A COMPARISON OF THE LATE QUATERNARY SEDIMENTARY SEQUENCE AND PALEOMAGNETIC RECORD OF THE NORTH BAY OUTLET AND A BAFFIN ISLAND FIORD

BY

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ABSTRACT

The lithology of the Late Quaternary lacustrine sequences of five lakes in the North Bay area differs from one lake to another.However , chronostratigraphically equivalent sections of cores taken from the same lake do show similarities in mean grain size, sand percentage and organic and carbonate carbons.The lithology of the Late Quaternary fiord sedimentary sequence of McBeth Fiord,Baffin Island exhibits a slightly higher sand content and lower organic carbon content than the North Bay lacustrine sediments.

The magnetic mineral grains deposited on the bottom of lakes and fiords tend to align in the direction of the earth's magnetic field at the time of deposition creating a remanent magnetic field in the sediments.The sedimentary sequences of lakes in the North Bay and McBeth Fiord, Baffin Island areas provides a record of the direction and intensity of the earth's magnetic field for these regions during the Late Quaternary.The declination and inclination values of oriented samples taken from soft-sediment cores of the Late Quaternary lacustrine sequences of the North Bay area and the fiord sequences of McBeth Fiord can be compiled

into paleodeclination and paleoinclination logs.The oscillations of the relative paleodeclination logs show a similar character for cores taken from the five lakes and the fiord as do the paleoinclination logs.Marker horizons picked on the character of either the paleodeclination or paleoinclination logs provide a method for chronostratigraphic correlation from one core to another within the North Bay area and also for the McBeth Fiord area.

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INTRODUCTION

General

The objectives of this study were to compile paleomagnetic logs from oriented samples of cores of Late Quaternary sediments taken from lakes along the North Bay and Fossmill outlet routes from the Great Lakes to the Champlain Sea and from McBeth Fiord,Baffin Island ; to utilize the paleomagnetic logs for chronostratigraphic correlation and absolute time dating of the stratigraphic sequence of these two areas; to relate the sedimentary sequences to the the post- glacial lake phases of the Great Lakes for the Nipissing area; to fit the stratigraphic sequence of McBeth Fiord into late Quaternary chronozones suggested by Andrews and Ives(1978) and Andrews(1982);and to compare the sedimentary sequence deposited in lacustrine and fiord enviroments.

During the Quaternary Period, the Great Lakes region was subjected to four glaciations which from oldest to youngest have been designated the Nebraskan , Kansan, Illinoian, and Wisconsinan Stages. However, evidence of only the Wisconsinan Stage is found in the North Bay area. This continental glacier retreated from the region surrounding North Bay about 10,500 to 11,200 years BP. (Terasmae,1980 ; Prest,1970). As the margin of the glacier receded northward from the study area , glacial melt waters were dammed against the wasting ice front (Lumbers,1971). Subsequent uplift drained many of these lakes leaving fewer and smaller lakes in the topographical depressions. Lake Nipissing is the largest remnant lake in the study area a relect of a very substantial glacial margin lake system that has been described in detail by Hough (1958;1963) and Prest(1970). During early post-glacial time the study area was occupied by part of the North Bay outlet route from Lake Algonquin to the Champlain Sea (Map 1).

McBeth Fiord,Baffin Island is situated in a region of active climate change.About 300 years BP a large proportion of the north central plateau of Baffin Island was covered by permanent ice and snow, whereas only about 2% is covered at present. Bradley and Miller(1972) noted that climatic shifts in the order of a decade have substantial effects on the amount of permanent ice and snow on Baffin Island.

Previous Studies

The last time that glacial ice filled the Lake Huron Basin was during the Port Huron glacial advance which occurred about 13,200 years BP. As glacial retreat occurred Lake Warren(210 m average sea level) and Lake Grassmere (195 m average sea level) formed in the southern part of the Lake Huron basin. Then about 12,500 years BP Lake Algonquin(184 m average sea level) came into existence and drained southward possibly first by the Chicago outlet and later by the Port Huron outlet.There was a brief lowering of the lake level to 171m average sea level during the Kirkfield phase which commenced about 12,400 years BP when Lake Simcoe became free of ice and Lake Algonquin discharged directly into Lake Iroquois by the Fenelon Falls-Trent River system (Prest 1970).However this outlet was blocked by a readvance of the Simcoe ice lobe (Deane 1950) and discharge by the Port Huron outlet resumed about 12,200 years BP.Retreat of this ice lobe about 12,000 years BP opened the Kirkfield outlet again but isostatic uplift closed the outlet resulted in raising the lake level to 184 m average sea level. Main Lake Algonquin continued until 11,200 years BP (Prest 1970),or between 10,800 and 10,500 years BP (Terasmae 1980),when glacier retreat allowed the opening of an outlet to the northeast of Lake Huron to the Champlain Sea forming the Lake Stanley phase of the Great Lakes.This resulted in a drop of lake level to 137 m average sea level (Fossmill outlet) and then to 5Ø m average sea level (North Bay outlet). The discharge of Lake Stanley via the Fossmill and North Bay outlets resulted in the deposition of a large delta in the northern part of the Champlain Sea.The timing of the drainage of Lake Stanley through outlets in the North Bay area to the Champlain Sea is controversial because of the lack of stratigraphic information (Prest,197Ø; Karrow et al.,1975; and Terasmae,198Ø).

The Lake Stanley phase ended when isostatic uplift raised the northeastern outlets above lake level which resulted in a gradual flooding of the Huron basin until a stable lake level(184m average sea level) was reached when the Port Huron outlet to the south opened again.This uplift caused the formation of a series of lakes in the topographic depressions along the North Bay outlet route .Continued uplift of the area drained many of the lakes leaving fewer and smaller lakes in the depressions. The largest of the string of small is Lake Nipissing.

The stable lake level period of the Lake Huron basin is referred to as the Nipissing phase of the Great Lakes and is usually dated from about 6,000 to 4,500 years BP (Prest,1970;and Terasmae 1979). The Nipissing terrace is well displayed a short distance west of North Bay at an elevation of 700 ft. whereas the present lake level of Lake Nipissing is at 648 ft. Radiocarbon dates on basal organic materials from small lakes at the Nipissing level on Manitoulin Island (Lewis,1968) prove that the Nipissing phase was in existence about 5,500 years BP. Similar evidence from North Bay reported by Lewis(1968) indicates that the outlet to the Ottawa River did not function after 5,000 years BP. Mapping of surficial deposits in the North Bay area has been carried out by Sharpe(1979) and Harrison(1972).Reviews on the deglacial chronology of southeastern Ontario have been published by Prest(1970), Terasmae et al.(1972), and Dreimanis(1977 a,b).

Investigations of the Wisconsin glacial history of Baffin Island have shown that the maximum Wisconsin ice cover occurred early in the last glacial, and successive advances were less extensive and local in nature (Pheasant and Andrews,1972; England and Andrews,1973).Investigations of the late and post-glacial marine deposits have been carried out for nearly 20 years on Baffin Island by Andrews.Until fairly recently there has been little systematic attention paid to the establishment of Holocene subdivisions (Andrews and Ives,1978) for Arctic Canada despite a number of radiocarbon dates taken on a wide variety of materials (Lowden and Blake,1978; Miller,1979). However,Andrews and Ives(1978), and Andrews(1982)have suggested delimiting the Holocene of Baffin Island into chronozones comparable to those established for the Nordic Countries.

In recent years paleomagnetic studies of late Quaternary sediments have been carried out in Lake Erie (Creer et.al. 1976a), in Lake Michigan (Creer et al.1976b), in Lake Superior (Mothersill ,1979), in Lake Huron (Mothersill ,1981;Mothersill and Brown 1982),in Lake Ontario (Mothersill ,1983),and in Lake Kylen and Lake St.Croix (Banerjee et al.1979). The work has been summarized by Mothersill (1983). These studies based on the natural remanent magnetic directions , resulted in the compilation of suggested type paleodeclination and paleoinclination logs for the Great Lakes area(Creer and Tucholka,1982).

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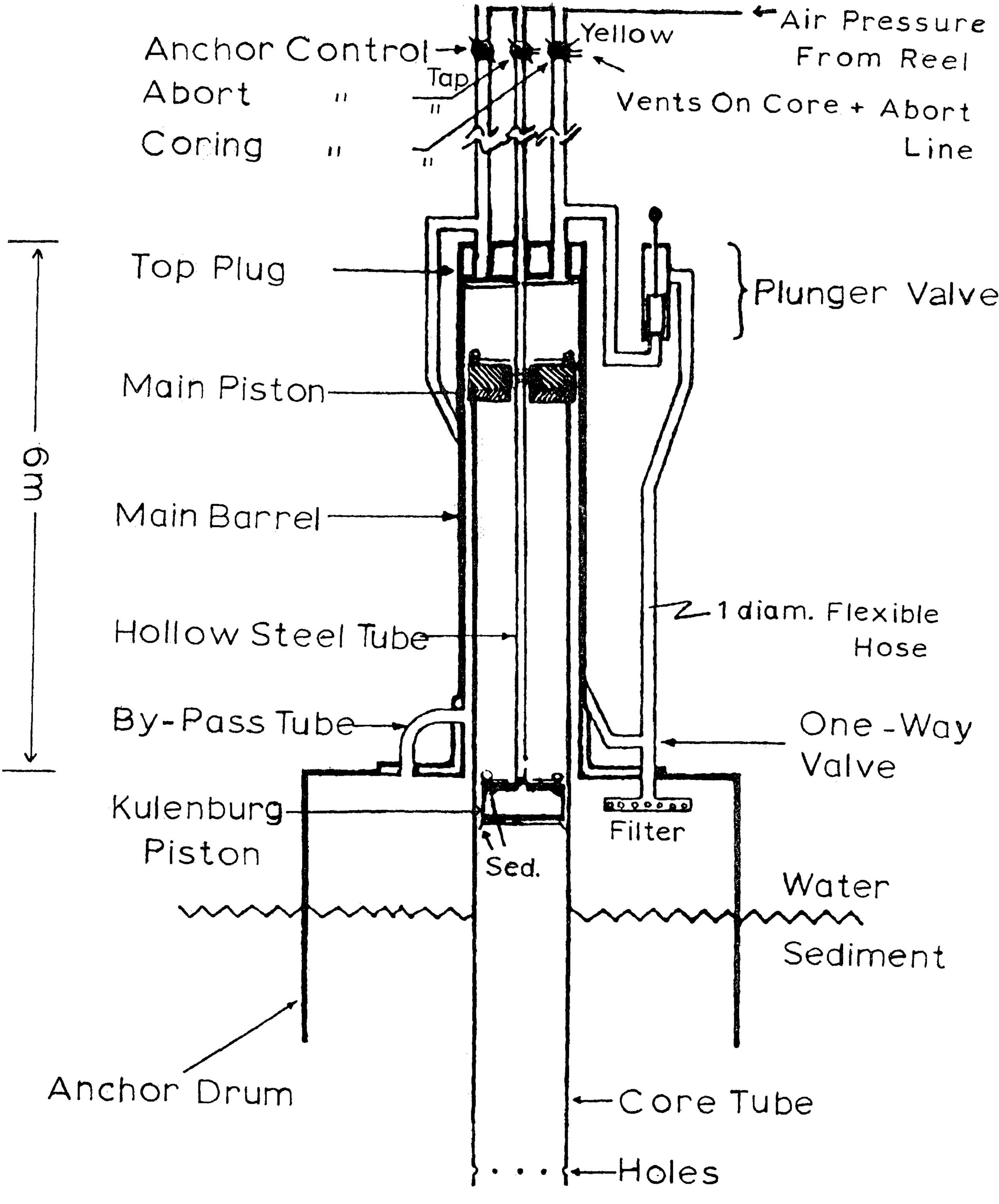


FIG. 1. MACKERETH CORER

Methods of Study

In May,1982 , nine cores were taken from five lakes in the North Bay area using a Mackereth compressed air corer fitted with a 6 meter long (6cm Internal Diameter) plastic liner (Fig.1). An arbitrary reference line was drawn along the length of the liner before the corer was assembled onshore. Once assembled, the corer was towed behind the Department of Geology's sixteen foot motor boat to the core site and then slowly lowered to the bottom by a nylon rope. An aluminium anchor drum was sunk into the bottom sediment by suction to form the base against which the coring operating could be carried out. Then the plastic liner was slowly forced into the soft sediment by compressed air and once the upper end of the liner had passed the by-pass valve the anchor drum filled with air resulting in the coring device being ejected to the surface. The end of the core liner was bunged with a cap to ensure that the core was retained.The coring operation took approximately one hour and the corer was towed back to shore and disassembled. The water above the core was drained off carefully to ensure that the core was not disturbed. The position of the top of the core in the liner was determined and the liner was cut off several cm above the top of the core. The remaining space above the core was filled with paper towelling to ensure that the soft- sediment core could not shift , and then the top end was capped. The liner was cut into three or four sections to facilitate handling.Each section of the liner was clearly marked to indicate the top and bottom of the section and both ends were capped and taped. In September,1982, two cores were taken from marine sediments in McBeth Fiord, Baffin Island area using a Benthos Piston corer from the CSS Hudson of the Atlantic Geoscience Centre, Bedford Institute of Oceanography, Dartmouth, Nova Scotia.

In the laboratory, each section was split longitudinally and the lithology and structure of the sedimentary sequence was described in detail.One half of the core was used for paleomagnetic studies and the other half for grain size ,mineralogy ,and carbon , hydrogen , and nitrogen analyses. Samples were taken at 3 cm intervals in cubed shaped(2cm)plastic boxes in a consistent direction relative to the reference line so that all the samples for each core would be oriented in the same direction The open plastic boxes were pressed slowly into the soft sediment until the box was completely filled. The air was able to escape through a small hole that had been drilled in the bottom of the box prior to the sampling.Then the box filled with sample was carefully cut away from the core and capped with the snap-on top.The bottom hole was covered by scotch tape to prevent drying of the sample, and any sediment adhering to the outside of the box washed off.The oriented samples were measured for remanent magnetic direction and magnetic intensity values using a Minispin 2A fluxgate spinner magnetometer in the University Instrument Room,Lakehead University.

Samples were taken at 20cm intervals along the length of the core for grain size analysis and sand percentage determinations.The grain size distribution analyses were carried out on a Micromeritics Sedigraph 5000. Each sample was dried and then a 5g cut was added to a beaker containing a 0.05% solution of Calgon(sodium hexametaphosphate) in double-distilled water to prevent flocculation of the grains.Then the beaker was set in a Bransonic 12 ultrasonic cleaner for at least 20 to 30 minutes to ensure complete grain separation. Wet sieving of the sample through a 0.063mm(4 phi) sieve was carried out to remove the sand fraction .The remaining clay and silt fraction was analyzed on the Sedigraph 5000 to determine the grain-size distribution in the 4 to 12 phi range. The dry weight of the sand fraction was determined and the percentage that it represented of the total sample was calculated as the sand percentage. Cores taken from McBeth Fiord, Baffin Island were split and described at Bedford Institute of Oceanography.Samples were taken at every 25 cm for grain size, mineralogy,organic and carbonate carbon studies,and cube shaped (2 cm^3) samples were taken at 3 cm intervals as described above for paleomagnetic studies.

Grain size analysis of sand samples was carried out on 21 samples from three cores(7 samples from core LU-82-13, 12 samples from core McBETH-1,and 2 samples from core McBETH-2).Each sample was weighed and then sieved on an electrical sieve shaker for ten minutes using a set of 8 inch diameter sieves at half phi(Ø.5Ø phi) intervals from Ø.5 to <4.Ø phi.

Petrographic microscopic examination of about 6Ø thin sections from the 11 cores of the North Bay, and McBeth Fiord, Baffin Island area were made to determine the percentages of heavy minerals present.Heavy mineral separation was carried out on the 4.Ø phi fractions using tetrabromoethane (specific gravity,2.94), and sample slides were then prepared for mineral identification, by petrographic microscope.

Samples taken at 50cm intervals for X-ray diffractometry analysis were dried at room temperature and then finely ground by mortar and pestle .The X-ray diffractometry analysis of the sample was carried out using a Cu-anode with Ni-filter, and scanning rate 1/min.(1 degree per minute), and a PW 4251 counter with a PW 1366 amplifier. The minerals present were identified based on tables from Smith(1967) , Grim(1968) and Berry(1972).

Samples were taken at 0,5,10,50 cm,and then at 50 cm intervals for carbon analysis utilizing a Perkin Elmer Model 240 Elemental Analyzer. Analysis for the total carbon percentage,was carried out on a 1g cut of powdered sample and repeated on a second cut of the sample that had been treated with sulphurous acid.The carbonate carbon percentage was calculated by subtracting the organic carbon percentage from the total carbon percentage.

The paleoinclination oscillation peaks of the curves for the Lake Nipissing area were correlated with the oscillation peaks of the type section for the Great Lakes area (Creer and Tucholka,1982). Based on the absolute age suggested for the oscillation peaks of the Great Lakes area absolute ages were assigned to the Lake Nipissing area cores. Dried 2 cm samples were utilized to calculate the rate of sedimentation in mm/yr, and in mg/cm^2/yr.

RESULTS

Coring sites LU-82-1 (Callander Bay) ,LU-81-3,and LU-82-7 (Lake Nosbonsing) ,LU-82-8 and LU-82-9 (Lake Nipissing) , LU-82-1Ø, and LU-82-13 (Lake Talon), LU-82-11 (Kiosk Lake) , and Lu-82-12 (Cedar Lake) are shown on Map 1.

Lake Nipissing

A description of the lithology of core LU-82-1 (Callander Bay) is shown in detail in Appendix A.The core consists predominantly of homogeneous, olive gray,non-calcareous,silty clay. Core LU-82-8(Lake Nipissing) consists of greenish gray to light brown- gray homogeneous, non-calcareous silty clay with a two cm.thick white band occuring at 3.91m and as well as thin white bands from 4.14-4.17m.Core LU-82-9 consists of dark green- gray homogeneous, non-calcareous silty clay.

The mean grain size of the silty clay samples analysed from core LU-82-1 (Callander Bay) ranges from Ø.ØØ55mm (7.5 Ø) to Ø.ØØ1Ømm (1Ø.Ø Ø), and the sand percentage of the silt to clay sediments range from Ø.5 to 19.Ø% (Fig.2). The upper 1 m of the core contains a higher percentage of sand and has a larger mean grain size than the lower portion of the core. The sand percentage and grain size generally show an irregular distribution with depth below 1m. (Fig.5 and 6). For cores LU-82-8, and LU-82-9 from Lake Nipissing proper the mean grain size ranges from Ø.ØØ28mm (8.5Ø) to Ø.ØØ1Ømm (1Ø.Ø Ø), and Ø.ØØ19mm (9.ØØ Ø) to about Ø.ØØ14mm (9.45 Ø) respectively. The sand percentage for samples from core LU-82-8 ranges from Ø.Ø1 to 7.6Ø% and for core LU-82-9 from Ø.Ø2 to Ø.13%.The higher upper limit of sand percentage in core LU-82-8 is based on one sample taken at 3.91 m depth. Generally ,both cores taken from Lake Nipissing show an irregular distribution of sand percentage with depth.

The sediments of Lake Nipissing are composed of major amounts of quartz and K-feldspar,subordinate amounts of plagioclase, and minor amounts of chlorite, kaoline ,illite, vermiculite, dolomite,and calcite (Appendix E).The percentage by weight of the heavy minerals present in the sand fraction ranges from 1.Ø to 31.1%, and consists of hornblende(3Ø-4Ø%),epidote(1Ø-15%),garnet both rose and a coloress variety(5-1Ø%), pyroxene(1-5%), tourmaline(1-2%), zircon(1-2%), apatite(1-5%), magnetite (1-2%) and hematite (1-3%).The organic carbon percentage ranges from 1.4 to 4.2 for samples from core Lu-82-1(Callander Bay), and the carbonate carbon percentage ranges from zero to Ø.1%. The organic carbon percentage ranges from Ø.2 to 2.5% and the

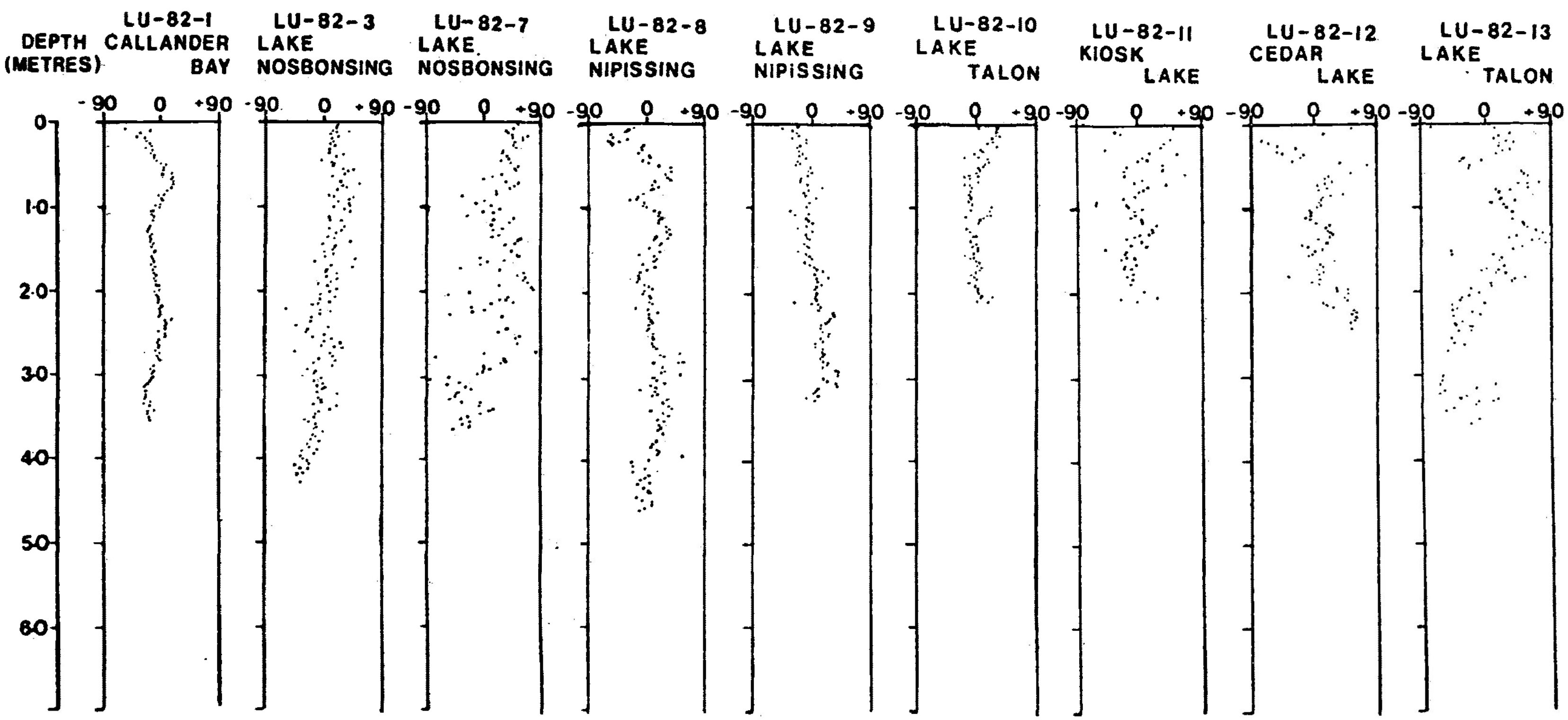


FIGURE 3. Paleodeclination logs of North Bay area.

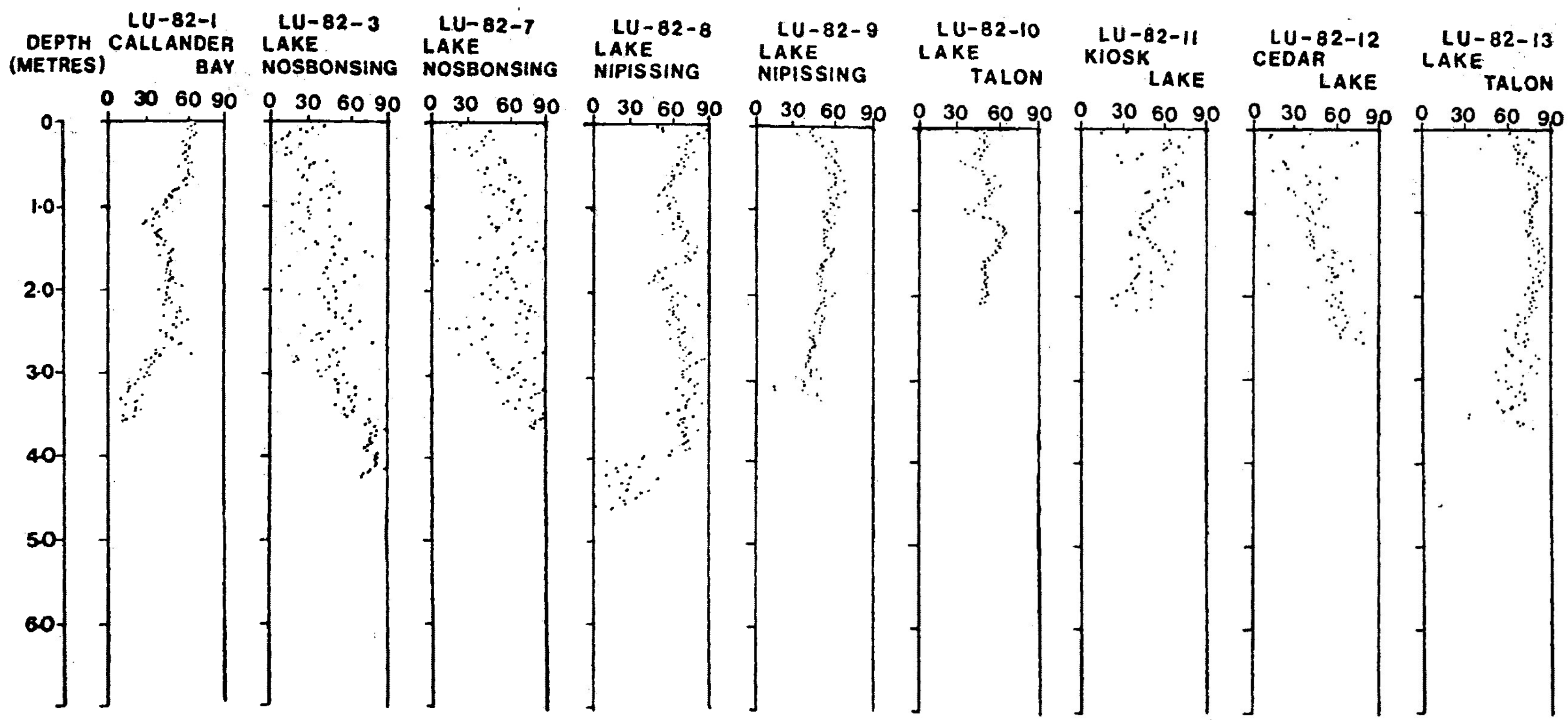


FIGURE 4. Paleoinclination logs of North Bay area.

carbonate carbon ranges from zero to 1.1% for core LU-82-8, and the organic carbon percentage rages from Ø.9 to 1.7% and the carbonate carbon percentage ranges from Ø.Ø to 1.6 for core LU-82-9 (Appendix C).

The relative declination and inclination of cores LU-82-1 ,LU-82-8, and LU-82-9, are shown in Figures 3 and 4. The declination values for each core were first determined relative to the arbitrary reference line.Then the mean declination was calculated and assigned a zero value,with each declination value determined relative to the mean value.The plots of the relative declination values for each core of the lacustrine sediments form a continuous curve,which swings through a number of oscillations with maximum and minimum amplitudes. The inclination values were plotted directly from the values determined by the Minispin 2A spinner magnetometer (Fig. 4), and also show a continuous oscillating curve for each of the cores. It was not possible to determine whether the cores were taken vertically during the coring operation. However even if some of the cores were not taken vertically it would only result in a decrease in magnitude of the inclination values and the oscillations of the paleoinclination log.The magnetic intensity values for the samples analyzed range from 3.38 to 37.96 uG(Ø.34-3.79 mT) for core LU-82-1 (Callander Bay), from 13.99 to 335.Ø4 uG(1.39-33.5 mT) for core LU-82-8 , and 14.28 to 63.93 uG(1.45-6.52 mT) for core LU-82-9.

Lake Nosbonsing

Cores LU-82-3 and LU-82-7 from Lake Nosbonsing consist of olive black and gray to greenish gray, homogeneous, non-calcareous silty clay(Fig. 7).The mean grain size of samples from core LU-82-3 range from 0.0025mm (8.67 Ø)to 0.0013mm (9.67 Ø)and for LU-82-7 from 0.0019mm (9.00 Ø) to about 0.0011mm (9.93 Ø) Fig. 8.The sand percentages of these cores range from 0.9 to 14.0 % and 0.3 to 15.15% respectively.Both cores taken from Lake Nosbonsing show a decrease in grain size and sand percentage with depth.

The mineralogy of the sedimentary sequence for Lake Nosbonsing is similar to that of Lake Nipissing.But the percentage of heavy minerals of the sand fraction is less than for Lake Nipissing and ranges from 0.08 to 6.66%. The organic carbon content ranges from 2.62 to 11.16% and the carbonate carbon ranges from zero to 1.2% for core LU-82-3.The organic carbon ranges from 2.7 to 8.7% and the carbonate carbon from zero to 1.1% for core LU-82-7.

The plot of the relative paleodeclination values of Lake Nosbonsing cores LU-82-3,and LU-82-7 show a continuous oscillating curve for each core although the plots are much more scattered than for the Lake Nipissing cores.The relative declination plots for core LU-82-3 exibits somewhat less scattering than for LU-82-7 (Fig. 7 and 8).Similarly the paleoinclination value plots which show considerable scattering show a general trend of oscillating curves for each core. The magnetic intensity values of both cores range from 1.75 to 6.48 uG (0.18-0.65 mT), and 1.54 to 7.97 uG (0.16-0.79 mT) for cores LU-82-3 and LU-82-7 respectively.

Lake Talon

Core LU-82-10 consists of olive gray to greenish gray, homogeneous, non-calcareous silty clay with dark bands that occur at 2 to 3 cm intervals throughout the core. Core LU-82-13 consists of olive gray to dark greenish gray, homogeneous, non-calcaleous silty clay with dark bands occuring at 2 to 3 cm intervals to a depth of 1.23m. Sand forms in the lower part of the core from 2.63-2.90 m. The mean grain size of samples of silty clay from these cores ranges from 0.0019mm (9.00 Ø) to 0.0016mm (9.33 Ø) for core LU-82-10 (Fig. 9), and from 0.0032 to 0.0011mm (8.33 to 9.92 Ø) for core LU-82-13. The sand percentages range from zero to 2.6% and 0.1% to 17.1% for cores LU-82-10 and LU-82-13 respectively for the silty clay. The sand percentage of the lower sandy portion of core LU-82-13 ranges from 84.4 to 96.7% (Fig. 10).

The mineralogy of the sedimentary sequence for Lake Talon is similar to that of Lake Nipissing and Lake Nosbonsing, and the heavy mineral percentage of the sand fraction ranges from 0.4 to 5.0%. The organic carbon percentage of core LU-82-10 ranges from 3.5 to 7.1% and the carbonate carbon ranges from zero to 1.4%. For core LU-82-13 the organic carbon ranges from 1.1 to 5.9% and the carbonate carbon ranges from 0.0 to 1.8%.

The relative paleodeclination values of these two cores show continuous oscillating curves with the log for LU-82-10 being the better defined of the two.The paleoinclination plots also form continuous oscillating curves with the curve for LU-82-10 being better defined (Fig. 9 and 10). The magnetic intensity values ranged from 5.89 to 66.40 uG (0.58-6.64 mT) for core LU-82-10,and 3.17 to 45.91 uG (0.32-4.59 mT) for core LU-82-13.

Kiosk Lake

Core LU-82-11(Kiosk Lake) consists of olive black, homogeneous,non-calcareous silty clay.The mean grain size ranges from 0.0032mm (8.33 Ø) to 0.0016mm (9.33 Ø),with sand percentage varying from 0.1 to 1.5%.The grain size and the sand percentage show an irregular distribution with depth.

The mineralogy of the sedimentary sequence is similar to that of Lake Nipissing, Lake Nosbonsing, and Lake Talon.However the percentage of heavy minerals forming the sand fraction is lower and ranges from 0.8 to 2.2% The organic carbon percentage ranges from 6.8 to 9.2% and the carbonate carbon ranges from 0.7 to 2.9%.

A pattern of oscillation can be discerned for the paleodeclination and paleoinclination curves despite the scattering of the plots (Fig. 11). The magnetic intensity values of the Kiosk Lake core range from 0.66 to 22.12 uG (0.66-2.21 mT).

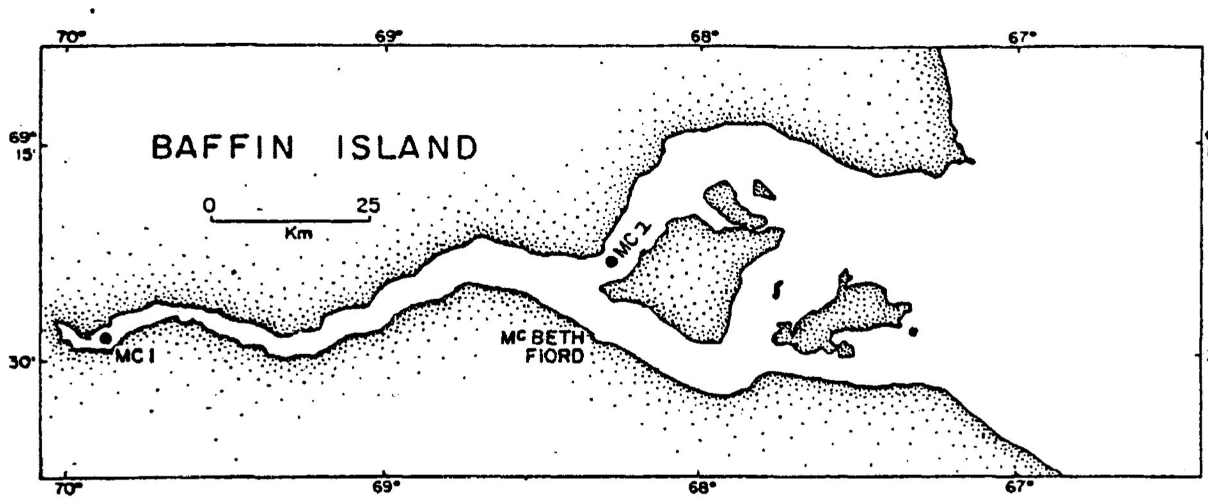
Cedar Lake

Core LU-82-12 from Cedar Lake consists of brownish black homogeneous,and non-calcareous silty clay (Fig. 12). The mean grain size of samples taken from the core ranges from 0.0026 to 0.0018mm (8.58 to 9.08 Ø), and the sand percentage from 0.4 to 7.8%.

The mineralogy of the sedimentary sequence is similar to the rest of the lakes of the study area, and the percentage of heavy minerals forming the sand fraction ranges from 1.0 to 5.0%. The organic carbon percentage ranges from 9.68 to 12.33% and the carbonate carbon from 0.7 to 2.9%.

The paleodeclination and paleoinclination plots show a cosiderable scattering of data for the upper part of the core although for the lower part the log is less scattered and continuous curves can be discerned(Fig. 12). The magnetic intensity values varies from 2.67 to 18.97 uG (0.27-1.93 mT).

The detailed lithology, mean grain size, sand percentage, organic and carbonate carbon percentage,relative paleodeclination, paleoinclination and magnetic intensity values for each core have been compiled in Appendices A,B,C and D.



Map 2. Location map of McBeth Fiord, Baffin Island.

McBeth Fiord

The location sites for cores McBeth-1 and McBeth-2 from McBeth Fiord, Baffin Island are shown in Map 2. McBeth-1 core is located at the head of McBeth Fiord,and McBeth-2 core is located on the northeastern distributary of the fiord.

The lithology of the sediments of McBeth-1 core was examined on a fresh core surface after the segments had been split longitudinally along the length of the core and is portrayed in Figure 13.It consists of olive gray, homogeneous and non-calcareous silty clay.Sand layers, approximately 2 cm thick, occur at 0.013, 0.026, 0.031, 0.050, 0.075, 0.38, 0.89, 2.01, 2.22, 3.30, 5.05,7.51, and 9.31 meters(Appendix B).The mean grain size of the silty clay sequence,which was determined using the Sedigraph 5000 and wet sieving methods for samples at 0.25m intervals along the length of the core ranges from 0.0055 to 0.00125mm (7.50 to 9.83 Ø).The sand percentage of the silt and silty clay sequence ranges from zero to 8.5%.

McBeth Fiord sediments are composed of major amounts of quartz and K-feldspar, subordinate amounts of plagioclase, and minor amount of chlorite, illite, phlogopite, and vermiculite. The percentage of heavy minerals comprising the sand fraction of the silty clay varies from 2.1 to 5.Ø%, and consists of major amounts of phlogopite (2Ø-3Ø%), hornblende (1Ø-2Ø%),epidote (5-1Ø%),garnet (1-5%),and minor amount of pyroxene(1-5%), tourmaline(1-2%), apatite(1-2%), magnetite(1-2%) and hematite(1-3%).The organic carbon ranges from Ø.31 to Ø.78% and the carbonate carbon from zero to Ø.3%.

The lithology of core McBeth-2 is shown in detail in (Fig. 14).It consists of olive gray, homogeneous and non-calcareous silty clay.Shell fragments occur at Ø.52-Ø.53m. Thinly-laminated silt occurs at 2.93-3.Ø1m, and interbedded silt and clay at 3.Ø1-3.Ø6m. Silty sand forms the succession at 3.Ø6-3.25m.A pebble of granite was found at 3.25m. Only one thin bed of sand (324.5 to 33Ø.5 cm) was noted in this core. The mean grain size of the silty clay and silt sequence of the McBeth-2 core ranges from Ø.ØØ19 to Ø.ØØ12mm (9.ØØ-9.75 Ø), and the sand percentage ranges from 1.1 to 4.7%.

The mineralogy of the sedimentary sequence is similar to that of core McBeth-1, but the percentage of heavy minerals is greater ranging from Ø.5-8.5%.The organic carbon ranges from Ø.5 to 1.4% and the carbonate carbon from zero

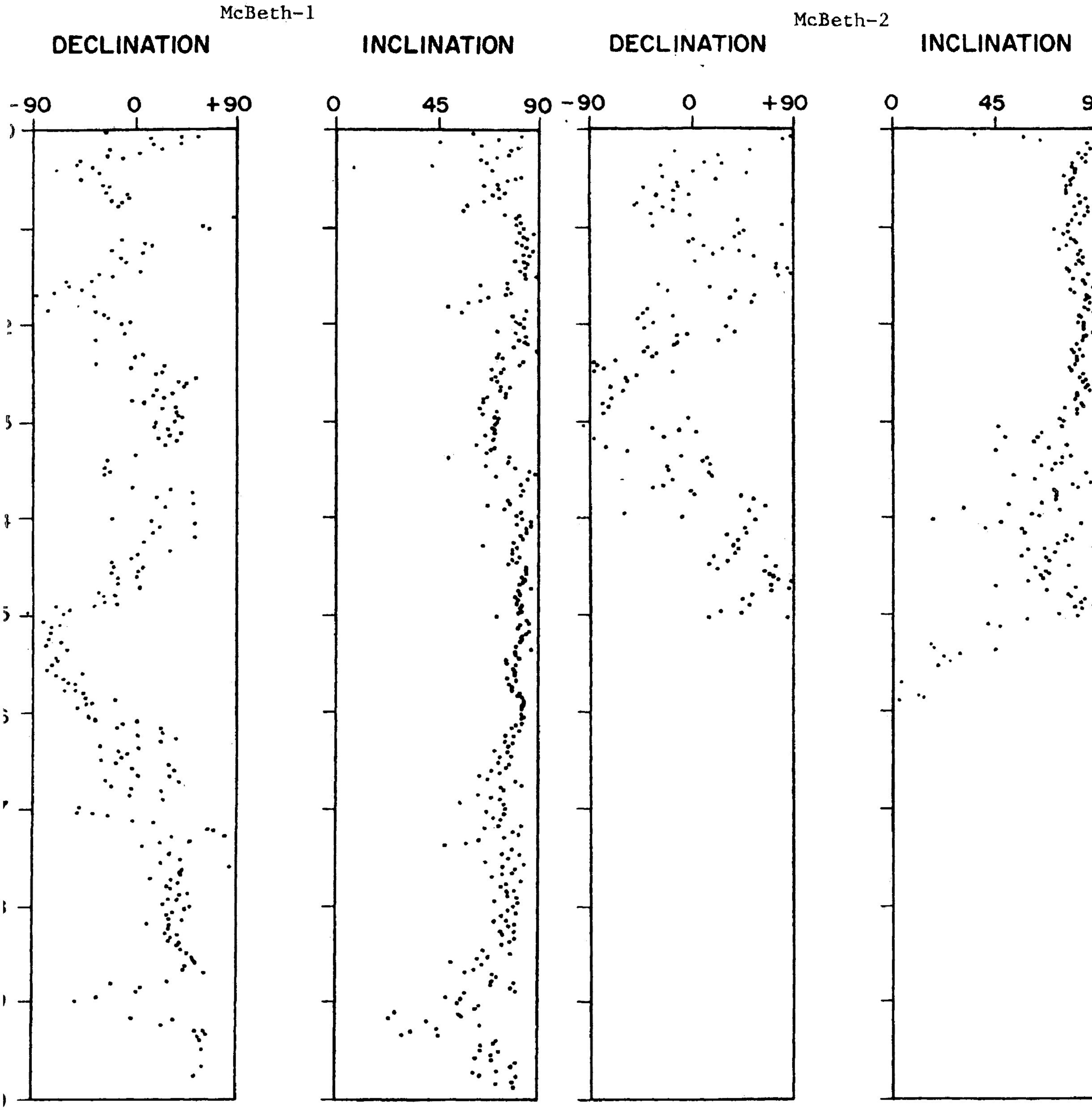


FIGURE 15. Paleodeclination and Paleoinclination logs of McBeth fiord.

to Ø.3%.

The relative declination and inclination values of samples taken from cores McBeth-1 and McBeth-2 are shown in Figure. 15. Unfortunately an arbitrary line had not been drawn along the length of the liner before the corer was assembled for taking the Baffin Island cores.Therefore the declination values of each core segment had to be rotated relative to each other to obtain the best fit. Then the average declination value was determined and the relative declination calculated.The lack of a reference line did not affect the magnitude of the inclination values.The paleodeclination and paleoinclination values of these two cores show continuous oscillating curves. The magnetic intensity values for core McBeth-1 range from 12.6Ø to 232 uG (1.26-23.2Ø mT) and for core McBeth-2 from 13.64 to 3Ø3 uG (1.36-3Ø.3Ø mT).

DISCUSSIØN OF RESULTS

One of the major problems encountered in studies of the late Quaternary stratigraphic sequence of the Great Lakes basin is that ^{14}C has not proved to be a reliable method for dating postglacial lacustrine or outwash deposits because of the " old carbon " contained in the sediments (Mothersill,1982;1983), and (Creer,1982).For example, Creer et al.(1976) suggested an error of 2,ØØØ years for the post-glacial sediments of Lake Michigan; Mothersill(1979) suggested an error of at least 1,7ØØ years for the post-glacial stratigraphic sequence of Thunder Bay, Lake Superior; and Graham and Rae(198Ø) suggested surface corrections of 1,25Ø to 1,6ØØ years in the Alpena and Manitoulin Basins, Lake Huron .These errors cannot be applied as a consistent correction throughout the sedimentary sequence.

The oscillations of the paleodeclination and paleoinclination curves result from the secular variations of the earth's magnetic field with time. Therefore marker horizons picked on the character of either of these curves could be used for time-parallel correlation from one core to another within the North Bay area. The paleomagnetic method

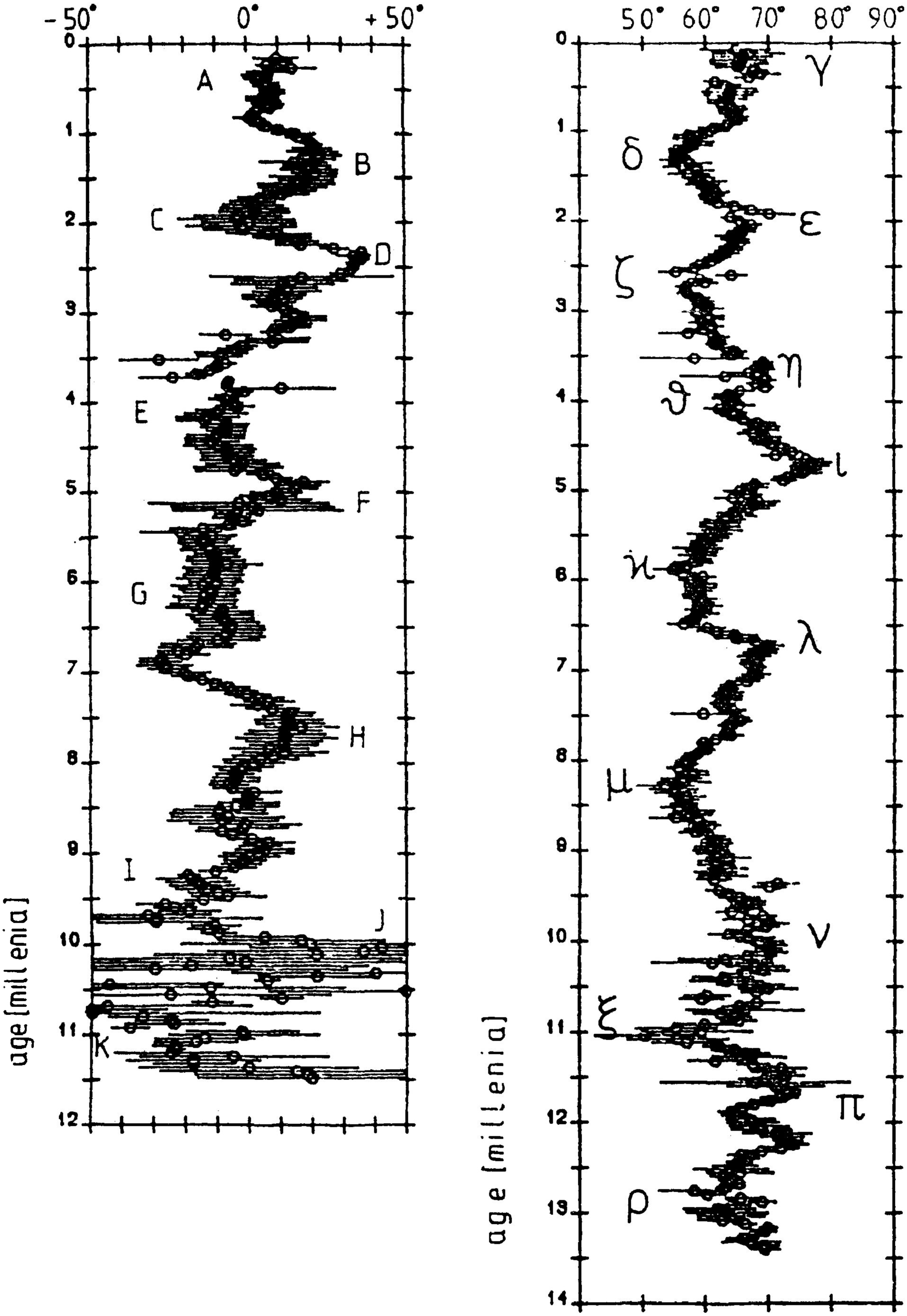


Fig.16 . 'Type' paleodeclination and paleoinclination logs for Great Lakes (after Creer and Tucholka, 1982).

Feature label	Age (radiocarbon years BP)
γ	200
δ	1 300
ε	2 100
ζ	2 600
η	3 500
θ	4 050
ι	4 750
κ	6 000
λ	6 750
μ	8 200
ν	9 500
ξ	10 500
π	12 100
ρ	12 800
σ	14 300
τ	16 500

TABLE 1. Lakes St. Croix and Kylen: estimated ages of inclination features (after Creer and Tucholka,1982).

has been used as a secondary method for absolute time dating, of the late Quaternary stratigraphic sequence in the Great Lakes region (Mothersill,1981; 1982; and 1983, Creer et al. 1976; Creer and Tucholka,1982).Creer and Tucholka (1982) have suggested "type" paleodeclination and paleoinclination logs for the late Quaternary of the Great Lakes area and have designated symbols for the major oscillation swings (Fig. 16).The absolute dates assigned to identifiable features of these paleoinclination oscillation swings are noted in Table 1. Mothersill(1982) noted that for the Holocene stratigraphic sequence of the Great Lakes area the average period of the oscillations of the paleodeclination and paleoinclination logs were 2600 years based on using the date of 9,000 years BP proposed by Saarnisto (1975) for the cessation of glacial varve deposition in Lake Superior.

North Bay area

The character of the paleodeclination,as well as for the paleoinclination logs for cores LU-82-1, LU-82-3, LU-82-7, LU-82-8, LU-82-9, LU-82-10, LU-82-11, LU-82-12, and LU-82-13 show similar oscillation trends(Fig. 3 and 4).The Lake Nosbonsing, Kiosk and Cedar logs show a much greater scattering of the paleodeclination and paleoinclination

Table 2. RATE OF SEDIMENTATION IN THE NORTH BAY AREA

[illegible]	AGE YEARS BP	LAKE NIPISSING						LAKE NOSBONSING				LAKE TALON				KIOSK LAKE		CEDAR LAKE	
		LU-82-1		LU-82-8		LU-82-9		LU-82-3		LU-82-7		LU-82-10		LU-82-13		LU-82-11		LU-82-12	
[illegible]BEL		mm/yr	$mg/cm^2/yr$	mm/yr	$mg/cm^2/yr$	mm/yr	$mg/cm^2/yr$	mm/yr	$mg/cm^2/yr$	mm/yr	$mg/cm^2/yr$	mm/yr	$mg/cm^2/yr$	mm/yr	$mg/cm^2/yr$	mm/yr	$mg/cm^2/yr$	mm/yr	$mg/cm^2/yr$
[illegible]	0- 200	1.00	60.55	0.90	91.91	1.00	63.05	3.25	89.63	1.75	41.96	1.00	24.27	1.00	23.42	1.00	15.12		
[illegible]	200-1300	0.90	66.24	0.54	52.59	0.73	54.40	0.95	22.35	0.36	7.80	0.73	20.33	0.73	21.58	0.73	14.30	0.90	09.40
[illegible]	1300-2100	1.75	119.73	0.87	62.98	0.62	52.73	0.69	17.94	1.75	43.80	0.37	10.51	0.75	28.79	0.75	13.47	1.30	19,60
[illegible]	2100-2600	1.80	160.40	0.80	78.52	0.50	39.39	1.40	34.04	1.20	76.73	0.80	29.07	1.80	132.14	0.80	16.59		
[illegible]	2600-3500			1.00	102.19	0.66	51.99	0.89	40.94	0.67	62.71			0.3	33.00				
[illegible]	3500-4050			0.36	34.47	0.66	51.99							0.5	46.5				
[illegible]	4050-4750			0.57	49.40														
[illegible]	4750-6000			0.80	74.87														

plots resulting from the relatively low magnetic intensity values compared to the other cores, because of the high organic content as well as the high quartz sand content in the case of the Nosbonsing cores .The paleomagnetic logs of the cores from Lake Nipissing and Talon show a fairly well defined trend of oscillations.However,the paleoinclination log of core LU-82-9 from Lake Nipissing shows a much more subdued oscillation pattern. The inclination values for this core are lower than for the other paleoinclination logs compiled for Lake Nipissing which would indicate that this core was not taken vertically. Non-vertical coring would tend to decrease the absolute as well as the relative paleoinclination values and therefore the amplitude of the oscillations. Based on the age of the oscillation peaks assigned by Creer and Tucholka (1982) the rate of sedimentation for the time intervals bracketed by these oscillation peaks can be calculated in mm/yr and in $mg/cm^2/yr$ (Table 2).It should be pointed out that although the age of these features could be modified as more accurate ^{14}C data becomes available these assigned dates provide the most viable method of dating the sedimentary sequence and calculating the rates of sedimentation available at the present time.The paleoinclination logs usually have been found to be more reliable than the paleodeclination logs

(Mothersill, 1982) and therefore are utilized for dating the cores and determining the rates of deposition with time.The paleodeclination and paleoinclination logs have been replotted at the same scale as the "type" logs for the Great Lakes area for correlation purposes.

Five marker horizons have been picked on the paleodeclination log and another four marker horizons have been picked on the paleoinclination log for the core taken from Callander Bay (LU-82-1) for time-parallel correlation purposes.It can be noted that there is a strong correlation with the "type" paleomagnetic logs established for the Great Lakes (Creer and Tucholka,1982).Based on the paleomagnetic time scale the core bottomed at 2800 years BP. Seven marker horizons have been picked on the paleodeclination log and another eight marker horizons have been picked on the paleoinclination log for core LU-82-8 and six marker horizons have been picked on the paleodeclination and paleoinclination logs for core LU-82-9. These logs also can be correlated with the "type" section logs. Based on the paleomagnetic time scale cores LU-82-8 and LU-82-9 would appear to have bottomed in sediments dated at about 6000 and 4500 years BP respectively.

The paleomagnetic logs for core LU-82-3 and especially core LU-82-7 taken, from Lake Nosbonsing show a much greater scattering of the paleodeclination and paleoinclination plots than did the paleomagnetic logs for the Callander Bay and Lake Nipissing cores.This phenomenon has been noted for paleomagnetic curves from sedimentary sequences with a high organic and quartz sand content resulting in relatively low magnetic intensity values (Mothersill, 1983). The magnetic intensity values for Lake Nosbonsing cores LU-82-3 and LU-82-7 range from 1.75 to 6.48 uG (0.18-0.65 mT) and 1.54 to 7.97 uG (0.16-0.80 mT) whereas the magnetic intensity values for LU-82-8 from Lake Nipissing which has very well defined paleodeclination and paleoinclination logs range from 13.99 to 335.04 uG (1.40-33.50 mT).However the trend of the oscillating curves can be discerned.It exibits a similar pattern to the "type" paleodeclination and paleoinclinations logs proposed by Creer and Tucholka (1982). Seven marker horizons have been picked on the paleodeclination and another seven marker horizons have been picked on the paleoinclination curve from both these cores.Based on the paleomagnetic time scale cores LU-82-3 and LU-82-7 would appear to have bottomed in sediments dated at about 4000 years BP.

The paleomagnetic logs for cores LU-82-1Ø, and LU-82-13 taken from Lake Talon are well defined and can be correlated to the "type" paleomagnetic logs and also to the other paleomagnetic logs of the cores of North Bay area.Four paleodeclination and paleoinclination marker horizons have been picked from core LU-82-1Ø, and four paleodeclination and four paleoinclination marker horizons have been picked for core LU-82-13. Based on the paleomagnetic time scale cores LU-82-1Ø and LU-82-13 would appear to have bottomed in sediments dated at about 275Ø and 34ØØ years BP respectively.

Three paleodeclination marker horizons and four paleoinclination marker horizons for core LU-82-11 from Kiosk Lake have been correlated to the paleomagnetic "type" logs.Based on the paleomagnetic time scale this core bottomed in sediments dated at 26ØØ years BP. Four paleodeclination and three paleoinclination marker horizons have been correlated for the paleomagnetic logs of core LU-82-12 from Cedar Lake with the "type" paleomagnetic logs.Based on these correlations the core bottomed in sediments deposited 23ØØ years BP.The paleomagnetic logs of the cores from Kiosk and Cedar Lakes show a scattering of the plots and therefore not as well defined logs as for either the Nipissing or Talon cores because the relatively high organic content (organic carbon>10%) has diluted the ferrimagnetic mineral content of the sediments resulting in magnetic intensity values of 0.66 to 22.12 uG (0.07-2.21 mT) and 2.67 to 18.97 uG (0.27-1.90 mT). However the plots of the paleomagnetic logs of these cores show less of a scattering than for the Lake Nosbonsing cores where magnetic intensities are lower because of dilution of the ferromagnetic minerals both by organic matter and the higher quartz sand content.

It can be noted that for the cores taken of the North Bay and Fossmill outlets the sand percentage, mean grain size, and organic and carbonate carbon logs compiled in Figures 2, and 5 to 12 cannot be correlated from one lake to another. However these parameters do show a similarity for cores taken from the same lake. Core LU-82-1 (Callander Bay) would appear to have bottomed in sediments dated at about 2800 years BP based on the paleomagnetic time scale. This date can be used to calculate that the average rate of sedimentation from the present to 2800 years BP for the Callander Bay site was 1.1 mm/yr which fluctuated from 0.9 to 1.8 mm/yr (60.55 to 160.40 mg/cm^2/yr, see Table 2). The sand percentage of this core ranges from 0.5 to 19%, and the mean grain size ranges from 0.0010 to 0.0039mm (10.0 to 8.0 Ø), for the homogeneous, olive green, silty clay of the sequence. It was not possible to calculate the grain size parameters of these silty clays either by the method of moments (Friedman, 1961) or by the graphic method (Folk and Ward, 1957) for the entire grain size distribution of the silty clays because the Sedigraph 5000 can only determine grain sizes from 0.063mm (4 Ø) to 12 Ø.

Cores LU-82-8 and LU-82-9 would appear to have bottomed in sediments dated at about 6000 and 4500 years BP respectively, based on the paleomagnetic time scale. Both cores LU-82-8 and LU-82-9 were taken from sites in the open and central part of Lake Nipissing. The calculated average rate of sedimentation from the present to 2600 years BP was considerably lower at 0.77 mm/yr (71.5 $mg/cm^2/yr$) for site LU-82-8 and 0.71 mm/yr (52.39 $mg/cm^2/yr$) for site LU-82-9 than for the Callander Bay site for the comparable time period. The oscillation peaks of the paleoinclination log for core LU-82-8 are well defined and should be accurately dated based on the "type" paleomagnetic log. The average rates of sedimentation for the period between oscillation peaks for this core are compiled in Table 2 for time intervals from the present to 6000 years BP. The rates fluctuated from 0.36

mm/yr ($34.47 mg/cm^2/yr$) to 1.ØØ mm/yr ($1Ø2.19 mg/cm^2/yr$). It should be noted that the relative rates of sedimentation for core sites LU-82-1 from Callander Bay and LU-82-8 from Lake Nipissing show the same trends with the lowest rates of sedimentation occuring between 2ØØ and 13ØØ years BP followed by an increase from 2ØØ years BP to the present.

The rates of sedimentation for core LU-82-9 do not show the same trends as the other two cores although a substantial increase is noted for the past 2ØØ years BP. As pointed out earlier the overall rates of sedimentation of the two cores from Lake Nipissing are comparable and the determinations for the shorter time periods could be inaccurate as a result of the more poorly defined oscillation peaks for the log of core LU-82-9. Cores LU-82-8, and LU-82-9 from Lake Nipissing proper show generally very low sand percentages, of less than 1% and mean grain sizes which range from Ø.ØØ1Ø to Ø.ØØ28mm (1Ø.Ø to 8.5Ø Ø). However, at a depth of 3.85m (about 52ØØ years BP) in core LU-82-8, the sand percentage does increase to 7% (Fig. 5). The grain size of the sediments forming cores LU-82-8 and LU-82-9 located in the open and central part of Lake Nipissing is substantially finer than for the Callander Bay core for the same time period, and shows the normal decrease in grain size lakeward and further from the sediment source.There is a substantial increase in mean grain size and sand percentage at the top of the sedimentary sequence for the Callander Bay core, which could reflect an increased rate of erosion resulting from the de-forestation of the shore region of the bay area that took place during the last century. There is also a slight increase in mean grain size at the top of core LU-82-8, though not for core LU-82-9 in the central part of Lake Nipissing.

Lithologically these two cores from Lake Nipissing proper do show a similarity in grain size for the time period of overlap to 4500 years BP. The organic carbon content for surface interface sediments for core LU-82-1 from Callander Bay is 4.2% and decreases to slightly less than 2.0% below 2.0m whereas the organic carbon content for core sites LU-82-8 and LU-82-9 are about half these amounts for the surface sediments and at depth along the core (Fig. 5 and 6).This would suggest that the relative amount of organic material being deposited on the lake-bottom for Lake Nipissing proper is less than for Callander Bay.Unfortunately there is very little information available on organic matter in the basinal clays of lakes (Friedman,1978).Streams and rivers contain both dissolved and particulate organic matter.The organic content of streams and rivers ranges from 10 to 30 ppm (Clark,1924) and for the temperate areas the organic content of rivers tends to be lower and consists of particulate matter because decomposition is retarded in a cold climate.The organic content deposited in the basinal areas of lakes cannot be matched with a probable source (Friedman,1978).However the two main sources would be terrestrial organic matter from the surrounding watershed and phytoplankton from within the lake.Much of the organic matter tends to be oxidized to form carbon dioxide and water.The silled situation of Callander Bay would result in lower energy conditions than Lake Nipissing proper would tend to allow the deposition of relatively more particulate organic matter. The oxidized and reduced units of the sequence comprise the syndiagenetic phase with the oxidized unit corresponding to the "initial stage" and the reduced unit corresponding to the "early burial stage" of Dapples (1962). Twenhofel (1942) pointed out that the "initial stage" may extend from a few millimeters to as much as 50cm below the sediment interface, depending on such factors as water-depth, rate of sedimentation and amount of organic matter.The lower rates of sedimentation in the open and central part of Lake Nipissing areas, where the lake-bottom sediments contain lower amounts of organic carbon, would allow time for the aerobic bacteria to consume a greater percentage of the entrapped organic matter, resulting in a substantial decrease in the organic carbon.However, at the Callander Bay site where the rate of sedimentation was more rapid there would be less time for aerobic bacteria to consume the organic matter and therefore there would be a greater chance for preservation of more of the organic matter in the early burial stage of the syndiagenetic sequence. The highest values of organic carbon occur just below the water-sediment interface as is generally the case for most lakes in the Great Lakes area (Mothersill,1971) and elsewhere where oxidizing conditions occur at the lake-bottom. Generally the carbonate carbon content of the sediments is low in the Lake Nipissing region, except for a slight increase at the top of core LU-82-9.The source of the carbonate carbon for the North Bay area lakes probably was detrital limestone and dolomite derived from carbonate debris from the paleozoic carbonate strata of the Moose River Basin to the north and brought into the area by glacial action. The greenish color may be due in part to the content of the green phyllosilicates such as illite and chlorite,(Blatt,et al.,1972) and in part to the state of oxidation of iron in the sediments (probably mostly the Fe^{2+}).

AREA OF LAKES, SURROUNDING DRAINAGE BASIN AND THEIR RELIEF IN THE STUDY AREA.

Area	Elevation	Relief
Callander Bay: 11 KM^2	196m	
Surrounding Drainage Basin: 50 KM^2	288m	92m
Lake Nipissing: 821.5 KM^2	196m	
Surrounding Drainage Basin:9500 KM^2	288m	92m
Lake Nosbonsing: 15 KM^2	235m	
Surrounding Drainage Basin: 92 KM^2	364m	129m
Lake Talon: 11 KM^2	193m	
Surrounding Drainage Basin: 56 KM^2	379m	186m
Kiosk Lake: 11 KM^2	303m	
Surrounding Drainage Basin: 54 KM^2	424m	121m
Cedar Lake: 16 KM^2	303m	
Surrounding Drainage Basin: 35 KM^2	409m	106m

TABLE 2b.

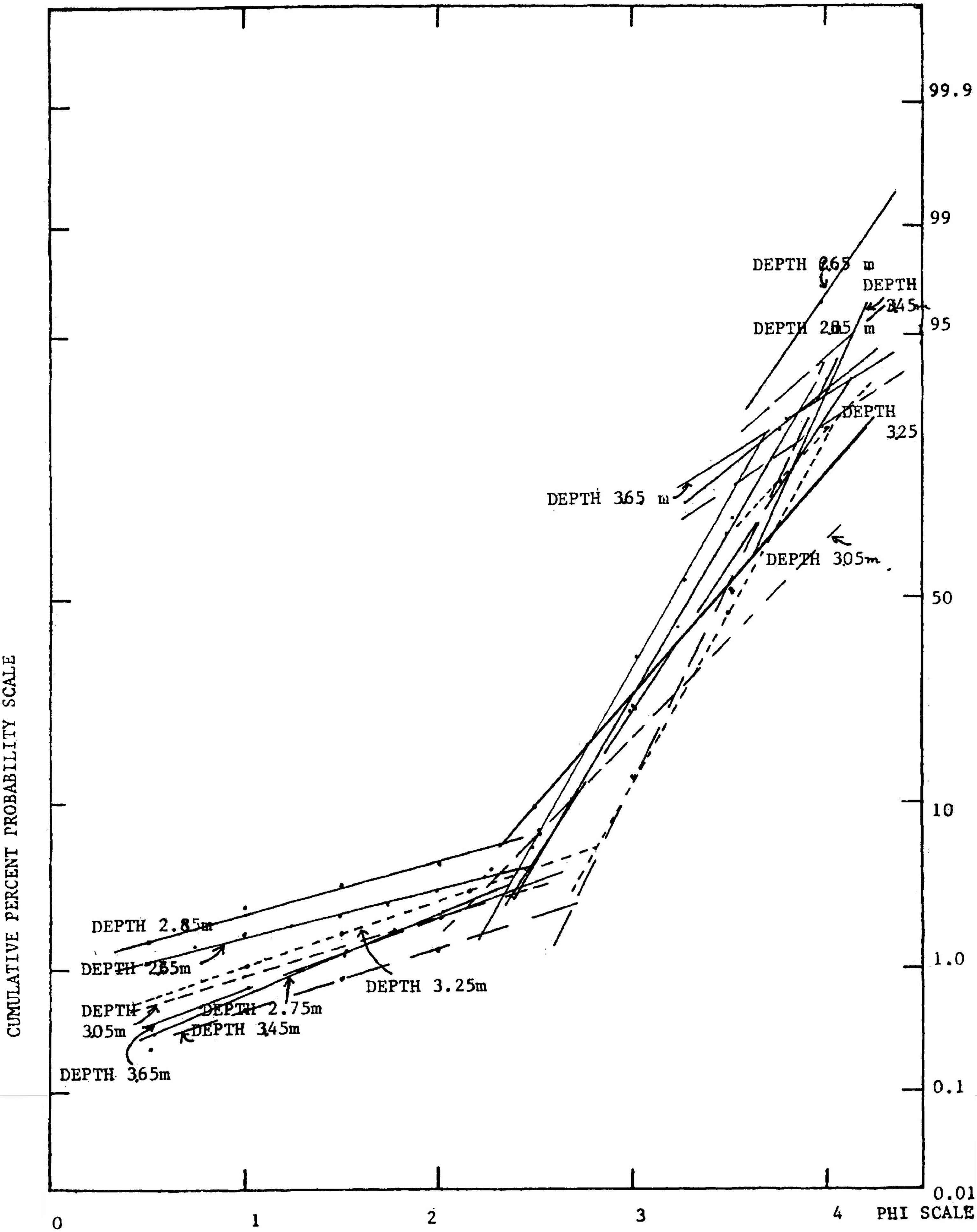
LAKES	RANGES OF GRAIN SIZE (Ø)	RANGES OF ORGANIC CARBON
Callander Bay (LU-82-1)	7.5 to 10.0	1.4 to 4.2
Lake Nipissing (LU-82-8)	8.5 to 10.0	0.9 to 2.5
Lake Nipissing (LU-82-9)	9.0 to 9.4	0.9 to 1.7
Lake Nosbonsing (LU-82-3)	8.7 to 9.7	2.6 to 11.2
Lake Nosbonsing (LU-82-7)	9.0 to 9.9	2.7 to 8.7
Lake Talon (LU-82-10)	9.0 to 9.3	3.5 to 7.1
Lake Talon (LU-82-13)	8.3 to 9.9	1.1 to 5.9
Kiosk Lake (LU-82-11)	8.3 to 9.3	6.8 to 9.2
Cedar Lake (LU-82-12)	8.6 to 9.1	9.7 to 12.3

TABLE 3 Average grain size and organic carbon percentages of the North Bay areas.

Lake Nosbonsing cores LU-82-3, and LU-82-7 show similar sand percentages ranging from Ø.3Ø to 15.15%, and mean grain sizes ranging from Ø.ØØ1Ø Ø.ØØ25mm (1Ø.Ø to 8.63 Ø).The organic carbon percentage is relatively higher than for the cores of Callander Bay and Lake Nipissing (Table 3). The bay in which the two cores were taken is silled by a small island at it's mouth which would result in low energy conditions for the bay allowing the deposition of particulate organic matter in its central portion.The shorter transport distances and lower energy conditions for the smaller lakes of the study area would tend to be more favourable for the deposition of particulate organic matter relative to Lake Nipissing. Also it should be noted that generally for the study area that those lakes having the higher organic carbon content are those that have the coarser mean grain size of the silt-clay fraction (Table 3). There is a decrease in organic carbon content for the uppermost part of both cores from Lake Nosbonsing which could be a reflection of increased erosion and detrital deposition over the past 2ØØ years.This distribution of organic matter is certainly not representative of lakes in the Great Lakes area or the other lakes studied in the North Bay area. Although the relief is greater than for Lake Nipissing much of the clastic sediments may be derived from the island and surrounding shoreline of the bay. It has been pointed out that the paleomagnetic logs for the cores from Lake Nosbonsing,and especially for LU-82-7, show a scattering of the plots and therefore provide less reliable control than for the cores from Callander Bay and Lake Nipissing.However based on utilizing the age of the oscillation peaks of cores LU-82-3 and LU-82-7 Nosbonsing sites show fairly similar rates of sedimentation of 1.07 and 0.98 mm/yr repectively.These would be sedimentation rates similar to that for the Callander Bay site and considerably greater than the two Lake Nipissing proper sites. However,if the rate of sedimentation is calculated in mg/cm^2/yr then the rates of sedimentation for the Lake Nosbonsing sites is considerable lower than for Callander Bay and the Lake Nipissing proper sites because of the relatively higher organic content for the Nosbonsing sites.

The sedimentary sequence for the Lake Talon cores consists of homogeneous, olive gray to greenish gray,silty clay with dark colored bands.These bands are probably concentrations of black unstable iron sulphide mineral hydrothoilite.The silty clay sediments of core LU-82-10 from Lake Talon exhibits sand percentages and mean grain sizes ranging from zero to 2.6% and from 0.0016 to 0.0019mm (9.33

to 9.ØØ Ø) respectively. Core LU-82-13 has a sand percentage which ranges from Ø.1 to 17.1% and mean grain size which ranges from Ø.ØØ11 to Ø.ØØ32mm (9.92 to 8.33 Ø). In core LU-82-13 there is a substantial increase in the sand content in the sequence from a depth of 2.25m, to 3.65m, which would have been deposited during the period from 275Ø to 34ØØ years BP. The sand percentage of this sandy portion of the core ranges from 84.4 to 96.7%.The uppermost part of this time interval may have been encountered of the base of core LU-82-1Ø which bottomed at about 275Ø years BP.Although a minor increase in sand percentage occurred in Lake Nipissing at the core LU-82-8 site at a depth 3.85m (52ØØ years BP) no increase was noted in the interval 275Ø to 34ØØ years BP which would indicate that this period of sand deposition in Lake Talon was a local event.All of the samples analysed are well to moderately sorted, negative to positively skewed, and mesokurtic to leptokurtic based on determination of the grain size parameters using moment measures after Friedman (1961).Based on the shape of the cumulative curves of the grain size distribution of each sample based on the work of Visher, 1969, beach rather than river deposition would be indicated (Fig. 17). In addition the samples were analyzed by compiling graphs of different combinations of grain size parameters. These graphs were:



IGURE 17. Cumulative-frequency curves of Lake Talon sands.

kurtosis versus skewness (Fig. 18), skewness versus standard deviation (Fig. 19), and simple skewness measure versus simple sorting measure (Fig. 20). For the skewness versus standard deviation the Lake Talon sands plot in the beach environmental field and in the skewness versus kurtosis and skewness versus simple sorting measure most of the Lake Talon sand samples plot in the beach environment field.This provides substantial evidence that the sands deposited at the LU-82-13 site were beach sands. Therefore it would appear that beach sands were deposited at site LU-82-13 from 2750 to 3400 years BP and were onlapped by lacustrine silty clay basinal sediments deposited from 2750 years BP to the present.This would indicate a transgressive sequence and that Lake Talon increased in size after 2750 years BP.

The organic carbon percentage is highest at the sediment-water interface and generally decreases with depth,for the two cores from Lake Talon which is the normal organic distribution for lakes which have oxidizing conditions at the lake-bottom. The sediments of both cores contain less than 2% carbonate carbon,that is probably detrital carbonate as previously noted.The relief of the surrounding catchment basin for Lake Talon is greater than

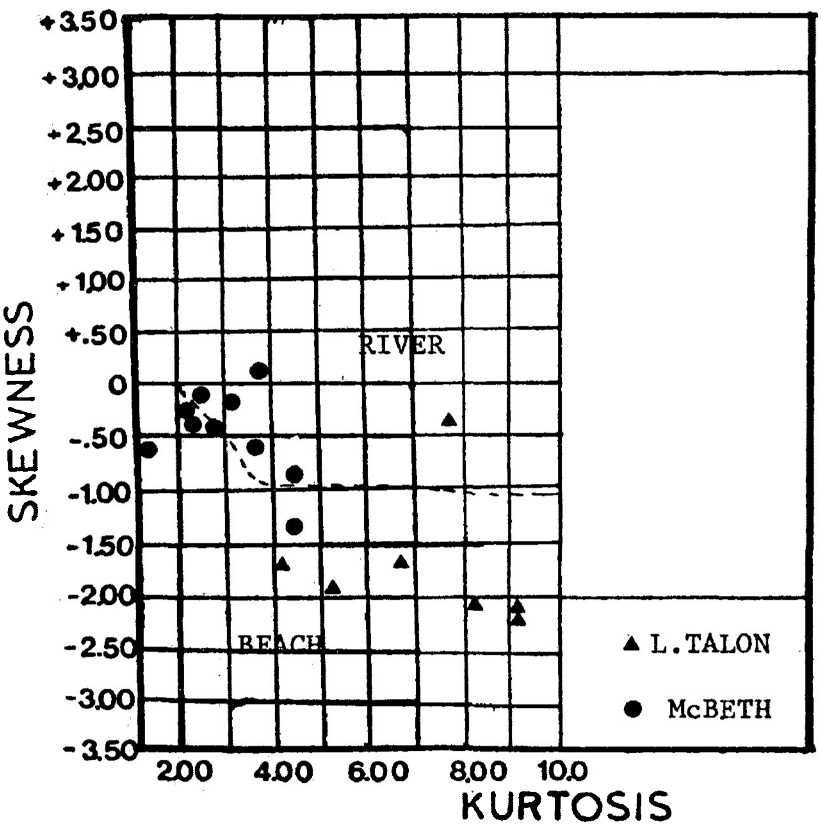
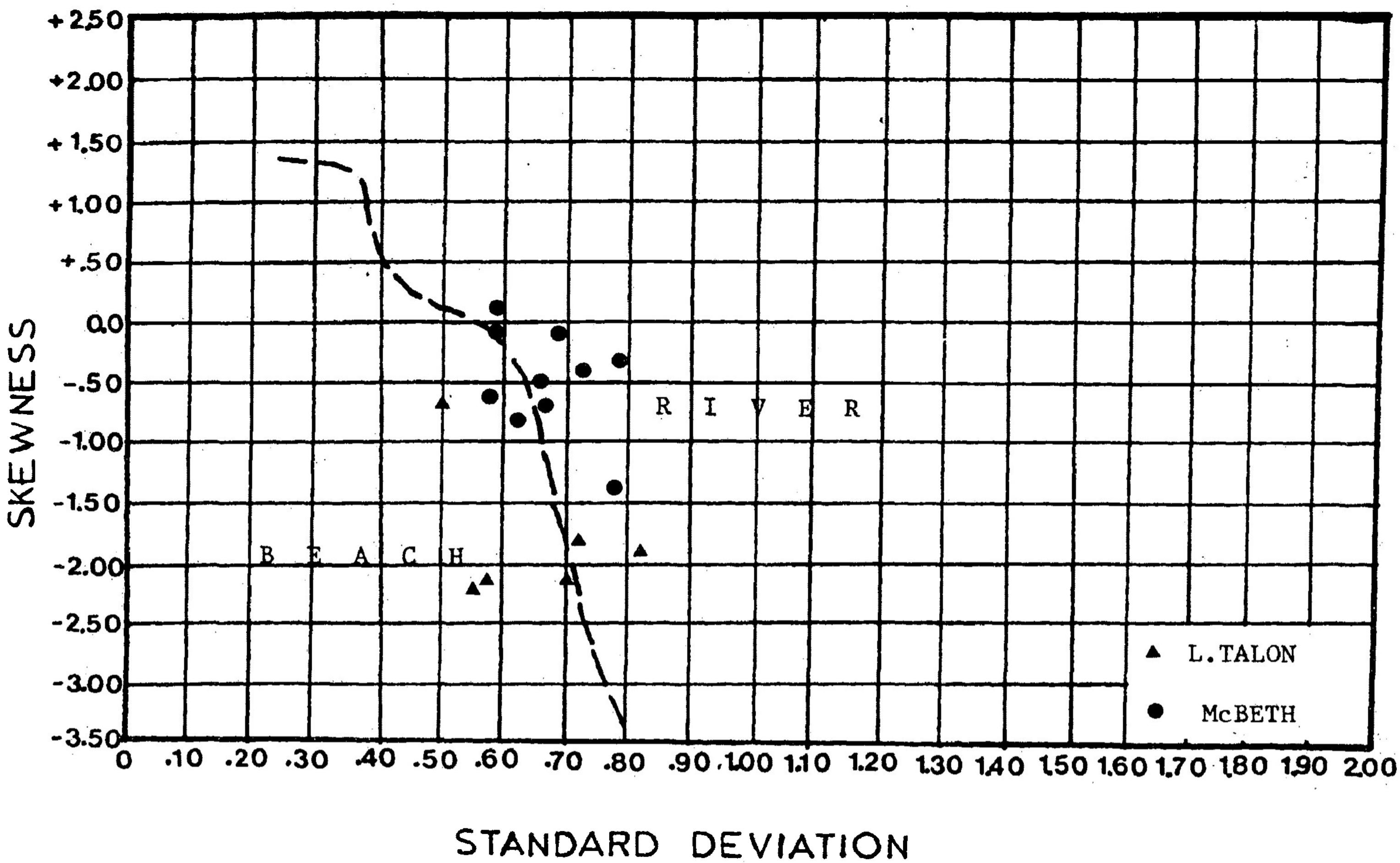


FIGURE 18 . Plot of third moment (skewness) and fourth moment (kurtosis), using phi (ϕ) scale, for beach and river sands, (after Friedman , 1961 fig.3, p.519).



IGURE 19. Plot of third moment (skewness) and standard deviation, using phi (Ø) scale, for beach and river sands, (after Friedman,1961, fig.4, p.520).

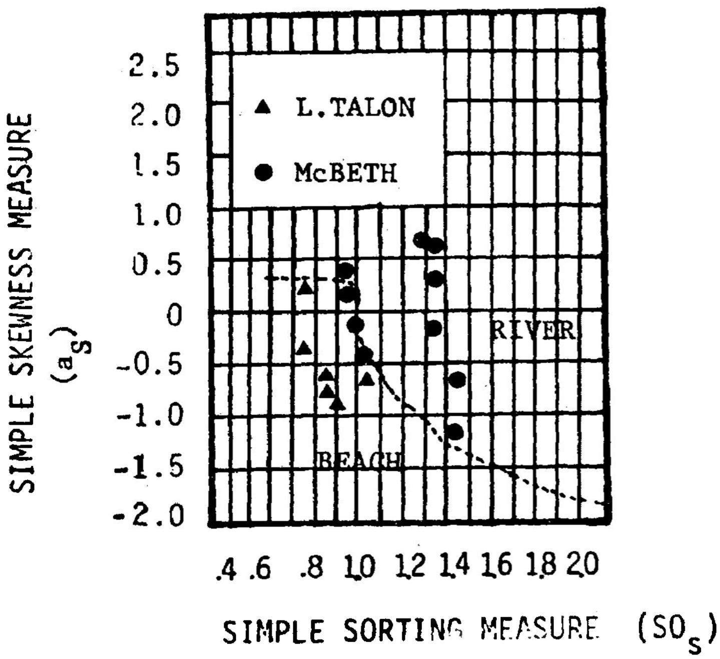


FIGURE 20.Plot of Simple Skewness Measure and Simple Sorting Measure, for beach and river sands,(after Friedman,1979, fig.4, p.12).

for the other small lakes (Nosbonsing, Kiosk and Cedar) which could account for the relatively lower organic content of LU-82-1Ø (3.47-7.14%) and uppermost part of LU-82-13 (3.8Ø-5.19%) because of increased clastic input.The decrease in the organic carbon content below 3.Øm in LU-82-13 is a result of the dilution of the organic material by the substantial increase in coarse clastic material.This increase in the sand content below 2.5m in core LU-82-13 is reflected in a decrease in magnetic intensity for that part of the section and a scattering of the paleodeclination and paleoinclination plots. The well defined paleomagnetic curves for the basinal lacustrine sequence for Lake Talon reflects higher magnetic intensity values resulting from a higher ferrimagnetic mineral content. The calculated average rate of sedimentation from the present to 26ØØ years BP is lower for core LU-82-1Ø relative to LU-82-13 both in mm/yr (Ø.65 versus Ø.96) and in $mg/cm^2/yr$ (37.6 versus 57.1). These rates of deposion range between the rates for the core site at Callander Bay and the core sites of Lake Nipissing proper (Table 2).

The sedimentary sequence for the Kiosk Lake core consists of homogeneous, olive black, very fine grained silt to coarse grained clay. The grain size analyses of samples from core LU-82-11 from Kiosk Lake gave sand percentage ranging from 0.1 to 1.5%, and the mean grain size ranges from 0.0016 to 0.00125mm (9.33 to 8.83 Ø), both of which exhibit an irregular distribution with depth. The organic carbon percentages are highest at the top of the core just below the water-sediment interface (9.2%) and show a progressive decrease with depth which has already been pointed out is the usual situation for well-aerated lakes. The carbonate carbon percentage is somewhat higher for the upper part of the core. The dark color of the sediments probably results for the most part from both the high organic content and to a lesser extent and the reduced state of the iron content in the sediments. The area of the surrounding drainage basin of Kiosk Lake is about five times that of the lake area which is comparable to the ratio for Lake Talon. However the organic carbon content of the sediments is considerably greater than for the stratigraphic sequence of Lake Talon. The average rate of sedimentation from 2500 years to the present is about 0.8 mm/yr and ranges from a low of 0.5 mm/yr (8.4 $mg/cm^2/yr$) from 1300 tp 2100 years BP to a maximum of 1.5 mm/yr (22.7 $mg/cm^2/yr$) from the present to 200 years BP.These rates of sedimentation are similar to that of core site LU-82-13 for Lake Talon in mm/yr, however the rate in $mg/cm^2/yr$ is considerably less.Therefore the higher organic content of the sediments of Kiosk Lake appear to reflect a greater input of organic material and a lower amount of detrital material.The lower amount of detrital material could be a reflection of the lower relief of the surrounding watershed of Kiosk Lake relative to Lake Talon (Table 2b). The increased rate of deposition in the immediate past probably reflects the logging operations carried out for slightly more than 100 years.

The sedimentary sequence at Cedar Lake consists of homogeneous, brownish black, fine grained silt.The grain size analyses of samples from Cedar Lake core LU-82-12 gave sand percentages ranging from 0.0 to 4.1%, with the mean grain size ranging from 0.0018 to 0.0026mm (9.08 to 8.58 Ø). The sand percentage and mean grain size increase very slightly with depth. There is a slight increase in the sand content (+5%) for the interval from 1.0 to 2.0m (1200 to 2000 years BP based on the paleomagnetic chronology).Once again this appears to be a local increase in sand content that is not reflected in the record of the other lakes of the study area.The organic carbon content of this core is higher than for any of the other lake-cores from the North Bay area. There is a relatively higher organic carbon percentage, at the top of the core (13%) versus an average of about 10 percent for the rest of core which is the normal distribution of organic carbon in a stratigraphic sequence of an aerated lake. The consistent brownish black (5YR2/1) of the sediments probably results from the high organic content of the sediments.The scattering of the paleodeclination and paleoinclination plots (Fig. 12) is a result of the relatevely low magnetic intensity values ranging from 2.67 to 18.97uG (0.27 to 1.93 mT) resulting from the dilution of detrital ferromagnetic minerals by the high organic content of the sediments. The surrounding drainage basin for Cedar Lake is 2.2 times the lake area (Table 2b), and the maximum relief is lower (106m)than for the other three small lakes in the study area.The relative lower relief of the Cedar Lake drainage basin could account for the high organic content of the sedimentary sequence.Although the average rate of sedimentation of 1.1 mm/yr from the present to 2100 years BP was comparable with the other lakes of the area it is quite low (14.5 $mg/cm^2/yr$) if expressed in weight/area/year.

The mineralogy of the sedimentary sequences of the lakes studied in the North Bay area consists of major amounts of quartz,subordinate plagioclase and orthoclase

Table 4. THE HEAVY MINERALS PRESENT IN THE SAND FRACTION OF THE SILTY CLAY IN THE NORTH BAY AREAS

CORE SITES	HORNBLENDE	EPIDOTE	GARNET	PYROXENE	TOURMALINE	ZIRCON	APATITE	HEMATITE	MAGNETITE
LU-82-1 (Callander Bay)	20 - 30%	5 - 10%	1 - 5%	1 - 5%	0 - 1%	0 - 1%	1 - 3%	1 - 2%	0 - 1%
LU-82-8 (Lake Nipissing)	30 - 40%	10 - 15%	5 - 10%	1 - 5%	1 - 2%	1 - 2%	1 - 5%	1 - 3%	1 - 2%
LU-82-9 (Lake Nipissing)	25 - 40%	10 - 15%	5 - 10%	1 - 5%	0 - 1%	0 - 1%	1 - 5%	1 - 2%	0 - 1%
LU-82-3 (Lake Nosbonsing)	10 - 20%	5 - 10%	1 - 5%	1 - 3%	1 - 2%	0 - 1%	1 - 3%	1 - 2%	0 - 1%
LU-82-7 (Lake Nosbonsing)	10 - 20%	5 - 10%	1 - 5%	1 - 3%	1 - 2%	0 - 1%	1 - 3%	1 - 2%	0 - 1%
LU-82-10 (Lake Talon)	10 - 15%	5 - 15%	1 - 5%	1 - 5%	1 - 2%	0 - 1%	1 - 2%	1 - 3%	0 - 2%
LU-82-13 (Lake Talon)	10 - 15%	5 - 10%	1 - 5%	1 - 5%	1 - 2%	0 - 1%	1 - 2%	1 - 3%	0 - 2%
LU-82-11 (Kiosk Lake)	5 - 10%	2 - 5%	1 - 5%	1 - 5%	0 - 1%	0 - 1%	1 - 2%	1 - 2%	0 - 1%
LU-82-12 (Cedar Lake)	5 - 10%	1 - 5%	2 - 3%	1 - 3%	0 - 1%	0 - 1%	1 - 2%	0 - 2%	0 - 1%

feldspar, and minor amounts of chlorite, kaolin, illite, vermiculite, dolomite, and calcite.The percentage of heavy minerals of the sand fraction ranges from 1 to 31% in the lakes of the study area.The sediments of the Lake Nipissing cores show the maximum percentage(1 to 31%) of heavy minerals contained in the sand fraction of the sediments rather than in the silt fraction. Lake Nosbonsing cores contained 1 to 7%, heavy minerals in the sand fraction, Lake Talon from Ø.4 to 4.Ø%, Kiosk Lake Ø.8 to 2.Ø% and Cedar Lake from Ø to 1%. The heavy sand grains consist of a wide variety of minerals with major amounts of hornblend(3Ø-4Ø%), epidote(1Ø-2Ø%), garnet(both rose and colorless variety) 5-1Ø%,and minor pyroxene (5-1Ø%), tourmaline(1-2%), rutile (1-2%), zircon(1-2%), apatite(1-5%), magnetite(1-2%) and hematite (1-3%) as shown in Table 4.There is little change in the heavy minerals present from lake to lake in the North Bay area.The heavy minerals are those which would be expected to be derived from the Pre-Cambrian biotite and hornblende rich gneissic rocks, and the granitic and monzonitic rocks that comprise the Precambrian outcropings in the study area. The etched surface of the mineral grains of the sand fraction of the sediments suggest that the grains underwent chemical as well as physical weathering.Etched grains constitute good evidence of solution.However it is not always clear that etching was achieved after, rather than before deposition (Pettijohn,1975). Hydration and hydrolysis of minerals is the first step in the chemical alteration of parent minerals such as the feldspars to clay minerals (Degens,1965).The main clay minerals of the sediments from the lakes of the study area are kaolinite. illite, vermiculite, and chlorite. Hydrogen ions combine with the aluminum silicate radical of the orthoclase to form the new clay minerals under conditions of intense weathering and decomposion. Muscovite and K-feldspar as well as plagioclase, may provide the alumina and silica necessary for forming kaolinite which is the most common weathering product of feldspar (Brownlow,1979).Vermiculite forms primarily from the partial weathering of muscovite and biotite (Jackson,1964;Brownlow,1979).Illite found in soils is probably to a great extent simply inherited from pre-existing sedimentary illite of diagenetic origin, or from the partial weathering of igneous and metamorphic muscovite (Berner,1971).Most sedimentary chlorite is probably derived from pre-existing chlorite, although limited amounts form from later layer-type silicates during weathering (Jackson,1964;Brownlow,1979). Most chlorites have a low ion-exchange capacity and are nonswelling

(Brownlow,1979). Therefore the kaolinite, and vermiculite would appear to be, at least in part, products of the post-glacial weathering cycle of the Precambrian bedrock of the North Bay area.The chlorite, illite and part of the kaolinite and vermiculite would appear to be products of the glacial deposits and pre-existing sediments that underwent at least second-cycle weathering and erosion.Only a fraction of the feldspar underwent complete alteration to clay minerals as orthoclase and plagioclase are two of the most abundant minerals of the sediments of the lakes of the North Bay area.

McBeth Fiord

There is a good correlation of the paleodeclination as well as the paleoinclination logs for cores McBeth-1 and McBeth-2 from McBeth Fiord, Baffin Island (Fig. 13 and 14). There are nine well defined declination and inclination oscillations for the McBeth-1 core and eight declination and inclination oscillations for McBeth-2 .These well defined paleodeclination and paleoinclination oscillations should provide a method of time-parallel or chronostratigraphic correlation from one core to the other. The paleodeclination and paleoinclination logs from both the cores from McBeth Fiord show a strong similarity to the "type" paleomagnetic logs established for the Great Lakes (Creer and Tucholka,1982), and also to the logs compiled for the Lake Nipissing area.The "type" paleodeclination and paleoinclination logs for the Great Lakes also appears to correlate with paleomagnetic logs for the Lake District of England(Creer,1976b). Therefore it would appear to be reasonable to assume that the McBeth paleomagnetic logs can be correlated with the "type" paleomagnetic logs for the Great Lakes area and that the suggested geomagnetic time scale be tentatively applied to the McBeth paleomagnetic logs.But due to the westward drift (secular change) of the earth's magnetic field with time the ages assigned to the paleomagnetic features probably would be about 200 years older than for the ages assigned to these paleomagnetic features for the Great Lakes area. As this region is nearer to the magnetic north pole the paleoinclination values should be greater than for the Great Lakes area and it can be noted that in the McBeth Fiord area the paleoinclination values range from 60° to 90° versus 20° to 70° for the Great Lakes area. The cores would appear to have bottomed in sediments dated at about 9500 and 4750 years BP for cores McBeth-1 and McBeth-2 respectively.

Both core taken from McBeth Fiord,Baffin Island are correlated to subdivisions of the Holocene proposed by Andrews and Ives (1978) and Andrews,1982 based on the selection of isochronous boundaries at 10,000, 9.000, 8,000, 5,000, and 2.500 years BP (Fig. 21 and 22).

The lithology of the sedimentary sequences cored at the two sites in McBeth Fiord consists predominantly of sandy, coarse grained clay to very fine grained silt with subordinate thin beds of sand.For core McBeth-1, taken from the head of the McBeth Fiord the sand percentage of the coarse grained clay to very fine grained silt ranges from 0.22 to 8.48%, and the mean grain size ranges from 0.00125

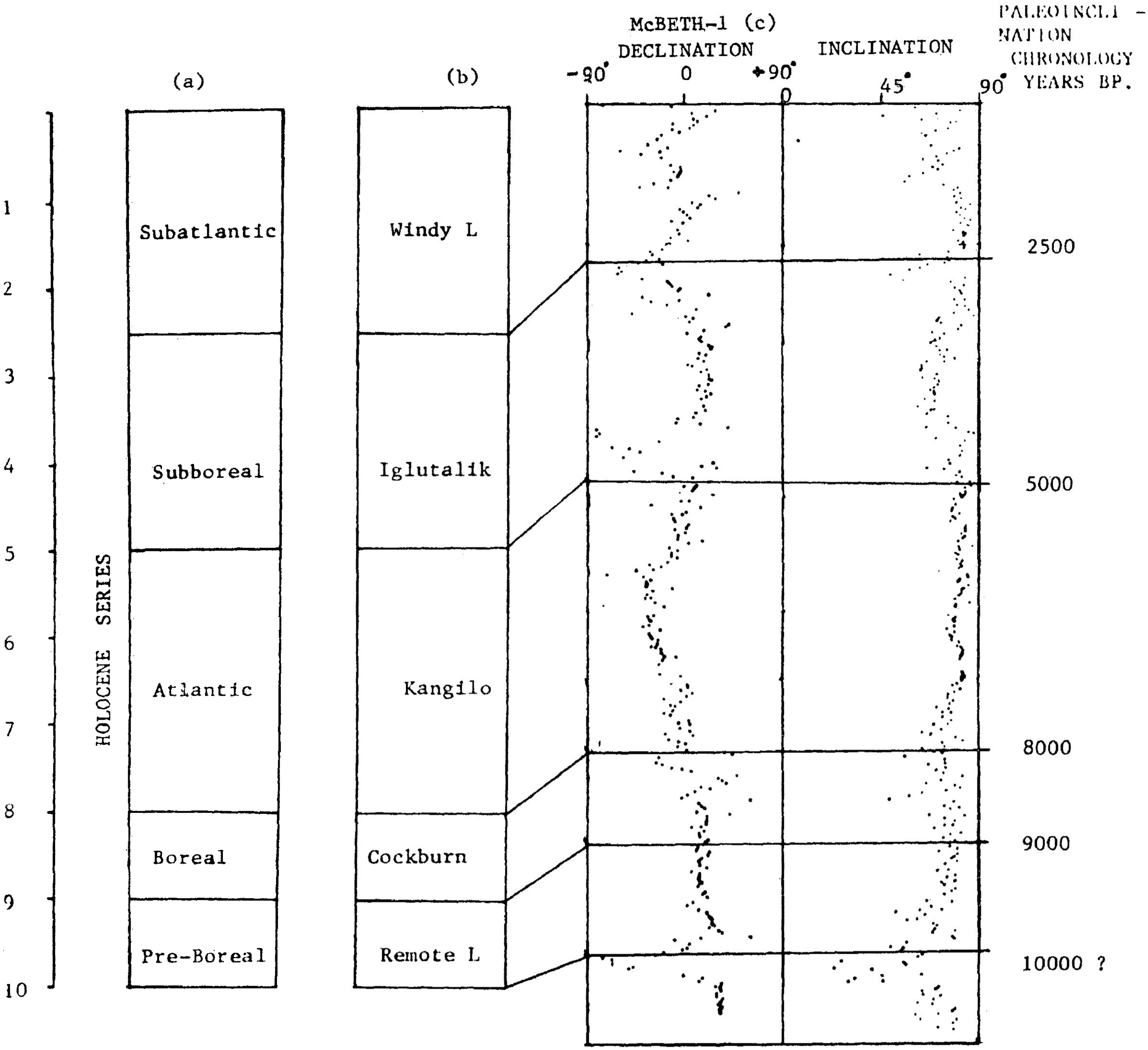
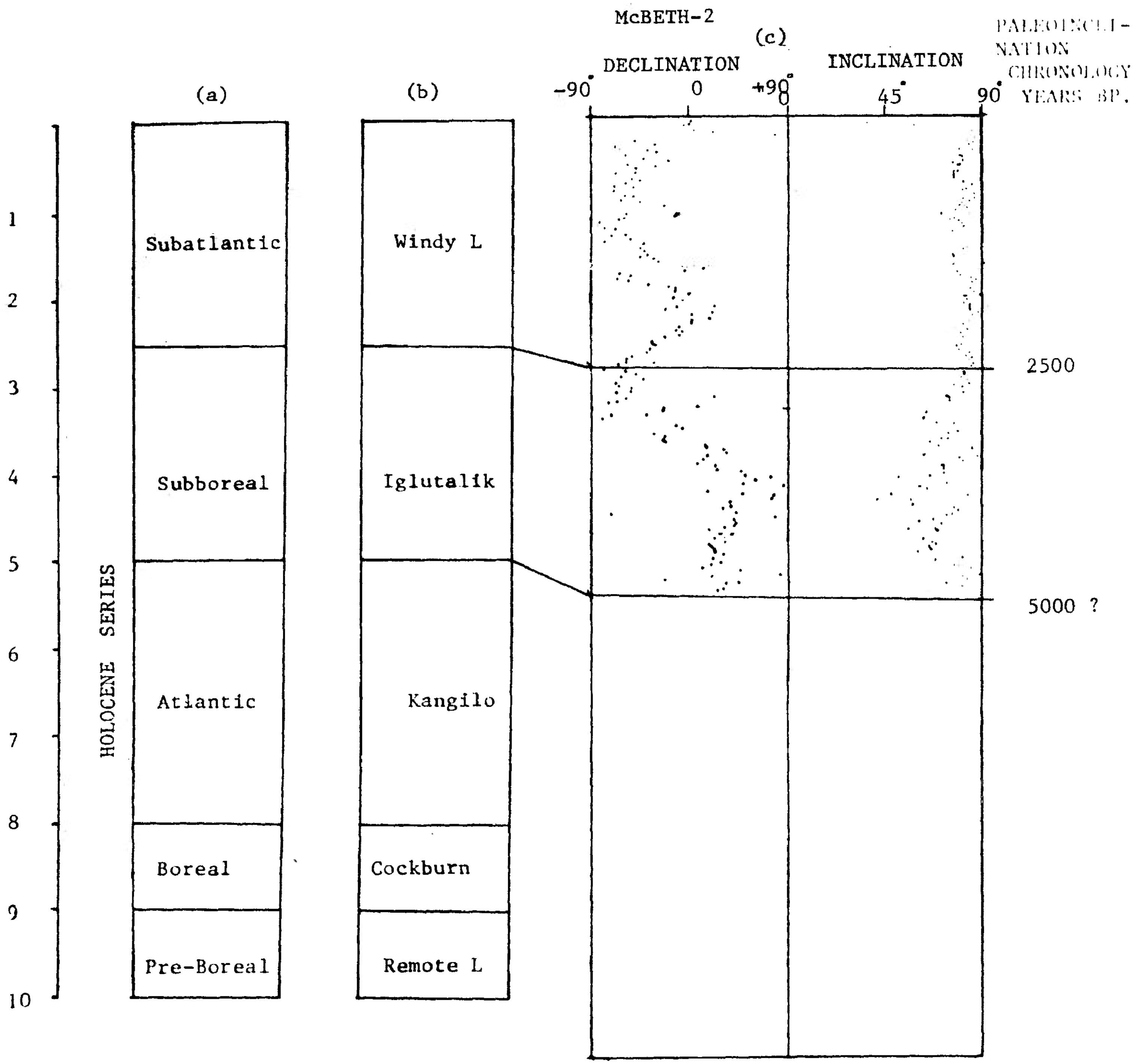


FIGURE 21. Holocene subdivisions proposed after Andrews and Ives (1978) and Andrews (1982), for Baffin Island.
a) Chronostratigraphic subdivision of Norden Region (Mangerud et al.,1974).
b) Chronostratigraphic/geochronological subdivision for the Canadian Arctic (Andrews and Ives,1978:Andrews,1982).
c) Paleodeclination and Paleoinclination logs of McBeth-1.



URE 22. Holocene subdivisions proposed after Andrews and Ives (1978) and Andrews (1982), for Baffin Island.

a) Chronostratigraphic subdivision of Norden Region (Mangerud et al.,1974).

b) Chronostratigraphic/geochronological subdivision for the Canadian Arctic (Andrews and Ives,1978:Andrews,1982).

c) Paleodeclination and Paleoinclination logs of McBeth-2.

to Ø.ØØ17mm (9.83 to 9.17 Ø). Thin sand beds which are 2 to 3 cm thick, occur at Ø, Ø.Ø13, Ø.Ø27, Ø.Ø31, Ø.Ø75, Ø.38, Ø.89, 2.Ø1, 2.22, 3.3Ø, 5.Ø5, 7.51, and 9.31 meters and consist of 74.Ø to 94.4% of sand sized particles.All of the samples analysed were plotted using different combinations of grain size parameters. For skewness versus standard deviation, skewness versus kurtosis and simple skewness versus simple sorting measure the McBeth Fiords sands plot in the river environment field (Figures 18 to 2Ø). The sediments contain less than 1% organic and carbonate carbons in core McBeth-1, and there is a decrease in organic carbon percentage with depth. The small amount of organic carbon in the fiord sediments would result from the low amounts of terrestrial organic matter. Carbonate carbon is probably detrital and derived from the adjacent rocks.

The second core, McBeth-2,located on the northeastern distributary of McBeth Fiord,consists predominantly of coarse clay with a mean grain size ranging from Ø.ØØ14 to Ø.ØØ19mm (9.58 to 9.ØØ Ø).The sand percentage of this lithology which ranges from Ø.55 to 4.66% is somewhat lower than for the coarse clay at McBeth-1.Only one thin bed of sand from 3.24 to 3.3Ø depth was noted in this core.There is a convolute overturn structure from 3.Ø4 to 3.24m above the

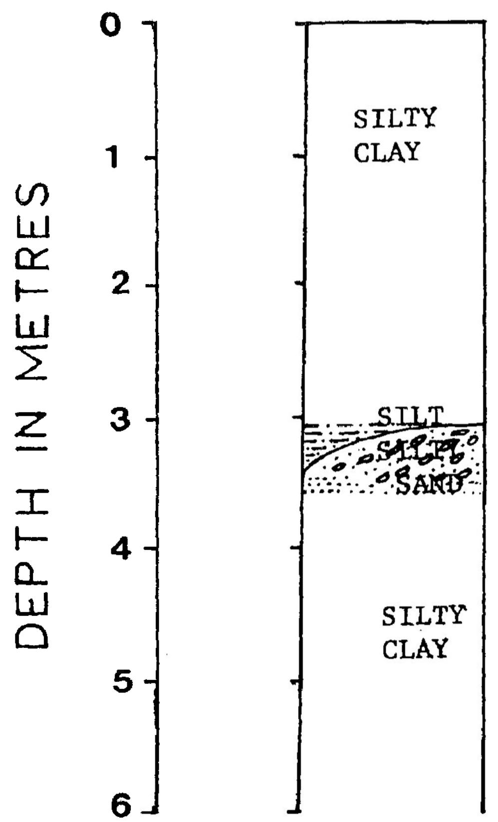


FIGURE 23 . Convolute overturn structure from 3.04 to 3.24m above the sand bed at McBeth-2 site.

sand bed.It would appear that the sand acted as a sole on which slumping of a thin segment of the overlying coarse clay unit took place probably shortly after deposition as the clay strata above 3.Øm does not show any structural distortion (Fig. 23).This is substantiated by the paleodeclination and paleoinclination plots which show a scattered distribution for the thin slump interval but form a continuous and well defined log for the sandy clay sequence above 3.Øm depth.These points would indicate that the slumping took place shortly after deposition of the thin distorted section from 3.Ø4 to 3.24m depth and would have occurred about 26ØØ years BP based on the paleomagnetic time scale.A pebble of granite breccia was found at a depth of 3.25m in the McBeth-2 core below the slump structure.It may have been deposited by ice rafting.

In core McBeth-1 site fourteen sand beds occur with eleven of these beds occuring from the top of the core to 3.3Øm depth. However at the site of the core McBeth-2 site only one sand bed was found at 3.31m depth. As the river at the head of the fiord provides the main source of clastic sediment input to the fiord it would be likely that the sediments comprising the normal deposition of sandy, coarse grained clay would show a decrease in grain size away from

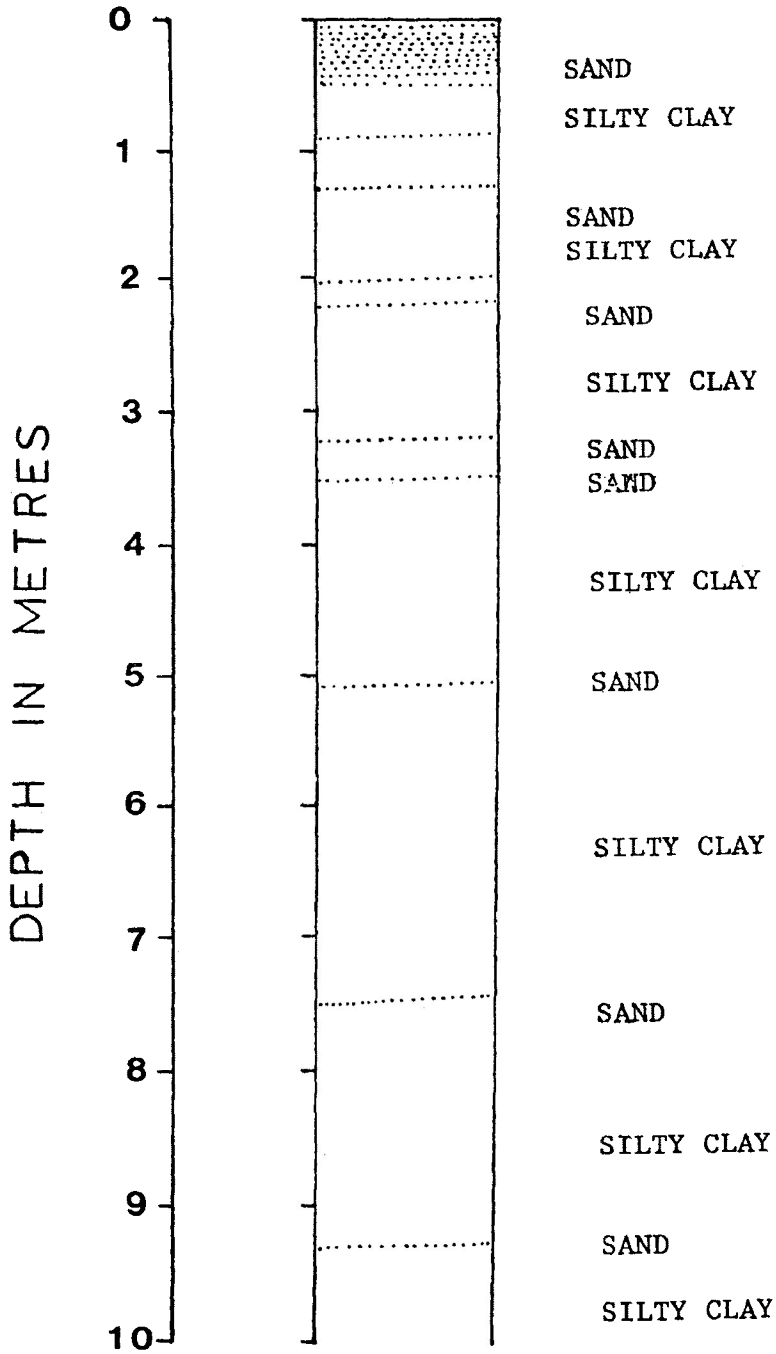


FIGURE 24. Graded sand beds (turbidites) at McBeth-1 site.

site McBeth-1 at the head of the fiord to McBeth-2 on the northeastern distributry of the fiord.

In core McBeth-1,the normal deposits consisting predominantly of sandy clay are interbedded with the thin beds of graded sand, which would appear to result from turbidite deposition.These sand beds are moderately sorted,negative to strongly positively skewed and platykurtic to leptokurtic, fine to very fine grained sand, (based on the graphic paramaters of Folk and Ward,1957 and the moment measures of Friedman,1961).A graded sand sample was taken from the McBeth-1 core site at about 3.48m along the length of the core for thin section study.It was clearly noted by microscope studies that the fine grained sand units are graded, fining upward. The interbedding of the normal deposition of coarse grained clay with graded sands commonly occurs in turbidite successions and if these graded sand beds are turbidites it should be possibl e to correlate, sand beds from McBeth-1 (Fig. 24) to the sand single sand bed encountered in McBeth-2 at 3.31m. Based on the paleomagnetic time scale the sand bed in McBeth-1 would be dated about 4000 yeats BP and would correlate with a series of sand beds in McBeth-1 at about 2.30m depth.

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Table 5. RATE OF SEDIMENTATION IN McBETH FIORD, BAFFIN ISLAND

FEATURE	AGE YEARS BP	McBeth - 1		McBeth - 2	
Label		mm/yr	mg/cm^2/yr	mm/yr	mg/cm^2/yr
γ	0 - 200	1.00	74.70	1.5	92.74
γ – δ	200 - 1300	0.54	47.10	0.73	50.58
δ – ε	1300 - 2100	0.37	31.35	0.62	49.89
ε – ζ	2100 - 2600	1.20	120.85	1.80	141.47
ζ – η	2600 - 3500	0.61	61.43	1.67	152.91
η – θ	3500 - 4050	1.09	87.88		
θ – ι	4050 - 4750	1.00	80.63		
ι – κ	4750 - 6000	0.76	64.71		
κ – λ	6000 - 6750	0.93	78.84		
λ – μ	6750 - 8200	0.69	66.23		
μ – ν	8200 - 9500	0.61	67.62		

Generally the high sand content results from the sand particles being carried in a flow of fresh water over the more dense marine waters of the fiord before an inter-mixing of the fresh water and marine water occurs.Studies of Tingin and Itirbilung fiords, Baffin Island that are currently being carried out at Lakehead University on these fiords show a sand content in excess of 10%. However, this type of fiord deposit was not found at the two sites in McBeth Fiord.Generally a basinward thickening of the sedimentary sequence may be noted from McBeth-1 to McBeth-2,especially from the present to 2500 years BP (Fig. 21 and 22).The rate of sedimentation at the head of the fiord (McBeth-1) was relatively lower both in mm/yr and in $mg/cm^2/yr$ from the present to 4750 years BP than for the northeastern distributary (McBeth-2) Table 5.

The sedimentary sequence of McBeth Fiord,Baffin Island is composed of major amounts of quartz, K-feldspar, subordinate amounts of plagioclase, and minor amounts of chlorite, phlogopite, illite, and vermiculite.The percentage of heavy minerals ranges from 2 to 4.54% in core McBeth-1 ,and from 0.51 to 8.52% in core McBeth-2.Both cores show a decrease in the percentage of heavy minerals with depth. Heavy minerals consists of major amounts of

Table 6. THE HEAVY MINERALS IN THE SAND FRACTION OF THE SILTY CLAY IN THE McBETH FIORD, BAFFIN ISLAND

CORE SITES	PHLOGOPITE	HORNB LENDE	EPIDOTE	GARNET	PYROXENE	TOURMALINE	APATITE	HEMATITE	MAGNETIT
McBETH - 1	20 - 30%	10 - 20%	5 - 10%	1 - 5%	1 - 5%	1 - 2%	1 - 2%	1 - 3%	1 - 2%
McBETH - 2	20 - 30%	10 - 15%	5 - 10%	1 - 5%	1 - 3%	0 - 1%	0 - 1%	1 - 2%	1 - 2%

phlogopite(20-30%),hornblend(10-15%), epidote(5-10%), and garnet both rose and colorless variety(1-5%), and minor amounts of pyroxene(1-5%), tourmaline(1-2%), magnetite(1-2%),and hematite(1-3%) as shown in Table 6.The surface texture of phologopite and other minerals grains are quite fresh in appearance.The type and appearance of the mineral grains of the sand fraction suggests that the sediments were derived from Precambrian granitic gneiss and migmatite, undifferentiated plutonic, sedimentary and volcanic rocks of the adjacent area that had been subjected principally to physical weathering.The absence of kaolinite and presence of the mica mineral phlogopite in the McBeth Fiord sediments indicate that these sediments were not subjected to extensive chemical weathering.The illite found is probably, to a great extent, simply inherited from pre-existing sedimentary illite of diagenetic origin or from the partial weathering of igneous and metamorphic muscovite (Berner,1971). Most sedimentary chlorite is probably derived from pre-existing chlorite, although limited amounts form from later layer-type silicates during weathering (Jackson,1964;Brownlow,1979). Vermiculite forms primarily from the partial weathering of muscovite and biotite (Jackson,1964;Brownlow,1979).

CONCLUSIONS

It was hoped that cores taken in the North Bay area would have penetrated to the glacial deposits in order to ascertain the timing of the North Bay (through Lake Nipissing, Trout Lake and Talon Lake) and the Fossmill (through Lakes Nipissing,Nosbonsing,Kiosk and Cedar) outlets draining water to the Champlain Sea.Unfortunately the post-glacial sedimentary sequence was thicker than expected and it was not possible to obtain cores to the glacial deposits with the coring device available. The Nipissing transgression is dated at 5,750+ years BP (Sly and Lewis, 1972).The oldest sediments cored in the study were dated at 6000 years BP (core LU-82-8 from Lake Nipissing proper).This indicates that the basal sediment in the core could represent the beginning of the Nipissing phase of the Great Lakes. At that time isostatic uplift of the North Bay area had occurred and separate lakes formed along the North Bay and Fossmill outlet routes. This would account for the different lithologies from lake to lake.

Chronostratigraphic correlation of the lacustrine stratigraphic sequences utilizing paleomagnetic logs would appear to be the most viable of correlation tools available at this time.Scattering problems develop in the plots of the paleodeclination and paleoinclination values when the magnetic intensities of the stratigraphic sequence are low. Usually this is caused by a decrease in the ferromagnetic mineral content due to high quartz sand and/or a high organic content.However, the repeatable oscillation pattern of the "type" paleodeclination and paleoinclination logs can still be ascertained. This study clearly indicates that paleodeclination and paleoinclination logs can be utilized for chronostratigraphic correlation from one core to another within the North Bay area as well as for McBeth Fiord,Baffin Island. The paleomagnetic logs of McBeth Fiord can be correlated with the "type" paleomagnetic logs established for the Great Lakes area by Creer and Tucholka(1982). Utilizing the geomagnetic time scale of the "type" logs for assigning absolute dates to the cores of McBeth Fiord would appear to be valid. However the absolute dates of the paleomagnetic markers would probably be 200 years older for the McBeth area than for the Great Lakes area. Dating the age of the cores provides sufficient information to calculate the rate of sedimentation for intervals in mm/yr as well as in mg/cm^2/yr with time.

The chronostratigraphic subdivisions of the Holocene of Baffin Island proposed by Andrews and Ives (1978),and Andrews (1982) based on the selection of isochronous boundaries at 10,000, 9,000, 8,000, 5,000, and 2,500 years BP, can be applied to the two cores of McBeth Fiord based on the paleomagnetic time scale.

The predominant lithology of the North Bay lakes and McBeth Fiord is silty clay, but the sand fraction percentages of the silty clay of the lacustrine sedimentary sequence (North Bay outlet) except for Callander Bay and Lake Nosbonsing show lower sand percentages than for the fiord sequence.

Generally the organic carbon percentage of the lacustrine sequence is higher than for the fiord sequence and is undoubtedly due to the greater availability of terrestrial organic matter in the North Bay area.Carbonate carbon percentage of both areas range in between 1 to 2%, denoting that both areas probably contain detrital carbonate derived from the adjacent source areas.

The mineralogy and grain surfaces of the sedimentary sequence in the North Bay lakes sampled show that both physical and chemical weathering were active.For example the etching and fracture, surfaces of the grains strongly indicates chemical weathering, either prior to erosion or during the transportation of the sediments.Whereas in the McBeth Fiord area the appearance of the mineral grains and presence of phlogopite would indicate that the sediments are basically a product of physical weathering.

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APPENDIX A

Lithological discriptions of cores

1-North Bay areas

LU-82-1 (Callander Bay)

LU-82-8 (Lake Nipissing)

LU-82-9 (Lake Nipissing)

LU-82-3 (Lake Nosbonsing)

LU-82-7 (Lake Nosbonsing)

LU-82-10 (Lake Talon)

LU-82-13 (Lake Talon)

LU-82-11 (Kiosk Lake)

LU-82-12 (Cedar Lake)

2-McBeth Fiord

McBeth-1

McBeth-2

LITHOLOGICAL DISCRIPTIONS OF CORES

LU-82-1(CALLANDER BAY): Ø-2.36 meters silty clay, olive gray(5Y4/1), homogeneous,non-calcareous.2.36-3.79 meters silty clay, olive green(5Y4/1), homogeneous,and non-calcareous.

LU-82-3(LAKE NOSBONSING): Ø-1.1Ø meters silty clay olive blackish gray(5Y3/1), homogeneous, non-calcareous,and not very compact, color gradually darkens to olive black(5Y2/1).1.1Ø-2.86 meters silty clay olive black (5Y2/1),homogeneous,non-calcareous,and more compact. 2.86-3.43 meters silty clay color change to dark greenish gray(5GY4/1), homogeneous,non-calcareous,and compact.3.43-4.33 meters silty clay greenish gray(5GY5/1),homogeneous, non-calcareous,and compact.

LU-82-7(LAKE NOSBONSING):Ø-Ø.53 meter silty clay olive gray(5Y4/1), homogeneous, non-calcareous,and loose compact.Ø.53-2.58 meters silty clay olive blackish gray(5Y3/1),homogeneous,non-calcareous, and slightly more compact.2.58-2.63.,2.63-2.98 meters silty clay olive gray(5Y4/1),homogeneous, non-calcareous, and more compact.2.98-3.66 meters silty clay greenish gray(5GY6/1), homogeneous, non-calcareous, and compact.

LU-82-8(LAKE NIPISSING):Ø-3.13 meters silty clay greenish gray(5GY6/1), homogeneous,non-calcareous,and firm compact. 3.13-3.63 meters same color but non-homogeneous in nature. From 3.63 meters color change upto 3.73 meters silty clay dark greenish gray(5GY4/1),homogeneous,non-calcareous, and firm compact. But from 3.73 meters color gradually changes into olive gray(5Y4/1) upto 3.91 meters.From 3.91 meters abrupt color change upto 3.96 meters separated by 2cm white-gray band to dark greenish gray(5GY4/1). But from 4.03-4.14 meters silty clay complete color change to light brownish gray (5YR6/1), homogeneous, and calcareous.4.14-4.17 meters small white band again separates, a color change black to a much brownish gray (5YR6/1).At 4.19 meters small white band 1-2 cm and at 4.22 meters color again change to greenish gray(5GY4/1) upto 4.30 meters silty homogeneous, and calcareous,followed by light brownish gray(5YR6/1). 4.30-4.66 meters pattern continues once more until the end of the core.

LU-82-9(LAKE NIPISSING):0-.20 meter silty clay, dark greenish gray(5GY4/1), homogeneous,non-calcareous, and fairly loose compact. 0.20-3.25 meters silty clay greenish gray(5GY6/1), homogeneous, non-calcareous and more compact.

LU-82-10(TALON LAKE):0-1.00 meter silty clay olive gray(5Y4/1), homogeneous,non-calcareous, loose compact,and dark band at 2-3 cm intervals found throughout section(core),but from 1.00-1.90 meters it becomes more compact.1.90-2.11 meters silty clay , homogeneous,non-calcareous,and color changes to greenish gray(5GY6/1), and even more compact.

LU-82-11(KIOSK LAKE):Ø-1.ØØ meter silty clay olive black(5Y2/1), homogeneous,non-calcareous,and a brownish gray(5YR4/1),band running the whole lenth of section(core) on the outer edges(5 mm width) loose compact.1.ØØ-1.Ø5meters gap.1.Ø5-1.8Ø meters olive black(5Y2/1), and again band running down the core section for about 4Ø cm. But at about 1.8Ø meters color becomes slightly darker near the bottom of the core section (i.e.,at about 2.19 meters).

LU-82-12(CEDAR LAKE):Ø-Ø.85 meter silty clay, brownish black(5YR2/1), homogeneous, non-calcareous, and very loose compact. Ø.85-Ø.88 meter gap in core section.Ø.88-1.88 meters silty clay, brownish black(5YR2/1), homogeneous, non-calcareous,loose compact, and darker diagonal bands are found throughout the core section. Again from 1.88-2.Ø6 meters gap in core section.2.Ø6-2.75 meters silty clay, brownish black(5YR2/1),homogeneous,non-calcareous, and quite loose compact.

LU-82-13(TALON LAKE):Ø-1.23 meters silty clay, olive gray(5Y4/1), homogeneous,non-calcareous,loose compact,darker bands are found at 2-3 cm intervals throughout the core section(1 cm width). At 1.23 meters no more bands, but it becomes more compact. 1.7Ø-2.63 meters silty clay, dark greenish gray(5GY5/1), homogeneous, non-calcareous,and more compact.2.63-2.90 meters sandy portion(i.e., about 25 cm) same color ,firm compact till 3.61 meters.

Lithological Discriptions of McBeth-1 site.

0 - 0.13 meter silty clay, surface oxidized to moderately dark yellowish brown (10 YR 3/3) with sand bed 1-2 cm thick, olive gray (5Y 3/2). 0.13 - 0.25 meter silty clay , light olive gray (5Y 4-5/2) with darker mottlings. 0.25 - 0.265 meter sand, olive gray (5Y 3/2) and (5Y 2.5/2). 0.265 - 0.80 meter silty clay, moderate olive brown (5Y 4/2) interbedded sand and clay, olive gray (5Y 3/2) and olive brown (5Y 4/2). 0.80 - 1.55 meters silty clay, olive brown (5Y 4/2) with dark yellowish brown (7.5YR 2/0) mottlings, fine sand layer occurs at 1.30 meters. 1.55 - 1.64 meters silty clay, olive brown (5Y 4/2) decreased mottlings. 1.64 - 1.82 meters silty clay, olive gray (5Y 3/2) grading to fine sand. 1.82 - 1.84 meters interbedded clay and sand, dark olive brown (5Y 4/1) and olive gray (5Y 3/2). 1.82 - 1.995 meters once again interbedded clay and sand, dark olive brown (5Y 4/1) and dark olive gray)5Y 3/1), clay shows mottlings of dark yellowish brown (7.5YR 2/0). 1.995 - 2.19 meters silty clay, dark olive gray to brown (5Y 3-4/1), with bioturbations of dark yellowish brown (7.5YR 2/0).2.19 - 2.21 meters sand bed, dark olive gray (5Y 3/2). 2.21 - 2.25 meters silty clay, dark olive brown (5Y 4/1), with dark yell with brown (7.5YR 2/0) mottlings. 2.25 - 4.94 meters silty clay, dark olive brown (5Y 4/1) with dark yellowish brown (7.5YR 2/0) mottlings and some olive gray (5Y 3/2) mottlings occurs at 4.34 - 4.35 and 4.70 - 4.73 meters. 4.945 - 4.96 meters sand bed, very dark olive gray (5Y 2.5/1). 4.96 - 6.13 meters silty clay, dark olive brown (5Y 4/1) with distinct mottlings of dark yellowish brown (7.5 YR 2/0) and some olive gray (5Y 3/2), sand bed occur at 6.12 - 6.13 meters, olive gray (5Y 3/2). 6.13 - 6.295 meters interbedded clay and sand, dark olive brown (5Y 4/1) and olive gray (5Y 3/2).

6.295 - 6.79 meters silty clay, dark olive brown (5Y 4/1) with sand layers. 6.79 - 6.895 meters clay, dark olive brown (5Y 4/1) interbedded mottled clay and clay with fine sands (6.895 - 7.00 meters). 7.00 - 7.99 meters silty clay , dark olive brown (5Y 4/1) with sandy silt, dark yellowish brown (7.5YR 2/0). 7.99 - 9.12 meters silty clay, dark olive brown (5Y 4/1) with some fine sand. 9.12 - 9.13 meters silty sand, dark olive brownish gray (5Y 3.5/1). 9.13 - 9.85 meters silty clay, dark olive brown (5Y 4/1) with distinct mottlings of dark yellowish brown (7.5 YR 2/0), fine sand bed occurs at 9.25 meters.

Lithological Discription Of McBeth-2 site.

0 - .32 meter silty clay, dark olive gray (5Y 4/1) with horozontal mottlings of darker olive gray (5Y YR 2.5/1) and dark yellowish brown (7.5 YR 2.0) irregular less common mottlings. 0.32 -0.63 meter mottlings, shell fragments found at 0.52-0.53 meter. 0.63 - 0.95 meter once again horizontal mottlings. 0.95 - 2.35 meters silty clay ,dark olive brown (5Y 4/1) with bioturbation dark yellowish brown (7.5 YR 2/0) and dark olive gray (5Y 3/1) mottlings.2.45 - 2.85 meters silty clay, dark olive brown (5Y 4/1) with dark yellowish brown (7.5 YR 2/0) slightly horizontal mottlings. 2.88 - 2.91 meters silt, dark olive brown (5 YR 4/1) and dark olive olive brownish gray (5Y 3.5/1). 2.91 - 3.06 meters silty&clay, interbedded (5Y 3.5/1) and (5Y 4/1). 3.06 - 3.245 meters silt. dark olive gray (5Y 4/1) with dark olive brown clasts. 3.245 - 3.305 meters sand, dark olive gray (5Y 3/1) fine to coarse at bottom clayey sily, dark olive brown, with (7.5 YR 2.0) interbedded silty clay. 3.305 - 3.42 meters silty clay , very dark olive (2.5Y 2.5/0). 3.42 - 3.95 meters silt, dark brown mixed with darker mottlings. 3.95 - 4.97 meters silty clay, dark olive brown (5Y 4/1) with some faintly horizontal bioturbation, dark yellowish brown (7.5 YR 2/0) and very dark olive gray (2.5 Y 2.5/0) mottling. 4.97 - 5.11 meters silty clay, dark olive gray (5Y 3/1).

APPENDIX B

Compilation of grain size data

1-North Bay areas

LU-82-1 (Callander Bay)

LU-82-8 (Lake Nipissing)

LU-82-9 (Lake Nipissing)

LU-82-3 (Lake Nosbonsing)

LU-82-7 (Lake Nosbonsing)

LU-82-10 (Lake Talon)

LU-82-13 (Lake Talon)

LU-82-11 (Kiosk Lake)

LU-82-12 (Cedar Lake)

2-McBeth Fiord

McBeth-1

McBeth-2

Mean grain size and sand percentages of cores.

LU-82-1(CALLANDER BAY)

DEPTH (cm)	MEAN GRAIN SIZE (Phi)	SAND %
5	7.66	16.80
25	7.53	19.00
45	8.87	13.80
65	9.80	4.33
85	9.00	8.03
105	10.00	0.60
125	9.17	0.80
145	9.50	1.20
165	9.50	1.40
185	9.63	2.00
205	8.90	4.00
225	9.23	2.60
245	8.30	3.32
265	9.30	0.60
285	9.40	0.80
305	8.27	2.90
325	9.00	2.00

345	9.07	2.20
365	9.50	0.52

LU-82-3(LAKE NOSBONSING)

DEPTH (cm)	MEAN GRAIN SIZE (Phi)	SAND %
5	8.70	2.16
25	9.17	13.49
45	9.23	12.67
65	8.67	11.26
85	9.07	12.52
105	9.03	5.76
125	9.50	6.29
145	8.97	14.00
165	9.13	12.74
185	9.30	6.11
205	9.13	11.88
225	9.23	6.56
245	8.87	11.40
265	9.00	10.00
285	8.97	6.60
305	9.13	1.20
325	8.97	13.20
345	8.63	1.40

365	9.37	1.2Ø
385	9.67	Ø.9Ø
4Ø5	9.3Ø	1.25

LU-82-7(LAKE NOSBONSING)

DEPTH (cm)	MEAN GRAIN SIZE (Phi)	SAND %
5	9.10	0.90
25	9.33	8.65
45	9.30	1.20
65	9.20	11.60
85	9.13	10.44
105	8.97	8.75
125	9.07	15.15
145	9.13	8.10
165	9.33	2.20
185	9.23	7.66
205	9.30	1.29
225	9.43	5.91
245	9.57	0.30
265	9.67	1.43
285	9.23	1.69
305	9.93	0.60
325	9.73	1.00
345	9.33	1.68
365	9.73	0.30

LU-82-8(LAKE NIPISSING)

DEPTH (cm)	MEAN GRAIN SIZE (Phi)	SAND %
5	8.66	Ø.3Ø
25	8.5Ø	Ø.2Ø
45	8.83	Ø.12
65	9.33	Ø.1Ø
85	9.16	Ø.Ø8
1Ø5	9.1Ø	Ø.Ø4
125	9.16	Ø.Ø3
145	9.33	Ø.12
165	9.23	Ø.22
185	9.27	Ø.2Ø
2Ø5	9.27	Ø.Ø8
225	9.63	Ø.Ø2
245	9.36	Ø.1Ø
265	8.66	Ø.16
285	9.4Ø	Ø.Ø8
3Ø5	8.66	Ø.Ø1
325	9.73	Ø.Ø1
345	9.57	Ø.12

365	9.27	0.66
385	9.30	7.60
405	9.53	0.06
425	10.00	0.06
445	8.93	0.02

LU-82-9(LAKE NIPISSING)

DEPTH (cm)	MEAN GRAIN SIZE (Phi)	SAND %
5	9.25	0.06
25	9.33	0.06
45	9.33	0.02
65	9.25	0.05
85	9.33	0.04
105	9.25	0.06
125	9.43	0.02
145	9.33	0.01
165	9.17	0.02
185	9.25	0.03
205	9.08	0.08
225	9.25	0.00
245	9.33	0.13
265	9.16	0.05
285	9.25	0.02
305	9.25	0.00
325	9.33	0.00

LU-82-10(TALON LAKE)

DEPTH (cm)	MEAN GRAIN SIZE (Phi)	SAND %
5	9.00	0.79
25	9.16	0.51
45	9.33	1.14
65	9.00	2.39
85	9.00	2.63
105	9.16	1.54
125	9.33	0.00
145	9.33	0.61
165	9.16	0.49
185	9.16	0.56
205	9.08	0.59

LU-82-11(KIOSK LAKE)

DEPTH (cm)	MEAN GRAIN SIZE (Phi)	SAND %
5	8.95	1.14
25	9.08	1.33
45	9.00	0.99
65	9.00	0.85
85	9.16	0.01
105	9.33	0.75
125	9.16	0.73
145	9.16	1.53
165	9.00	1.16
185	8.83	0.85
205	8.83	1.53

LU-82-12(CEDAR LAKE)

DEPTH (cm)	MEAN GRAIN SIZE (Phi)	SAND%
5	9.08	1.80
25	8.67	1.51
45	8.67	2.56
65	8.67	1.83
85	8.67	0.42
105	8.92	7.83
125	8.58	3.55
145	8.58	2.75
165	8.67	2.93
185	8.58	4.15

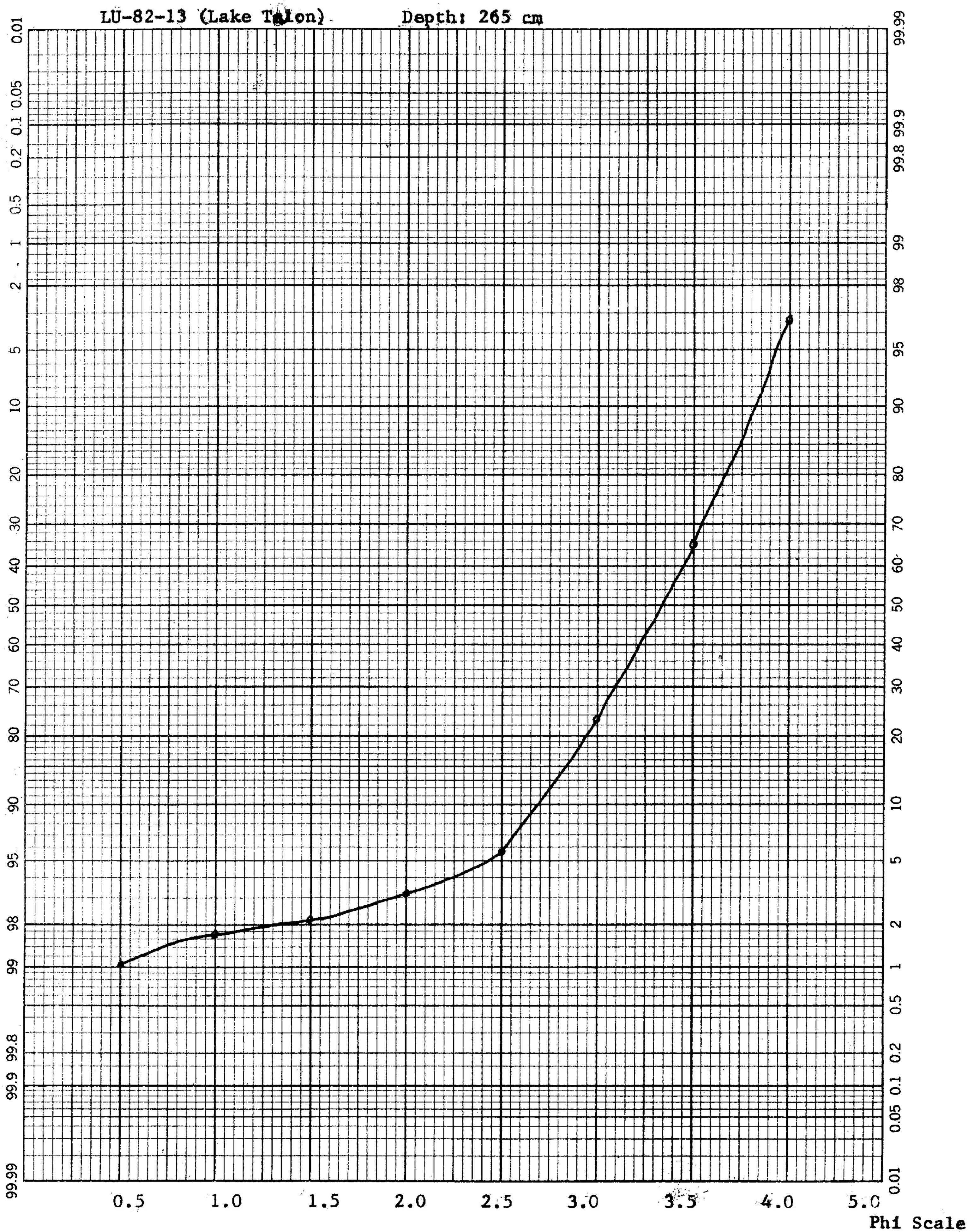
LU-82-13(TALON LAKE)

DEPTH (cm)	MEAN GRAIN SIZE (Phi)	SAND%
5	9.00	0.66
25	9.33	0.65
45	9.67	0.57
65	9.33	0.34
85	9.67	1.44
105	9.92	0.28
125	9.50	0.13
145	9.50	0.36
165	9.83	0.29
185	8.92	0.55
205	8.67	1.35
225	8.67	5.03
245	8.33	17.15
265	8.42	74.35
285	9.17	49.56
305	8.83	32.14
325	9.08	26.60
345	9.17	56.41
365	9.17	38.81

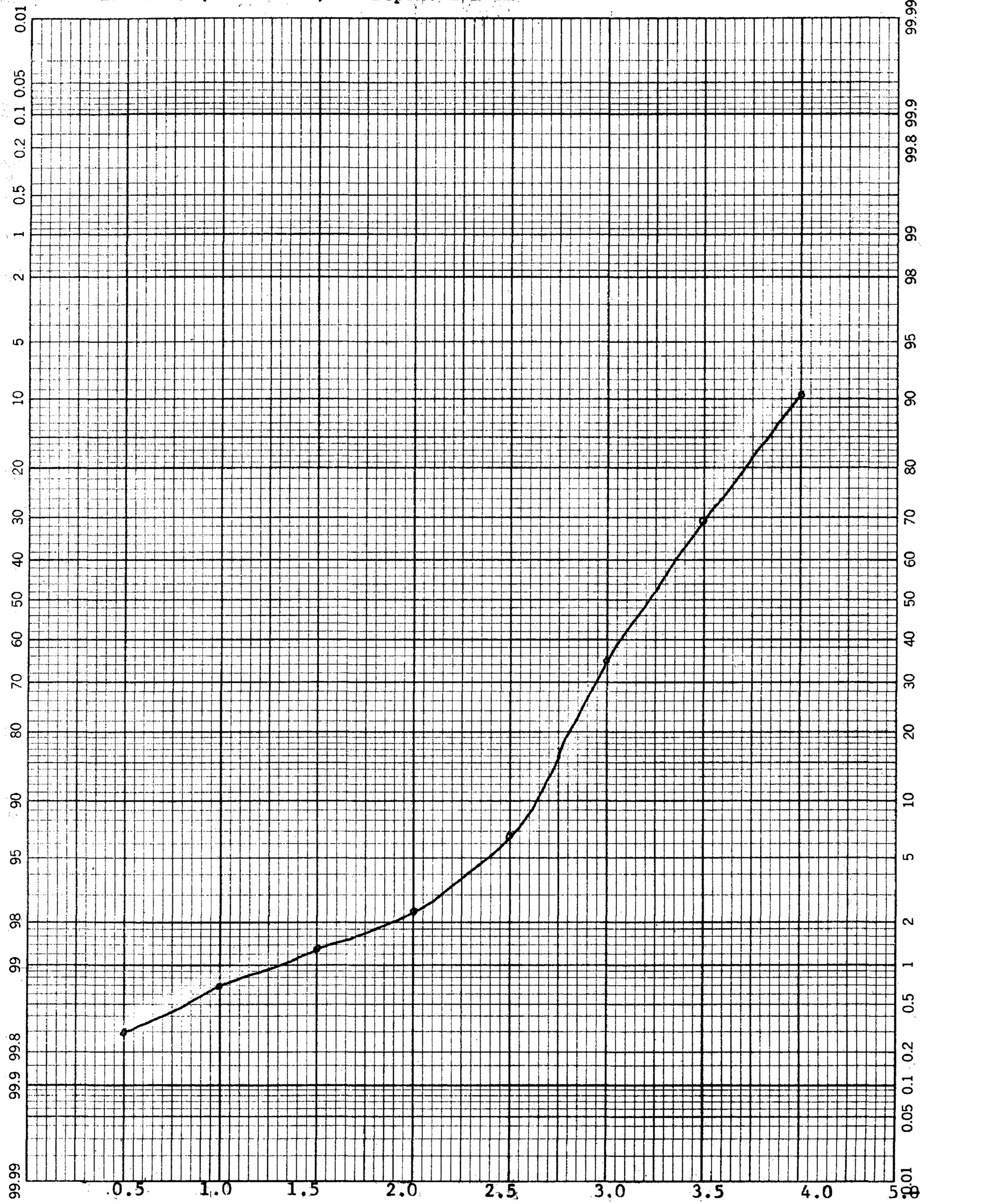
GRAIN-SIZE ANALYSES OF LAKE TALON*(NORTH BAY) AREA, (GRAPHIC METHOD, AFTER FOLK & WARD,1957)

DEPTH (cm)	MEAN (Mz)	INCLUSIVE GRAPHIC STANDARD DEVIATION (σ_I)	INCLUSIVE GRAPHIC SKEWNESS (SK_I)	KURTOSIS (K_G)
265	3.32	0.44 Well Sorted	-0.16 Coarse skewed	1.06 Mesokurtic
275	3.26	0.52 Moderately Sorted	+0.07 Near Symmetrical	0.94 "
285	3.36	0.60 "	-0.26 Coarse skewed	1.09 "
305	3.53	0.50 Well Sorted	-0.38 Strongly coarse Skewed	1.09 "
325	3.57	0.48 "	-0.37 "	1.54 Leptokurtic
345	3.49	0.40 "	-0.24 Coarse skewed	1.23 "
365	3.38	0.52 Moderately Sorted	-0.34 Strongly coarse Skewed	0.93 Mesokurtic

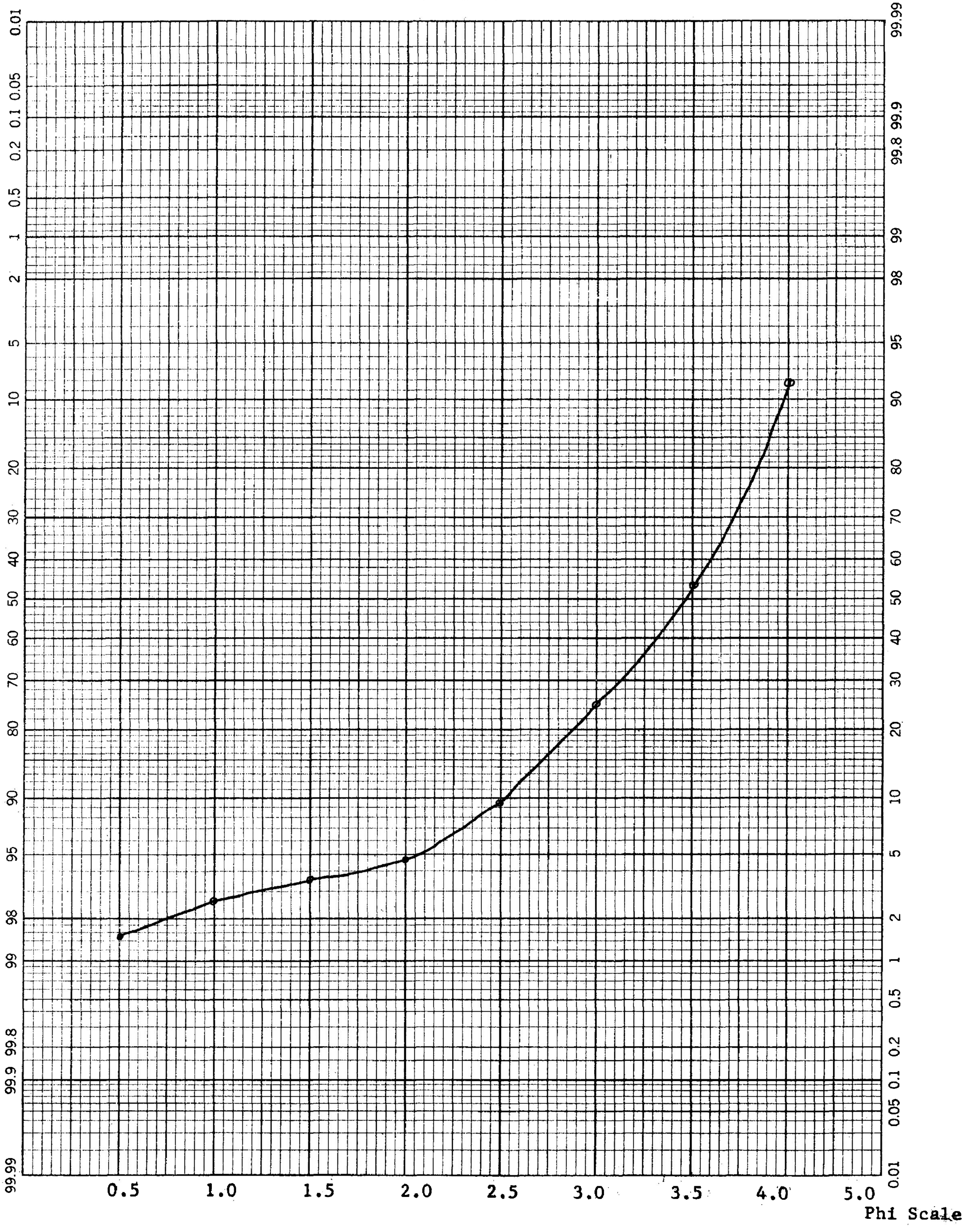
* LU-82-13(LAKE TALON)

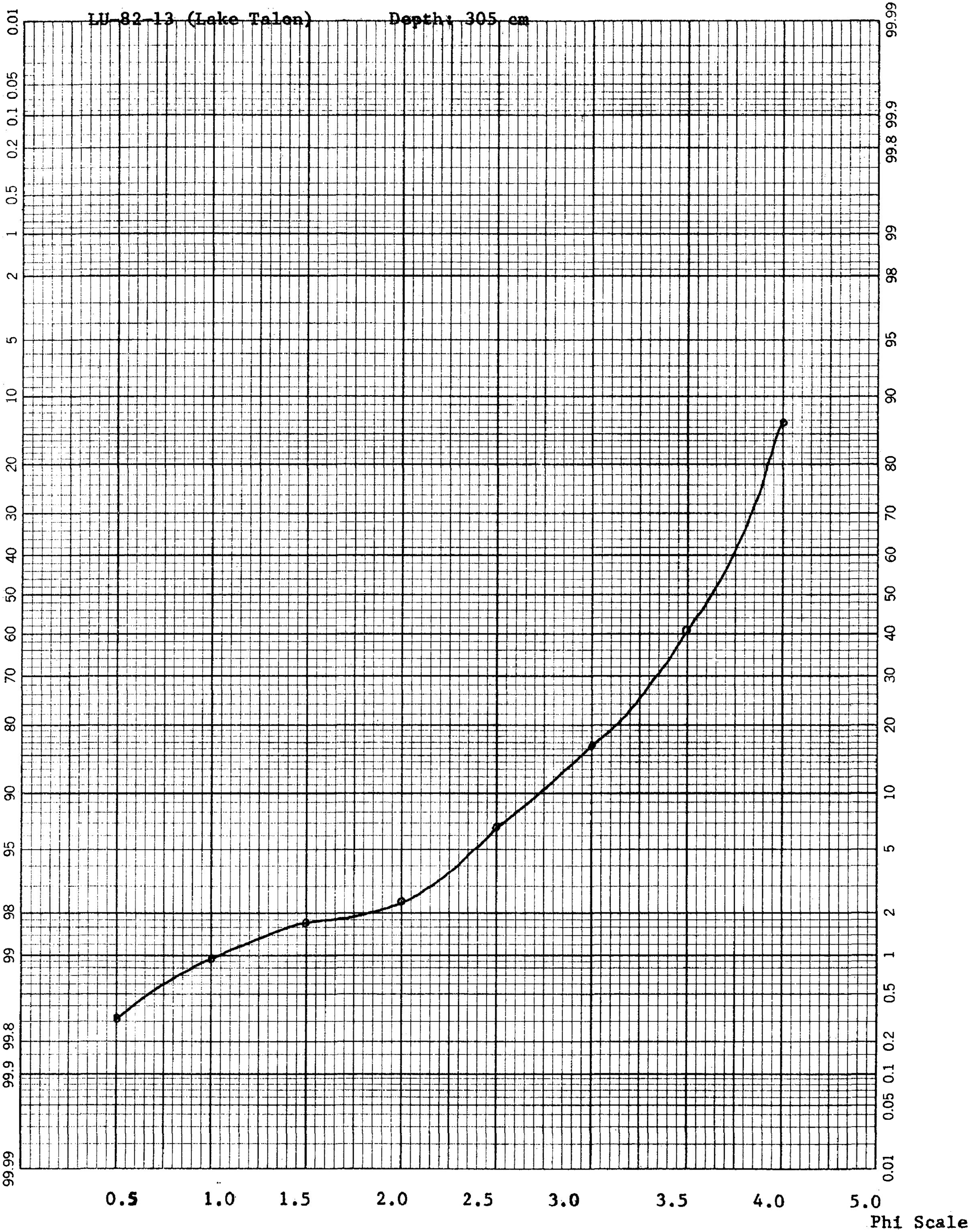

LU-82-13 (Lake Talon)
Depth: 265 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scale

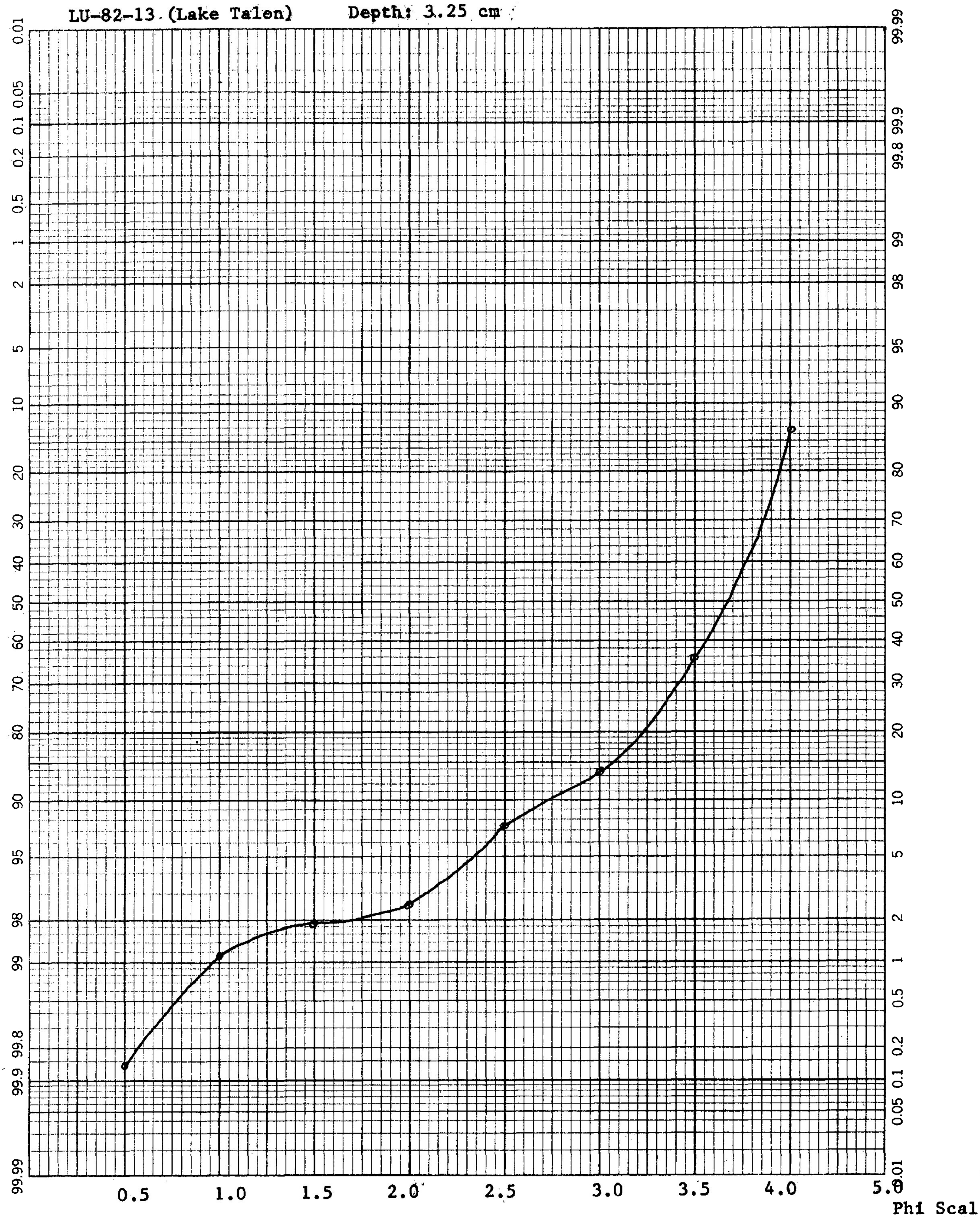
LU-82-13 (Lake Talon)   Depth: 275 cm



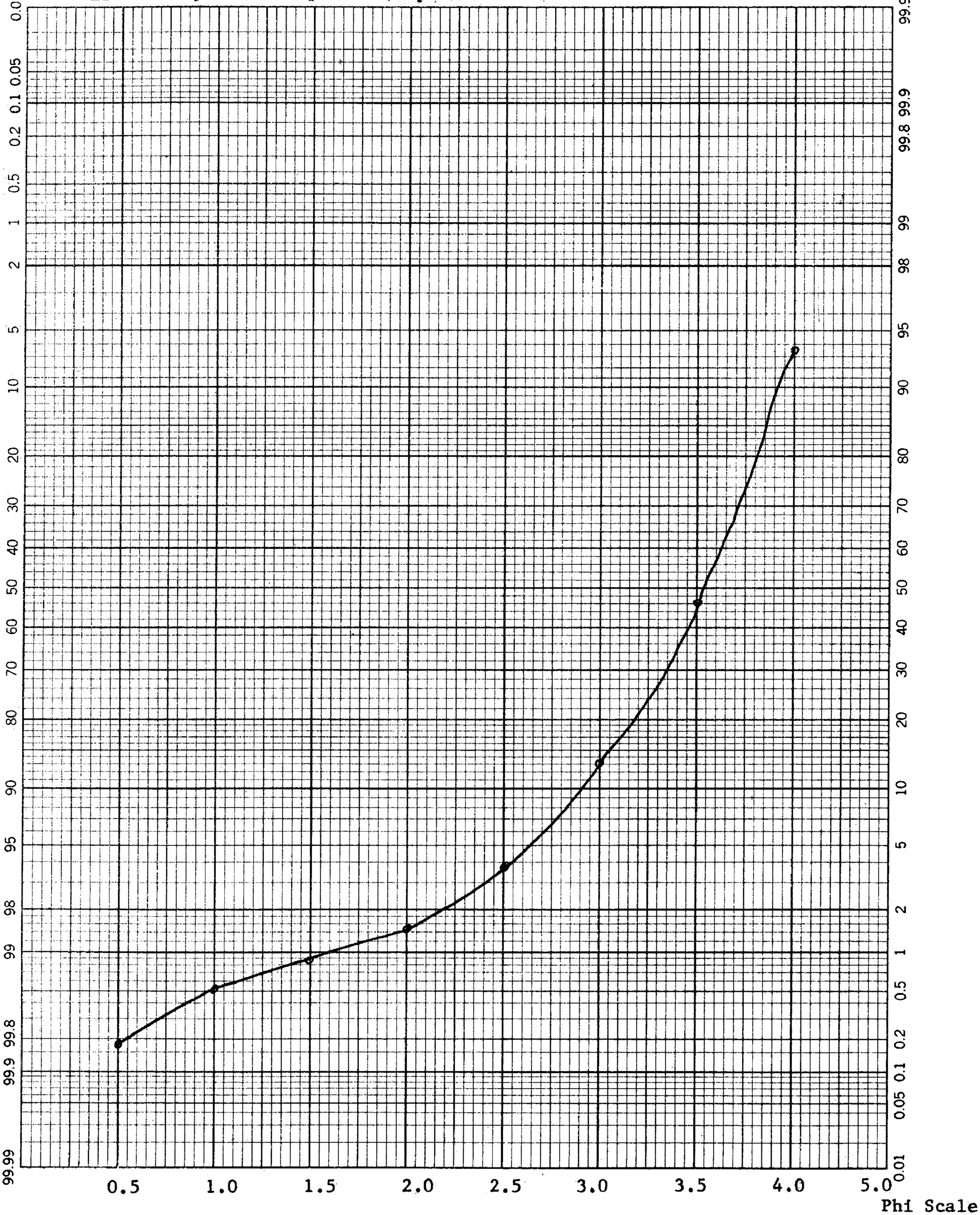
LU-82-13 (Lake Talon)   Depth: 285 cm

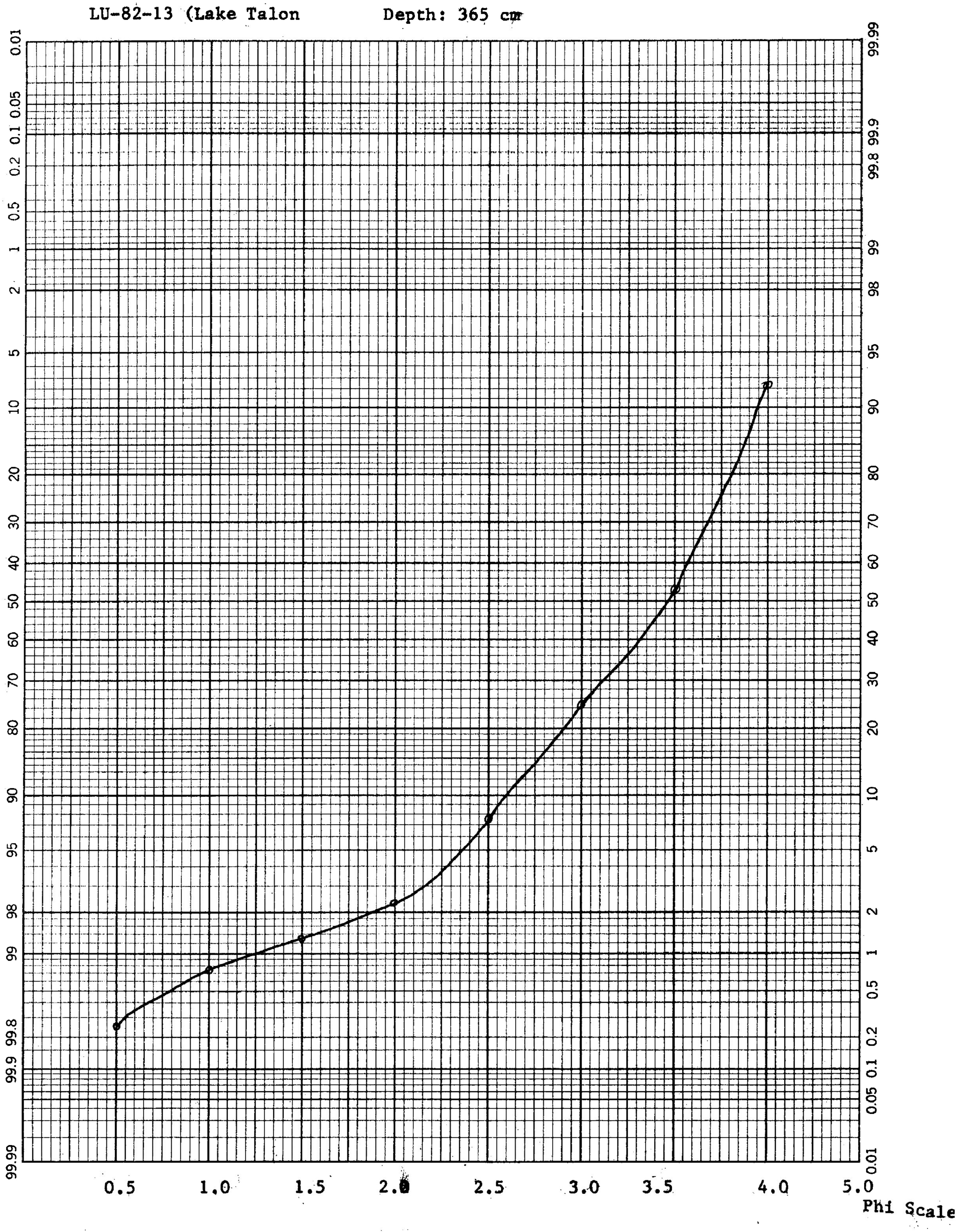



LU-82-13 (Lake Talon)
Depth: 305 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
99.99
99.9
99.8
99
98
95
90
80
70
60
50
40
30
20
10
5
2
1
0.5
0.2
0.1
0.05
0.01
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scale


LU-82-13 (Lake Talen)
Depth: 3.25 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scale

LU-82-13 (Lake Talon) Depth: 345 cm





LU-82-13 (Lake Talon
Depth: 365 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scale

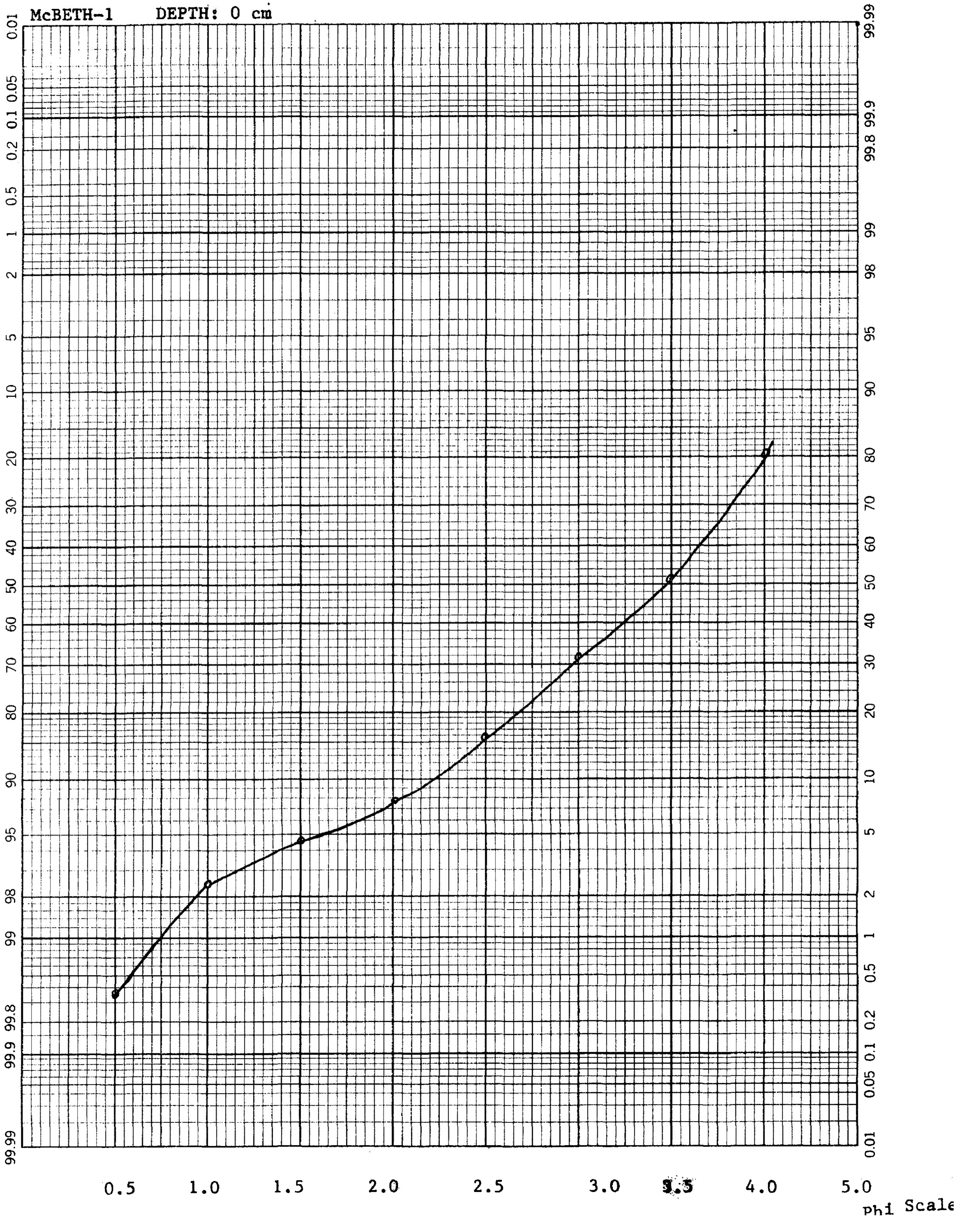
McB-1(McBETH,FIORD)

DEPTH (cm)	MEAN GRAIN SIZE (Phi)	SAND%
0		
25	9.00	16.06
50	9.00	2.20
75	9.33	2.59
100	9.33	3.40
125	9.33	1.36
150	9.33	2.35
175	9.50	0.57
200	9.33	4.42
225	9.58	2.68
250	9.58	8.48
275	9.58	1.78
300	9.58	1.96
325	9.50	2.91
350	9.67	3.07
375	9.67	0.81
400	8.92	1.06
425	9.67	0.38

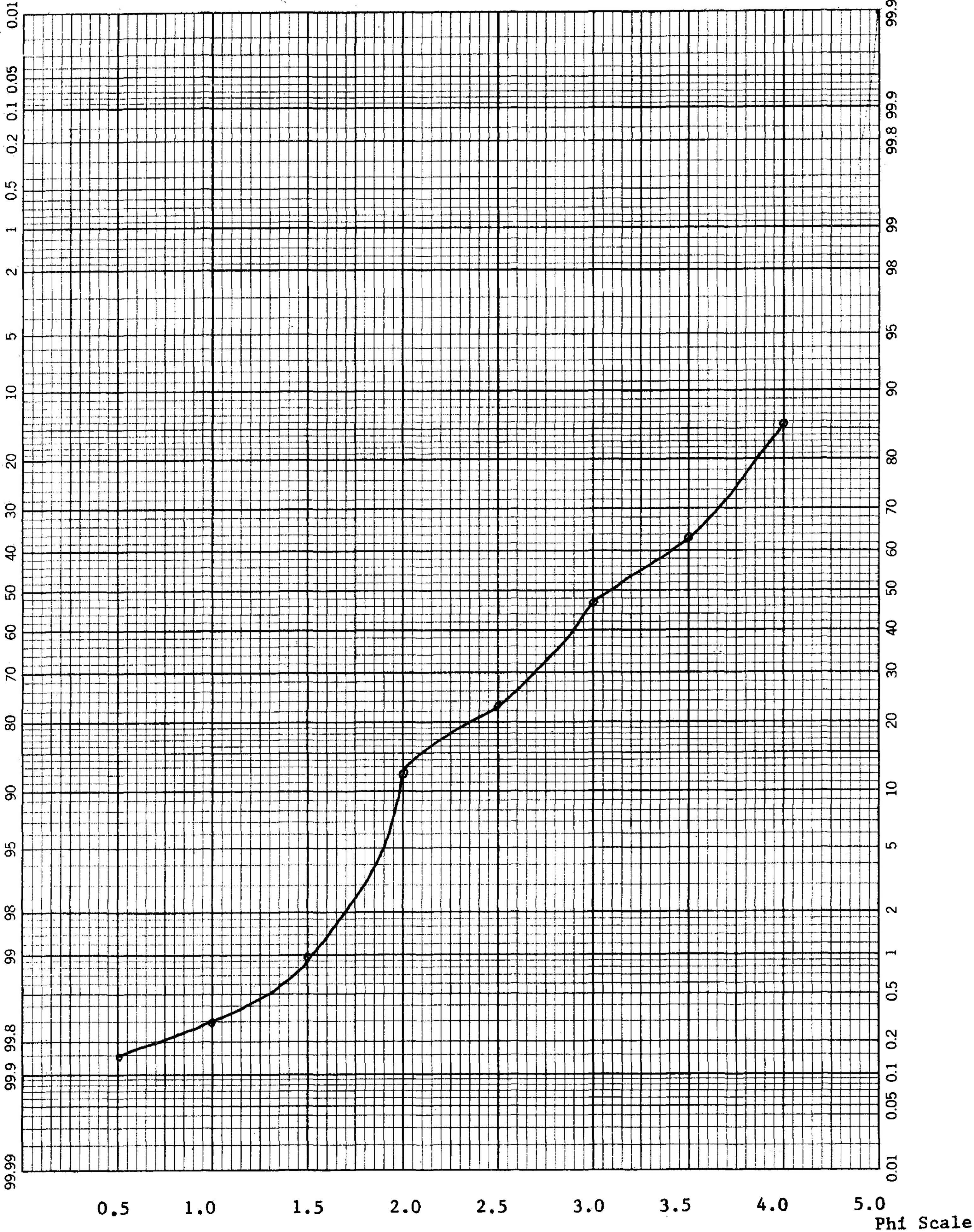
450	9.83	1.66
475	9.67	0.62
500	9.50	5.26
525	9.83	0.34
550	9.83	1.32
575	9.33	0.51
600	9.33	1.75
625	9.25	0.81
650	9.08	0.80
675	9.00	0.51
700	9.50	0.18
725	9.33	0.00
750	9.42	1.64
775	9.58	0.32
800	9.58	1.37
825	9.42	0.16
850	9.50	0.97
875	9.42	0.83
900	9.67	0.22
925	7.50	3.79
950	9.17	2.06
975	9.17	0.28

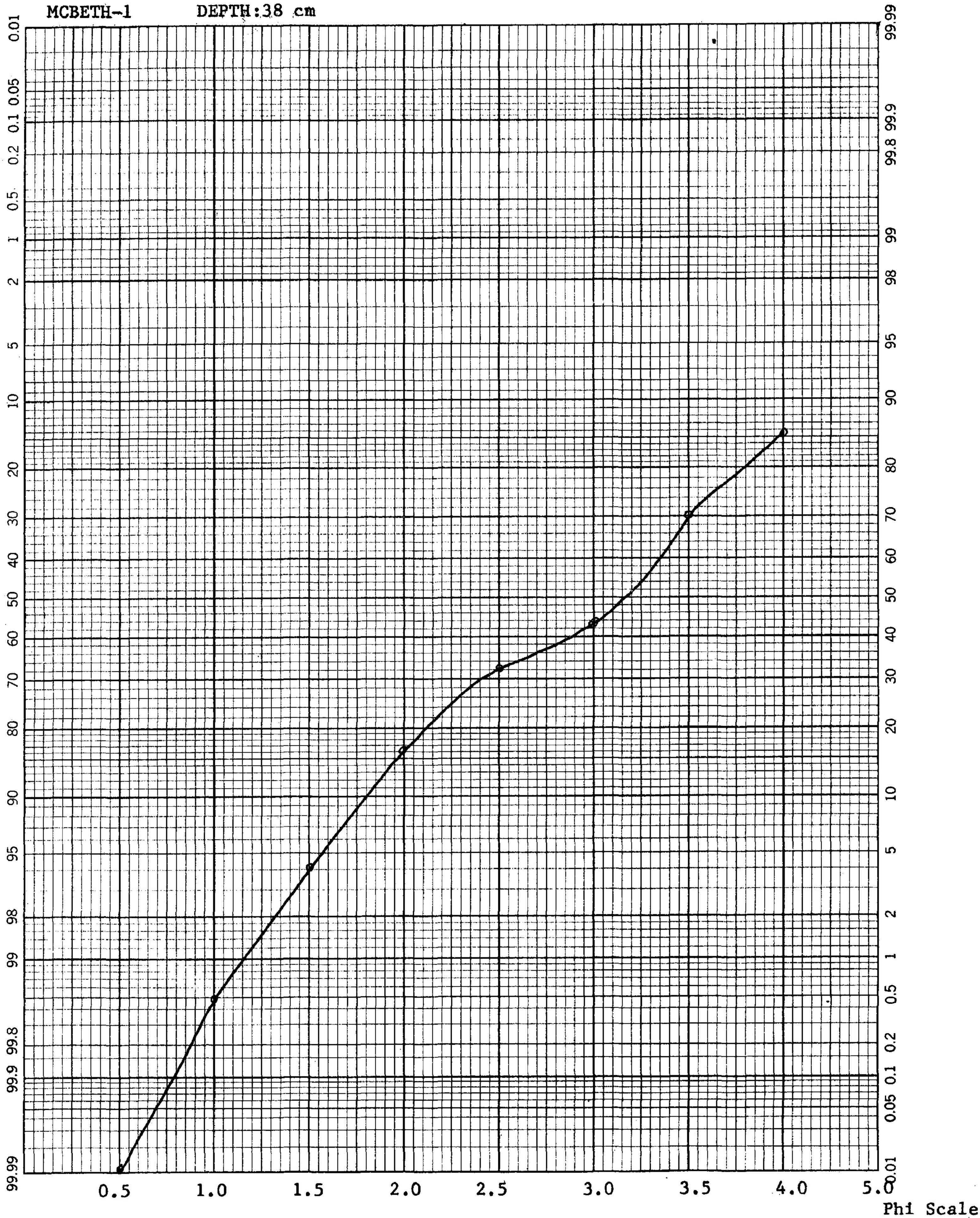
GRAIN-SIZE ANALYSES OF McBETH-1 FIORD, BAFFIN ISLAND (GRAPHIC METHOD, AFTER FOLK & WARD, 1957)

DEPTH (cm)	MEAN (Mz)	INCLUSIVE GRAPHIC STANDARD DEVIATION (σ_I)	INCLUSIVE GRAPHIC SKEWNESS (SK_I)	KURTOSIS (K_G)
0	3.37	0.78 Moderately Sorted	-0.34 Strongly coarse skewed	1.62 Leptokurtic
26	3.10	0.80 "	-0.15 Coarse skewed	0.81 Platykurtic
38	2.72	0.89 "	-0.24 "	0.79 "
89	3.29	0.61 "	+0.07 Near-Symmetrical	1.06 Mesokurtic
201	3.00	0.53 "	-0.39 Strongly coarse skewed	0.87 Platykurtic
222	3.19	0.60 "	+0.17 Coarse skewed	0.93 Mesokurtic
330	2.63	0.57 "	+0.16 "	1.87 Leptokurtic
505	3.11	0.61 "	+0.26 "	1.03 Mesokurtic
751	2.95	0.68 "	+0.27 "	0.83 Platykurtic
931	3.22	0.71 "	+0.03 Near-Symmetrical	0.98 Mesokurtic

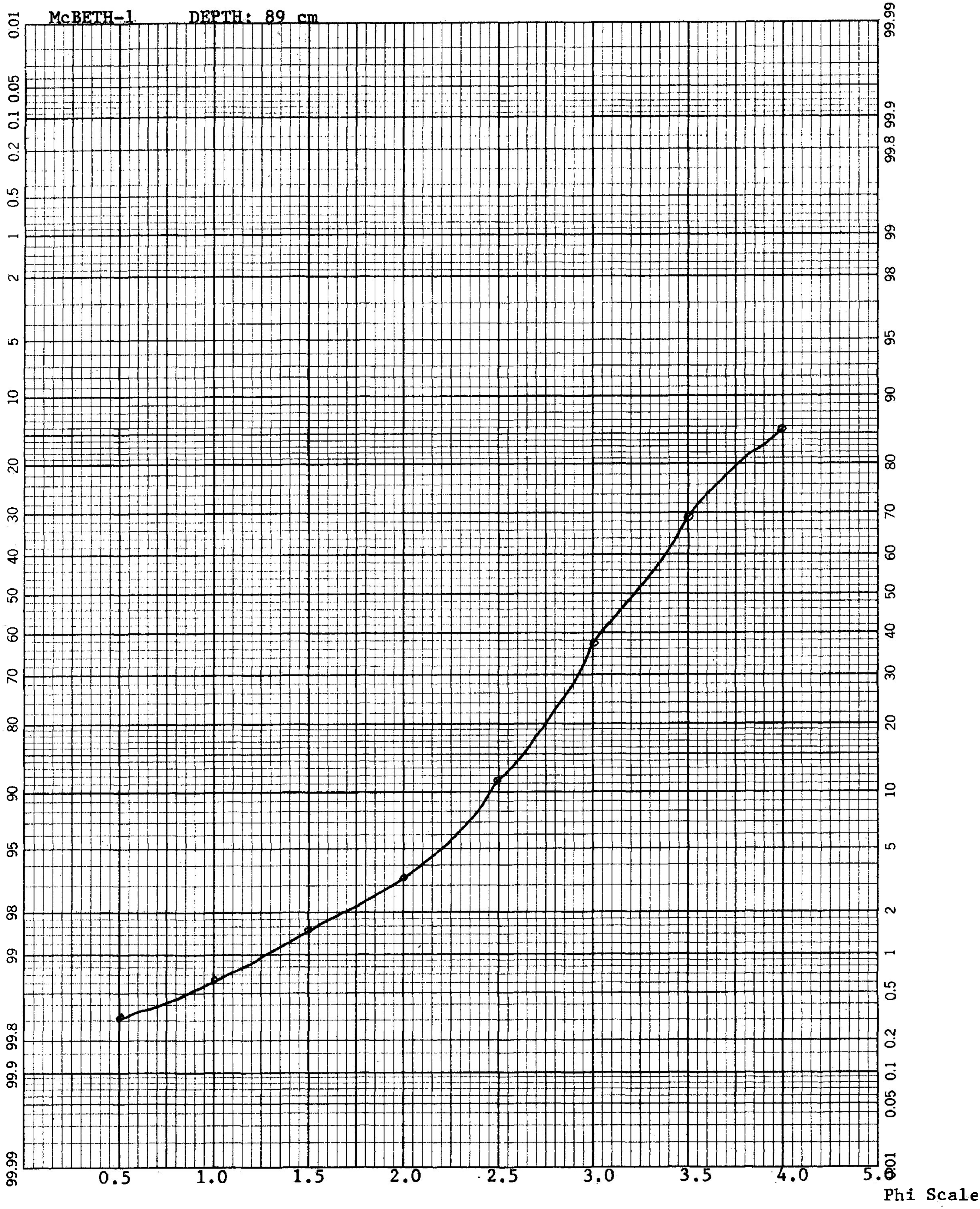

McBETH-1 DEPTH: 0 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scale

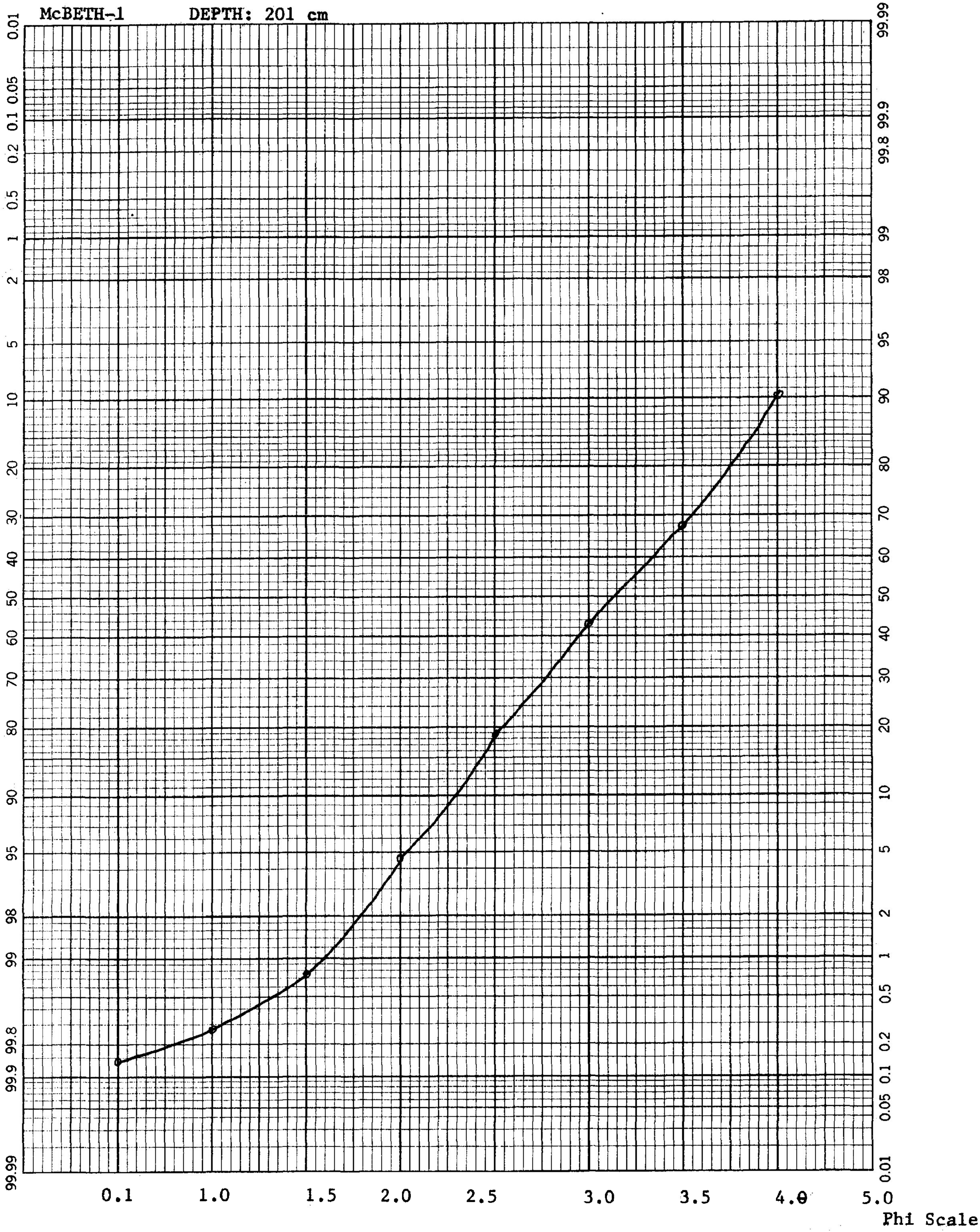
McBETH-1 DEPTH: 26 cm

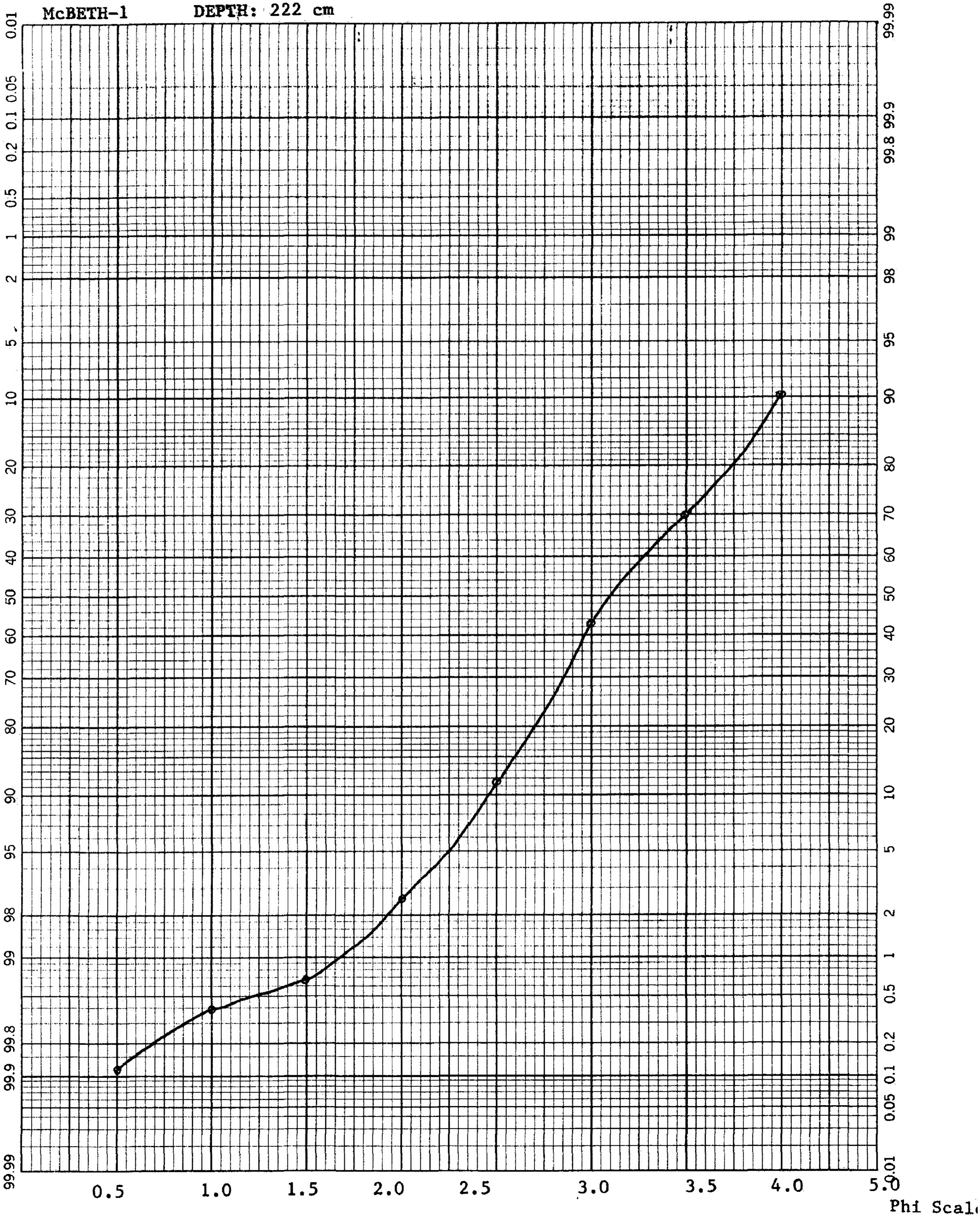


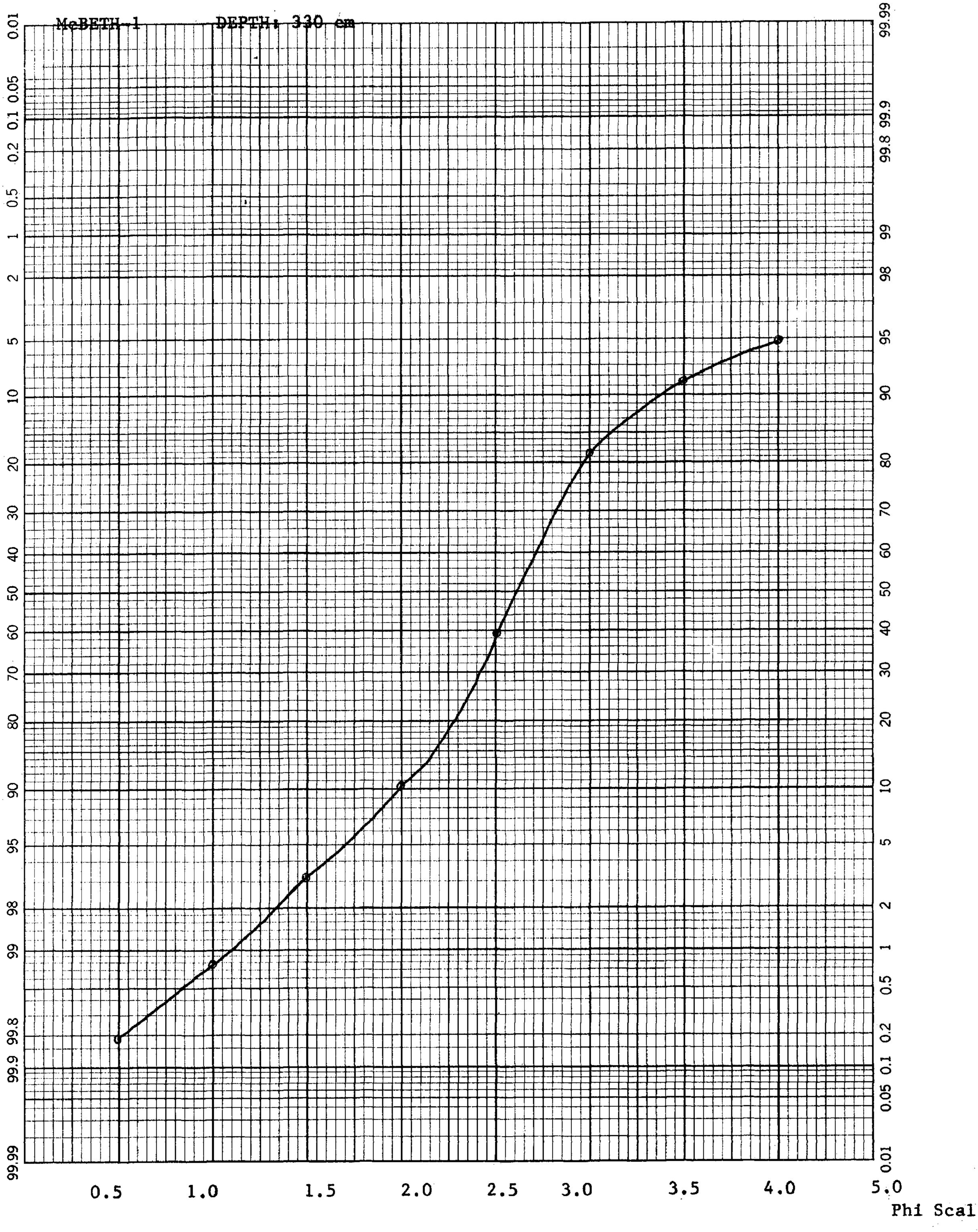


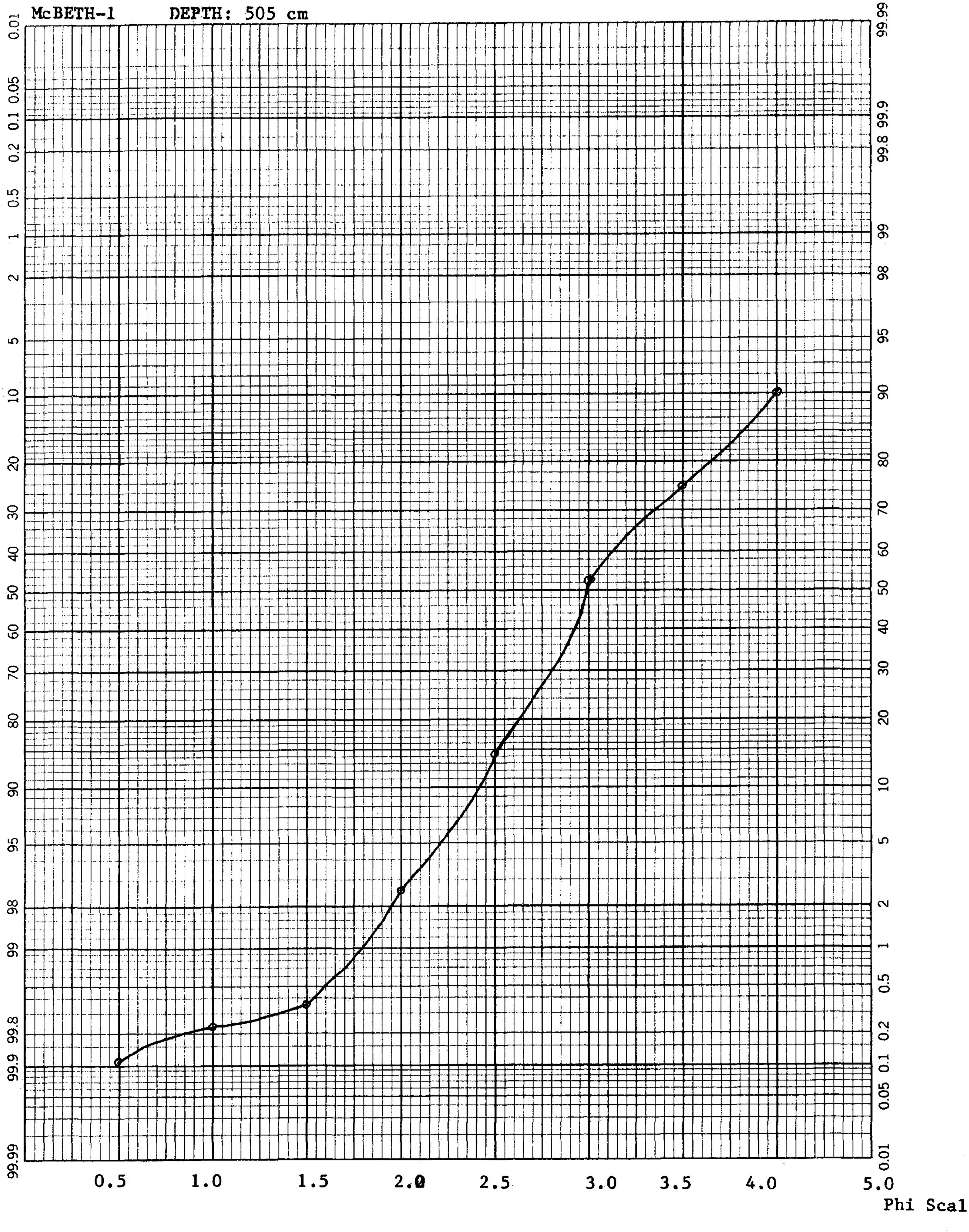
MCBETH-1
DEPTH:38 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scale

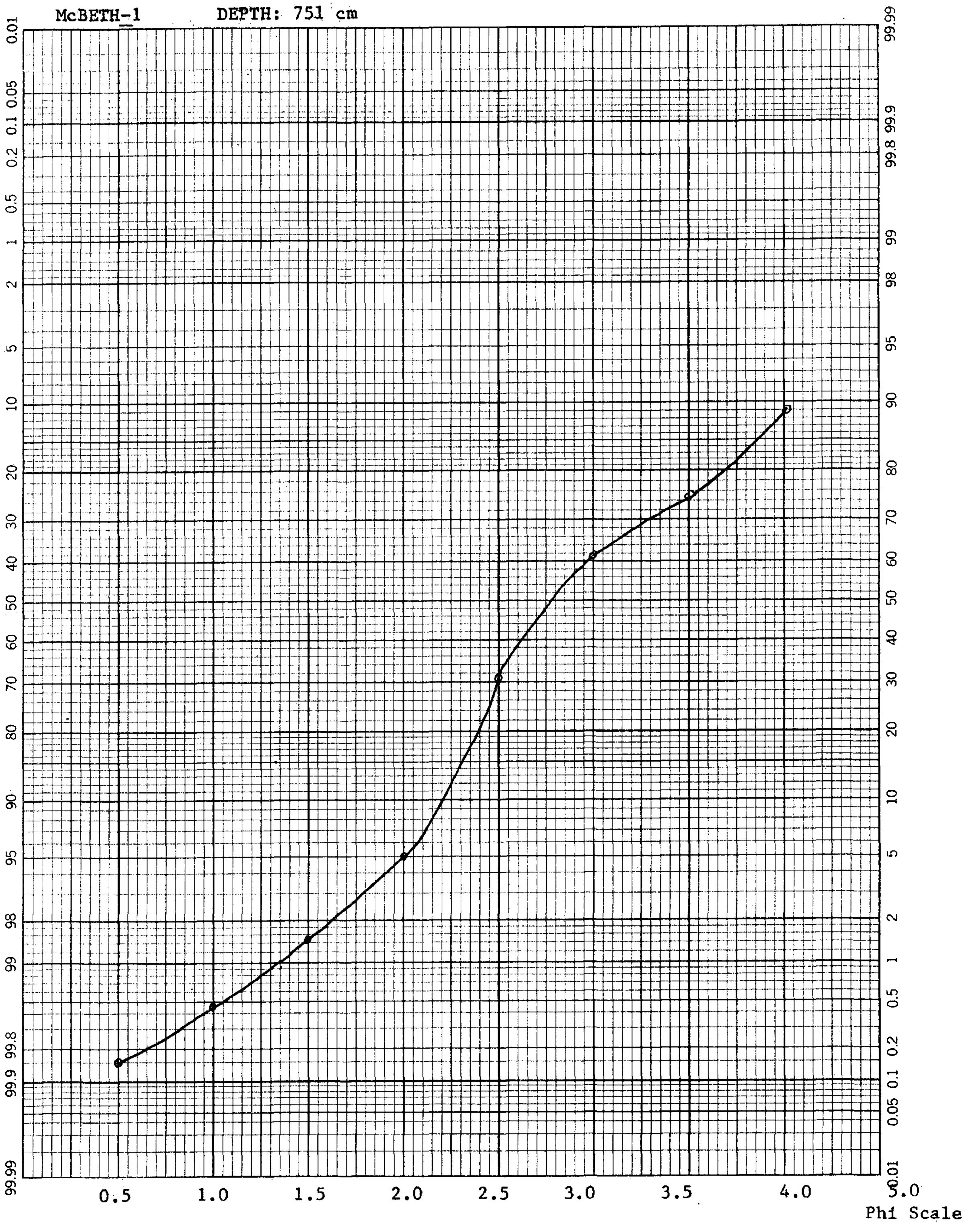

McBETH-1
DEPTH: 89 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scale

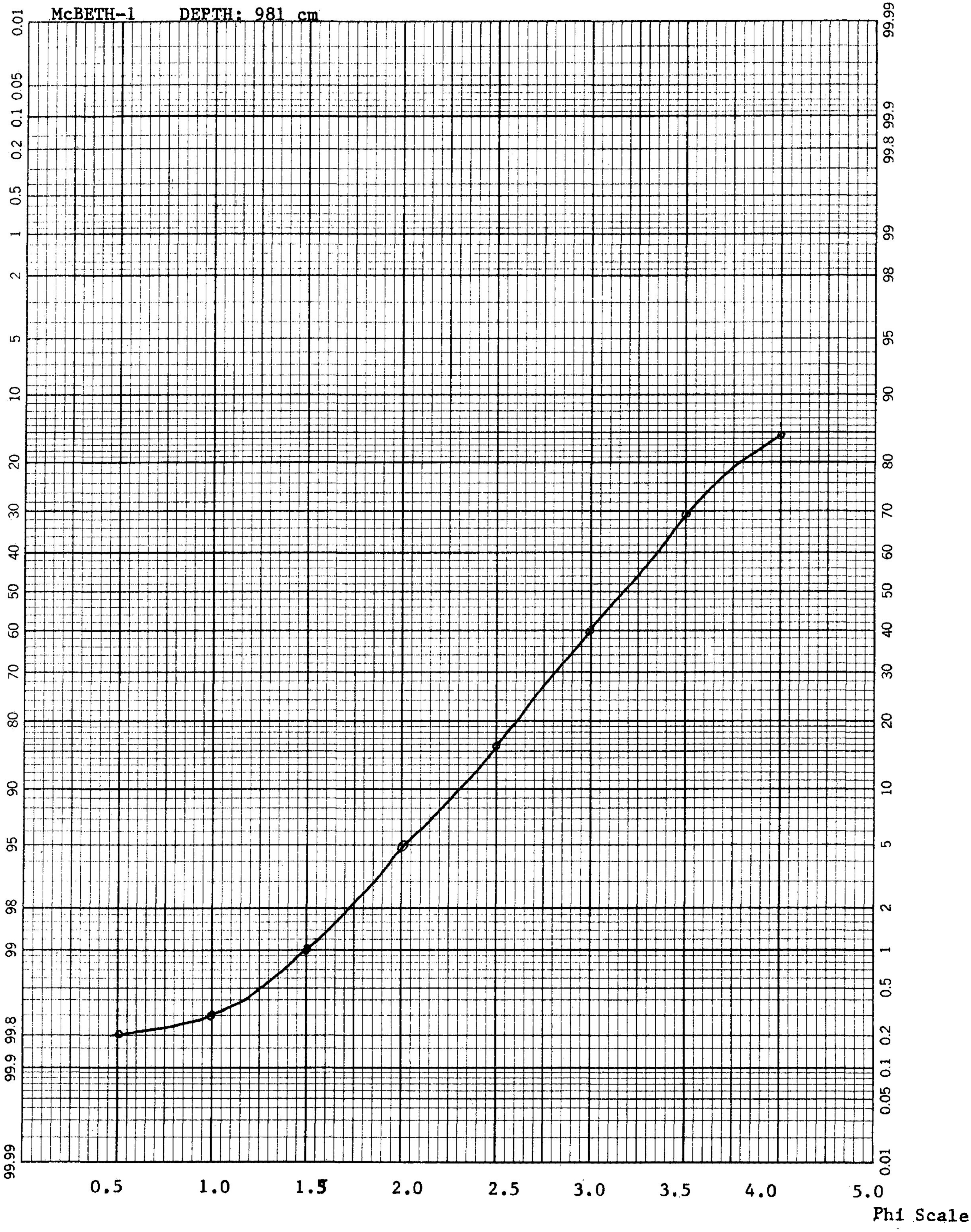

McBETH-1 DEPTH: 201 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
99.99
99.9
99.8
99
98
95
90
80
70
60
50
40
30
20
10
5
2
1
0.5
0.2
0.1
0.05
0.01
0.1
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scale


McBETH-1
DEPTH: 222 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
99.99
99.9
99.8
99
98
95
90
80
70
60
50
40
30
20
10
5
2
1
0.5
0.2
0.1
0.05
0.01
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scal


McBETH-1
DEPTH: 330 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scal


McBETH-1 DEPTH: 505 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scal


McBETH-1
DEPTH: 751 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
99.99
99.9
99.8
99
98
95
90
80
70
60
50
40
30
20
10
5
2
1
0.5
0.2
0.1
0.05
0.01
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scale


McBETH-1 DEPTH: 981 cm
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
5.0
Phi Scale

McB-2(McBETH,FIORD)

DEPTH (cm)	MEAN GRAIN SIZE (Phi)	SAND%
0	9.08	6.10
25	9.00	3.57
50	9.08	5.93
75	9.67	6.10
100	9.50	0.89
125	9.50	2.99
150	9.50	8.52
175	9.58	1.37
200	9.33	2.91
225	9.58	4.10
250	9.42	0.81
275	9.50	1.01
300	9.58	0.51
325	9.58	3.44
350	9.58	2.57
375	9.75	2.38
400	9.50	1.13
425	9.50	2.27

450	9.58	1.82
475	9.67	4.12
500	9.50	3.64

APPENDIX C

Compilation of organic and carbonate carbons percentages

1-North Bay areas

LU-82-1 (Callander Bay)

LU-82-8 (Lake Nipissing)

LU-82-9 (Lake Nipissing)

LU-82-3 (Lake Nosbonsing)

LU-82-7 (Lake Nosbonsing)

LU-82-10 (Lake Talon)

LU-82-13 (Lake Talon)

LU-82-11 (Kiosk Lake)

LU-82-12 (Cedar Lake)

2-McBeth Fiord

McBeth-1

McBeth-2

LU-82-1 (CALLANDER BAY)

DEPTH (cm)	TOTAL C.%	ORG. C.%	CARB. C.%
0	4.11	4.21	0.0
5	3.45	3.45	0.0
10	3.19	3.09	0.1
50	2.23	2.24	0.0
100	2.02	1.96	0.06
150	1.89	1.88	0.01
200	1.84	1.99	0.0
250	1.52	1.49	0.03
305	1.51	1.36	0.15

LU-82-3 (LAKE NOSBONSING)

DEPTH (cm)	TOTAL C.%	ORG. C.%	CARB. C.%
0	6.51	5.84	0.67
5	6.04	5.50	0.54
10	6.35	5.79	0.56
50	8.29	8.06	0.23
100	8.82	8.48	0.34
150	8.64	8.21	0.43
200	10.69	9.47	1.22
250	10.91	11.16	0.00
305	5.05	4.85	0.20
405	3.02	2.62	0.40

LU-82-7 (LAKE NOSBONSING)

DEPTH (cm)	TOTAL C.%	ORG. C.%	CARB. C.%
0	5.93	5.46	0.47
5	8.29	8.03	0.26
10	8.40	7.48	0.92
50	8.76	8.02	0.74
100	9.45	8.71	0.74
150	7.79	6.72	1.07
200	8.49	7.45	1.04
250	8.65	7.69	0.96
305	3.13	2.72	0.41
365	2.79	3.00	0.00

LU-82-8 (LAKE NIPISSING)

DEPTH (cm)	TOTAL C.%	ORG. C.%	CARB. C.%
0	2.77	2.46	0.31
5	1.71	1.44	0.27
10	1.00	0.94	0.06
50	1.00	1.02	0.00
100	0.93	0.83	0.10
200	0.81	0.75	0.06
250	0.75	0.77	0.00
300	0.64	0.73	0.00
350	0.71	0.70	0.01
410	0.72	0.67	0.05
450	1.23	0.18	1.08

LU-82-9(LAKE NIPISSING)

DEPTH (cm)	TOTAL C.%	ORG. C.%	CARB. C.%
0	2.11	1.74	0.37
5	1.90	1.59	0.49
10	2.85	1.24	1.61
50	1.24	1.18	0.06
100	1.22	1.17	0.05
200	1.13	1.14	0.00
250	1.00	1.08	0.00
300	0.87	0.87	0.00

LU-82-10(TALON LAKE)

DEPTH (cm)	TOTAL C.%	ORG. C.%	CARB. C.%
0	7.27	7.14	0.13
5	6.56	5.26	1.30
10	7.58	6.35	1.23
50	5.91	4.47	1.44
100	4.88	4.16	0.72
150	6.16	6.30	-0.14
205	2.51	3.47	-0.96

LU-82-13(TALON LAKE)

DEPTH (cm)	TOTAL C.%	ORG. C.%	CARB. C.%
0	5.46	4.54	0.92
5	6.62	4.98	1.64
10	7.68	5.91	1.77
50	7.22	4.44	1.78
100	4.92	3.80	1.12
200	4.01	3.50	0.51
300	1.38	1.50	0.00
350	1.37	1.06	0.31

LU-82-11(KIOSK LAKE)

DEPTH (cm)	TOTAL C.%	ORG. C.%	CARB. C.%
Ø	1Ø.51	9.25	1.26
5	1Ø.34	8.29	2.Ø5
1Ø	1Ø.66	8.79	1.87
5Ø	11.6Ø	8.63	2.97
1ØØ	8.99	7.93	1.Ø6
15Ø	8.34	7.64	Ø.7Ø
2ØØ	8.31	6.82	1.49

LU-82-12(CEDAR LAKE)

DEPTH (cm)	TOTAL C.%	ORG. C.%	CARB. C.%
0	15.19	12.33	2.86
5	14.69	13.22	1.47
10	12.33	11.61	0.72
50	12.29	10.50	1.79
100	12.37	10.51	1.86
150	11.57	9.68	1.89
200	11.64	10.16	1.48
250	12.50	10.05	2.45

McB-1(McBETH,FIORD)

DEPTH (cm)	TOTAL C.%	ORG. C.%	CARB. C.%
50	0.63	0.62	0.02
100	0.87	0.78	0.09
150	0.92	0.64	0.28
200	0.90	0.72	0.18
250	0.81	0.49	0.32
300	0.39	0.18	0.19
350	0.66	0.62	0.04
400	0.69	0.49	0.20
450	0.72	0.55	0.17
500	0.49	0.45	0.04
550	0.51	0.57	0.00
600	0.23	0.51	0.00
650	0.34	0.30	0.04
700	0.40	0.38	0.02
750	0.39	0.37	0.02
800	0.39	0.36	0.03
850	0.48	0.41	0.07
900	0.40	0.35	0.05
950	0.32	0.31	0.01

McB-2(McBETH, FIORD)

DEPTH (cm)	TOTAL C.%	ORG. C.%	CARB. C.%
0	1.50	1.36	0.14
50	1.37	1.19	0.18
100	1.18	1.05	0.13
150	0.91	0.73	0.18
200	0.85	0.62	0.20
250	0.90	0.61	0.29
300	0.80	0.60	0.20
350	0.69	0.51	0.18
400	0.63	0.55	0.08
450	0.81	0.68	0.13
500	0.63	0.66	0.00

APPENDIX D

Compilation of paleomagnetic records data

1-North Bay areas

LU-82-1 (Callander Bay)

LU-82-8 (Lake Nipissing)

LU-82-9 (Lake Nipissing)

LU-82-3 (Lake Nosbonsing)

LU-82-7 (Lake Nosbonsing)

LU-82-10 (Lake Talon)

LU-82-13 (Lake Talon)

LU-82-11 (Kiosk Lake)

LU-82-12 (Cedar Lake)

2-McBeth Fiord

McBeth-1

McBeth-2

LU-82-1(CALLANDER BAY)

DEPTH (cm)	DECLINATION (relative)	INCLINATION	MAGNETIC INTENSITY (uG)
1	299.8	53.2	4.08
4	329.4	50.8	3.38
7	306.7	49.3	3.79
10	278.5	51.8	7.83
13	290.3	54.0	11.49
16	292.8	52.7	9.42
19	282.0	50.8	10.80
22	281.9	45.7	14.21
25	279.2	48.0	13.56
28	275.6	49.1	14.88
31	281.7	48.6	17.46
34	275.1	46.9	12.75
37	277.0	46.4	12.79
40	273.4	48.6	17.28
43	272.9	47.6	14.74
46	270.3	51.6	25.72
49	264.6	49.1	22.19
52	260.9	44.0	21.57

55	262.2	49.3	23.66
58	262.3	48.6	26.20
61	252.7	50.2	25.66
64	263.9	52.0	20.48
67	249.5	47.3	28.74
70	253.3	45.9	29.59
73	250.6	47.8	33.64
76	250.7	44.4	28.34
79	252.6	43.3	27.65
82	262.2	42.1	19.10
85	262.3	39.0	26.94
88	267.3	41.2	20.87
91	265.0	36.5	26.29
94	263.9	36.4	21.46
97	266.4	34.8	23.21
100	272.6	37.4	20.48
103	265.9	29.4	22.57
106	274.9	33.4	16.66
109	279.1	32.5	16.64
112	277.6	33.8	22.16
115	273.7	30.1	18.89
118	273.9	23.9	20.42
121	275.5	22.5	18.07
124	271.4	29.0	22.12

127	280.0	33.0	13.88
130	281.2	32.4	21.57
133	282.2	30.1	20.65
136	276.8	32.5	20.93
139	280.0	34.4	17.56
142	279.0	36.3	21.02
145	278.7	31.1	19.79
148	274.8	35.1	18.89
151	277.7	41.5	20.33
154	272.0	40.5	22.21
157	273.8	38.0	17.30
160	276.9	32.2	18.45
163	276.4	39.1	17.59
166	274.2	39.7	22.26
169	278.0	37.5	18.63
172	272.6	37.2	19.52
175	275.2	36.9	15.51
178	273.8	38.7	19.62
181	271.7	36.2	19.82
184	274.1	39.2	18.98
187	271.9	40.0	20.21
190	272.3	37.6	15.13
193	269.4	41.5	18.26
196	281.7	45.5	16.53

199	266.6	36.6	14.54
202	274.1	32.3	19.04
205	271.2	36.4	11.21
208	269.6	35.6	14.01
211	269.0	38.2	13.81
214	269.5	35.8	15.07
217	265.1	38.9	17.61
220	267.9	33.7	13.13
223	266.7	44.0	22.84
226	269.9	44.0	24.46
229	268.8	42.5	20.33
232	254.0	35.3	20.57
235	262.7	42.0	35.82
238	260.4	47.6	28.36
241	261.0	44.7	25.21
244	261.0	40.3	23.68
247	270.5	41.8	16.60
250	261.5	33.3	23.45
253	261.4	35.8	20.93
256	268.0	35.6	31.66
259	271.0	39.3	36.36
262	268.0	40.1	32.60
265	268.6	44.8	31.12
268	271.1	43.3	37.96

271	267.0	34.6	29.87
274	271.6	29.8	36.99
277	270.1	30.1	26.42
280	265.9	32.2	26.94
283	276.4	27.5	28.36
286	279.3	23.9	32.96
289	274.7	28.6	28.77
292	278.1	27.4	29.08
295	276.6	26.3	28.84
298	279.8	20.3	23.76
301	280.8	24.6	27.09
304	283.8	26.5	27.95
307	284.6	21.8	27.19
310	284.2	19.3	20.72
313	284.0	14.3	22.23
316	283.2	17.5	20.62
319	283.6	15.0	24.15
322	284.3	14.6	25.02
325	278.9	14.7	20.43
328	285.3	22.4	19.10
331	279.5	10.4	19.21
334	274.8	19.3	13.81
337	282.2	18.3	16.90
340	283.3	14.2	16.61

343	282.9	18.6	21.09
346	280.5	20.7	18.57
349	126.2	18.1	20.43
352	114.4	13.3	20.45
355	120.2	17.5	18.68
358	107.9	12.4	25.39
361	110.9	10.1	16.22
364	109.6	9.0	15.42
367	115.4	6.6	21.64
370	115.7	10.5	21.66

LU-82-3(LAKE NOSBONSING)

DEPTH (CM)	DECLINATION (RELATIVE)	INCLINATION	MAGNETIC INTENSITY (uG)
1	344.2	Ø.2	1.75
4	345.4	32.5	4.ØØ
7	349.5	24.Ø	3.43
1Ø	345.5	17.1	1.26
13	351.7	21.2	2.46
16	343.4	1Ø.8	1.13
19	35Ø.6	9.9	1.92
22	349.1	6.5	1.31
25	352.8	2.4	1.53
28	347.5	17.3	Ø.93
31	353.4	8.6	Ø.6Ø
34	354.2	-7.5	1.Ø1
37	337.3	11.5	1.Ø1
4Ø	346.1	6.8	Ø.53
43	Ø.3	19.9	1.12
46	351.Ø	31.9	1.41
49	348.8	25.3	Ø.84
52	351.Ø	23.4	Ø.67

55	340.6	23.2	0.66
58	334.2	15.5	0.73
61	339.0	34.8	0.54
64	351.4	18.2	0.56
67	350.0	17.7	0.65
70	341.2	29.2	0.75
73	321.1	34.1	0.51
76	339.6	32.4	0.39
79	334.4	34.7	0.52
82	346.0	28.1	0.25
85	336.2	39.3	0.58
88	350.0	16.0	0.54
91	332.0	33.3	0.70
94	345.3	23.2	0.36
97	332.1	14.6	0.32
100	331.0	11.5	0.35
103	337.7	20.8	0.34
106	331.4	34.2	0.32
109	329.9	20.6	0.41
112	355.0	22.7	0.40
115	355.2	-2.9	0.32
118	341.3	22.0	0.41
121	306.3	12.5	0.59
124	338.7	45.5	0.44

127	355.8	32.8	0.43
130	340.6	16.5	0.30
133	347.8	17.6	0.21
136	356.8	12.5	0.29
139	349.2	37.0	0.32
142	331.8	39.2	0.32
145	2.3	24.7	0.29
148	348.4	26.1	0.26
151	350.1	34.6	0.26
154	1.8	19.0	0.52
157	349.9	53.2	0.25
160	358.9	35.6	0.37
163	326.3	57.5	0.21
166	12.3	12.3	0.16
169	352.1	33.0	0.18
172	329.4	40.1	0.35
175	357.6	10.2	0.39
178	359.2	31.1	0.42
181	346.0	15.8	0.41
184	357.7	29.7	0.30
187	345.2	47.2	0.27
190	351.8	31.7	0.43
193	7.9	41.2	0.31
196	357.3	64.5	0.30

151

199	347.2	35.3	0.29
202	354.7	26.8	0.39
205	6.8	37.1	0.56
208	349.3	16.3	0.62
211	7.2	30.4	0.44
214	356.4	37.2	0.64
217	8.1	8.1	0.49
220	15.1	33.4	0.41
223	44.6	44.6	0.55
226	7.3	33.2	0.30
229	353.7	44.0	0.27
232	7.2	35.9	0.42
235	15.7	36.9	0.22
238	346.2	40.2	0.43
241	17.1	49.6	0.22
244	33.7	41.3	0.31
247	358.3	18.4	0.37
250	20.6	46.0	0.39
253	23.2	33.3	0.34
256	2.0	27.3	0.35
259	14.5	25.1	0.38
262	352.7	29.2	0.34
265	2.0	14.0	0.46
268	343.9	56.2	0.38

271	5.1	8.1	0.60
274	351.0	38.6	0.43
277	342.4	33.7	0.40
280	34.8	36.2	0.37
283	354.8	32.4	0.35
286	353.4	33.0	0.16
289	7.8	24.2	0.39
292	350.2	38.0	0.20
295	15.5	36.8	0.25
298	352.3	31.9	0.37
301	21.4	29.5	0.33
304	12.8	25.0	0.72
307	14.5	39.5	0.57
310	27.0	52.4	0.56
313	5.2	35.5	0.57
316	14.7	40.9	0.55
319	3.9	37.1	0.50
322	9.8	46.2	0.94
325	1.3	36.8	0.60
328	6.2	36.7	0.42
331	10.0	49.5	0.80
334	347.7	42.8	0.99
337	9.5	54.5	0.99
340	5.0	43.6	0.50

343	5.5	35.2	0.87
346	14.2	14.2	0.62
349	349.2	39.0	1.42
352	356.2	45.8	1.50
355	9.1	40.4	1.23
358	13.4	41.5	1.38
361	14.6	53.7	1.53
364	25.2	55.2	2.45
367	20.3	52.3	4.08
370	12.9	57.7	4.51
373	11.5	63.3	4.42
376	14.9	59.0	3.34
379	4.9	54.9	1.83
382	16.5	58.0	1.50
385	13.5	55.2	2.28
388	18.1	54.7	2.33
391	7.6	56 3	2.52
394	23.1	53.7	2.15
397	19.3	52.2	2.61
400	12.5	53.1	4.04
403	27.9	59.3	3.77
406	14.7	58.5	4.13
409	29.8	59.0	4.60
412	27.2	58.4	5.29

415	23.0	58.5	5.98
418	20.6	57.5	6.48
421	36.6	61.8	4.50
424	21.6	54.0	4.91
427	30.1	54.5	4.32
430	27.2	50.1	4.45
433	33.8	40.7	4.54
436	29.1	62.1	2.25

LU-82-7(LAKE NOSBONSING)

DEPTH (cm)	DECLINATION (relative)	INCLINATION	MAGNETIC INTENSITY (uG)
1	48.2	27.2	3.30
4	13.5	22.0	1.55
7	52.2	24.2	1.32
10	60.9	44.1	1.47
13	59.3	70.0	0.67
16	35.9	40.8	0.94
19	55.1	46.5	1.55
22	42.2	39.1	1.61
25	52.5	40.8	1.51
28	53.3	32.4	0.86
31	50.0	24.5	0.72
34	66.0	36.1	0.71
37	66.6	33.5	0.72
40	60.0	49.5	0.67
43	59.5	51.8	0.78
46	69.0	52.5	0.85
49	57.0	47.7	0.75
52	49.1	42.0	0.70

55	53.4	36.6	0.54
58	51.0	40.7	0.71
61	67.9	55.5	0.37
64	78.7	58.4	0.57
67	90.0	54.8	0.84
70	62.2	60.7	0.70
73	48.7	44.0	0.73
76	52.8	40.2	1.16
79	59.5	49.1	0.64
82	74.7	52.3	0.39
85	76.4	45.0	0.25
88	114.2	63.5	0.26
91	39.8	57.3	0.46
94	90.0	56.3	0.19
97	100.3	57.2	0.33
100	82.2	53.0	0.39
103	70.8	55.6	0.46
106	91.5	59.6	0.39
109	79.0	58.8	0.43
112	109.4	43.3	0.29
115	56.3	53.9	0.29
118	79.0	60.6	0.45
121	60.6	44.5	0.33
124	82.2	47.4	0.40

127	67.9	48.5	0.28
130	81.4	47.9	0.26
133	333.4	85.0	0.25
136	72.9	59.7	0.57
139	81.7	36.6	0.32
142	50.0	70.1	0.51
145	53.1	56.0	0.25
148	66.0	59.2	0.20
151	315.0	76.4	0.22
154	57.1	68.3	0.29
157	108.4	58.1	0.38
160	50.8	56.5	0.47
163	95.3	47.4	0.34
166	66.3	11.4	0.29
169	87.3	31.1	0.27
172	96.5	35.9	0.29
175	117.6	52.2	0.43
178	71.9	45.2	0.41
181	45.9	53.0	0.40
184	52.0	49.2	0.33
187	43.5	45.7	0.41
190	54.5	55.1	0.24
193	39.8	56.9	0.15
196	72.9	42.6	0.19

199	36.9	63.4	Ø.3Ø
2Ø2	32.6	59.3	Ø.31
2Ø5	1Ø7.9	47.1	Ø.25
2Ø8	133.3	37.5	Ø.49
211	62.5	52.3	Ø.47
214	71.9	42.4	Ø.37
217	57.4	59.7	Ø.45
22Ø	84.5	62.2	Ø.35
223	1Ø5.1	64.7	Ø.33
226	92.5	63.9	Ø.28
229	1Ø5.4	68.1	Ø.43
232	13Ø.6	59.3	Ø.38
235	7Ø.Ø	62.7	Ø.4Ø
238	17.8	38.3	Ø.38
241	353.3	56.6	Ø.49
244	24.9	42.9	Ø.33
247	3Ø.3	29.9	Ø.25
25Ø	62.6	23.2	Ø.36
253	74.9	63.1	Ø.32
256	25.6	56.6	Ø.27
259	5Ø.4	4Ø.Ø	Ø.41
262	55.8	38.4	Ø.21
265	15.7	62.2	Ø.38
268	5Ø.6	32.4	Ø.32

271	348.7	80.2	0.32
274	187.1	75.4	0.17
277	31.2	40.5	0.27
280	90.0	24.4	0.32
283	148.0	66.8	0.13
286	68.2	42.9	0.47
289	64.9	57.7	0.52
292	101.2	44.2	0.76
295	93.2	45.5	0.82
298	84.4	53.6	0.65
301	94.3	57.1	1.05
304	100.4	54.8	1.12
307	133.5	51.6	1.34
310	152.3	60.8	1.89
313	120.4	45.9	2.91
316	135.0	67.0	2.96
319	113.0	59.3	3.63
322	105.9	72.4	3.02
325	120.0	69.1	3.78
328	124.1	66.5	5.09
331	124.6	64.3	4.76
334	130.7	58.5	2.37
337	117.5	51.3	2.76
340	97.5	49.4	1.07

343	98.5	63.3	1.75
346	80.7	55.4	1.86
349	88.6	64.8	2.60
352	97.1	71.7	3.57
355	110.9	72.4	3.26
358	116.8	69.9	7.94
361	109.5	66.2	7.97
364	117.2	65.6	7.50
367	108.8	64.1	7.25
370	128.8	64.6	6.47

LU-82-8(LAKE NIPISSING)

DEPTH (CM)	DECLINATION (relative)	INCLINATION	MAGNETIC INTENSITY (uG)
1	276.6	51.3	13.99
4	282.9	55.4	24.32
7	287.1	55.0	42.75
10	301.3	74.8	52.32
13	299.7	68.3	52.27
16	284.4	77.5	44.64
19	293.1	71.3	53.65
22	303.1	67.7	40.81
25	265.2	63.9	40.17
28	267.6	66.9	65.51
31	268.5	71.5	55.52
34	270.0	66.7	43.47
37	260.1	68.5	52.37
40	259.1	64.6	55.24
43	269.3	66.4	59.42
46	260.6	62.3	51.51
49	248.5	66.7	67.03
52	234.6	72.5	53.86

55	235.1	60.4	43.86
58	241.3	64.3	53.76
61	238.1	59.8	50.47
64	233.9	61.4	55.79
67	253.5	59.8	63.42
70	257.9	58.4	54.30
73	249.3	60.0	52.64
76	256.6	55.2	55.06
79	258.9	54.2	51.61
82	268.6	52.5	53.94
85	273.3	56.7	51.95
88	275.5	59.8	52.11
91	268.2	62.0	38.27
94	269.0	57.8	49.62
97	264.0	57.5	55.09
100	254.4	58.4	52.07
103	248.8	49.7	39.18
106	249.6	62.6	50.45
109	247.1	62.9	49.53
112	250.1	63.3	51.10
115	250.6	64.6	55.37
118	242.5	59.0	38.24
121	240.7	64.3	44.78
124	242.3	58.5	51.13

127	238.4	68.7	51.95
130	254.4	69.3	64.89
133	241.4	68.0	55.87
136	255.3	67.6	69.73
139	247.7	65.1	44.22
142	249.2	68.6	50.22
145	261.4	73.9	70.92
148	249.2	72.8	72.08
151	274.6	69.0	31.96
154	256.7	72.1	60.19
157	253.5	65.5	71.95
160	258.2	67.8	68.08
163	270.1	70.2	64.93
166	254.8	64.9	71.15
169	256.9	60.9	71.58
172	275.4	55.3	70.68
175	275.8	51.2	70.62
178	273.9	52.0	80.73
181	277.4	47.7	55.11
184	268.8	53.4	66.75
187	263.1	47.6	56.97
190	259.3	44.8	59.95
193	268.6	57.5	56.02
196	271.2	55.9	54.69

199	263.7	52.7	48.07
202	262.4	62.2	58.01
205	263.0	66.1	62.43
208	259.7	58.4	52.91
211	279.2	57.3	58.77
214	265.3	74.3	57.05
217	253.4	61.6	60.14
220	264.1	56.8	54.04
223	264.0	55.8	66.94
226	262.1	55.7	82.88
229	260.1	58.0	69.14
232	264.6	60.0	73.98
235	265.2	61.9	76.60
238	266.7	55.0	76.53
241	259.7	56.4	74.70
244	260.5	65.8	88.85
247	258.9	62.4	85.12
250	259.4	64.8	105.48
253	258.6	63.9	95.95
256	255.6	62.4	79.18
259	231.8	56.5	56.14
262	250.0	62.8	88.26
265	246.2	62.8	98.49
268	243.4	65.1	82.68

271	231.5	63.8	93.08
274	249.4	68.8	103.83
277	256.1	67.9	121.62
280	251.6	66.2	115.55
283	229.7	76.6	94.38
286	259.9	64.3	91.77
289	257.5	72.4	92.67
292	247.3	67.8	102.67
295	263.1	65.7	114.03
298	258.1	64.2	112.82
301	273.9	64.3	112.53
304	257.8	64.6	108.57
307	255.7	68.8	103.35
310	261.6	68.2	111.16
313	243.6	72.6	115.71
316	248.4	70.1	112.79
319	242.4	60.0	106.94
322	236.6	55.7	103.33
325	264.2	71.5	100.16
328	247.5	64.4	93.75
331	243.0	68.1	134.42
334	254.6	67.9	125.11
337	246.9	76.5	114.46
340	252.5	67.2	112.89

343	250.5	65.7	114.54
346	253.6	59.6	147.20
349	249.2	54.6	93.57
352	241.5	70.7	109.60
355	241.3	64.9	95.01
358	257.5	63.4	101.98
361	262.2	63.8	107.85
364	263.2	61.2	106.67
367	253.0	67.3	93.52
370	254.6	73.1	81.02
373	228.0	63.7	62.02
376	266.2	65.1	26.74
379	287.0	63.6	24.96
382	285.4	67.3	34.42
385	271.4	64.9	14.29
388	285.2	64.1	12.64
391	267.6	68.1	28.30
394	270.7	65.2	41.96
397	276.0	56.6	23.13
400	264.6	55.8	36.02
403	277.7	40.6	201.07
406	271.7	39.6	94.18
409	267.1	20.5	100.51
412	264.6	31.4	78.04

415	280.3	39.3	149.01
418	274.2	25.0	172.47
421	262.7	26.2	169.18
424	262.9	18.8	89.34
427	270.8	31.7	124.60
430	277.7	49.4	230.14
433	271.7	27.9	121.13
436	268.2	31.1	127.82
439	260.4	20.5	96.25
442	269.7	31.3	178.50
445	276.7	43.8	333.06
448	266.2	38.6	335.04
451	264.0	26.9	131.19
454	270.4	36.4	190.51
457	264.0	29.1	215.11
460	261.7	29.7	218.90
463	256.7	13.1	96.48
466	260.3	23.3	129.23

LU-82-9(LAKE NIPISSING)

DEPTH (cm)	DECLINATION (relative)	INCLINATION	MAGNETIC INTENSITY (uG)
1	306.7	43.6	27.76
4	327.3	43.2	20.21
7	315.4	34.6	14.28
10	308.2	44.5	17.76
13	306.2	48.2	23.29
16	315.8	45.5	16.54
19	299.1	55.4	28.30
22	299.5	49.3	34.03
25	305.4	57.6	38.44
28	308.2	57.9	32.53
31	307.0	52.9	30.98
34	303.1	54.5	35.68
37	307.4	51.2	31.88
40	299.2	55.8	26.12
43	309.1	56.6	28.77
46	306.1	58.4	29.35
49	311.5	50.9	22.72
52	293.7	59.1	41.16
55	297.3	52.9	48.44
58	292.7	56.3	39.42
61	299.2	57.0	39.83
64	305.3	60.7	37.79

67	305.5	56.8	29.71
70	297.6	56.7	34.40
73	281.6	53.7	29.44
76	296.9	53.2	35.98
79	302.7	61.8	35.16
82	300.7	57.9	41.56
85	288.8	54.3	30.69
88	296.3	57.4	39.40
91	301.5	53.9	24.84
94	300.7	55.7	21.66
97	318.6	58.6	29.18
100	296.8	52.6	35.91
103	312.5	48.9	34.18
106	299.1	50.8	51.48
109	296.2	50.4	48.39
112	292.9	52.5	37.77
115	300.1	52.9	41.47
118	310.3	56.8	33.45
121	293.2	54.0	39.83
124	300.6	49.0	41.28
127	299.2	51.2	33.17
130	297.0	48.7	47.65
133	293.7	51.3	53.19
136	302.7	49.8	49.16

139	299.3	49.7	54.21
142	298.4	49.8	56.22
145	309.2	51.6	47.22
148	300.9	55.7	62.00
151	296.0	55.4	47.66
154	293.3	54.5	60.93
157	302.2	54.5	47.81
160	296.9	50.7	58.20
163	290.6	49.9	57.47
166	289.5	49.3	66.11
169	282.3	50.2	63.76
172	291.4	48.5	62.50
175	275.0	50.0	54.77
178	288.4	46.5	54.78
181	287.9	49.4	52.94
184	283.3	50.5	54.70
187	288.2	49.8	54.97
190	289.7	47.9	61.77
193	287.0	49.5	54.12
196	287.7	48.7	61.69
199	289.0	50.8	63.93
202	287.7	55.7	56.57
205	294.1	54.1	49.12
208	286.0	49.5	56.57

211	283.2	50.4	52.25
214	286.3	48.8	57.61
217	269.8	51.3	55.13
220	269.1	46.8	45.96
223	273.5	45.7	47.24
226	275.1	45.5	56.54
229	277.7	48.7	45.67
232	284.0	51.4	40.90
235	284.2	49.1	41.89
238	280.8	44.3	51.73
241	274.5	47.6	47.75
244	275.3	48.0	34.53
247	284.3	41.3	37.13
250	281.0	48.1	36.01
253	291.4	44.0	48.54
256	289.7	41.4	45.87
259	280.6	43.4	42.33
262	282.4	44.0	30.71
265	280.5	44.5	41.91
268	279.5	43.2	53.54
271	283.6	41.5	37.31
274	281.3	41.6	47.85
277	276.4	39.9	43.87
280	277.5	42.3	38.40

283	282.0	41.0	43.66
286	267.3	39.7	41.56
289	264.8	38.7	37.19
292	265.0	39.0	37.66
295	282.5	44.5	42.44
298	277.5	42.2	53.15
301	266.6	41.8	43.83
304	265.6	49.5	33.95
307	286.8	35.7	37.52
310	288.8	38.2	33.19
313	292.9	38.2	34.33
316	288.2	22.2	28.61
319	301.3	21.7	35.71
322	289.9	37.0	46.97
325	293.2	45.8	55.25
328	296.4	45.7	48.48
331	300.9	50.4	35.94

LU-82-10(TALON LAKE)

DEPTH (cm)	DECLINATION (relative)	INCLINATION	MAGNETIC INTENSITY (uG)
1	68.4	42.9	7.61
4	43.3	30.9	5.89
7	43.2	47.6	12.32
10	42.7	49.4	14.70
13	39.6	44.9	16.82
16	48.8	46.9	18.66
19	48.7	47.0	19.89
22	55.5	48.7	25.45
25	42.4	44.4	20.96
28	62.0	47.7	20.09
31	60.2	41.8	24.18
34	70.2	44.8	30.43
37	82.1	44.6	28.36
40	54.9	33.2	20.92
43	52.6	36.1	21.30
46	58.3	40.4	25.59
49	59.9	41.7	24.82
52	64.2	46.1	24.48

55	67.8	47.0	24.02
58	73.6	52.6	27.15
61	80.8	49.0	24.36
64	67.5	49.5	18.14
67	55.3	47.8	20.99
70	82.3	55.6	29.12
73	72.2	52.3	32.07
76	59.7	49.5	24.12
79	75.9	51.0	25.14
82	69.8	49.7	20.81
85	77.2	47.4	33.63
88	72.9	48.4	16.21
91	75.6	44.1	30.02
94	71.7	47.7	25.26
97	50.8	35.0	17.30
100	67.9	40.6	19.53
103	52.6	38.2	30.21
106	52.2	46.1	43.62
109	56.5	50.2	38.44
112	59.9	54.2	24.52
115	65.7	55.0	41.29
118	66.9	56.4	38.36
121	78.3	56.9	31.32
124	79.3	57.2	31.47

127	77.7	59.1	44.53
130	72.4	57.9	35.34
133	73.9	57.0	32.10
136	71.6	52.9	28.02
139	77.0	54.8	31.35
142	69.9	54.7	36.40
145	74.5	55.8	34.76
148	69.4	51.8	31.81
151	67.8	53.1	29.25
154	72.7	50.8	36.44
157	72.3	48.3	39.00
160	75.7	49.0	43.91
163	71.1	46.1	42.03
166	67.3	47.3	39.20
169	67.8	46.7	41.41
172	64.1	44.9	32.64
175	66.3	47.5	26.98
178	71.4	46.3	33.64
181	76.3	48.7	35.27
184	73.2	47.4	39.25
187	68.9	46.4	31.74
190	78.4	47.3	50.64
193	70.9	47.4	66.40
196	68.5	45.3	39.47

199	69.2	48.2	32.40
202	68.4	48.7	27.34
205	63.8	46.9	19.92
208	65.3	45.2	14.92
211	70.3	46.5	13.80
214	56.7	42.2	9.57

LU-82-11(KIOSK LAKE)

DEPTH (CM)	DECLINATION (RELATIVE)	INCLINATION	MAGNETIC INTENSITY (uG)
1	44.3	37.4	2.07
4	18.6	22.9	0.67
7	108.4	89.0	0.95
10	105.5	73.1	3.75
13	139.4	61.8	7.85
16	43.7	63.3	1.47
19	100.6	58.5	5.02
22	338.7	67.8	4.29
25	178.2	57.6	4.64
28	119.5	70.0	5.22
31	344.2	31.2	0.30
34	345.9	15.7	0.74
37	351.4	42.4	4.29
40	1.1	34.3	1.62
43	70.4	64.6	6.01
46	79.5	58.3	3.43
49	73.1	59.8	5.80
52	83.8	61.0	6.44

55	74.4	56.7	4.20
58	94.9	57.3	10.17
61	56.4	66.8	2.17
64	96.9	68.7	7.76
67	30.3	68.9	0.70
70	96.8	62.8	5.07
73	78.5	58.0	2.22
76	87.4	48.8	3.18
79	53.7	46.6	2.03
82	73.8	59.1	4.33
85	78.8	55.1	5.15
88	83.4	61.3	4.80
91	100.9	51.6	5.28
94	86.4	52.4	3.37
97	100.2	50.8	6.90
100	130.1	49.2	5.34
103	95.5	45.2	11.10
106	92.8	52.9	8.05
109	79.1	44.1	3.23
112	87.2	49.1	8.03
115	86.1	43.5	3.20
118	90.3	45.2	3.29
121	81.2	46.5	8.57
124	79.4	38.2	3.28

127	63.8	38.5	3.23
130	65.0	43.3	5.85
133	68.6	48.3	7.12
136	67.4	49.6	7.50
139	73.0	52.8	6.14
142	85.6	51.5	2.44
145	95.8	54.9	3.13
148	79.8	64.0	2.67
151	92.5	43.1	3.39
154	74.9	56.8	1.38
157	119.2	39.3	14.25
160	96.1	58.1	3.39
163	97.0	62.2	3.72
166	95.0	43.3	3.57
169	87.4	60.0	1.66
172	102.2	49.4	4.76
175	84.6	43.0	4.19
178	96.9	42.2	4.50
181	99.4	40.8	7.18
184	105.0	50.4	5.09
187	89.3	37.6	7.89
190	93.9	56.2	2.66
193	89.3	39.5	5.27
196	91.3	34.6	4.12

199	115.3	40.0	5.14
202	18.0	30.4	22.12
205	140.3	27.0	18.28
208	76.0	50.1	5.43
211	179.0	16.8	9.75
214	63.2	30.5	7.39
317	102.5	49.6	8.86
220	83.7	39.6	16.39

LU-82-12(CEDAR LAKE)

DEPTH (cm)	DECLINATION (relative)	INCLINATION	MAGNETIC INTENSITY (uG)
1	168.5	-30.8	2.67
4	217.2	31.6	8.27
7	270.1	10.1	20.14
10	249.8	9.8	17.10
13	148.1	59.1	19.97
16	128.2	56.0	1.37
19	319.5	28.0	1.55
22	200.9	-48.7	3.68
25	292.4	-12.3	0.70
28	279.9	-23.0	1.47
31	300.7	-17.7	8.07
34	296.2	-26.2	6.06
37	259.1	17.0	7.96
40	273.4	18.5	7.70
43	277.1	37.9	4.37
46	284.9	19.1	2.19
49	231.7	11.5	2.19
52	199.5	30.5	7.38

55	86.4	46.7	1.84
58	217.9	61.1	4.87
61	244.4	32.4	9.48
64	249.4	38.4	7.85
67	239.8	31.4	11.57
70	248.5	20.1	4.64
73	258.2	23.0	4.66
76	245.0	38.0	7.81
79	255.7	24.3	5.68
82	227.7	41.2	13.97
85	242.5	38.9	17.73
88	250.6	29.1	14.93
91	253.4	32.4	18.97
94	254.7	36.7	15.69
97	252.7	34.3	12.75
100	258.2	34.0	13.05
103	267.2	24.8	6.72
106	266.1	31.1	15.51
109	266.2	31.9	14.50
112	271.4	34.8	13.84
115	267.0	40.5	12.37
118	258.8	42.9	11.38
121	242.9	32.5	11.25
124	247.0	33.0	11.92

127	245.3	33.7	9.86
130	242.1	30.4	9.86
133	239.5	34.2	13.87
136	243.4	34.8	14.25
139	258.3	33.4	12.24
142	246.1	34.7	11.63
145	274.8	45.5	11.61
148	269.0	46.1	11.38
151	251.3	40.1	14.56
154	259.8	46.4	17.42
157	263.8	37.7	7.19
160	268.4	51.0	8.26
163	237.2	43.2	7.04
166	230.8	44.5	14.14
169	254.8	56.6	7.19
172	251.4	45.9	5.85
175	259.0	48.6	7.02
178	251.2	46.9	7.47
181	255.7	42.8	10.24
184	288.6	46.1	6.27
187	254.8	9.4	13.78
190	264.8	31.5	16.24
193	257.1	23.3	5.60
196	235.8	50.2	17.41

199	223.5	45.8	21.47
202	224.8	47.7	21.04
205	219.7	42.5	13.82
208	227.3	50.7	10.14
211	222.6	44.8	15.88
214	250.7	50.2	15.55
217	247.1	52.0	10.78
220	240.4	63.5	10.79
223	216.2	53.1	16.95
226	212.2	47.4	14.68
229	217.9	43.9	8.96
232	212.6	53.6	17.89
235	215.4	48.4	14.15
238	218.4	52.6	16.82
241	219.5	51.8	11.53
244	219.5	61.3	12.24
247	229.6	51.1	14.30
250	231.7	51.4	13.37
253	199.8	59.2	7.67
256	178.0	63.1	11.06

LU-82-13(TALON LAKE)

DEPTH (cm)	DECLINATION (relative)	INCLINATION	MAGNETIC INTENSITY (uG)
1	288.6	66.9	8.72
4	217.9	56.2	3.17
7	175.5	72.4	14.19
10	205.1	78.1	17.05
13	213.9	79.6	28.67
16	220.2	72.4	19.12
19	204.7	69.0	24.35
22	215.1	70.5	32.55
25	222.2	72.2	30.34
28	220.6	76.5	29.33
31	239.0	74.8	25.70
34	265.2	71.6	29.95
37	252.4	72.0	28.63
40	256.1	75.5	29.45
43	258.6	79.0	25.69
46	245.9	76.8	27.48
49	238.9	81.0	27.08
52	247.3	84.3	26.31

55	190.0.1	88.0	26.61
58	187.7	84.9	23.79
61	182.4	77.1	32.95
64	150.9	84.1	24.00
67	169.4	81.8	22.02
70	192.8	77.6	28.62
73	183.2	82.8	34.73
76	218.0	82.7	19.83
79	202.2	82.8	22.83
82	213.1	81.1	33.93
85	319.4	83.1	22.98
88	212.3	82.4	31.20
91	196.1	80.4	18.24
94	223.2	79.3	16.82
97	207.6	76.4	28.08
100	206.8	77.8	25.26
103	256.0	78.8	29.40
106	204.9	78.0	24.42
109	216.0	79.0	25.64
112	199.1	78.5	45.91
115	159.9	77.9	40.07
118	154.1	80.0	35.13
121	151.7	76.9	31.53
124	148.1	77.8	32.27

127	138.9	77.5	36.17
130	129.4	82.7	25.88
133	159.8	80.3	30.62
136	169.5	84.0	17.34
139	143.3	81.2	18.85
142	142.2	84.9	18.32
145	154.2	83.1	15.54
148	200.0	83.4	23.01
151	268.7	86.5	18.95
154	220.4	78.5	28.05
157	220.7	83.8	28.57
160	212.3	85.7	30.09
163	214.2	79.0	29.48
166	215.9	82.0	21.70
169	210.2	85.6	21.80
172	228.0	83.7	24.11
175	217.7	83.2	14.69
178	209.4	79.5	13.82
181	185.3	84.4	11.07
184	198.3	79.8	10.55
187	199.7	86.1	9.38
190	224.1	75.8	8.64
193	224.3	81.9	8.14
196	247.3	79.1	7.94

199	297.6	74.7	5.34
202	238.1	80.0	7.51
205	249.9	80.7	6.97
208	256.2	79.3	5.88
211	257.9	79.3	5.04
214	233.1	81.9	6.28
217	266.9	77.9	6.95
220	262.9	79.2	6.65
223	266.2	70.8	5.86
226	246.4	77.1	6.23
229	235.9	73.7	5.81
232	265.7	71.8	5.00
235	202.1	75.5	5.42
238	256.2	71.3	7.15
241	265.1	63.8	7.68
244	246.5	69.6	6.07
247	260.9	74.7	3.95
250	245.4	69.7	6.32
253	234.0	77.5	5.30
256	268.0	74.2	7.30
259	229.9	71.0	3.62
262	264.0	73.8	7.10
265	251.7	65.4	6.88
268	346.7	64.8	6.24

271	272.7	67.5	11.22
274	135.6	81.4	7.08
277	290.5	83.1	7.34
280	240.9	71.6	9.23
283	244.9	64.4	8.14
286	349.3	78.7	5.43
289	301.4	77.9	4.29
292	298.7	57.0	2.78
295	73.3	82.4	4.91
298	242.3	72.7	4.12
301	276.6	58.3	4.50
304	238.7	64.5	5.09
307	279.0	73.0	5.71
310	253.3	67.5	5.35
313	281.0	65.4	6.48
316	242.1	71.3	4.61
319	274.7	73.1	5.51
322	281.9	68.5	5.53
325	251.9	75.5	4.39
328	267.9	58.4	7.68
331	221.7	70.6	5.56
334	239.4	66.5	7.38
337	242.1	60.8	9.39
340	266.7	61.6	5.49

343	275.2	43.4	4.28
346	307.9	16.6	4.84
349	334.5	42.5	5.21
352	168.9	70.1	7.87
355	247.3	71.7	7.34
358	307.8	81.4	7.02
361	61.6	78.8	5.75

McBETH I Location $69^{o}31.9'N$
$69^{o}47.5'W$

Depth (cm)	Declination Reading	Declination Rotated	Inclination	Intensity
2	153.1		59.9	53.3
5	234.3		81.5	12.6
8	193.0		70.5	26.6
11	218.6		45.5	23.9
14	196.4		64.3	26.3
17	203.5		79.5	28.8
20	156.2		76.6	31.5
23	183.3		75.7	25.2
26	155.2		70.1	31.9
29	168.2		64.4	35.3
32	139.2		66.4	69.7
35	127.7		44.1	81.7
38	142.6		6.5	52.1
41	111.3		68.2	37.4
44	147.6		80.7	25.3
47	62.0		77.8	44.9
50	132.0		75.2	28.2
53	99.9		69.9	30.2
56	151.2		64.3	30.3
59	157.4		71.0	38.4
62	154.4		73.9	42.2
65	171.9		68.4	35.7
68	172.8		71.4	39.9
71	161.1		63.6	37.5
74	167.7		58.0	41.8
77	163.6		19.4	31.4
80	352.2	157	54.5	29.0
83	292.1	124	74.2	39.0
86	269.9	96	79.6	47.7
89	315.2	147	79.0	26.3
92	86.7	278	81.7	34.2
95	36.3	228	79.5	36.8
98	43.3	235	83.3	45.8
101	2.6	194	80.4	39.8
104	19.4	211	86.9	44.8
107	10.6	202	82.9	40.4
110	337.4	169	83.7	37.9
113	346.6	178	80.2	42.1
116	351.9	183	82.2	44.0
119	337.6	189	83.7	42.3
122	326.9	158	86.5	49.2
125	345.1	177	81.6	42.3
128	256.8	88	85.8	37.5
131	335.6	167	77.9	32.7
134	338.9	170	83.1	38.1
137	169.8	1	84.6	28.2
140	322.8	154	84.4	32.1
143	353.2	185	81.3	39.1

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eclination ading	Rotated	Inclination	Intensity
17.3	149	84.4	33.7
28.8	160	87.8	39.8
10.2	142	83.6	32.9
37.7	119	75.8	69.5
90.2	122	62.9	67.5
91.2	133	75.8	79.1
76.7	108	76.8	66.6
51.1	93	74.6	57.3
.0.3	142	66.8	48.1
25.5	57	62.7	55.8
27.9	59	56.7	77.1
24.4	56	48.8	75.3
70.9	102	83.8	56.0
.4.5	146	53.6	80.1
1.0	153	77.9	34.9
5.4	157	83.9	40.4
2.8	174	79.3	38.4
5.4	167	81.3	31.8
1.1	223	81.8	22.9
9.3	101	71.3	24.8
6.4	168	79.7	30.7
6.0	118	83.3	32.2
4.3	146	80.0	25.4
0.6	202	85.1	38.9
8.9	40	85.8	28.1
4.1	86	77.6	23.4
9.7	181	88.1	29.3
3.1	196	72.4	31.6
4.9	187	71.4	42.8
9.1	262	73.3	74.6
2.3	155	81.5	36.3
3.2	216	80.7	21.1
2.3	185	68.1	25.4
.2	213	73.5	19.4
.7	208	72.9	25.6
.8	242	69.6	28.3
.6	227	67.0	25.8
.4	233	69.6	22.1
.2	232	75.6	18.2
.6	108	71.6	24.1
.5	221	72.3	86.8
.0	207	74.8	23.6
.7	216	74.8	19.6
.3	186	65.9	24.4
.6	197	64.4	27.5
.7	223	64.4	21.8
.6	213	62.9	16.3
.1	226	70.1	18.7

McBETH I Continued

Depth	Declination Reading	Declination Rotated	Inclination	Intensity
291	214.0	227	63.6	20.6
294	218.4	231	69.2	20.2
297	212.2	225	71.4	21.1
300	194.7	207	70.6	27.9
303	193.3	206	68.6	25.5
306	205.7	218	67.9	25.3
309	217.4	230	69.1	35.9
312	207.7	220	69.1	28.2
315	198.4	211	65.2	29.0
318	213.7	226	68.6	26.8
324	203.6	216	62.3	25.3
327	206.1	219	67.4	28.6
330	189.2	202	64.1	28.2
333	186.5	199	64.5	25.2
336	154.3	167	74.9	54.2
339	153.4	166	49.1	108.2
342	198.1	211	75.0	31.4
345	245.2	258	64.8	17.3
348	5.7	18	79.2	27.7
351	11.9	25	84.8	26.7
354	5.1	18	87.3	36.5
357	346.8	0	69.6	58.7
360	117.9	130	84.2	21.9
366	33.4	46	81.0	23.4
369	64.6	77	84.6	26.4
372	83.6	96	81.6	20.7
378	54.2	67	81.2	21.9
382	150.8	233	76.7	20.4
385	124.8	211	77.3	23.2
388	151.7	238	65.9	17.5
391	6.6	89	74.4	48.7
394	57.9	141	80.8	19.9
397	76.3	159	78.7	20.6
400	111.4	194	81.8	18.7
403	149.6	232	85.8	27.0
406	120.2	203	78.8	16.3
409	96.7	179	86.4	28.1
412	114.4	197	84.4	28.9
415	87.8	170	84.2	25.9
418	150.5	233	81.4	33.8
421	106.4	189	82.3	26.7
424	90.3	173	78.1	27.5
427	34.1	117	66.1	45.2
430	128.9	211	78.7	53.1
433	100.4	183	77.4	31.9
436	94.4	177	77.0	49.9
439	72.5	155	80.6	25.9
442	77.8	160	76.9	31.3
445	79.6	162	79.1	35.3
448	104.3	187	76.4	29.2

ETH I Continued

th	Declination Reading	Rotated	Inclination	Intensity
	99.9	183	84.4	32.2
	78.1	161	83.9	30.9
	98.9	181	83.8	30.4
	83.4	166	81.6	32.2
	83.9	166	83.9	28.8
	127.8	210	83.2	26.8
	102.4	185	80.3	29.3
	67.1	150	85.6	33.8
	81.8	164	79.6	31.8
	71.2	154	81.2	30.6
	72.8	155	78.6	34.4
	83.6	166	80.4	32.5
	63.7	146	79.9	28.1
	30.1	113	82.2	32.7
	52.7	135	81.0	35.1
	38.4	121	82.5	35.6
	6.1	89	79.7	62.4
	313.8	36	71.5	71.2
	20.2	103	83.6	42.8
	34.6	117	85.2	26.3
	27.4	110	80.8	31.2
	26.7	109	79.6	29.9
	73.1	156	83.6	28.7
	36.8	119	83.3	27.4
	26.1	109	82.4	22.4
	35.8	118	81.9	26.4
	24.8	107	81.2	26.9
	42.8	125	78.6	33.2
	120.8	27	85.9	25.3
	232.6	139	79.2	22.0
	215.6	122	79.0	25.8
	215.4	122	80.5	29.9
	203.9	110	75.4	24.9
	205.2	112	75.7	36.6
	207.8	114	78.7	42.1
	203.1	110	77.5	36.6
	196.6	103	78.7	59.5
	225.8	132	78.7	33.1
	204.1	111	76.3	43.3
	208.6	115	79.3	45.1
	215.1	122	77.3	36.8
	222.4	129	77.7	40.9
	222.8	129	77.9	38.8
	211.8	118	80.8	37.8
	228.4	135	80.3	35.3
	230.8	137	82.2	37.7
	255.5	162	82.6	41.7
	234.6	141	82.8	40.2
	232.6	139	82.4	42.8

McBETH I Continued

Depth	Declination Reading	Declination Rotated	Inclination	Intensity
598	223.4	130	81.8	33.9
601	222.8	129	82.1	33.4
604	226.8	133	83.0	34.6
607	265.2	172	82.3	29.9
610	251.5	158	82.4	31.5
613	248.1	155	79.9	28.8
616	275.1	182	77.5	31.8
619	275.2	182	81.0	28.3
622	265.5	172	78.7	64.7
625	288.3	195	74.5	24.1
628	275.2	182	75.1	24.3
631	232.8	139	77.8	28.3
634	266.4	173	76.5	27.2
637	245.7	150	70.1	35.9
640	253.9	160	75.8	61.1
643	251.1	158	76.5	71.6
646	233.4	140	72.6	38.7
649	244.1	151	73.4	44.5
652	279.7	186	76.8	52.8
655	260.0	167	76.3	83.9
658	283.6	190	68.3	66.8
661	265.2	172	72.5	47.4
664	282.4	189	63.2	123.9
667	235.0	142	66.6	68.1
670	288.6	195	77.9	43.2
673	241.6	148	81.8	78.3
676	259.5	166	72.8	79.0
679	273.8	180	74.2	25.1
682	257.5	164	63.1	92.9
685	275.5	182	68.5	138.9
688	345.5	252	72.9	142.7
691	1.9	269	55.0	71.9
694	106.9	129	74.1	67.3
697	103.9	126	73.6	82.1
700	116.4	139	65.8	130.1
703	128.5	151	74.3	117.67
706	151.7	174	69.7	110.8
709	169.9	192	72.9	88.1
712	251.4	274	82.6	50.0
715	218.7	241	72.3	50.0
718	225.4	248	65.3	74.2
721	233.6	256	79.3	102.9
724	188.3	211	80.9	101.7
727	203.3	226	73.9	118.1
730	175.4	198	63.3	113.2
733	160.1	183	57.8	127.5
736	149.9	173	45.5	232.3
739	280.7	303	76.7	87.1
742	185.1	208	74.4	23.1
745	190.5	213	81.1	49.3

McBETH I Continued

Depth	Declination Reading	Declination Rotated	Inclination	Intensity
748	194.6	217	76.3	19.3
751	176.3	199	67.4	78.6
754	239.4	262	82.5	21.4
757	195.7	218	73.9	18.1
760	195.2	218	79.1	16.4
763	195.2	218	77.9	33.9
766	169.9	192	74.1	82.6
769	186.5	209	68.6	19.9
772	193.3	216	82.3	21.0
775	184.7	207	76.2	24.9
778	186.4	209	72.9	25.2
781	202.6	225	78.6	50.3
784	194.7	217	75.9	33.7
787	191.9	214	76.4	42.6
790	183.7	206	79.8	29.6
793	180.5	203	70.3	29.2
796	203.3	226	80.4	38.5
799	199.9	223	79.5	25.6
802	189.4	212	76.2	26.5
805	184.3	207	79.7	24.3
808	185.7	208	74.4	35.8
811	197.3	220	75.2	61.7
814	168.5	191	70.3	71.8
817	185.6	208	79.1	29.8
820	185.9	208	75.2	25.4
823	184.3	207	79.2	27.6
826	191.7	214	72.9	27.8
829	186.8	210	74.1	30.9
832	184.8	207	79.4	39.6
835	194.9	217	76.9	25.9
838	191.8	214	73.8	29.9
844	335.9	220	64.6	6.7
847	311.6	196	77.1	10.8
850	294.5	181	66.8	6.6
856	318.9	203	62.6	5.6
859	336.4	221	51.5	20.9
862	341.6	226	65.0	26.9
865	346.9	231	61.3	35.0
868	347.6	232	50.1	46.0
871	348.7	233	69.1	48.9
874	340.2	225	68.8	19.3
877	357.5	242	78.3	17.6
880	5.1	250	67.4	70.9
883	58.4	303	77.1	72.2
886	324.8	209	78.6	86.1
889	274.9	159	56.8	97.1
892	302.3	187	49.1	90.3
895	298.5	183	54.7	86.7
898	287.8	172	53.9	90.3

McBETH I Continued

Depth	Declination Reading	Declination Rotated	Inclination	Intensity
901	252.8	137	63.9	76.1
904	237.1	122	61.9	78.8
907	140.6	25	27.3	90.3
910	159.7	44	55.3	46.4
913	159.3	44	56.7	31.5
916	200.8	85	23.1	78.2
919	189.8	74	40.1	53.1
922	109.8	-6	64.4	113.6
925	292.8	177	44.9	200.3
928	330.8	215	33.3	127.3
931	320.5	205	30.3	44.1
934	8.1	250	45.5	13.5
937	350.1	235	71.7	39.8
940	356.8	241	70.2	42.7
943	359.6	244	65.9	29.5
946	352.2	237	66.2	34.1
949	352.9	237	72.5	29.6
952	4.3	249	67.8	28.2
955	1.0	246	62.0	27.5
958	355.0	240	67.9	27.8
961	4.8	249	78.5	28.0
964	0.1	245	77.4	26.7
967	1.3	246	72.1	24.1

McBETH 2 Location 69°37'50"N
68°16'00"W

Depth	Declination Reading	Declination Rotated	Inclination	Intensity
2	180.0		-10.8	21.7
5	179.0		36.1	37.3
8	170.0		57.2	37.2
11	186.1		64.5	44.6
14	223.2		85.2	36.5
17	337.5		89.6	43.8
20	142.1		86.4	38.3
23	76.1		81.6	47.4
26	113.0		85.0	47.0
29	39.9		83.3	48.9
32	102.2		84.9	46.7
35	117.1		78.7	51.2
38	63.2		79.1	49.1
41	91.9		80.1	58.8
44	138.7		79.7	46.9
47	64.1		76.0	55.1
50	110.7		78.5	48.8
53	76.9		78.4	45.6
56	77.4		77.8	39.9
59	46.7		74.7	42.8
62	73.0		74.8	43.6
65	87.6		74.9	40.4
68	59.5		80.6	49.1
71	73.4		83.6	50.2
74	40.6		81.6	46.6
77	40.5		79.9	45.4
80	63.8		85.3	54.1
83	73.2		84.9	54.5
86	54.4		80.6	56.1
89	87.9		83.2	62.5
92	130.3		79.5	64.6
95	170.1		81.5	79.9
98	56.2		76.9	59.7
101	314.9	59	70.7	57.0
104	312.2	57	75.9	52.3
107	306.9	51	74.7	55.1
110	271.1	16	78.7	56.8
113	267.3	12	79.6	65.4
116	281.4	26	80.2	55.9
119	298.8	43	76.3	58.3
122	313.0	58	73.2	77.9
125	289.2	34	81.9	62.3
128	327.2	72	81.1	56.1
131	274.9	19	82.7	51.7
134	346.0	91	81.5	50.5
137	345.1	90	82.7	67.1
140	354.0	99	79.5	46.9
143	359.6	105	74.9	52.5

McBeth 2 Continued

Depth	Declination Reading	Declination Rotated	Inclination	Intensity
146	345.9	90	76.6	41.6
149	7.3	112	85.5	56.1
152	20.4	125	77.9	45.2
155	61.1	166	83.8	54.7
158	97.0	202	84.6	75.8
161	69.4	174	87.7	75.1
164	309.5	54	78.4	66.8
167	327.4	72	80.0	81.8
170	305.8	50	85.1	78.2
173	324.3	69	86.4	77.9
176	2.4	107	84.9	71.8
179	38.1	143	85.9	85.2
182	51.1	156	83.9	80.9
185	46.0	155	85.1	93.1
188	73.5	178	87.6	77.1
191	43.3	148	81.6	80.9
194	59.1	164	82.9	80.0
197	120.5	225	81.4	86.1
200	49.7	154	83.9	73.1
203	127.1	132	84.2	78.9
206	87.2	222	84.1	73.1
209	77.6	182	87.8	79.6
212	113.4	218	85.2	89.3
215	78.8	183	84.5	93.9
218	77.5	182	83.2	107.3
221	52.9	157	79.6	114.4
224	51.2	156	82.5	94.7
227	59.8	164	79.1	112.8
230	56.5	161	79.7	102.0
233	24.2	129	84.2	118.1
236	6.7	111	80.6	90.9
239	7.2	112	80.8	103.3
242	13.1	118	80.0	78.5
245	5.1	110	78.2	84.2
248	146.4	106	79.3	74.9
251	115.0	75	84.2	70.3
254	105.7	65	82.3	85.9
257	106.9	66	84.9	78.5
260	151.3	111	83.2	92.9
263	90.6	50	85.4	103.2
266	60.8	20	84.1	101.9
269	102.7	62	85.7	78.6
272	119.5	79	80.9	96.9
275	93.4	53	81.4	100.6
278	133.6	93	79.9	93.4
281	83.8	43	83.1	120.3
284	90.4	50	83.6	108.4
287	112.1	72	76.3	121.4

McBeth 2 Continued

Depth	Declination		Inclination	Intensity
	Reading	Rotated		
290	112.1	72	81.4	217.4
293	85.0	45	81.5	188.2
296	264.7	224	27.3	302.5
299	100.8	60	73.5	116.9
301	89.6	49	75.5	96.8
304	68.2	28	75.3	114.5
307	234.9	194	46.3	86.9
310	256.7	216	19.7	150.7
313	168.1	128	64.8	79.3
316	137.9	97	63.5	41.2
319	76.7	36	48.7	45.4
322	56.2	16	62.4	65.0
325	26.4	-14	77.0	60.1
328	193.6	153	68.5	64.4
331	210.9	170	44.4	75.8
337	153.5	113	77.9	51.7
340	175.9	135	74.5	100.3
343	172.4	132	73.6	92.2
346	179.6	139	70.9	132.9
349	246.7	206	65.4	100.2
352	248.9	208	69.2	105.9
355	283.8	243	84.7	66.6
358	287.1	247	52.5	53.9
361	252.4	212	62.2	113.2
364	102.0	62	87.3	71.2
367	244.4	204	78.7	90.3
370	234.2	194	81.2	106.6
373	269.3	229	70.7	97.7
376	271.9	231	72.2	88.5
379	312.8	272	72.3	70.3
382	324.4	284	73.3	108.8
385	7.0	327	65.1	86.6
388	334.2	294	50.4	83.9
391	321.5	281	30.7	38.1
394	32.2	352	73.4	67.3
397	103.9	163	59.7	44.5
400	155.2	215	64.1	29.9
403	221.3	281	16.9	13.6
406	274.1	334	46.8	23.3
409	272.8	332	83.4	67.8
412	212.1	252	40.1	97.1
415	213.8	253	56.5	86.4
418	196.9	236	56.7	28.9
421	336.9	36	77.7	73.1
424	205.6	265	79.2	80.8
427	258.9	318	76.0	74.8
430	201.3	261	71.7	127.4

McBeth 2 Continued

Depth	Declination Reading	Declination Rotated	Inclination	Intensity
433	206.3	266	66.0	128.6
436	202.6	262	59.1	85.0
439	183.8	243	71.4	73.2
442	154.9	214	55.5	76.5
445	196.1	256	67.0	89.6
448	179.9	239	68.2	93.4
451	163.3	223	77.2	73.9
454	186.6	246	62.1	70.3
457	154.1	214	66.1	90.4
460	157.1	217	67.8	86.0
463	162.2	222	64.7	82.8
466	165.5	225	65.6	87.4
469	177.6	237	59.1	83.1
472	161.0	221	45.1	76.1
475	177.4	237	80.2	100.1
478	161.4	221	66.9	67.8
481	142.5	202	76.7	67.6
484	209.0	269	77.7	149.8
487	287.4	347	83.6	47.3
490	159.5	219	83.5	89.2
493	69.9	129	87.9	69.7
496	189.7	249	79.5	85.5
499	209.8	269	83.3	83.1
502	180.2	240	73.2	125.8
505	173.9	233	80.5	149.5

APPENDIX E

Compilatilation of X-Ray diffraction data

1-North Bay areas

LU-82-1 (Callander Bay)

LU-82-8 (Lake Nipissing)

LU-82-9 (Lake Nipissing)

LU-82-3 (Lake Nosbonsing)

LU-82-7 (Lake Nosbonsing)

LU-82-10 (Lake Talon)

LU-82-13 (Lake Talon)

LU-82-11 (Kiosk Lake)

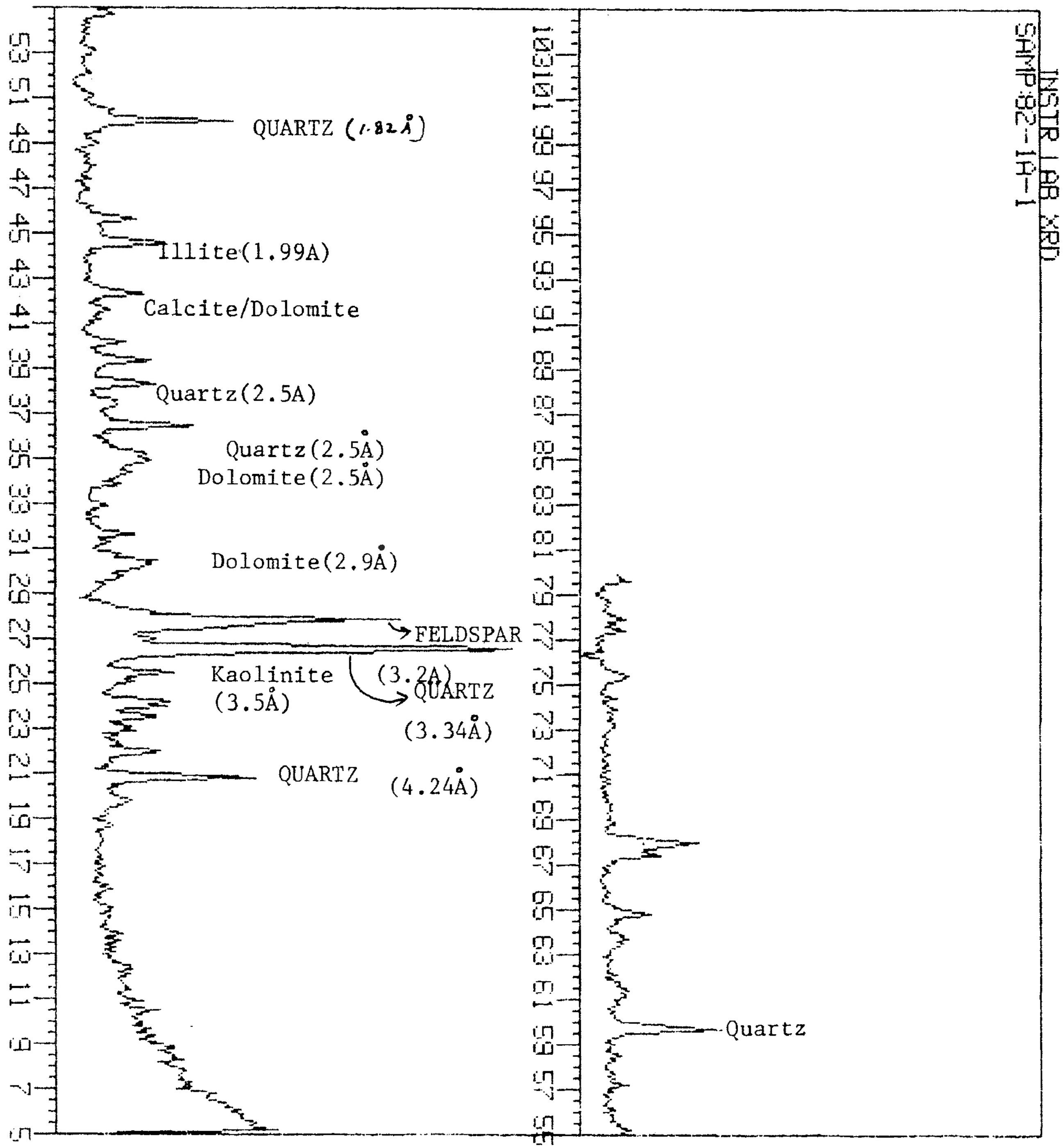
LU-82-12 (Cedar Lake)

2-McBeth Fiord

McBeth-1

McBeth-2

LU-82-1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Calcite/Dolomite
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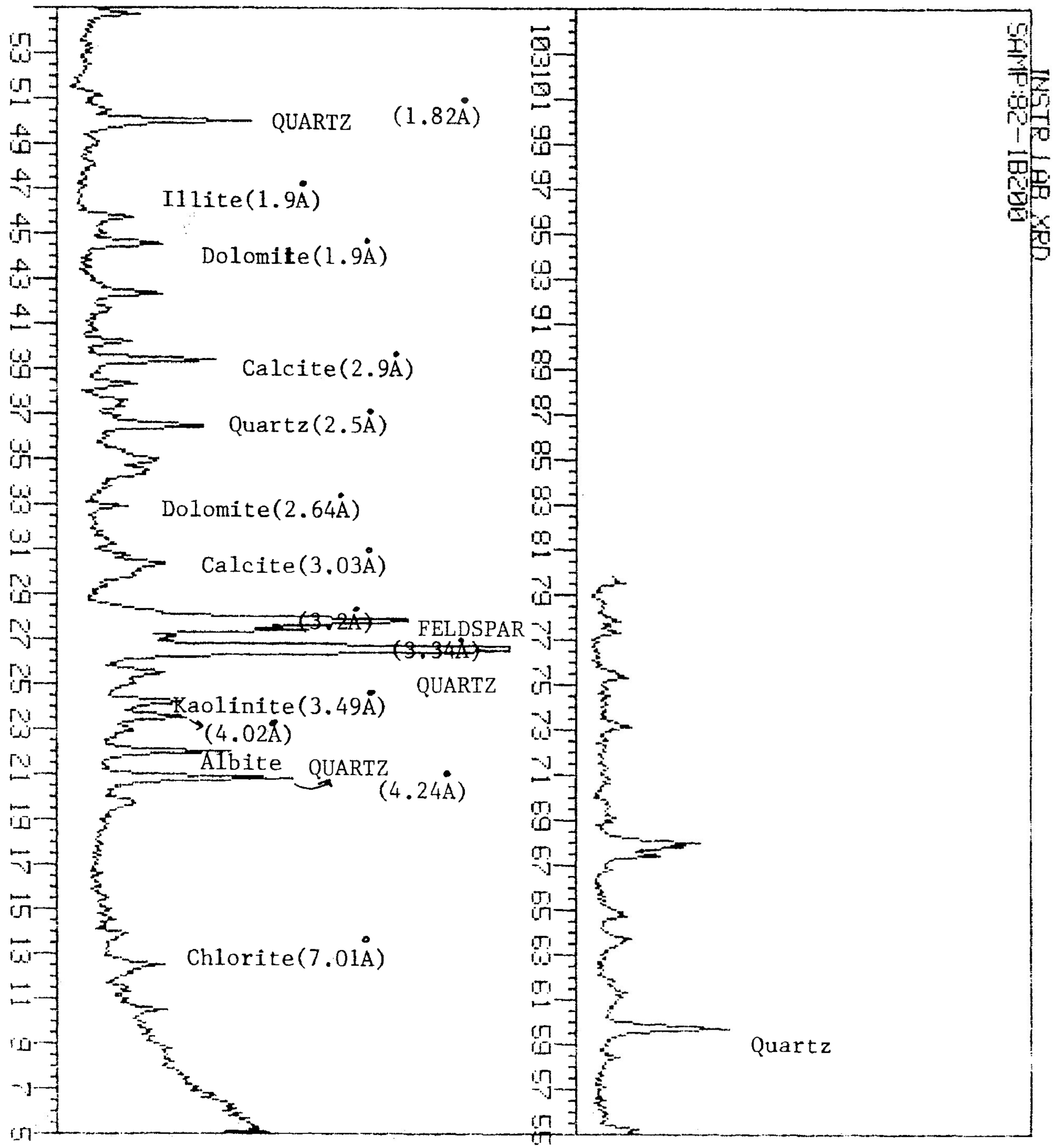
Quartz(2.5Å)
Dolomite(2.5Å)
Dolomite(2.9Å)
FELDSPAR
(3.2Å)
Kaolinite
(3.5Å)
QUARTZ
(3.34Å)
QUARTZ
(4.24Å)
Quartz



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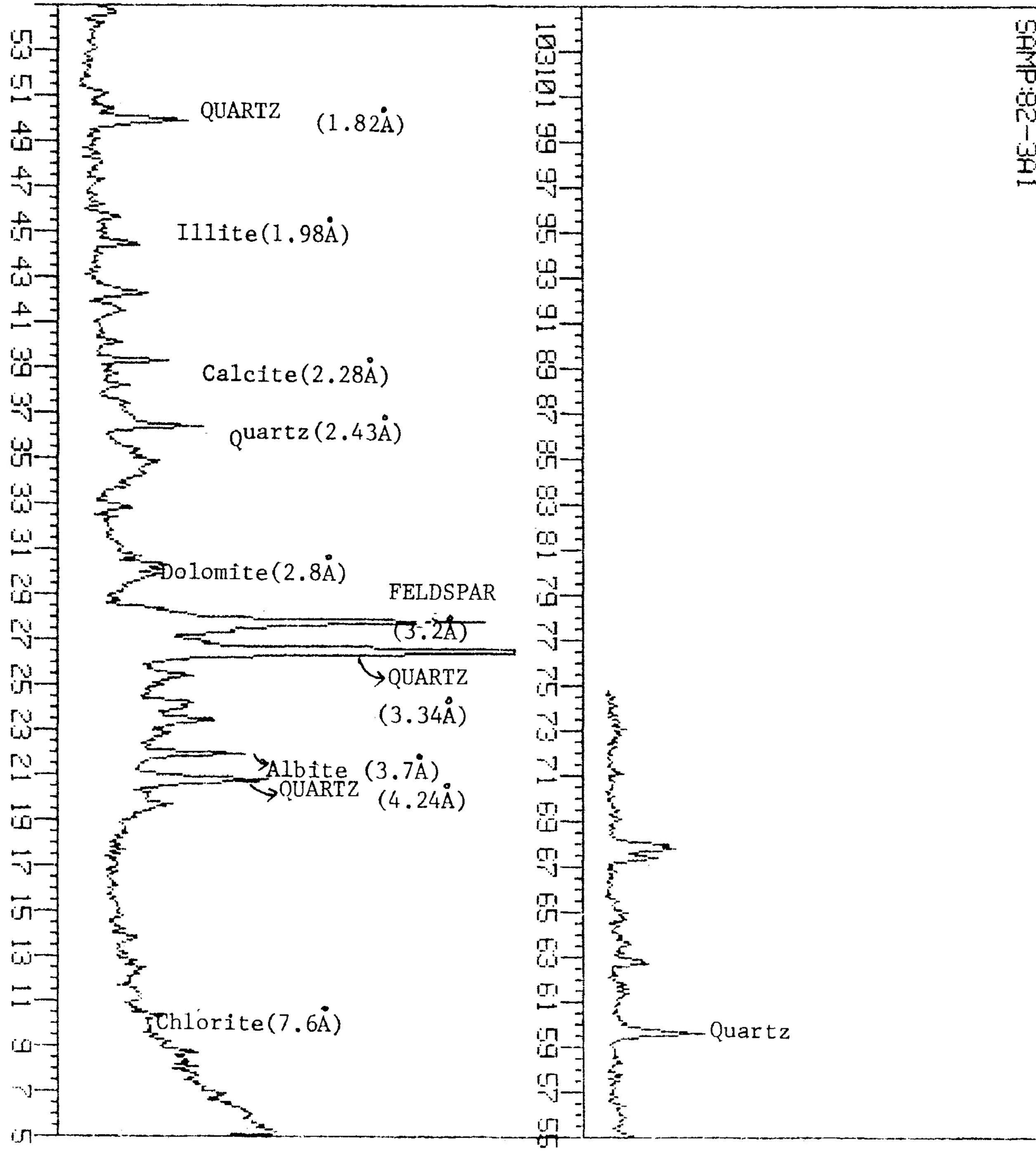
Quartz(2.5Å)
Dolomite(2.64Å)
Calcite(3.03Å)
(3.2Å)
FELDSPAR
(3.34Å)
QUARTZ
Kaolinite(3.49Å)
(4.02Å)
Albite
QUARTZ
(4.24Å)
Chlorite(7.01Å)
Quartz

LU=82-1

LU-82-3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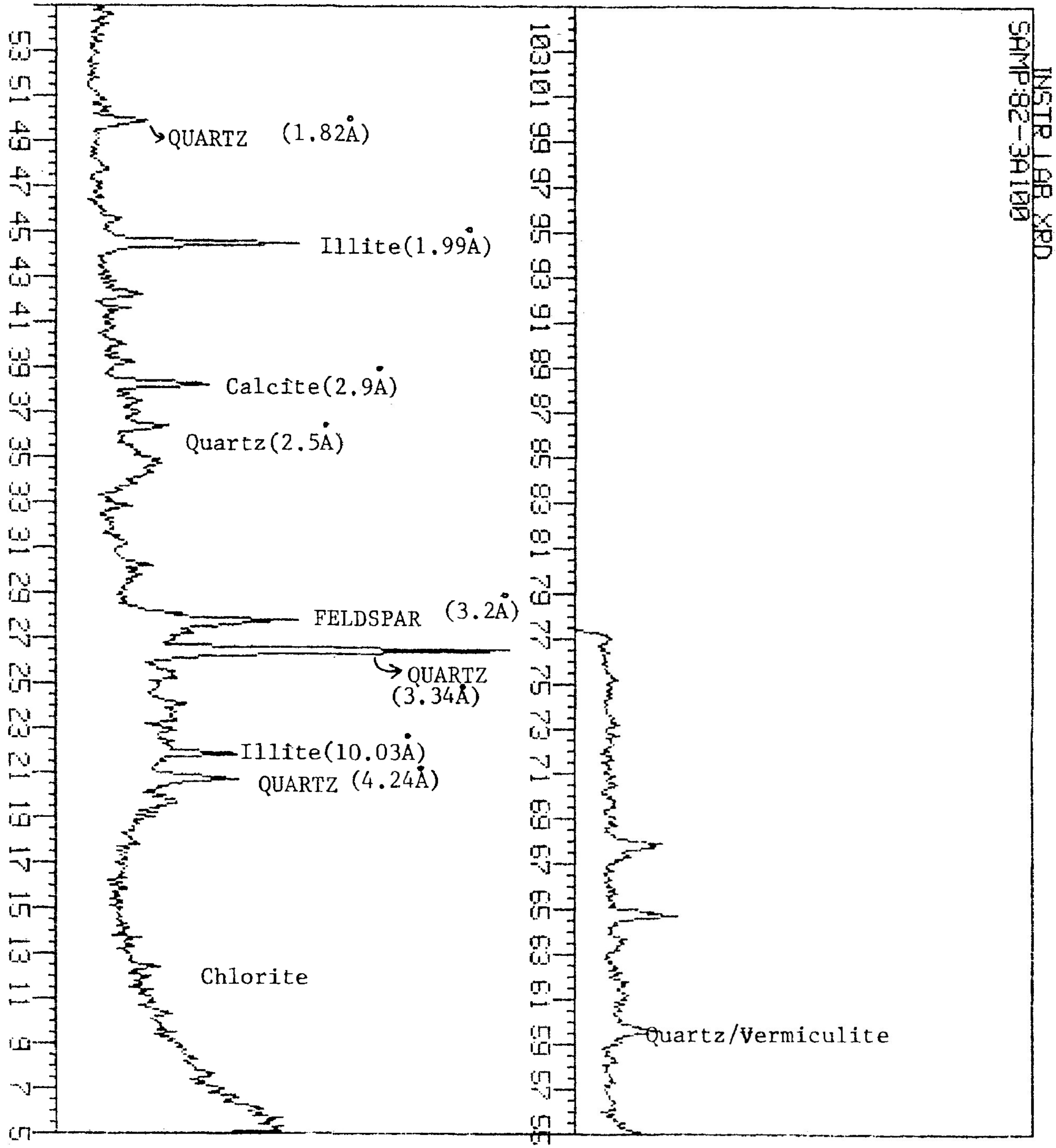
Dolomite(2.8Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
Albite (3.7Å)
QUARTZ (4.24Å)
Chlorite(7.6Å)
Quartz

LU-82-3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Quartz(2.5Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
Illite(10.03Å)
QUARTZ (4.24Å)
Chlorite
Quartz/Vermiculite
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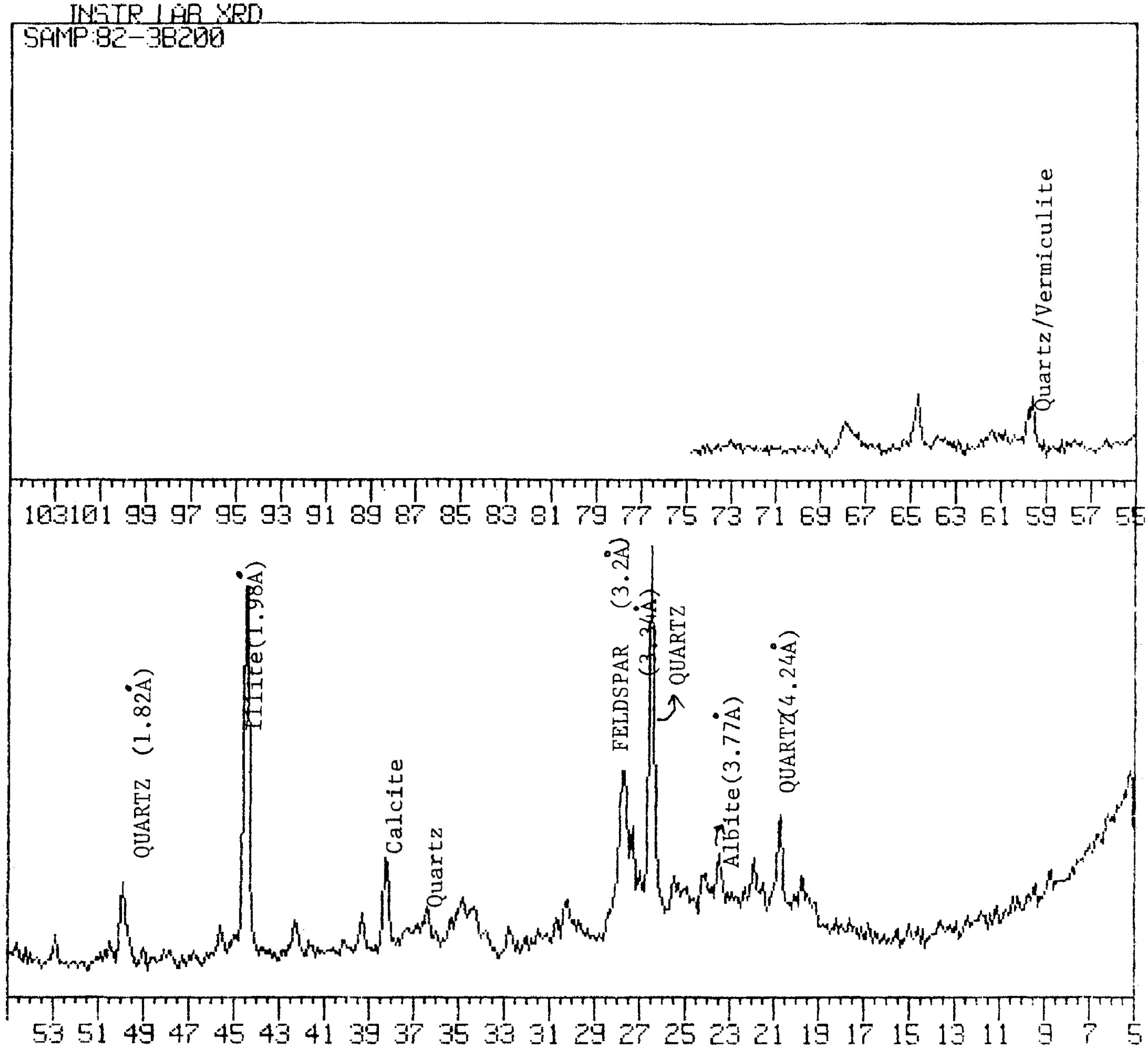
103 101 99 97 95 93 91 89 87 85 83 81 79 77 75 73 71 69 67 65 63 61 59 57 55

LU-82-3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Quartz/Vermiculite
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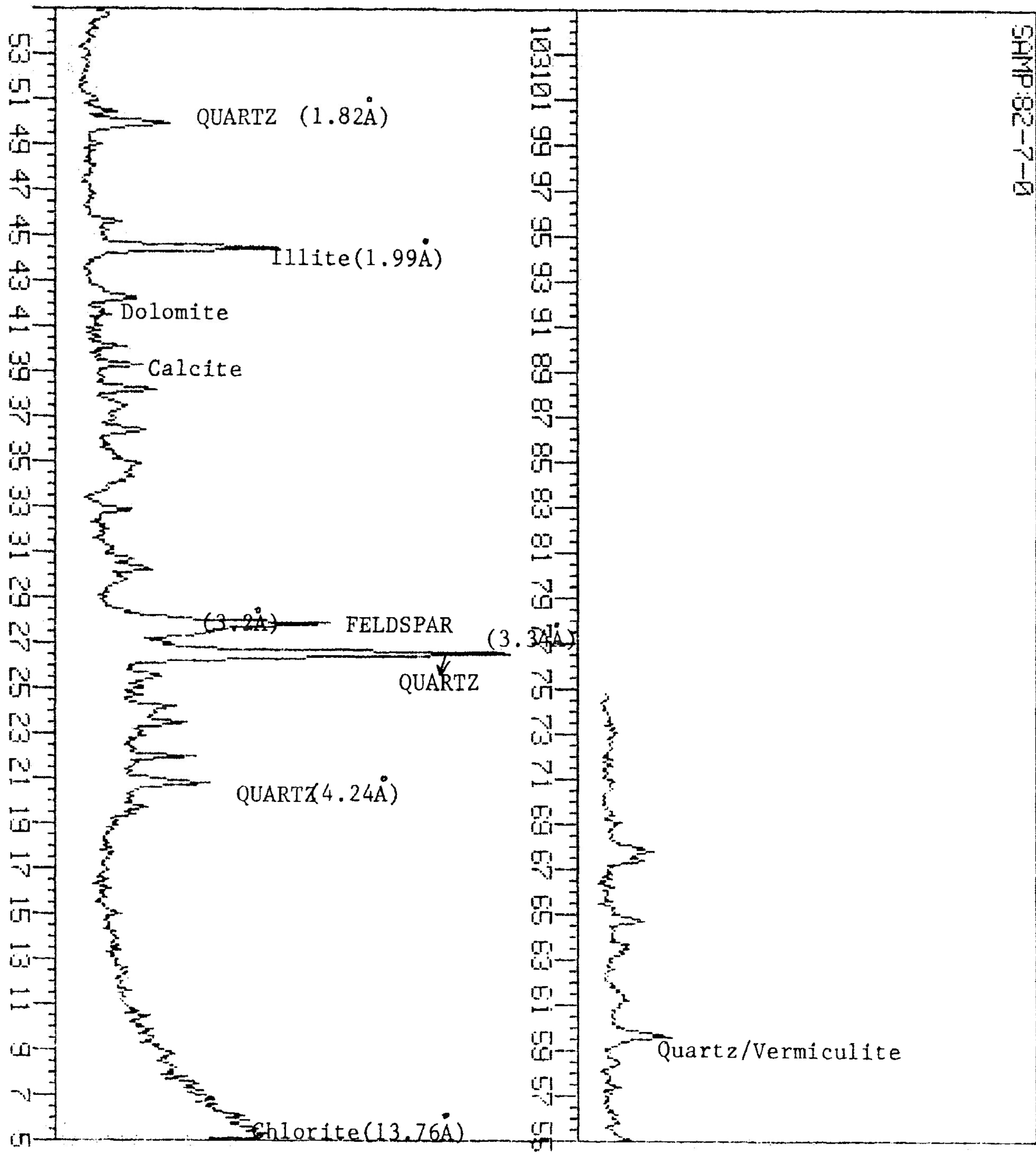
QUARTZ (1.82Å)
Illite(1.98Å)
Calcite
Quartz
FELDSPAR (3.2Å)
(3.34Å)
QUARTZ
Albite(3.77Å)
QUARTZ(4.24Å)
53 51 49 47 45 43 41 39 37 35 33 31 29 27 25 23 21 19 17 15 13 11 9 7 5

LU-82-7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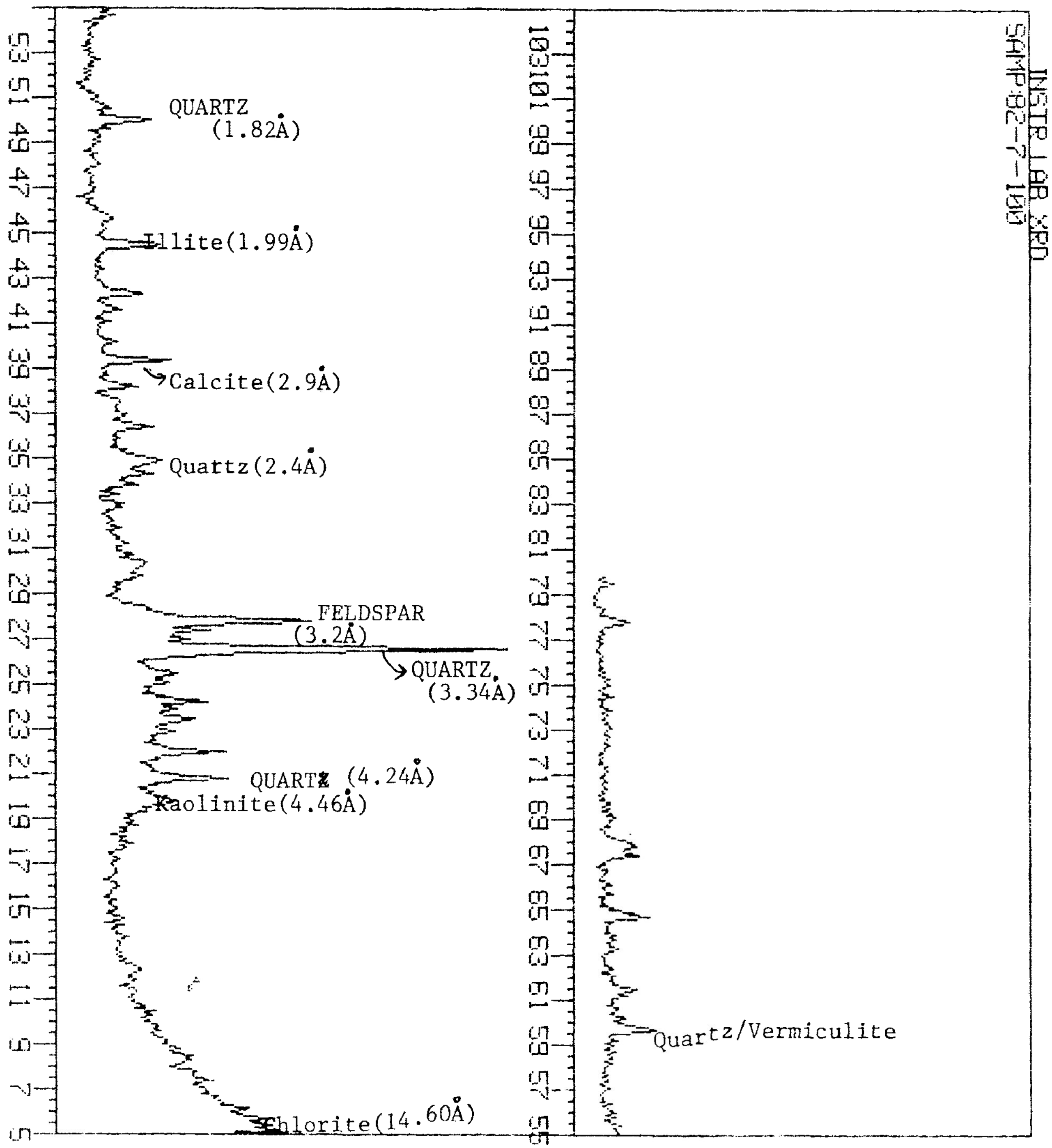
Illite(1.99Å)
Dolomite
Calcite
(3.2Å) FELDSPAR
(3.34Å)
QUARTZ
QUARTZ(4.24Å)
Chlorite(13.76Å)
Quartz/Vermiculite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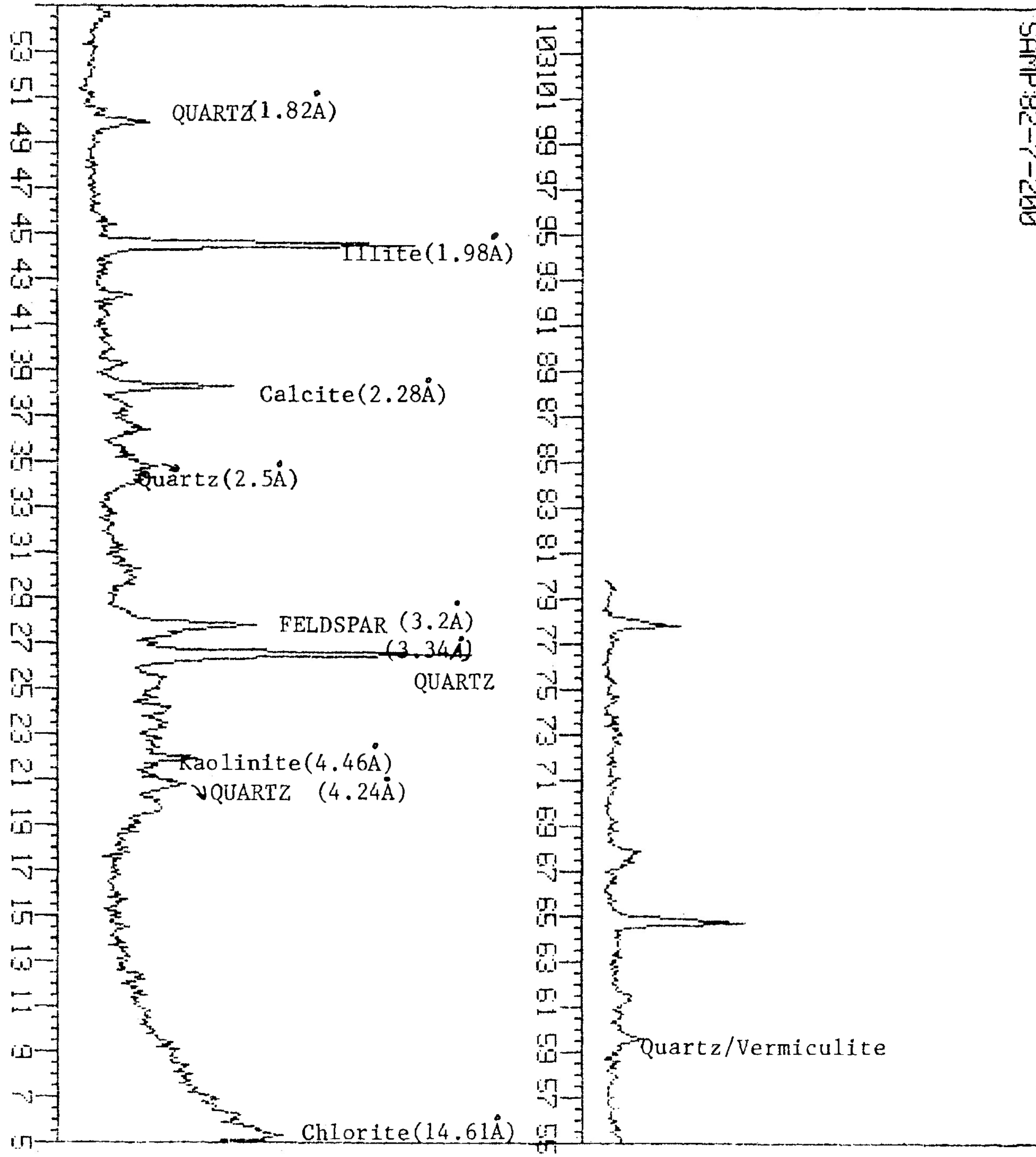
Illite(1.99Å)
Calcite(2.9Å)
Quartz(2.4Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
QUARTZ (4.24Å)
Kaolinite(4.46Å)
Chlorite(14.60Å)
Quartz/Vermiculite

LU-82-7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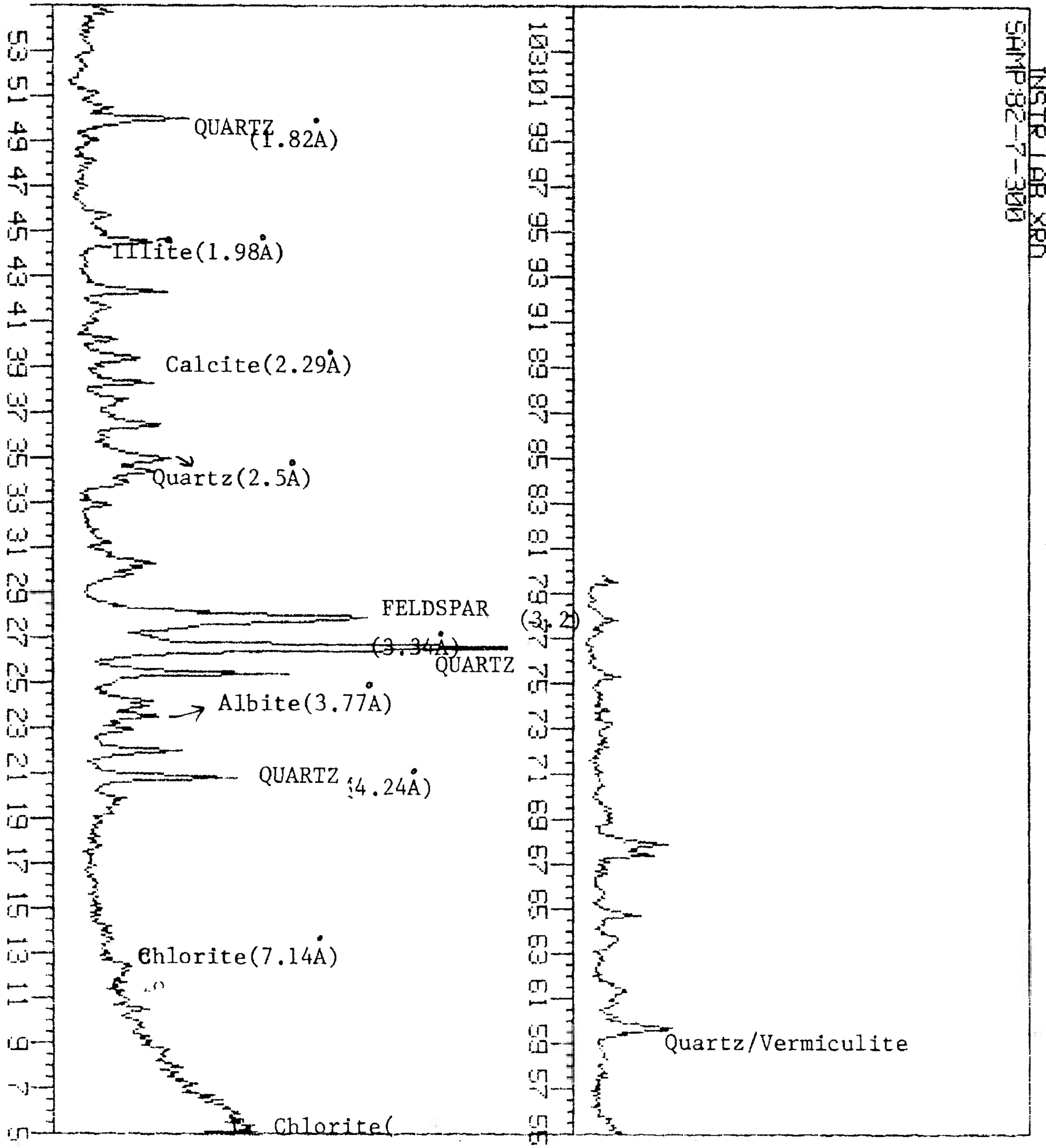
FELDSPAR (3.2Å)
(3.34Å)
QUARTZ
Kaolinite(4.46Å)
QUARTZ (4.24Å)
Chlorite(14.61Å)
Quartz/Vermiculite

LU-82-7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SAMP 82-7-300
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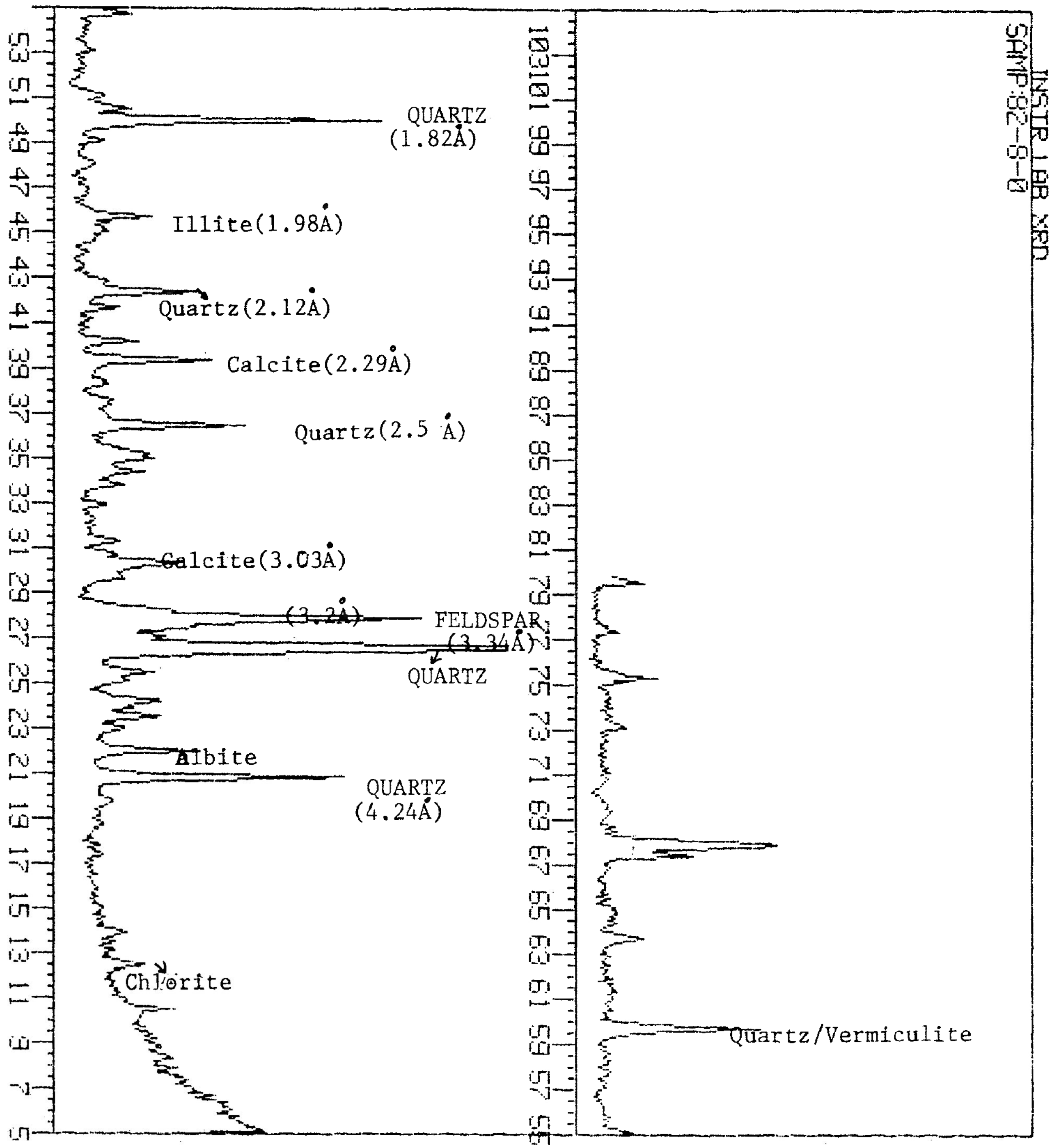
Calcite(2.29Å)
Quartz(2.5Å)
FELDSPAR (3.2)
(3.34Å) QUARTZ
Albite(3.77Å)
QUARTZ (4.24Å)
Chlorite(7.14Å)
Chlorite(
Quartz/Vermiculite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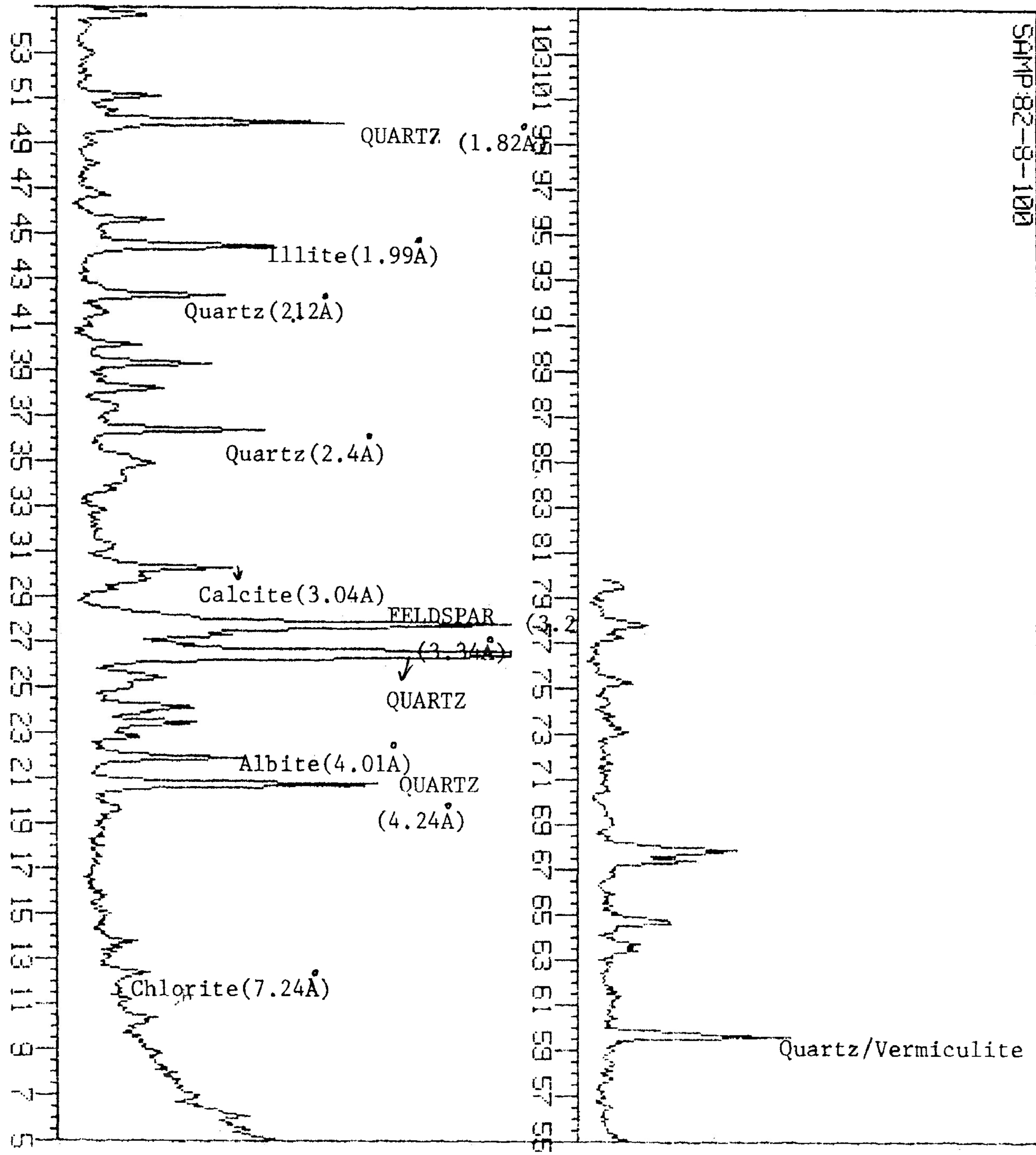
Quartz(2.12Å)
Calcite(2.29Å)
Quartz(2.5 Å)
Calcite(3.03Å)
(3.2Å)
FELDSPAR
(3.34Å)
QUARTZ
Albite
QUARTZ (4.24Å)
Chlorite
Quartz/Vermiculite

LU-82-8

LU-82-8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Quartz(2.12Å)
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FELDSPAR (3.2
(3.34Å)
QUARTZ
Albite(4.01Å)
QUARTZ
(4.24Å)
Chlorite(7.24Å)
Quartz/Vermiculite
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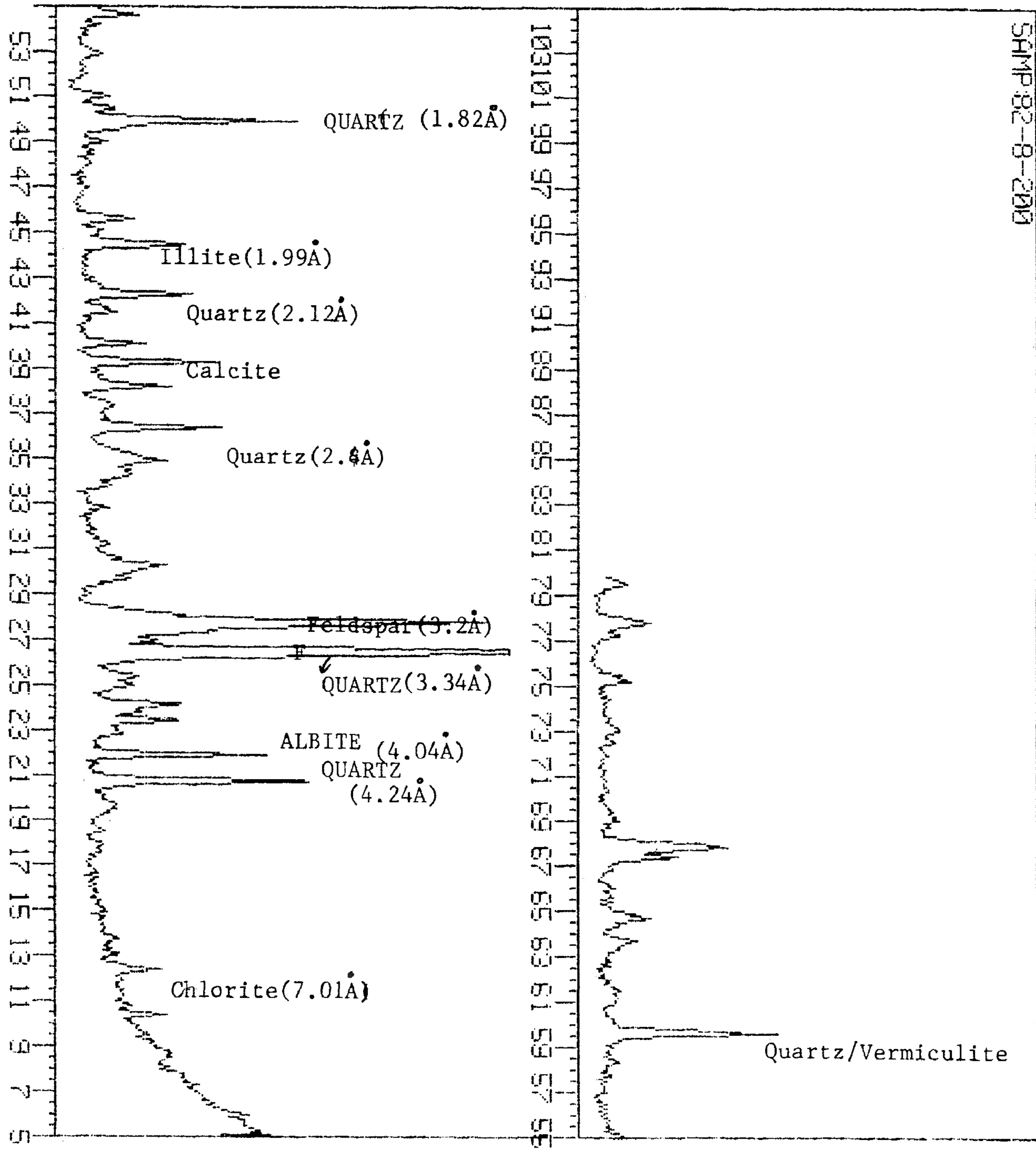
103 101 99 97 95 93 91 89 87 85 83 81 79 77 75 73 71 69 67 65 63 61 59 57 55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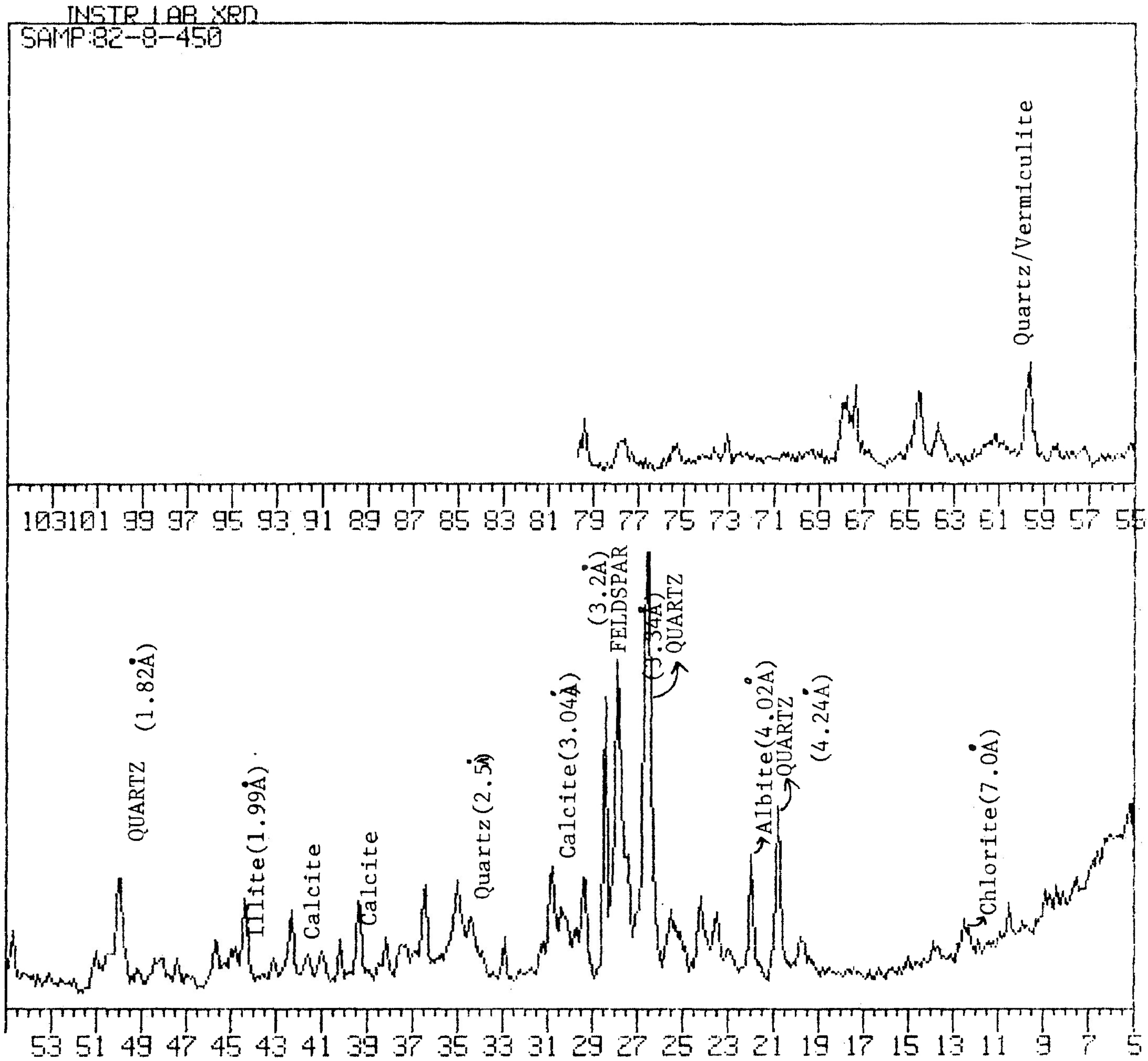
Illite(1.99Å)
Quartz(2.12Å)
Calcite
Quartz(2.4Å)
Feldspar (3.2Å)
QUARTZ(3.34Å)
ALBITE (4.04Å)
QUARTZ (4.24Å)
Chlorite(7.01Å)
Quartz/Vermiculite

LU-82-8

LU-82-8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Quartz/Vermiculite
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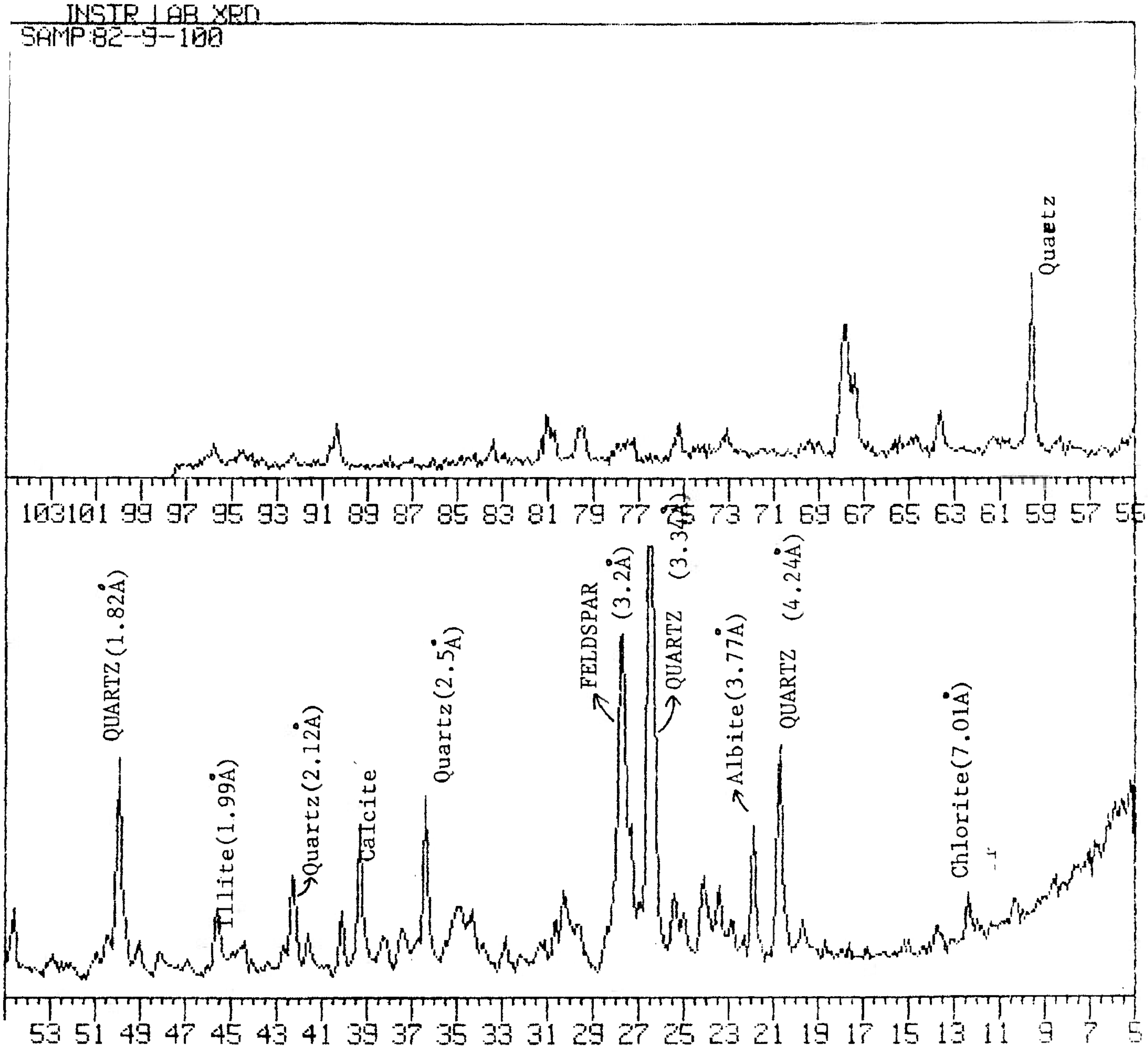
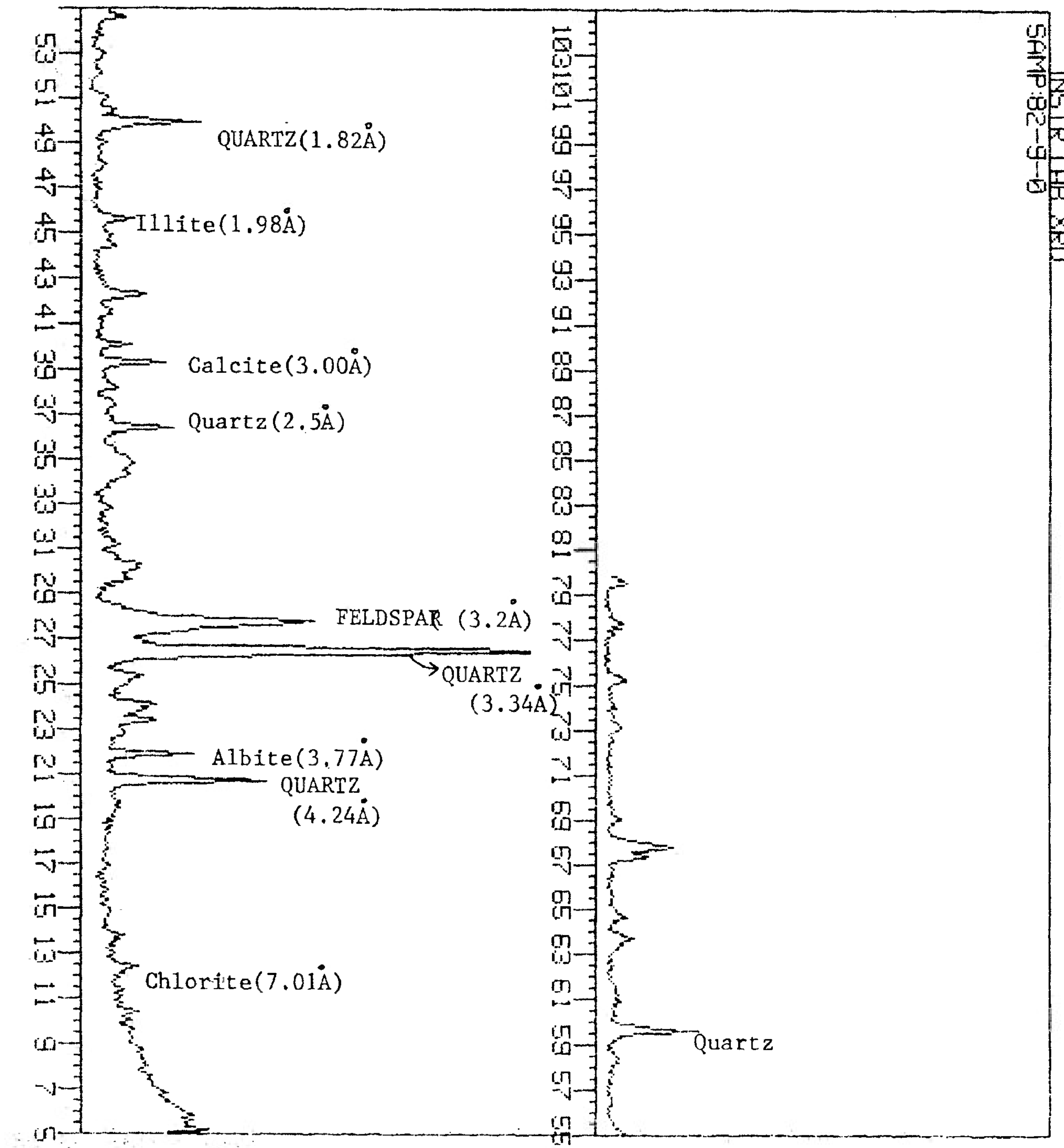
Illite(1.99Å)
Calcite
Calcite
Quartz(2.5Å)
Calcite(3.04Å)
(3.2Å)
FELDSPAR
(3.34Å)
QUARTZ
Albite(4.02Å)
QUARTZ
(4.24Å)
Chlorite(7.0A)
53 51 49 47 45 43 41 39 37 35 33 31 29 27 25 23 21 19 17 15 13 11 9 7 5

LU-82-9


INSTR LAB XRD
SAMP 82--9--100
Quaetz
103 101 99 97 95 93 91 89 87 85 83 81 79 77 75 73 71 69 67 65 63 61 59 57 55
QUARTZ(1.82Å)
Illite(1.99Å)
Quartz(2.12Å)
Calcite
Quartz(2.5Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
Albite(3.77Å)
QUARTZ (4.24Å)
Chlorite(7.01Å)
53 51 49 47 45 43 41 39 37 35 33 31 29 27 25 23 21 19 17 15 13 11 9 7 5

LU-82-9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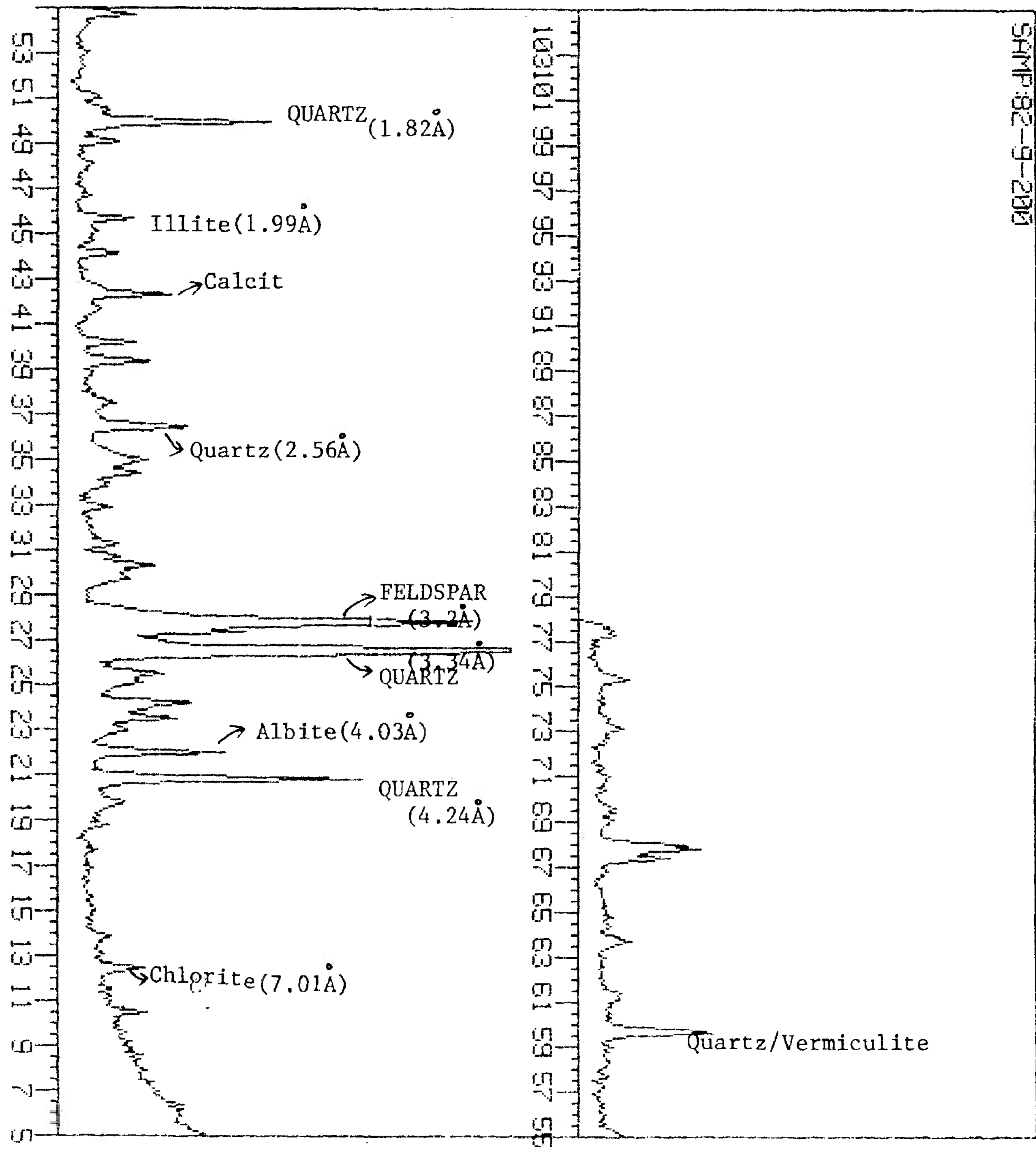
Calcite(3.00Å)
Quartz(2.5Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
Albite(3.77Å)
QUARTZ (4.24Å)
Chlorite(7.01Å)
Quartz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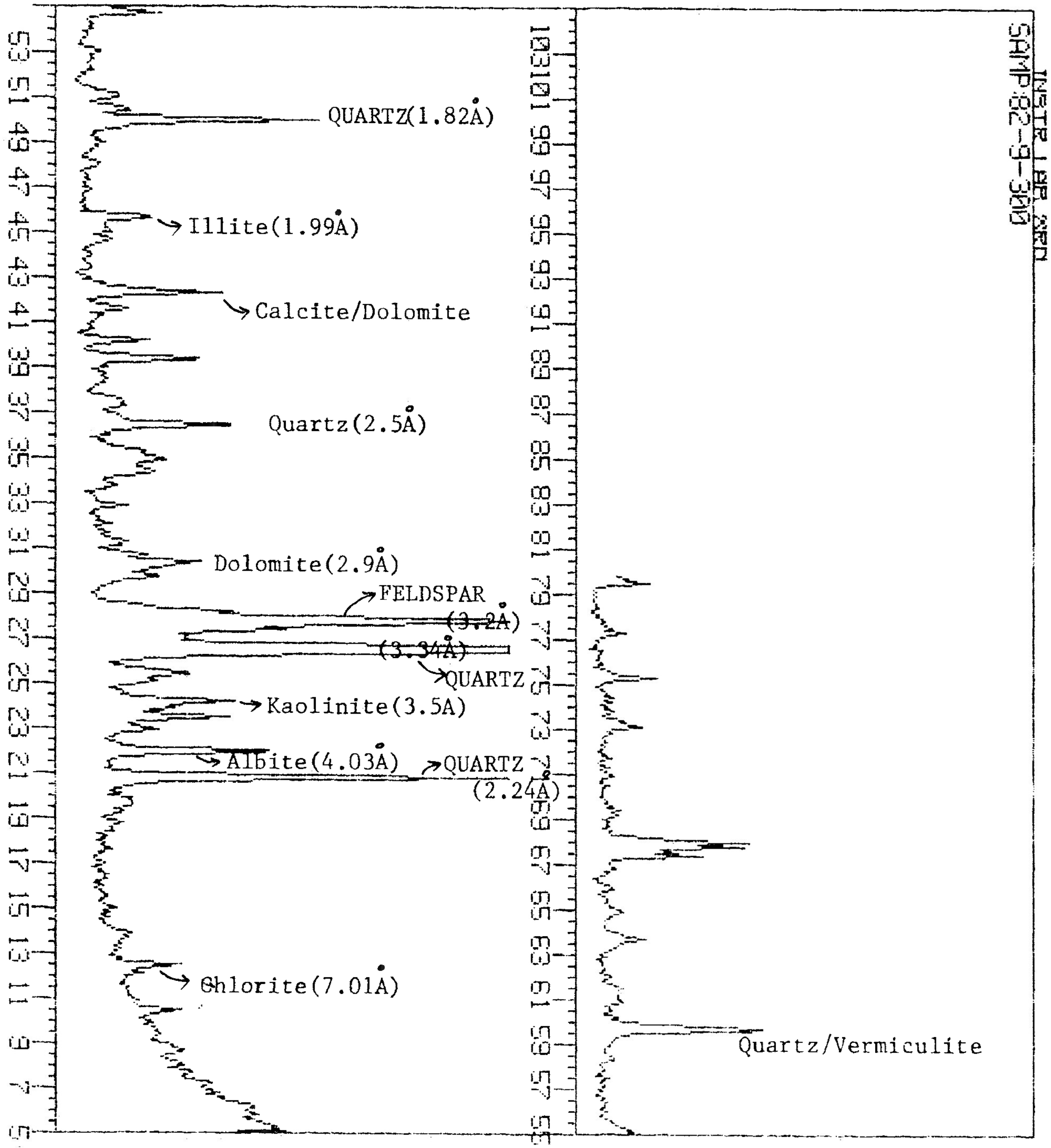
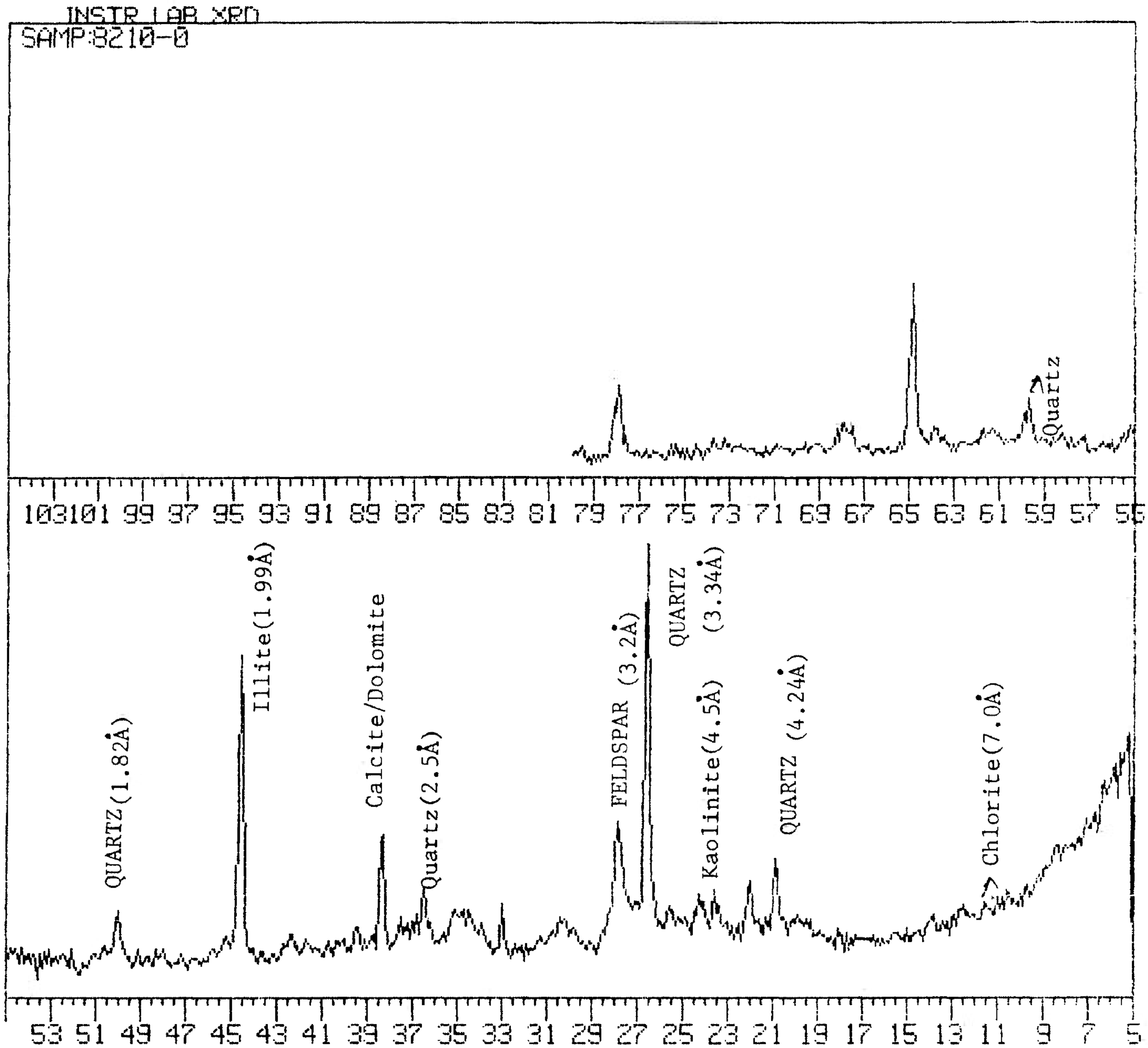
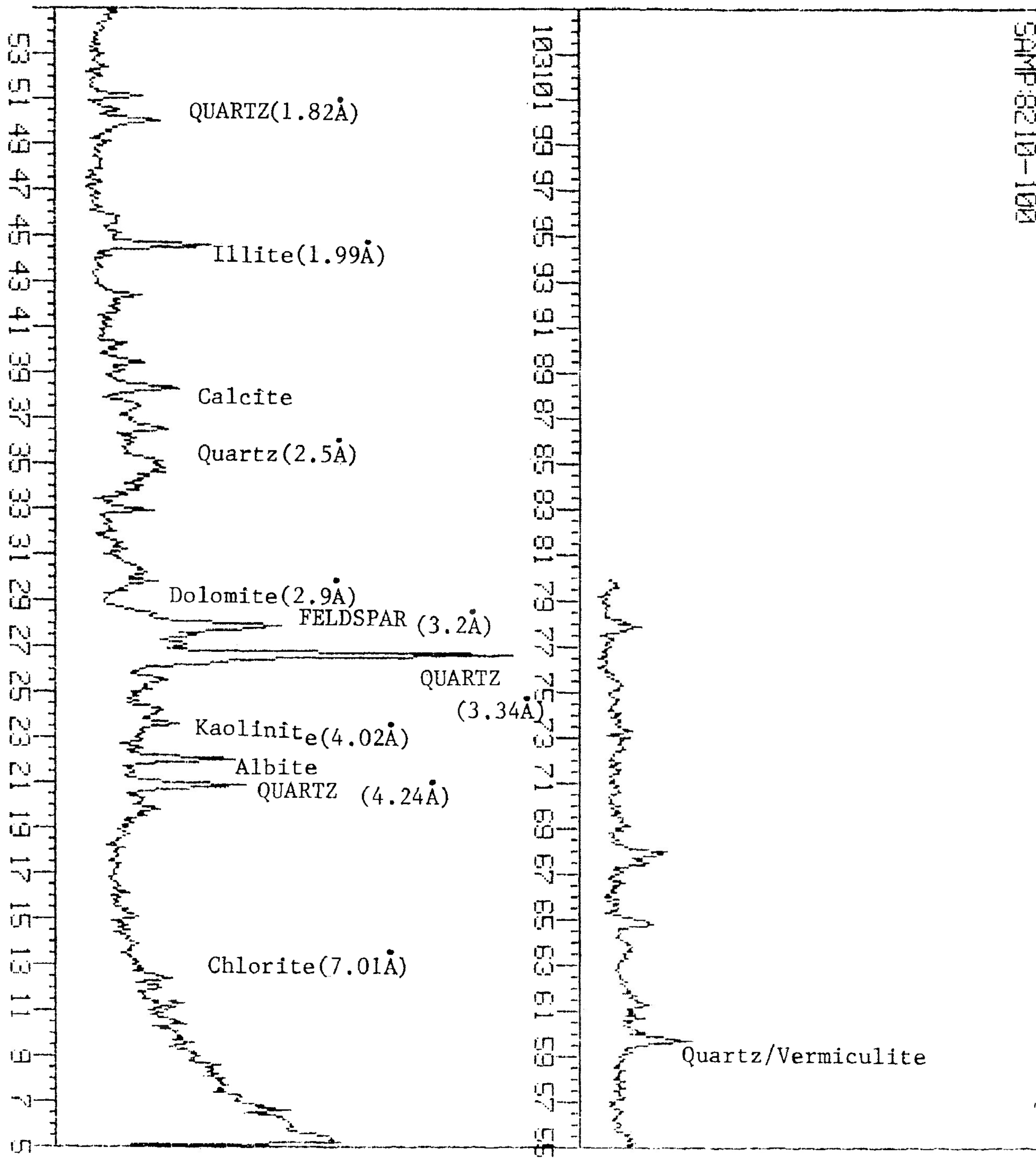
Illite(1.99Å)
Calcit
Quartz(2.56Å)
FELDSPAR (3.2Å)
(3.34Å) QUARTZ
Albite(4.03Å)
QUARTZ (4.24Å)
Chlorite(7.01Å)
Quartz/Vermiculite

LU-82-9


INSTR LBR 2RD
SAMP 82-9-300
QUARTZ(1.82Å)
Illite(1.99Å)
Calcite/Dolomite
Quartz(2.5Å)
Dolomite(2.9Å)
FELDSPAR
(3.2Å)
(3.34Å)
QUARTZ
Kaolinite(3.5A)
Albite(4.03Å)
QUARTZ
(2.24Å)
Chlorite(7.01Å)
Quartz/Vermiculite
53 51 49 47 45 43 41 39 37 35 33 31 29 27 25 23 21 19 17 15 13 11 9 7 5
103 101 99 97 95 93 91 89 87 85 83 81 79 77 75 73 71 69 67 65 63 61 59 57 55

LU-82-10


INSTR LAB XRD
SAMP:8210-0
Quartz
QUARTZ(1.82Å)
Illite(1.99Å)
Calcite/Dolomite
Quartz(2.5Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
Kaolinite(4.5Å)
QUARTZ (4.24Å)
Chlorite(7.0Å)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SAMP 8210-100
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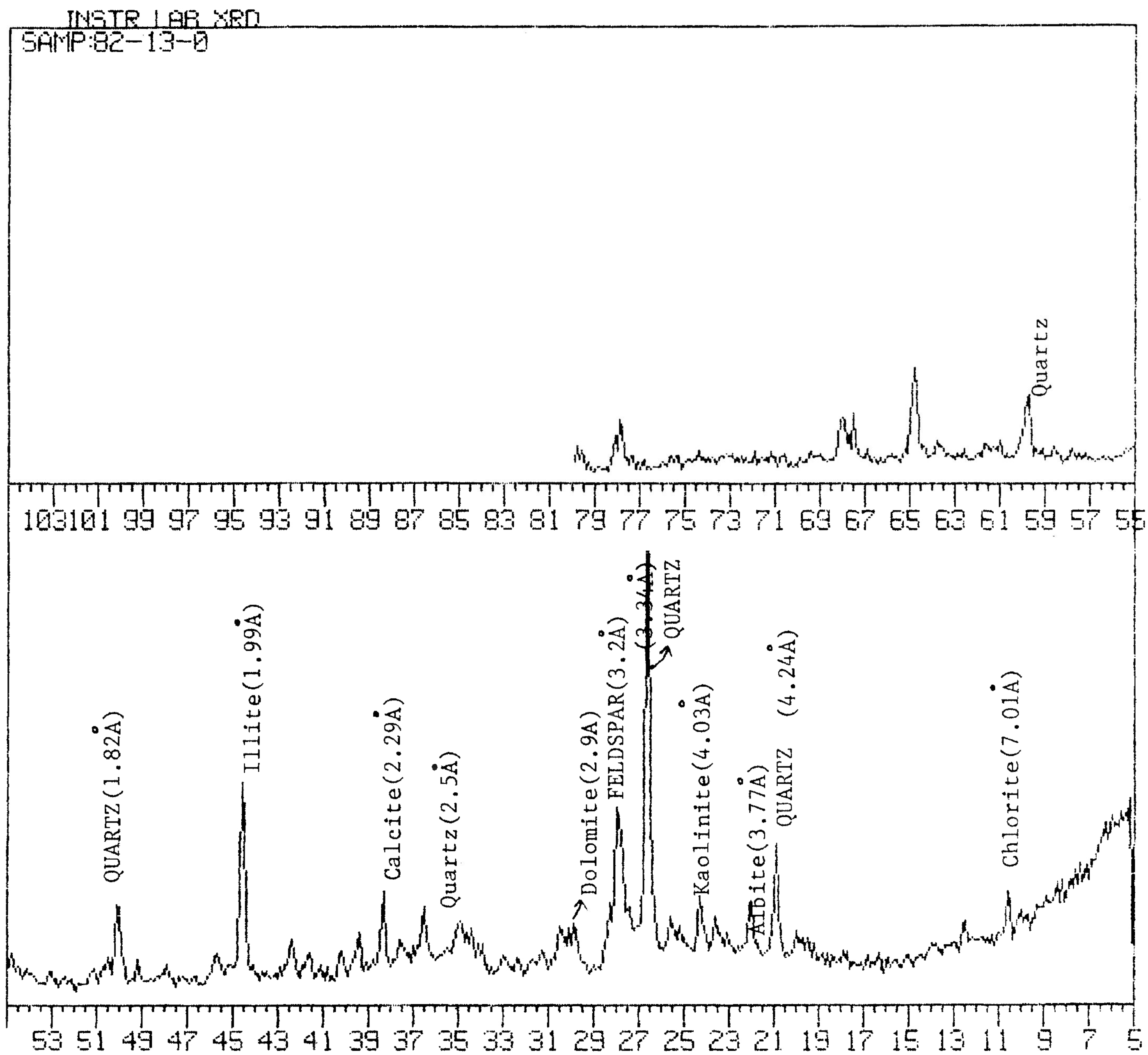
Illite(1.99Å)
Calcite
Quartz(2.5Å)
Dolomite(2.9Å)
FELDSPAR (3.2Å)
QUARTZ
(3.34Å)
Kaolinite(4.02Å)
Albite
QUARTZ (4.24Å)
Chlorite(7.01Å)
Quartz/Vermiculite

LU-82-10

LU-82-13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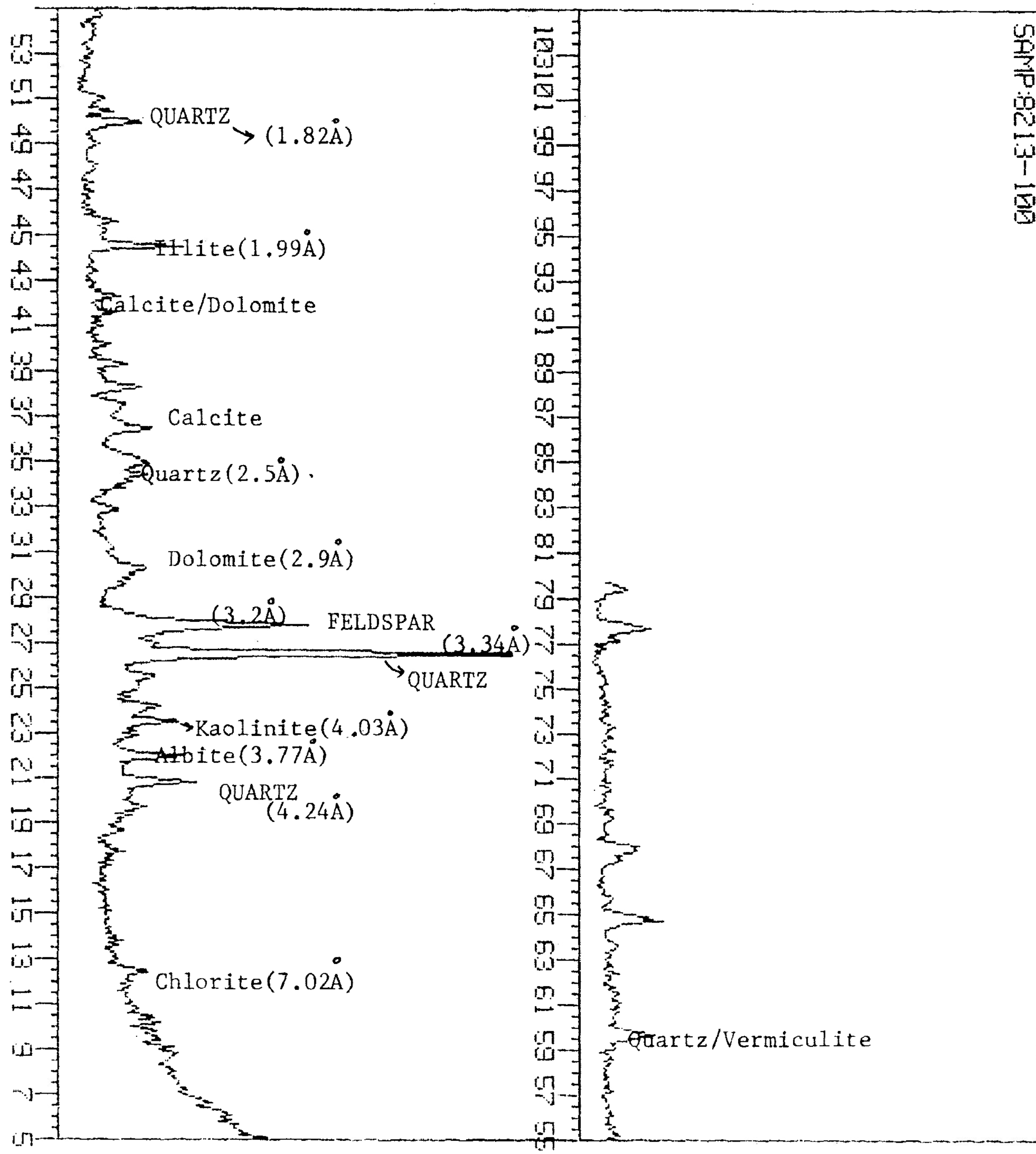
103 101 99 97 95 93 91 89 87 85 83 81 79 77 75 73 71 69 67 65 63 61 59 57 55
QUARTZ(1.82Å)
Illite(1.99Å)
Calcite(2.29Å)
Quartz(2.5Å)
Dolomite(2.9A)
FELDSPAR(3.2Å)
(3.34Å)
QUARTZ
Kaolinite(4.03Å)
Albite(3.77Å)
QUARTZ (4.24Å)
Chlorite(7.01Å)
53 51 49 47 45 43 41 39 37 35 33 31 29 27 25 23 21 19 17 15 13 11 9 7 5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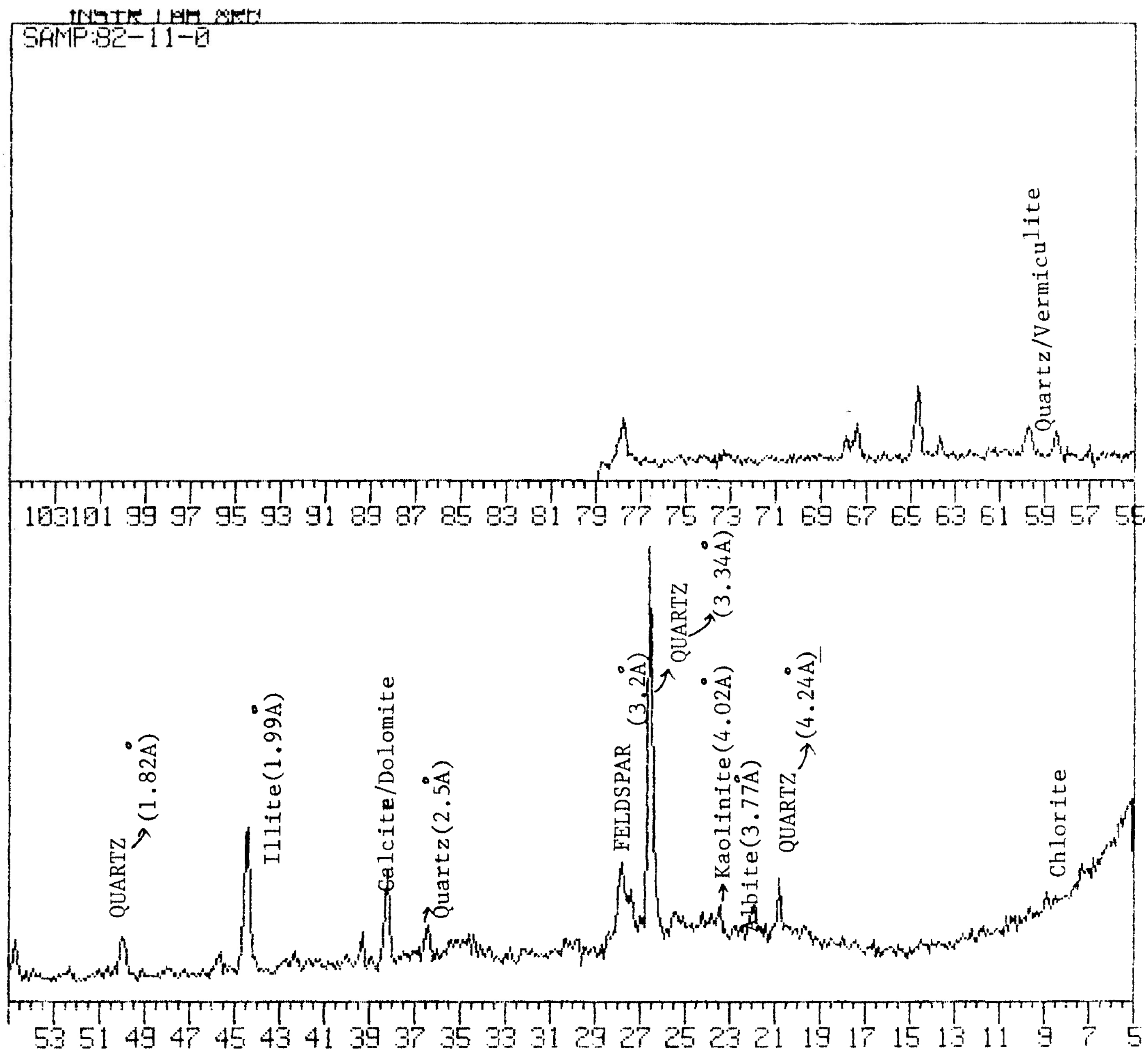
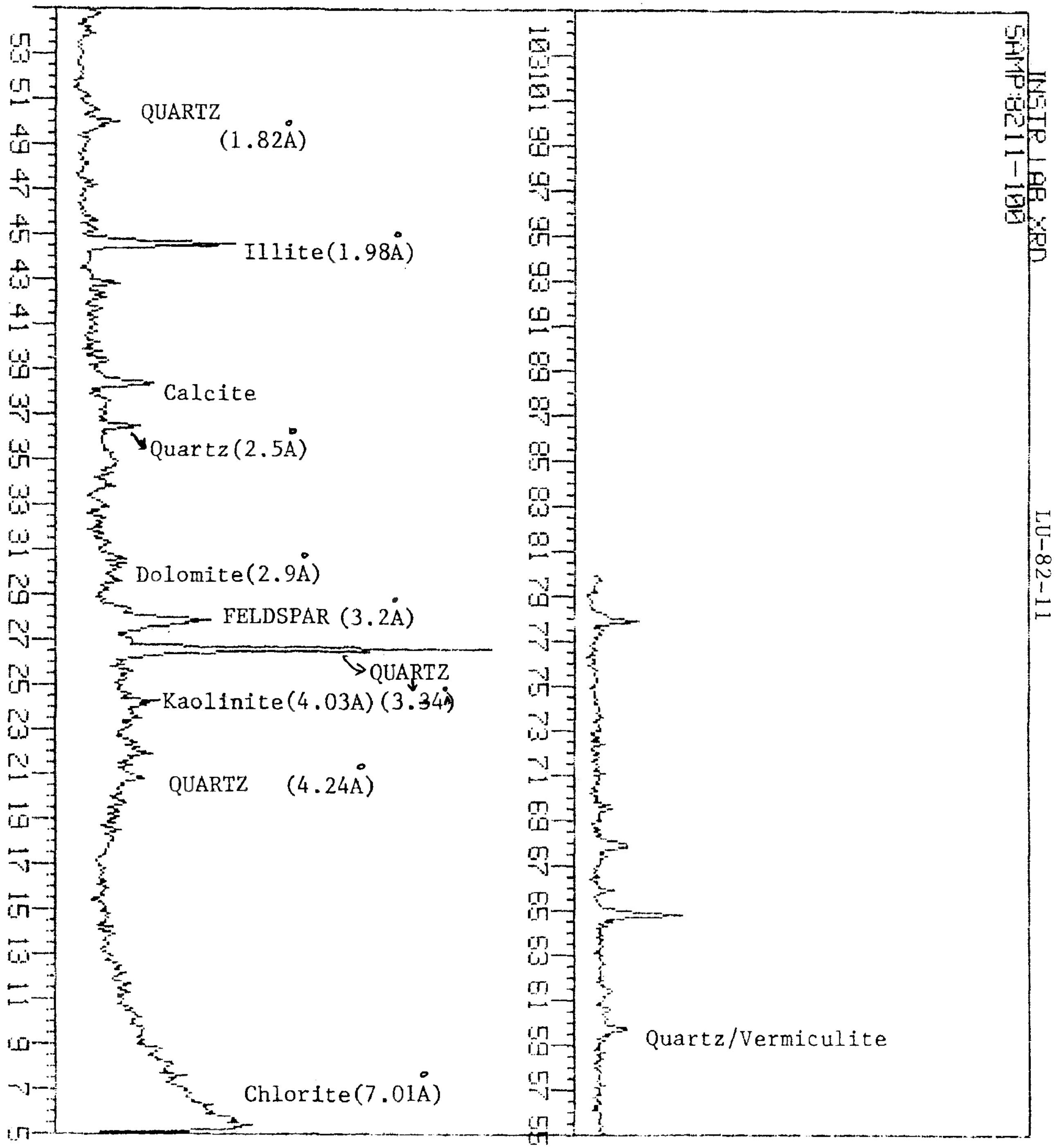
Illite(1.99Å)
Calcite/Dolomite
Calcite
Quartz(2.5Å)
Dolomite(2.9Å)
(3.2Å)
FELDSPAR
(3.34Å)
QUARTZ
Kaolinite(4.03Å)
Albite(3.77Å)
QUARTZ
(4.24Å)
Chlorite(7.02Å)
Quartz/Vermiculite
53 51 49 47 45 43 41 39 37 35 33 31 29 27 25 23 21 19 17 15 13 11 9 7 5
103 101 99 97 95 93 91 89 87 85 83 81 79 77 75 73 71 69 67 65 63 61 59 57 55

LU-82-13

LU-82-11


SAMP:82-11-0
Quartz/Vermiculite
103 101 99 97 95 93 91 89 87 85 83 81 79 77 75 73 71 69 67 65 63 61 59 57 55
QUARTZ (1.82Å)
Illite(1.99Å)
Calcite/Dolomite
Quartz(2.5Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
Kaolinite(4.02Å)
Albite(3.77Å)
QUARTZ (4.24Å)
Chlorite
53 51 49 47 45 43 41 39 37 35 33 31 29 27 25 23 21 19 17 15 13 11 9 7 5



INSTR LAB XRD
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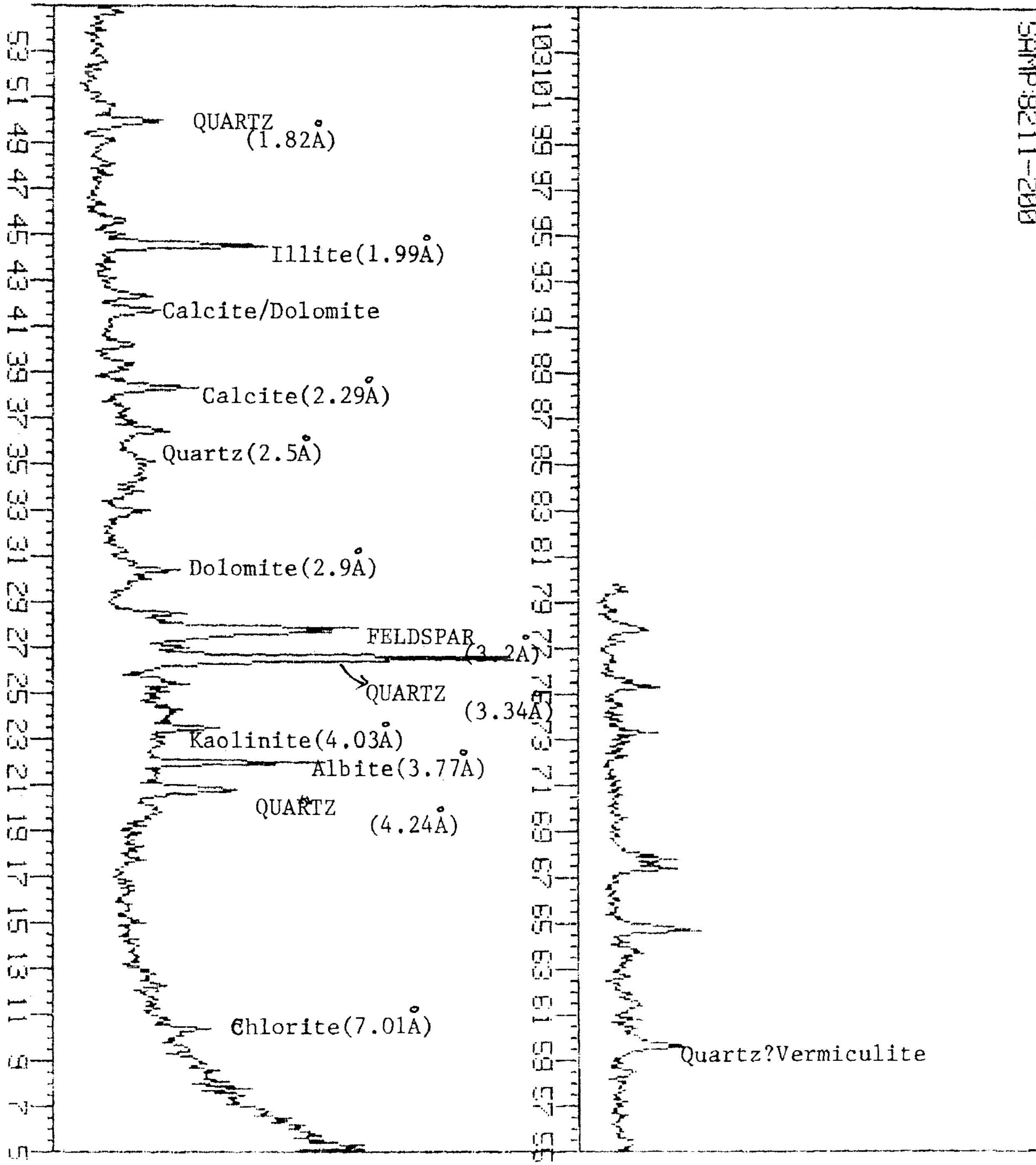
Illite(1.98Å)
Calcite
Quartz(2.5Å)
Dolomite(2.9Å)
FELDSPAR (3.2Å)
QUARTZ
Kaolinite(4.03A)(3.34Å)
QUARTZ (4.24Å)
Chlorite(7.01Å)
Quartz/Vermiculite

LU-82-11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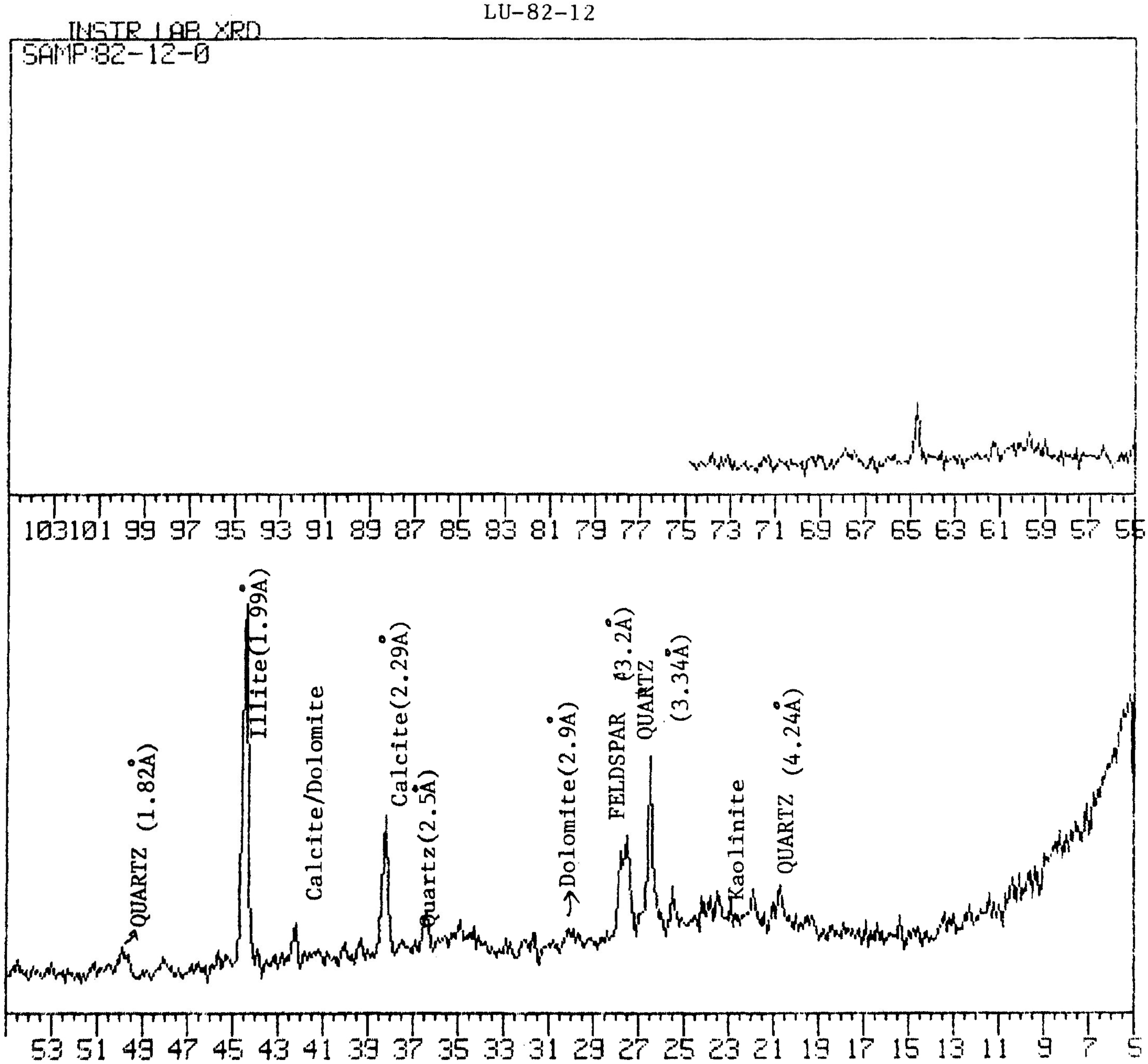
Illite(1.99Å)
Calcite/Dolomite
Calcite(2.29Å)
Quartz(2.5Å)
Dolomite(2.9Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
Kaolinite(4.03Å)
Albite(3.77Å)
QUARTZ (4.24Å)
Chlorite(7.01Å)
Quartz?Vermiculite

LU-82-11

LU-82-12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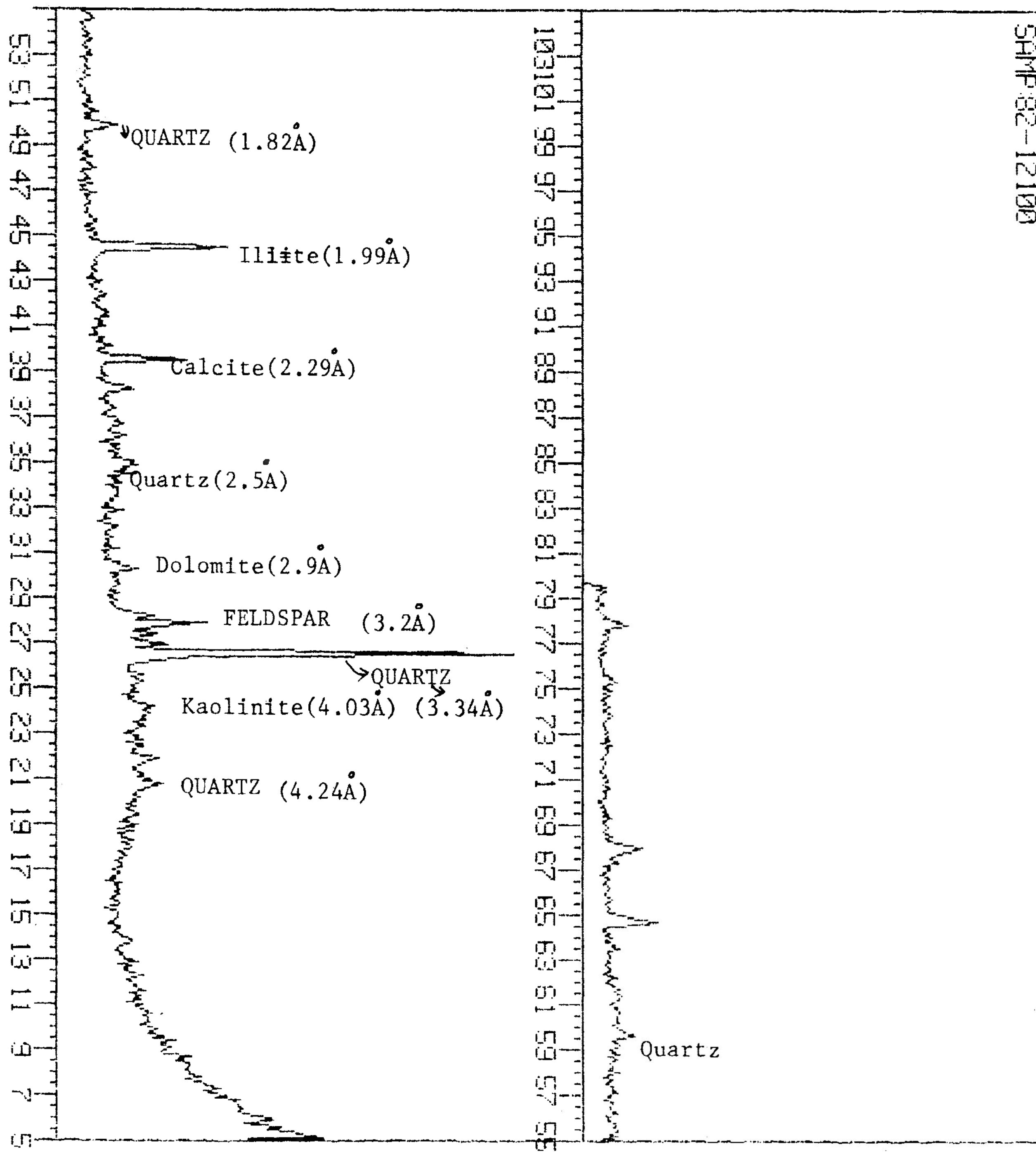
Illite(1.99Å)
Calcite/Dolomite
Calcite(2.29Å)
Quartz(2.5Å)
Dolomite(2.9Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
Kaolinite
QUARTZ (4.24Å)
53 51 49 47 45 43 41 39 37 35 33 31 29 27 25 23 21 19 17 15 13 11 9 7 5

LU-82-12


INSTIE LAB XRD
SAMP 82-12100
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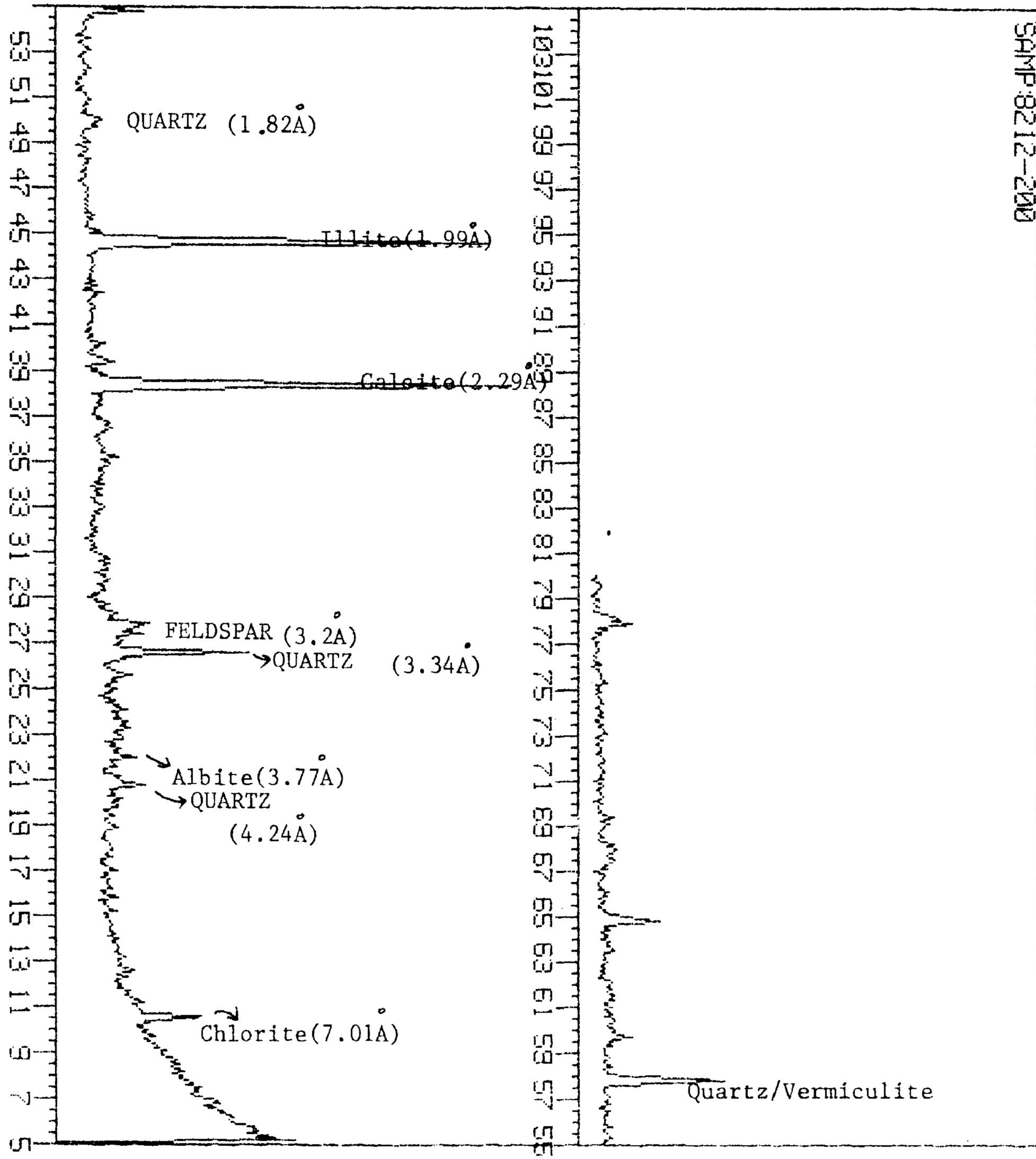
Ilite(1.99Å)
Calcite(2.29Å)
Quartz(2.5Å)
Dolomite(2.9Å)
FELDSPAR (3.2Å)
QUARTZ
Kaolinite(4.03Å) (3.34Å)
QUARTZ (4.24Å)
Quartz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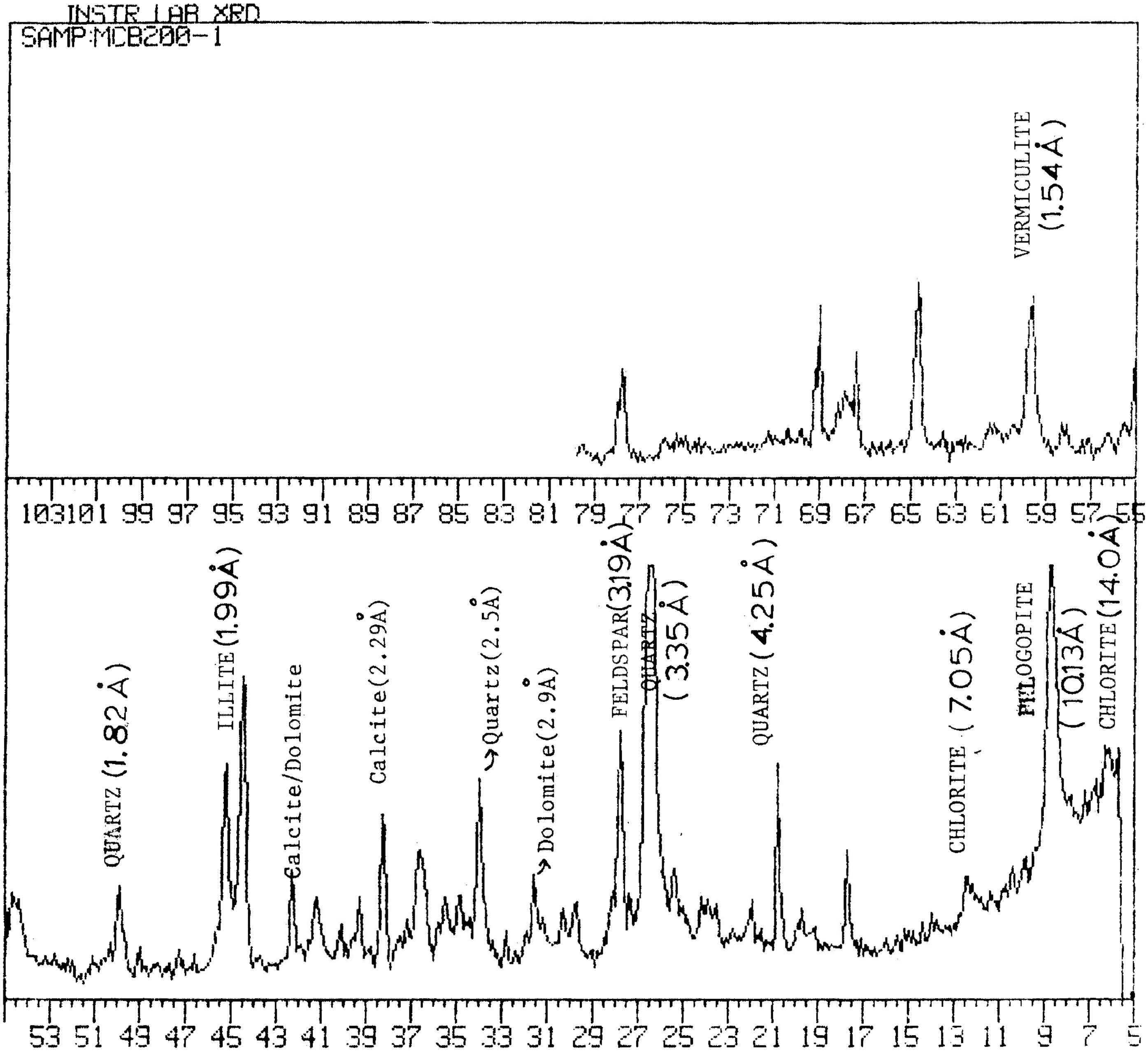
Illite(1.99Å)
Calcite(2.29Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
Albite(3.77Å)
QUARTZ (4.24Å)
Chlorite(7.01Å)
Quartz/Vermiculite
53 51 49 47 45 43 41 39 37 35 33 31 29 27 25 23 21 19 17 15 13 11 9 7 5
103 101 99 97 95 93 91 89 87 85 83 81 79 77 75 73 71 69 67 65 63 61 59 57 55

LU-82-12

McBeth-1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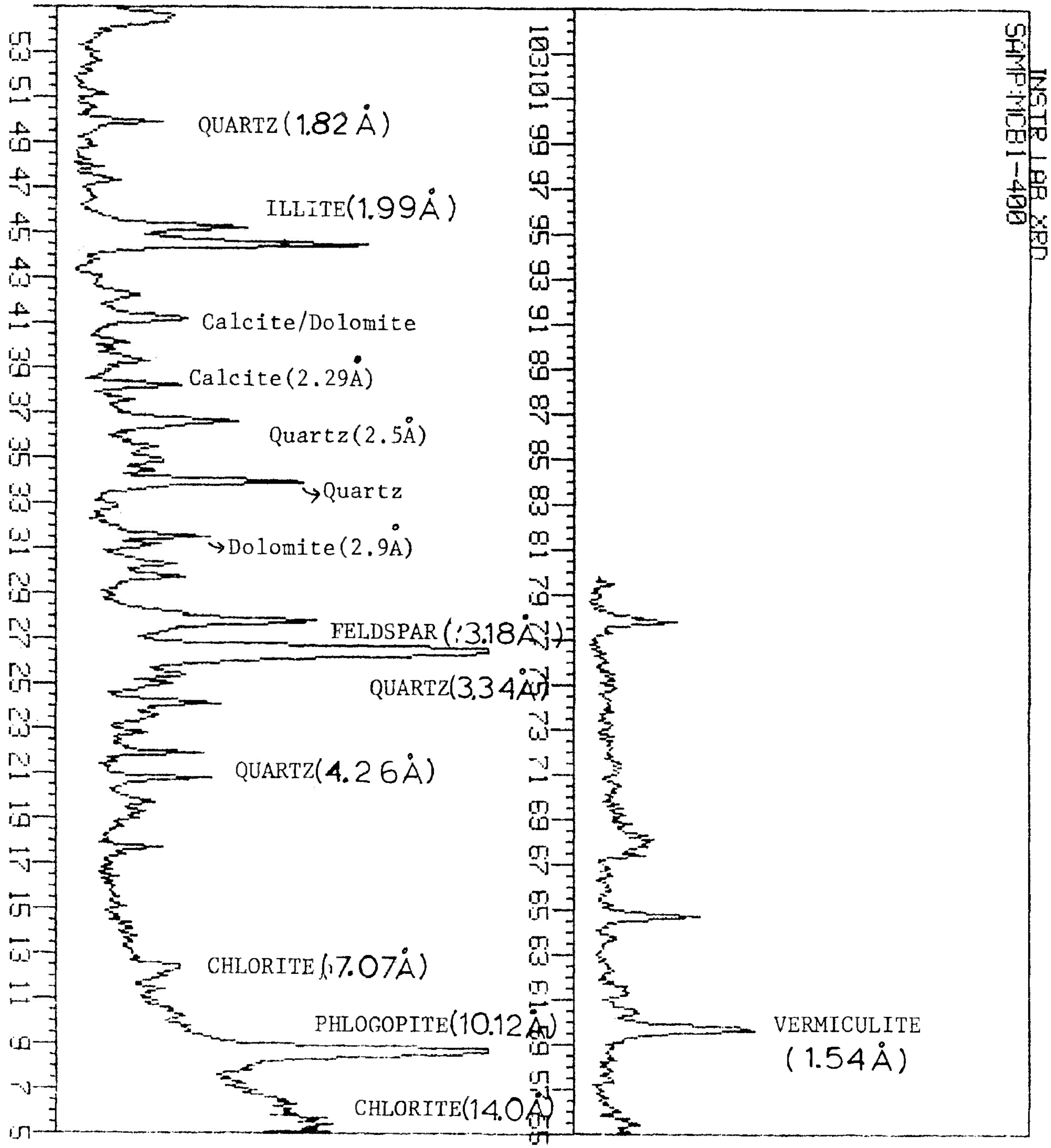
QUARTZ (1.82Å)
ILLITE (1.99Å)
Calcite/Dolomite
Calcite(2.29Å)
Quartz(2.5Å)
Dolomite(2.9Å)
FELDSPAR(3.19Å)
QUARTZ
(3.35Å)
QUARTZ (4.25Å)
CHLORITE (7.05Å)
PHLOGOPITE
(10.13Å)
CHLORITE (14.0Å)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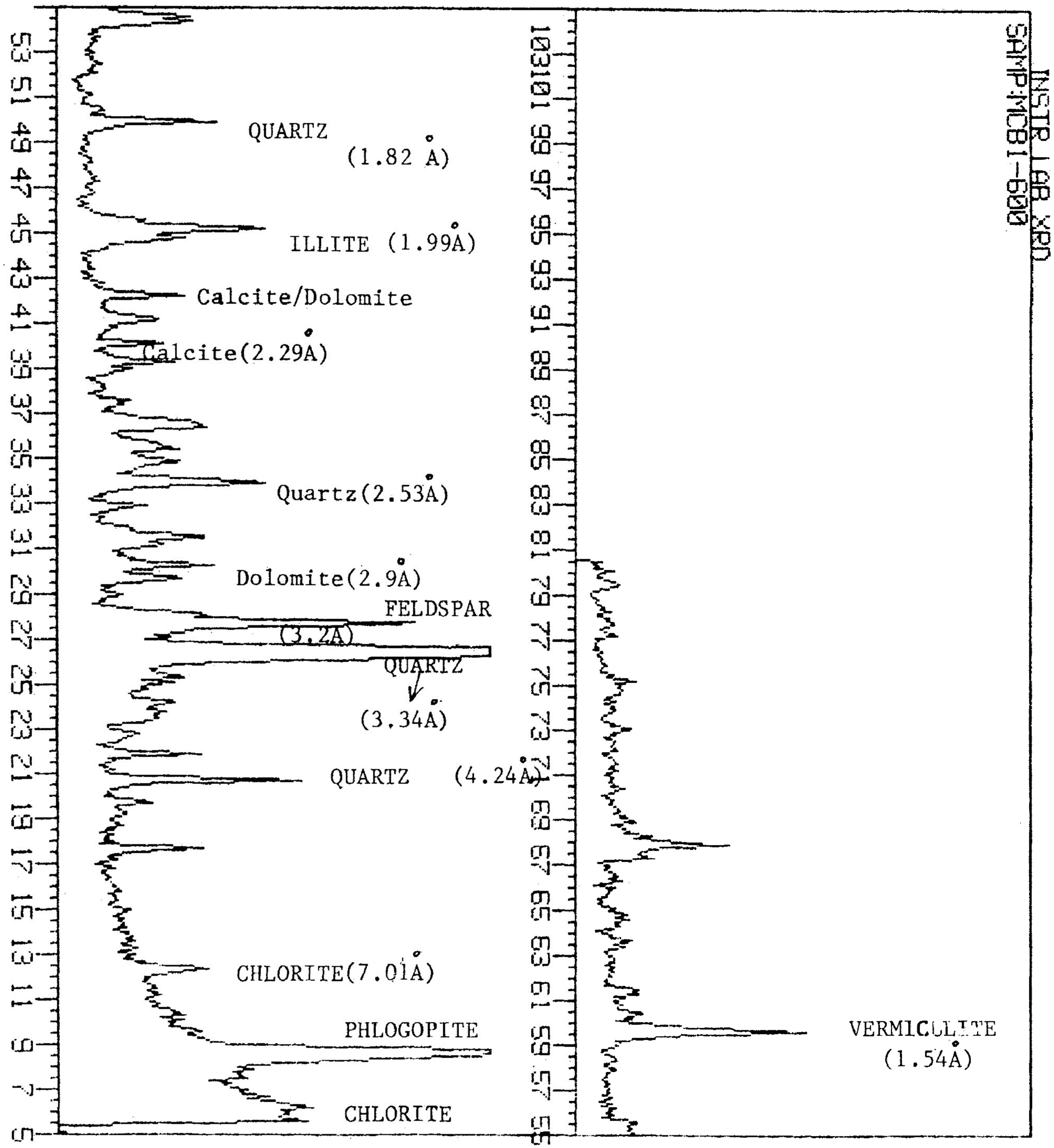
ILLITE (1.99 Å)
Calcite/Dolomite
Calcite (2.29 Å)
Quartz (2.5 Å)
Quartz
Dolomite (2.9 Å)
FELDSPAR (3.18 Å)
QUARTZ (3.34 Å)
QUARTZ (4.26 Å)
CHLORITE (7.07 Å)
PHLOGOPITE (10.12 Å)
CHLORITE (14.0 Å)
VERMICULITE
(1.54 Å)

McBeth-1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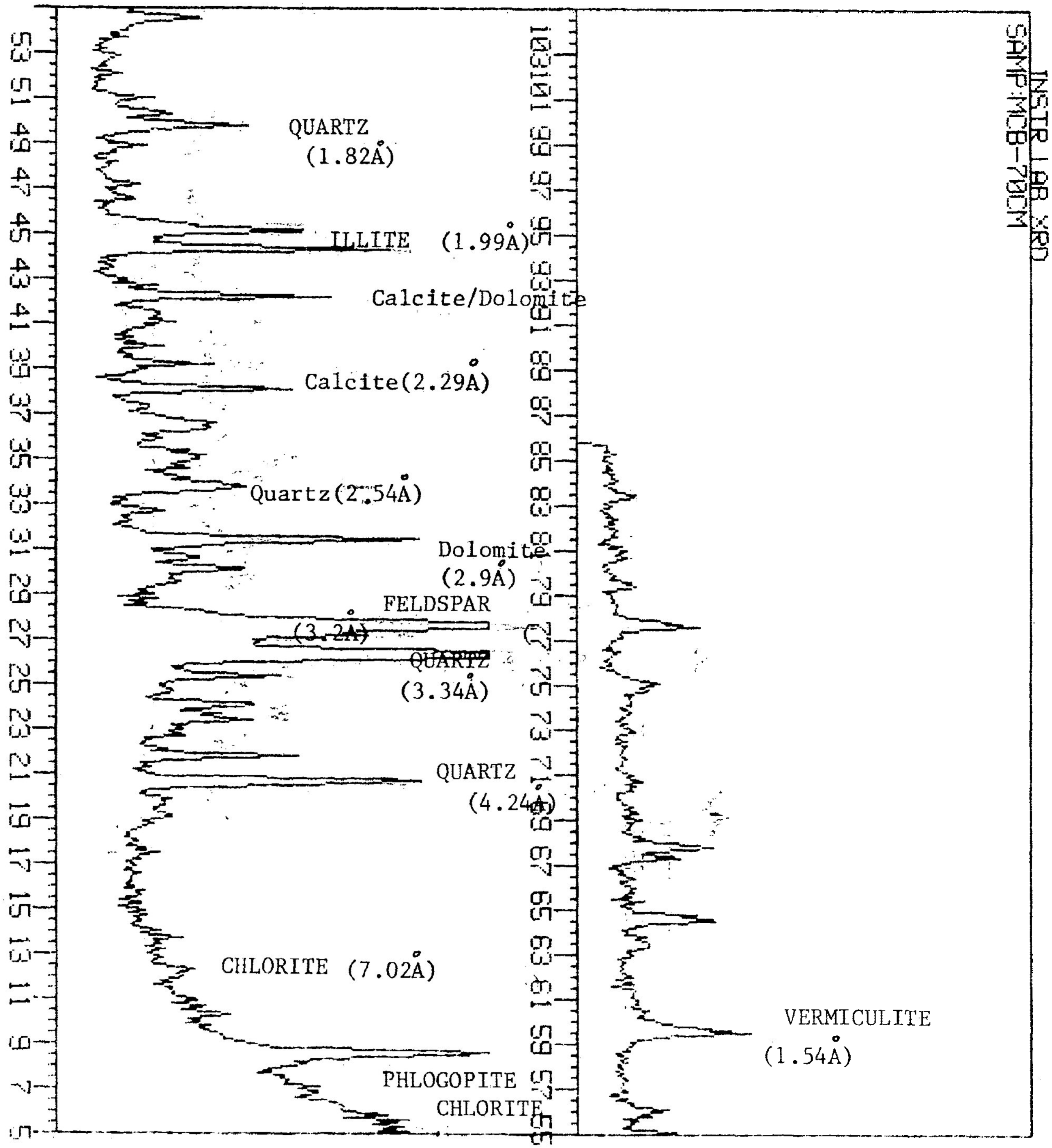
ILLITE (1.99Å)
Calcite/Dolomite
Calcite(2.29Å)
Quartz(2.53Å)
Dolomite(2.9Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
QUARTZ (4.24Å)
CHLORITE(7.01Å)
PHLOGOPITE
CHLORITE
VERMICULLITE (1.54Å)

McBeth-1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Calcite/Dolomite
Calcite(2.29Å)
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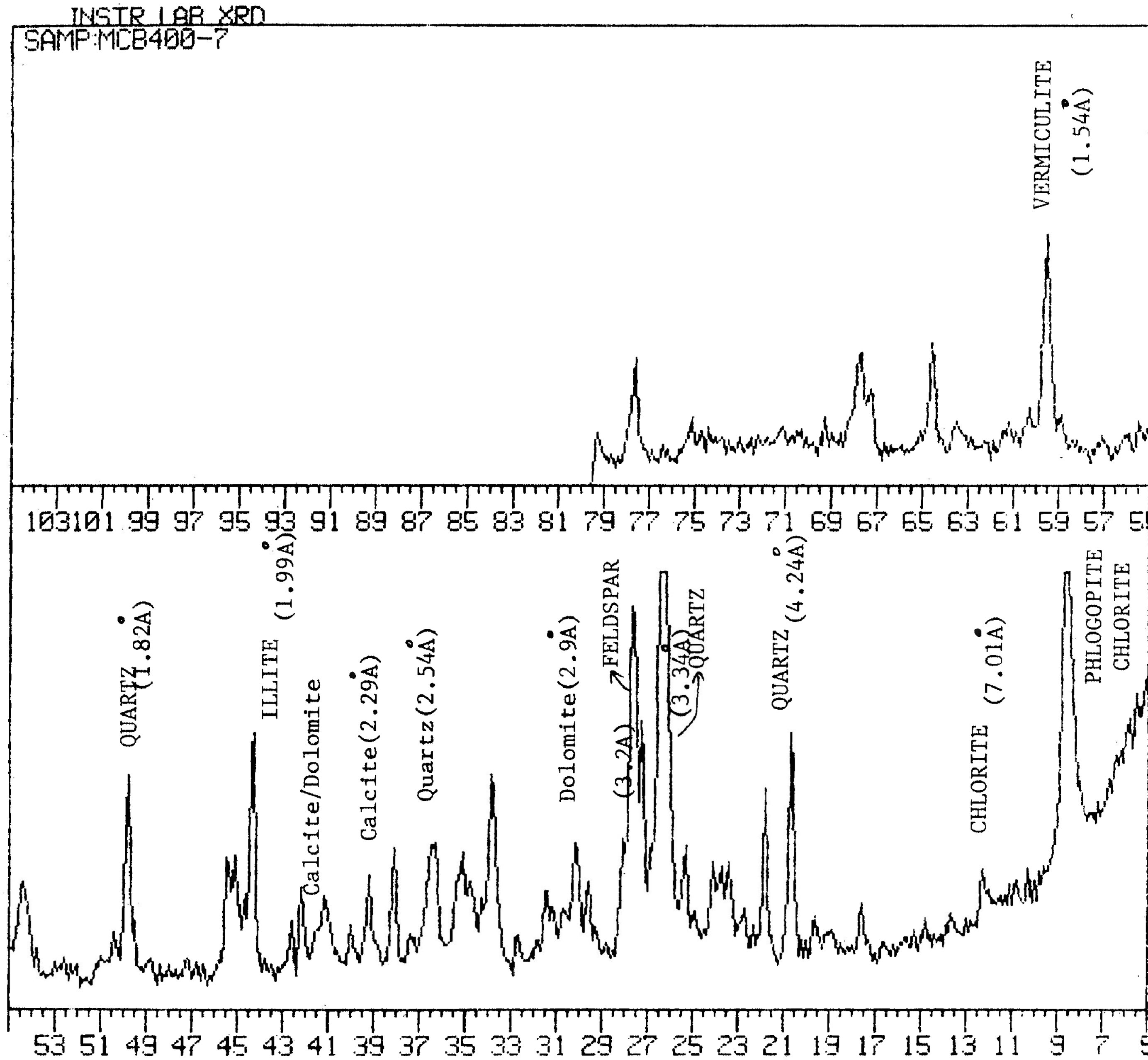
Dolomite (2.9Å)
FELDSPAR (3.2Å)
QUARTZ (3.34Å)
QUARTZ (4.24Å)
CHLORITE (7.02Å)
PHLOGOPITE
CHLORITE
VERMICULITE (1.54Å)

McBeth-2

McBeth-2


INSTR LAB XRD
SAMP:MCB400-7
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QUARTZ (1.82Å)
ILLITE (1.99Å)
Calcite/Dolomite
Calcite(2.29Å)
Quartz(2.54Å)
Dolomite(2.9Å)
(3.2A)
FELDSPAR
(3.34Å)
QUARTZ
QUARTZ (4.24Å)
CHLORITE (7.01Å)
PHLOGOPITE
CHLORITE
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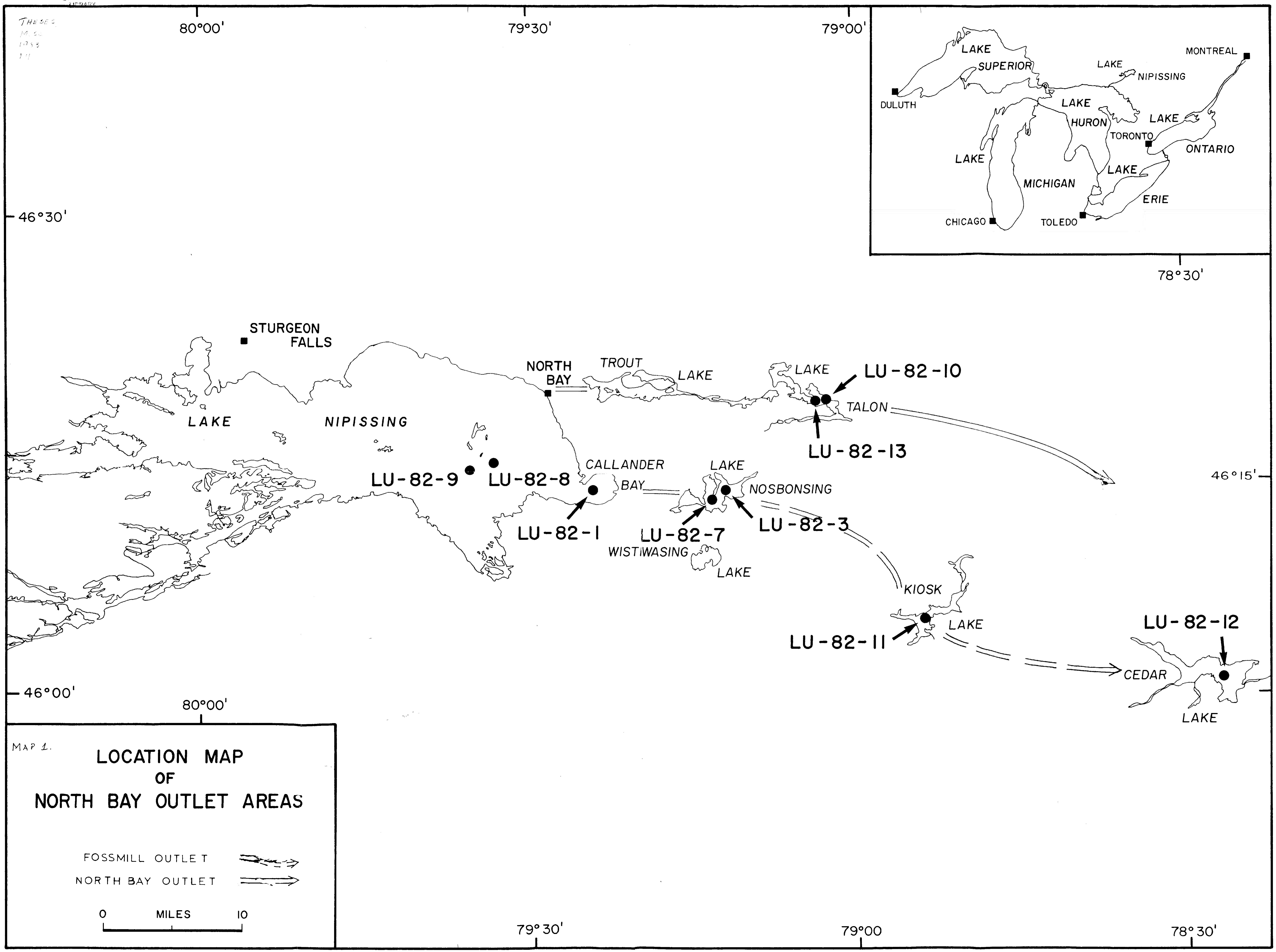
53 51 49 47 45 43 41 39 37 35 33 31 29 27 25 23 21 19 17 15 13 11 9 7 5


80°00'
79°30'
79°00'
78°30'
46°30'
46°15'
46°00'
LAKE SUPERIOR
LAKE NIPISSING
MONTREAL
DULUTH
LAKE HURON
LAKE ONTARIO
TORONTO
LAKE MICHIGAN
LAKE ERIE
CHICAGO
TOLEDO
STURGEON FALLS
NORTH BAY
TROUT LAKE
LAKE TALON
LU-82-10
LU-82-13
LAKE NIPISSING
LU-82-9
LU-82-8
CALLANDER BAY
LU-82-1
LAKE NOSBONSING
LU-82-7
LU-82-3
WISTIWASING LAKE
KIOSK LAKE
LU-82-11
LU-82-12
CEDAR LAKE
MAP 1.
LOCATION MAP OF NORTH BAY OUTLET AREAS
FOSSMILL OUTLET
NORTH BAY OUTLET
0 MILES 10

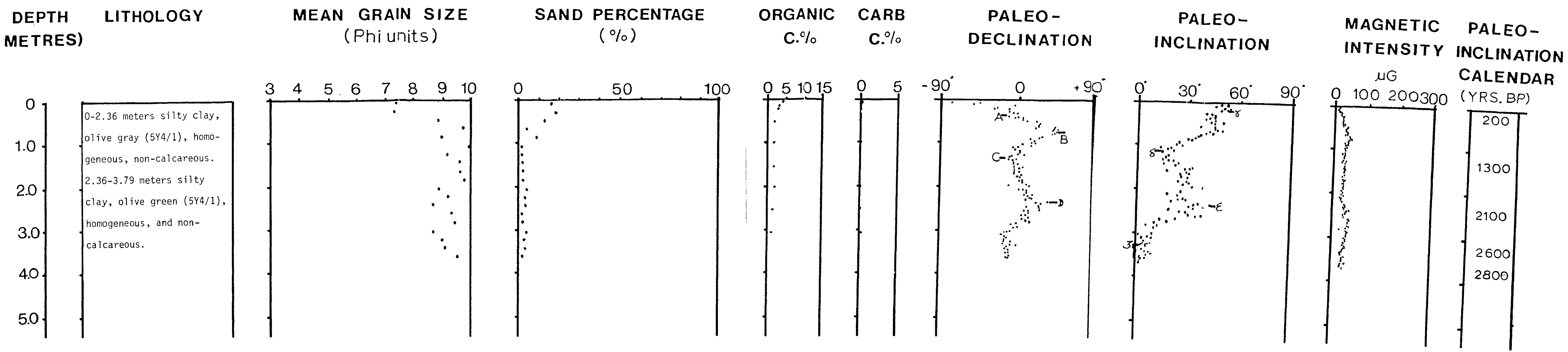


FIGURE 2 . LATE QUATERNARY STRATIGRAPHY SEQUENCE OF NORTH BAY OUTLET AREA : PALEOMAGNETIC RECORD , LITHOLOGY , TEXTURE AND CARBON PERCENTAGES.

LU-82-1 (CALLANDER BAY)

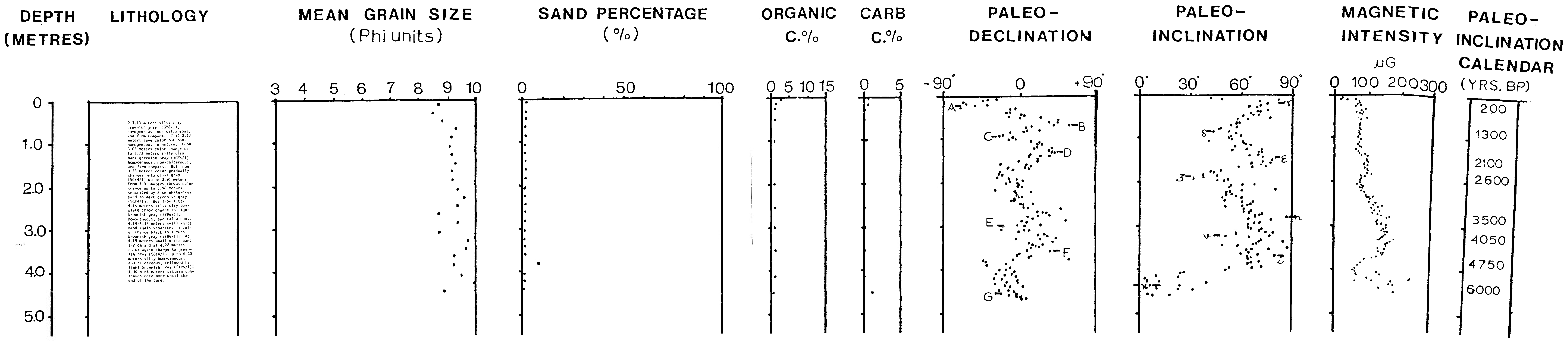


FIGURE 5 . LATE QUATERNARY STRATIGRAPHY SEQUENCE OF NORTH BAY OUTLET AREA : PALEOMAGNETIC RECORD, LITHOLOGY, TEXTURE AND CARBON PERCENTAGES.

LU-82-8 (L. NIPISSING)

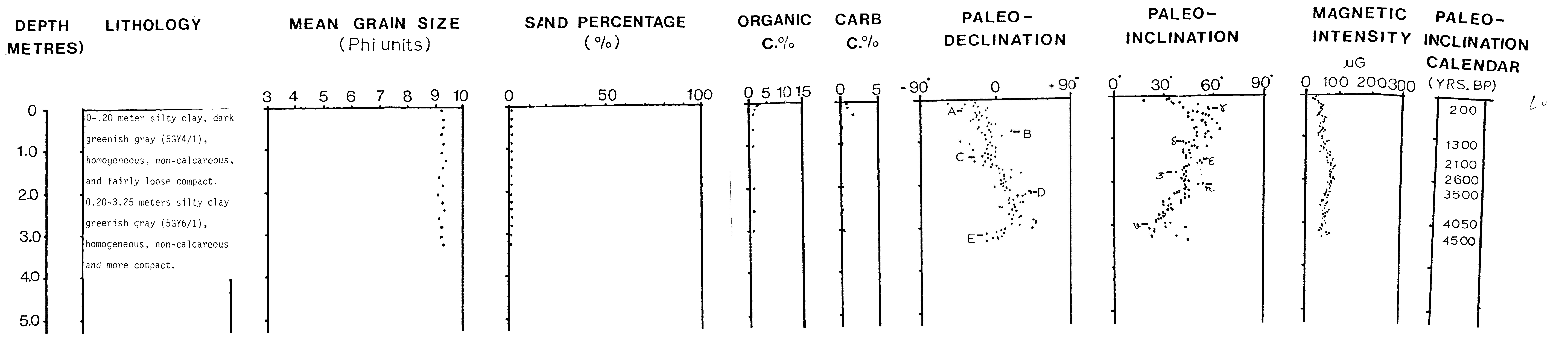


FIGURE 6 . LATE QUATERNARY STRATIGRAPHY SEQUENCE OF NORTH BAY OUTLET AREA : PALEOMAGNETIC RECORD , LITHOLOGY , TEXTURE AND CARBON PERCENTAGES.

LU-82-9 (L.NIPISSING)

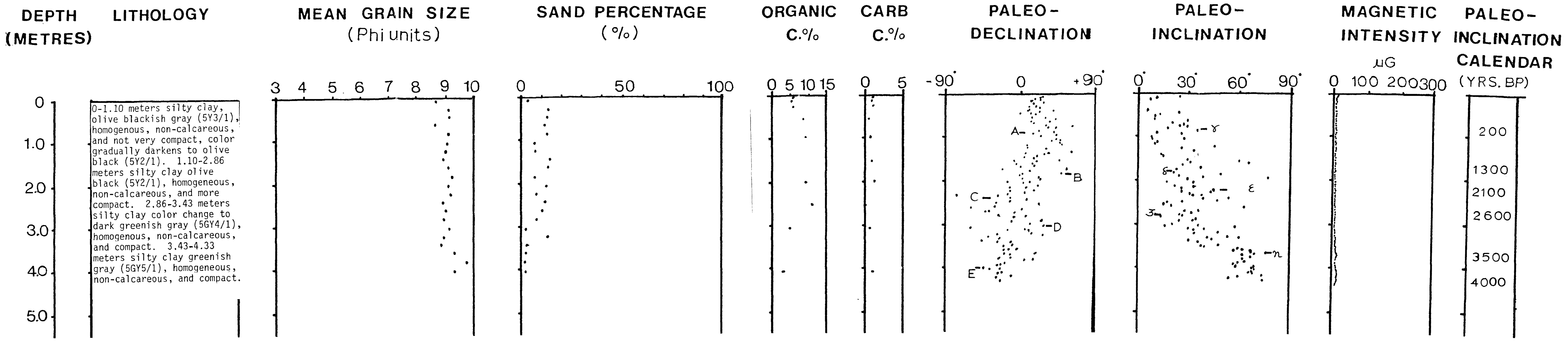


FIGURE 7 . LATE QUATERNARY STRATIGRAPHY SEQUENCE OF NORTH BAY OUTLET AREA : PALEOMAGNETIC RECORD , LITHOLOGY , TEXTURE AND CARBON PERCENTAGES.

LU-82-3 (L.NOSBONSING)

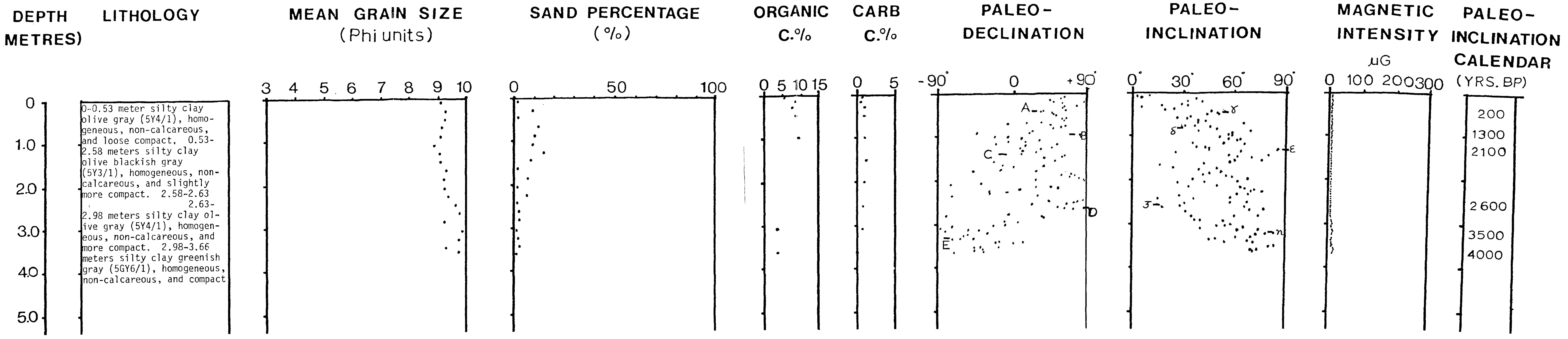


FIGURE 8 . LATE QUATERNARY STRATIGRAPHY SEQUENCE OF NORTH BAY OUTLET AREA : PALEOMAGNETIC RECORD , LITHOLOGY , TEXTURE AND CARBON PERCENTAGES.

LU-82-7 (L.NOSBONSING)

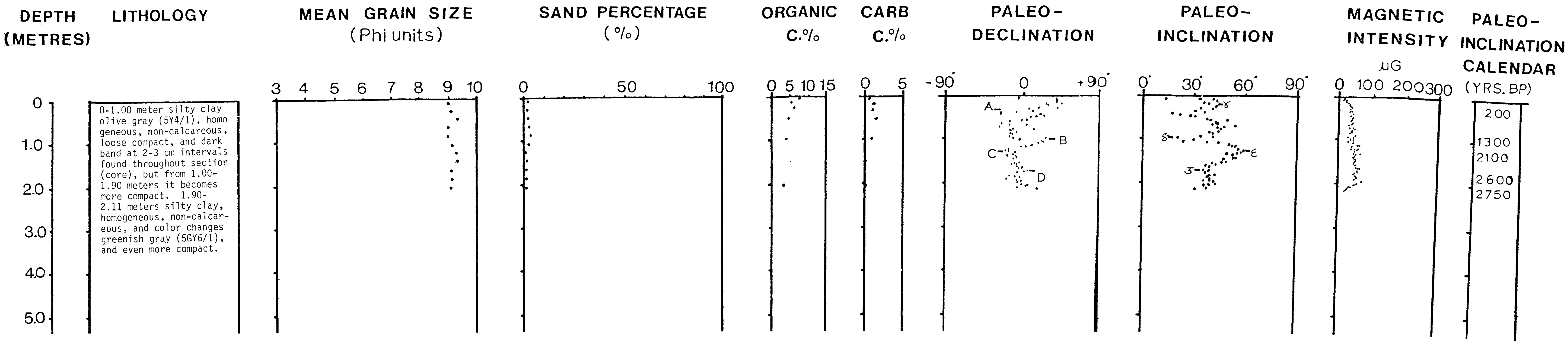


FIGURE 9 . LATE QUATERNARY STRATIGRAPHY SEQUENCE OF NORTH BAY OUTLET AREA : PALEOMAGNETIC RECORD , LITHOLOGY , TEXTURE AND CARBON PERCENTAGES.

LU-82-10 (L.TALON)

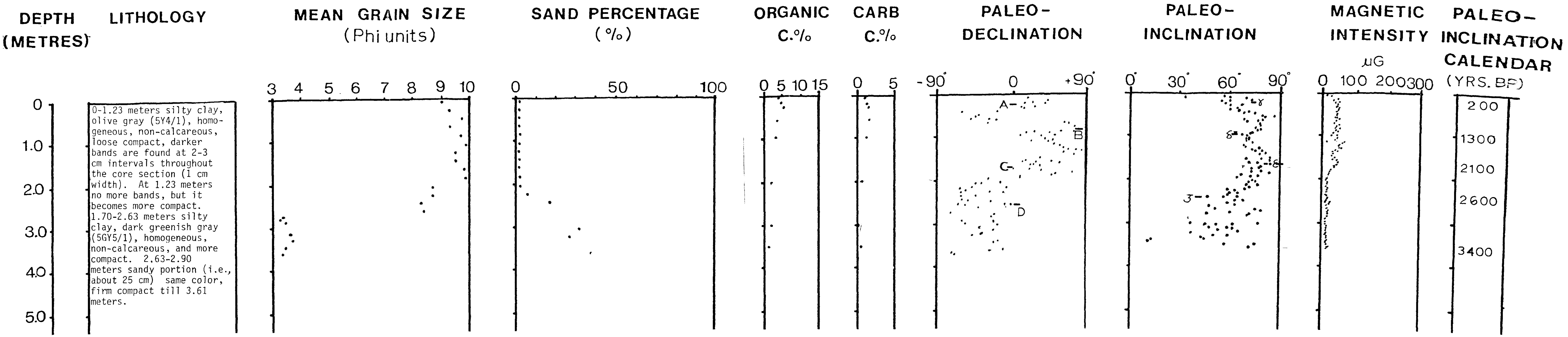


FIGURE 10. LATE QUATERNARY STRATIGRAPHY SEQUENCE OF NORTH BAY OUTLET AREA: PALEOMAGNETIC RECORD, LITHOLOGY, TEXTURE AND CARBON PERCENTAGES.

LU-82-13 (L.TALON)

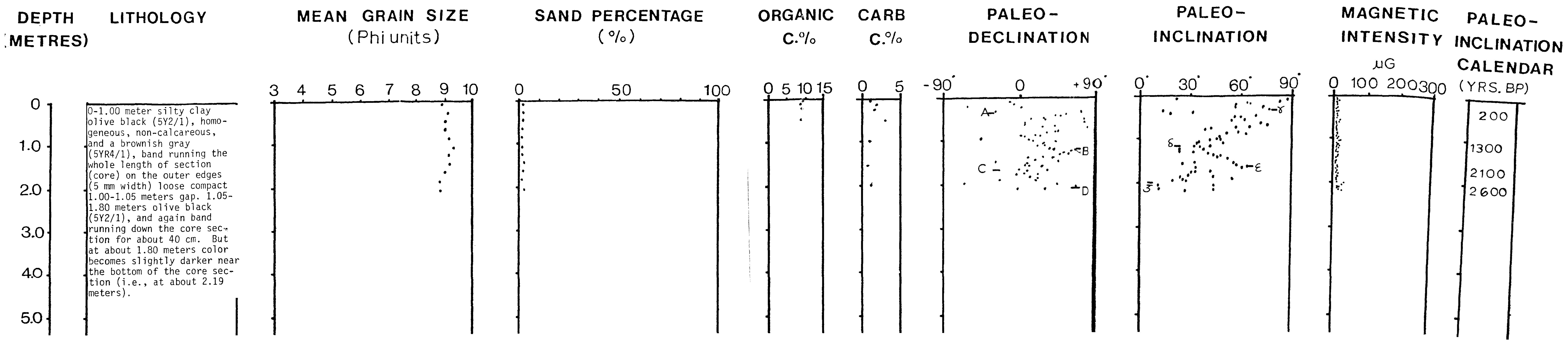


FIGURE // . LATE QUATERNARY STRATIGRAPHY SEQUENCE OF NORTH BAY OUTLET AREA : PALEOMAGNETIC RECORD , LITHOLOGY , TEXTURE AND CARBON PERCENTAGES.

LU-82-11 (KIOSK L.)

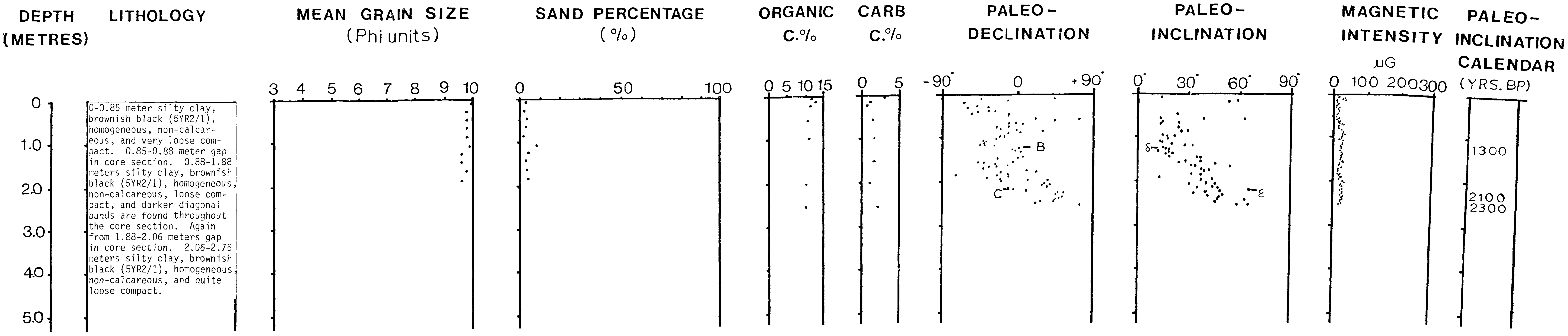


FIGURE 12. LATE QUATERNARY STRATIGRAPHY SEQUENCE OF NORTH BAY OUTLET AREA : PALEOMAGNETIC RECORD, LITHOLOGY, TEXTURE AND CARBON PERCENTAGES.

LU-82-12 (CEDAR L.)

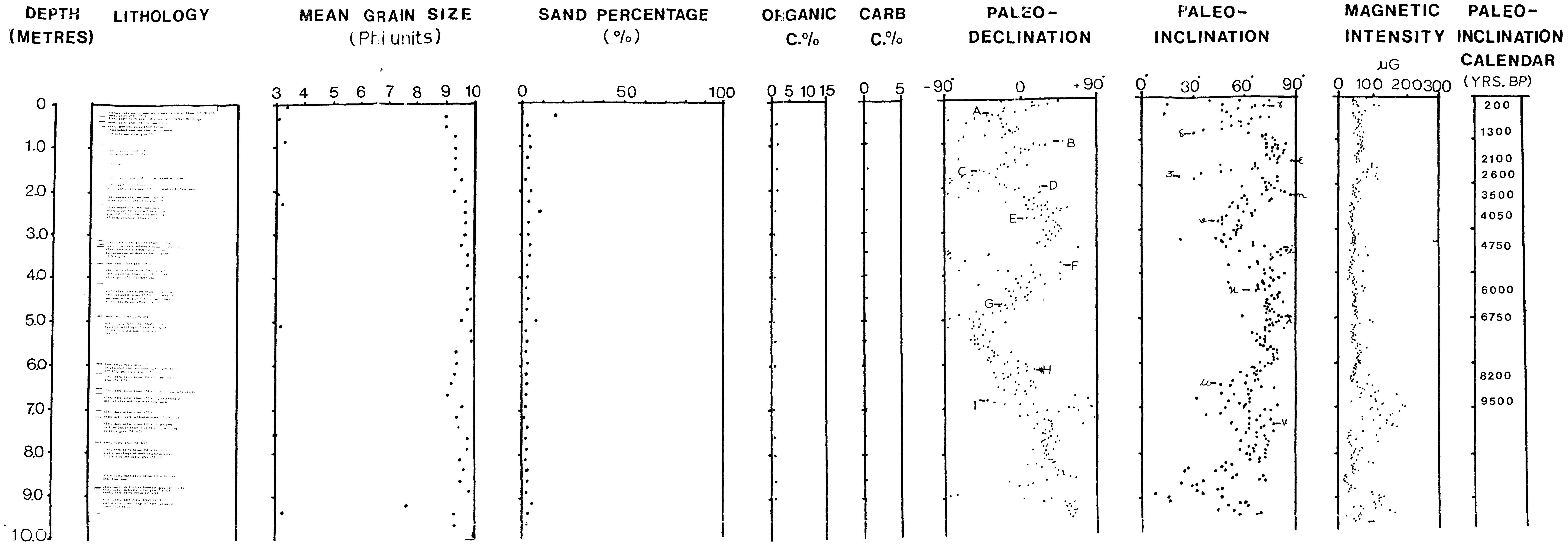


FIGURE 13. LATE QUATERNARY STRATIGRAPHY SEQUENCE OF McBETH FIORD, BAFFIN ISLAND PALEOMAGNETIC RECORD, LITHOLOGY, TEXTURE AND CARBON PERCENTAGES.

McBETH-1

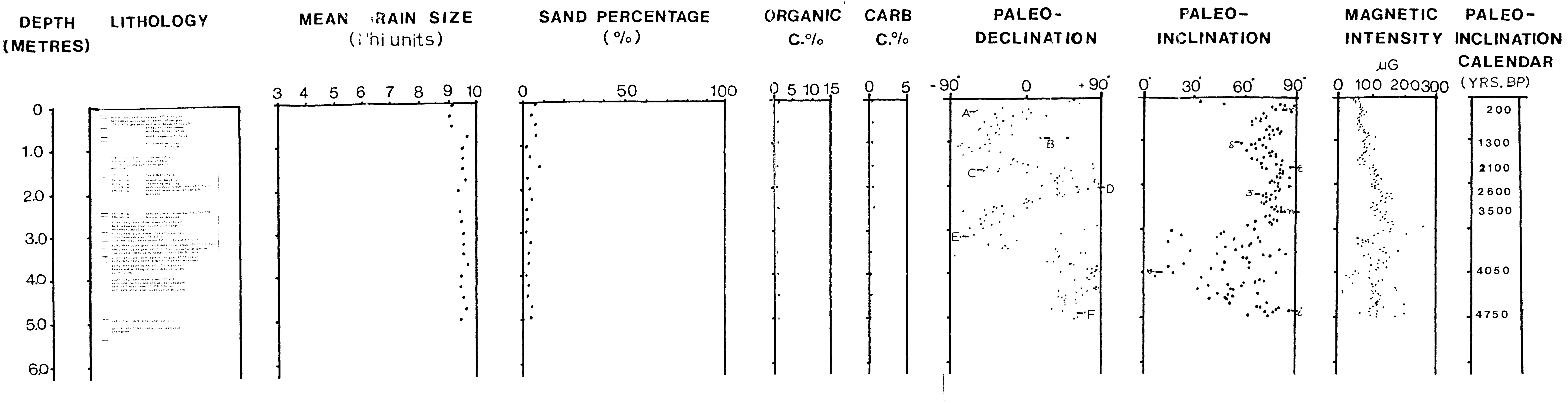


FIGURE 14. LATE QUATERNARY STRATIGRAPHY SEQUENCE OF McBETH FIORD, BAFFIN ISLAND: PALEOMAGNETIC RECORD, LITHOLOGY, TEXTURE AND CARBON PERCENTAGES.

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