CHAPTER V

CONCLUSION AND DISCUSSION

The objective in the part of data processing is to compare the results obtained by the common offset method with that of common mid point method. The comparison will be made by using the same parameters in doing NMO correction and Filtering. Because the NMO is the main stage in data processing, the comparison must use the same parameters which are velocity and intercept time. The important effect of NMO is to increase the low frequency contents ; therefore, the results after filtering of the same parameters may be different. In addition, time spent for data collection and processing for each method are compared.

Time used in Data Collection

For the total distance of 1500 meters with 3 labours and 1 operator, the time spent on used for data collection are 23 Hours and 33 Hours for common offset method and common mid point method, respectively. This does not include the time used to survey lines, ie., clearing, digging, planting geophone, etc., which depends on the topographical conditions.

The average times for data collection per 200 meters-line are 3 Hours for common offset method and 4 Hours for common mid point method. The time for data collection also depend upon the field condition such as wind and human disturbance.

Time for Data Processing

One difference in data processing data obtained by both methods is that the CDP sorting is not needed for common offset method. Time spent for processing in each module is as follows.

STA Time for static correction of data in each record comprising 12 traces is 2 minutes.

CDP CDP is run only for data obtained by common depth method. Each record comprising 12 traces were inputted and sorted into 6 traces/record. The average time for CDP is 1 minute/1 gathered record.

VEL Data from both method can be processed for velocity analysis. However, the time used for the analysis is large over 15 minute.

NMO NMO for common depth point data and common offset data are different. In this study, three folds are used for common depth point data. Each gather, traces are NMO corrected, then stacked and stored on a diskette. For each stacked trace 1 minute 45 seconds is consumed. For common offset data, NMO is done trace by trace and stored without stacking. The average time is 50 seconds per trace or 10 minutes per record of 12 traces.

Conclusion

There is no control boring in this study to conclude whether there is a reflector. Therefore, information from several sources including airphoto interpretation, geological data, shallow well for agriculture, and open pit must be used.

Ban Rong Wua From Figure 4-8 and general geology of the area, it is known that the sediment deposited forming natural levee (Kaewyana, 1985). Considering the sedimentation model in Figure 5-1, block diagram in Figure 5-2, and information from shallow well for agriculture, it is concluded that there is at least 1 reflector in this area.

Three survey lines were tested in this study area. Using common offset method, 5, 5, and 4 records were collected for line 1, 2, and 3, respectively. And using common depth point method, 53, 56, and 44 records were collected for line 1, 2, and 3, respectively. After sorting and making NMO correction, there are 8 final records of 96 traces, 9 records of 102 traces, and 7 records of 78 traces for line 1, 2, and 3, respectively. On line 2 and 3, at records number

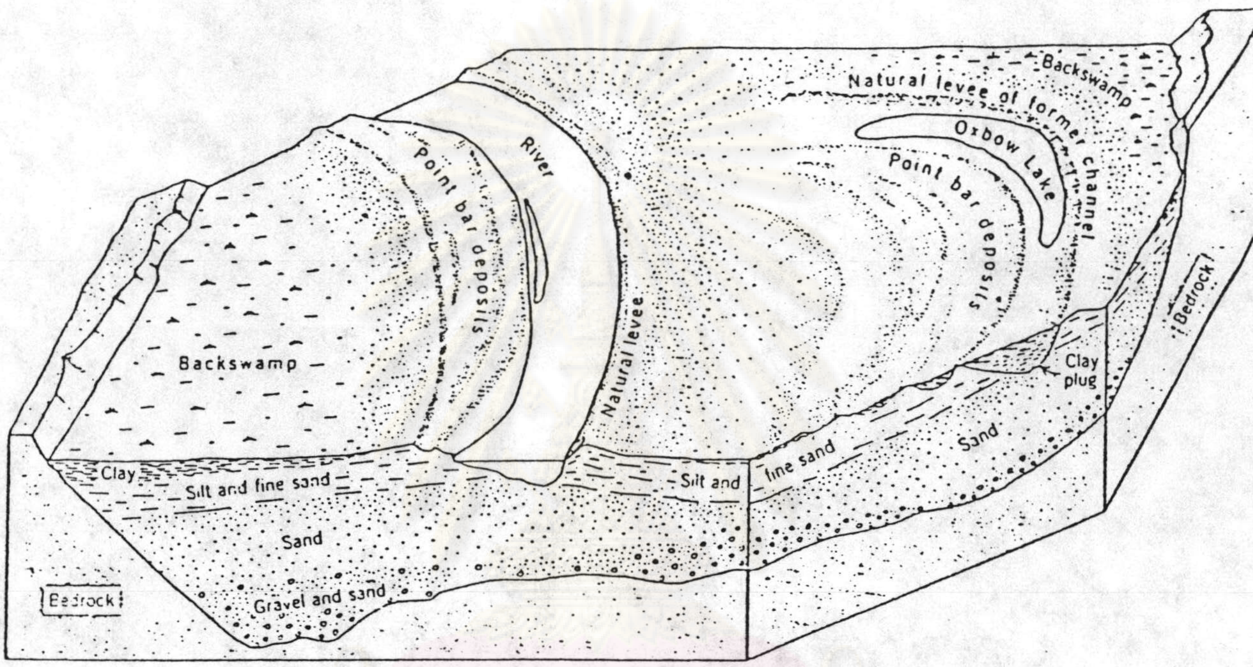


Figure 5-1 Topographic forms and deposits typical of large rivers show backswamp and natural levee. (After Ramingwong, 1985).

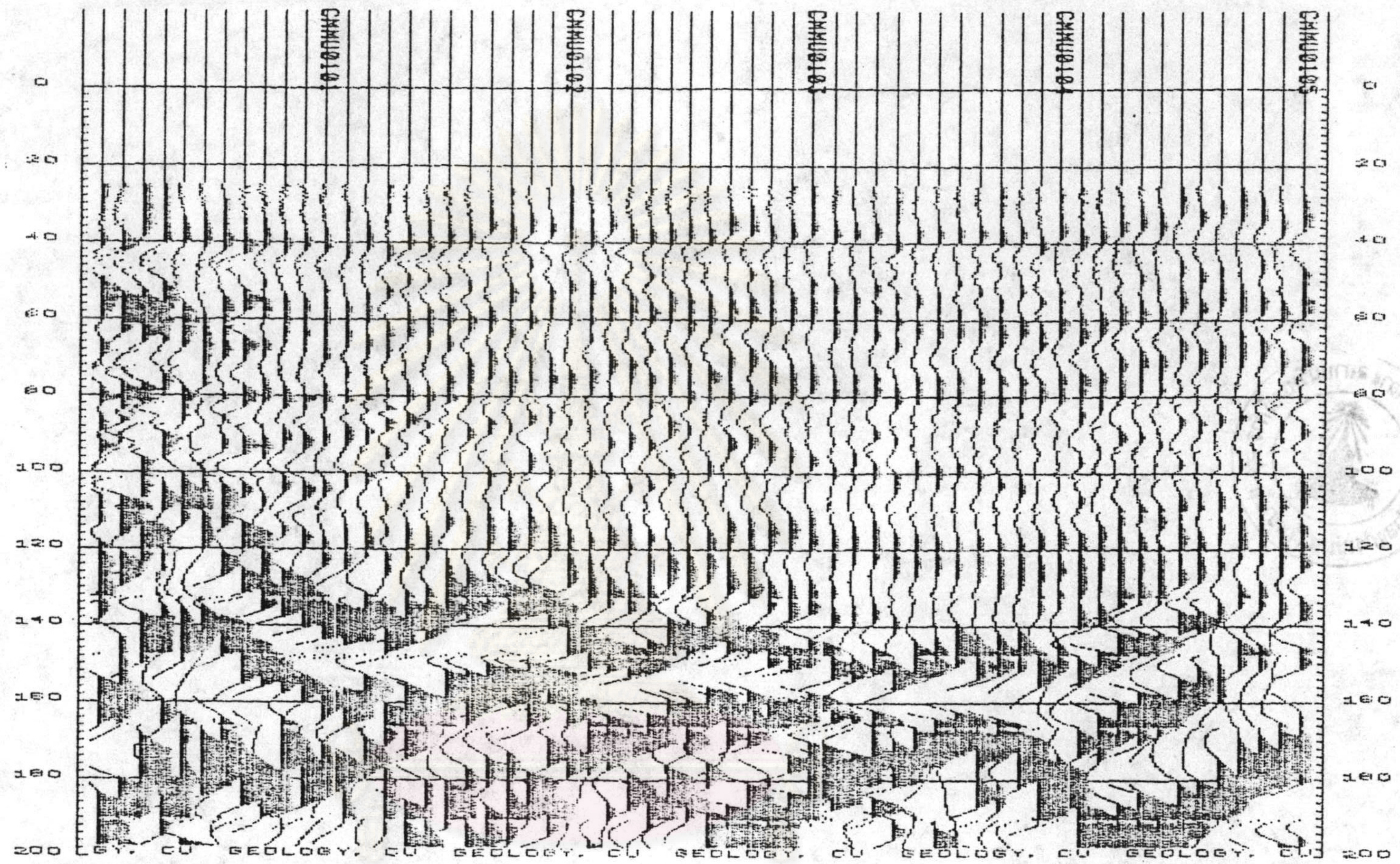


Figure 5-3 NMO result of common offset data from line 1, Ban Rong Wua study area. NMO with velocity 1300 M/S. Trend of reflector lies between 60-80 mS.

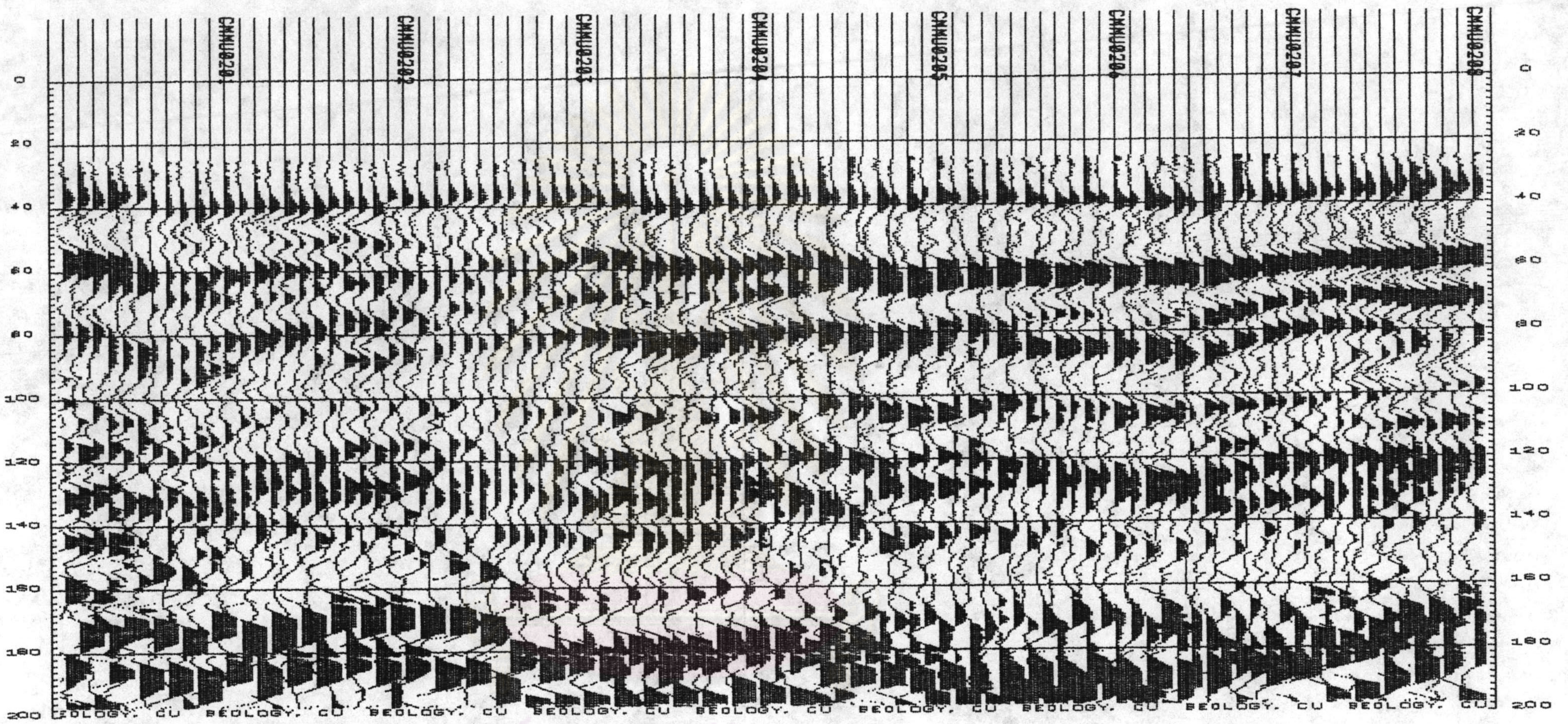


Figure 5-4 NMO result of 3-fold CMP data from line 1, Ban Rong Wua study area. NMO with velocity 1300 M/S. Trend of reflector lies between 60-80 mS.

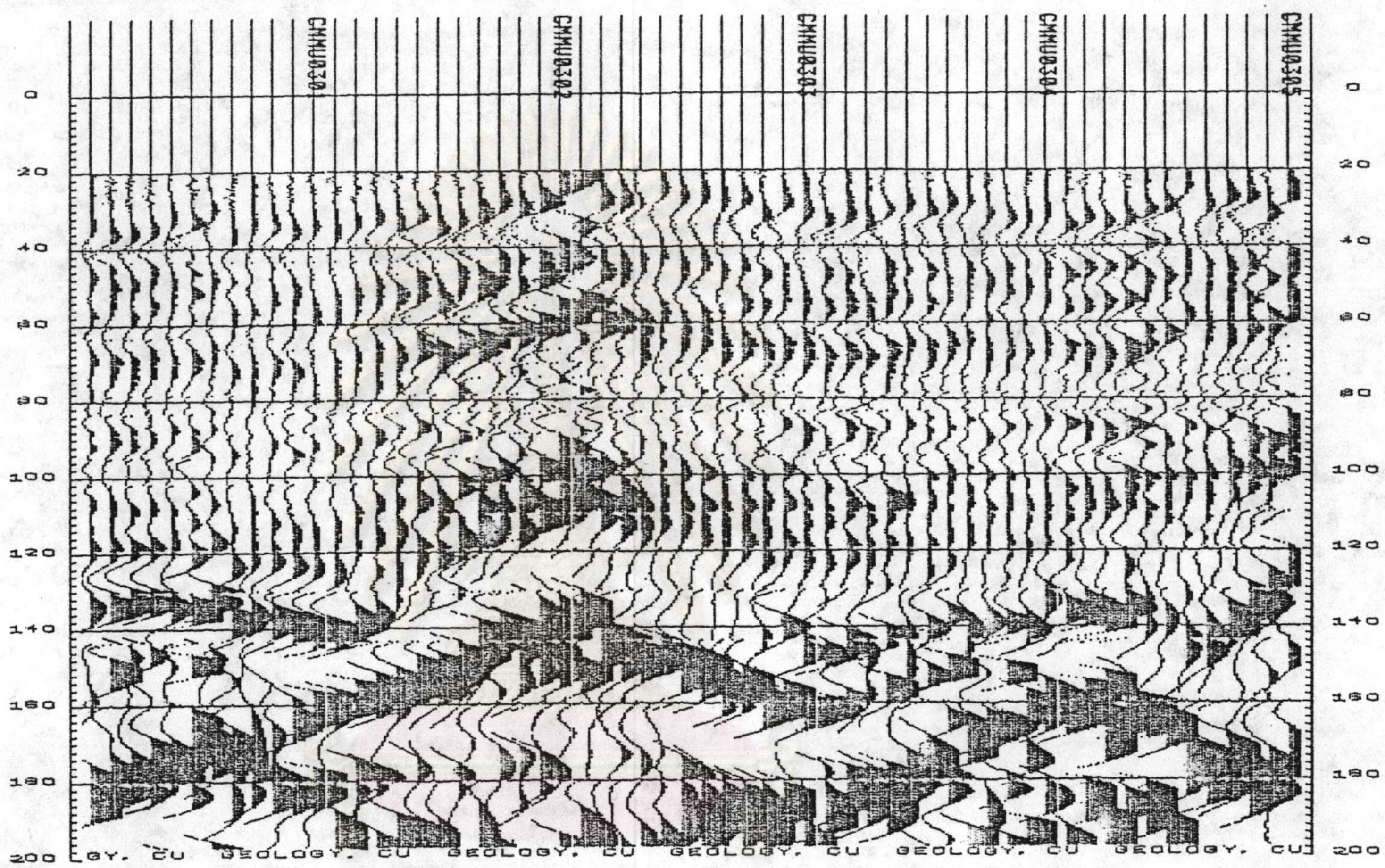


Figure 5-5 NMO result of common offset data from line 2, Ban Rong Wua study area. NMO with velocity 1300 M/S. Trend of reflector lies between 50-70 mS.

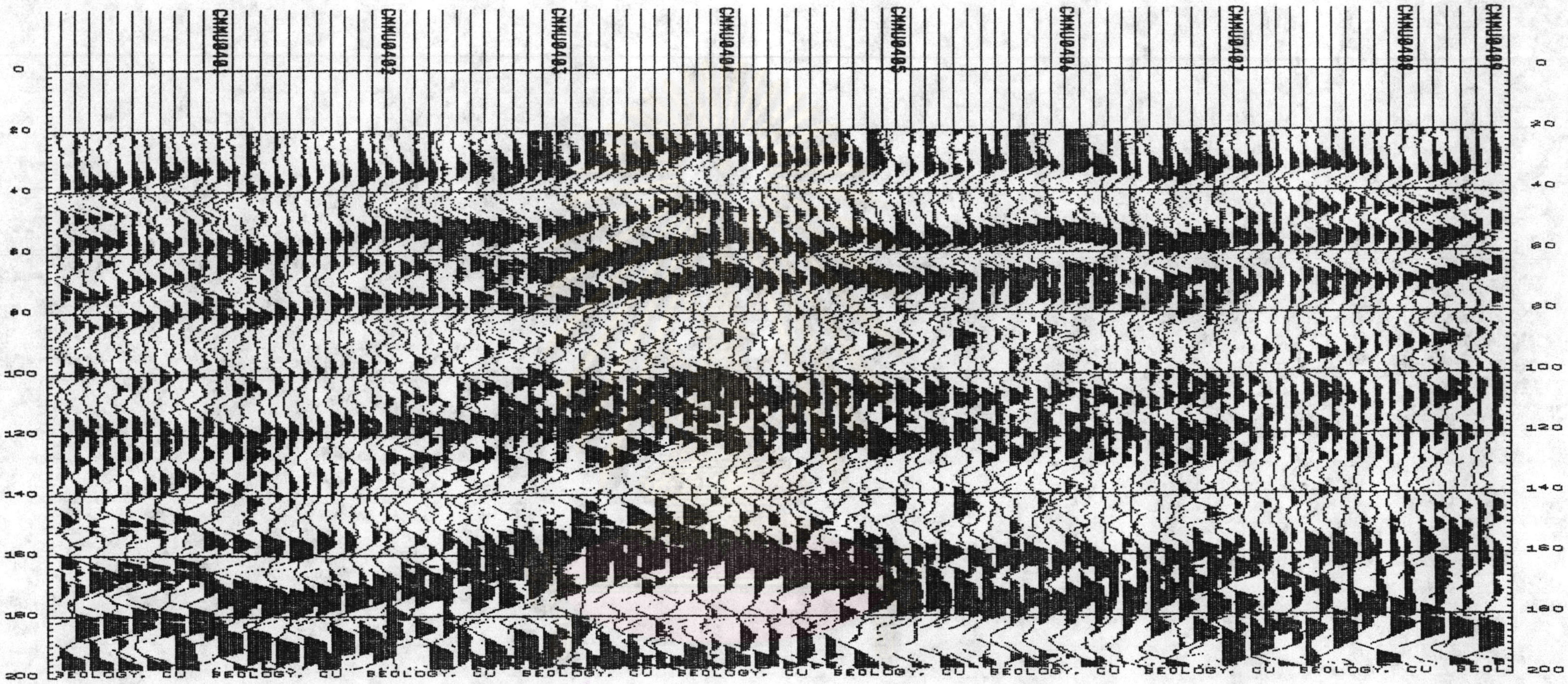


Figure 5-6 NMO result of 3-fold CMP data from line 2, Ban Rong Wua study area. NMO with velocity 1300 M/S. Trend of reflector lies between 50-70 mS.

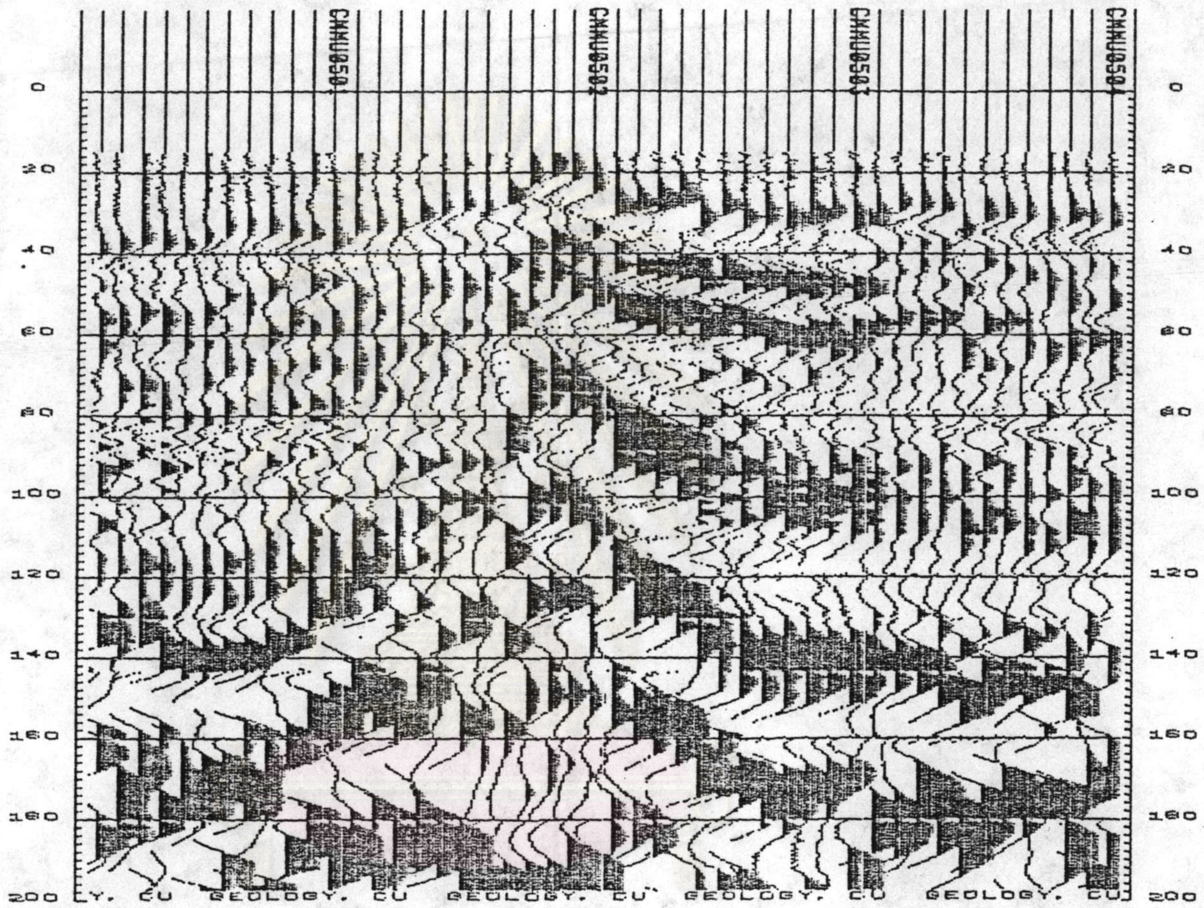


Figure 5-7 NMO result of common offset data from line 3, Ban Rong Wua study area. NMO with velocity 1300 M/S. Trend of reflector lies between 50-70 mS.

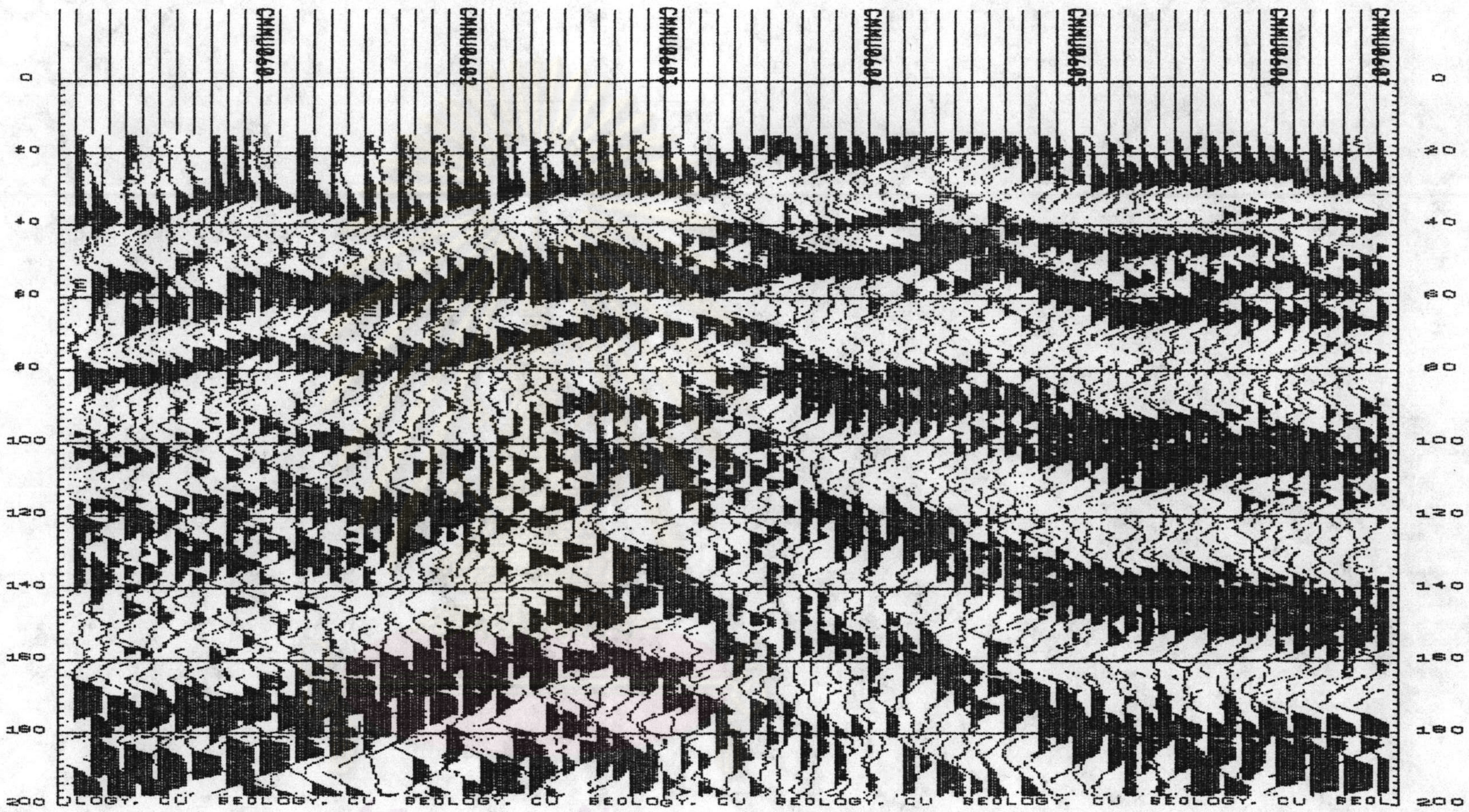


Figure 5-8 NMO result of 3-fold CMP data from line 3, Ban Rong Wua study area. NMO with velocity 1300 M/S. Trend of reflector lies between 50-90 mS.

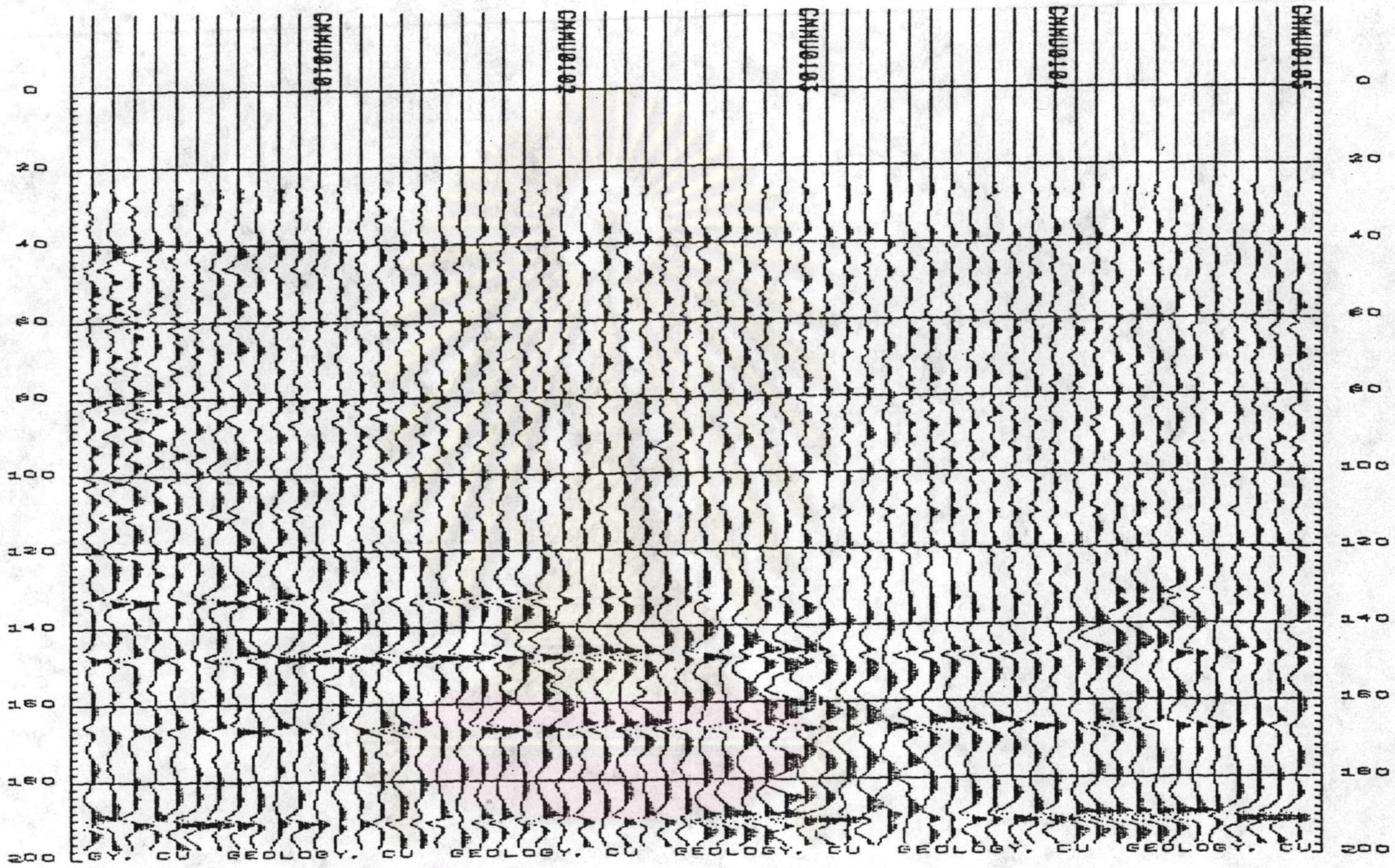


Figure 5-9 Filtered data after NMO of common offset data from line 1, Ban Rong Wua study area. Band pass 150-300 Hz.

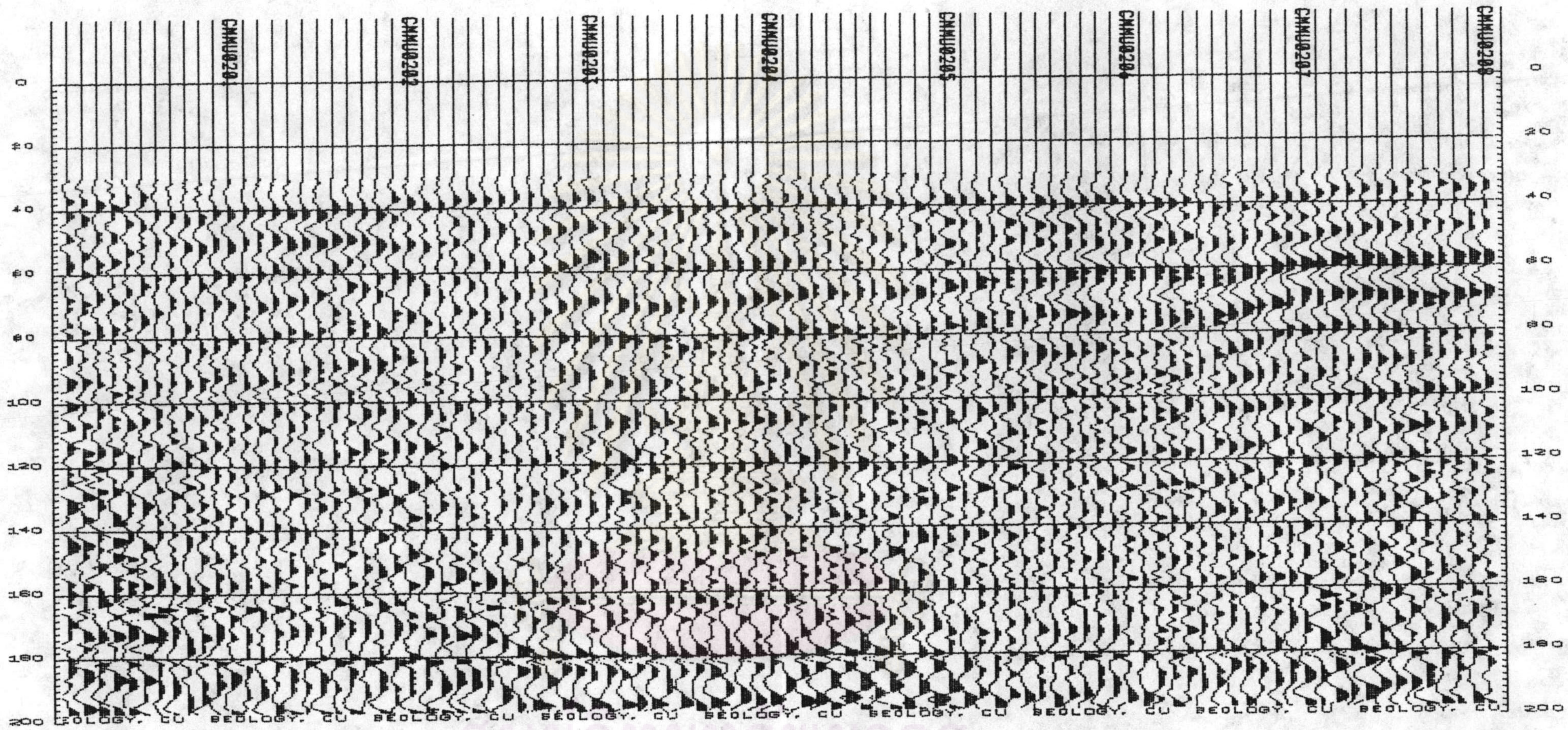


Figure 5-10 Filtered data after NMO of 3-fold CMP data from line 1, Ban Rong Wua study area. Band pass 150-300 Hz.

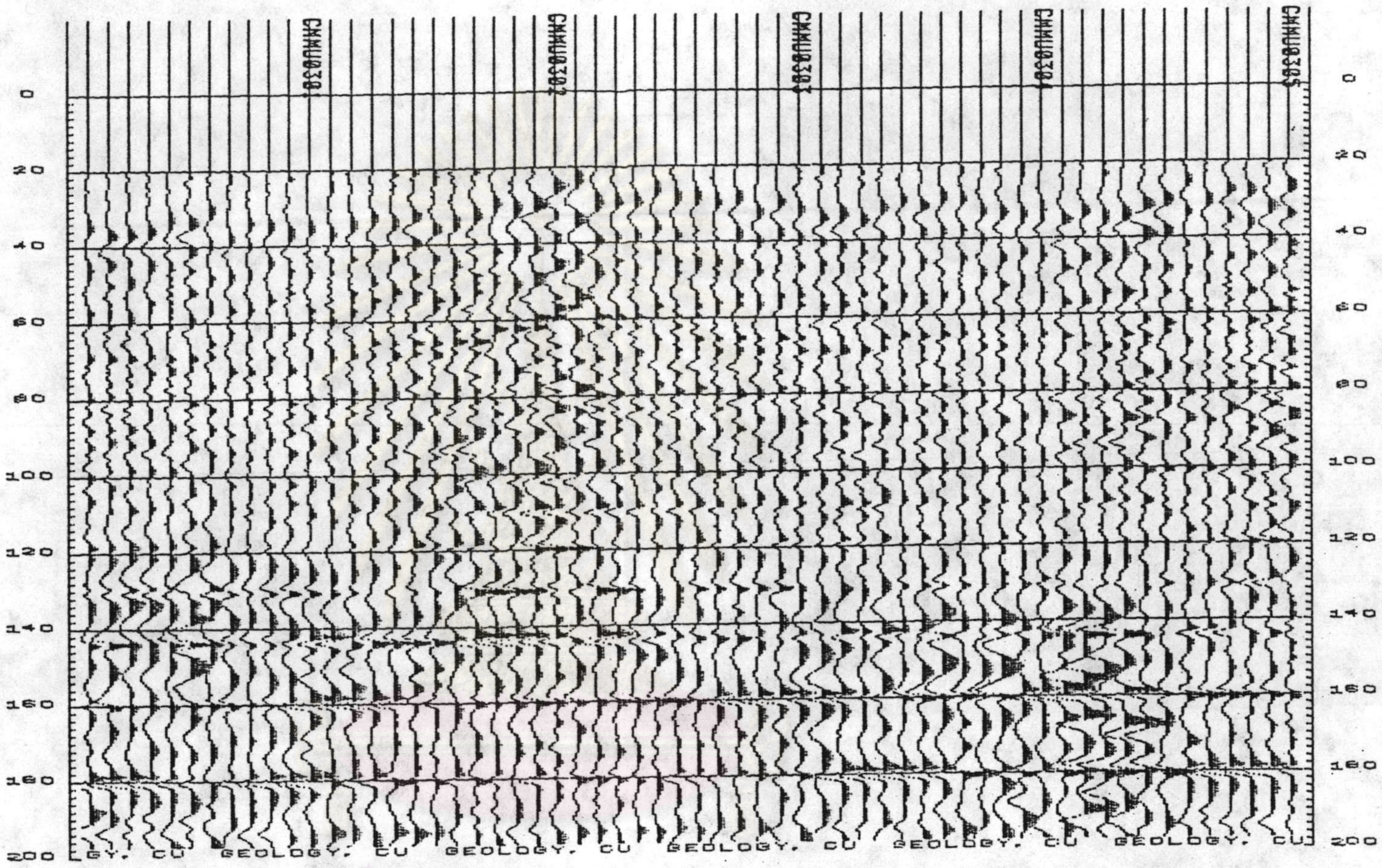


Figure 5-11 Filtered data after NMO of common offset data from line 2,
Ban Rong Wua study area. Band pass 150-300 Hz.

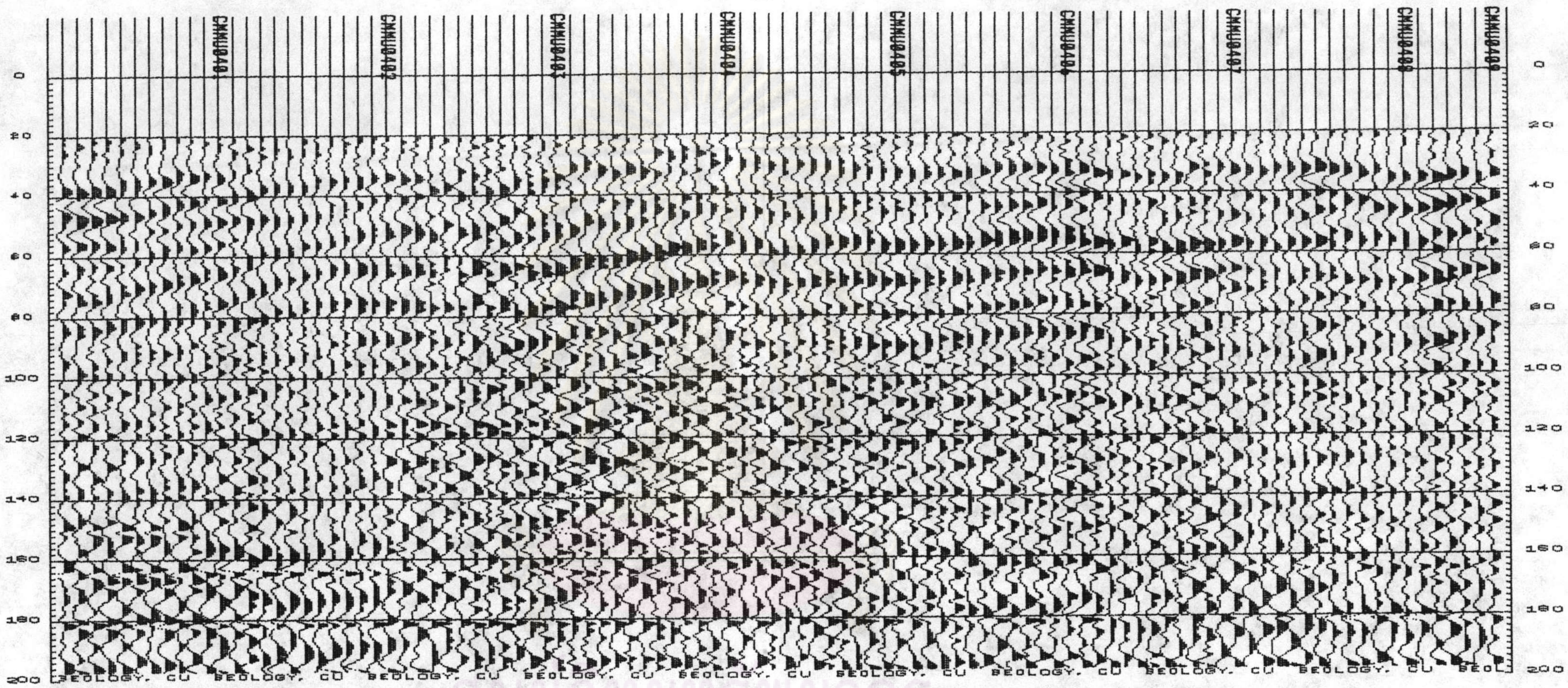


Figure 5-12 Filtered data after NMO of 3-fold CMP data from line 2, Ban Rong Wua study area. Band pass 150-300 Hz.

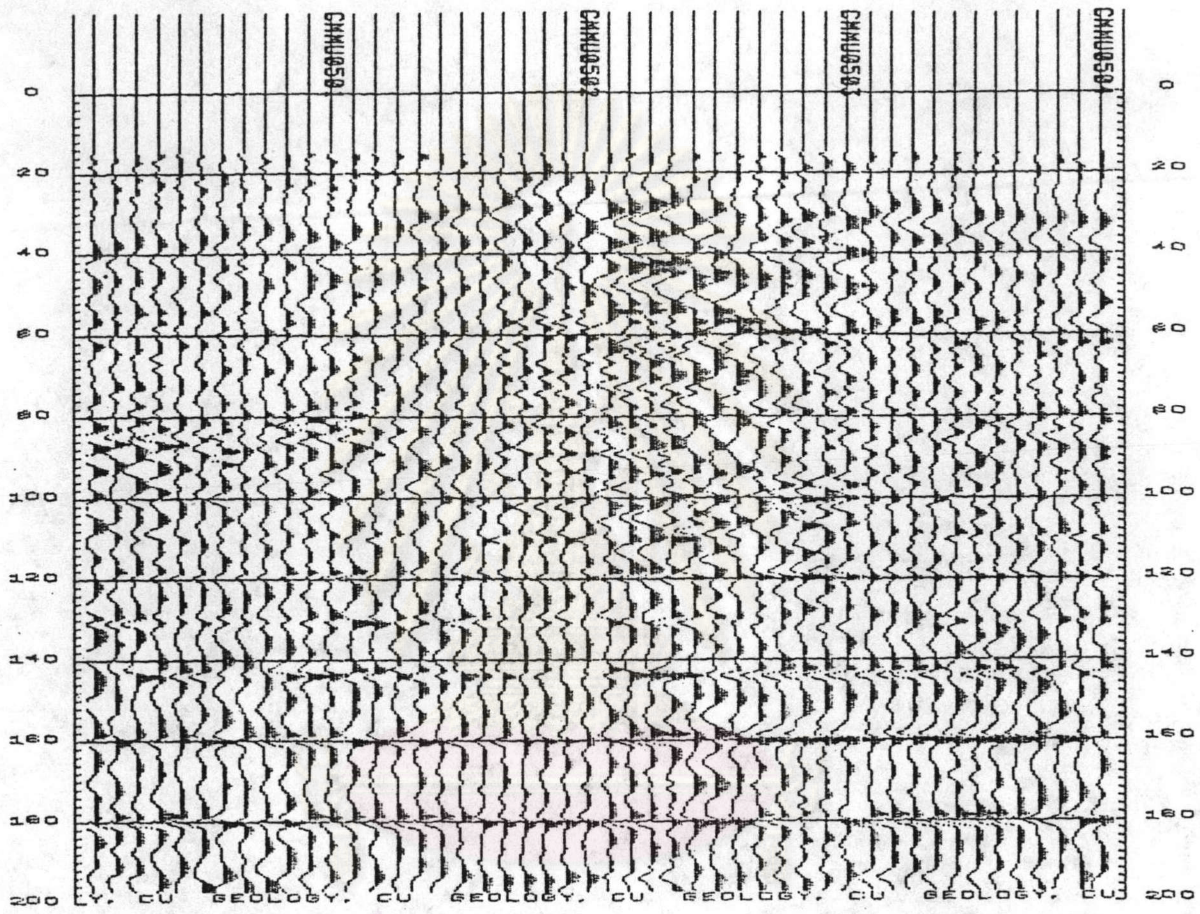


Figure 5-13 Filtered data after NMO of common offset data from line 3, Ban Rong Wua study area. Band pass 150-300 Hz.

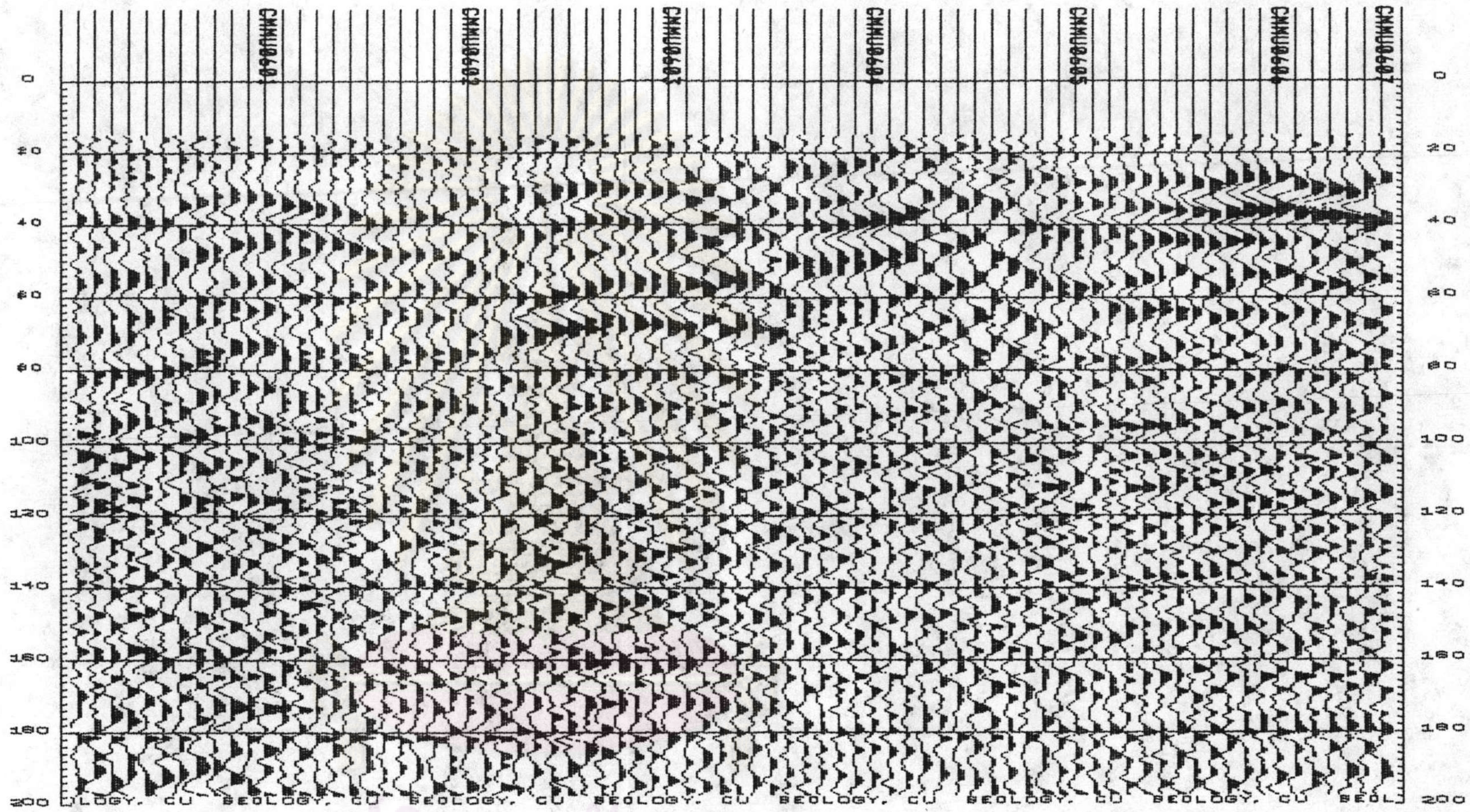


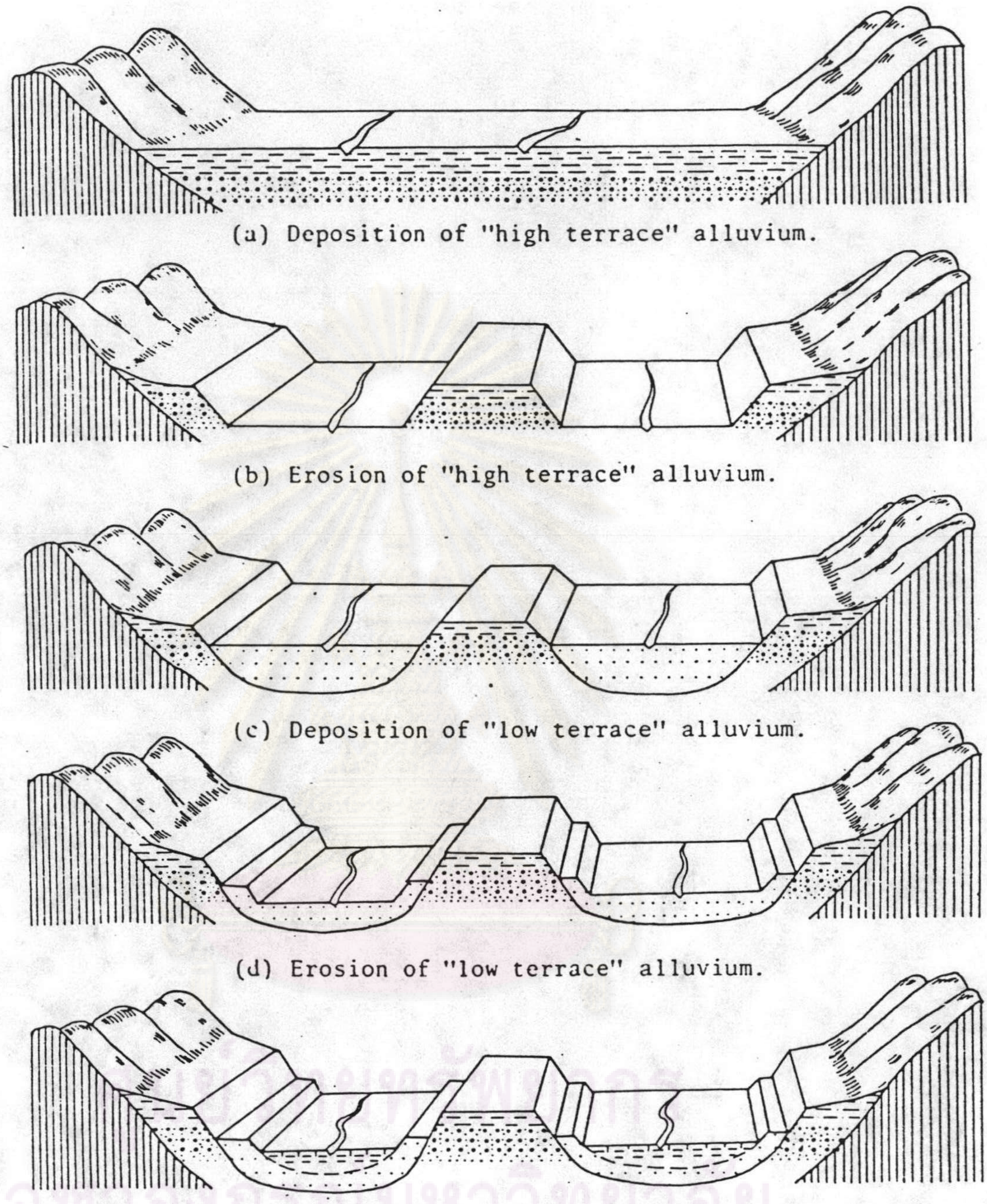
Figure 5-14 Filtered data after NMO of 3-fold CMP data from line 3,
Ban Rong Wua study area. Band pass 150-300 Hz.

almost disappear for common offset method. The trend of reflector is at the same position.

It is concluded that, at Ban Rong Wua, the common depth point method tends to be better than the common offset method. After processing, data obtained by common depth point method show better seismic section. After filtering, the trend of reflector from common offset method is smaller which may be the result of NMO or from the data collection in the field having very low frequency signal.

<u>Ban Huai Kieng</u> From Figure 4-9 and general geology of the area, it is concluded that the study area is locate within Mae Ping terrace. Considering deposition model in Figure 5-15 and block diagram of the area in Figure 5-16 together with field data showing gravel pit, It can be concluded that there is a reflector in this area.

There are two survey lines in this area. Using common offset method, 5 records and 4 records were collected for line 1 and line 2, respectively. And using common depth point method, 60 records and 50 records were collected for line 1 and line 2, respectively. After sorting, there are 10 records of 110 traces for line 1, and 8 records of 90 traces for line 2. Data from both method were processed by NMO at the velocity 900 M/S with intercept time 74 mS and at the velocity 1900 M/S with



(a) Deposition of "high terrace" alluvium.

(b) Erosion of "high terrace" alluvium.

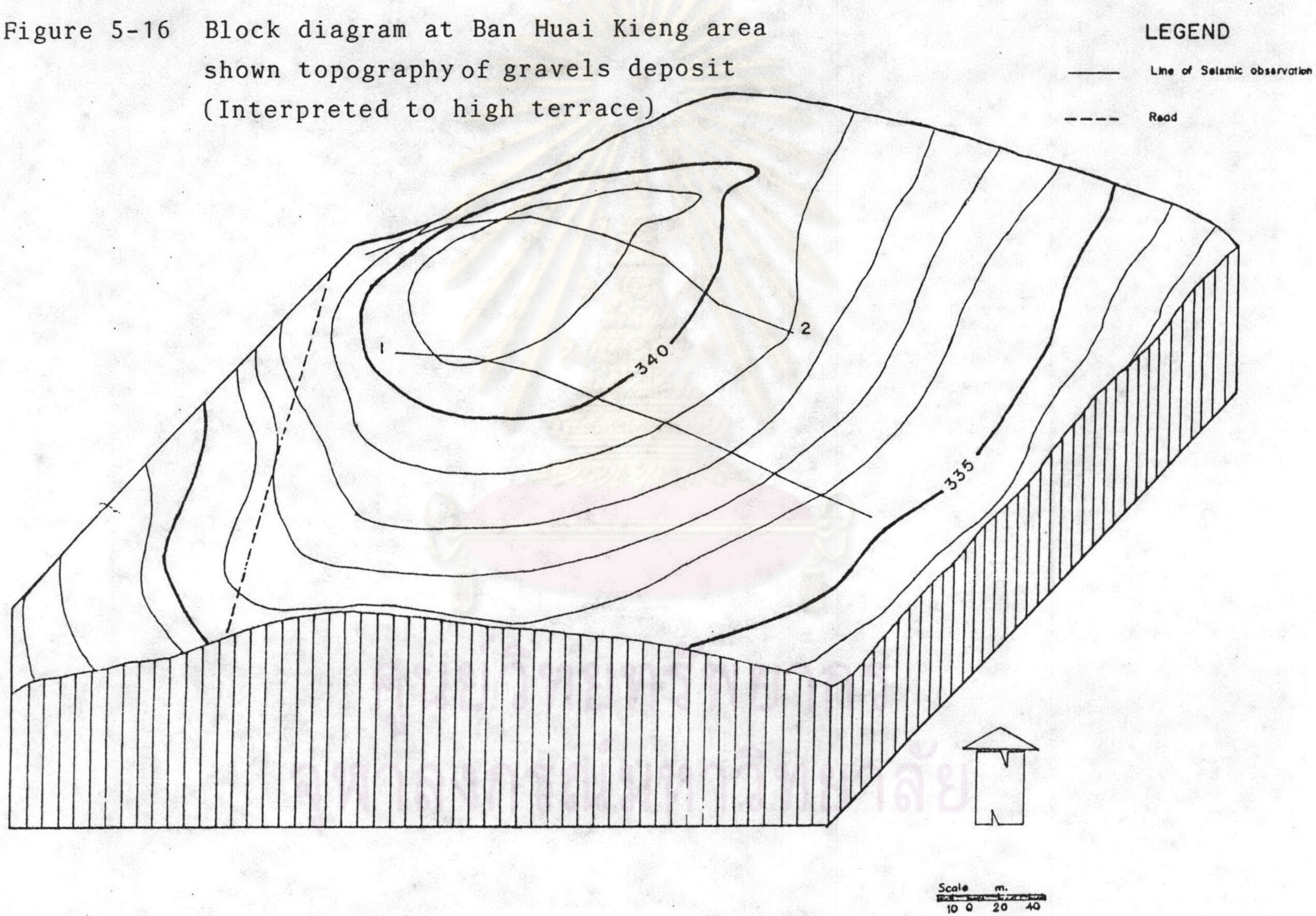
(c) Deposition of "low terrace" alluvium.

(d) Erosion of "low terrace" alluvium.

(e) Deposition of "present floodplain" alluvium.

Figure 5-15 Block diagram shown the formation of terraces in Chiengmai basin. (After Kaewyana, 1985).

Figure 5-16 Block diagram at Ban Huai Kieng area shown topography of gravels deposit (Interpreted to high terrace)



intercept time 120 mS. Figure 5-17 and 5-19 show the results of data from common offset method. Figure 5-18 and 5-20 show the result of data from common depth point method. All data were plotted with the same AGC parameters. Data obtained by common depth point method show more detail laterally. In comparision with data obtain by common offset method, the signal of common depth point data is larger and clearer at the time 40-80 mS ; the resolution is better at time 70-120 mS. Both type of data show trend of reflector similarly, indicating that seismic reflection method is applicable for shallow survey and it can be applied to rough topography similar to this study area.

The NMO corrected data were also subjected to filtering. The specified parameters are band pass 75-150 Hz, roll off 12 db/octave at lower limit frequency and 24 db/octave at upper limit frequency. Both type of data were plotted with the same AGC parameters. The result are shown in Figure 5-21 and 5-23 for data obtained by common offset method and Figure 5-22 and 5-24 for data obtained by common depth point method. The results after filtering show that the size of signal decrease but the trend of reflector is better than NMO results.

It can be seen that at Ban Huai Kieng, the data from both methods after processing have more or less the

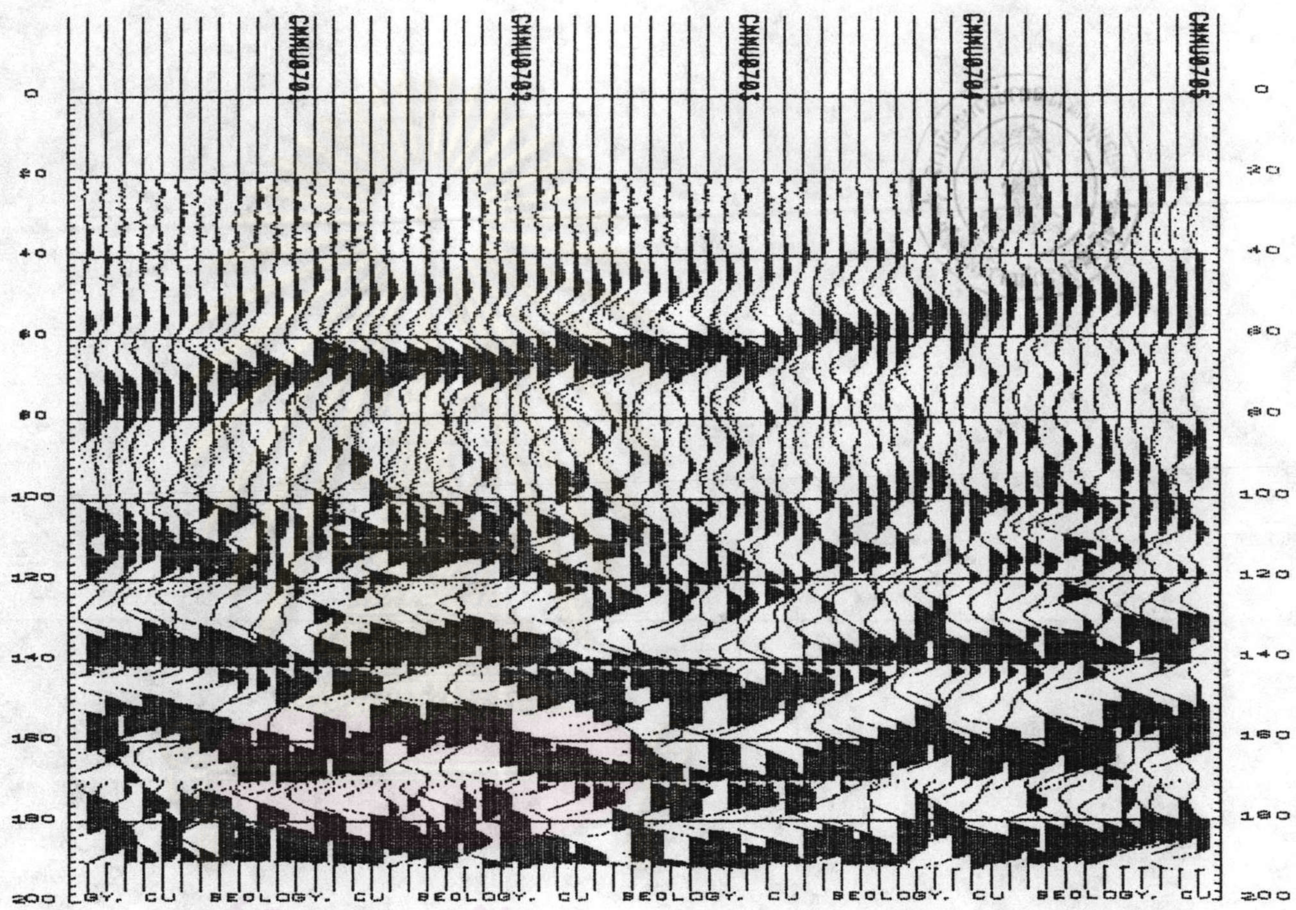


Figure 5-17 NMO result of common offset data from line 1, Ban Huai Kieng study area. NMO with velocity 900 M/S at T_O 74 mS and velocity 1900 M/S at T_O 120 mS. Trend of reflector lies between 80-120 mS.

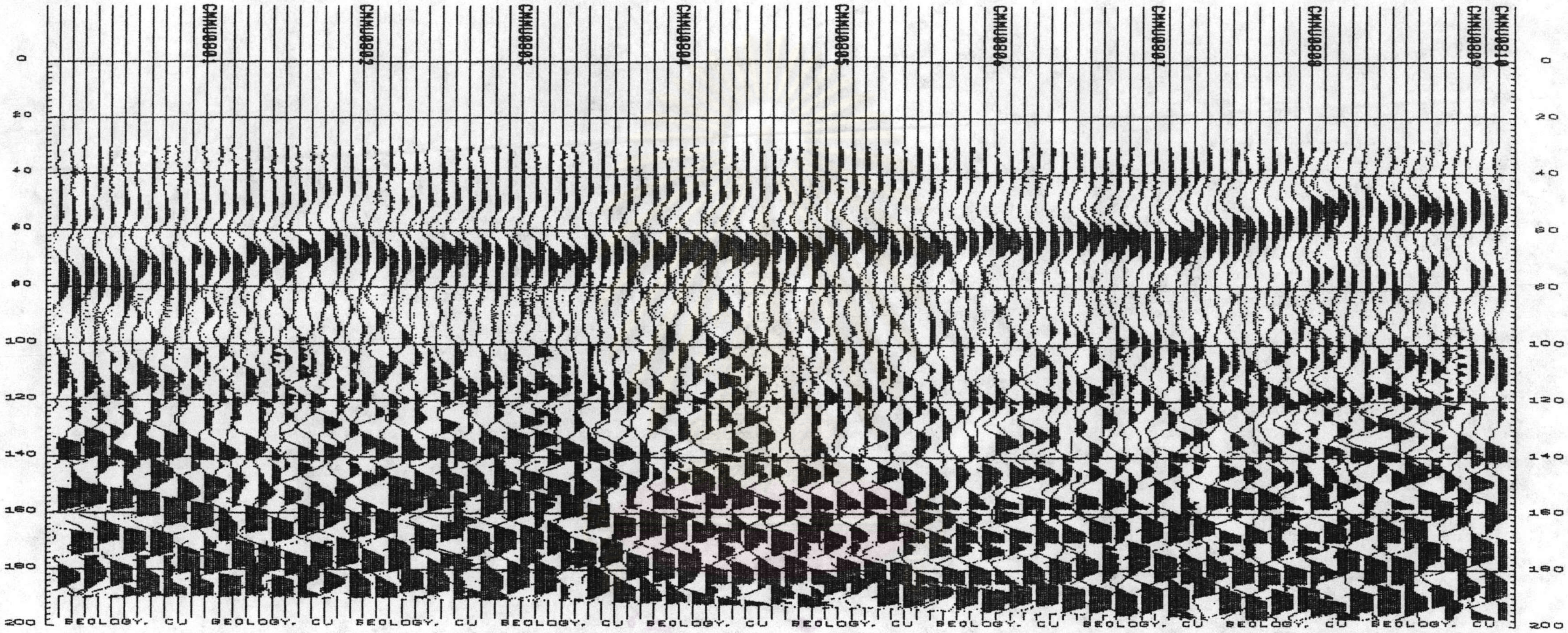


Figure 5-18 NMO result of 3-fold CMP data from line 1, Ban Huai Keing study area. NMO with velocity 900 M/S at T_O 74 mS and velocity 1900 M/S at T_O 120 mS. Trend of reflector lies between 80-120 mS.

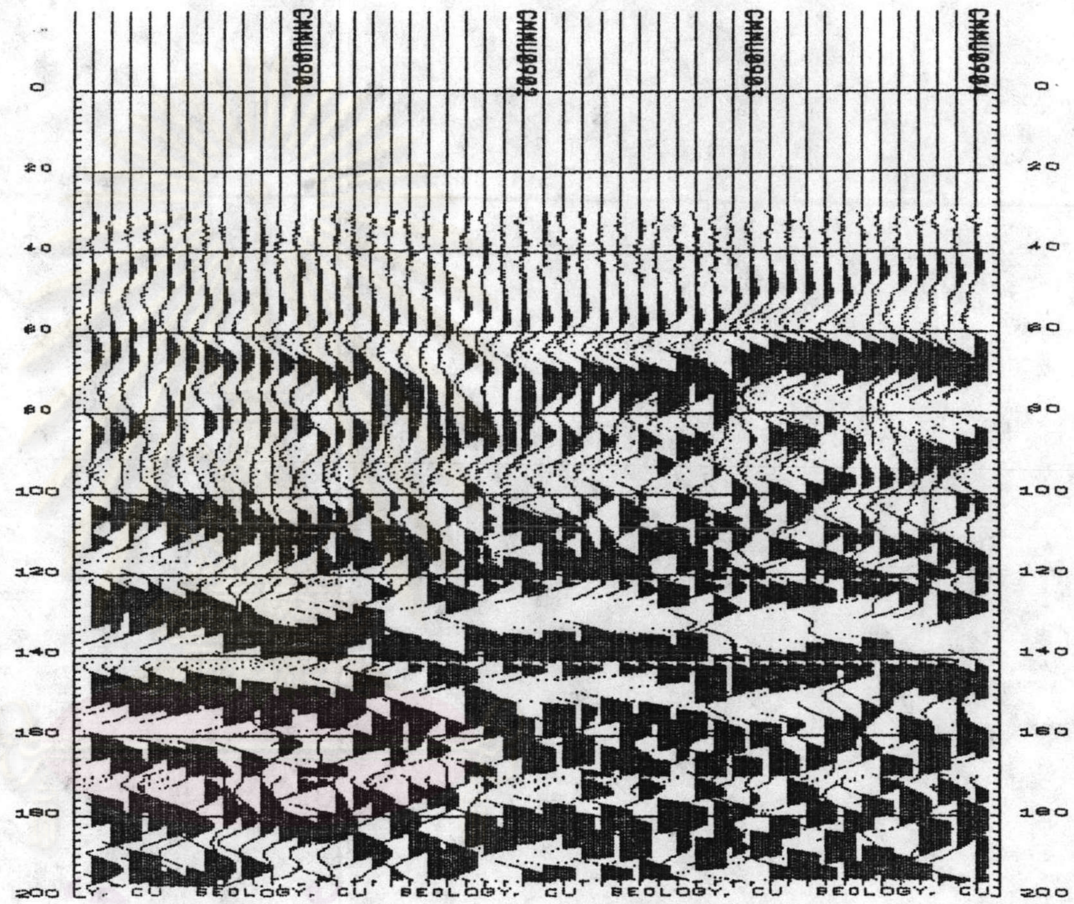


Figure 5-19 NMO result of common offset data from line 2, Ban Huai Keing study area. NMO with velocity 900 M/S at T_o 74 mS and velocity 1900 M/S at T_o 120 mS. Trend of reflector lies between 80-120 mS.

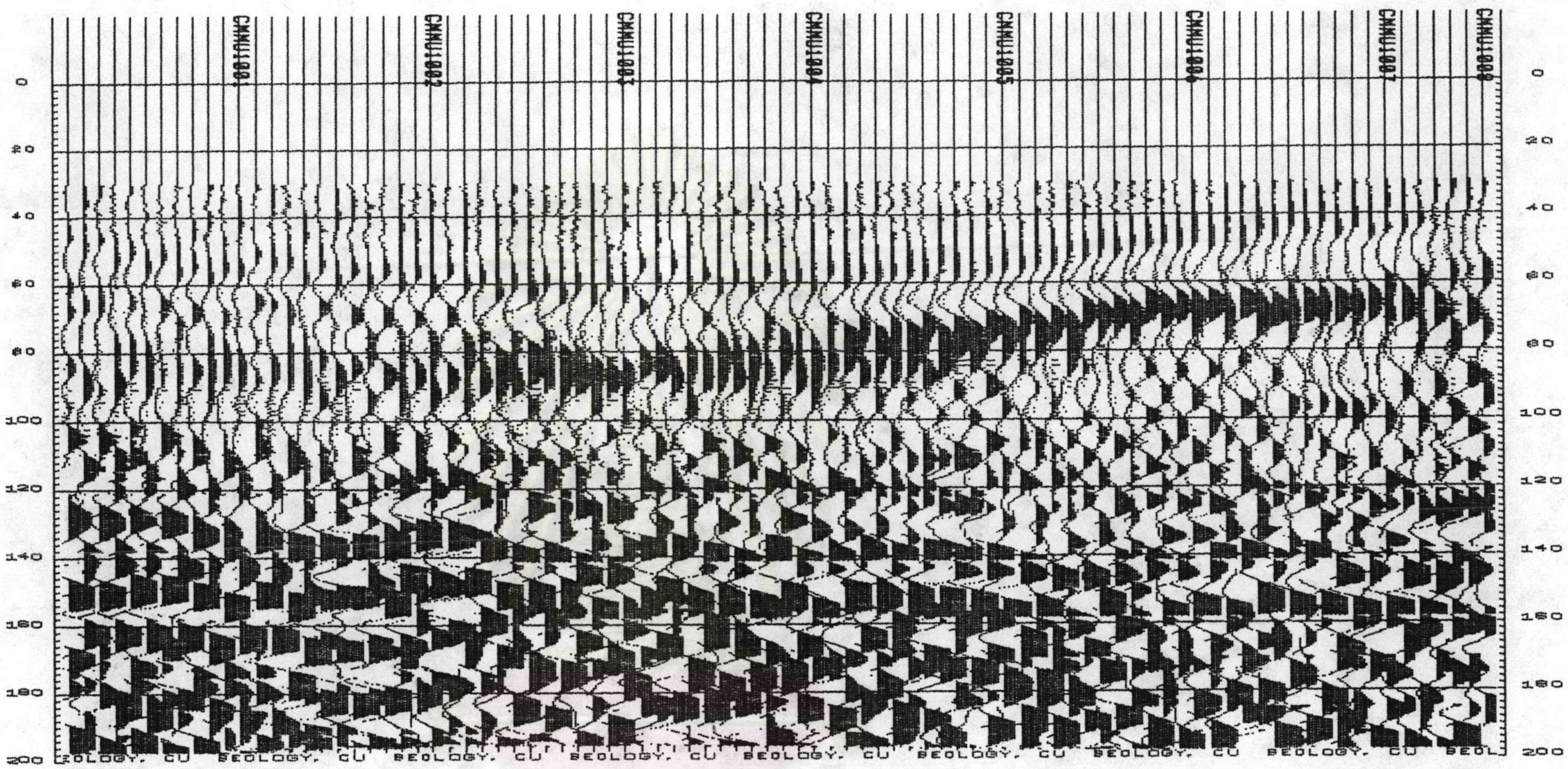


Figure 5-20 NMO result of 3-fold CMP data from line 2, Ban Huai Kieng study area. NMO with velocity 900 M/S at T_o 120 mS. Trend of reflector lies between 80-120 mS.

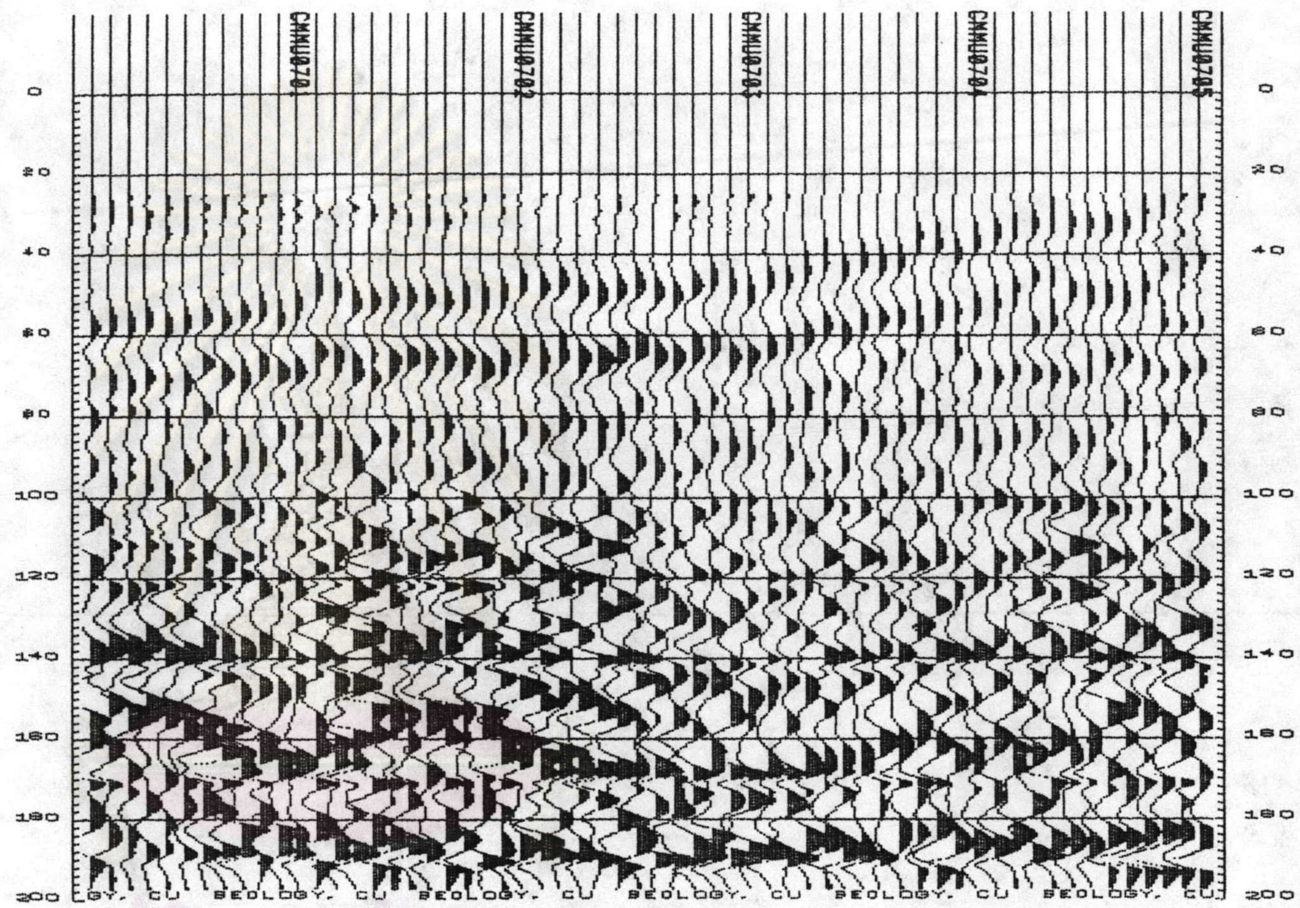


Figure 5-21 Filtered data after NMO of common offset data from line 1, Ban Huai Kieng study area. Band pass 75-150 Hz.

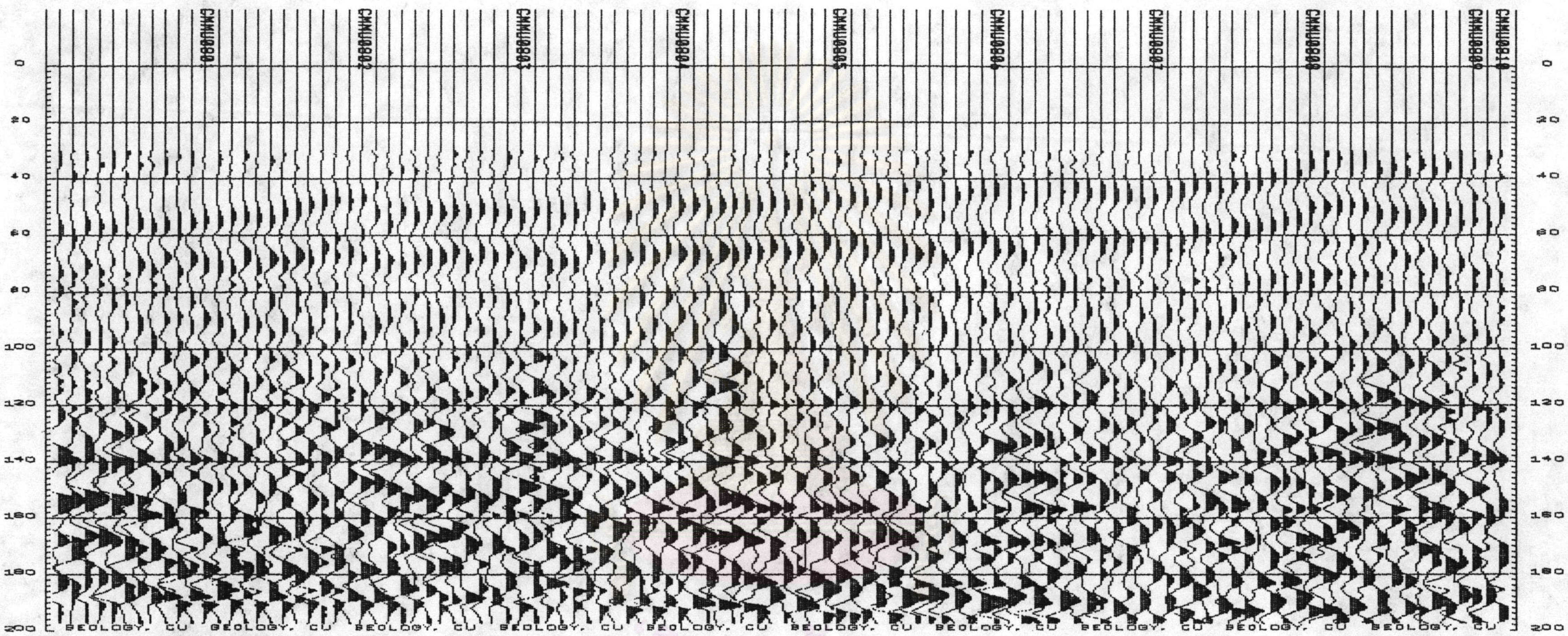


Figure 5-22 Filtered data after NMO of 3-fold CMP data from line 1, Ban Huai Kieng study area. Band pass 75-150 Hz.

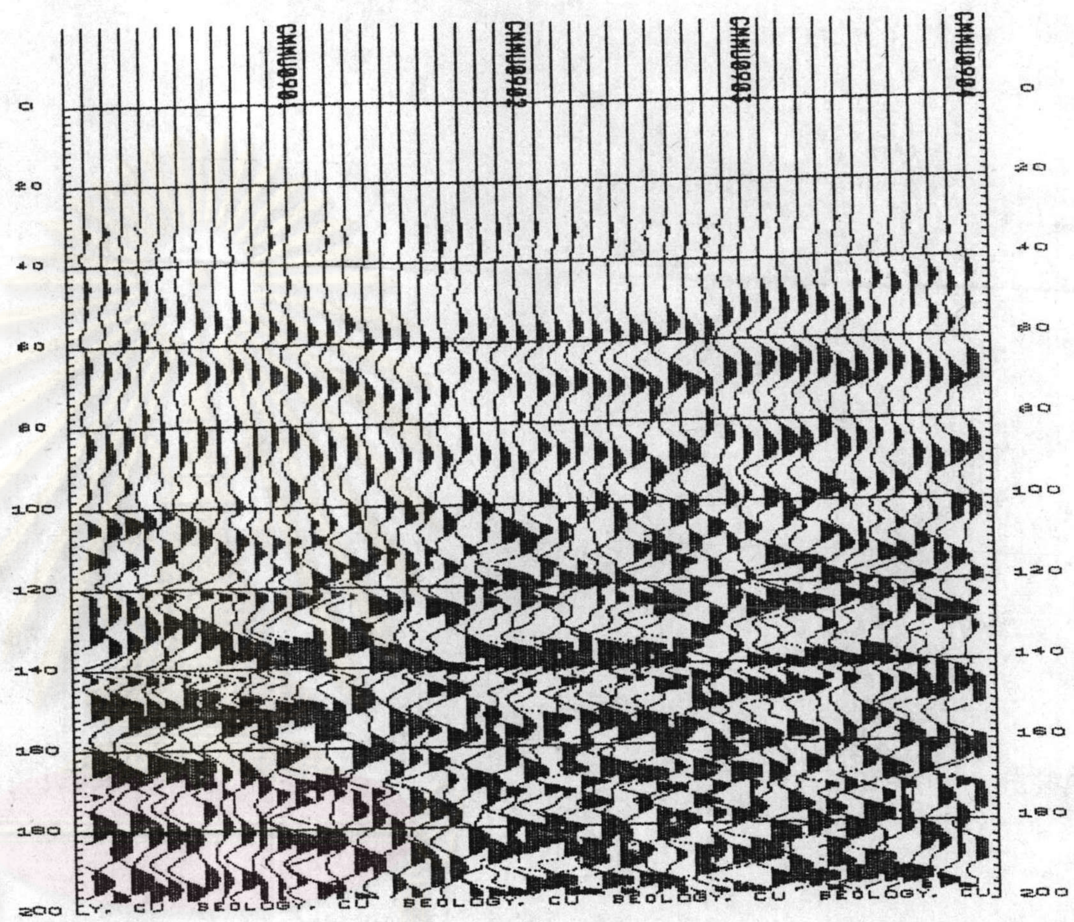


Figure 5-23 Filtered data after NMO of common offset data from line 2, Ban Huai Kieng study area. Band pass 75-150 Hz.

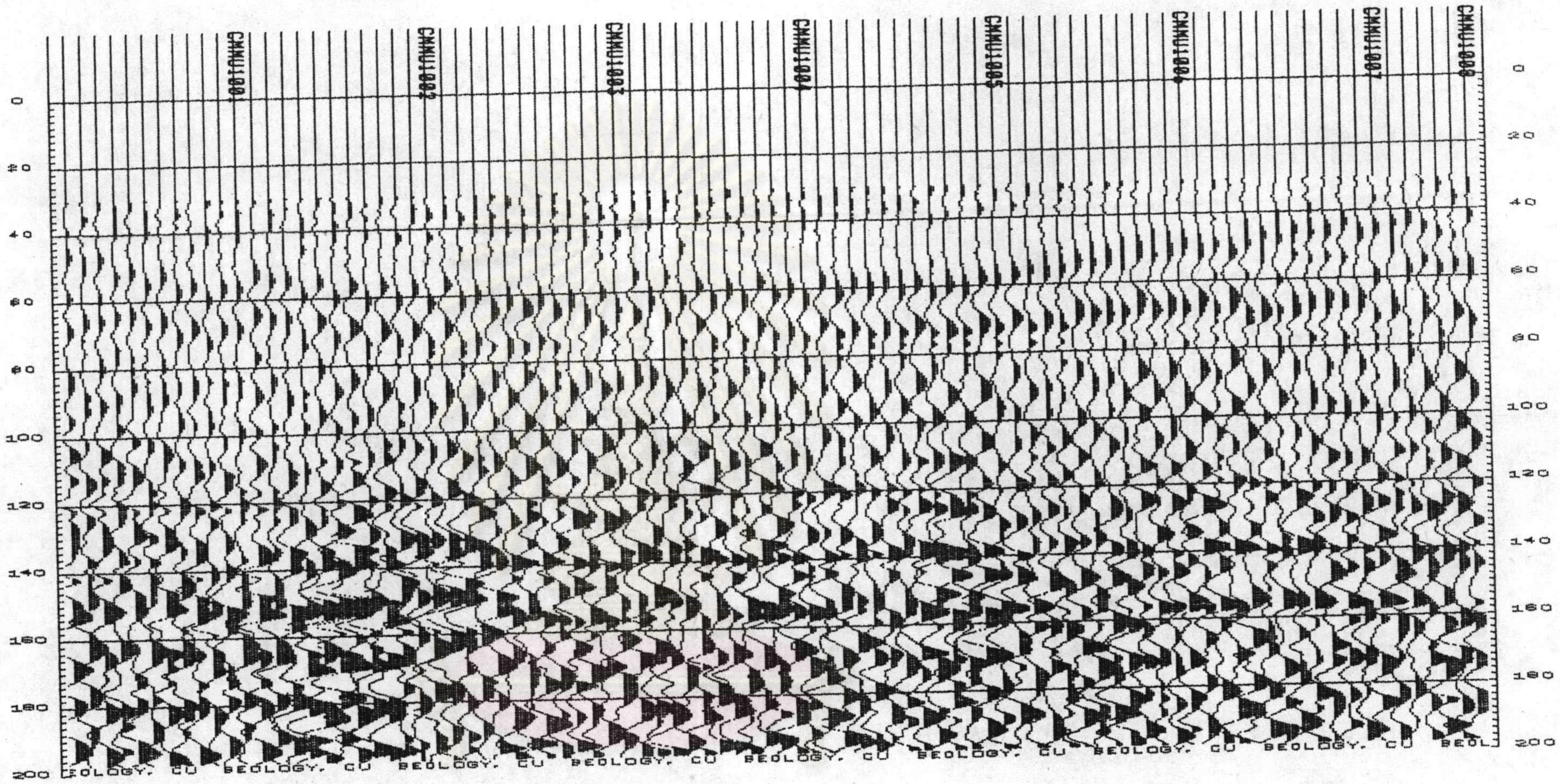


Figure 5-24 Filtered data after NMO of 3-fold CDP data from line 2, Ban Huai Kieng study area. Band pass 75-150 Hz.

same quality. The data are low frequency. This may be because of gravel layer having large attenuation which result in fewer high frequency wave.

Discussion

In this study, a computer software was developed for processing data from shallow seismic reflection survey. The objectives are 2 parts : first, to write the computer software for data processing and second, to compare the data collection between common offset method and common depth point method. The primary objective is the software for data processing. After completion of the software, It must be test for correctness. The results are satifactory for both model testing and field testing.

Field data were collected using an engineering seismograph ABEM Terraloc Mk II detailed in Chapter IV. The analog signal from seismic waves were converted into digital signal with value in the range of -128 to 127. When the data were transferred to the microcomputer, the variables were assigned to store data in the form of integer in order to save memory. 14 records of 12 traces could be saved on a diskette. The problem in running the program was encounterd in NMO module when 6 traces data were summed into 1 trace. Overflow ploblem occured when the stacked data values were out of range -32768 to 32767. To solve this problem the data were normalized to the maximum absolute value of 10,000.

In performing CDP sorting as the data were saved on several diskette, problem occur because sorting must be done in continuity between each diskette. This was solved by using 3 disk drives. The third drive was working drive within the hardware created by DOS command-VDISK. When the software ran into the continuing point of the diskette, the data from the first diskette were transferd to the third drive and the diskette was changed. By this method, sorting could done in continuity. This problem will be difficult to solve if DOS does not have function to create virtual disk.

In the velocity analysis, the concept is to determine flatted events at a specified velocity. As a result, when running the program, printer must be collaterally used to print the results for the selection of flat event. Since the time used in the analysis is large, the problem of paper feeding in the printer can occur.

In addition to software limitations, there are also limitation in collection of field data. The geophones used in this study have resonance frequency of 10 Hz. Data obtained is , therefore, limited to very low frequency waves. For shallow survey, use of high frequency waves will be neccessary. Pullen (1986) mentioned that in high resolution seismic reflection survey, the importance part is to use high frequency source and high frequency geophone. She also recommended the geophone with resonace frequency not less than 100 Hz.

Recommendation

The limitation of microcomputer is the capacity of the diskette to store data. Therefore, it is not convenient to run the program. This can be solved by using high capacity hard disk.

Binary format is used to read write data in this software. This may result in trancation error. The problem can be solved by avioding the use of binary format. Number of diskette required are to increase.

The number of records in working is running such as CMMU0501.TER to CMMU0599.TER (detail in Chapter II). If the running number is greater than 100, it is not convenient. This can be solved by using new file extension. For example, when the record is over 100, it is changed to CMMU0501.1TR.

Field data should be improved by using high frequency source and geophone as recommended by Pullen (1986).