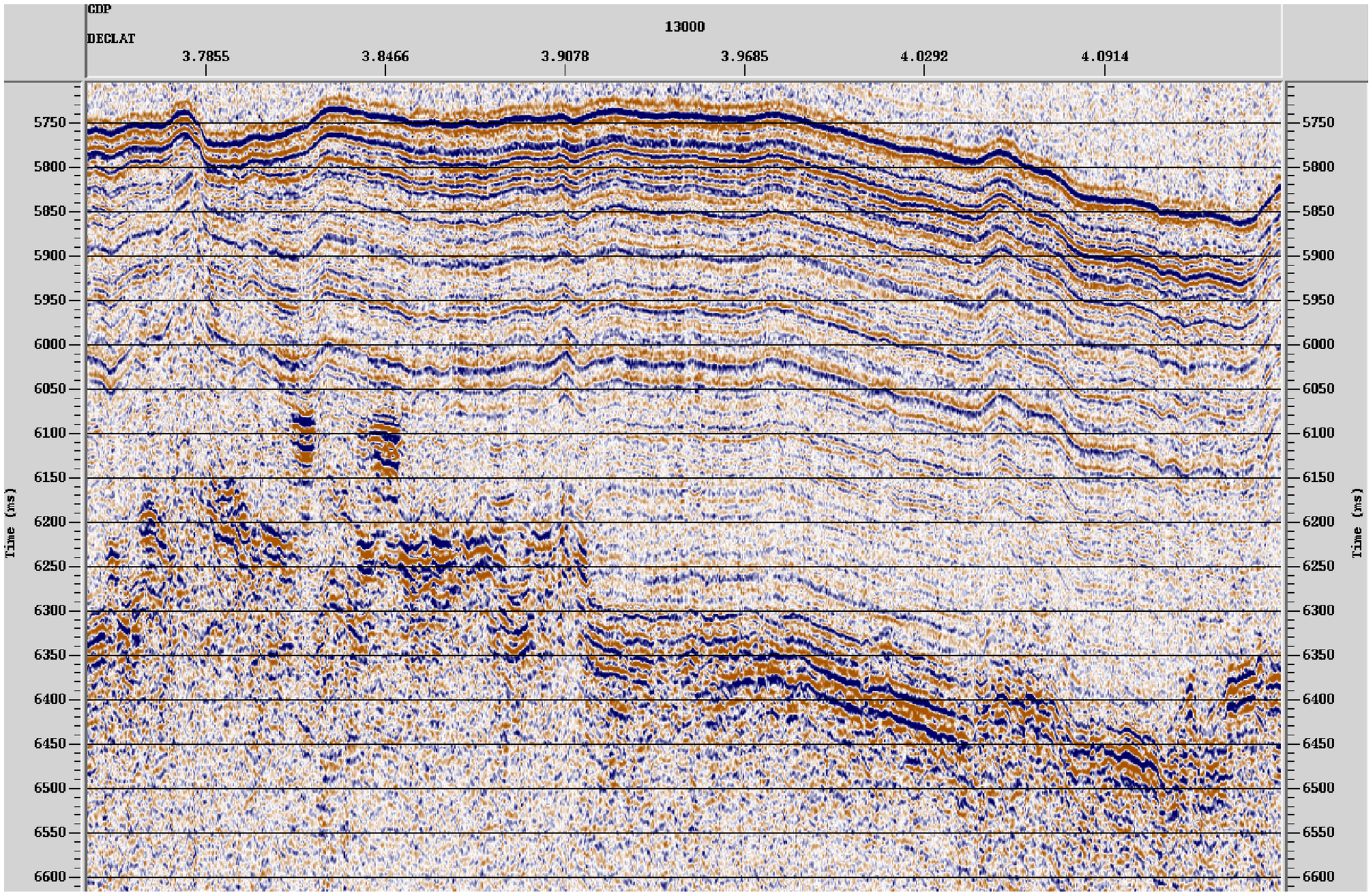
S

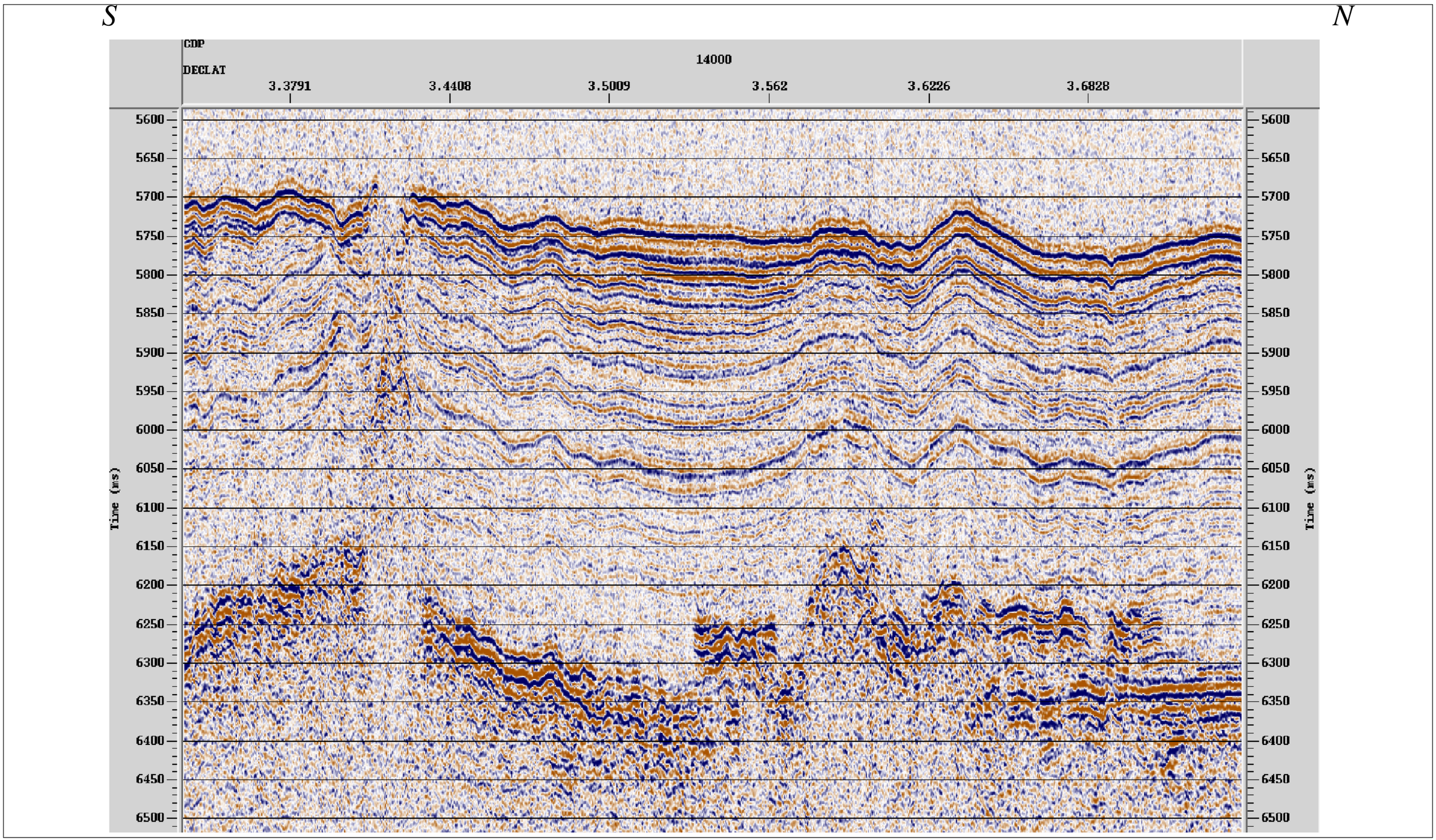
PAT-24 Region

N

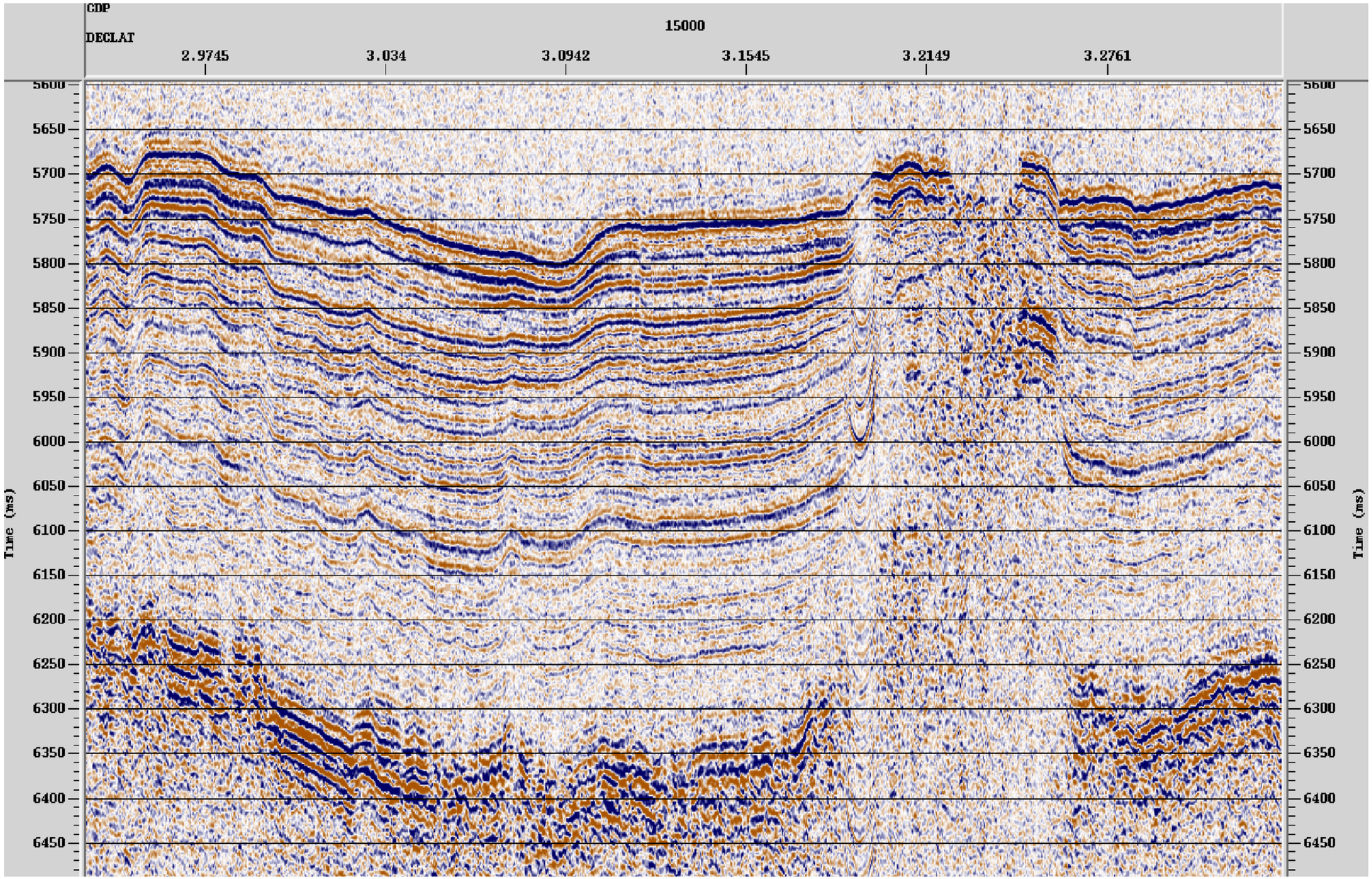


S N


CDP
DECLAT
13000
3.7855
3.8466
3.9078
3.9685
4.0292
4.0914
Time (ms)
5750
5800
5850
5900
5950
6000
6050
6100
6150
6200
6250
6300
6350
6400
6450
6500
6550
6600

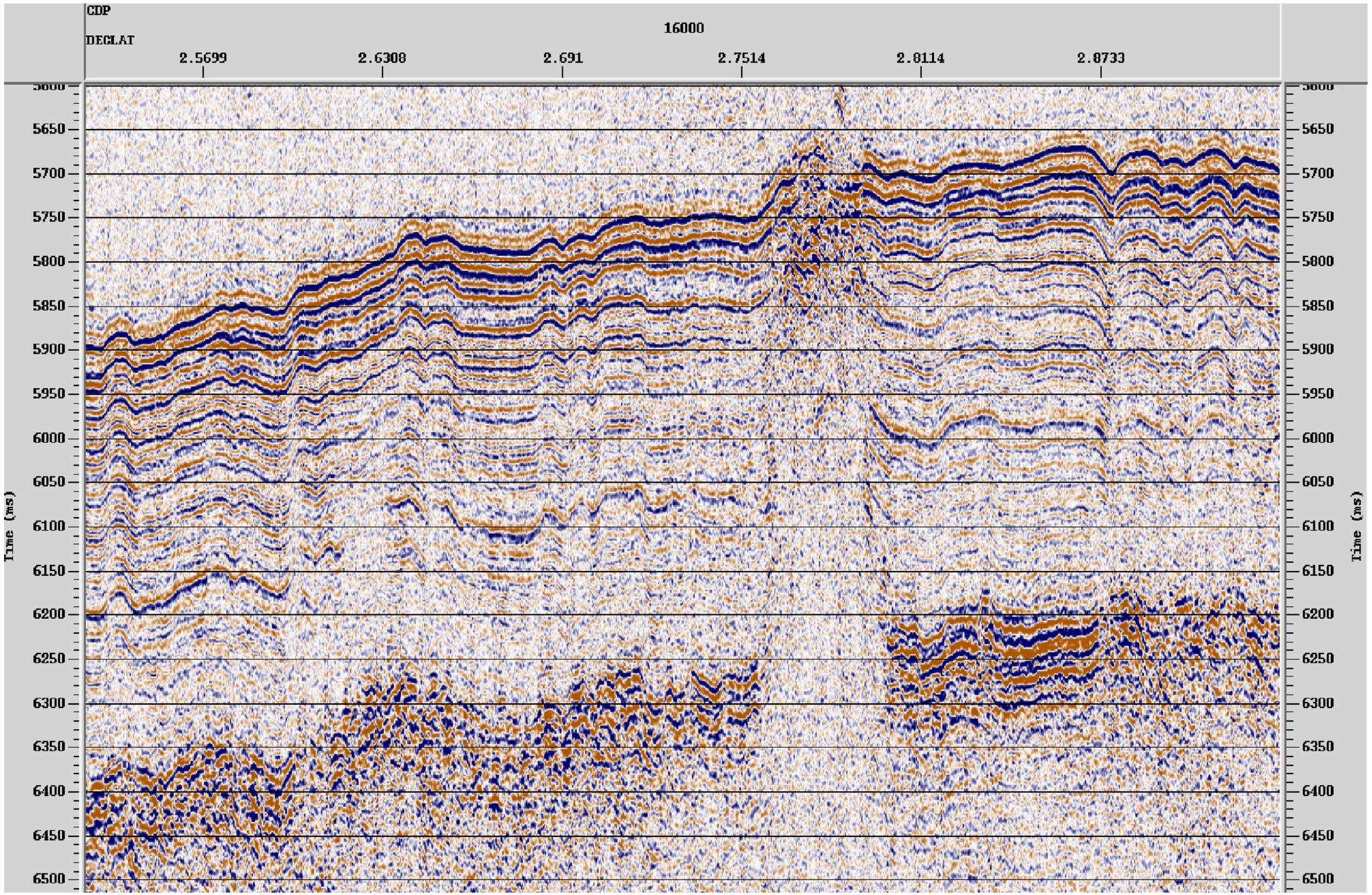

S
N
CDP
DECLAT
14000
3.3791
3.4408
3.5009
3.562
3.6226
3.6828
Time (ms)
5600
5650
5700
5750
5800
5850
5900
5950
6000
6050
6100
6150
6200
6250
6300
6350
6400
6450
6500

S N

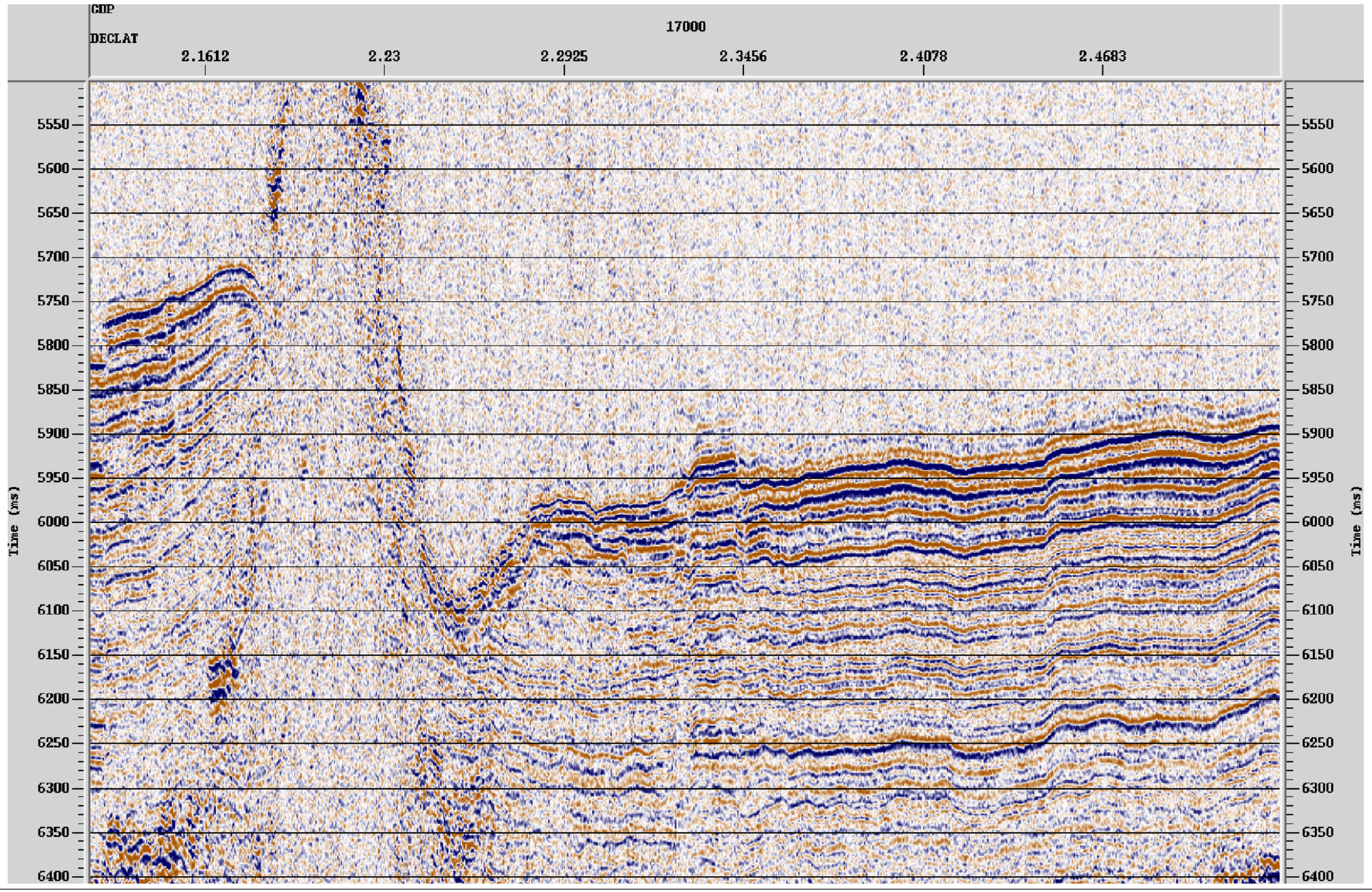

CDP
DECLAT
15000
2.9745
3.034
3.0942
3.1545
3.2149
3.2761
Time (ms)
5600
5650
5700
5750
5800
5850
5900
5950
6000
6050
6100
6150
6200
6250
6300
6350
6400
6450

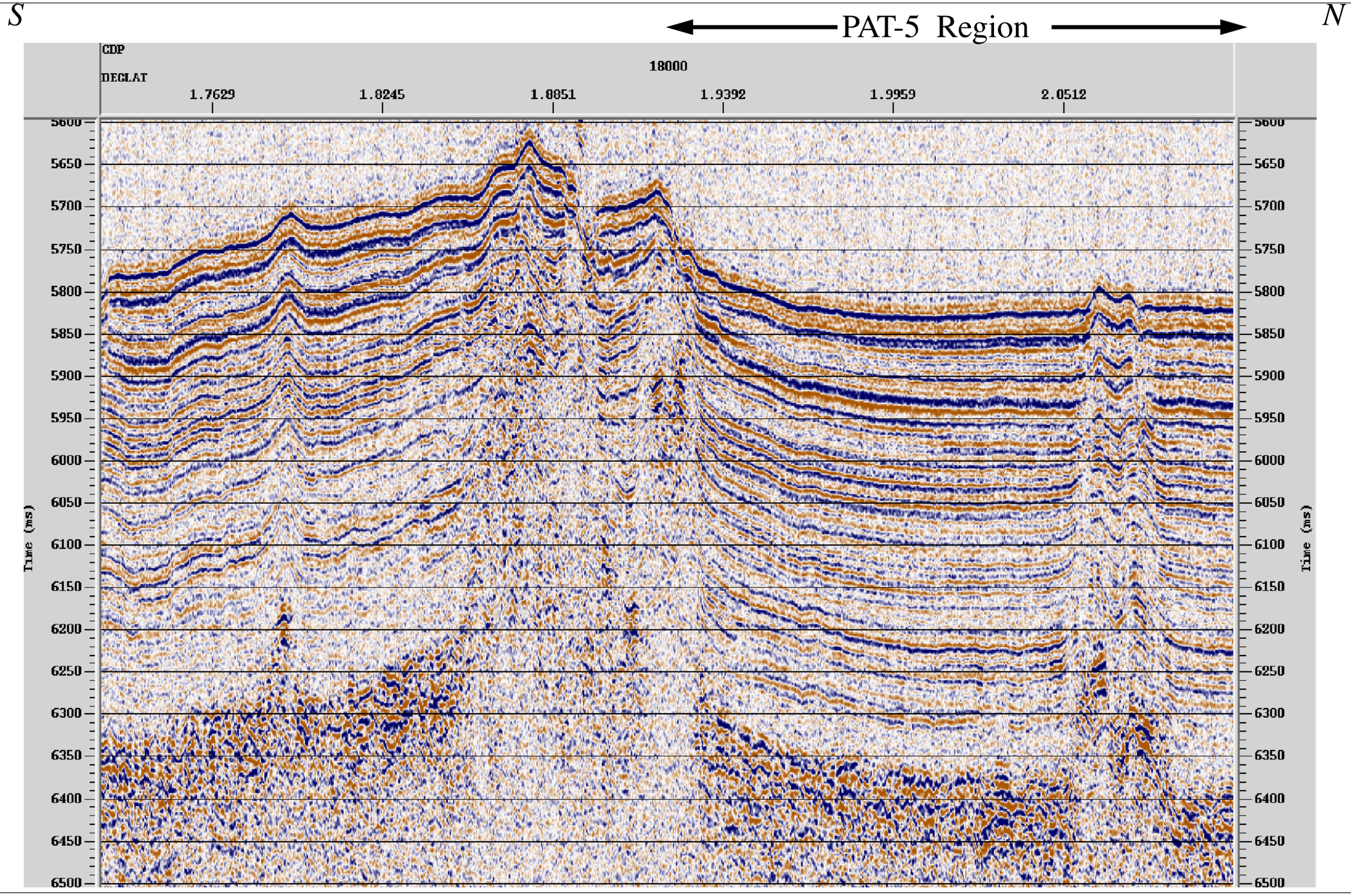
S

N

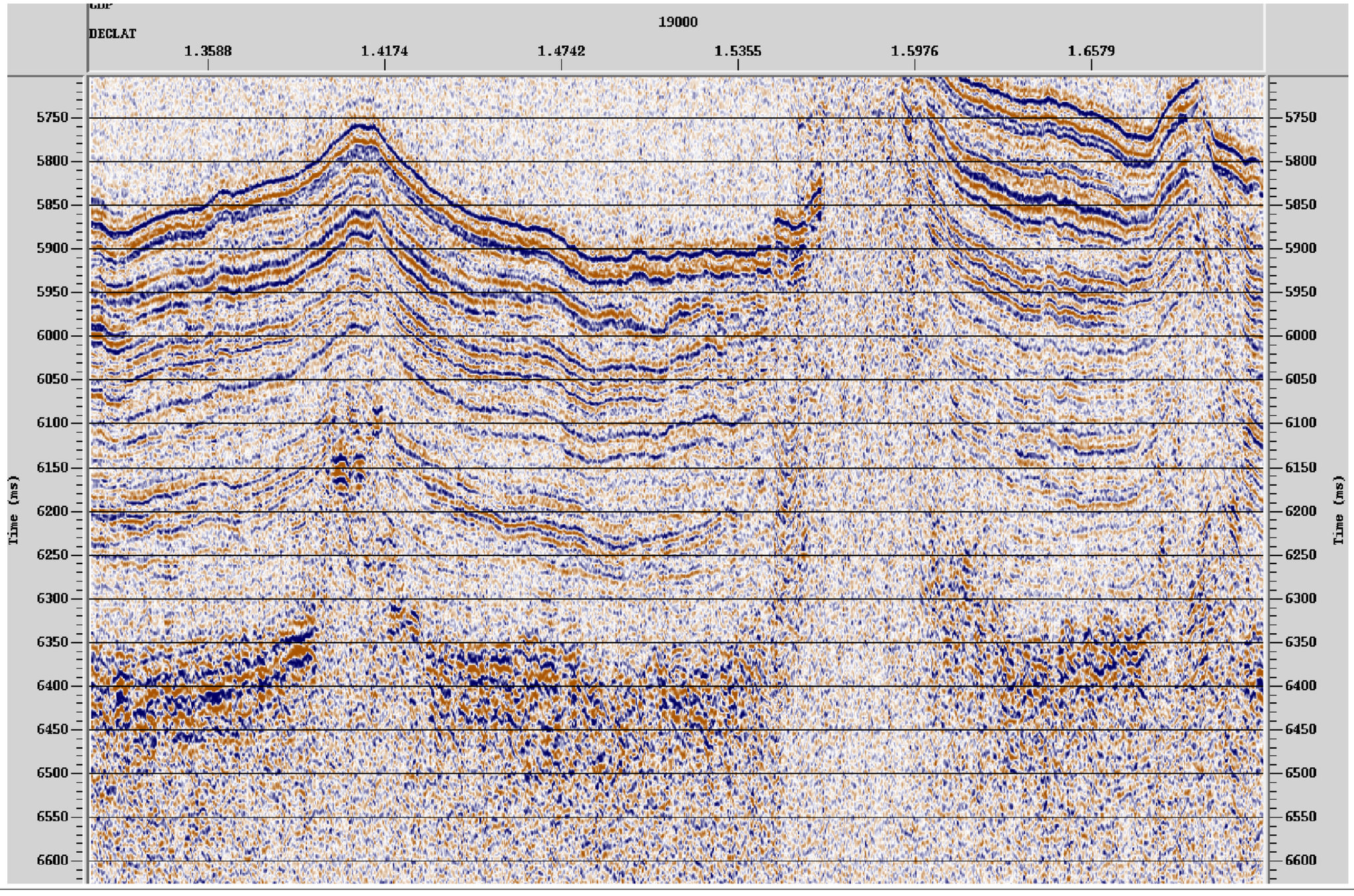

CDP
16000
DEGLAT
2.5699
2.6308
2.691
2.7514
2.8114
2.8733
Time (ms)
5600
5650
5700
5750
5800
5850
5900
5950
6000
6050
6100
6150
6200
6250
6300
6350
6400
6450
6500

S N

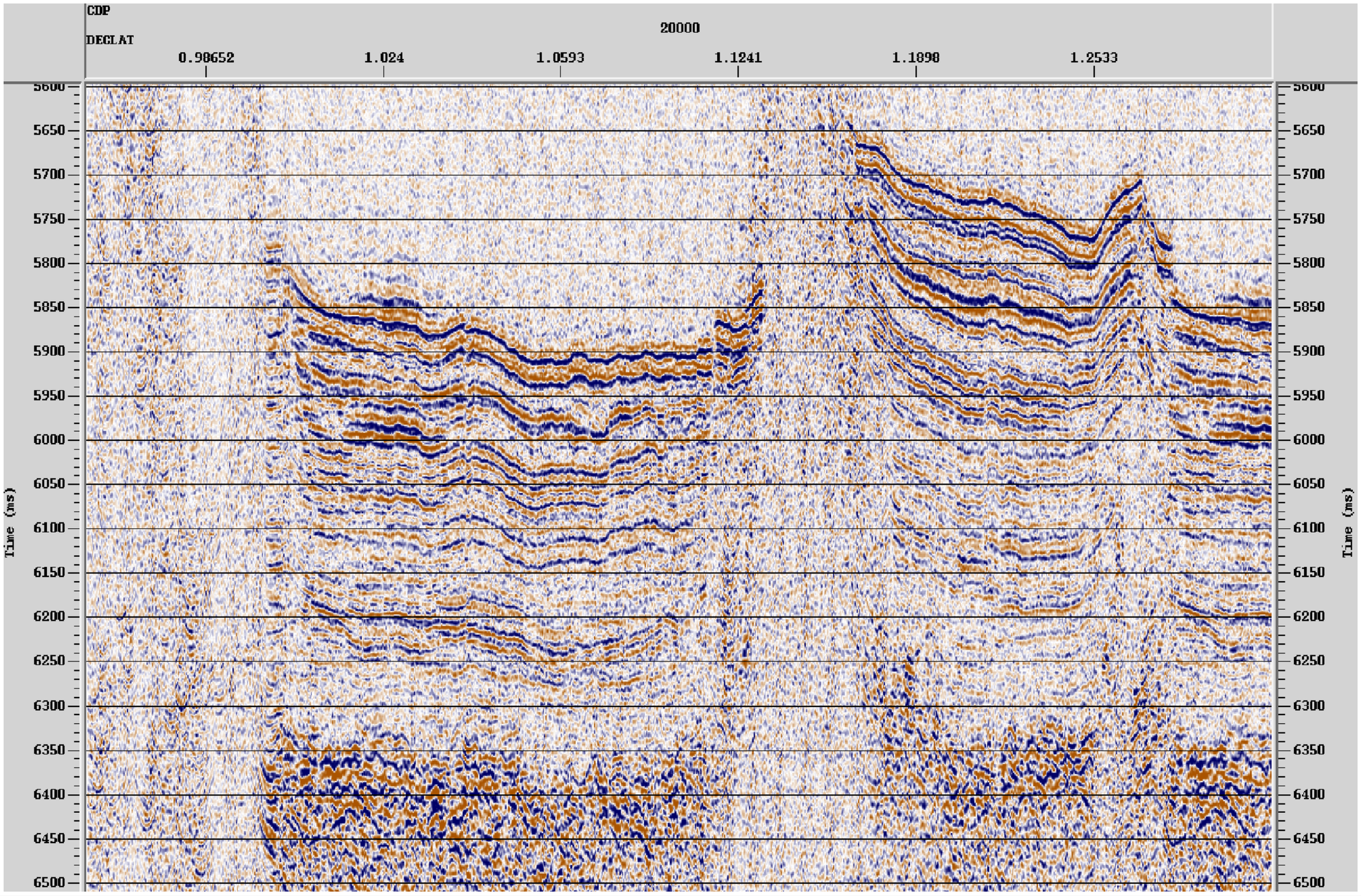

CDP
17000
DECLAT
2.1612
2.23
2.2925
2.3456
2.4078
2.4683
Time (ms)
5550
5600
5650
5700
5750
5800
5850
5900
5950
6000
6050
6100
6150
6200
6250
6300
6350
6400


S
PAT-5 Region
N
CDP
DECLAT
18000
1.7629
1.8245
1.8851
1.9392
1.9959
2.0512
Time (ms)
5600
5650
5700
5750
5800
5850
5900
5950
6000
6050
6100
6150
6200
6250
6300
6350
6400
6450
6500

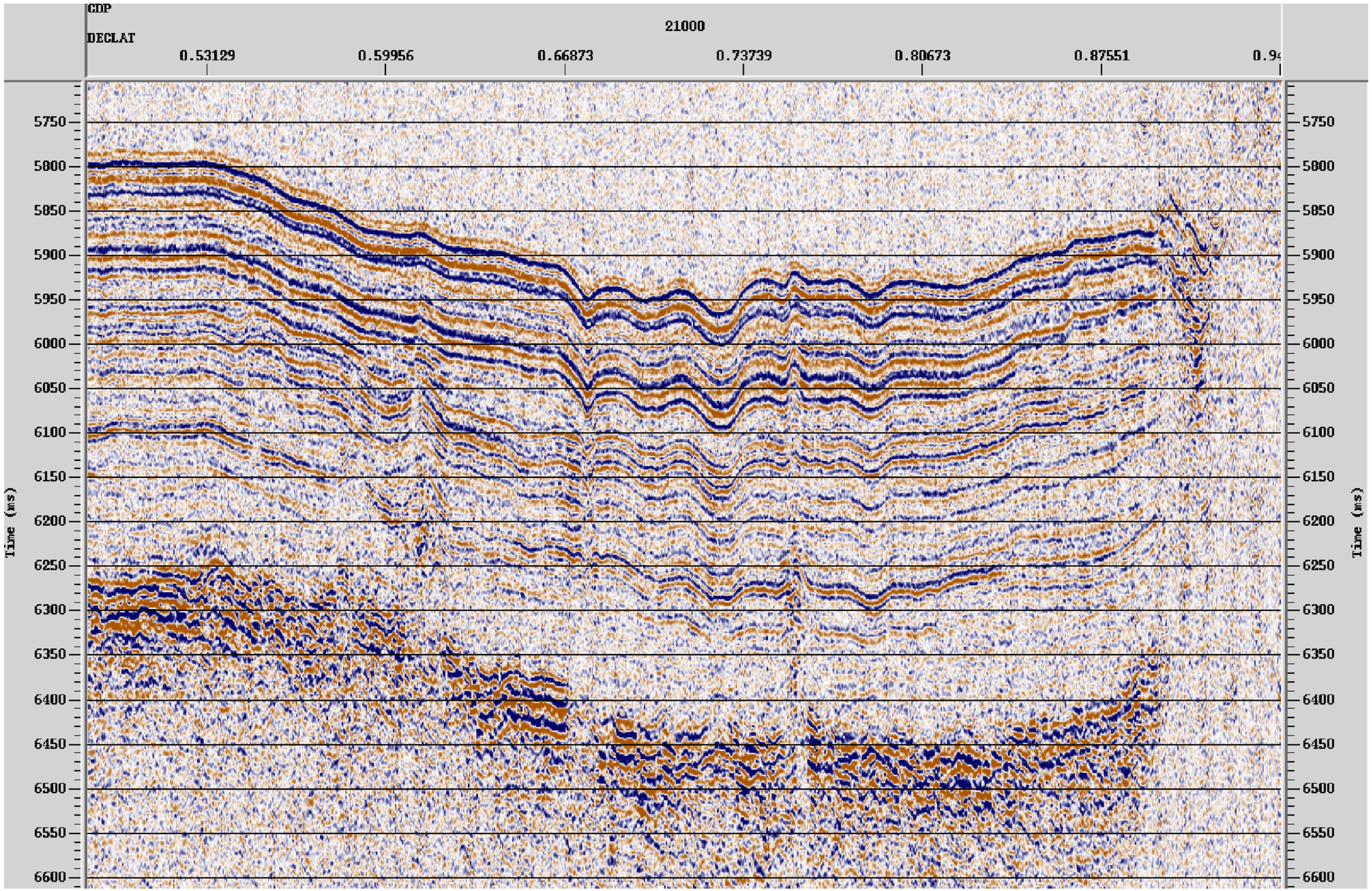
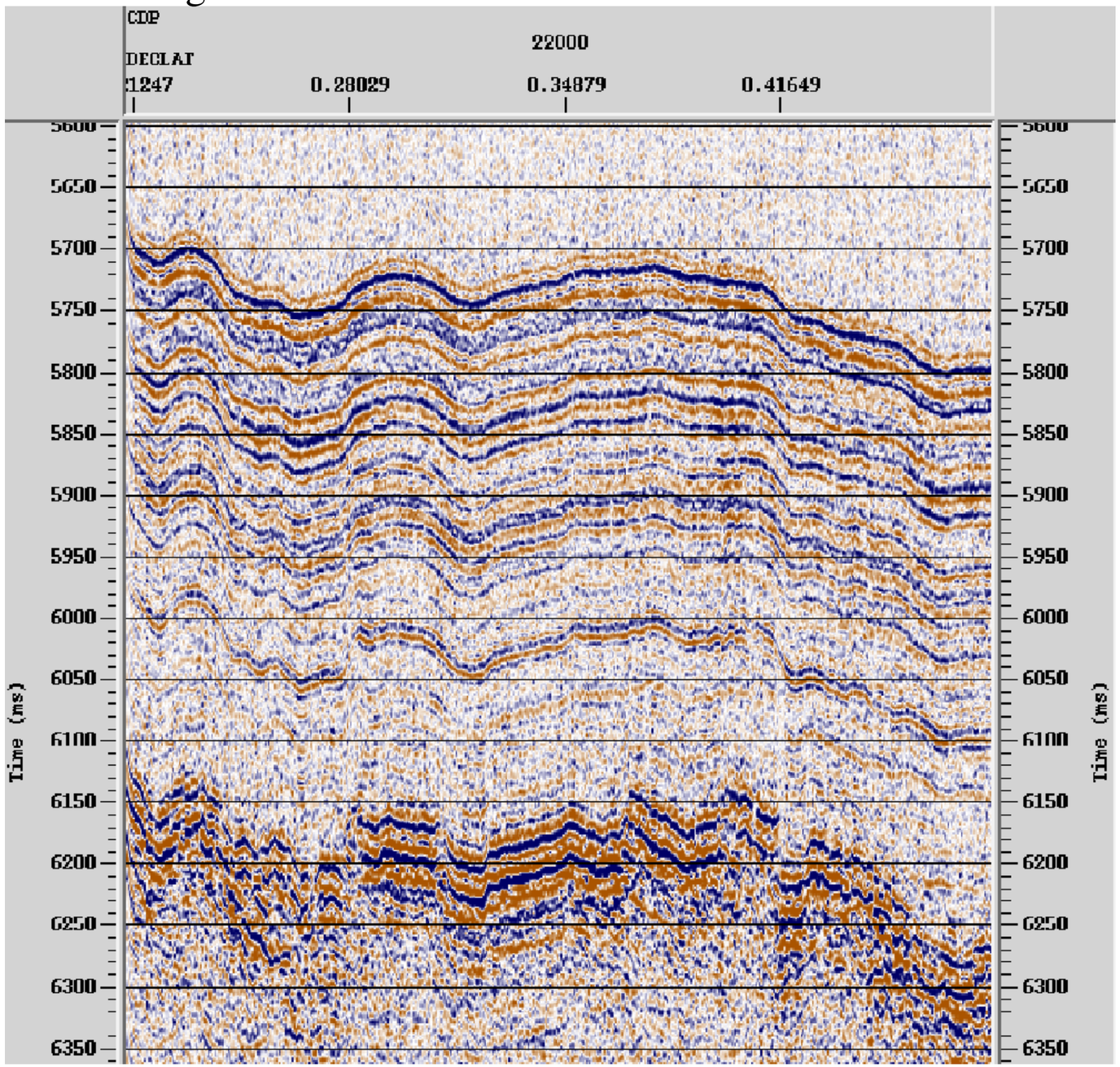
S N


CDP
19000
DECLAT
1.3588
1.4174
1.4742
1.5355
1.5976
1.6579
Time (ms)
5750
5800
5850
5900
5950
6000
6050
6100
6150
6200
6250
6300
6350
6400
6450
6500
6550
6600

S N


CDP
20000
DEGLAT
0.98652
1.024
1.0593
1.1241
1.1898
1.2533
Time (ms)
5600
5650
5700
5750
5800
5850
5900
5950
6000
6050
6100
6150
6200
6250
6300
6350
6400
6450
6500

S N


CDP
21000
DECLAT
0.53129
0.59956
0.66873
0.73739
0.80673
0.87551
5750
5800
5850
5900
5950
6000
6050
6100
6150
6200
6250
6300
6350
6400
6450
6500
6550
6600
Time (ms)

S ← PAT-4 Region → N