

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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BSU CGISS Technical Report 2001-03

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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

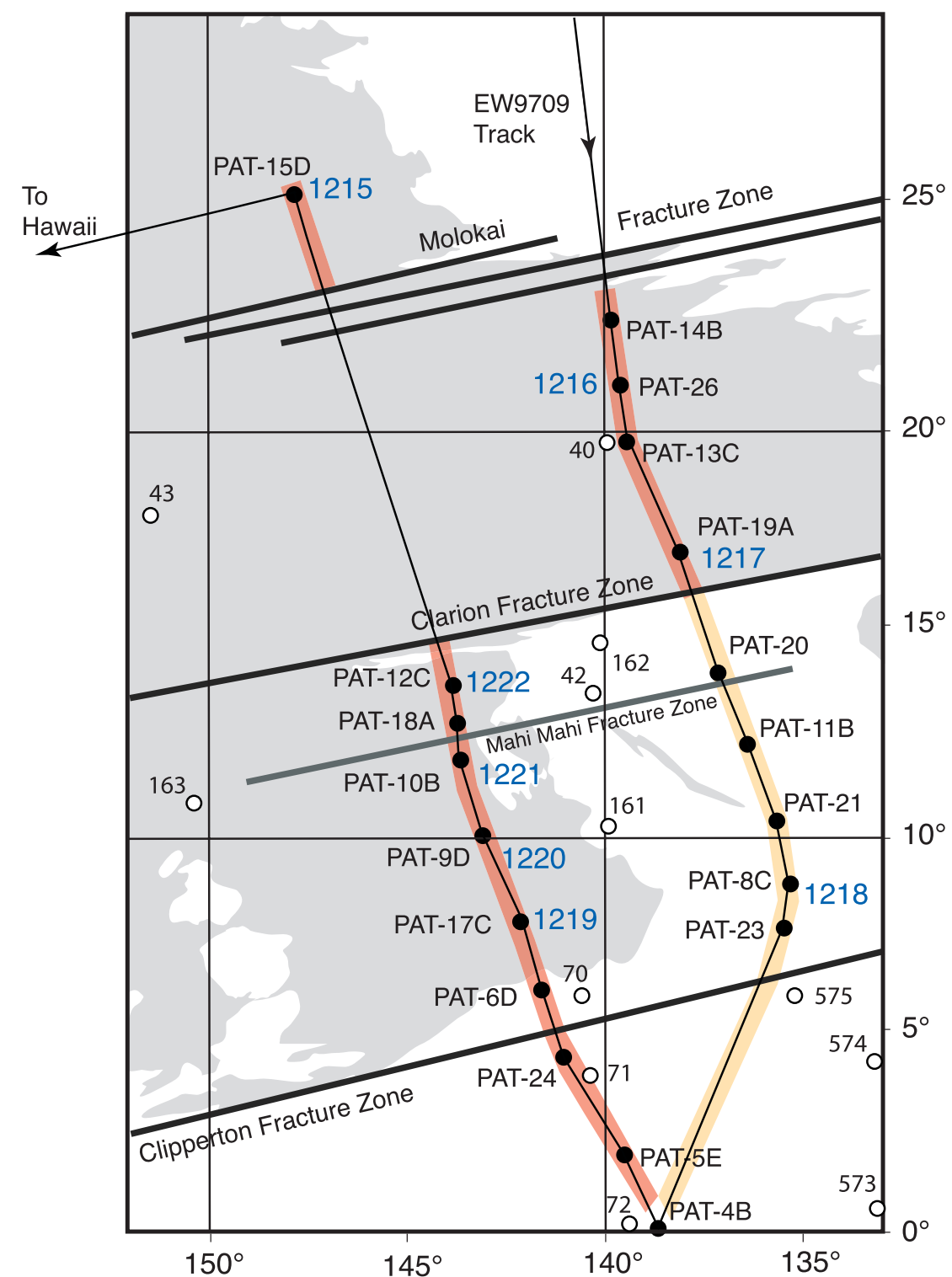


Figure 1: EW9709 Trackline, showing 56 Ma and 40 Ma transects, as well as drillsites surveyed for ODP Leg 199

56 Ma transect
40 Ma transect

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.

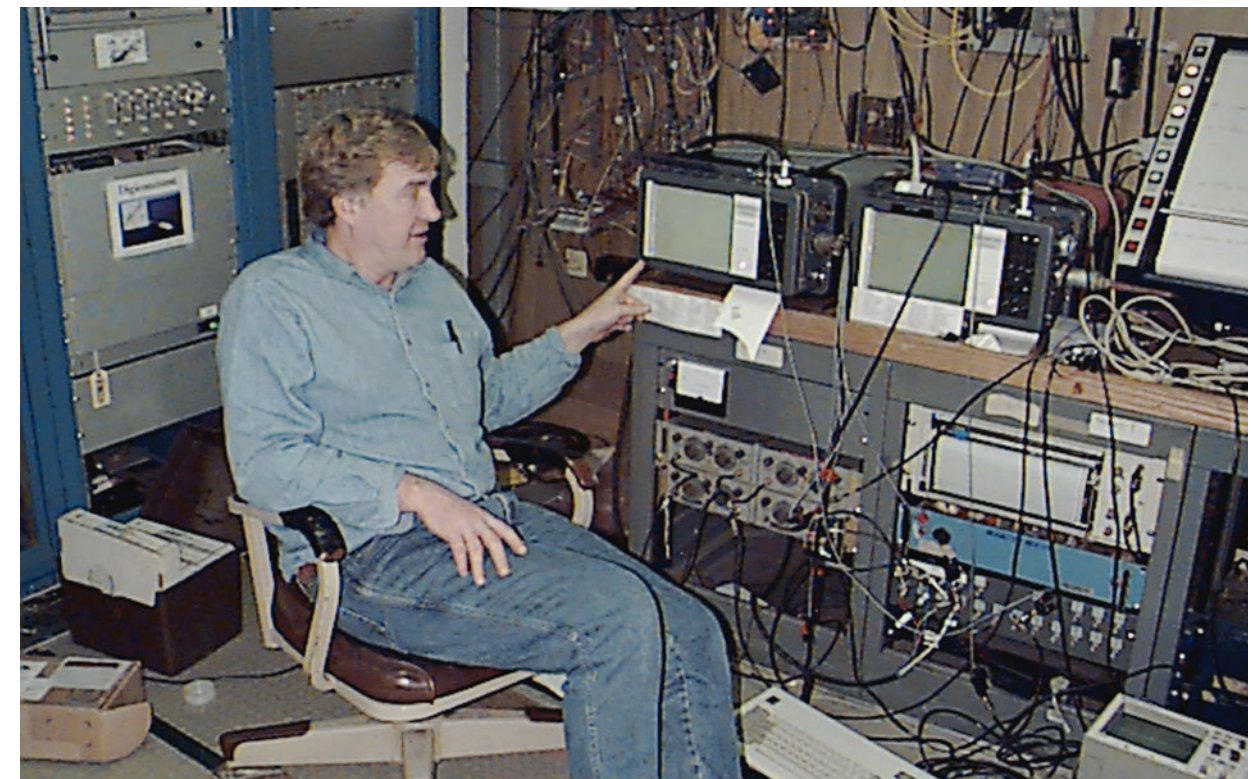
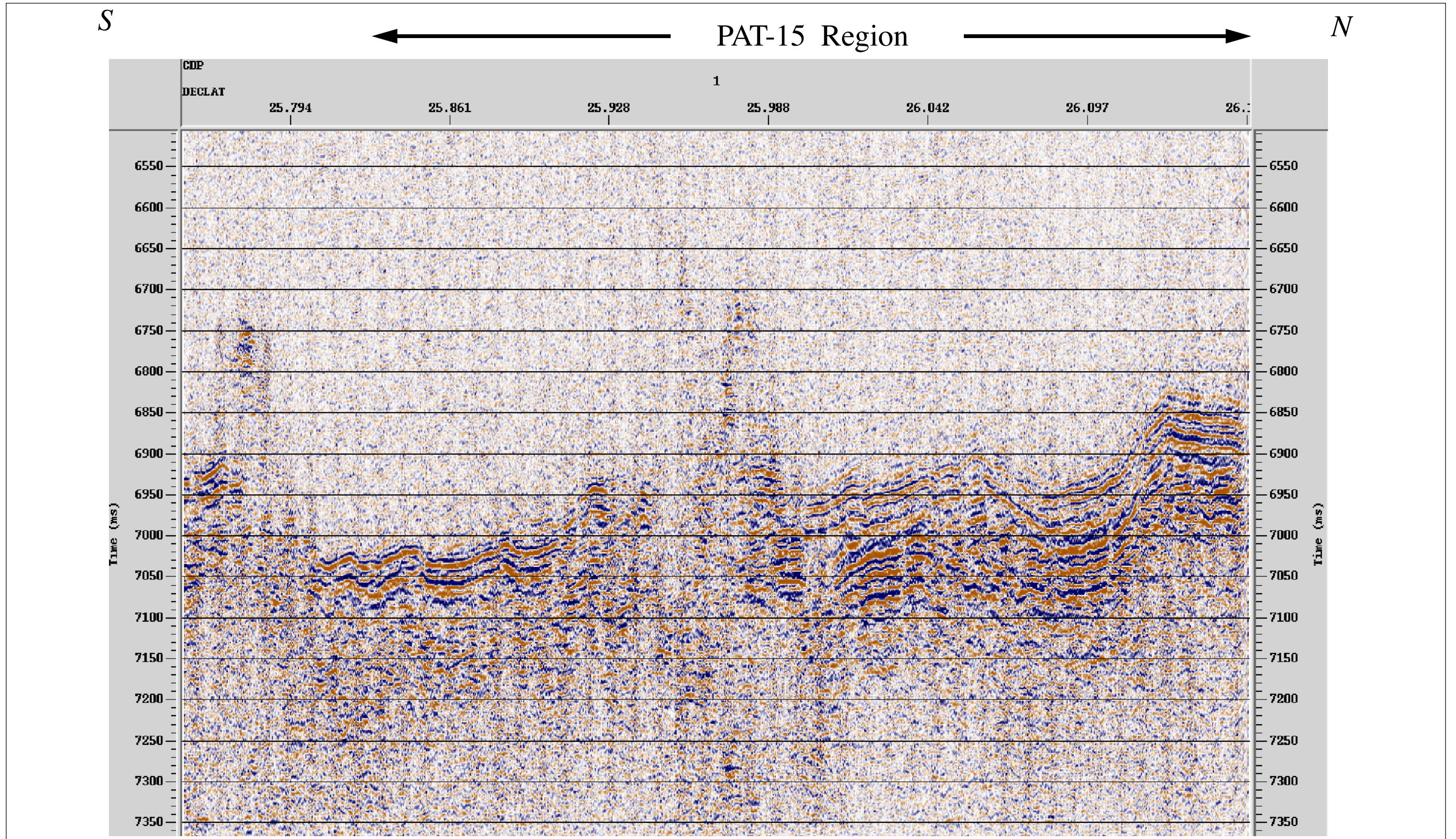
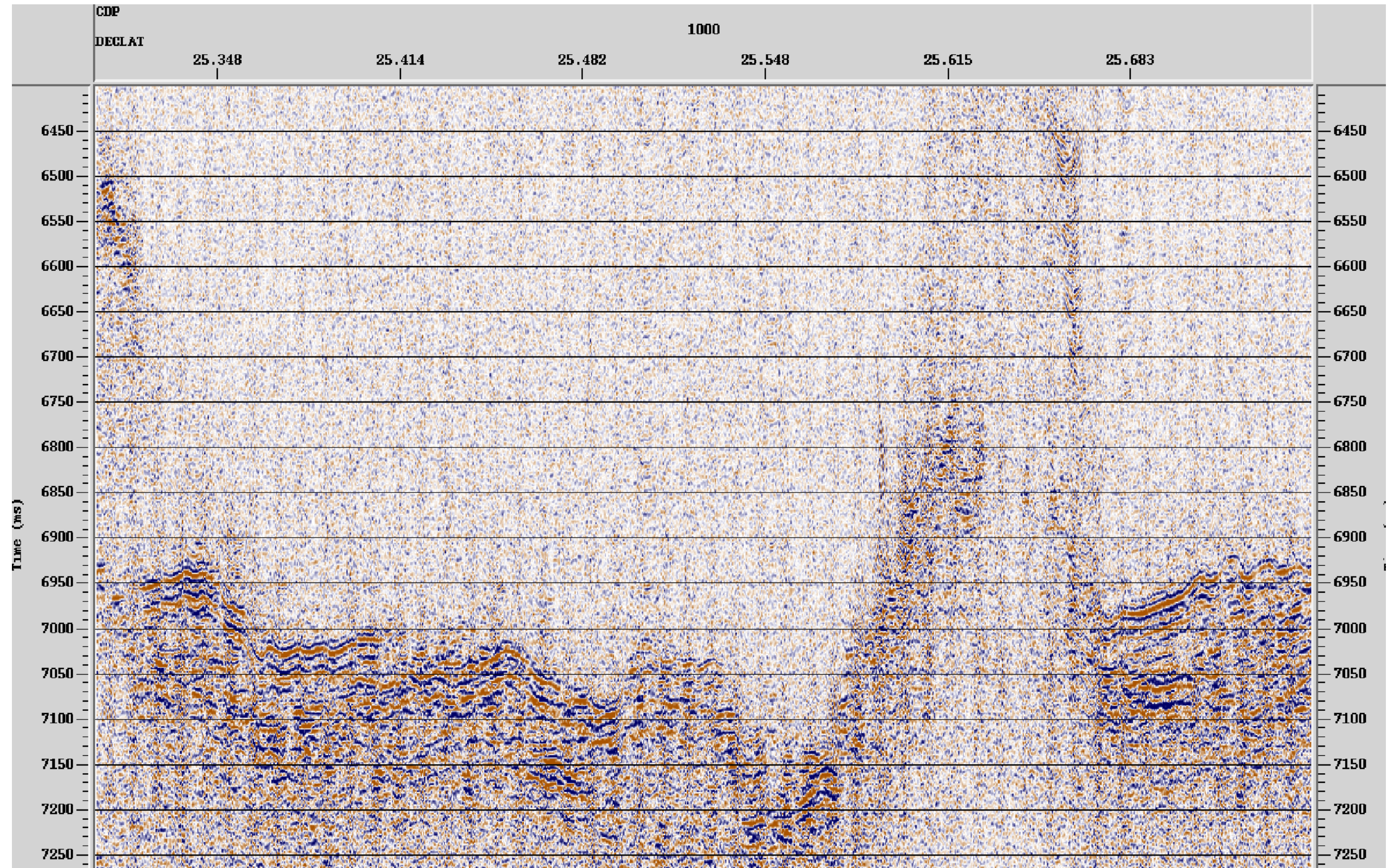


Figure 3: Mitch Lyle and digital recording setup for 80 c.i. watergun and for 3.5 kHz sub-bottom profiler



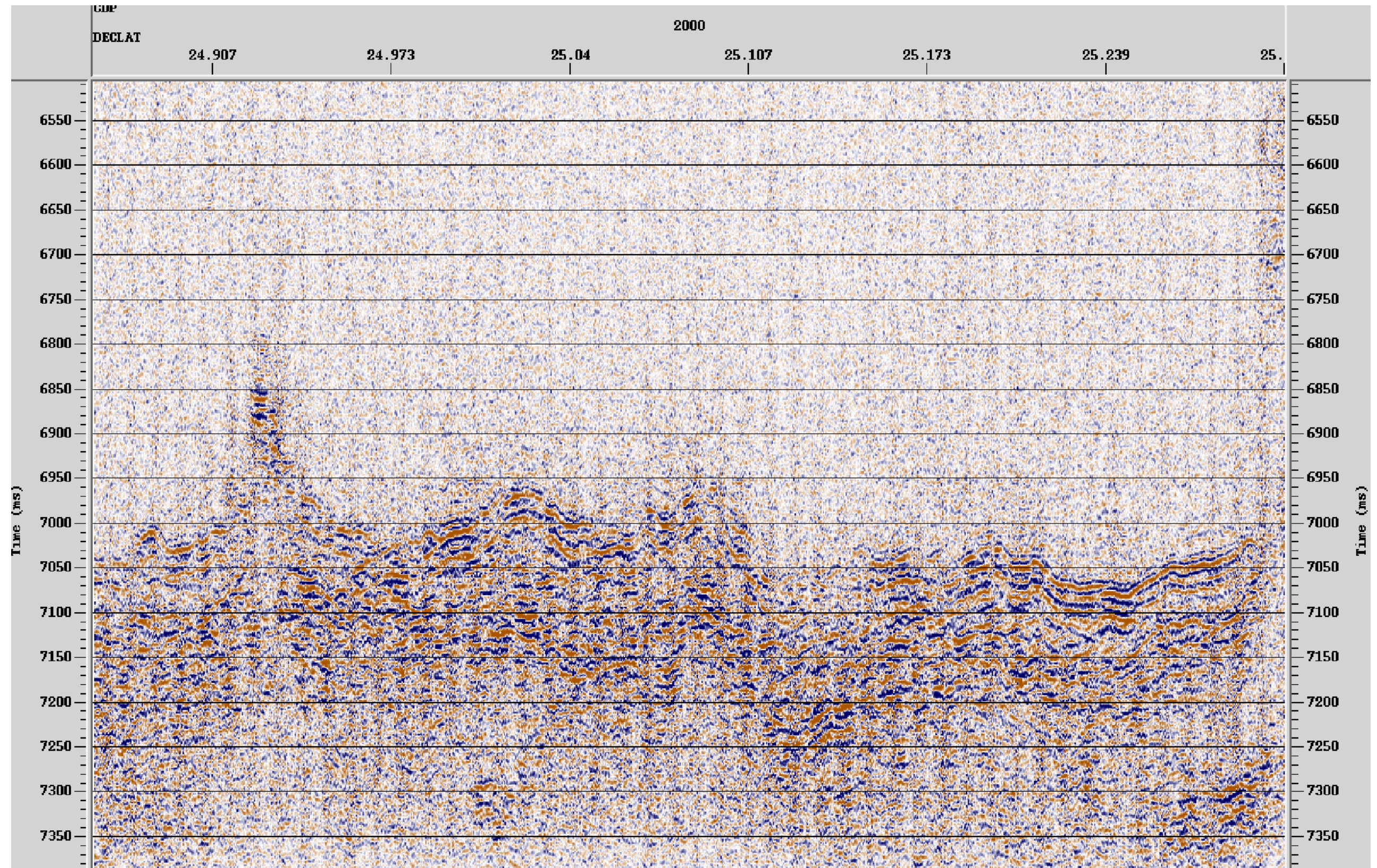
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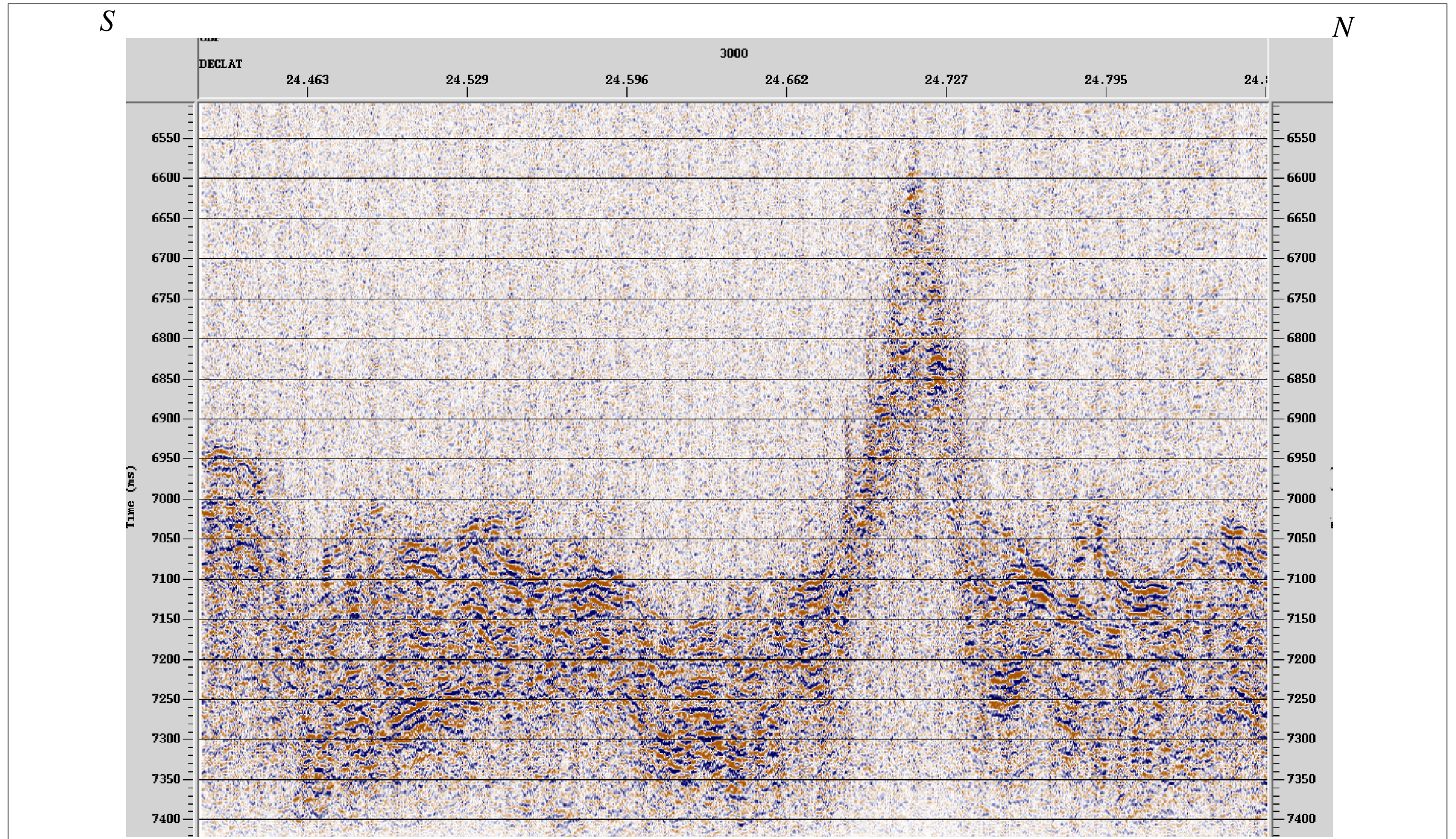
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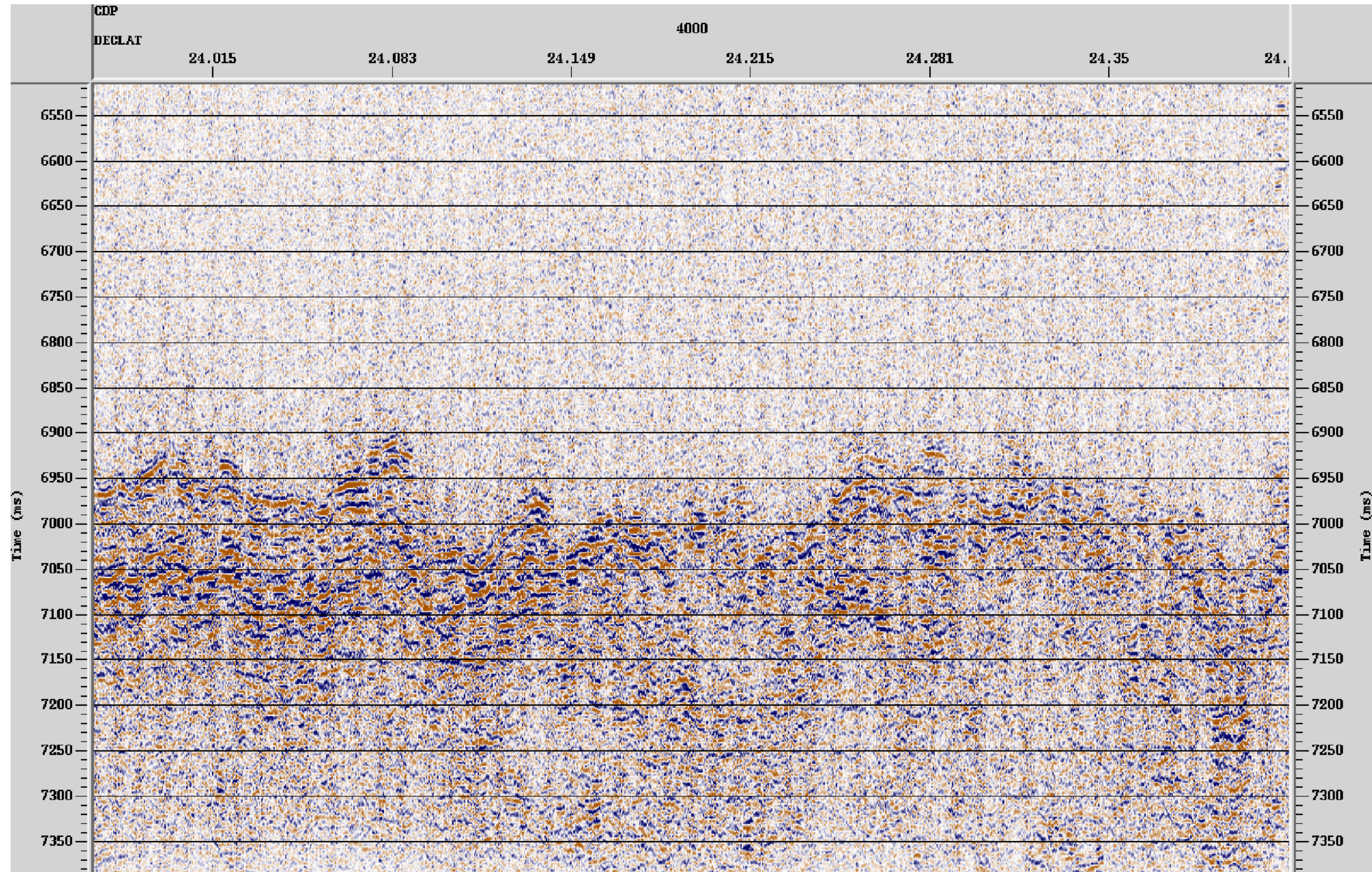
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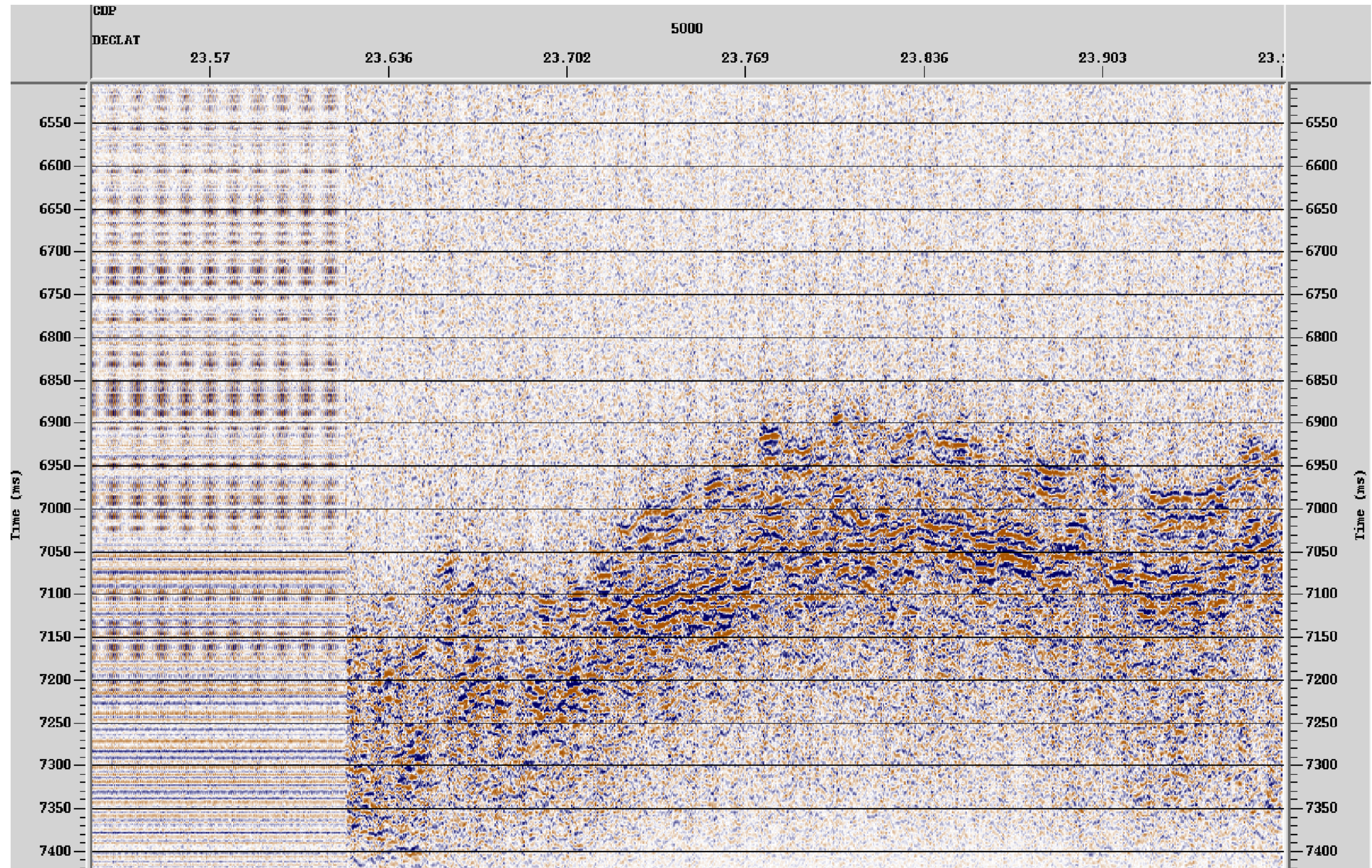
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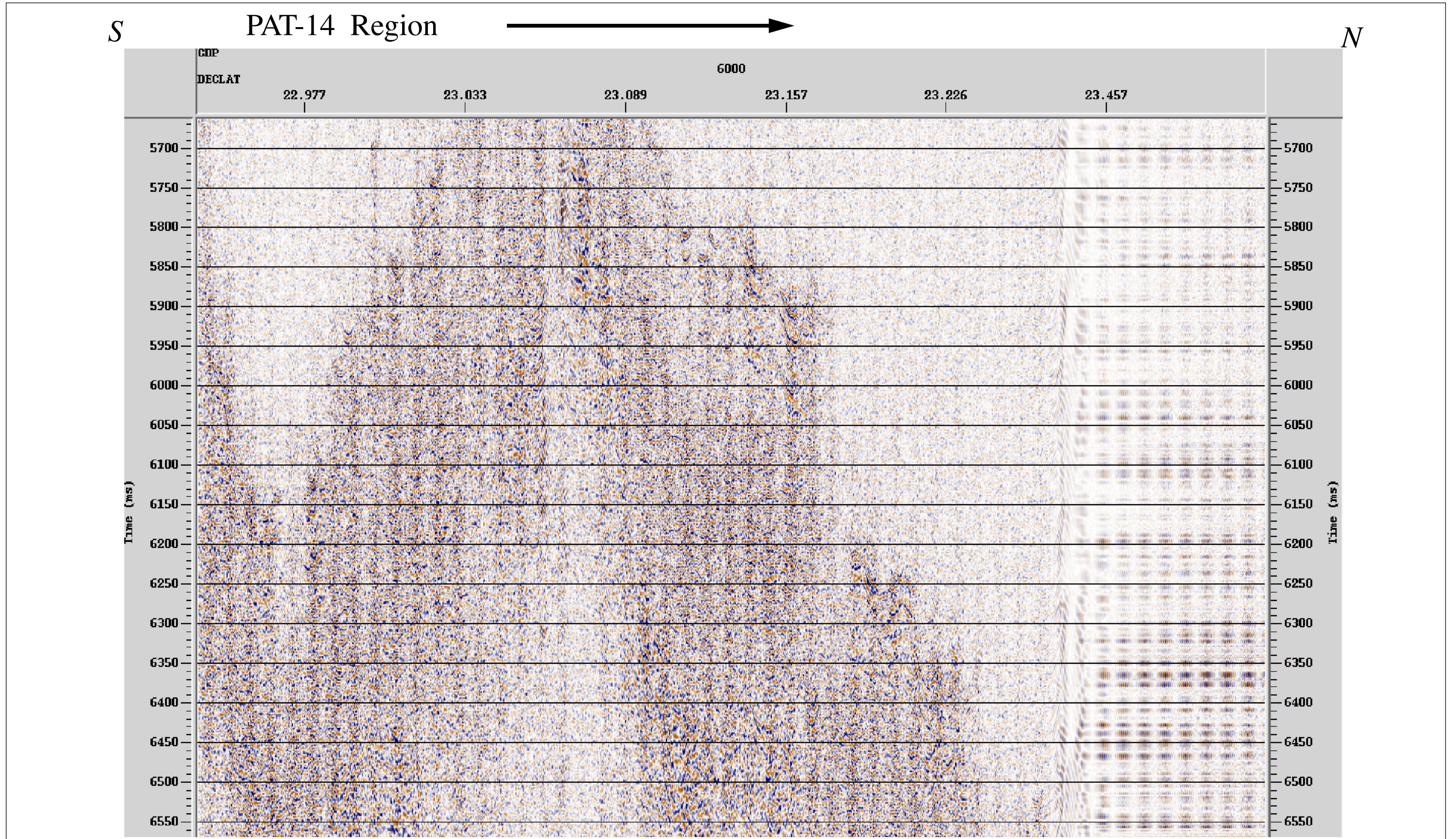
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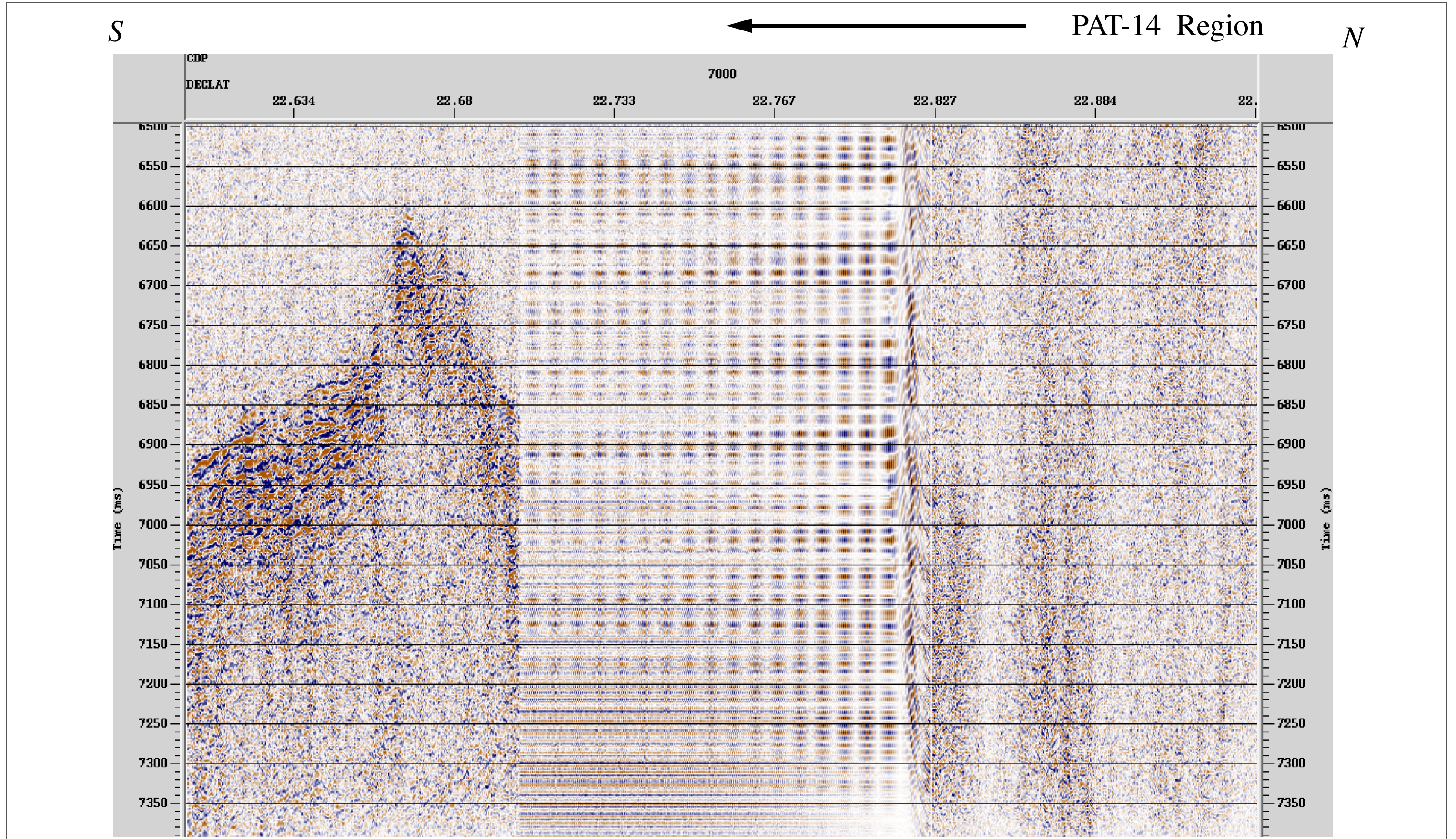


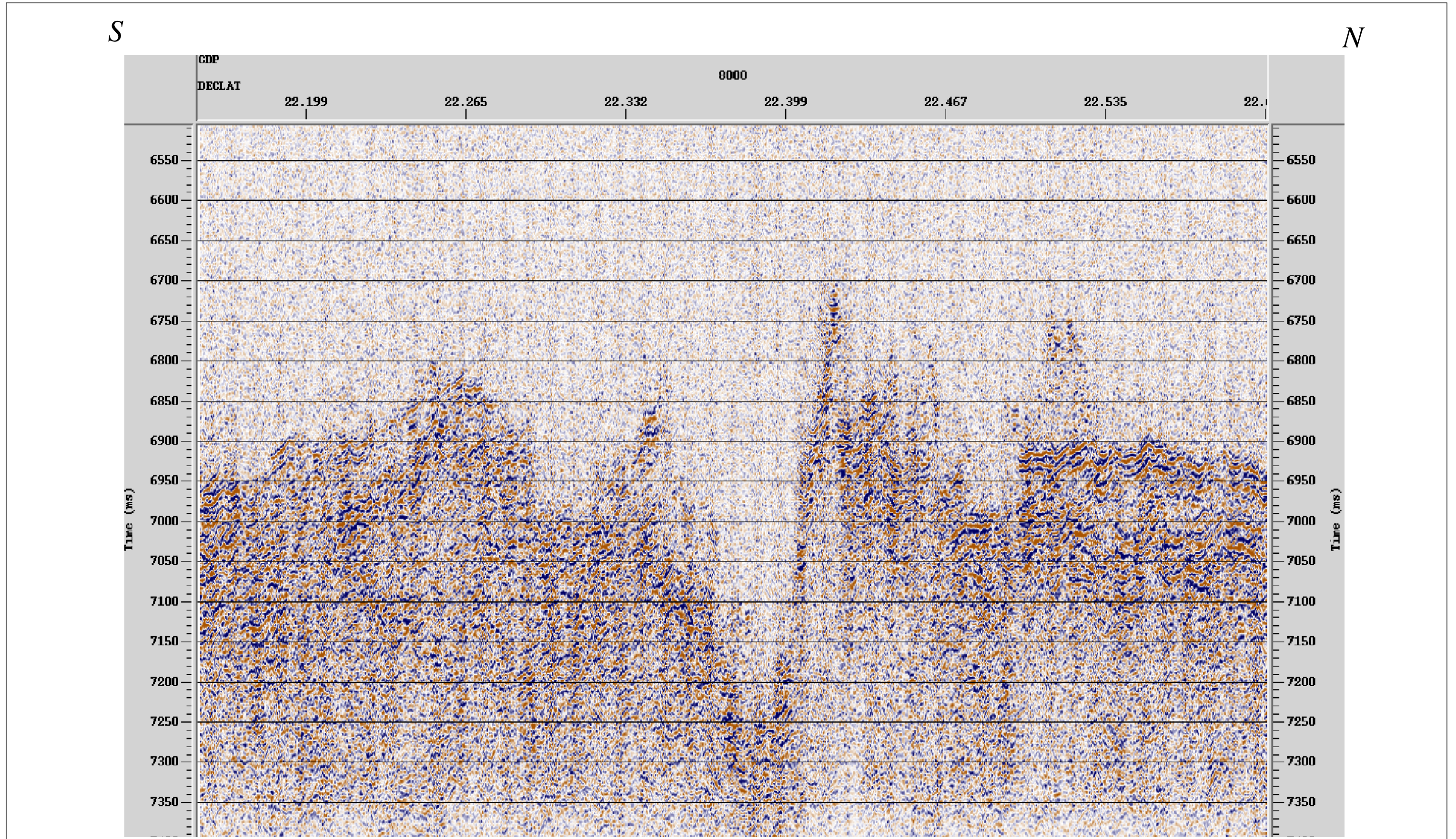
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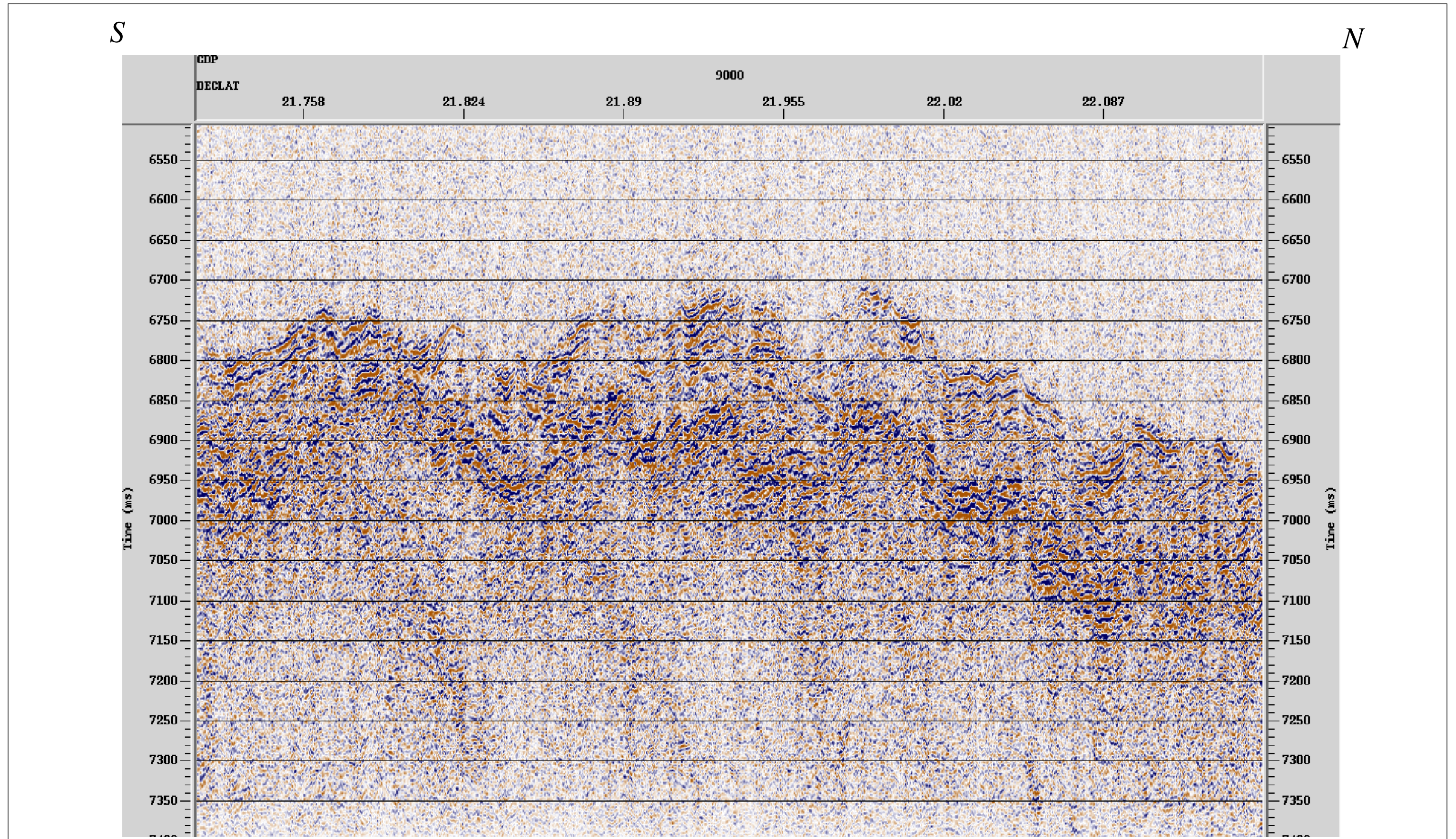
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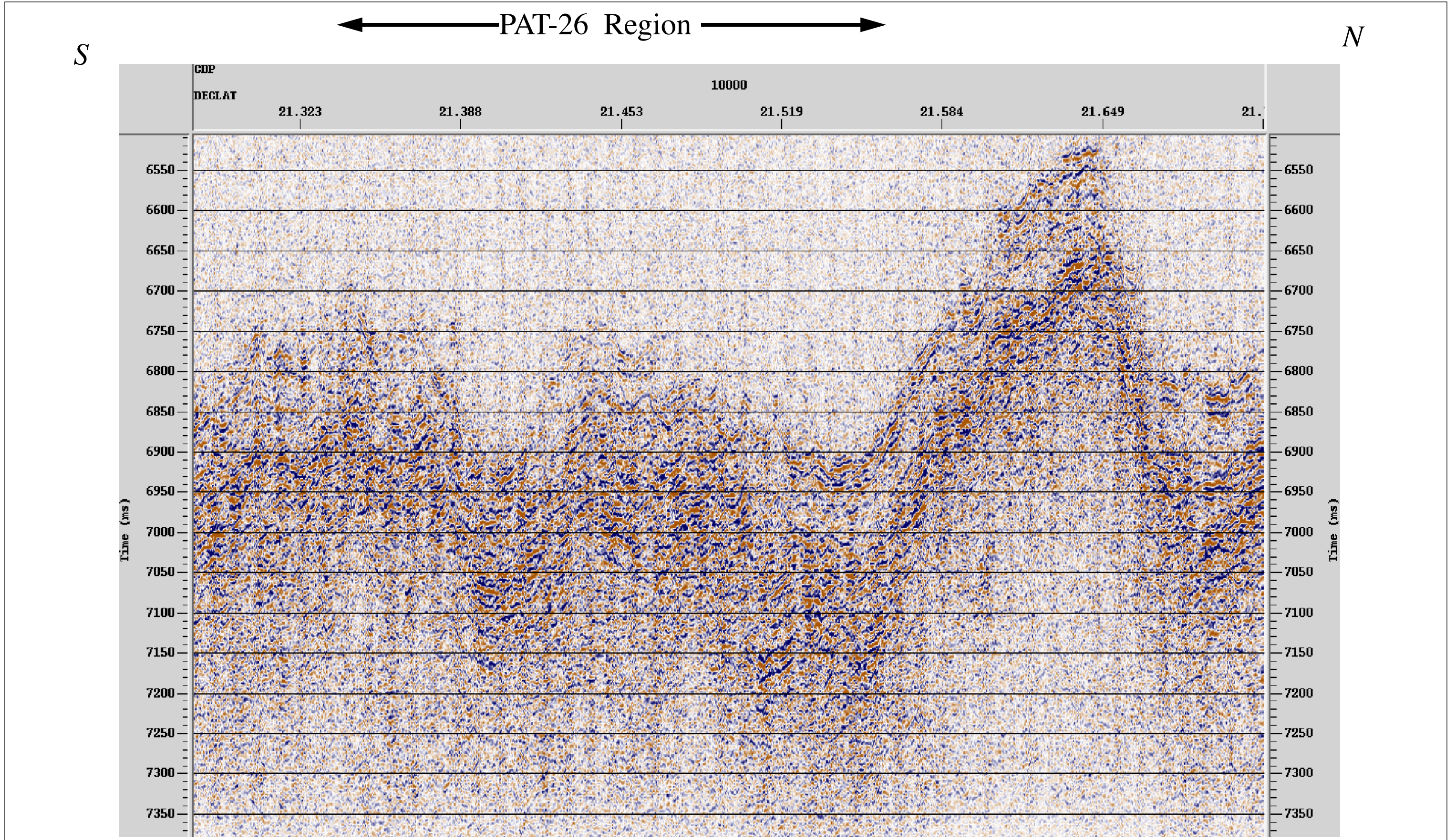


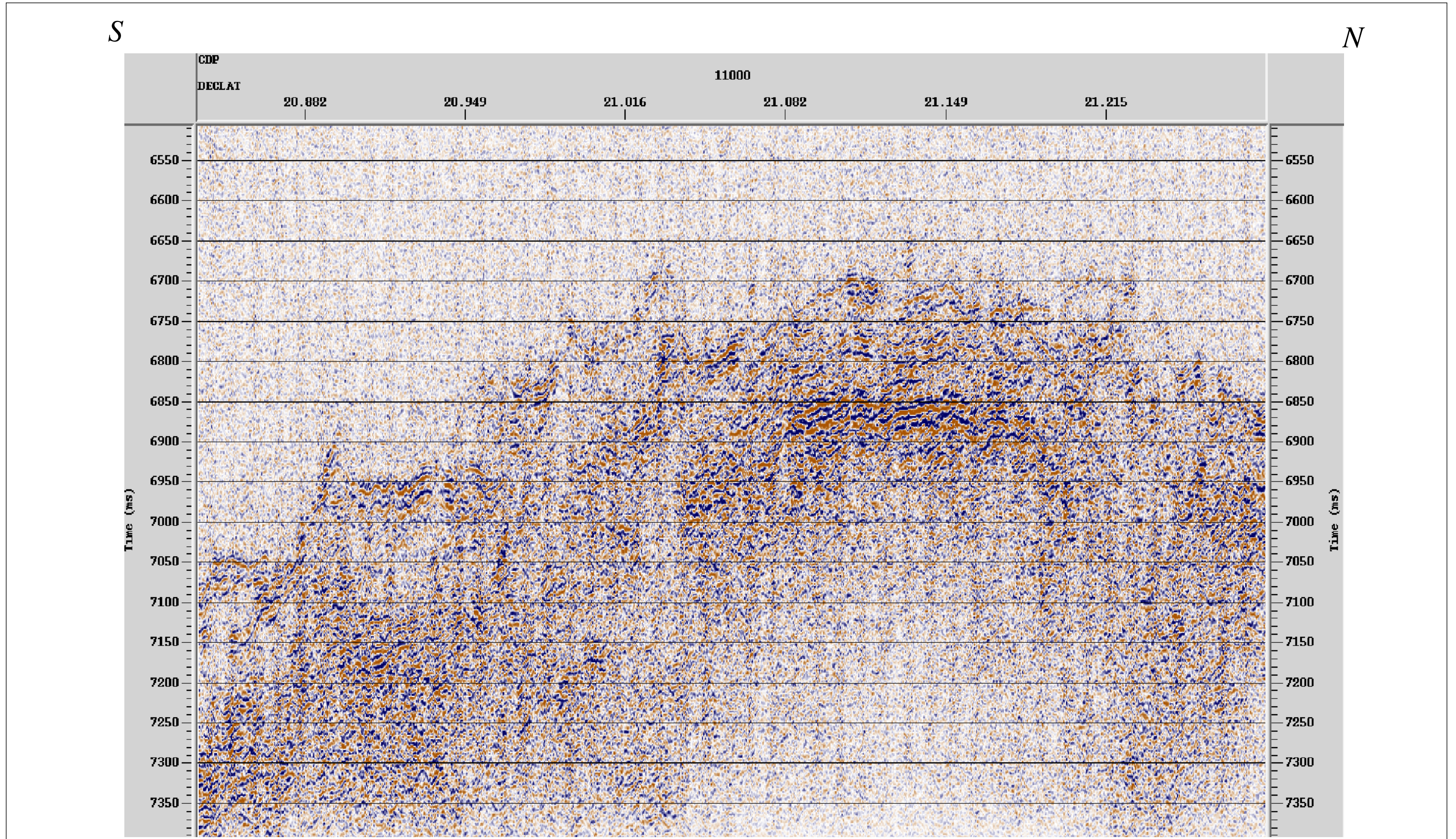




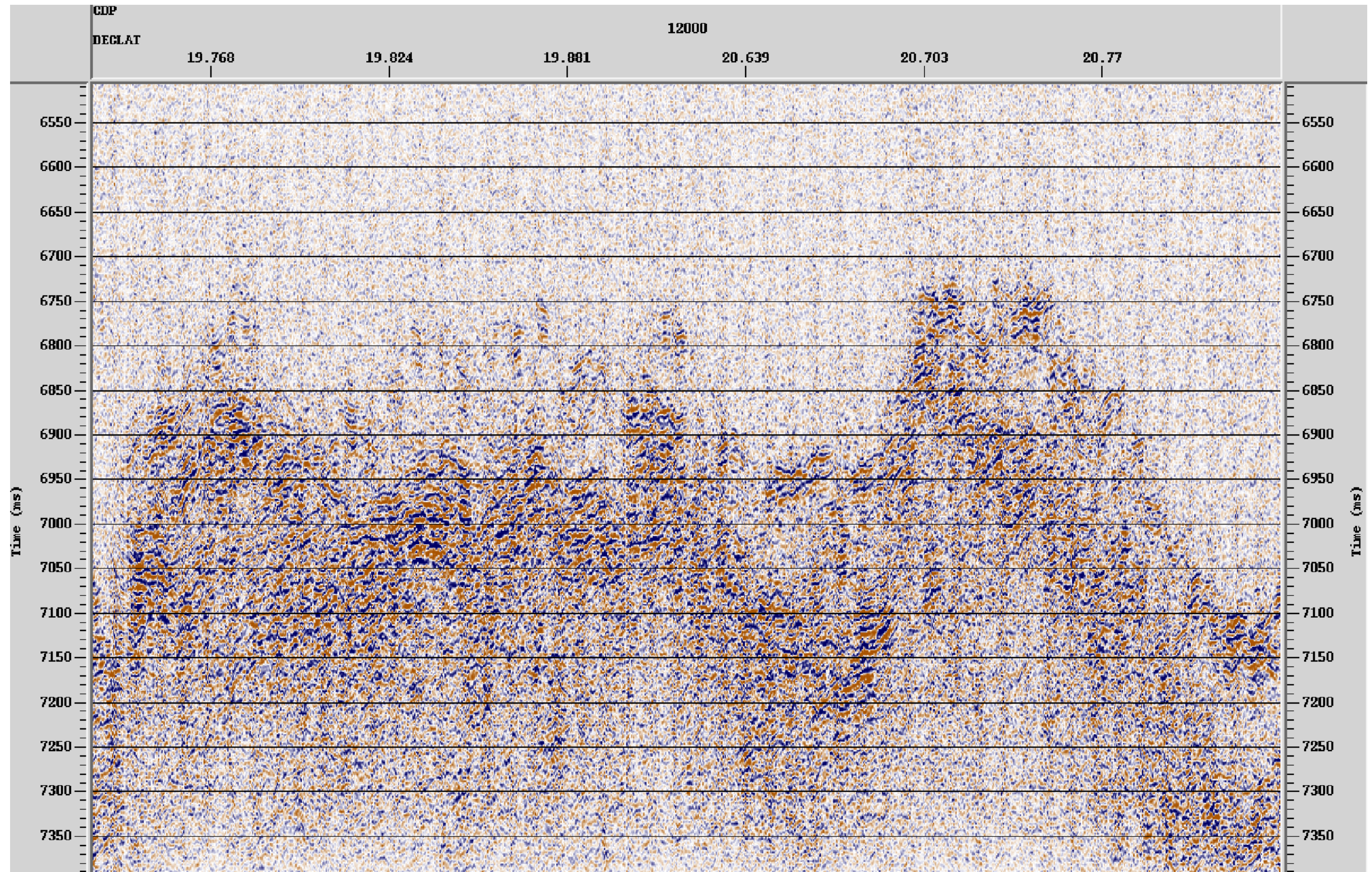






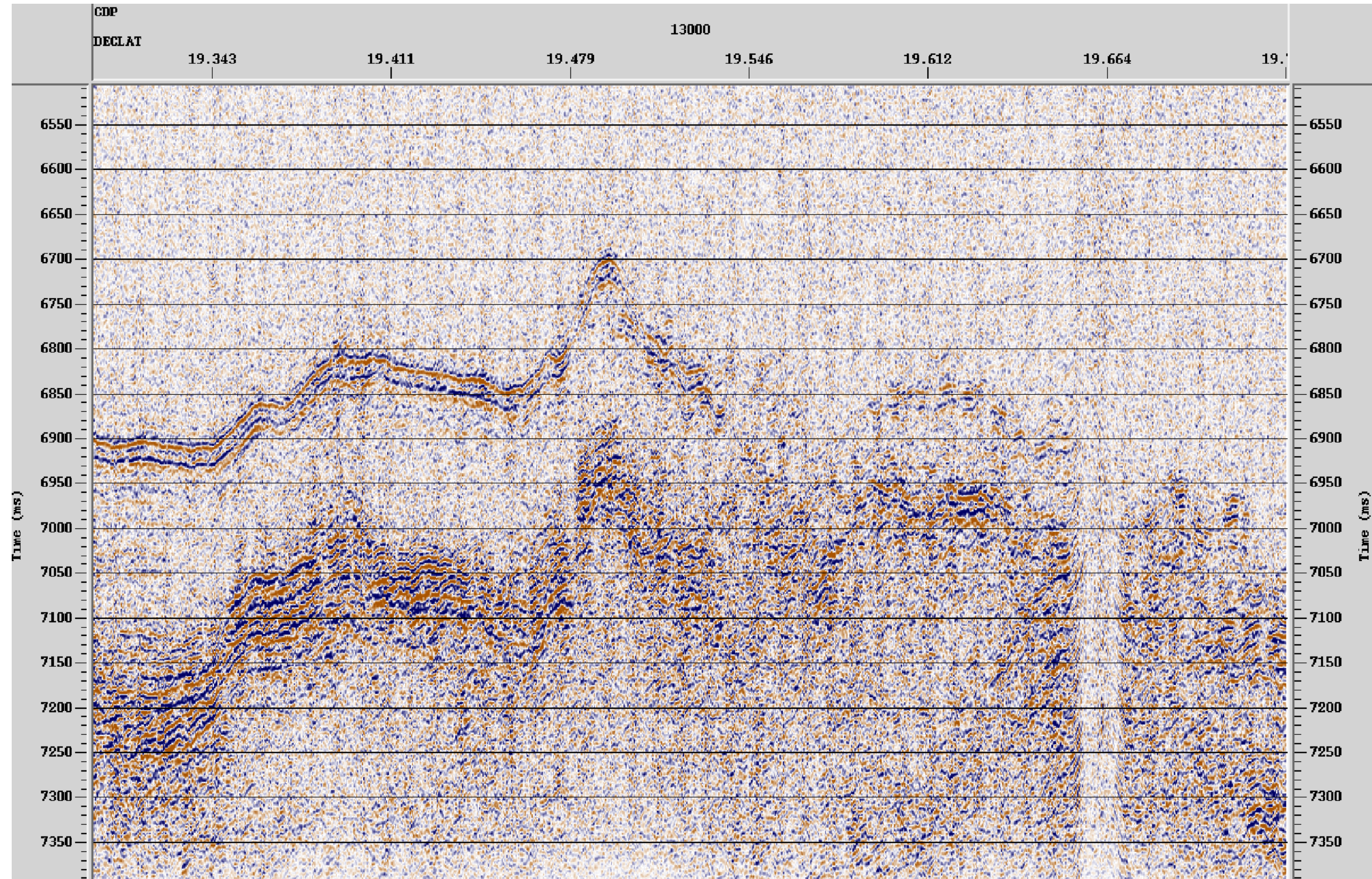


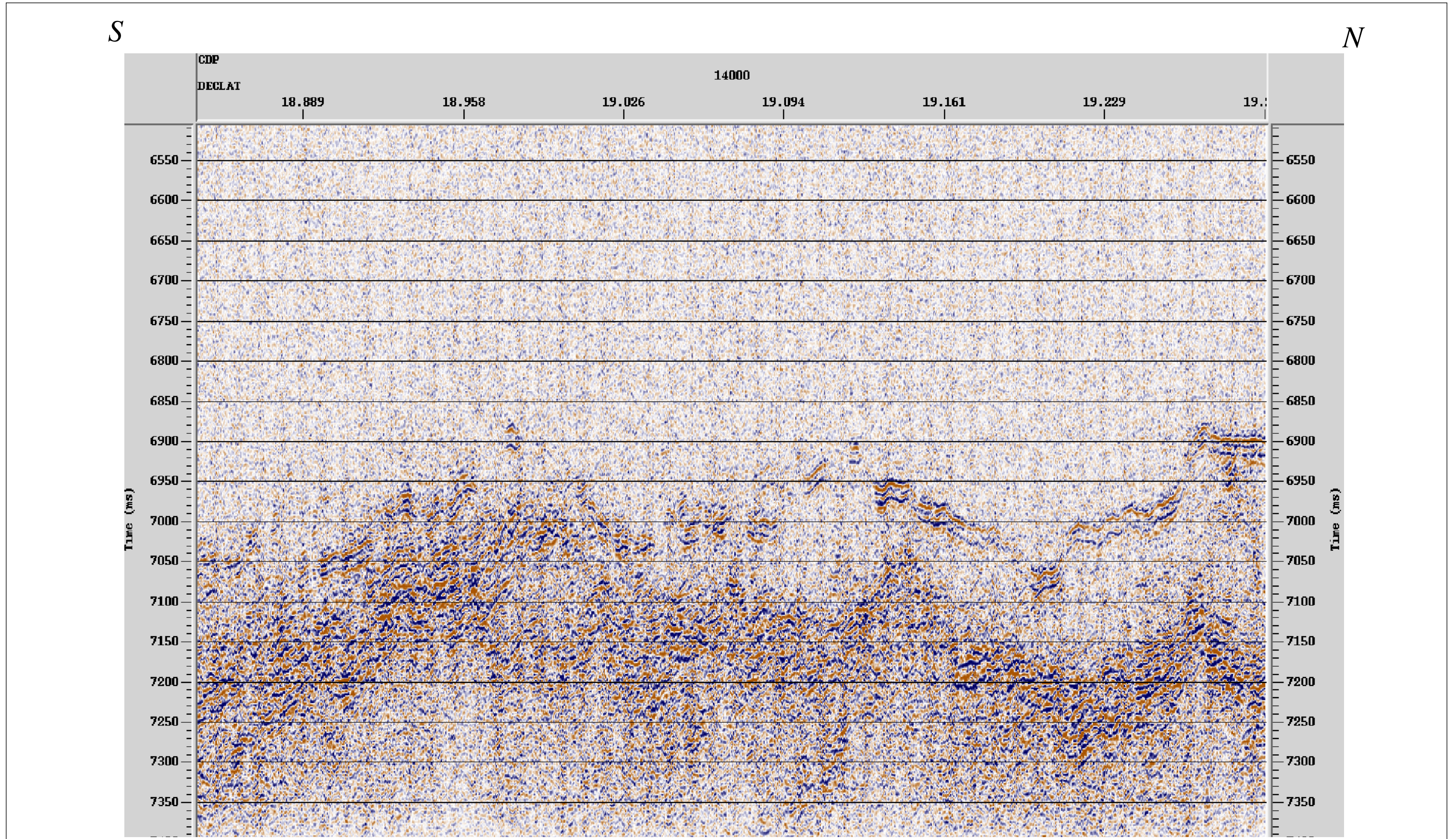
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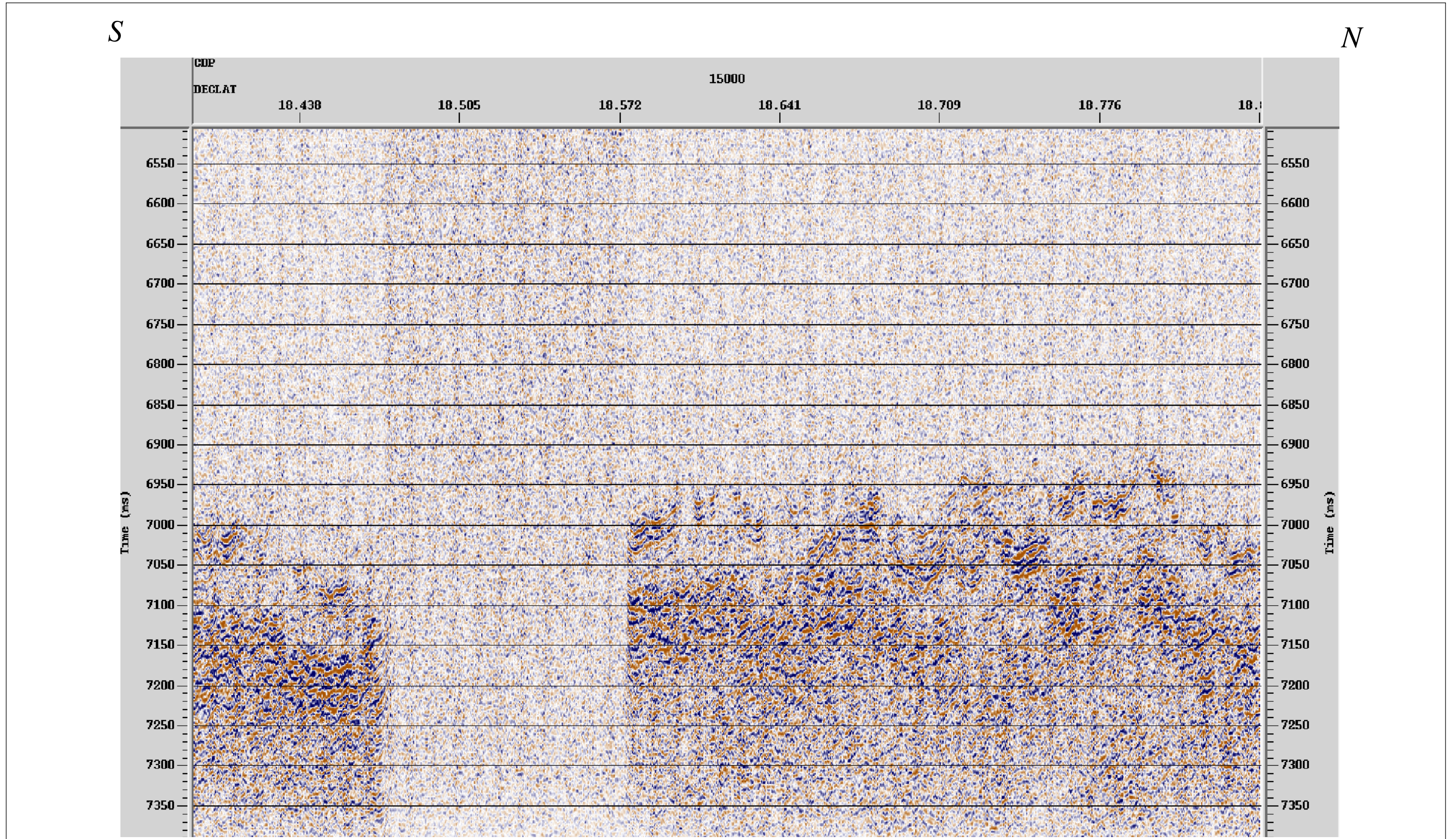


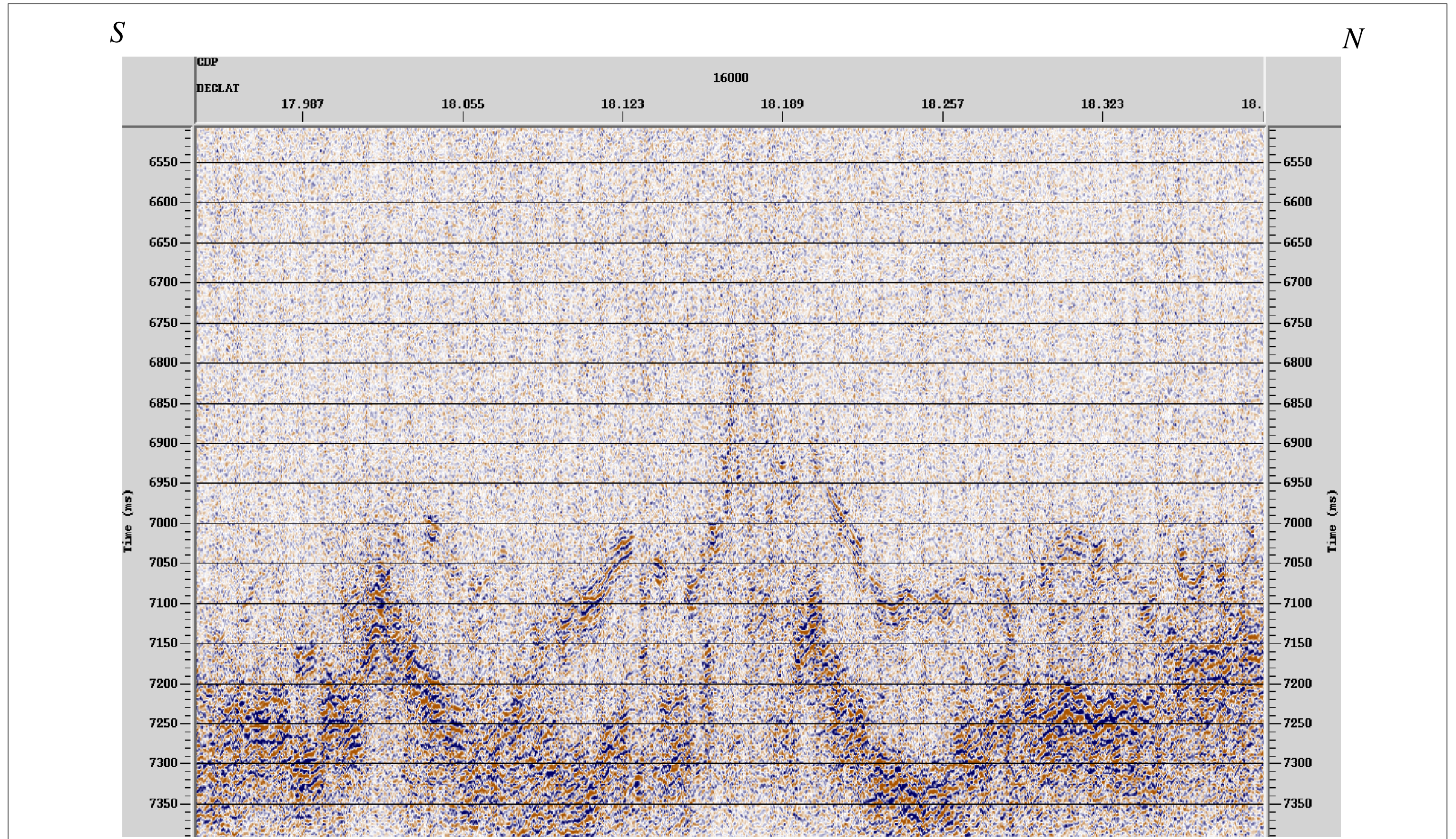
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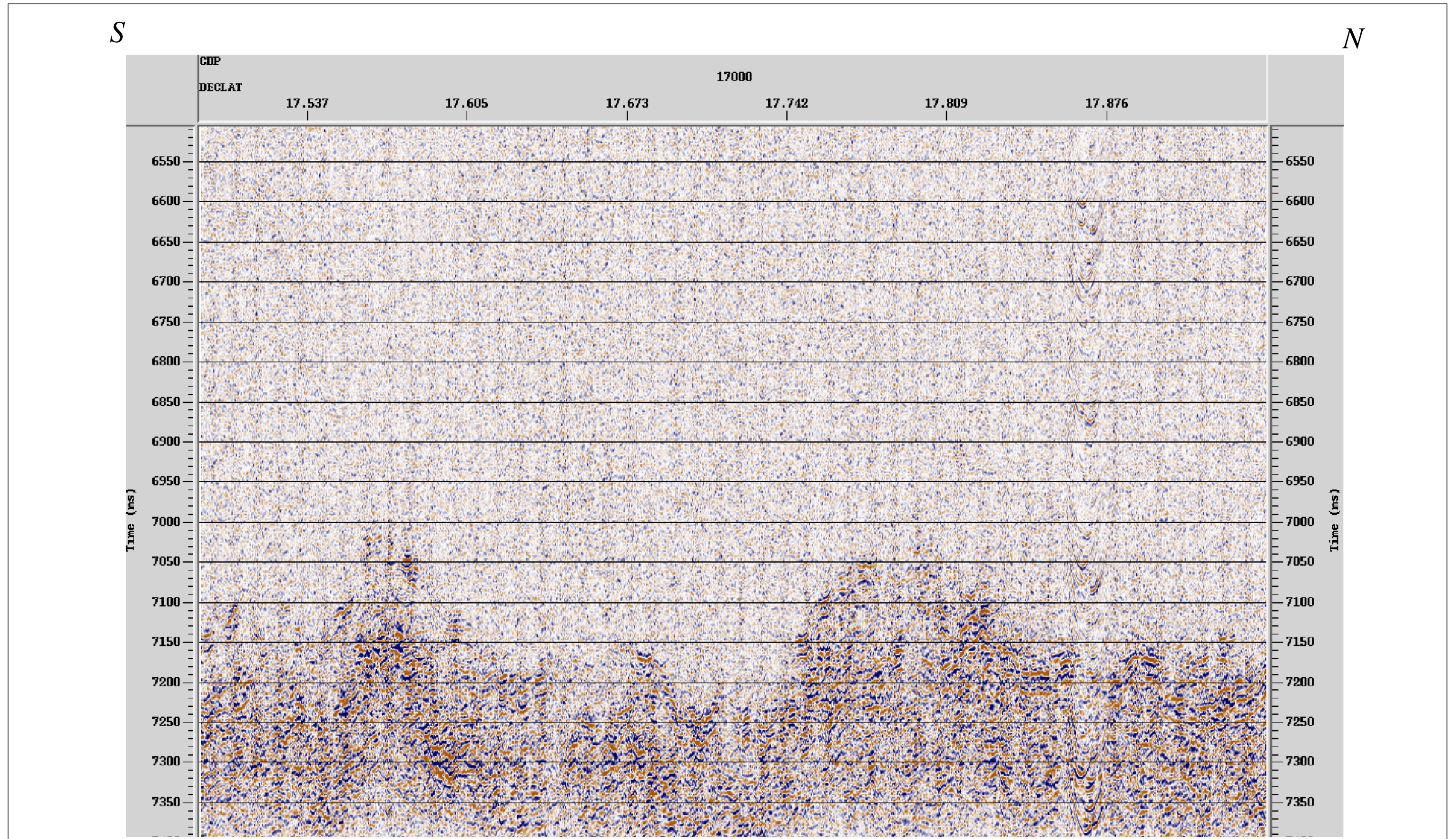
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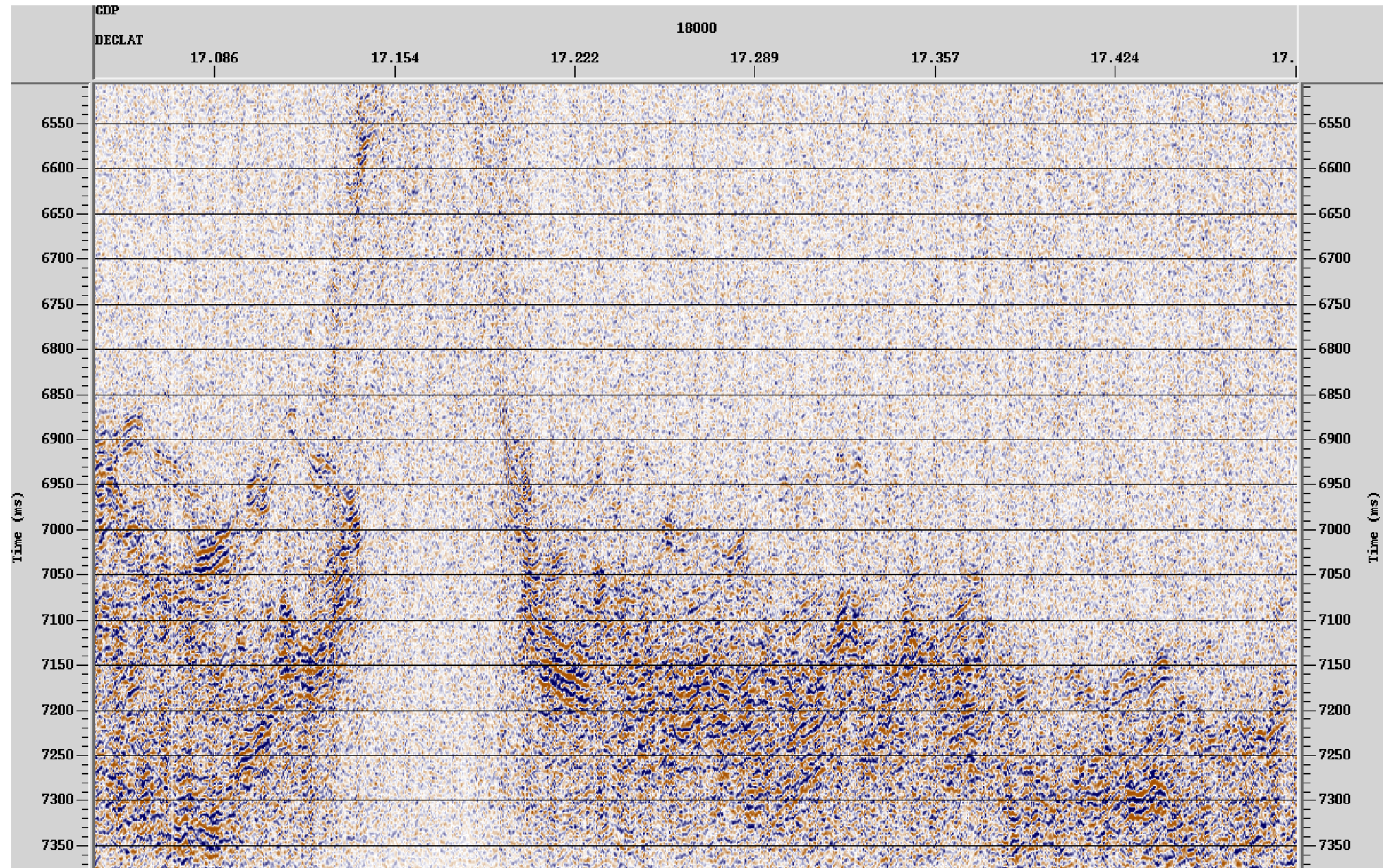


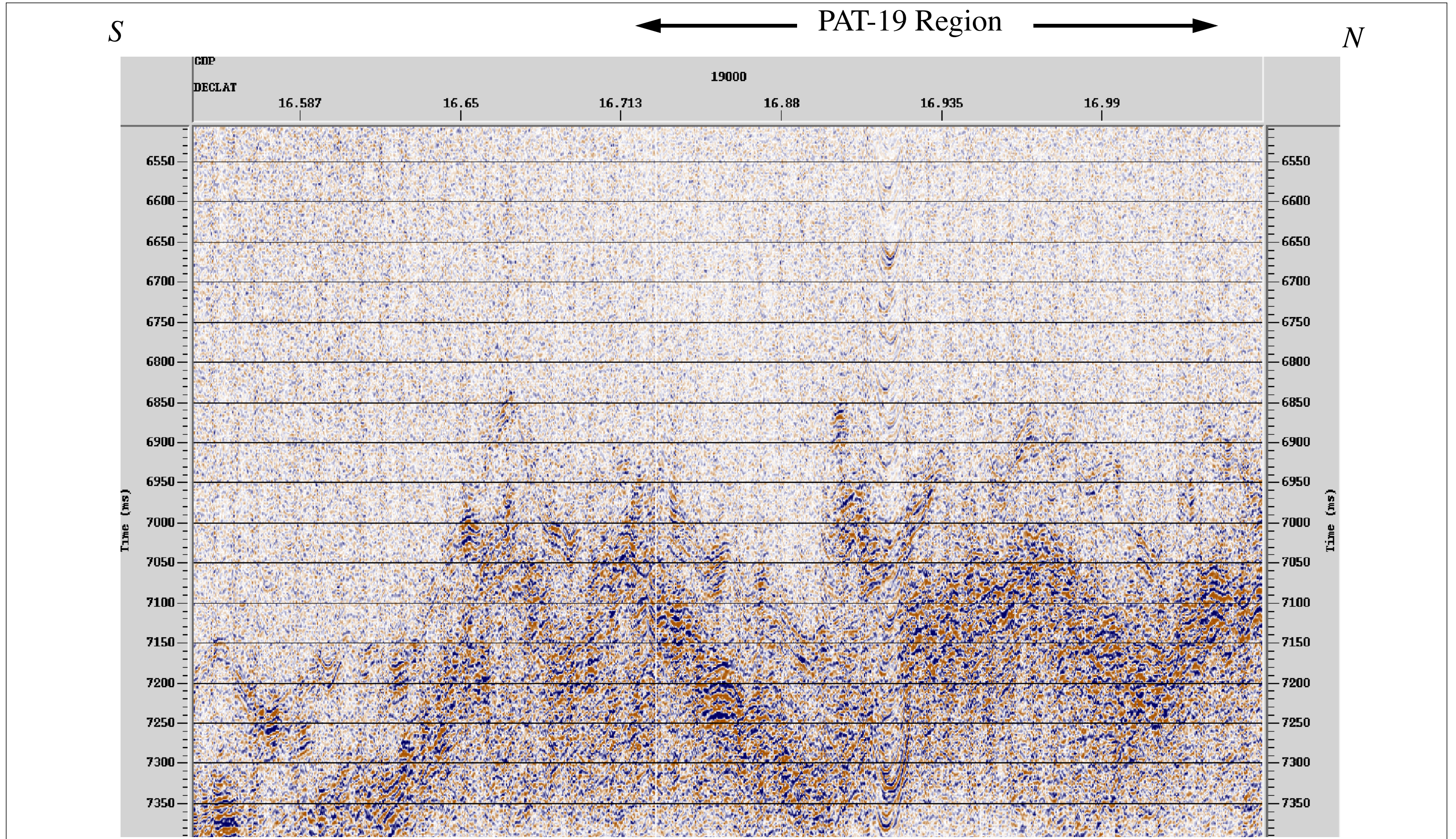


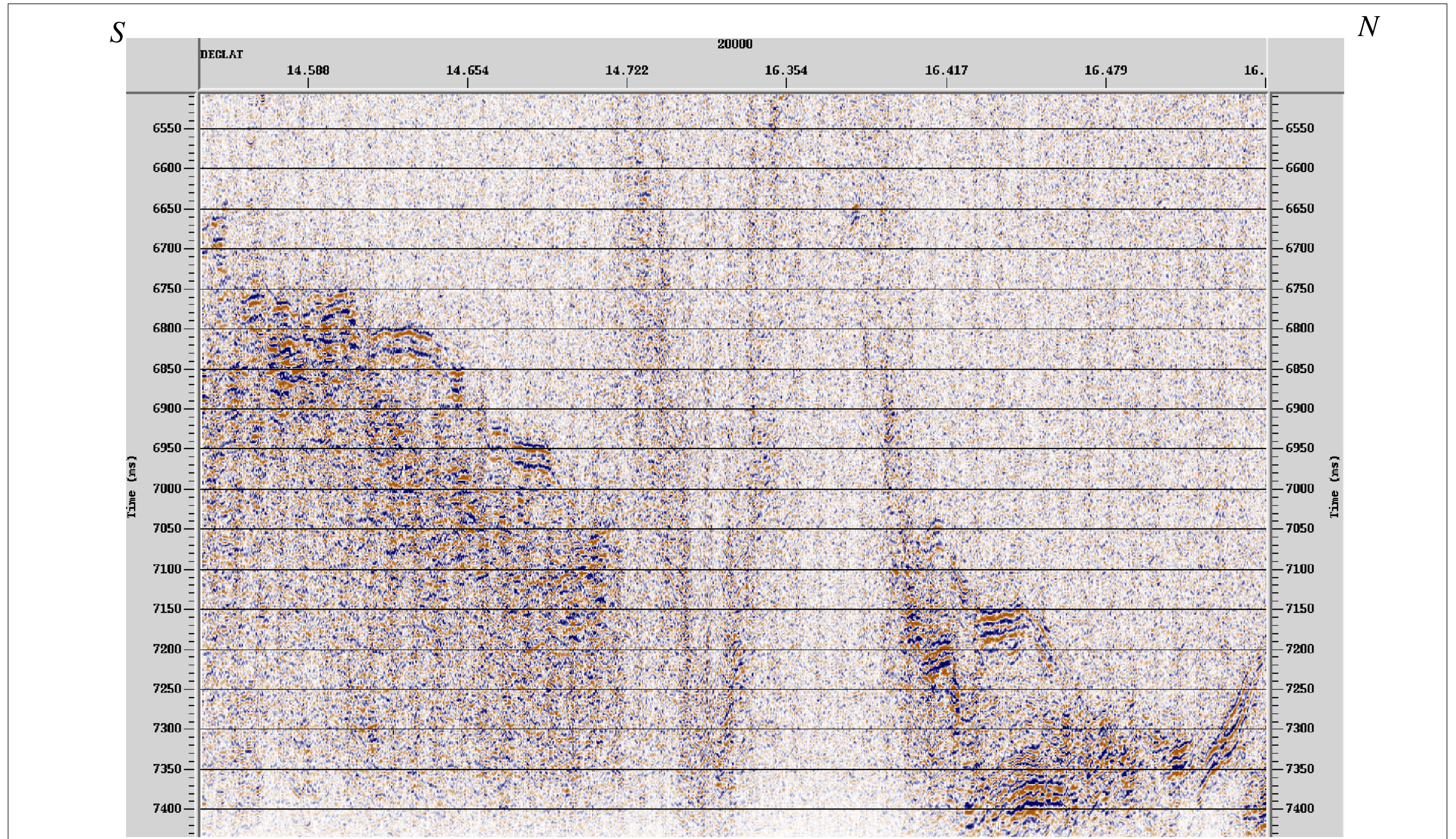


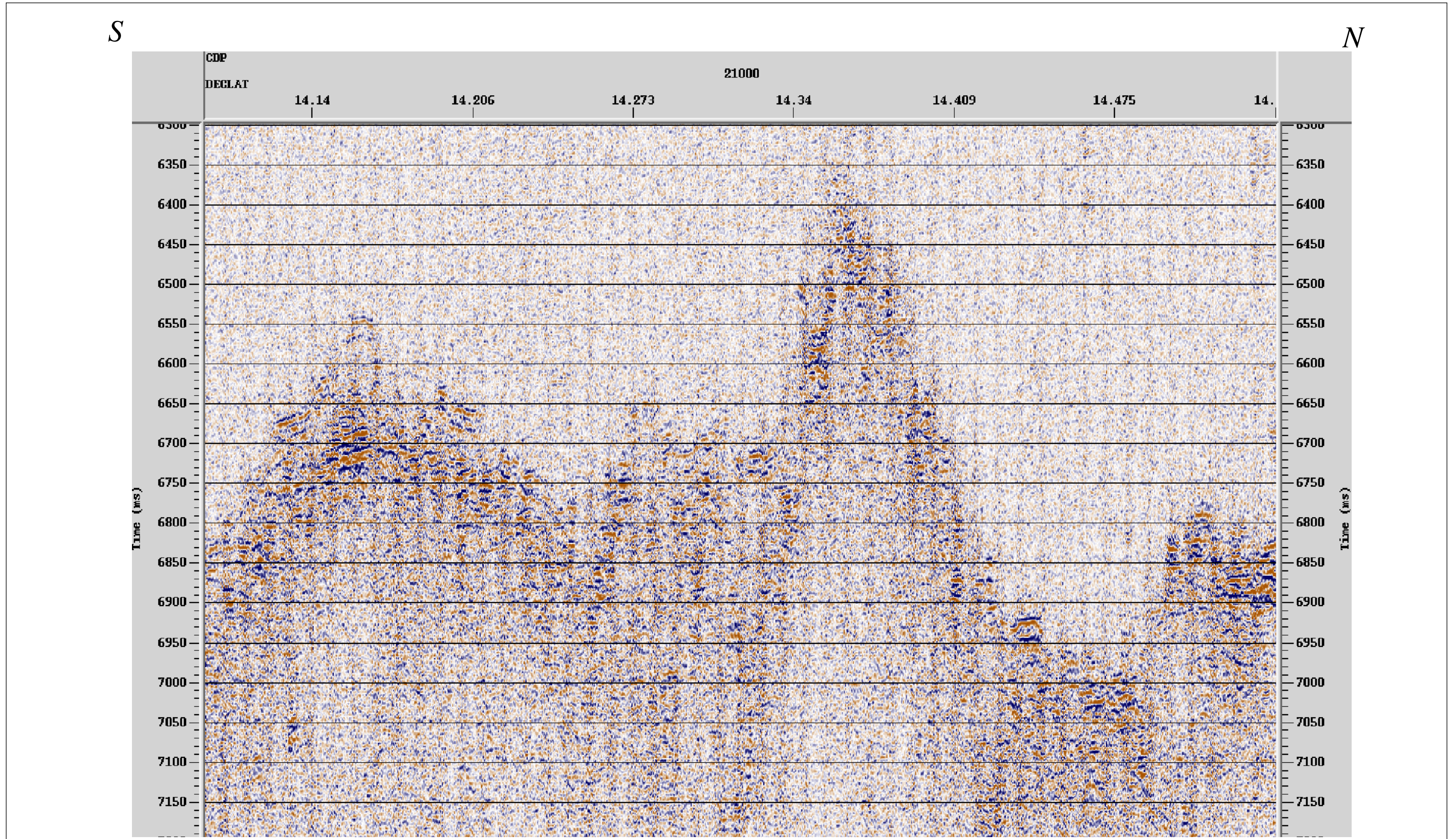
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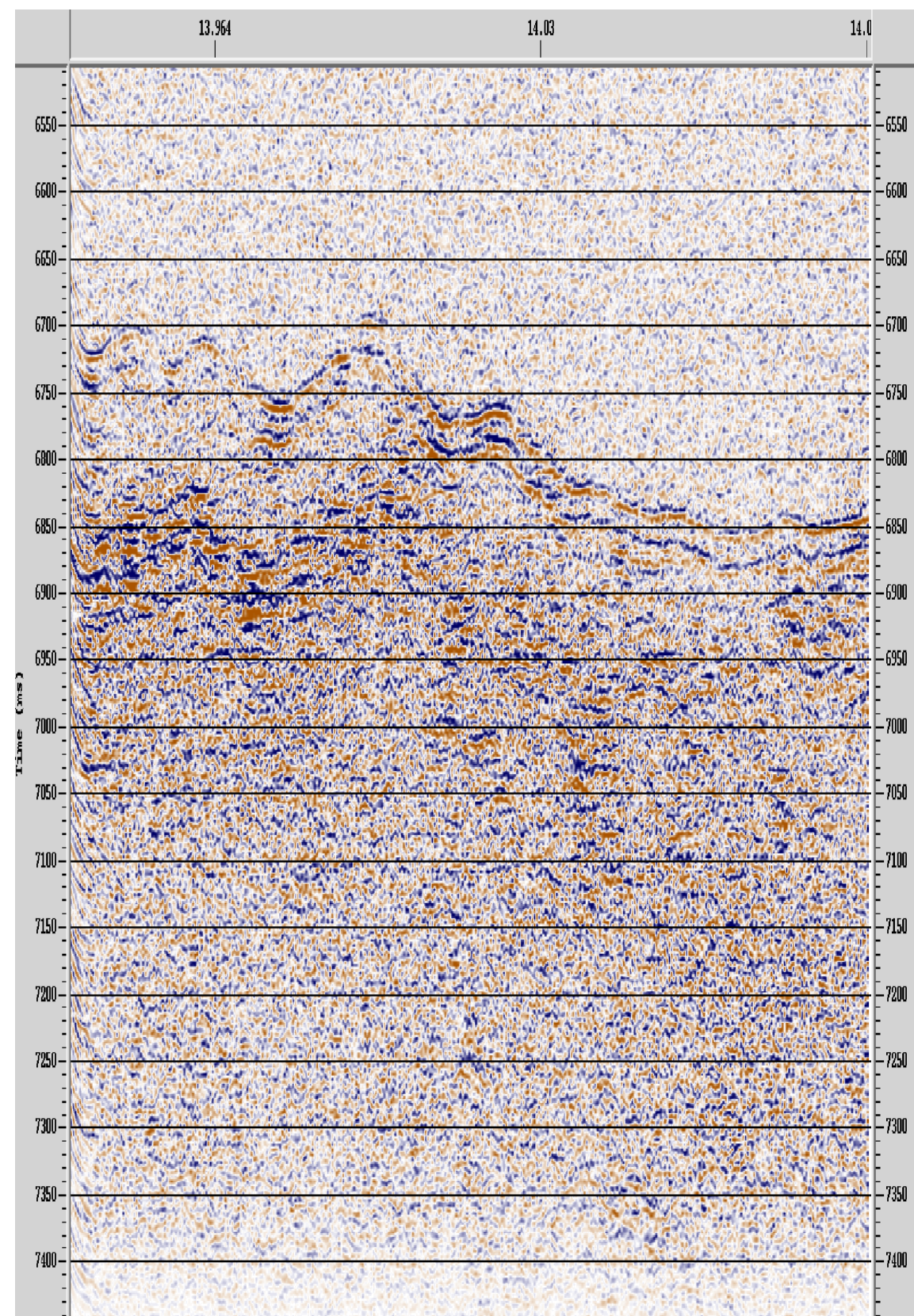




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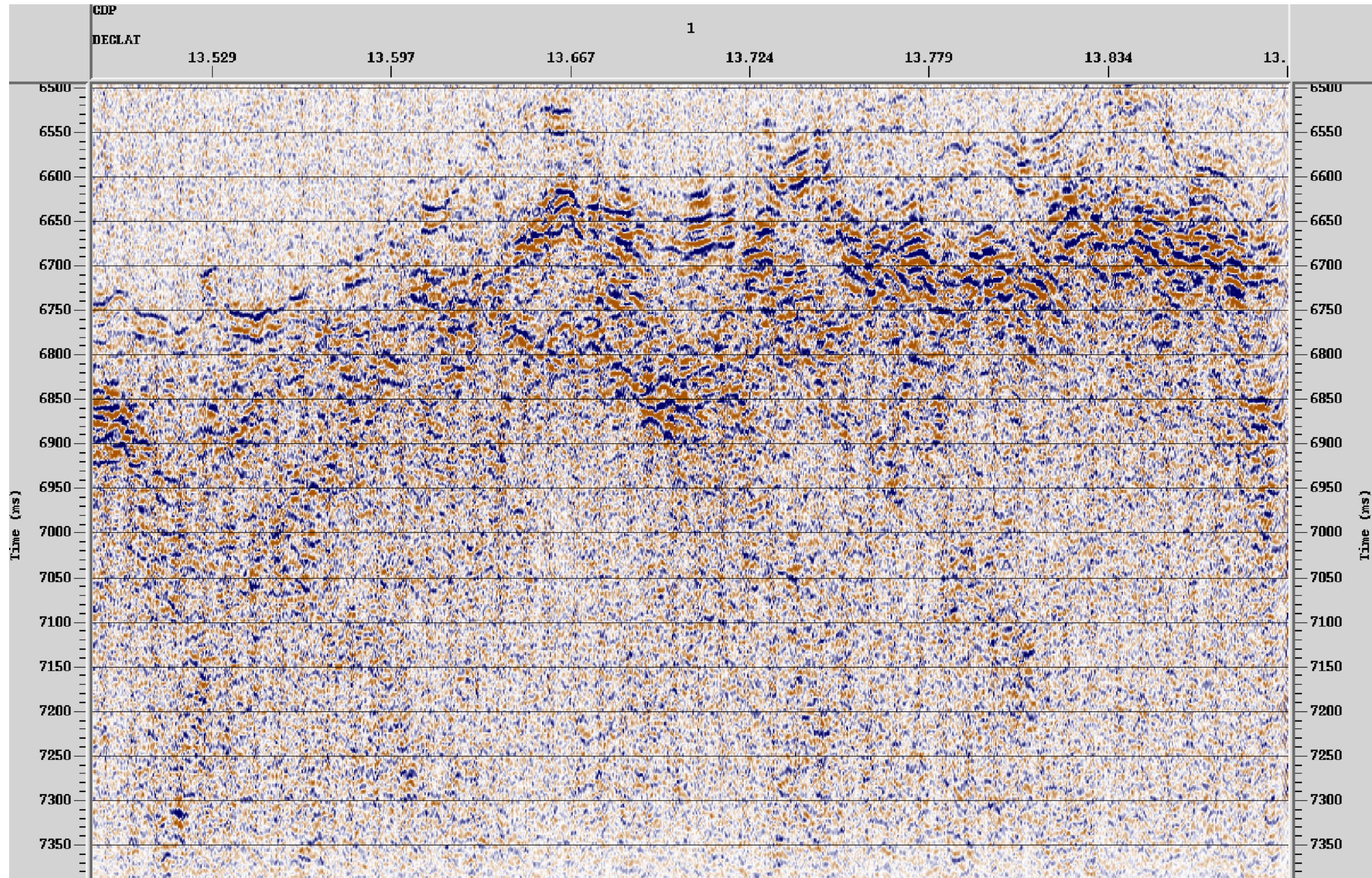
End 56 Block 3

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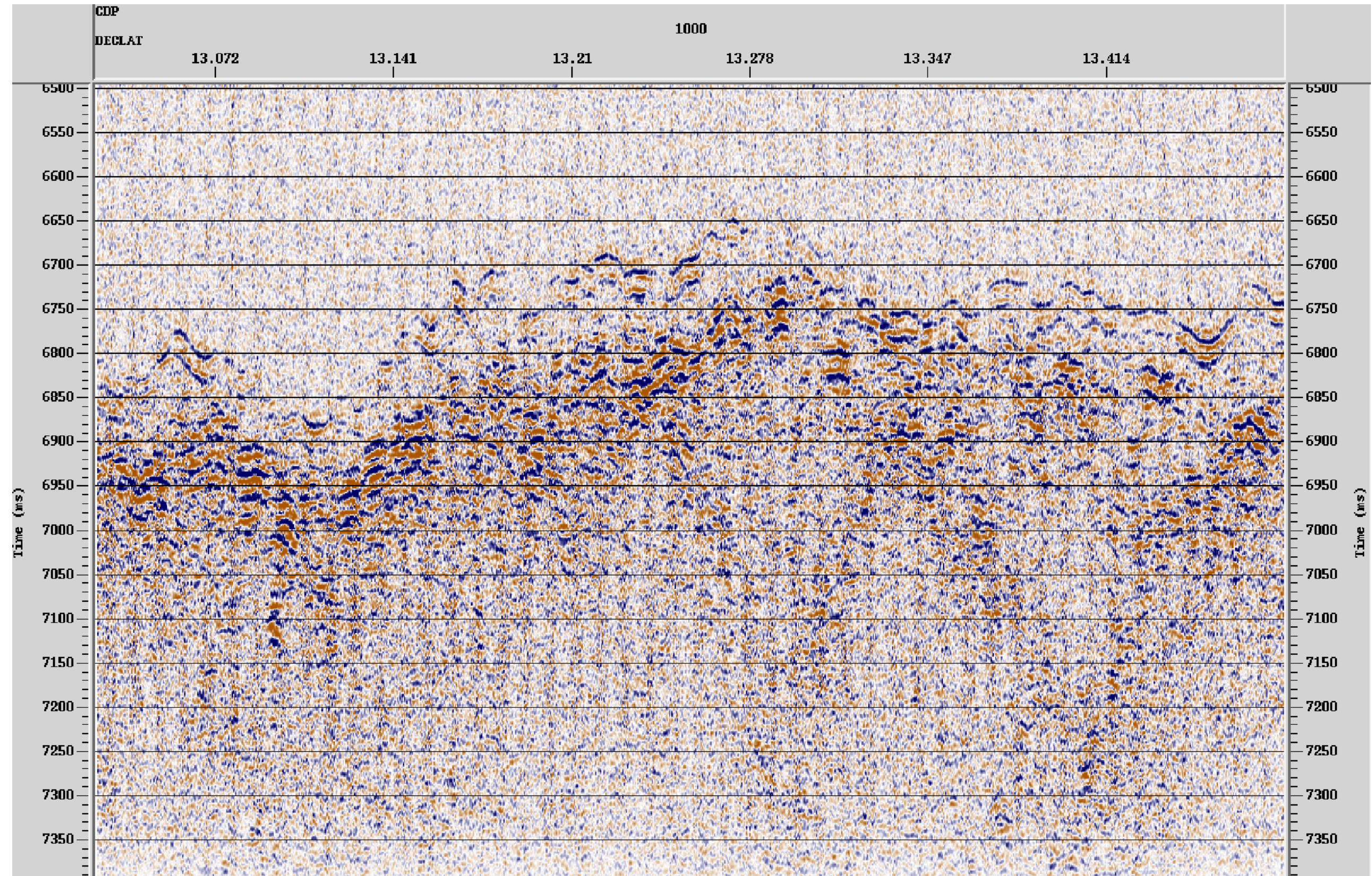
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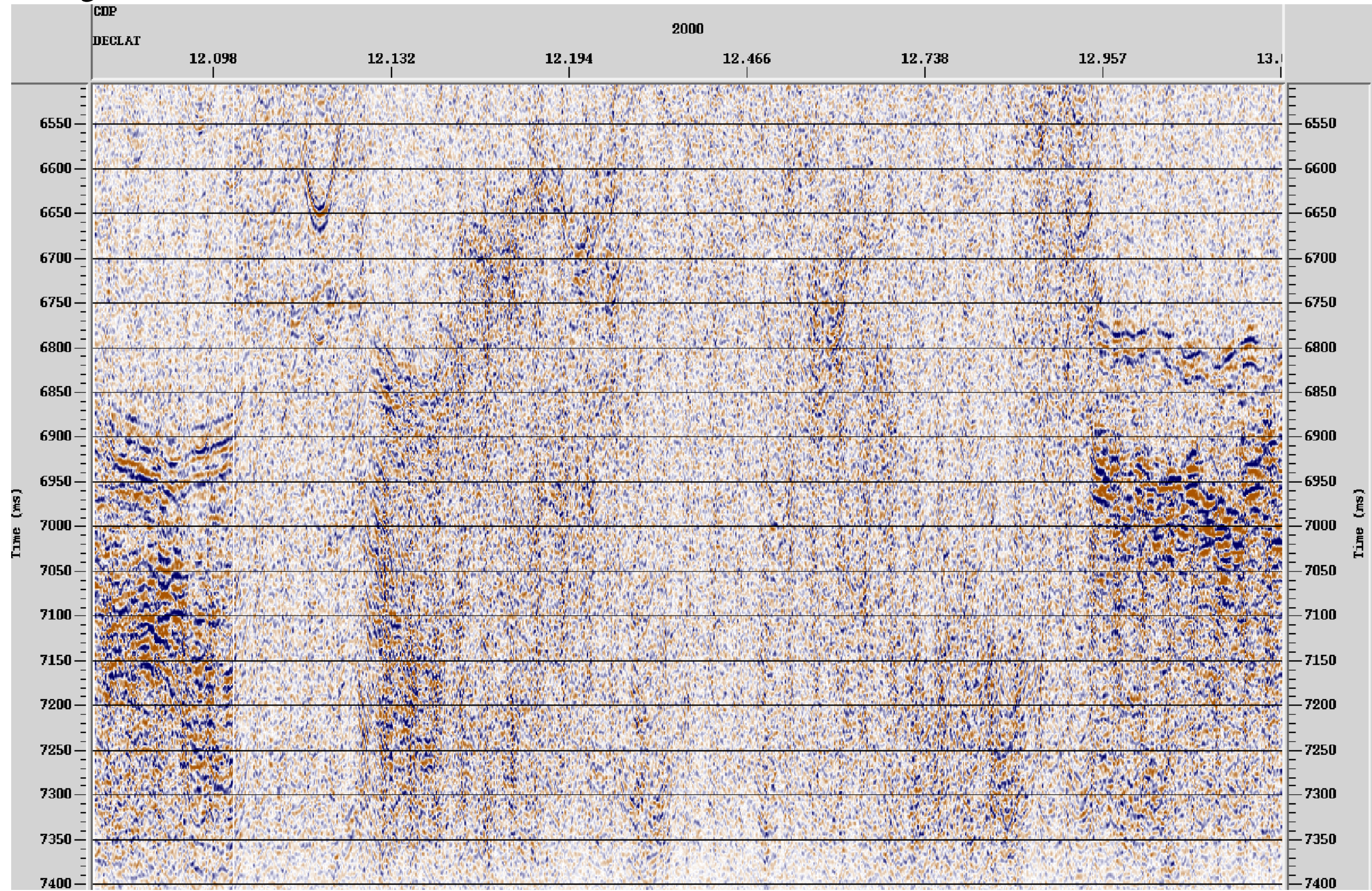


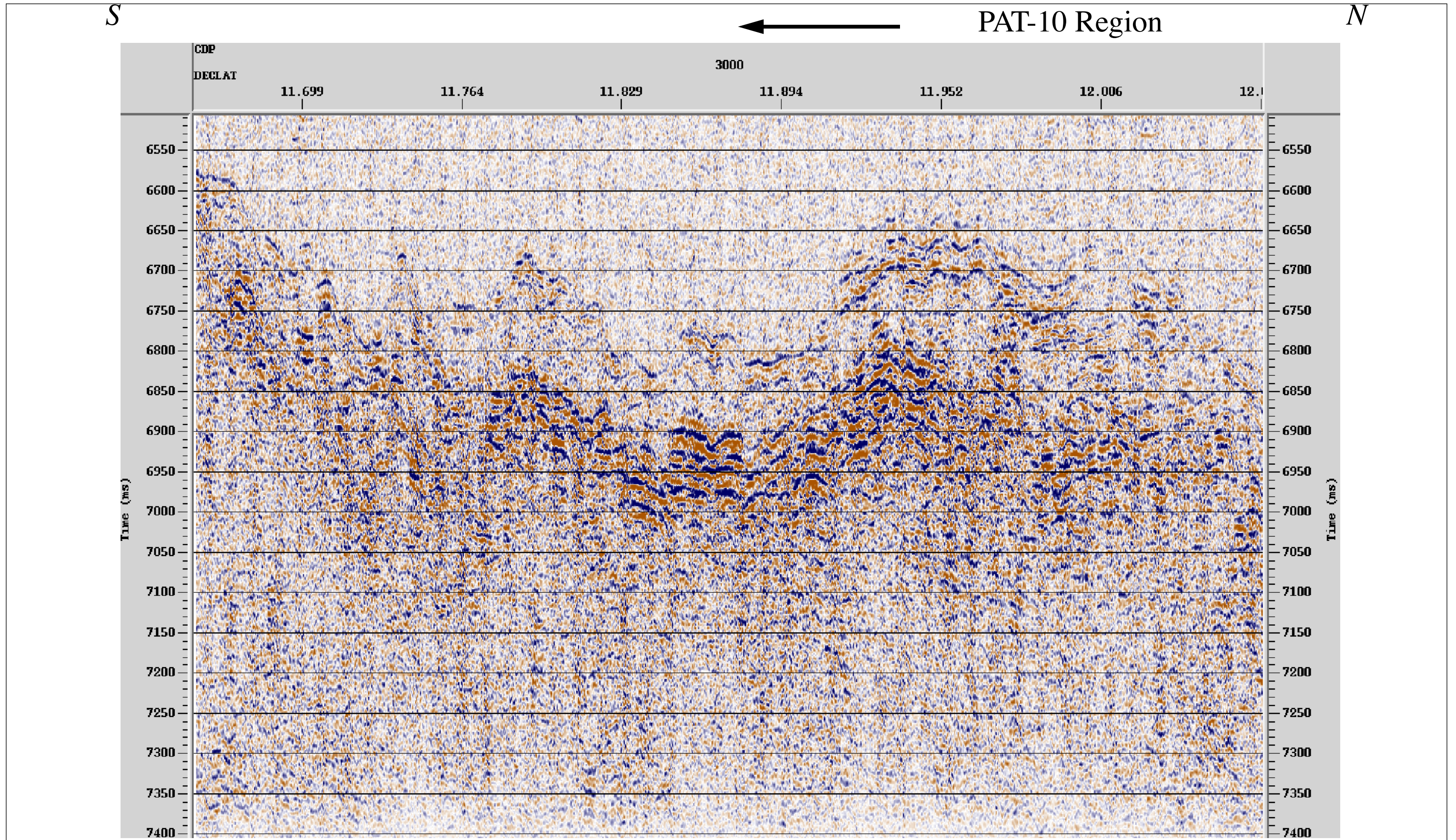
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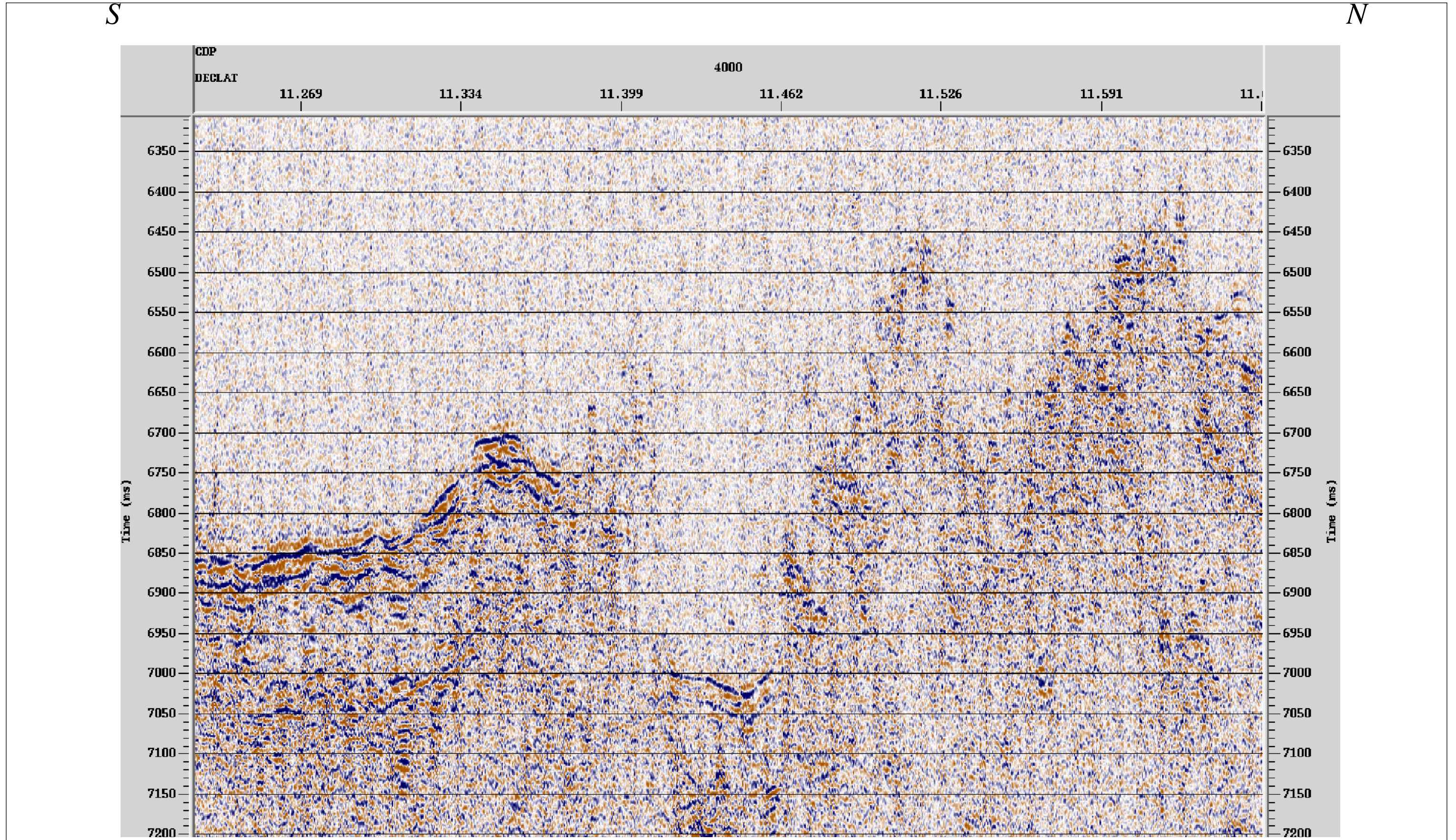
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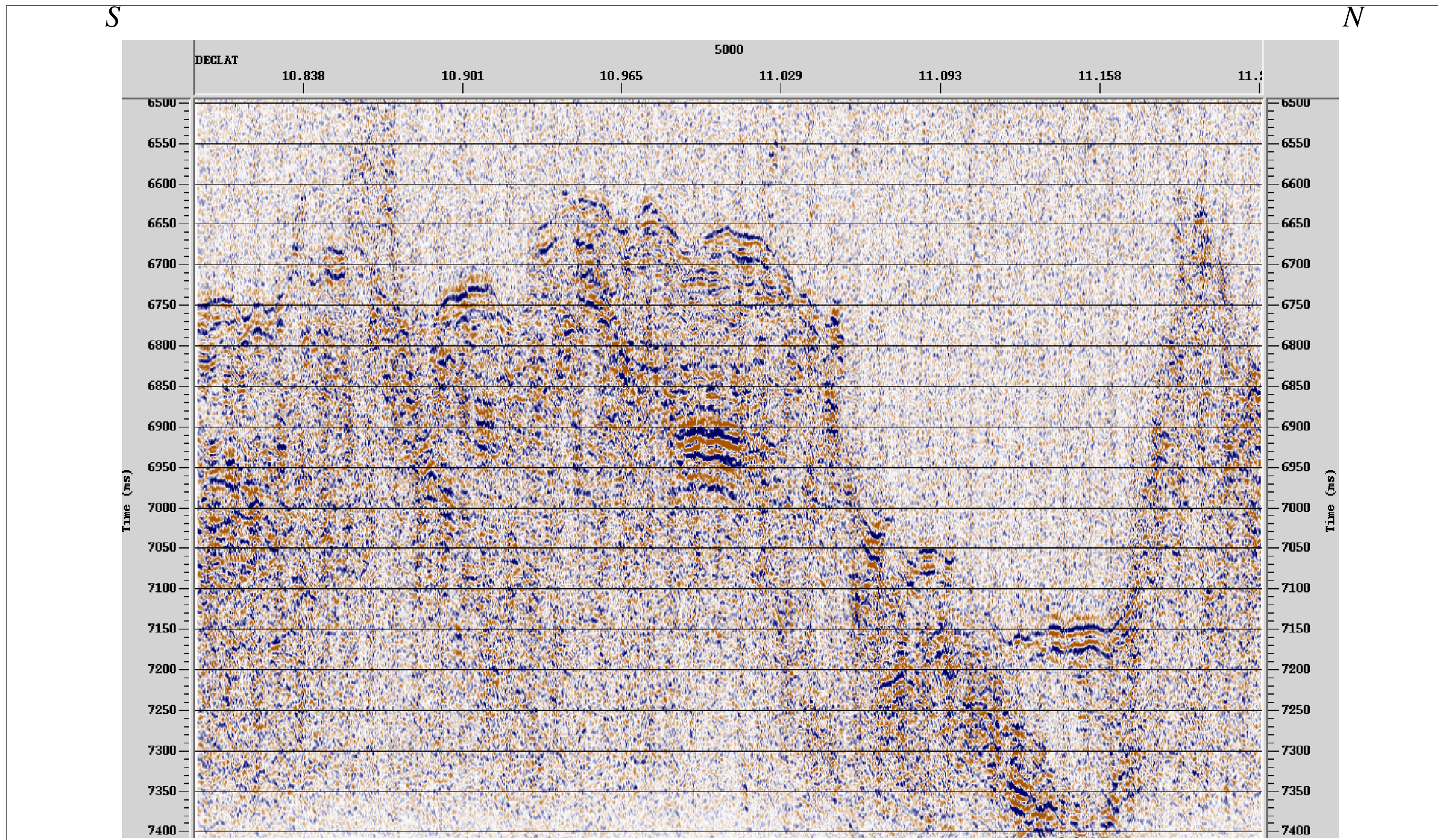
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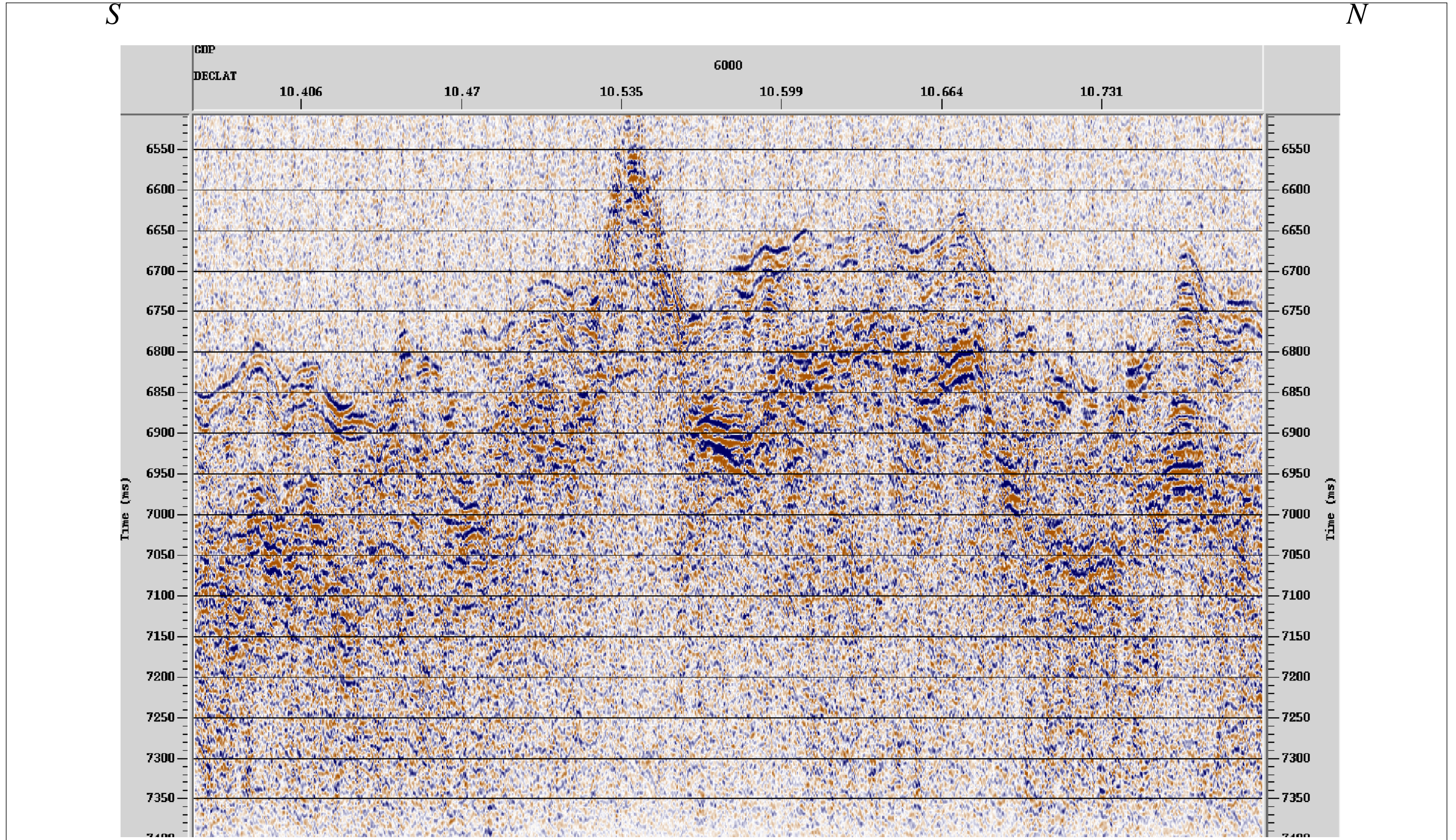
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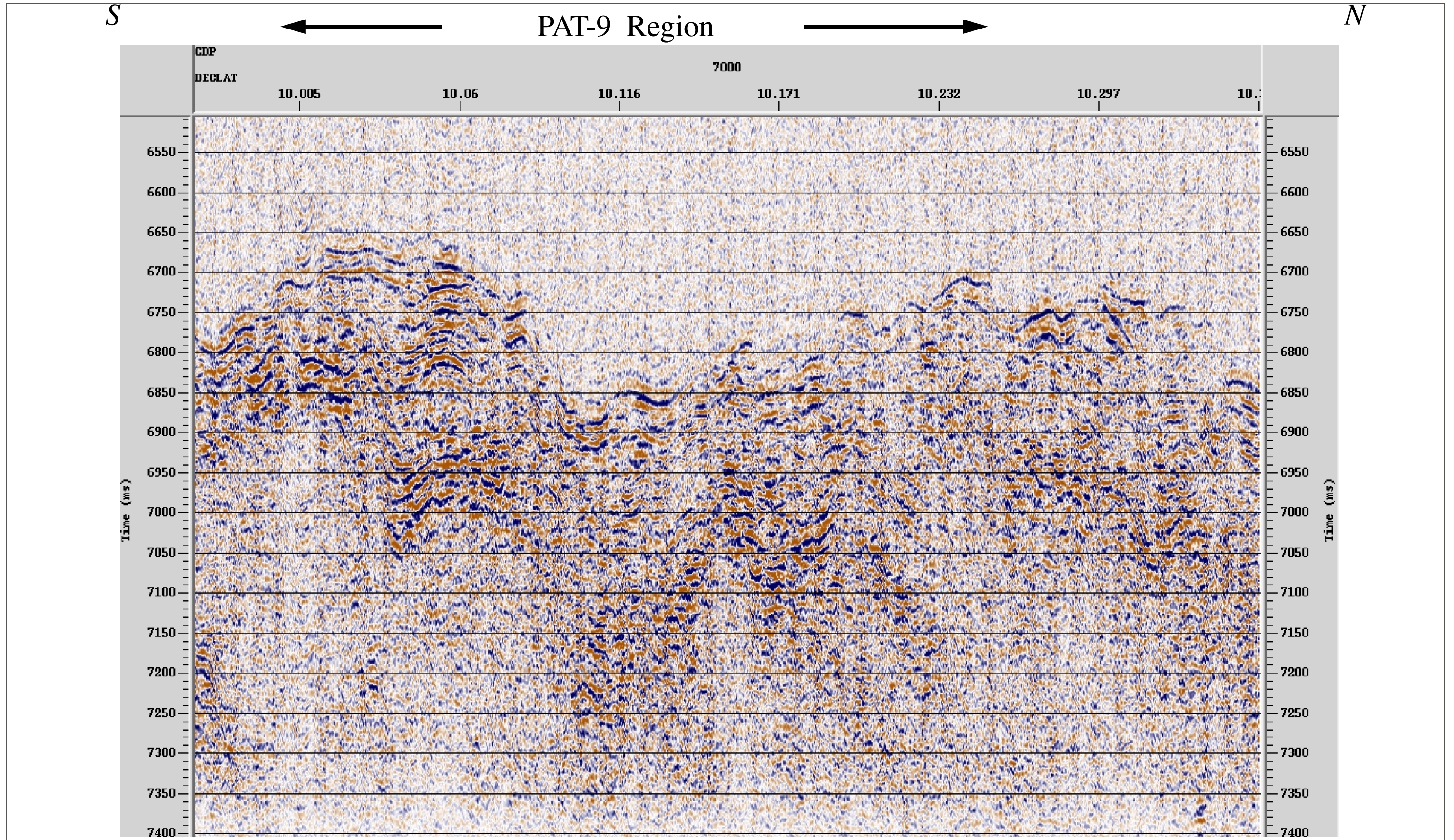


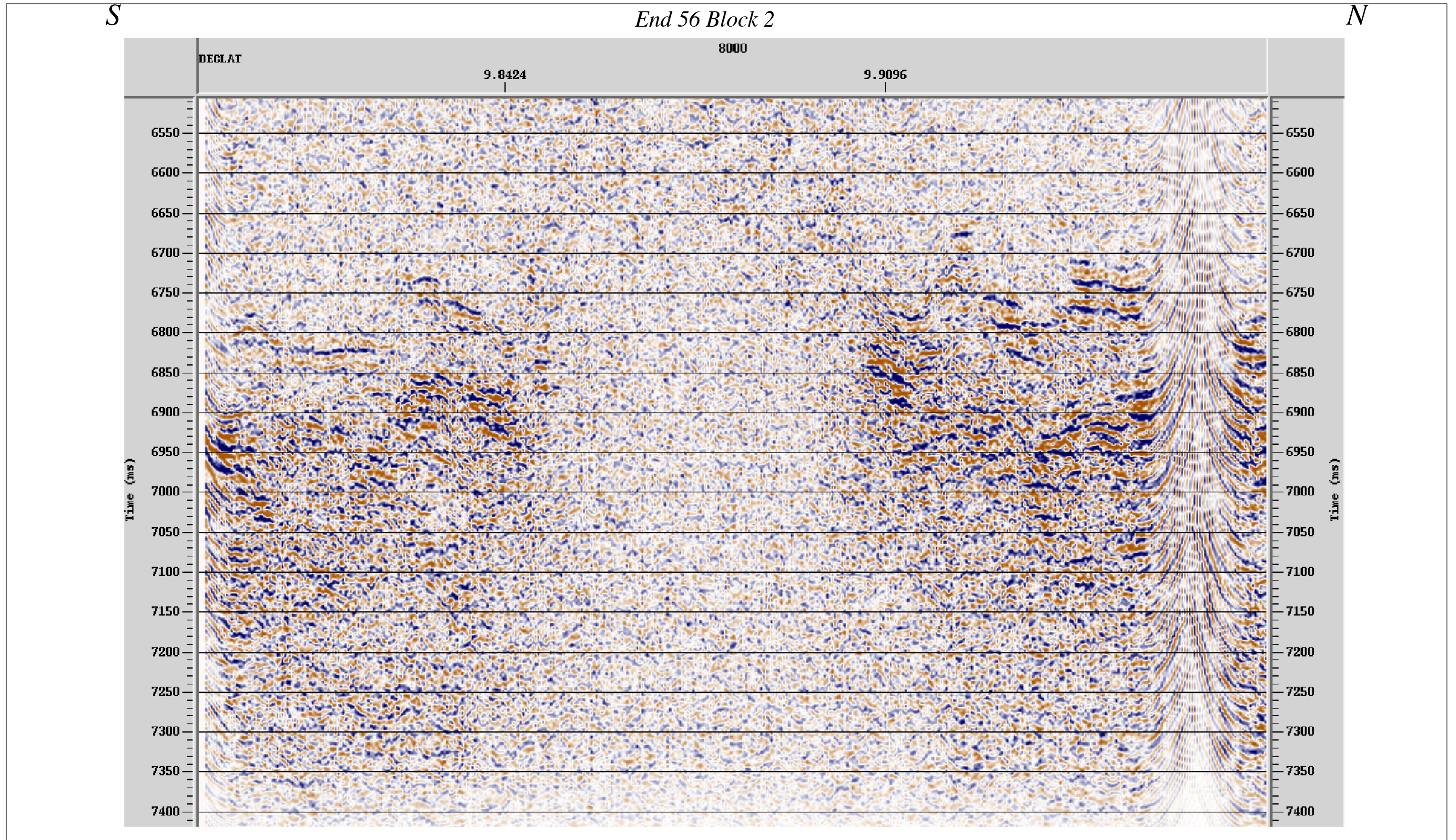








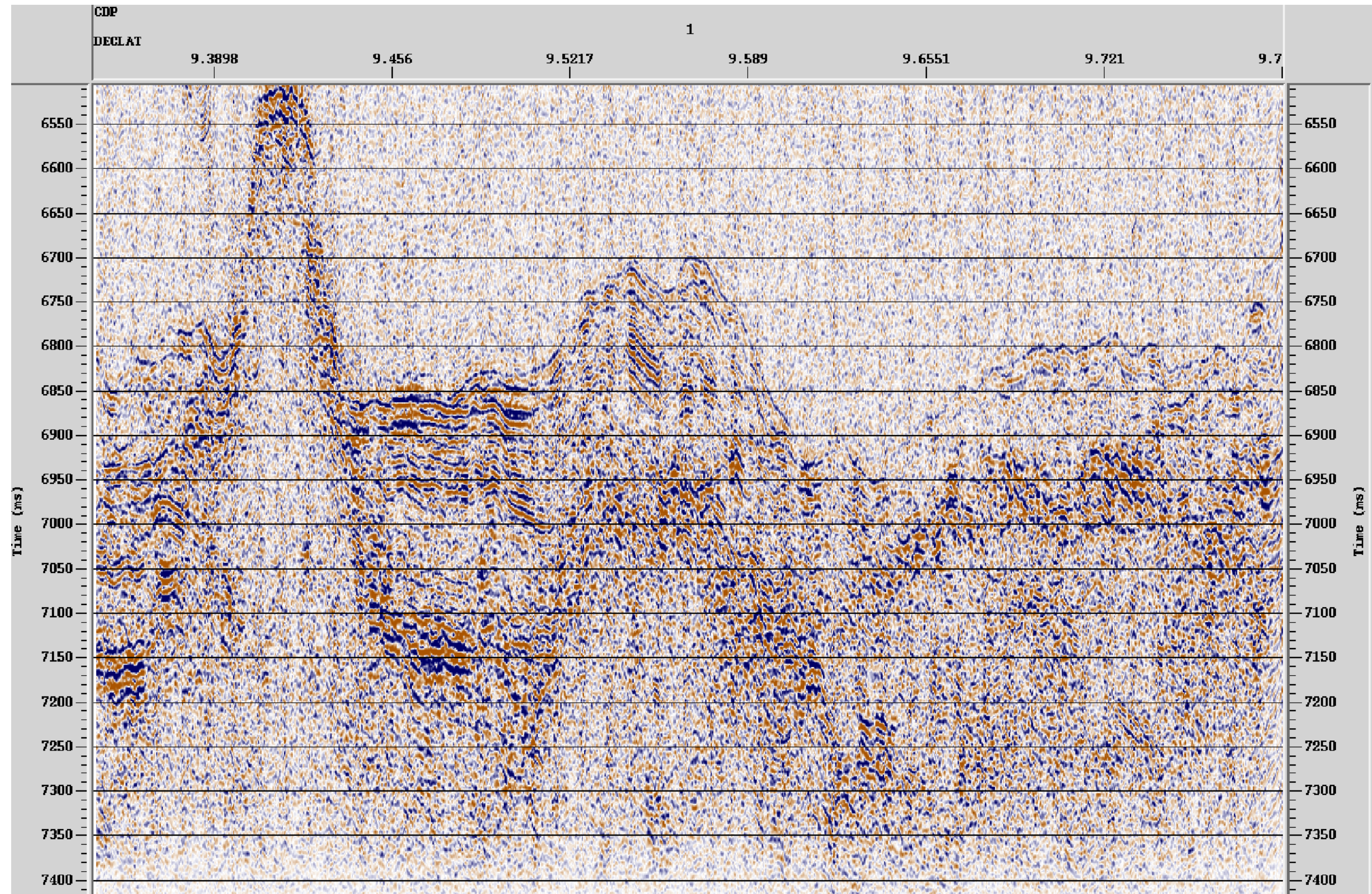




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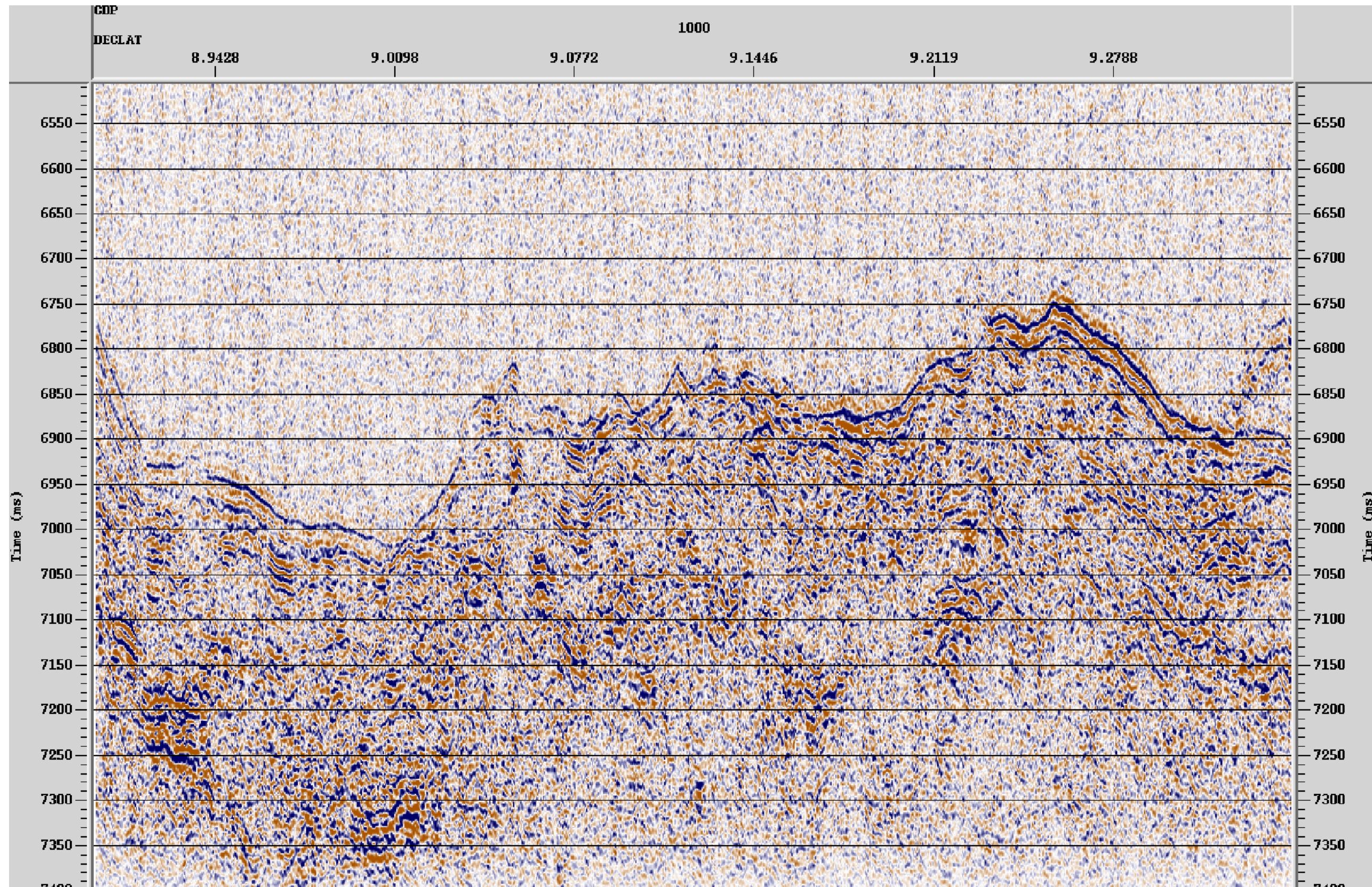
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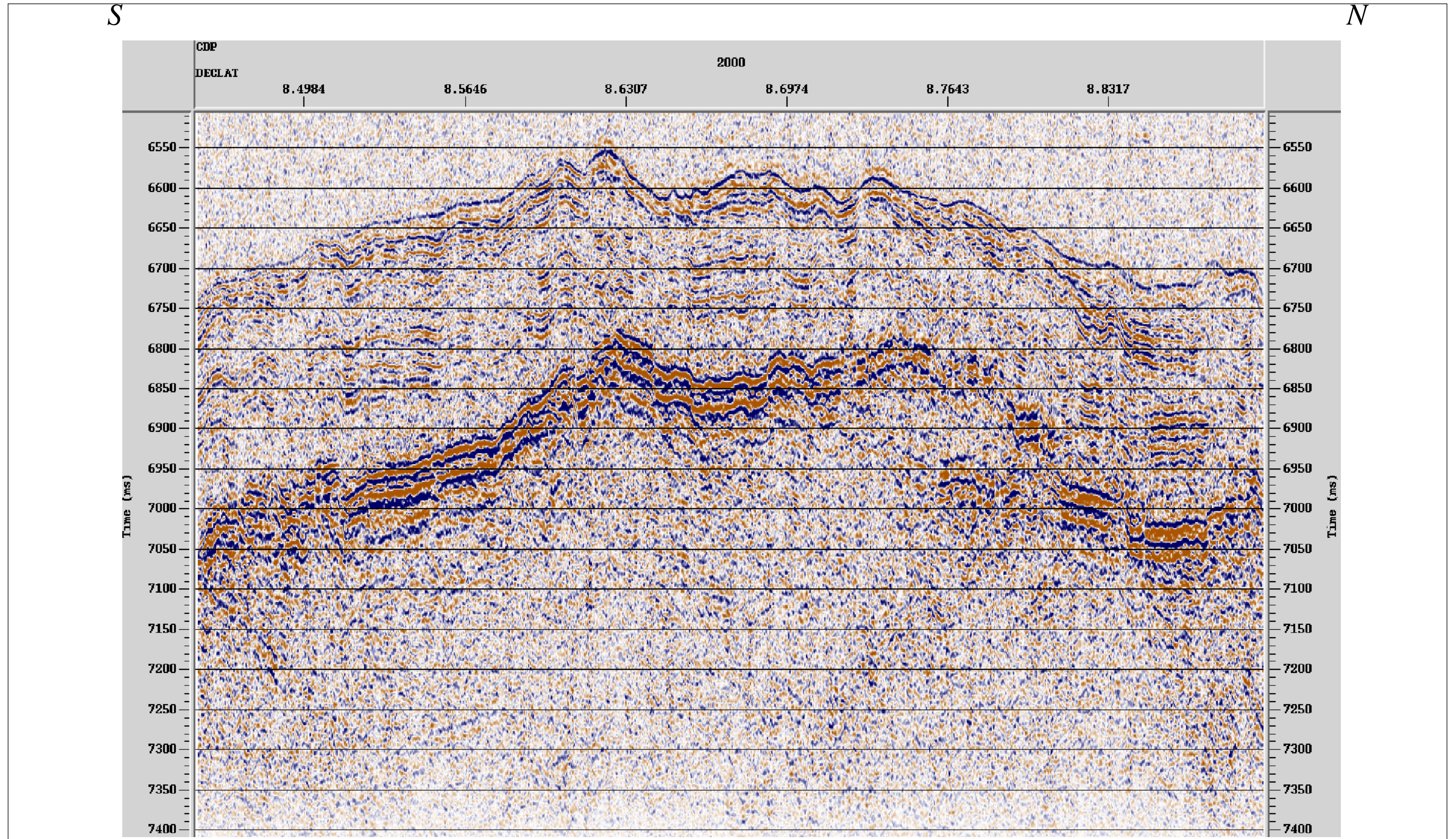
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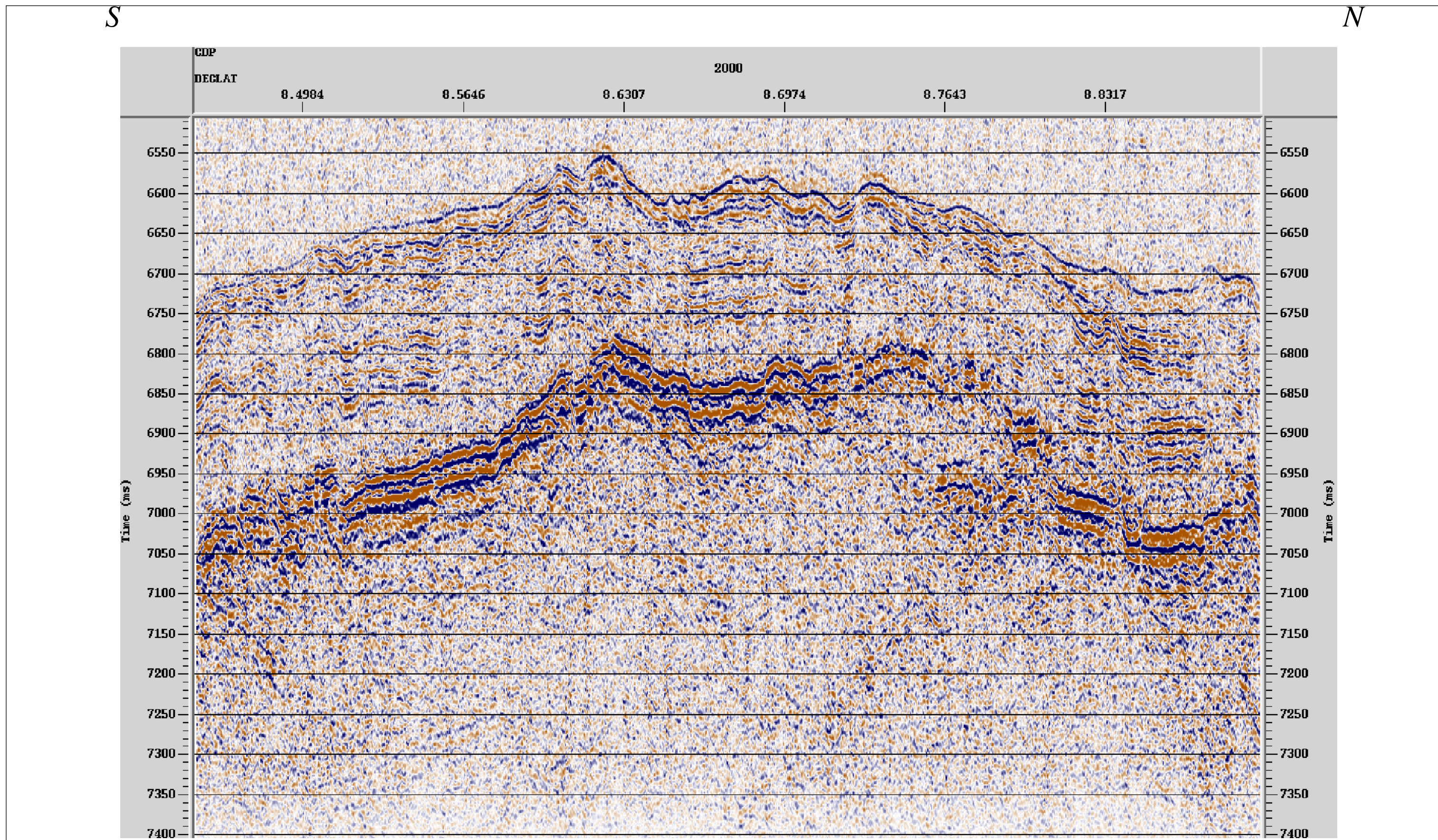


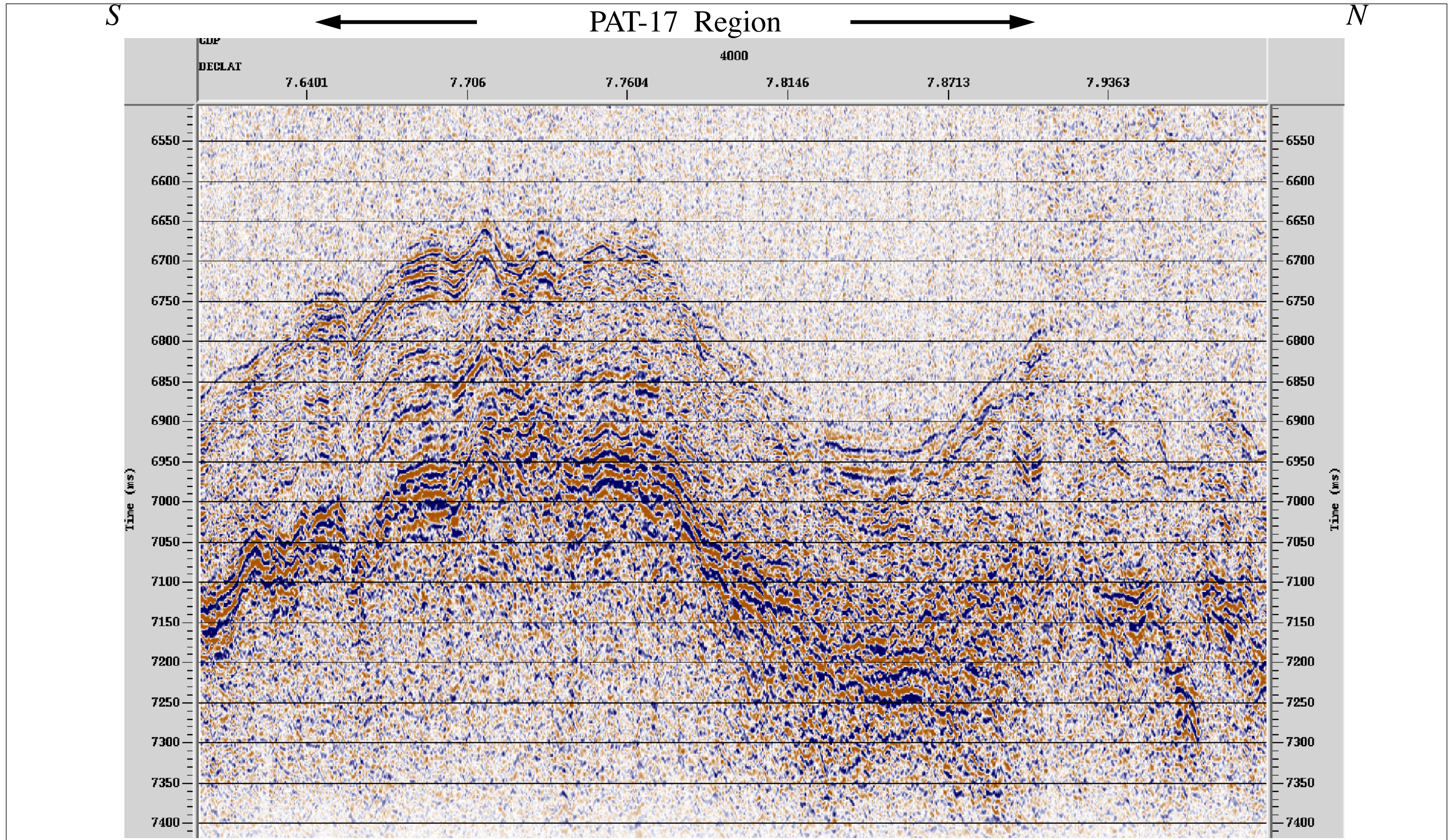
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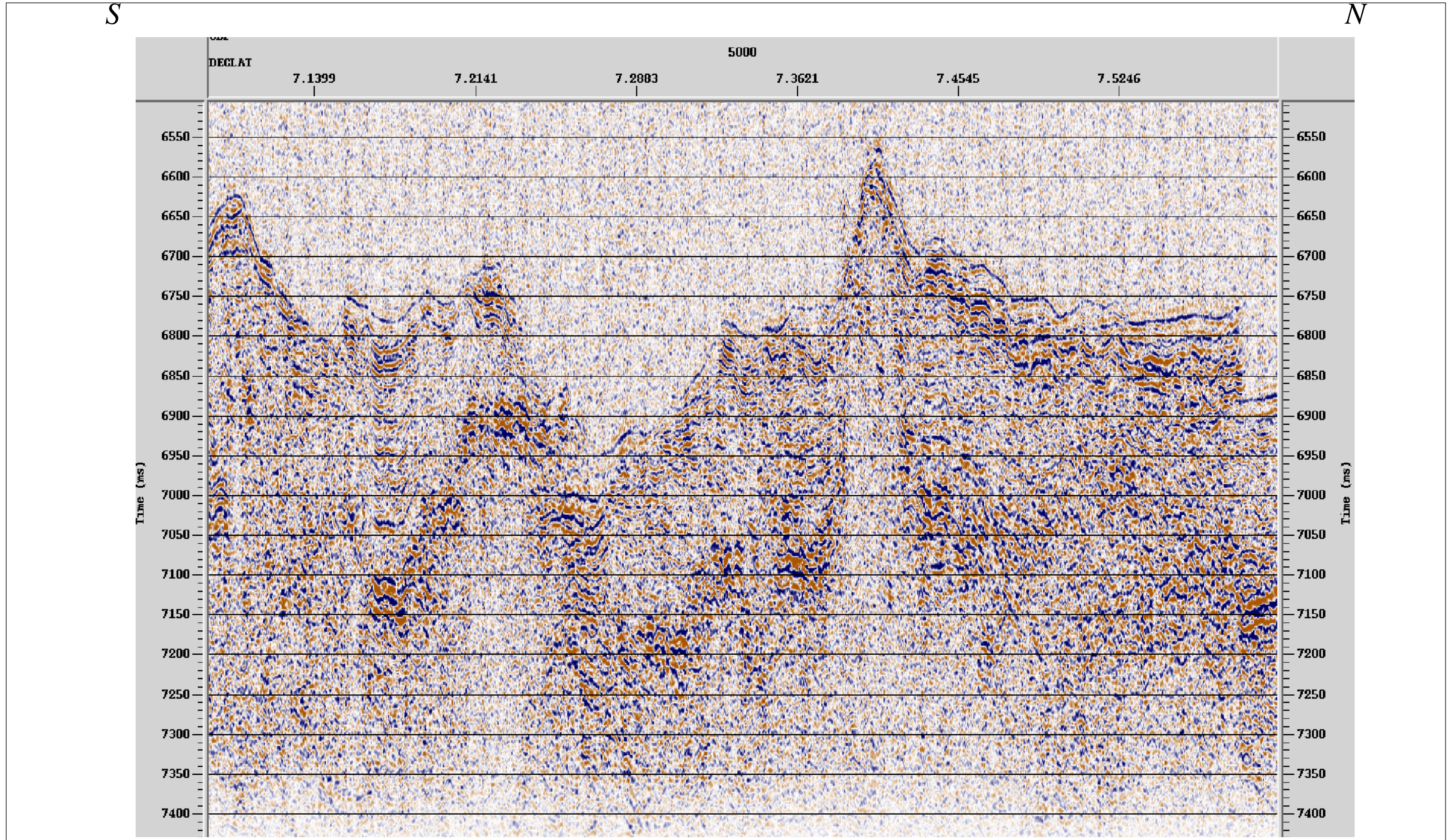
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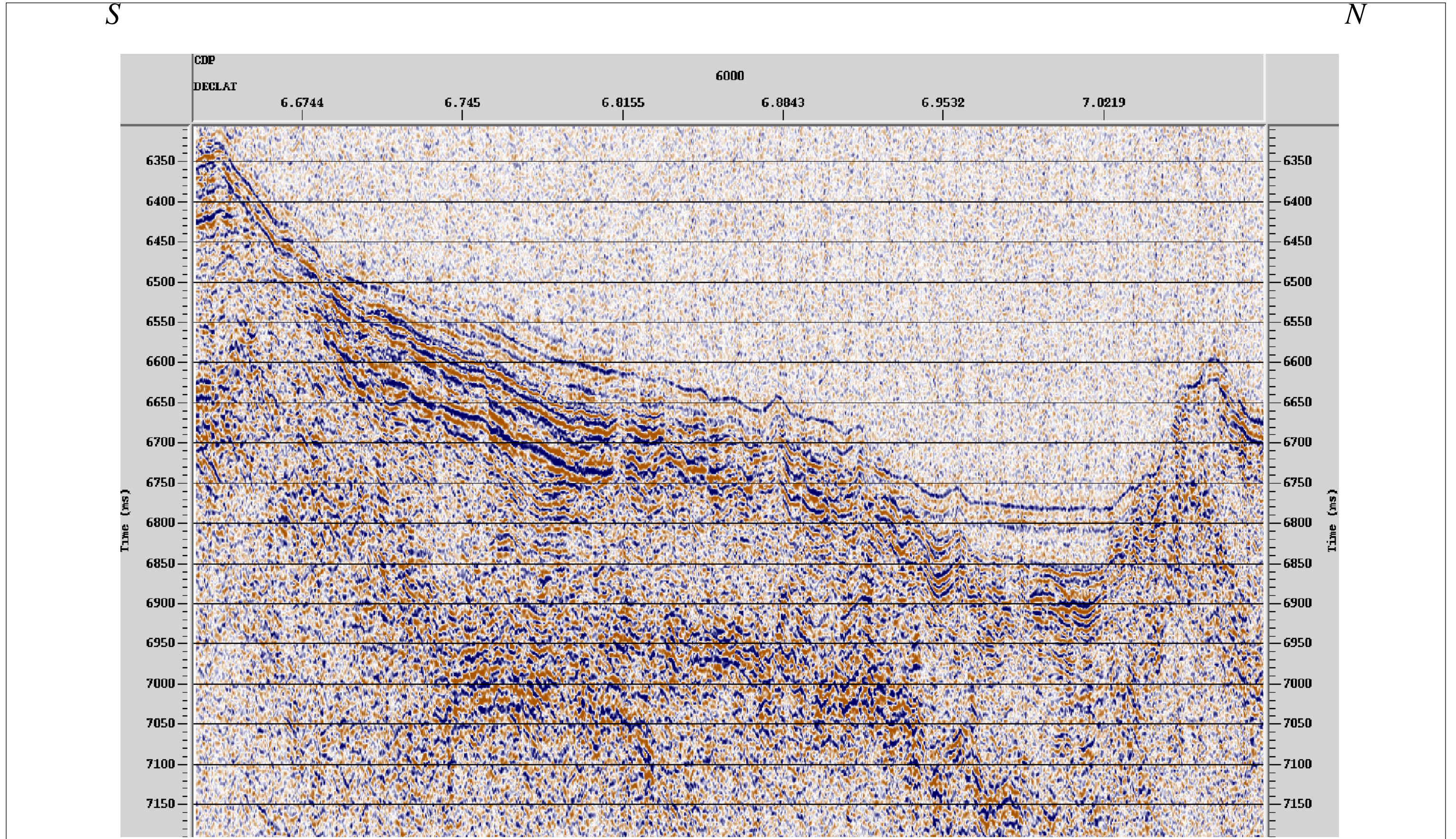


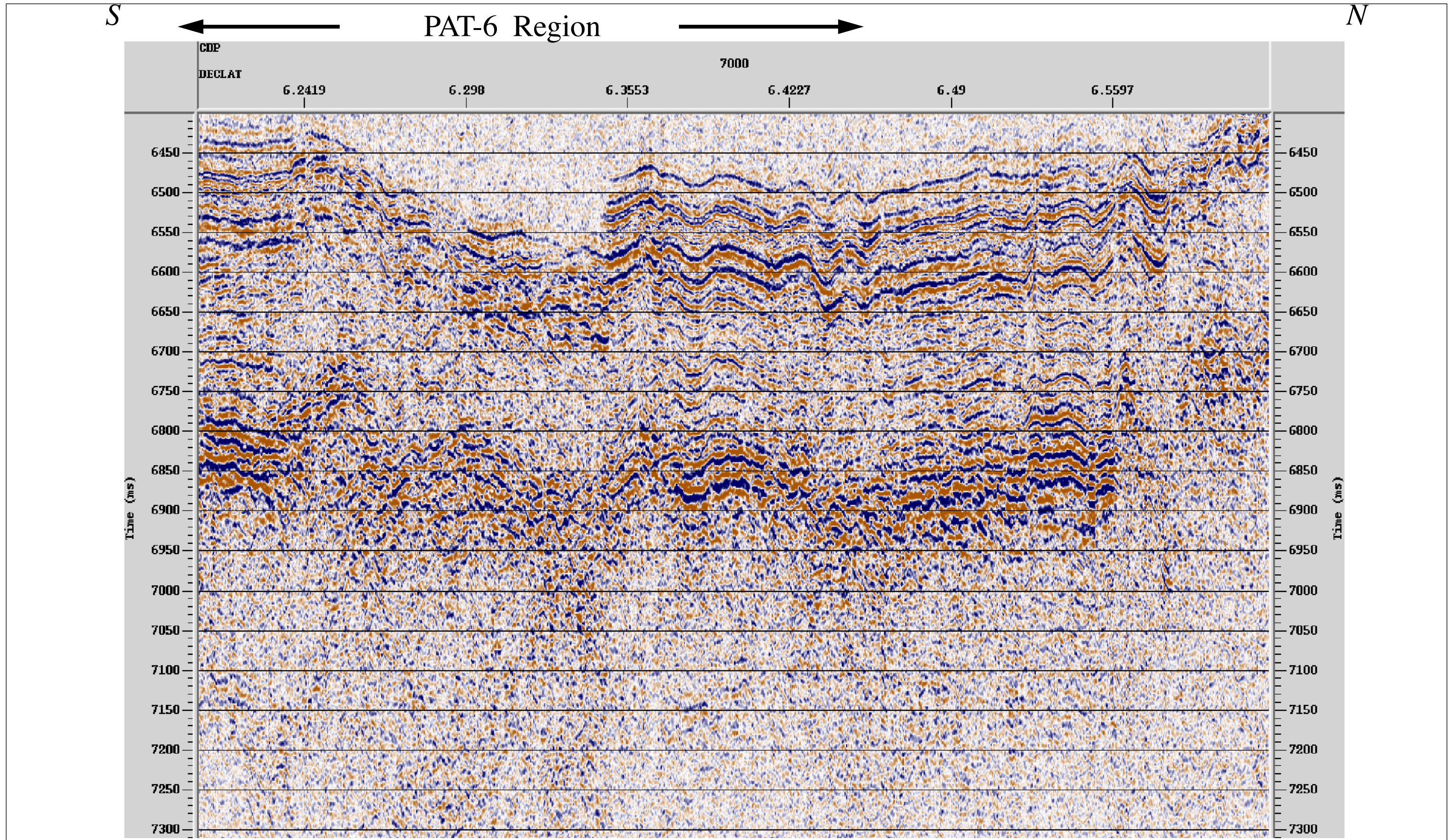


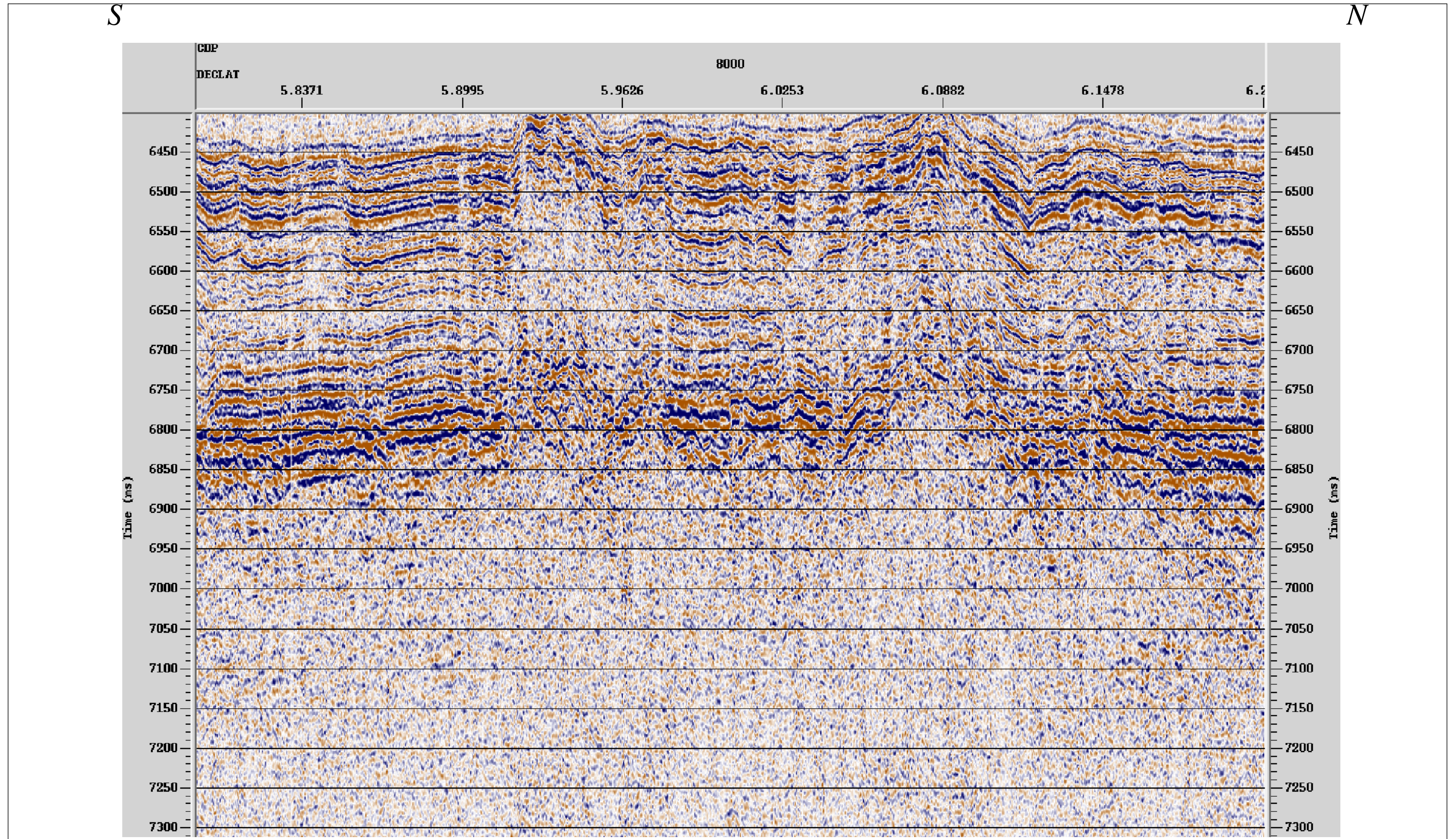






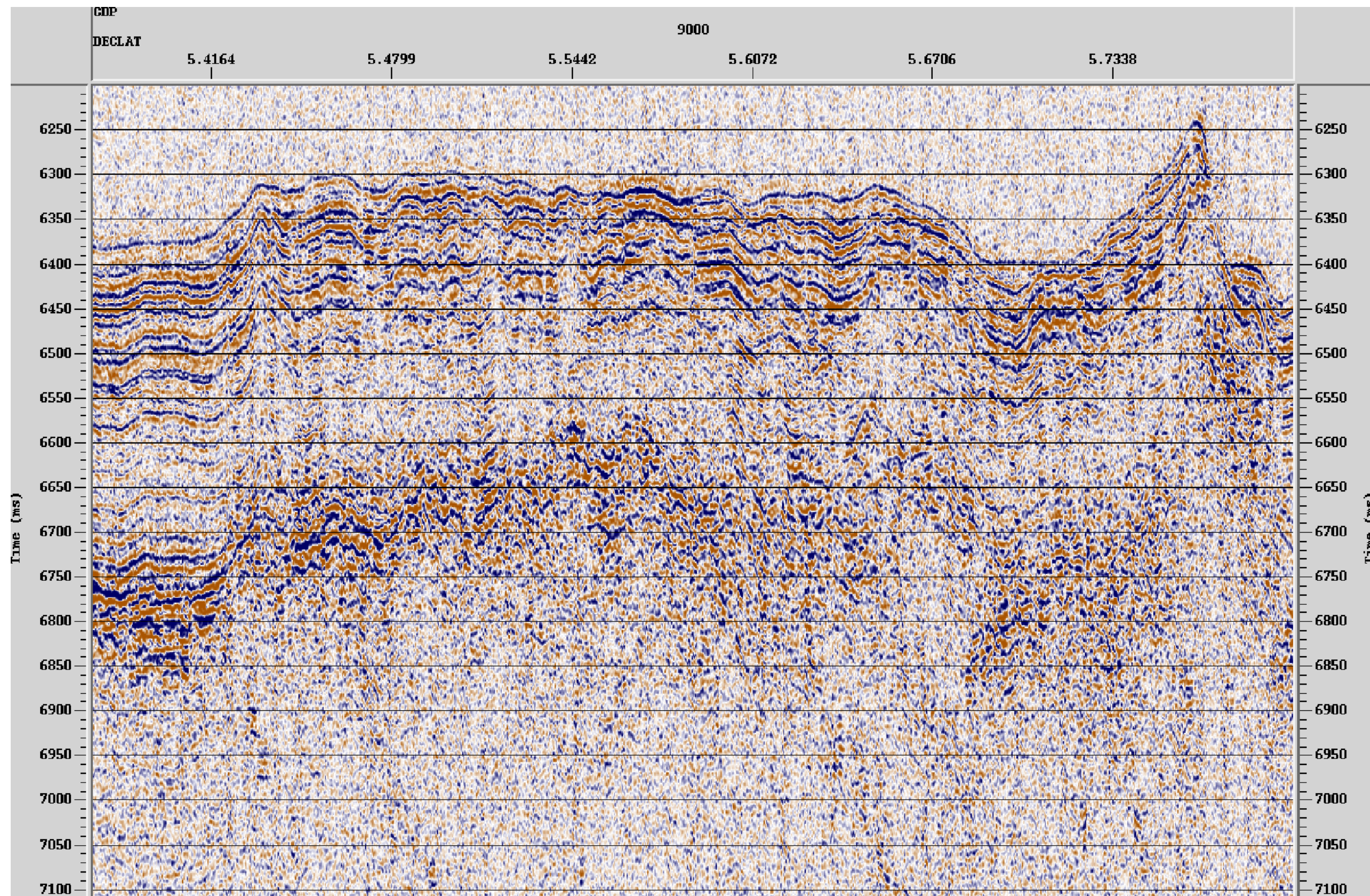


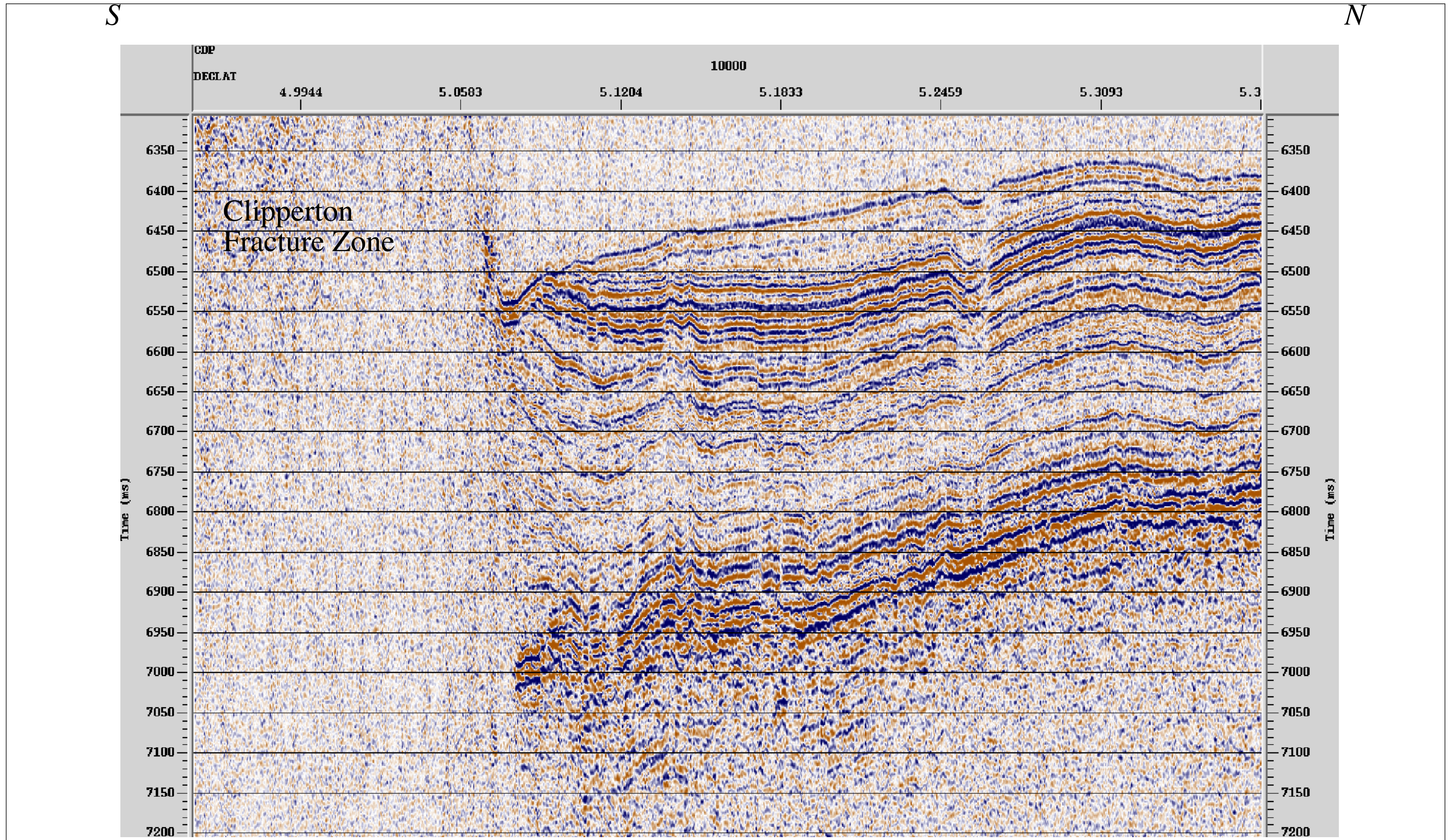




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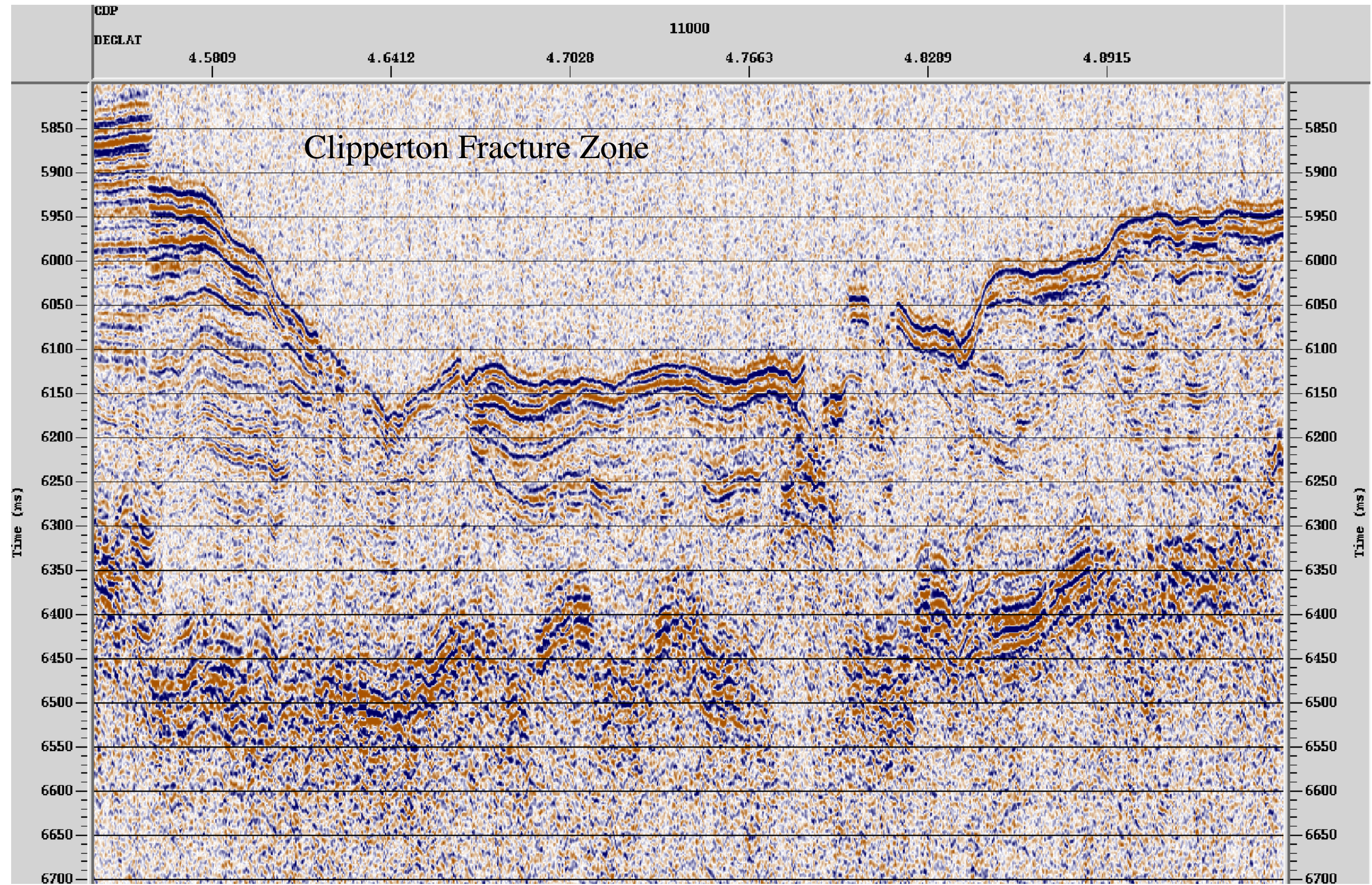
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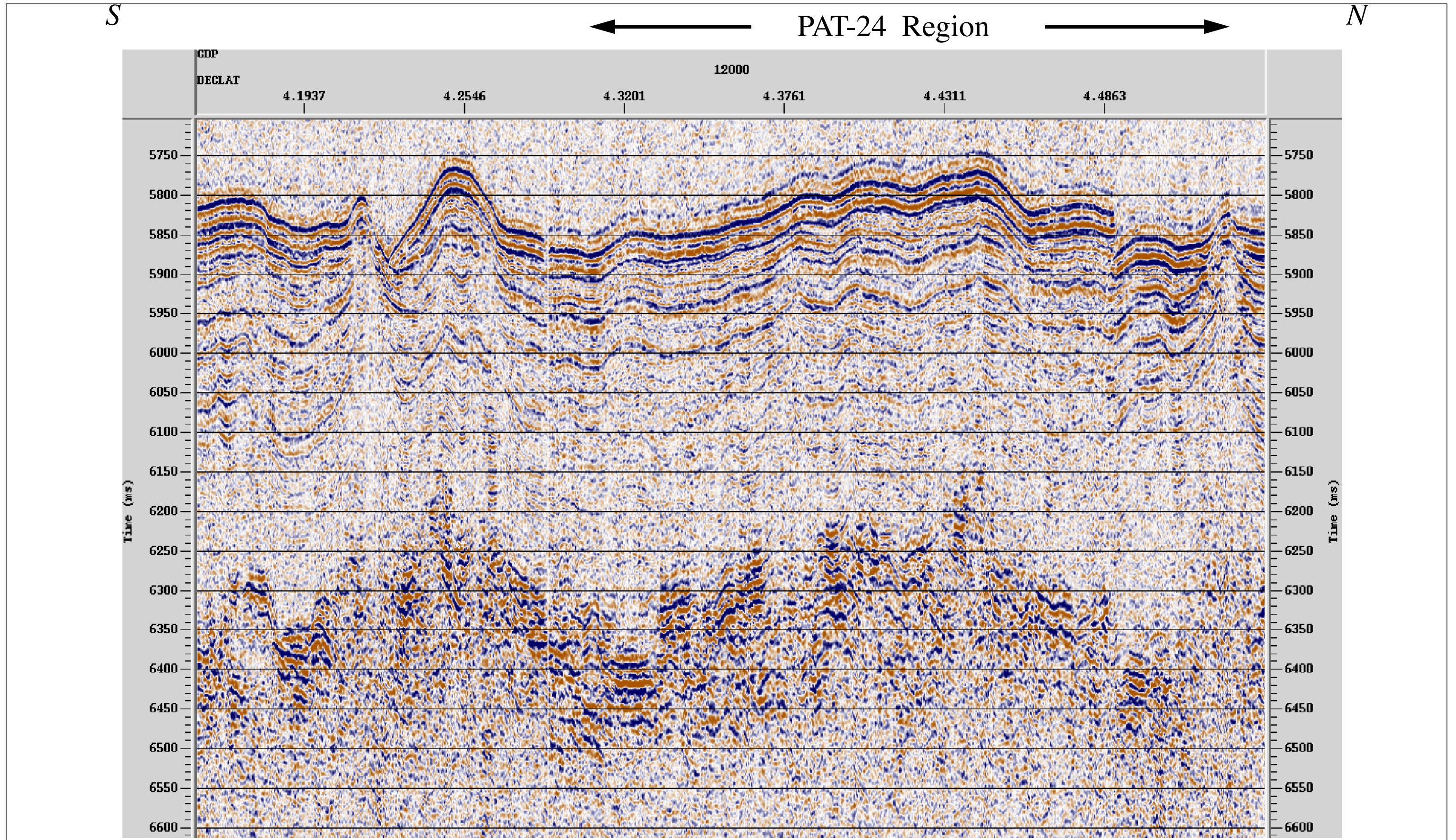


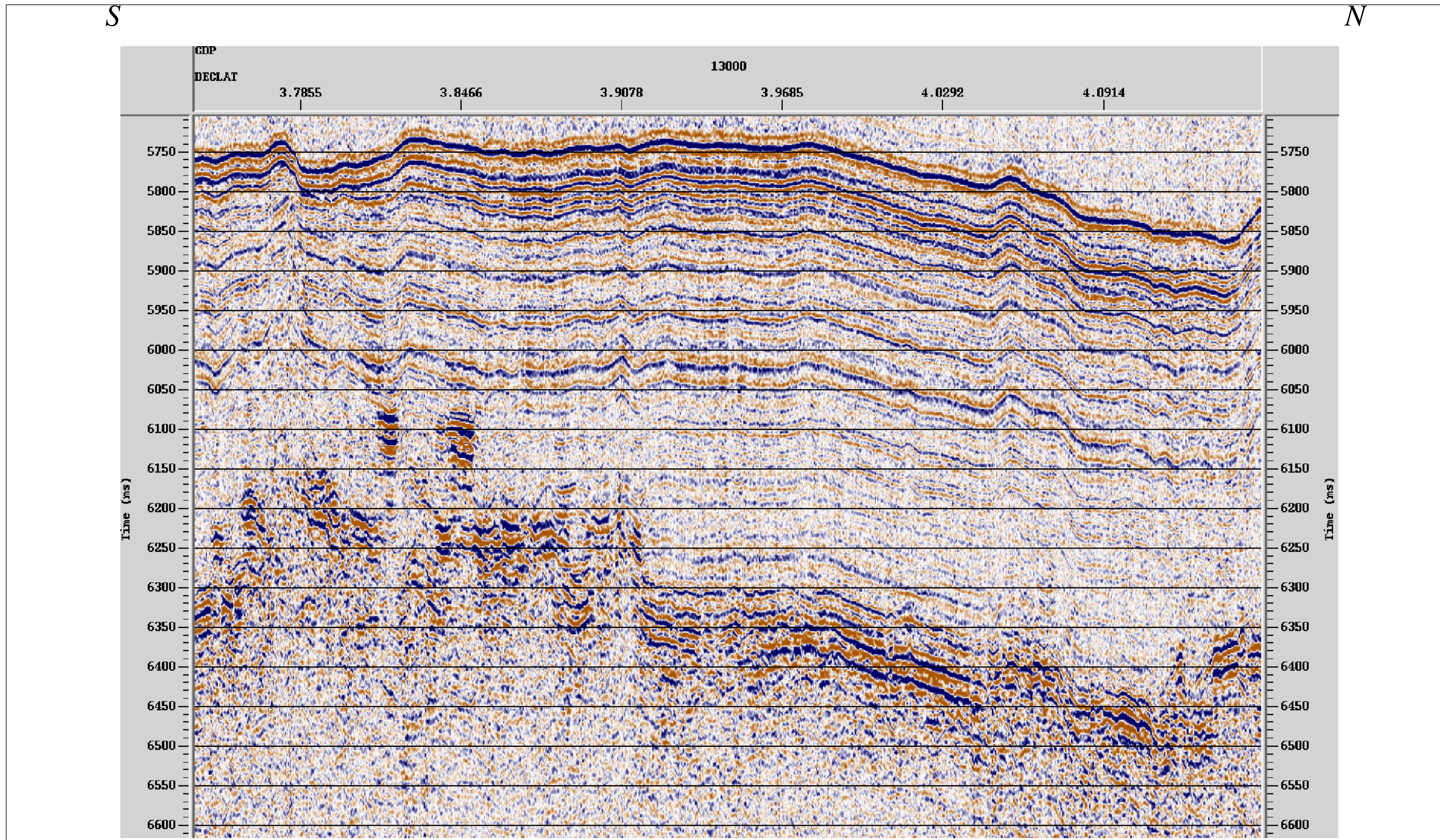


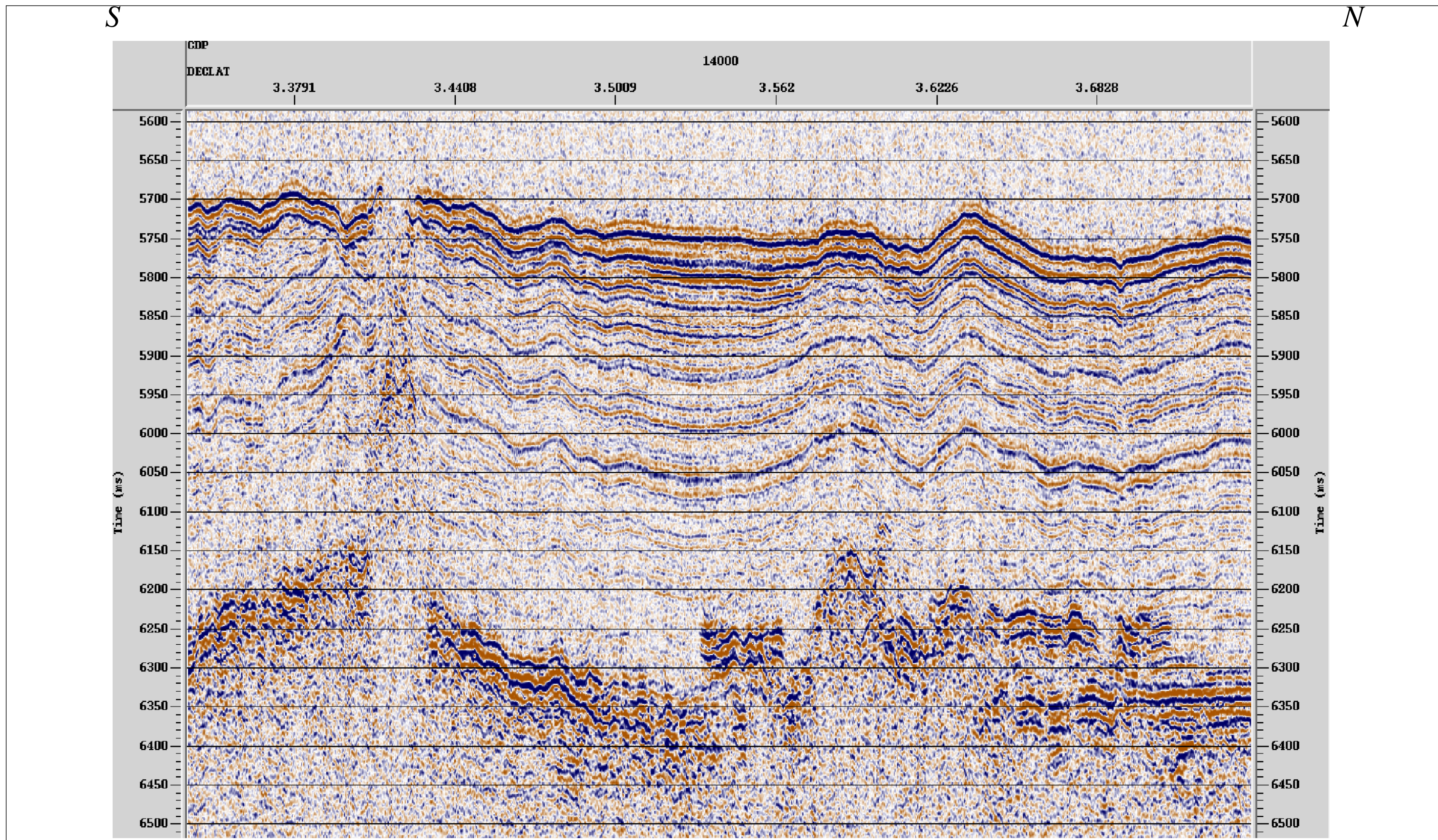
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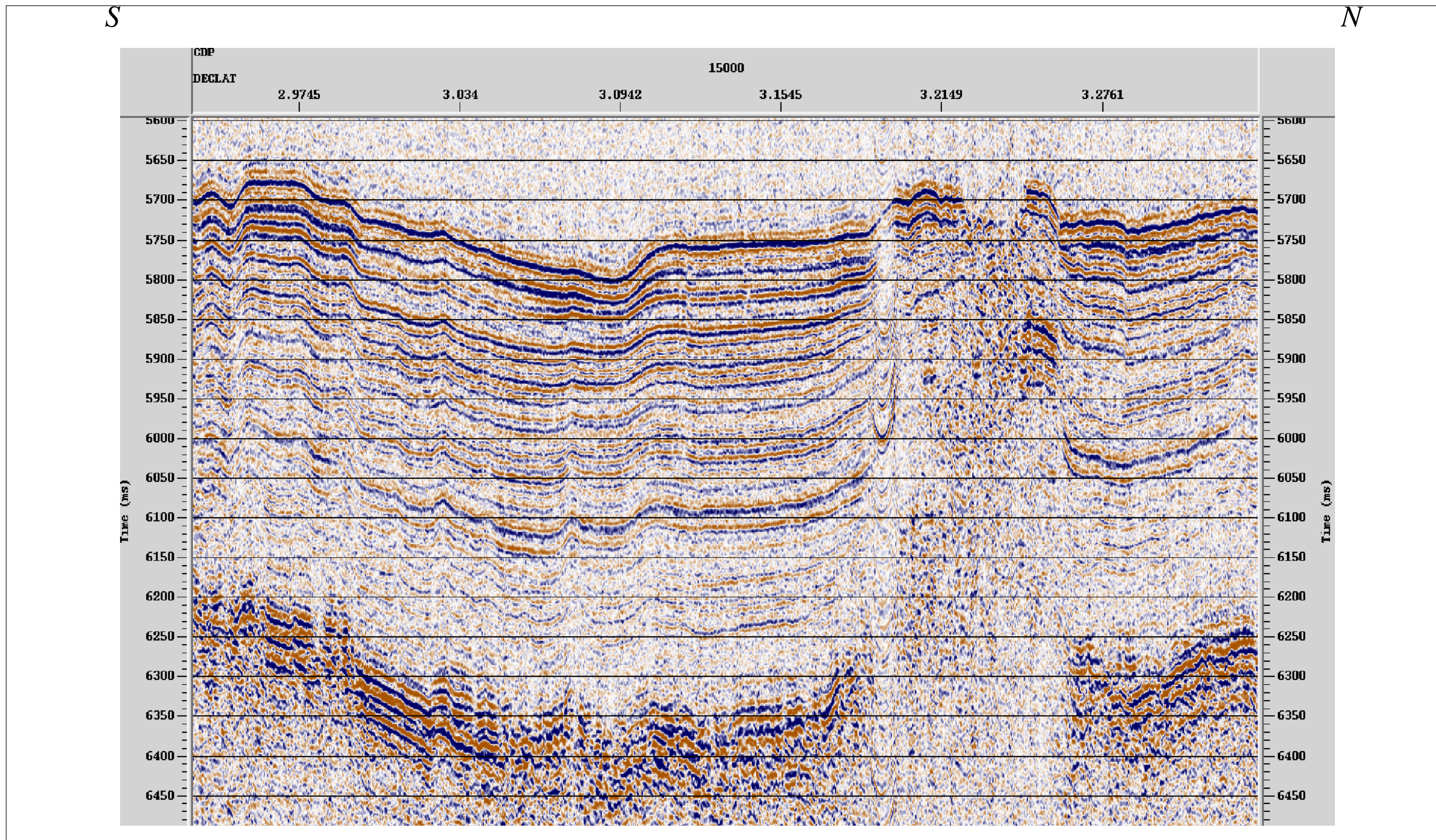
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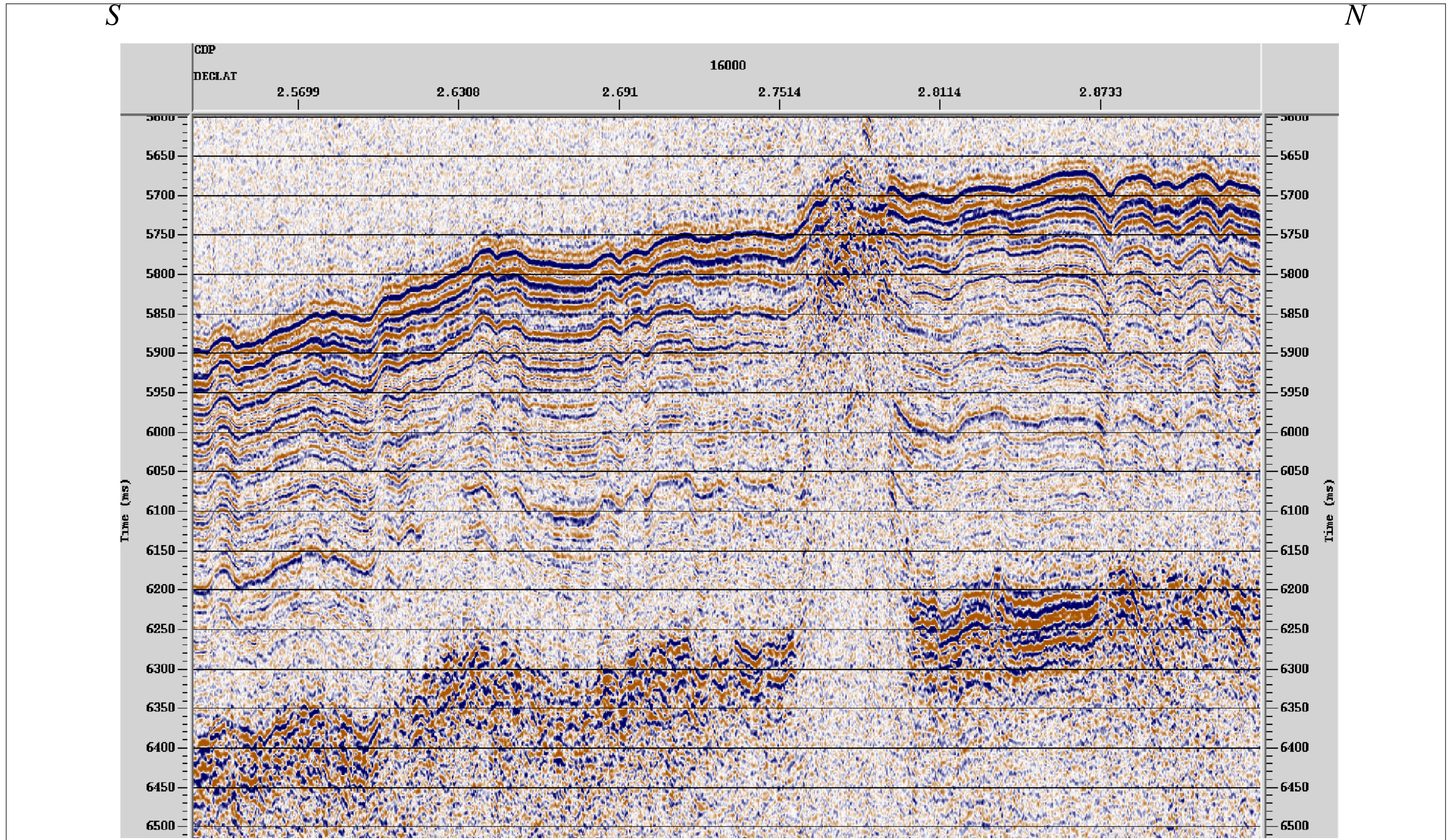






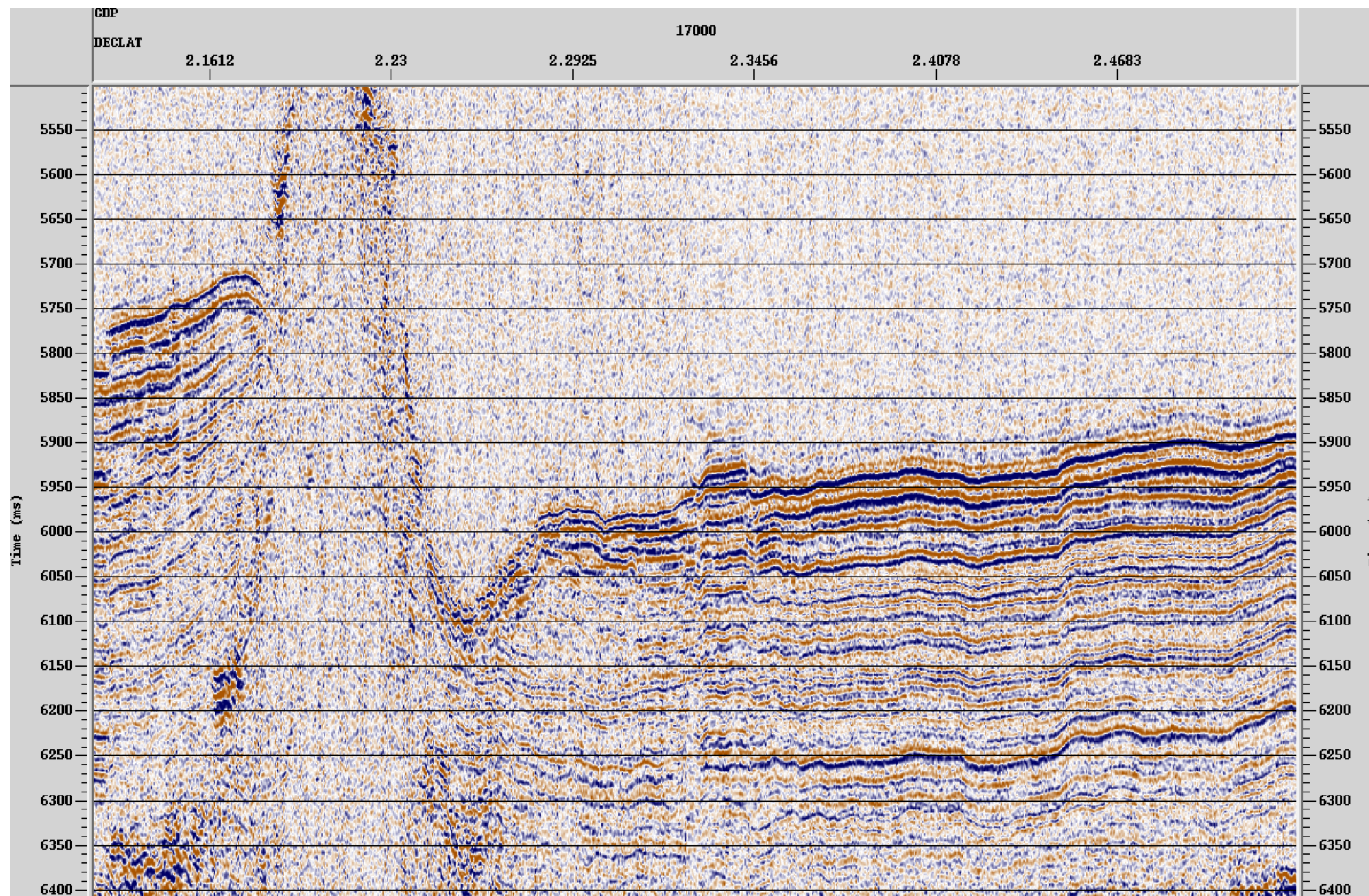


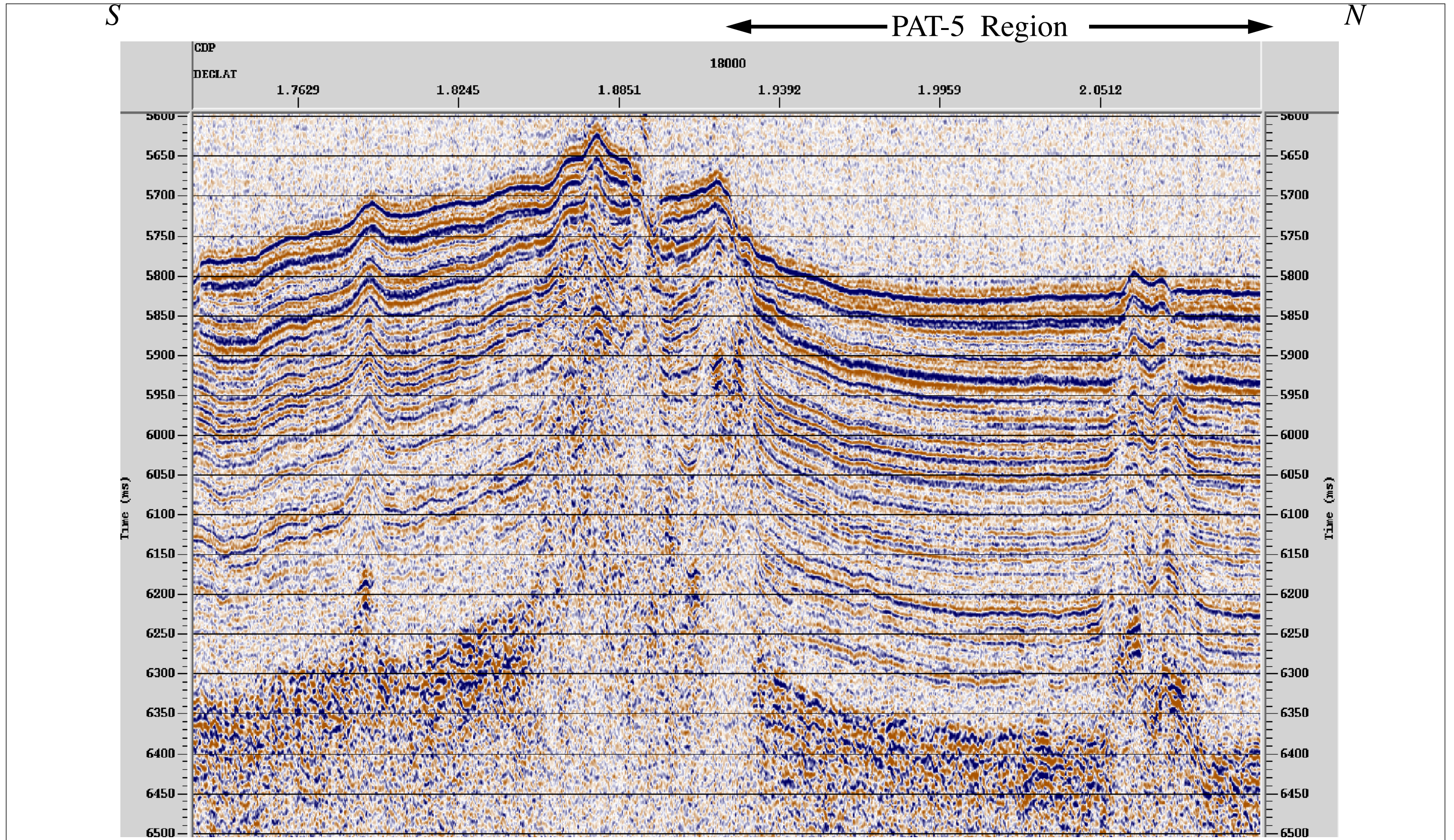


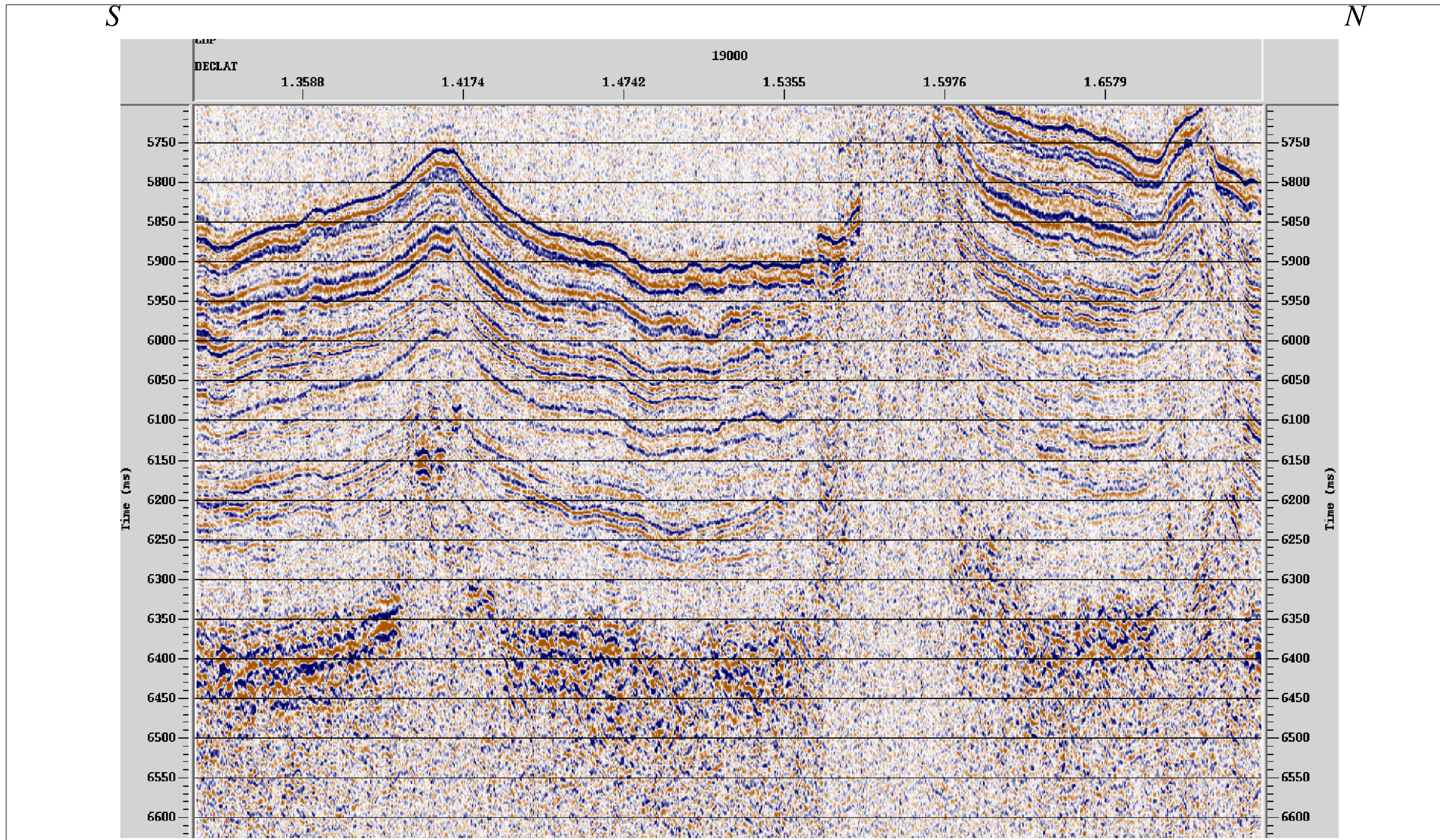


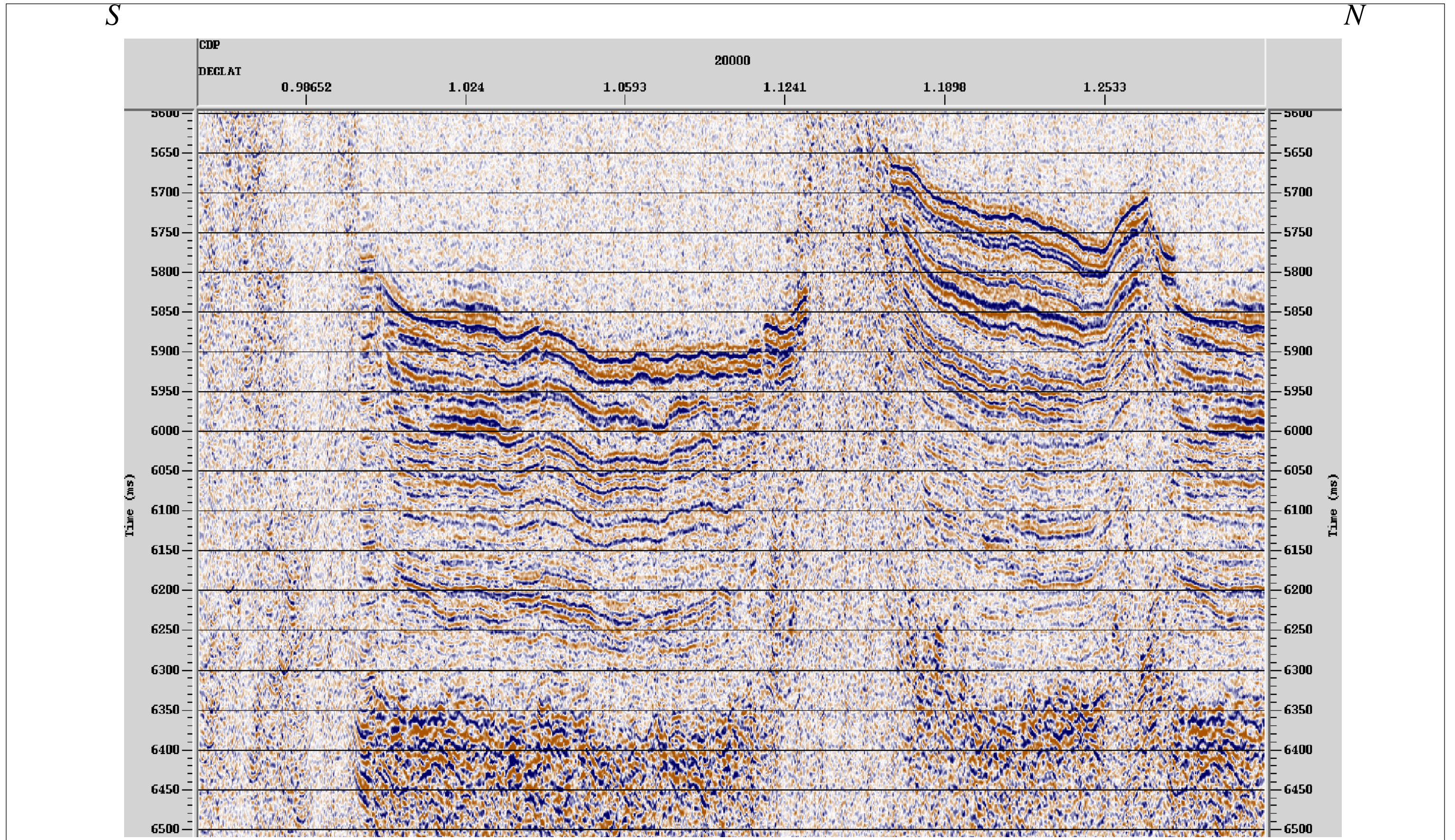
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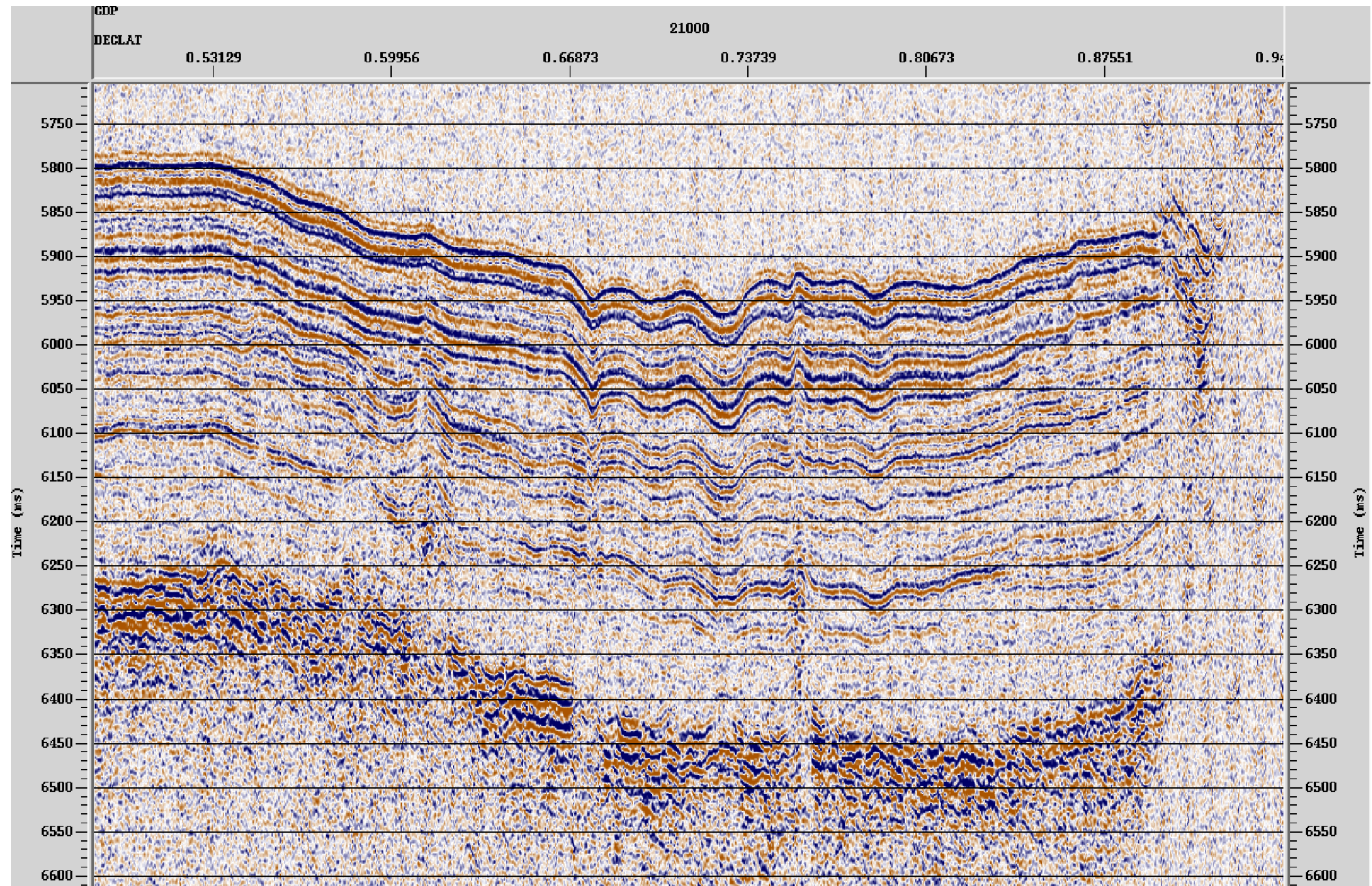






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