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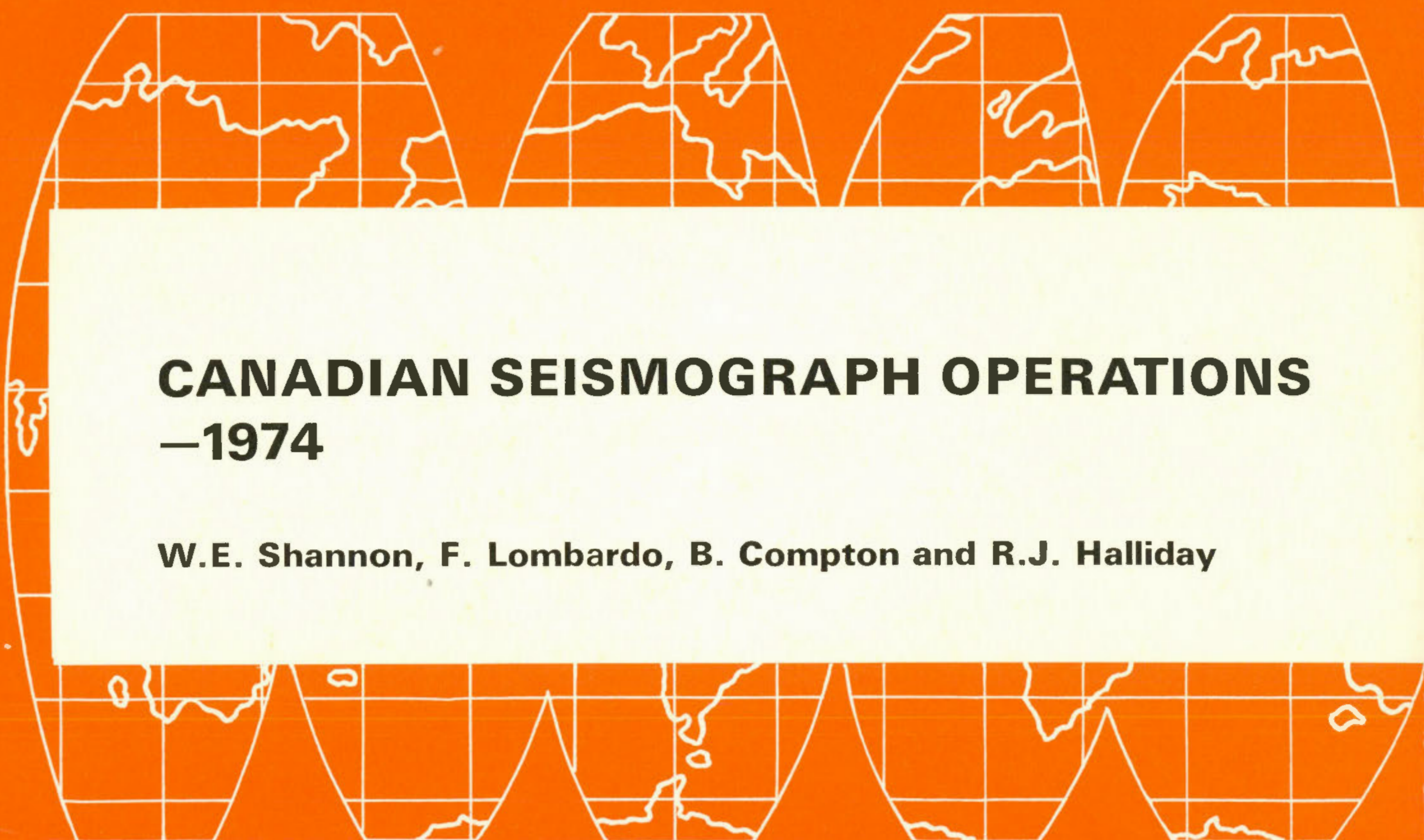

CANADIAN SEISMOGRAPH OPERATIONS —1974

W.E. Shannon, F. Lombardo, B. Compton and R.J. Halliday

Seismological Series Number 70
Ottawa, Canada 1975

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CANADIAN SEISMOGRAPH OPERATIONS —1974

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1. INTRODUCTION

This bulletin, formerly called the Seismological Bulletin, is published annually as part of the Seismological Series of the Earth Physics Branch. It contains summary information on the seismograph installations operated by or for the Division of Seismology and Geothermal Studies, Earth Physics Branch, Department of Energy, Mines and Resources. This information includes a brief description of the various types of seismograph installations, the data produced, the data processing procedures and the availability of station data and records. Summary information on instrumental changes in the Network and calibration curves for the standard and regional seismograph stations are included in the later pages of the Bulletin.

From 1964 to 1971 the Seismological Bulletin contained a chronological list of P-phase arrival times, ground amplitudes, periods and directions of first motion. Since this information is now routinely printed in the monthly Bulletins of the International Seismological Centre (ISC), the P-phase information has been deleted from the 1972 and subsequent annual editions of the bulletin.

2. CANADIAN SEISMOGRAPH NETWORK

2.1 General

The Canadian Seismograph Network (CSN) is composed of various types of seismograph installations which are briefly described in the following section. In 1974, these installations included 22 standard stations (minimum of six daily photographic seismograms), 11 regional stations (minimum of one daily record), a four-station, short-period, vertical network telemetered into Ottawa (Eastern Canada Telemetered Network - ECTN), a short- and long-period vertical seismograph array situated in Yellowknife, 3 long-period, 3-component, automatic digital stations located in British Columbia, a strong-motion seismograph network and several special seismograph installations.

2.2 Standard Stations

A standard station consists of three orthogonal long-period seismographs, each producing a photographic record. Tables 1 and 2 list stations, codes, location and operators (see also Figure 1). The three short-period seismometers used in most standard stations are Willmores with a nominal period of one second. The seismometer signal, after passing through an attenuator which has resistors arranged in a TEE pad formation, is fed into a Tinsley galvanometer having a nominal period of one-quarter second. A Sprengnether, 3-component photographic recorder is used for both short- and long-period seismographs. The Victoria and Montréal stations have a standard short-period Benioff system.

The short-period recorder drum rotation rate is set to 60 mm per minute, and the long-period rate at 15 mm per minute. The three long-period Columbia seismometers used in all standard stations have their free period nominally set to 15 seconds, with the exception of those at Yellowknife, which are set to 25 seconds. The same type attenuator TEE pad formation used in the short-period seismographs is also used in the long period. The long-period Lehner Griffith galvanometers have a nominal period of 90 seconds.

Calibration curves for all standard stations and any instrumental changes made during the year are included in a later section of this bulletin.

2.2 Regional Stations

Regional seismograph stations consist of a short-period vertical seismograph using a Willmore MKII or Geotech S13 seismometer with a nominal one second period. Tables 1 and 2 list the station codes, location and operators (see also Figure 1). These stations are used in seismically active areas of Canada to supplement the standard station network or for special studies. Most regional stations have electronic amplification using a Geotech preamplifier and a Geotech helicorder producing a visual record. At two region-

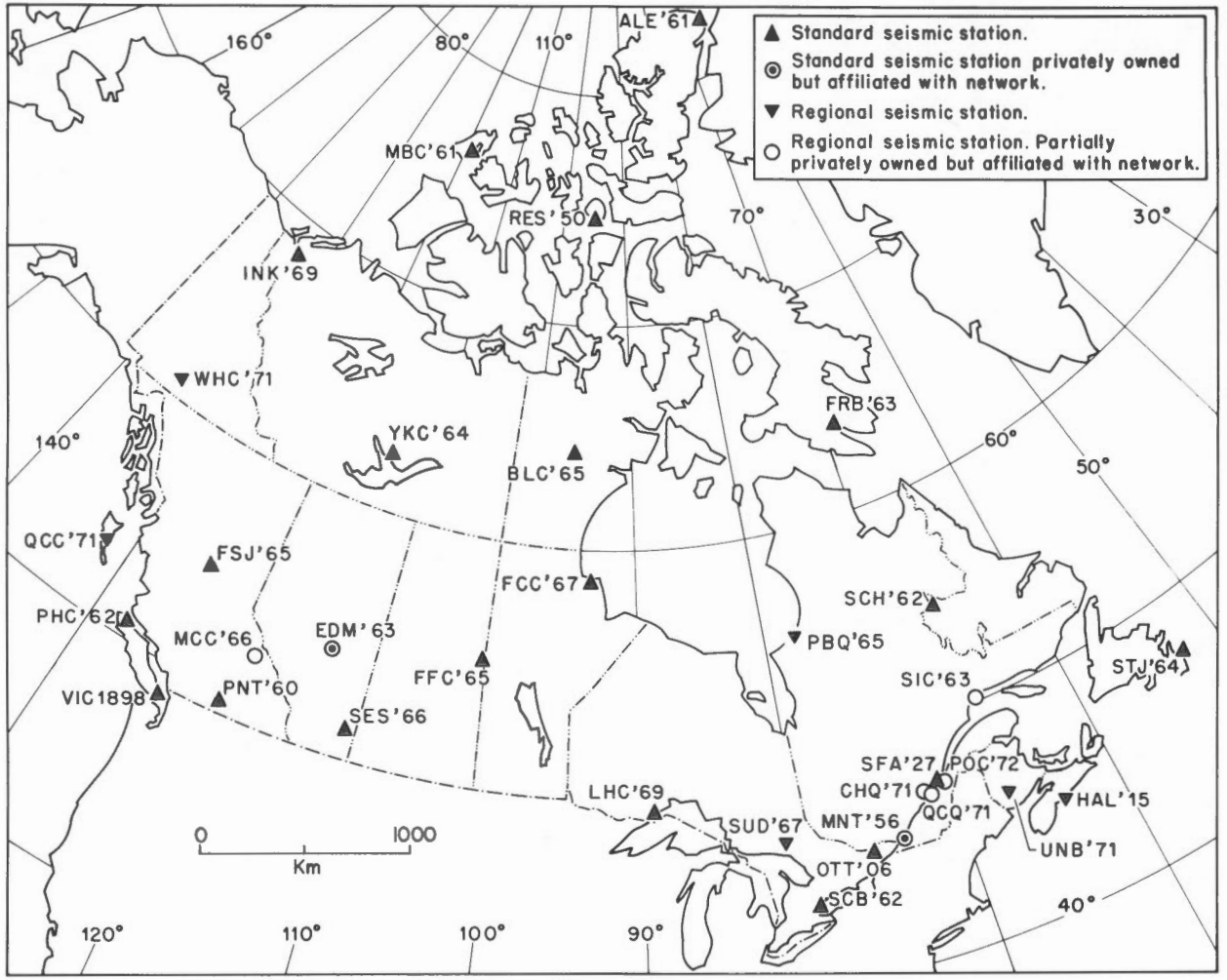

Figure 1. Canadian Standard and Regional Seismograph Stations 1974

TABLE 1

STANDARD AND REGIONAL SEISMOGRAPH STATIONS 1974

STATION CODE	STATION	LATITUDE AND LONGITUDE		ELEVATION (in metres)
ALE	Alert, N.W.T.	82.48N	62.40W	65
BLC	Baker Lake, N.W.T.	64.32N	96.92W	16
*CHQ	Charlesbourg, Qué.	46.89N	71.30W	145
EDM	Edmonton, Alta.	53.22N	113.35W	730
FCC	Fort Churchill, Man.	58.76N	94.09W	39
FFC	Flin Flon, Man.	54.73N	101.98W	338
FRB	Frobisher, N.W.T.	63.75N	68.55W	18
FSJ	Fort St. James, B.C.	54.43N	124.25W	772
*HAL	Halifax, N.S.	44.63N	63.60W	56
INK	Inuvik, N.W.T.	68.29N	133.50W	40
LHC	Thunder Bay, Ont.	48.42N	89.27W	196
MBC	Mould Bay, N.W.T.	76.24N	119.36W	15
*MCC	Mica Creek, B.C.	52.05N	118.59W	578
MNT	Montréal, Qué.	45.50N	73.62W	112
OTT	Ottawa, Ont.	45.39N	75.72W	83
*PBQ	Poste-de-la-Baleine, Qué.	55.28N	77.74W	20
PHC	Port Hardy, B.C.	50.71N	127.43W	33
PNT	Penticton, B.C.	49.32N	119.62W	550
*POC	La Pocatière, Qué.	47.36N	70.04W	61
*QCC	Queen Charlotte, B.C.	53.26N	132.09W	3
*QCQ	Québec, Qué.	46.78N	71.28W	91
RES	Resolute, N.W.T.	74.69N	94.90W	15
SCB	Scarborough, Ont.	43.72N	79.23W	153
SCH	Schefferville, Qué.	54.82N	66.78W	540
SES	Suffield, Alta.	50.40N	111.04W	770
SFA	St. Féréol (Seven Falls), Qué.	47.12N	70.82W	232
*SIC	Sept-Iles, Qué.	50.19N	66.74W	283
STJ	St. John's, Nfld.	47.57N	52.73W	62
*SUD	Sudbury, Ont.	46.47N	80.97W	267
*UNB	Fredericton, N.B.	45.95N	66.63W	56
VIC	Victoria, B.C.	48.52N	123.42W	197
*WHC	Whitehorse, Yukon	60.74N	135.10W	732
YKC	Yellowknife, N.W.T.	62.48N	114.48W	198

*Regional Stations

TABLE 2

STANDARD AND REGIONAL SEISMOGRAPH STATION OPERATORS

Standard Seismograph Stations:

Alert, N.W.T. (ALE)
Owned and operated by the Earth Physics Branch. Station seismologist in 1974 was C.A. Cederstrand, succeeded by M. Daniels on August 19.

Baker Lake, N.W.T. (BLC)
Owned and operated by the Earth Physics Branch. Station seismologist in 1974 was O.J. Jensen.

Edmonton, Alberta (EDM)
Instrumented by the Earth Physics Branch. Owned and operated by the Department of Physics, University of Alberta, with contract support from the Earth Physics Branch.

Flin Flon, Manitoba (FFC)
Owned and operated by the Earth Physics Branch. Station seismologist in 1974 was L. Marsh.

Fort Churchill, Manitoba (FCC)
Owned by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by the Radiosonde Division, Atmospheric Environment Service, Department of Environment.

Fort St. James, British Columbia (FSJ)
Owned and operated by the Earth Physics Branch. Station seismologist during 1974 was T.S. Browne.

Frobisher, N.W.T.(FRB)
Owned by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by the Radiosonde Division, Atmospheric Environment Service, Department of Environment.

Inuvik, N.W.T. (INK)
Owned by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by the Radiosonde Division, Atmospheric Environment Service, Department of Environment.

Montréal, Québec (MNT)
Owned and operated by Jean-de-Brébeuf College with partial instrumental support and contract support from the Earth Physics Branch (courtesy M. Buist, S.J., Director).

Mould Bay, N.W.T. (MBC)
Owned and operated by the Earth Physics Branch. Station seismologist during 1974 was D.A. Wright, succeeded by J.R. Alexander on June 20.

Ottawa, Ontario (OTT)
Owned and operated by the Earth Physics Branch.

Penticton, British Columbia (PNT)
Owned and operated by the Earth Physics Branch. Station seismologist during 1974 was M. Wilde.

Port Hardy, British Columbia (PHC)
Owned by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by the Radiosonde Division, Atmospheric Environment Service, Department of Environment.

Resolute, N.W.T. (RES)
Owned and operated by the Earth Physics Branch. Station seismologist during 1974 was R.V. Green.

St. John's, Newfoundland (STJ)
Owned by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by the Department of Physics, Memorial University.

Scarborough, Ontario (SCB)
Owned by the Earth Physics Branch. Operated only as a training station, under contract for the Earth Physics Branch by the Radiosonde Division, Atmospheric Environment Service, Department of Environment.

TABLE 2 (Continued)

Schefferville, Québec (SCH)
Owned by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by McGill University Sub-Arctic Research Laboratory.

Seven Falls, Québec (SFA)
Owned and operated by the Earth Physics Branch. Station seismologist during 1974 was J.B. Racine.

Suffield, Alberta (SES)
Owned by the Earth Physics Branch. Operated for the Earth Physics Branch by the Defence Research Board, Department of National Defence.

Thunder Bay, Ontario (LHC)
Owned by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by the Department of Geology, Lakehead University.

Victoria, British Columbia (VIC)
Owned and operated by the Earth Physics Branch. The seismograph observatory is part of the Victoria Geophysical Observatory, Department of Energy, Mines and Resources, 5071 West Saanich Road, R.R. #7, Victoria, B.C., V8X 3X3. This unit constitutes the West Coast office of the Earth Physics Branch.

Yellowknife, N.W.T. (YKC)
Owned and operated by the Earth Physics Branch. Station seismologists during 1974 were I. Ladd, O.I.C., D. Monsees and L. Brulotte.

Regional Seismograph Stations:

Charlesbourg, Québec (CHQ)
Instrumented by the Department of Geology, Laval University, and operated with contract support from the Earth Physics Branch.

Fredericton, New Brunswick (UNB)
Instrumented by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by the Physics Department, University of New Brunswick.

Halifax, Nova Scotia (HAL)
Owned by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by Dalhousie University.

La Pocatière, Québec (POC)
Instrumented by the Department of Geology, Laval University, and operated with contract support from the Earth Physics Branch.

Mica Creek, British Columbia (MCC)
Vault owned and operated by B.C. Hydro and Power Authority, but instrumented by the Earth Physics Branch.

Poste-de-la-Baleine, Québec (PBQ)
Instrumented by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by Laval University.

Québec, Québec (QCQ)
Owned and operated by the Department of Geology, Laval University, with contract support from the Earth Physics Branch.

Queen Charlotte, British Columbia (QCC)
Instrumented by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by the B.C. Forest Service.

Sept-Iles, Québec (SIC)
Owned and operated by the Iron Ore Company of Canada, Sept-Iles, Québec, with support from the Earth Physics Branch.

Sudbury, Ontario (SUD)
Instrumented by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by the Department of Geology, Laurentian University.

Whitehorse, Yukon Territory (WHC)
Instrumented by the Earth Physics Branch. Operated under contract for the Earth Physics Branch by the Radiosonde Division, Atmospheric Environment Service, Department of Environment.

al stations, Poste-de-la-Baleine and Whitehorse, short-period, north-south and east-west records are also produced. Regional station calibration curves and any instrumental changes made during the year are also included in this bulletin.

2.4 *Eastern Canada Telemetered Network*

On February 24, 1974, a network of short-period vertical stations linked to Ottawa by telephone lines commenced recording on an experimental/developmental basis. Figure 2 shows, and Table 3 gives a list of the stations, their location and operating dates for the various sites. The broadband seismic signals are transmitted in digital mode over dedicated telephone lines to Ottawa where a PDP-11 minicomputer is currently producing monitor records on four separate helicorders. In 1975 an automatic triggering system and digital storing of data is being incorporated into the computer processing program.

Figure 2. Eastern Canada Telemetered Network

2.5 *The Yellowknife Array*

The Division of Seismology and Geothermal Studies has operated and maintained a medium aperture array at Yellowknife, N.W.T., since 1962. The array configuration is shown in Figure 3. The 19 Willmore Mark II short-period vertical seismometers are arranged in two orthogonal lines with a 2.5 km spacing. The long-period tripartite array consists of Geotech SL210 long-period vertical seismometers placed at sites G1, G2 and G3, and additional Geotech SL220 long-period horizontal seismometers at site G1. The G1 site is the vault of the standard station, YKC. Data are radio-telemetered to the Control Centre where they are processed on-line by computer and, as back-up, are recorded on FM tape.

The on-line digital processing system, built around a PDP11-45 computer, was installed in early 1974. The processing system, called the Canadian Seismic Array Monitor (CANSAM), remotely monitors and calibrates the various seismic sensors, digitizes the short-period signals and processes the data with a detection algorithm. A hard-copy event detection bulletin is printed on a teletypewriter and punched in parallel on paper tape. A copy of the bulletin information and the raw digital data for each detected event is stored on 9-track digital tape. Additional processing of the Yellowknife array data is done off-line in Ottawa from the analog and digital tapes.

Additional information on the Yellowknife array history, developments and current configuration can be found in reports by Manchee and Hayman (1972) and Weichert (1975).

2.6 *Long-Period Digital Tape Stations*

In July 1972, three component, completely automatic long-period digital tape systems were commissioned in British Columbia. Figure 5 shows the station locations and Table 4 gives the coordinates and operating dates for the various sites. The 7-track magnetic tapes are changed every three weeks at the stations and sent to Ottawa for editing. A master composite tape is then compiled of all significant recorded events. This tape, which is complete from 1973 to date, also contains all available information on instrument characteristics, calibrations and epicentre parameters. For some events, the B.C. standard station LP records have also been digitized and included on the master tape.

2.7 *Strong-Motion Seismograph Network*

Rogers (1975) has described the 1974 configuration of the Canadian strong-motion seismograph network. It is intended that subsequent annual issues of this publication will contain information on developments in the strong-motion network.

2.8 *Special Stations*

In 1974, several stations in the standard network operated dual band, high gain SP/LP vertical seismographs. The systems are composed of two helicorders recording filtered signals from one Geotech SL210 seismometer (nominal period of 20 seconds). The LP helicorder (drum speed of 15 mm/min) recorded both short- and long-period signals. The SP helicorder (drum speed 60 mm/min) recorded only a sharply filtered high gain SP signal. The Alert short-period recording was decommissioned on October 14, 1973, and the remainder of the system on February 16, 1974. The system at Suffield ceased recording on January 22, 1974, and the Ottawa system on February 25, 1974. The other two stations which operated dual band systems, Penticton and Mould Bay, ceased operations on December 31, 1973, and September 11, 1973, respectively.

An extra long-period vertical experimental helicorder system, similar to other VLP stations, was commissioned at Alert on December 11, 1973, and continued operating in 1974.

3. CANADIAN SEISMOLOGICAL DATA

3.1 *Rapid Telex Data*

All Canadian standard seismograph stations send telegraphic reports of P-phase arrivals to Ottawa five days a week. Additional information, such as teleseismic P-phase periods and ground amplitudes, P first motions and pP phase arrivals are also telegraphed when clearly recorded. The P-phase arrival time for all local earthquakes of magnitude equal to or greater than three are included in the telegraphed messages along with S-P intervals and S-phase periods and maximum amplitudes.

The U.S. Geological Survey, National Earthquake Information Service (NEIS) continues to make immediate use of the Canadian P-phase data in their fast hypocentre determinations. The telegraphed data from Canadian standard stations is sent, with limited checking, within 48 hours to NEIS on computer cards. Most Canadian P-wave data arrives at the NEIS data centre within ten days of the occurrence of each event. Commencing in November, the P-wave data sent to NEIS on computer cards was also stored temporarily in the Departmental computer in Ottawa. These

TABLE 3

EASTERN CANADA TELEMETERED NETWORK STATIONS

STATION	LAT.	LONG.	ELEVATION (Meters)	OPERATING DATES
Ottawa, Ont.	45.39N	75.72W	83	Feb. 24 - to date
Montréal, Qué.	45.50N	73.62W	112	Feb. 24 - to date
Maniwaki, Qué.	46.37N	75.97W	199	Feb. 24 - to date
Manicouagan, Qué.	50.53N	68.78W	610	Nov. 27 - to date
Hauterive, Qué.	49.19N	68.39W	-	Mar. 21 - Nov. 25

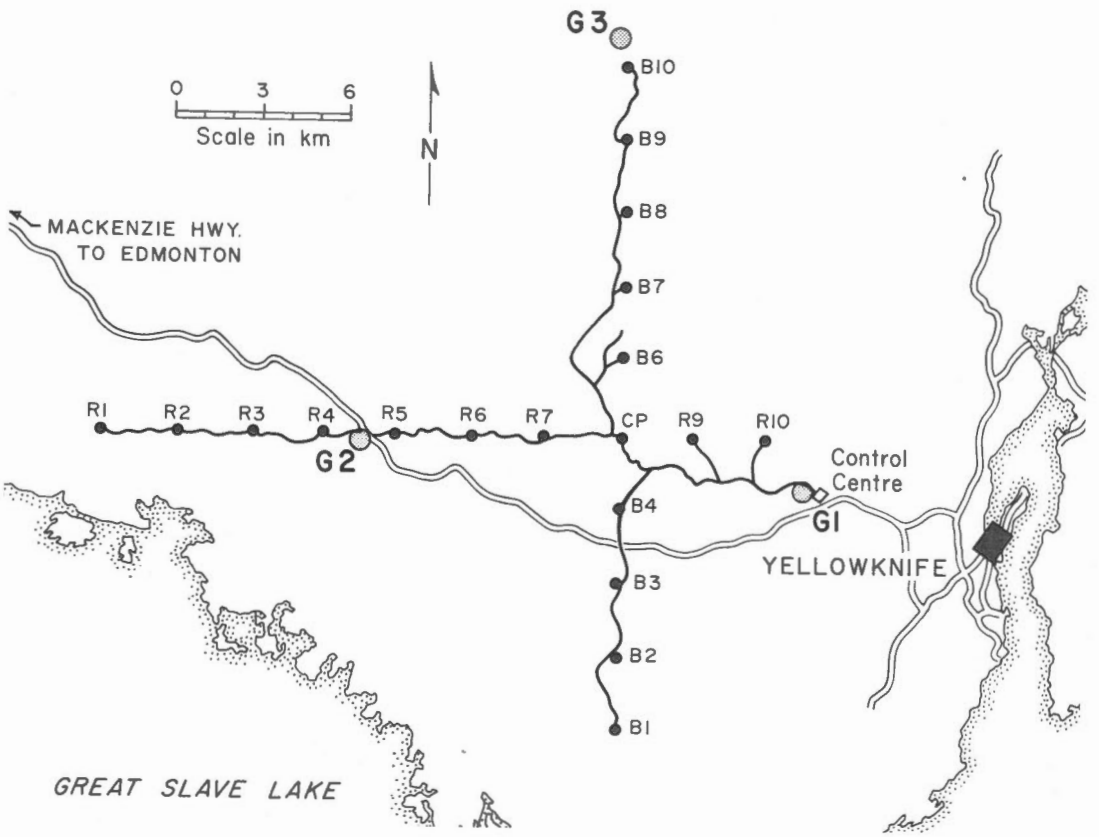

Figure 3. Yellowknife Seismograph Array

TABLE 4

LONG-PERIOD DIGITAL TAPE RECORDING STATIONS

STATION	LAT.	LONG.	ELEVATION (Meters)	OPERATING DATES
Wells, B.C.	53.10N	121.58W	1234	Aug. 6/72 - to date
Alexis Creek, B.C.	52.09N	123.27W	838	Aug. 7/72 - to date
Revelstoke, B.C.	50.96N	118.16W	494	Jul. 29/72 - May 1/74
Smithers, B.C.	54.77N	127.10W	579	Jul. 15/74 - to date

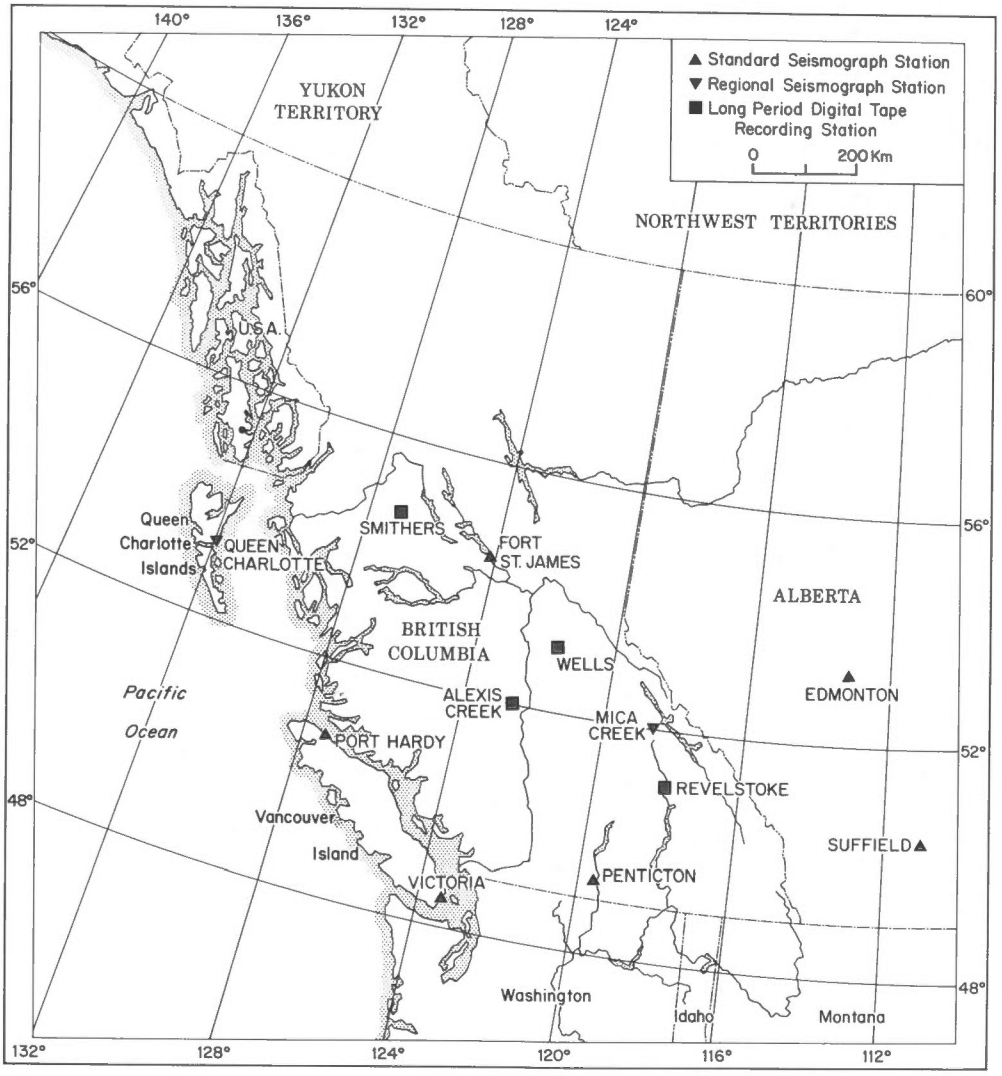

Figure 4. Long-Period Digital Tape Recording Stations 1974

data were then accessed by NEIS using a teletype terminal and telephone lines. This new procedure greatly decreased the delay in P-wave data reaching the NEIS data centre. Eventually, the sending of data by computer cards will cease and all data transmissions will be through computer-accessed files. Copies of the telegraphed P-arrival data were airmailed to Britain, Sweden and the U.S.S.R. for use of seismological institutions in those countries. NEIS relayed Canadian data to the International Seismological Centre, Edinburgh, for inclusion in the ISC definitive calculations.

3.2 *Microfilm*

Thirty-five millimeter negative microfilm rolls of all Canadian seismograms are stored in Ottawa. Copies of Canadian seismogram microfilm from January 1, 1962, to the present have been deposited with the World Data Center A for Seismology, Environmental Data Service, NOAA, Boulder, Colorado, 80302, U.S.A. Microfilm of records prior to 1962 is available to cooperating institutions on request to the Head, Canadian Seismograph Network, Division of Seismology and Geothermal Studies, Earth Physics Branch, Department of Energy, Mines and Resources, Ottawa, Canada, K1A 0Y3.

3.3 *Original Seismograms*

Original seismograms are normally available only to qualified Canadian research scientists, since microfilm is available at Boulder, Colorado, to all others. On special request to the Director, Division of Seismology and Geothermal Studies, Earth Physics Branch, Department of Energy, Mines and Resources, Ottawa, Canada, K1A 0Y3, original Canadian seismograms may be loaned to qualified foreign requestors. This loan, in general, can be made only after the seismograms have been photographed; this avoids undue delay in getting complete microfilm from the Canadian Seismograph Network deposited in the World Data Center for use of all scientists.

Original Canadian seismograms dating back to and including 1965 are stored in Ottawa. Seismograms previous to this date are on permanent loan to Lamont-Doherty Geological Observatory, Palisades, N.Y., U.S.A., 10964.

3.4 *Special Data*

Data and records from seismograph installations other than the standard and regional networks are available on special request to the Head, Canadian Seismograph Network, Division of Seismology and Geothermal Studies, Earth Physics Branch, Department of Energy, Mines and Resources, Ottawa, Canada, K1A 0Y3. These data include the SP and LP FM magnetic tapes from the Yellowknife arrays, the detection log and digital data of seismic signals produced by the real-time operating system, CANSAM, data from the tape of all events recorded on the long-period digital tape system deployed in B.C., and seismograms produced by the telemetered network and other special stations.

3.5 *Canadian Earthquakes*

All earthquakes occurring in or near Canada are located by the Seismicity, Seismic Hazards and Applications section of the Division of Seismology and Geothermal Studies. A bimonthly catalogue of Canadian Earthquakes is produced approximately six months in arrears and distributed to interested institutions. An annual catalogue of Canadian earthquakes is produced for each calendar year. Commencing with 1974 data, all Canadian earthquake determinations, with the associated data, will also be submitted to the ISC for inclusion in its Bulletin.

4. STATION PROCEDURES

Seismograms from all stations are mailed weekly to Ottawa. Standard stations submit on a weekly basis phase report sheets listing the arrival times of all P phases of teleseisms and also local earthquakes equal or or greater than magnitude three. Local earthquake monthly summary sheets, seismogram log sheets and instrument log sheets are submitted from standard stations monthly. Regional stations submit only monthly seismogram log sheets. Quality control on station seismograms, data and log sheets is performed by Network staff in Ottawa prior to having the seismograms microfilmed.

The daily telegraphed messages from standard stations include all teleseisms with good P-wave onsets. If the maximum P-wave amplitude is in the first five seconds and exceeds four millimeters (peak-to-peak), the period and maximum zero-to-peak ground amplitude in millimicrons is included. Select high gain stations telegraph periods and maximum ground amplitudes within the first minute of the P-wave train for all teleseisms. This procedure was introduced to improve m_b values for smaller events. For local earthquakes equal to or greater than magnitude three, P arrival times, other identifiable phase times, maximum S-wave amplitudes and periods are telegraphed. Only the P arrival times from these messages are relayed to other seismological institutions.

5. PERSONNEL

During 1974, Mr. R.J. Halliday was in charge of the Canadian Seismograph Network and was assisted in quality control and Network management by Mr. W.E. Shannon. Mr. F. Lombardo continued as the Chief Technician of the Network for station maintenance, calibration and installation, assisted by Mr. B.A. Compton. Mr. R.B. Hayman was in charge of the Seismological Instrumentation Laboratory in Ottawa supporting and servicing the Network. Dr. F. Kollar gave particular attention to the Network instrumental problems and their solution.

6. STANDARD AND REGIONAL SEISMOGRAPH STATION INSTRUMENTATION

6.1 Instrument Changes during 1974

Starting in 1971, a rectangular (box-car) pulse was applied twice daily to the long-period seismographs. The pulse, consisting of a known value of current for a specified time (nominally 0.1 microampere for 7 seconds), is applied automatically by the chronometer and time control unit at 0000 hours and 1200 hours U.T., and produces the output pulse, an example of which is shown in Figure 5. By the simple procedure of superimposing a standard pulse on the recorded daily pulse, any significant change in the seismograph response characteristics can be detected. For a more complete description of the pulse calibration, see the report by Wickens *et al.* (1974).

During 1974, the long-period pulse calibration circuitry was installed at YKC, and by the end of 1974 the only standard station which did not have the pulse calibration circuitry was VIC.

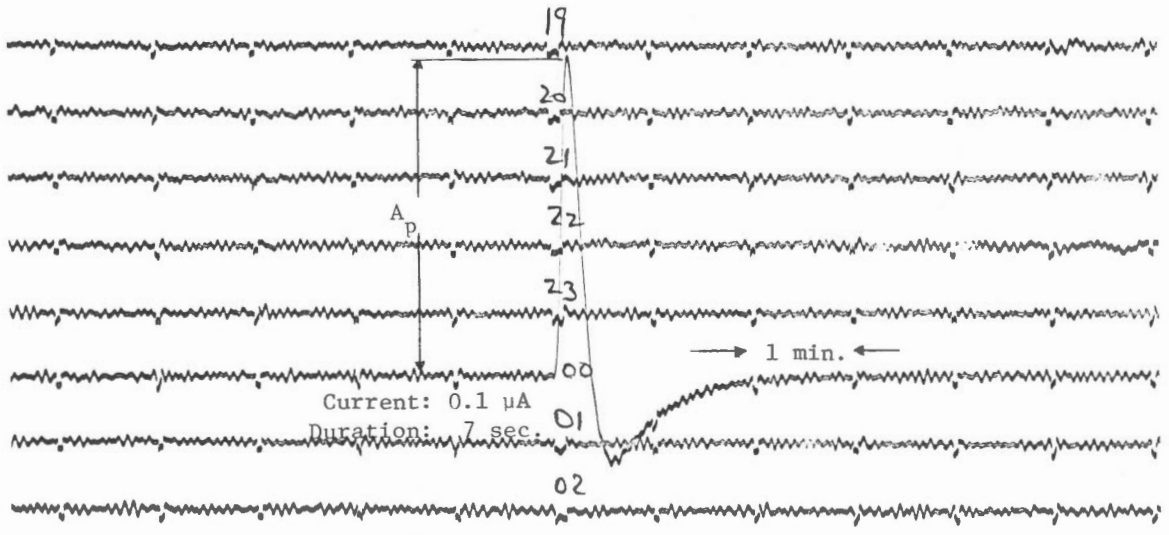

Figure 5. Pulse Calibration Example

Instrumental changes or calibrations were performed at the following stations during 1974. For any changes that resulted in more than one calibration curve being applicable during the year, the appropriate additional curves are included here.

Baker Lake (BLC). During the month of May, the short-period east-west seismograph indicated a loss of gain and on June 11, 1974, the galvanometer was replaced. A calibration curve was estimated in Ottawa with the aid of a galvanometer calibration at the station.

Edmonton (EDM). Starting on November 25, 1974, "as found" calibrations were performed on the three short-period and the three long-period seismographs. The three short-period seismometers had their impedances changed from 127 to 380 ohms, restoring the short-period responses to the original short-period vertical response of 1966, and the long-period seismographs had their gains reduced slightly. A final calibration was made under these conditions.

Flin Flon (FFC). On May 7, 1974, the long-period north-south galvanometer was replaced due to an intermittent short in the coil, and a calibration curve was estimated in Ottawa. Due to the overdamped condition of the replacement, a second galvanometer was installed on June 24, 1974, and another calibration curve was estimated. On August 26, 1974, the attenuator settings were adjusted so that the seismograph response more closely matched the original October 21, 1971, curve.

Inuvik (INK). On June 20, 1974, the long-period north-south galvanometer was replaced due to a partially shorted coil. A response curve was estimated in Ottawa with the aid of a galvanometer calibration performed at the station. Also on June 20, 1974, the long-period vertical galvanometer was broken and was temporarily replaced by the former long-period north-south galvanometer. This galvanometer was finally replaced on July 22, 1974. The long-period vertical seismograph attenuation was adjusted on August 26 to restore the response as closely as possible to the May 21, 1972, calibrated level.

Montréal (MNT). From February 11 to 15, 1974, calibrations were performed on the short- and long-period seismographs. Since all systems showed similar responses to the previous calibrations, no changes were made in the seismographs' responses.

Poste-de-la-Baleine (PBQ). On May 2, 1974, the buildings housing the seismographs were destroyed by fire. Records dating back to April 28, 1974, were also lost in the fire. On May 23, 1974, a new short-period vertical seismograph was commissioned and a calibration curve produced. Two short-period horizontal components were reinstalled on February 14, 1975.

Port Hardy (PHC). From June 24 to June 28, 1974, calibrations were performed on the three short-period and the three long-period seismographs. As all systems were found operating satisfactorily, the instruments were left operating in the "as found" conditions.

Penticton (PNT). From December 2 to 5, 1974, the station was closed for calibration and maintenance. "As found" calibrations were performed on both the three long-period and the three short-period seismographs. The two short-period horizontal Willmore MKI seismometers were replaced by Willmore MKII seismometers. The response of the three short-period seismographs was changed to match more closely that of other standard short-period stations and a calibration performed.

La Pocatière (POC). During the summer of 1974, a field survey was in progress in the lower St. Lawrence River area. The La Pocatière station was included in the field project network and its seismograph response was changed several times during the project. On June 10, 1974, the amplifier's bandpass was changed from 0.1 - 5 Hz to 0.75 - 30 Hz and the attenuation increased by a factor of two. On July 26, 1974, the attenuation was reduced by a factor of two and the filter bandpass set to 0.1 - 12.5 Hz. On October 10, 1974, the complete seismograph system was replaced with one using a Willmore short-period seismometer with an AS330 amplifier and a bandpass of 0.5 - 3.0 Hz. The original seismograph was sent to Ottawa for maintenance and on November 18, 1974, was put back into service.

Resolute (RES). From July 9 to 18, 1974, the station's recording instruments were relocated, although the seismometers were kept in their original location. After the relocation was completed, calibrations were performed on the three short-period and three long-period seismographs. On August 19, 1974, the long-period north-south galvanometer was found to be erratic, resulting in an intermittently stable trace. It was replaced on September 1, 1974, and a new response curve was calculated.

Suffield (SES). From December 6 to 10, 1974, the station was closed for maintenance and calibration. "As found" calibrations were performed on all six seismographs. The three

long-period seismographs were found to be operating satisfactorily and were not changed. The operating impedance of the short-period seismometers were changed from 125 to 380 ohms, restoring the short-period responses to their original settings of 1966.

Sept-Iles (SIC). On April 12, 1973, the photographic short-period vertical seismograph was decommissioned. On December 13, 1974, the station was reactivated with a new electronic seismograph consisting of a Willmore MKII vertical seismometer, AS420 Teledyne telemetry amplifier and a V.H.F. radio transmitter which telemetered the seismic signal from the seismograph vault to the control room of the Iron Ore Company of Canada in Sept-Iles. The seismic signal is now recorded on a Geotech RV301 helicorder. The present test settings are for a magnification of 30K at 1 Hz with a bandpass of 1 - 10 Hz. Final settings will be chosen later based on several months of recordings. At that time a response curve of the system will be published stating the final settings for the gain and filters.

Fredericton (UNB). The response curve dated February 7, 1973, was calculated assuming an attenuation of -18 dB, when in fact the seismograph was operated at -24 dB during 1974. On May 8, 1975, the complete system was recalibrated and a response curve calculated. The later curve more closely represents the seismograph response during 1974.

Victoria (VIC). From June 17 to 22, 1974, the station was closed for maintenance and calibration work. "As found" calibrations were performed on the three short-period seismographs and the three long-period seismographs. The calibrations indicated the instruments were operating as expected except for the long-period north-south which was operating at a higher gain than its estimated value of November 7, 1972. The long-period north-south response was lowered to match more closely the other two long-period components and the north-south seismograph recalibrated.

Whitehorse (WHC). On November 27, 1974, an "as found" calibration was performed on the short-period vertical seismograph. The seismometer had been operating since August 12, 1974, in an underdamped condition as can be seen from its "as found" response curve. This condition was corrected. Two short-period horizontal seismographs were added to the station which necessitated moving the seismometer vault slightly. A new cable connecting the seismometers and recorders was also installed.

Yellowknife (YKC). From March 18 to 27, 1974, the station was closed for maintenance and calibrations. "As found" calibrations were performed on all seismographs. Variations of up to 10 percent from the previous calibrations were found for the short-period and 20 percent for the long-period seismographs. The differences were due to physical changes in the individual instruments. Final calibrations were performed after the responses of the two sets of instruments were more closely matched.

6.2 Calibration Curves

Calibration curves for all standard and regional stations, listed alphabetically by station code, are given on the following pages. The curves for the photographic seismographs were obtained by application of the Willmore bridge method on site (Willmore, 1959). Regional station calibration curves are computed in Ottawa from the known seismograph instrument parameters. A smooth line response curve with no plotted points signifies a calculated rather than a calibrated response. Magnification and acceleration sensitivity of any instrument is determined from the curves by multiplying the velocity sensitivity by $2\pi/T$ and $T/2\pi$, respectively. The calibration sheets give the periods of the seismometers and galvanometers, and include other information such as the station coordinates, altitude, foundation material and date of calibration.

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Manchee, E.B., and R.B. Hayman. The radio telemetry installation at the Yellowknife seismic array. Pub. Earth Phys. Br., 43, 507-526, 1972.

Rogers, G.C. Survey of the Canadian strong-motion seismograph network. In: Conference preprints, Second Canadian Conference on Earthquake Engineering, June 5-6, 1975, McMaster University, Hamilton, Ont.

Weichert, D.H. The role of medium aperture arrays: The Yellowknife system. In: Exploitation of Seismograph Networks, NATO Advanced Study Institute Series E, No. 11, 1975.

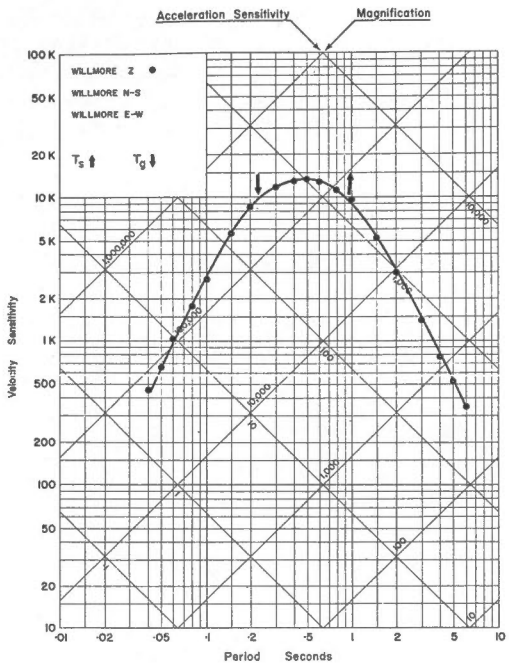
Wickens, A.J., H.S. Hasegawa, and M.N. Bone. Pulse calibration and its application to the daily calibration of the Canadian standard seismograph network long-period seismometers. Can. J. Earth Sci., 11, 691-697, 1974.

Willmore, P.L. The application of the Maxwell impedance bridge to the calibration of electromagnetic seismographs. Bull. Seis. Soc. Am., 49, 99-114, 1959.

STATION: ALERT, N.W.T. (AS FOUND AND LEFT) (ALE)

ϕ= 82°29' N λ= 62°24' W Altitude 65M

Foundation: Permanently frozen glacial debris overlying Palaeozoic limestone



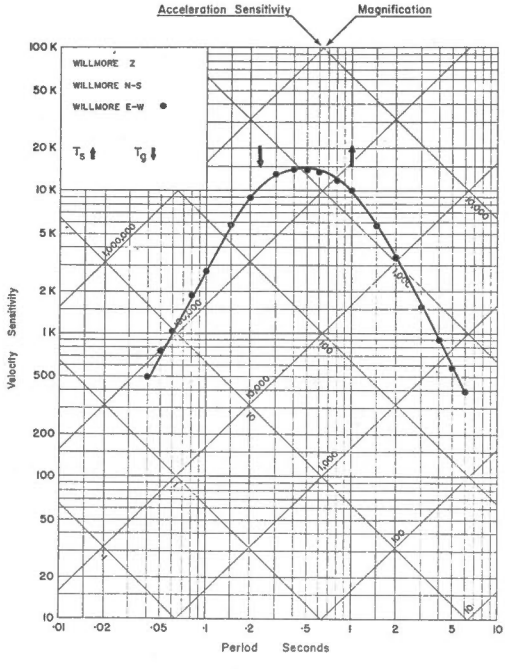
Dates of Calibration:

WILLMORE Z ● April 11, 1972
WILLMORE N-S
WILLMORE E-W

STATION: ALERT, N.W.T. (AS FOUND AND LEFT) (ALE)

ϕ= 82°29' N λ= 62°24' W Altitude 65M

Foundation: Permanently frozen glacial debris overlying Palaeozoic limestone.



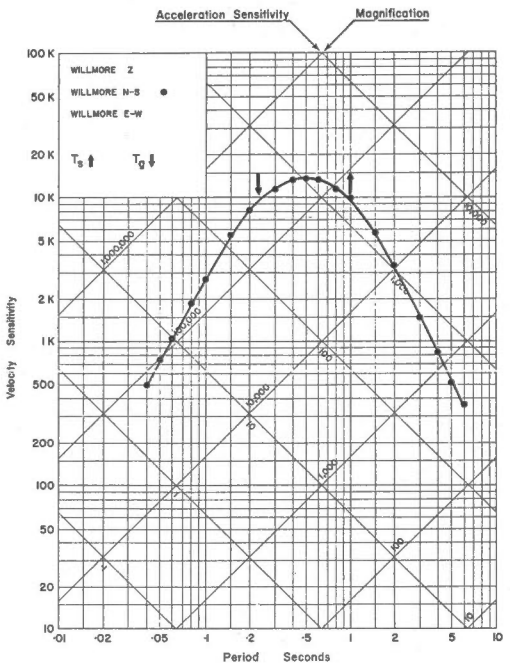
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● April 11, 1972

STATION: ALERT, N.W.T. (AS FOUND AND LEFT) (ALE)

ϕ= 82°29' N λ= 62°24' W Altitude 65M

Foundation: Permanently frozen glacial debris overlying Palaeozoic limestone.



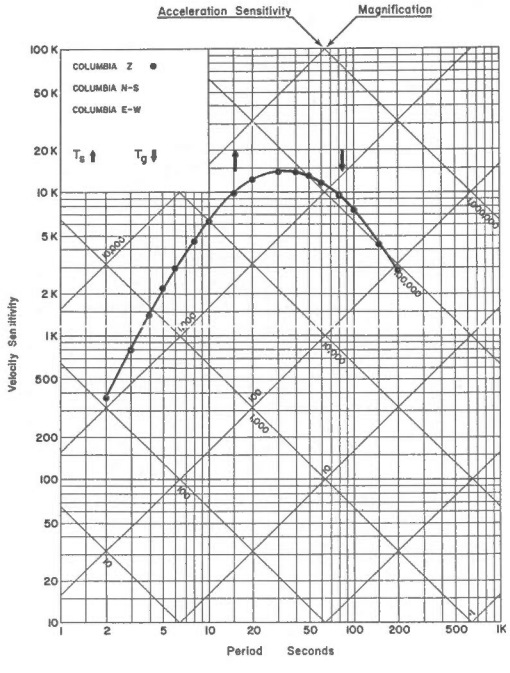
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● April 11, 1972
WILLMORE E-W

STATION: ALERT, N.W.T. (FINAL) (ALE)

ϕ= 82°29' N λ= 62°24' W Altitude 65M

Foundation: Permanently frozen glacial debris overlying Palaeozoic limestone.



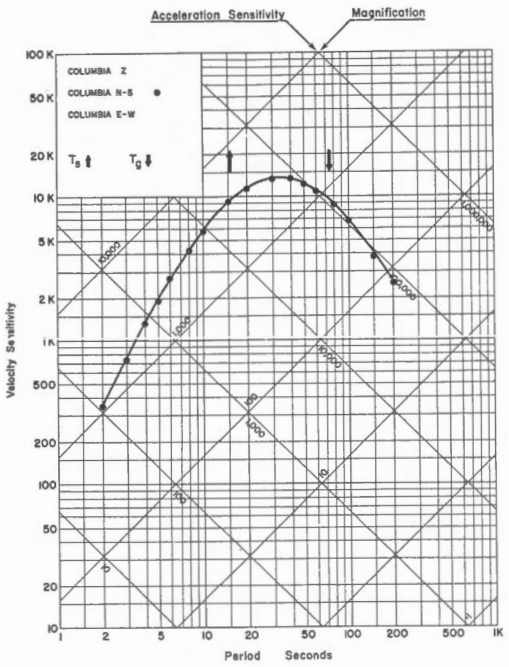
Dates of Calibration:

COLUMBIA Z ● April 11, 1972
COLUMBIA N-S
COLUMBIA E-W

STATION: ALERT, N.W.T. (FINAL) (ALE)

ϕ= 82°29' N λ= 62°24' W Altitude 65M

Foundation: Permanently frozen glacial debris overlying Palaeozoic limestone.



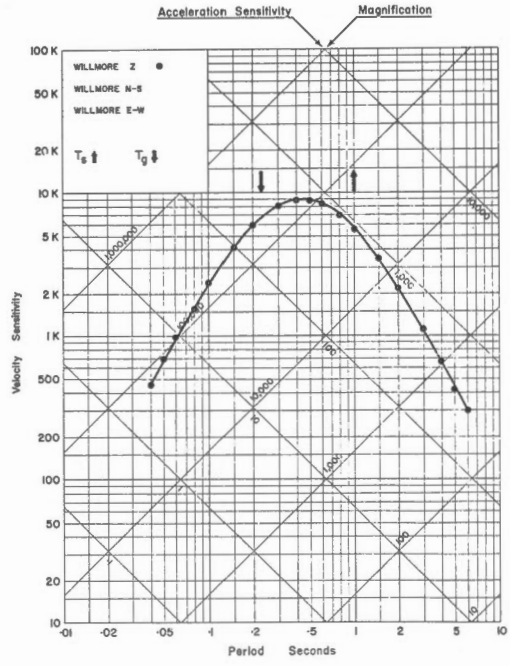
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● April 9, 1972
COLUMBIA E-W

STATION: BAKER LAKE, N.W.T. (As found and left) (BLC)

ϕ= 64°19'N λ= 96°01'W Altitude 16 M

Foundation: Granite Gneiss



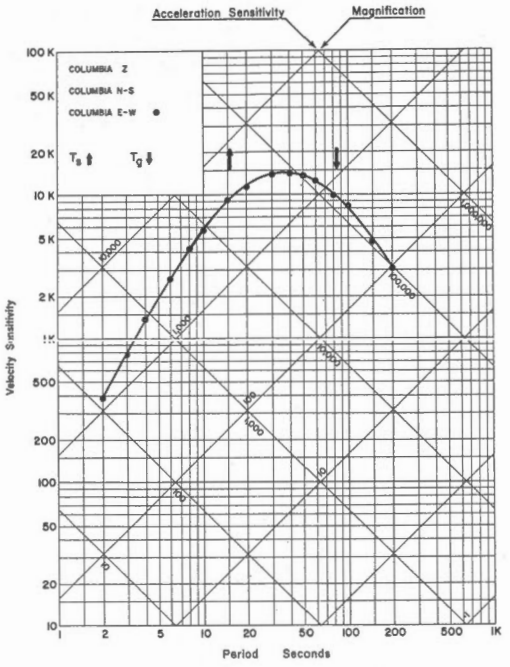
Dates of Calibration:

WILLMORE Z ● June 7, 1971
WILLMORE N-S
WILLMORE E-W

STATION: ALERT, N.W.T. (FINAL) (ALE)

ϕ= 82°29' N λ= 62°24' W Altitude 65M

Foundation: Permanently frozen glacial debris overlying Palaeozoic limestone.



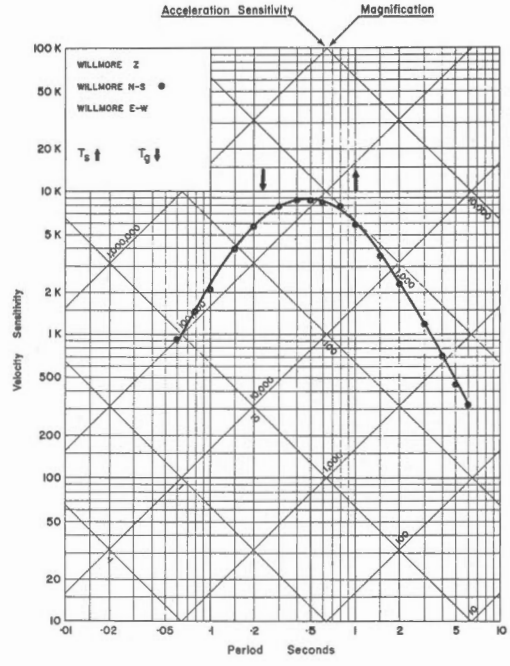
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● April 8, 1972

STATION: BAKER LAKE, N.W.T. (As found and left) (BLC)

ϕ= 64°19'N λ= 96°01'W Altitude 16 M

Foundation: Granite Gneiss



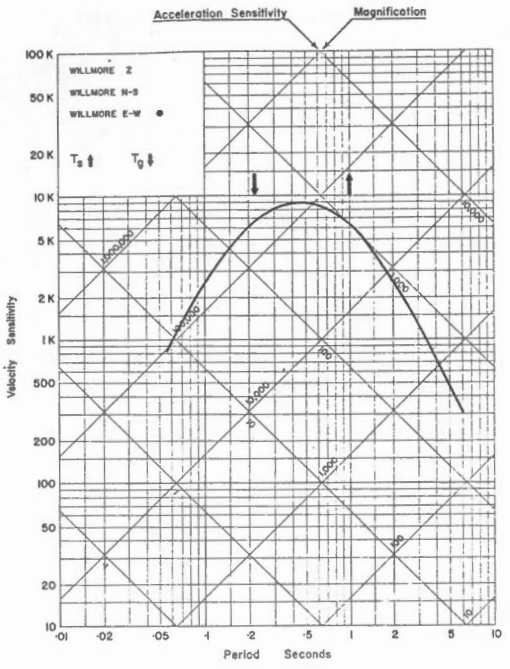
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● June 7, 1971
WILLMORE E-W

STATION: BAKER LAKE, N.W.T. (BLC)

ϕ= 64°19'N λ= 96°01'W Altitude 16 M

Foundation: Granite Gneiss



Dates of Calibration:

WILLMORE Z

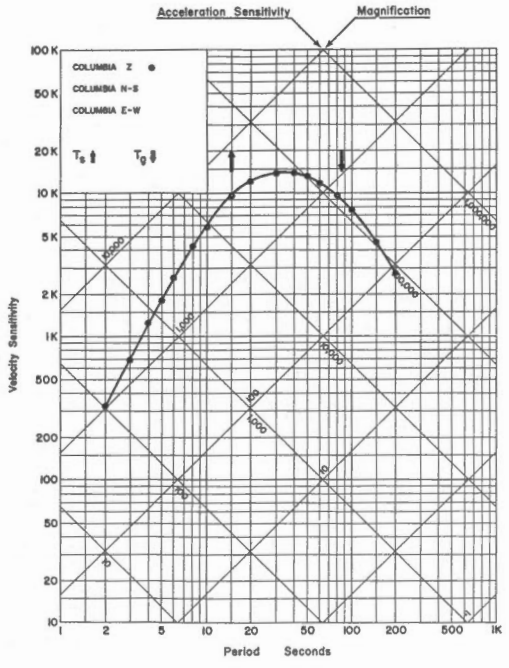
WILLMORE N-S

WILLMORE E-W ● March 17, 1972
(calibrated in Ottawa)

STATION: BAKER LAKE, N.W.T. (As found and left) (BLC)

ϕ= 64°19'N λ= 96°01'W Altitude 16 M

Foundation: Granite Gneiss



Dates of Calibration:

COLUMBIA Z ● June 9, 1971

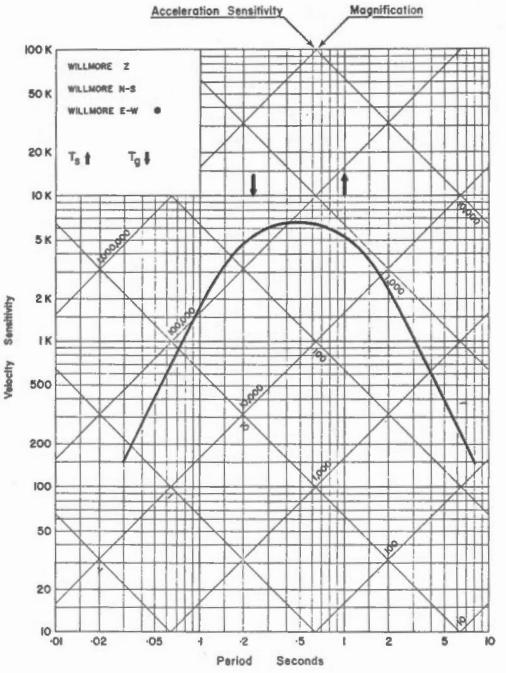
COLUMBIA N-S

COLUMBIA E-W

STATION: BAKER LAKE, N.W.T. (BLC)

ϕ= 64°19'N λ= 96°01'W Altitude 16 M

Foundation: Granite Gneiss



Dates of Calibration: June 11, 1974
(estimated in Ottawa)

WILLMORE Z

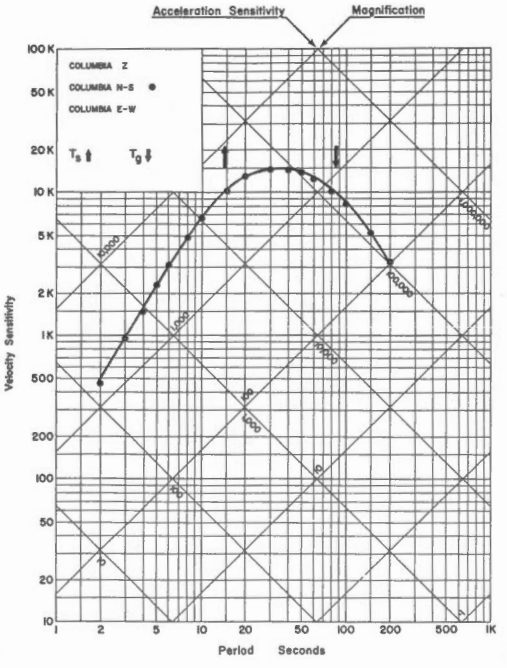
WILLMORE N-S

WILLMORE E-W

STATION: BAKER LAKE, N.W.T. (As found and left) (BLC)

ϕ= 64°19'N λ= 96°01'W Altitude 16 M

Foundation: Granite Gneiss



Dates of Calibration:

COLUMBIA Z

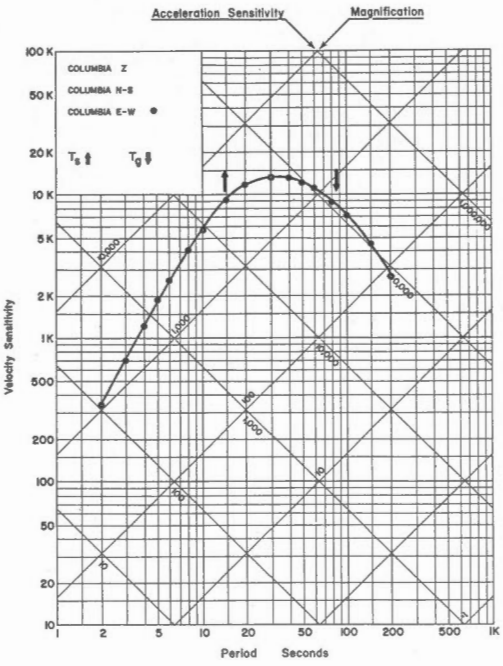
COLUMBIA N-S ● June 9, 1971

COLUMBIA E-W

STATION: BAKER LAKE, N.W.T. (As found and left) (BLC)

ϕ= 64°19'N λ= 96°01'W Altitude 16 M

Foundation: Granite Gneiss



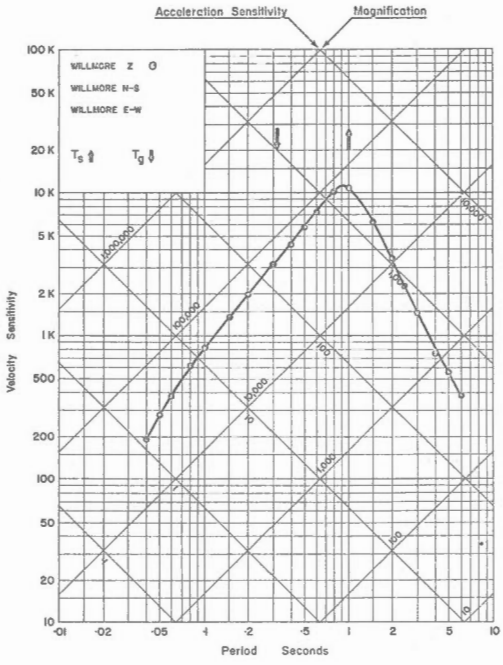
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● June 9, 1971

STATION: EDMONTON, ALTA. (EDM)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



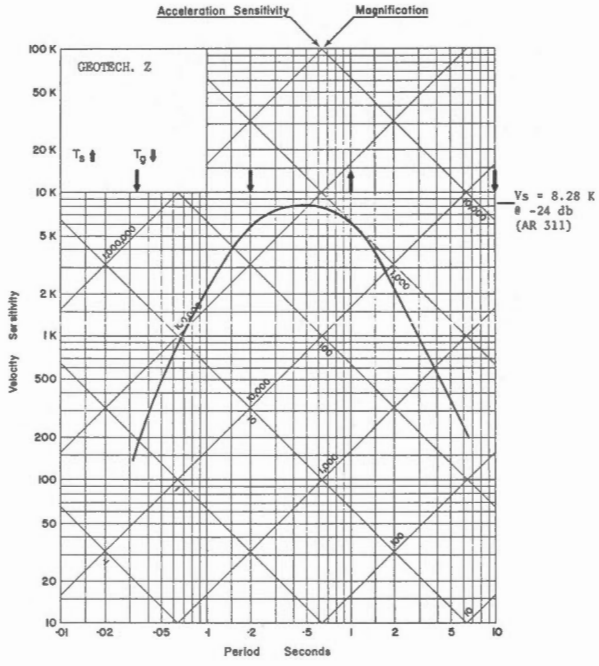
Dates of Calibration:

WILLMORE Z O May 20, 1970
WILLMORE N-S
WILLMORE E-W

STATION: CHARLESBOURG, QUEBEC (CHQ)

ϕ= 46°53'23"N λ= 71°18'00"W Altitude 145 M

Foundation: Precambrian Gneiss



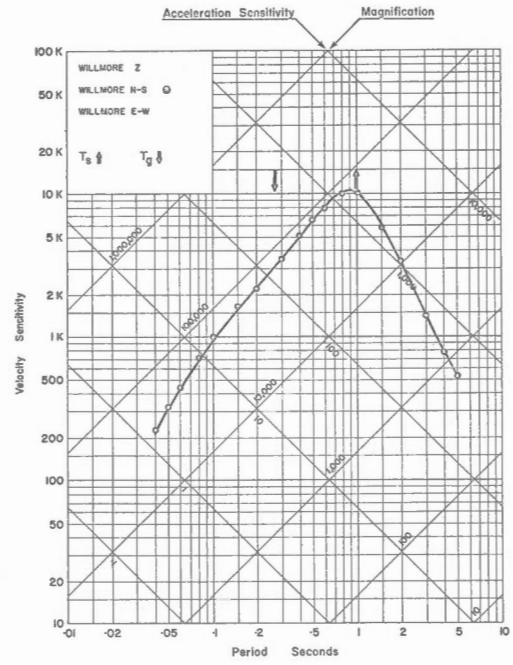
Dates of Calibration: October 1972

SEISMOMETER: Geotech. S13 G_L = 2.62 V.S./C M.
PREAMPLIFIER: AS330 operated at 30-30 db (SEP.-ATT.)
Filter Bandpass 0.1 - 5 Hz
AMPLIFIER: AR 311 - 1 CM./Volt @ 24 db
HELICORDER: RV 301 - 0-30 Hz
Corner frequencies indicated by "T_g" arrows.

STATION: EDMONTON, ALTA. (EDM)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



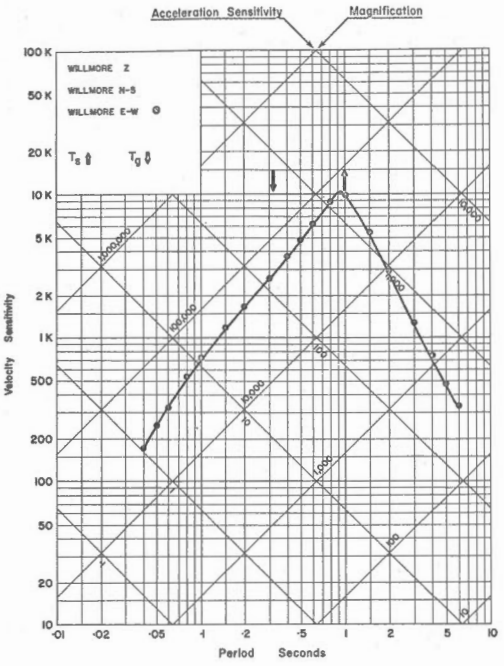
Dates of Calibration:

WILLMORE Z
WILLMORE N-S O May 19, 1970
WILLMORE E-W

STATION: EDMONTON, ALTA. (EDM)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



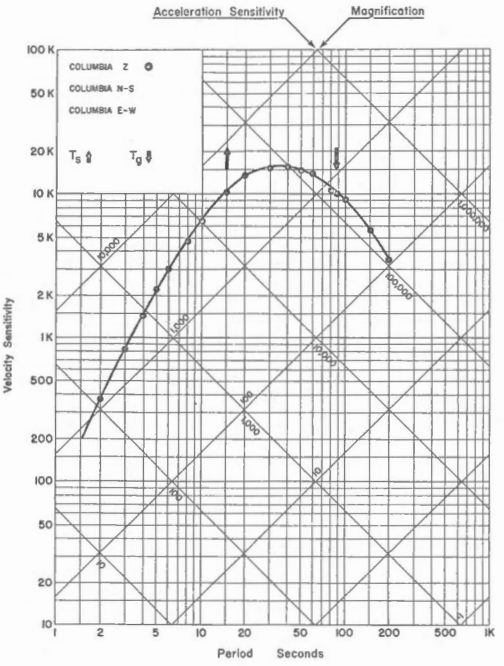
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● May 19, 1970

STATION: EDMONTON, ALTA. (EDM)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



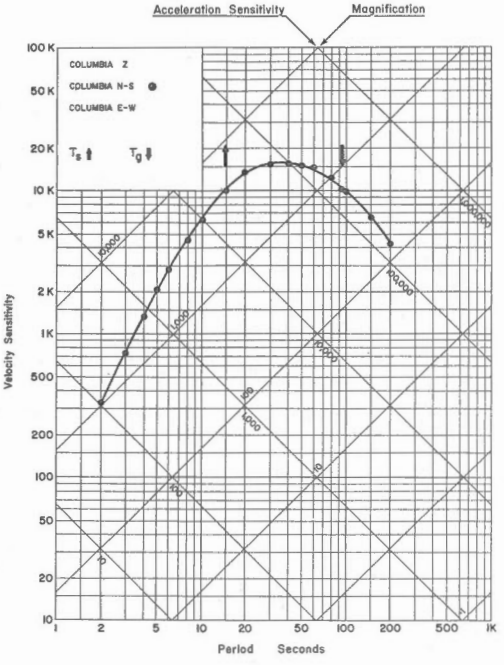
Dates of Calibration:

COLUMBIA Z ● May 18, 1970
COLUMBIA N-S
COLUMBIA E-W

STATION: EDMONTON, ALTA. (EDM)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



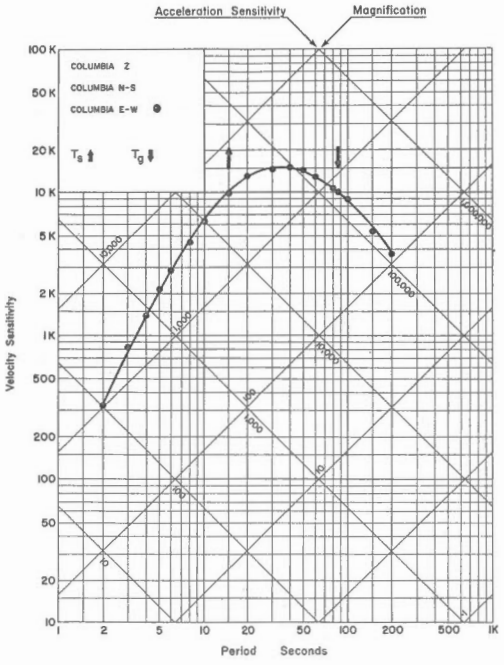
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● May 19, 1970
COLUMBIA E-W

STATION: EDMONTON, ALTA. (EDM)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



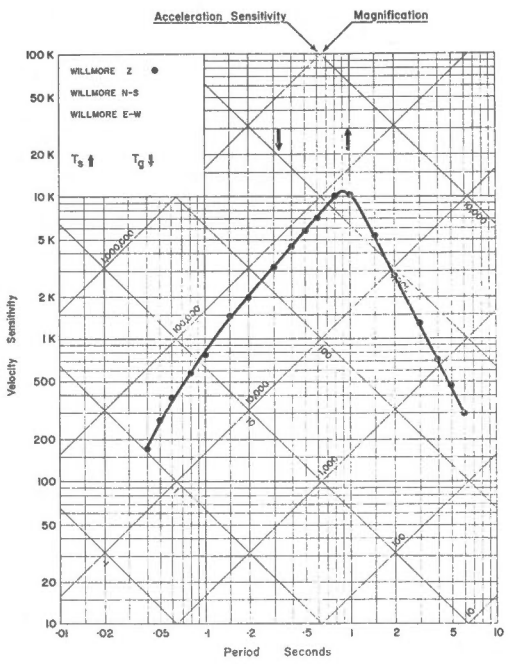
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● May 18, 1970

STATION: EDMONTON, ALTA. (EDM)
(As found)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



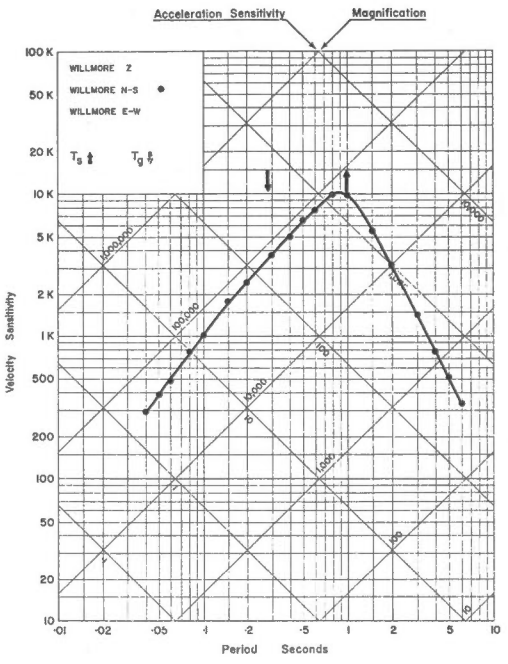
Dates of Calibration:

WILLMORE Z ● November 26, 1974
WILLMORE N-S
WILLMORE E-W

STATION: EDMONTON, ALTA. (EDM)
(As found)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



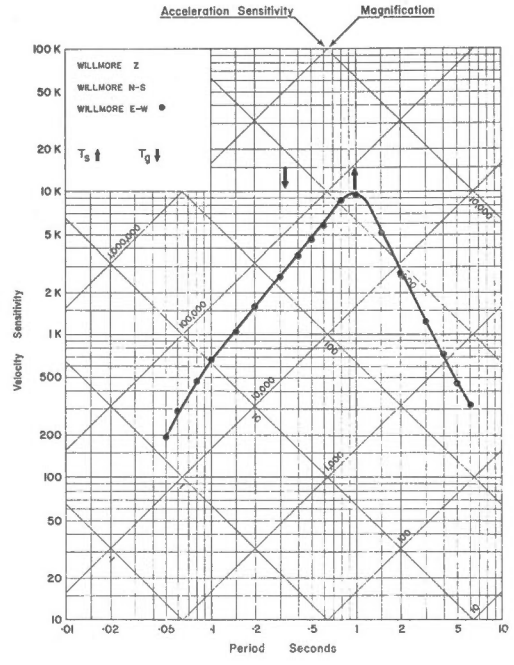
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● November 26, 1974
WILLMORE E-W

STATION: EDMONTON, ALTA. (EDM)
(As found)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



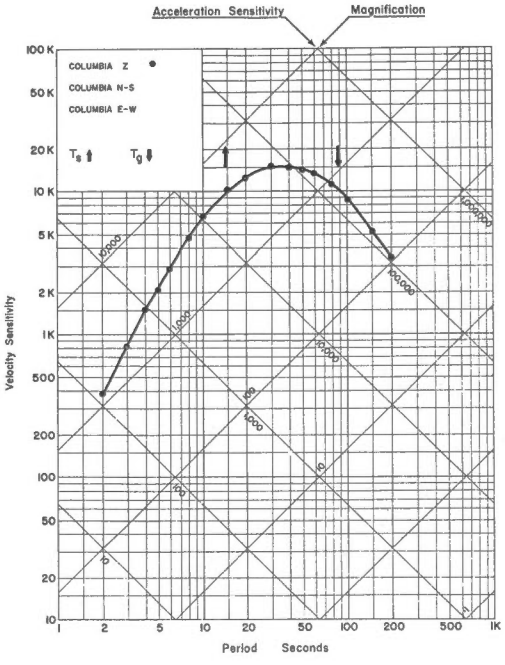
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● November 26, 1974

STATION: EDMONTON, ALTA. (EDM)
(As found)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



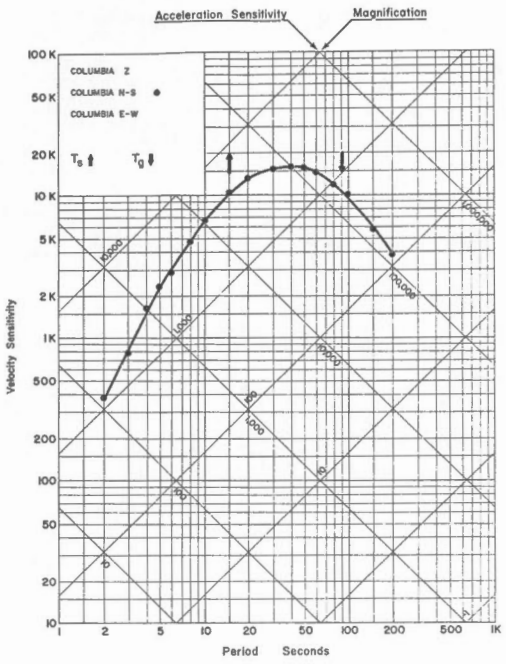
Dates of Calibration:

COLUMBIA Z ● November 27, 1974.
COLUMBIA N-S
COLUMBIA E-W

STATION: EDMONTON, ALTA. (EDM)
(As found)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



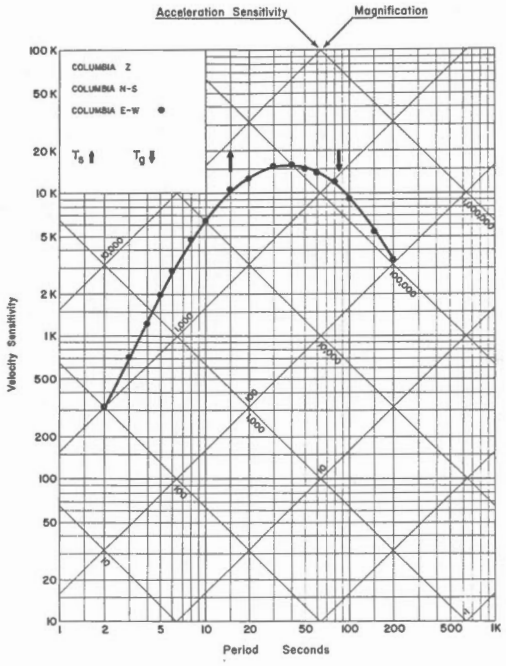
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● November 27, 1974
COLUMBIA E-W

STATION: EDMONTON, ALTA. (EDM)
(As Found)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



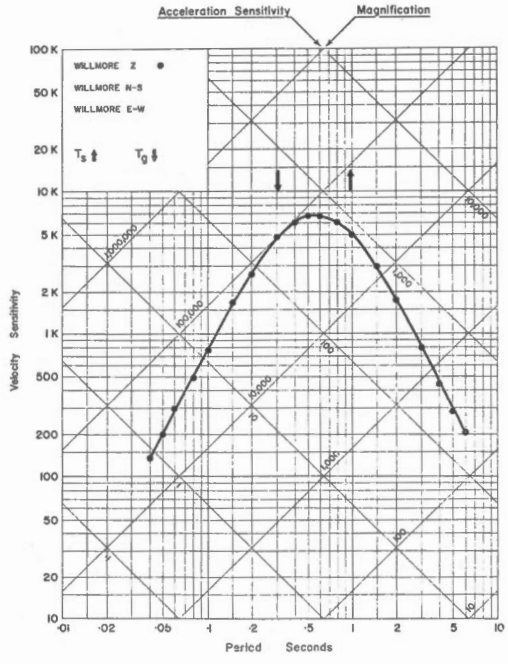
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● November 28, 1974

STATION: EDMONTON, ALTA. (EDM)
(Final)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



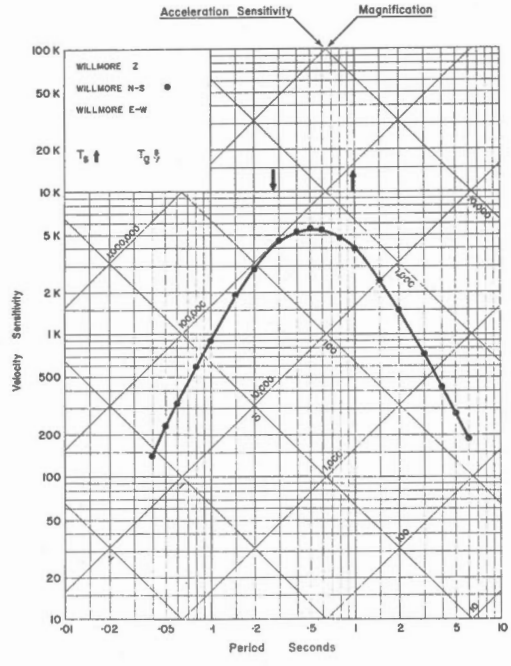
Dates of Calibration:

WILLMORE Z ● November 28, 1974
WILLMORE N-S
WILLMORE E-W

STATION: EDMONTON, ALTA. (EDM)
(Final)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



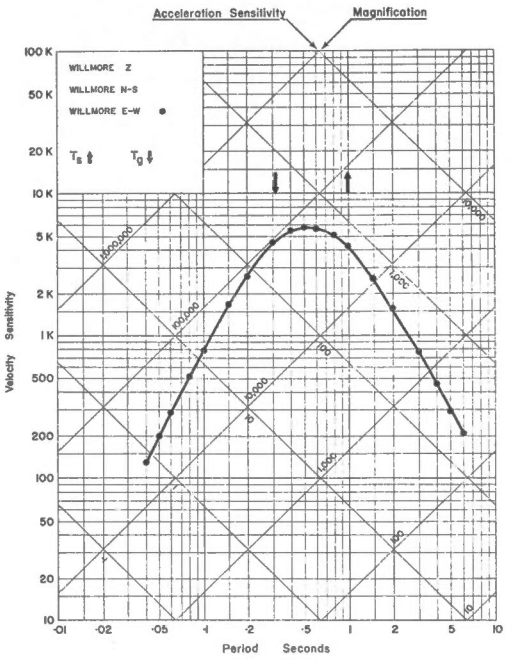
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● November 28, 1974
WILLMORE E-W

STATION: EDMONTON, ALTA. (EDM)
(Final)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



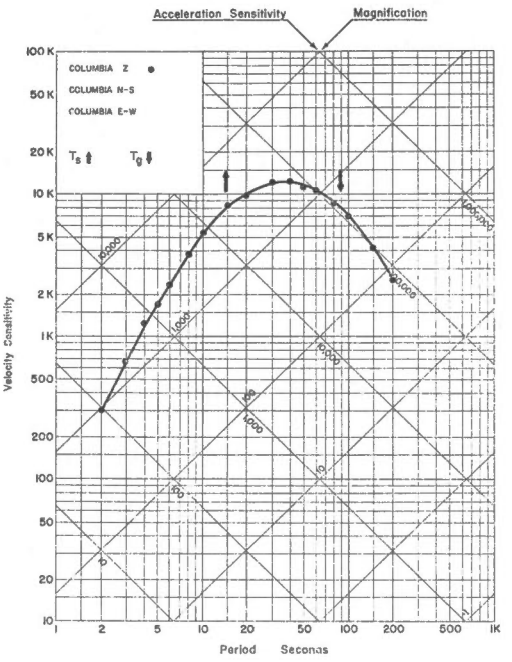
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● November 28, 1974

STATION: EDMONTON, ALTA. (EDM)
(Final)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



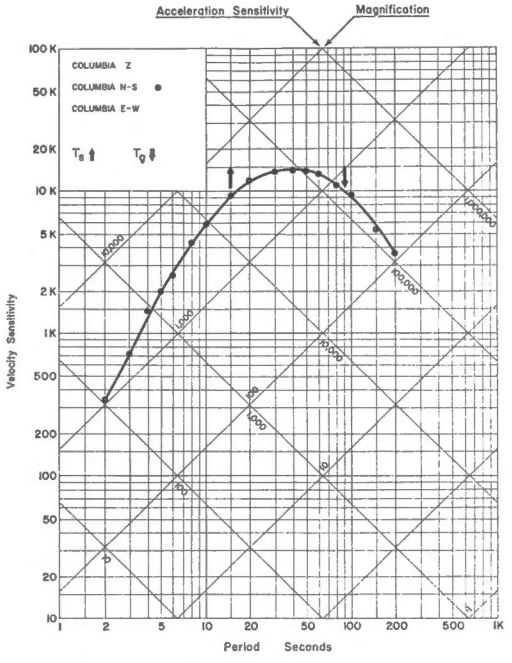
Dates of Calibration:

COLUMBIA Z ● November 27, 1974
COLUMBIA N-S
COLUMBIA E-W

STATION: EDMONTON, ALTA. (EDM)
(Final)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



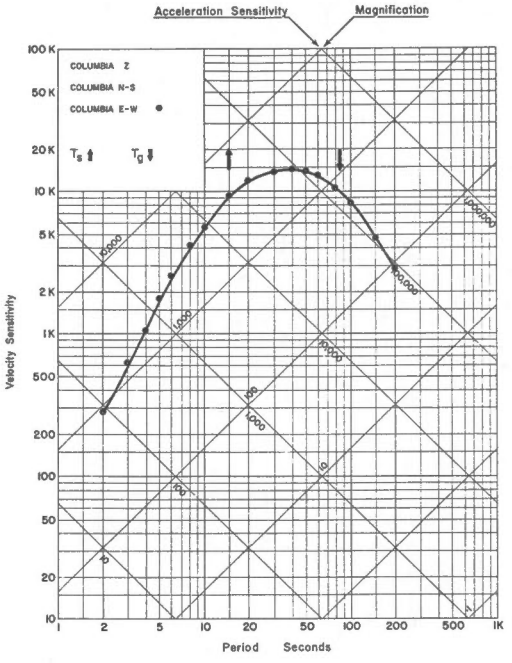
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● November 27, 1974.
COLUMBIA E-W

STATION: EDMONTON, ALTA. (EDM)
(Final)

ϕ= 53°13.3'N λ= 113°21'W Altitude 730M

Foundation: Unconsolidated Shales, Edmonton Formation



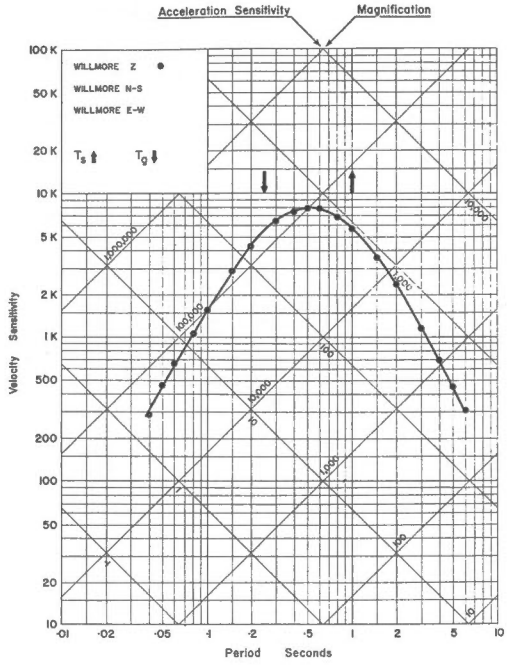
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● November 28, 1974

STATION: FORT CHURCHILL ; MAN. (As found and left) (FCC)

ϕ= 58°45.7'N λ= 94°05.2'W Altitude 39 M

Foundation: Precambrian sediments and volcanic rocks.



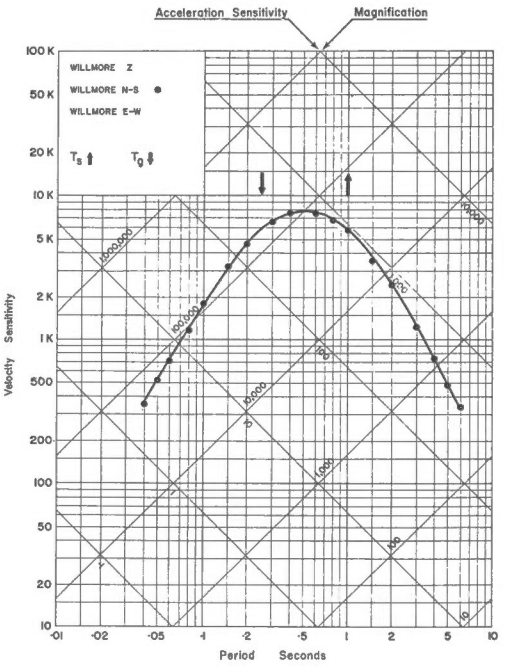
Dates of Calibration:

WILLMORE Z ● June 14, 1971
WILLMORE N-S
WILLMORE E-W

STATION: FORT CHURCHILL, MAN. (As found and left) (FCC)

ϕ= 58°45.7'N λ= 94°05.2'W Altitude 39 M

Foundation: Precambrian sediments and volcanic rocks.



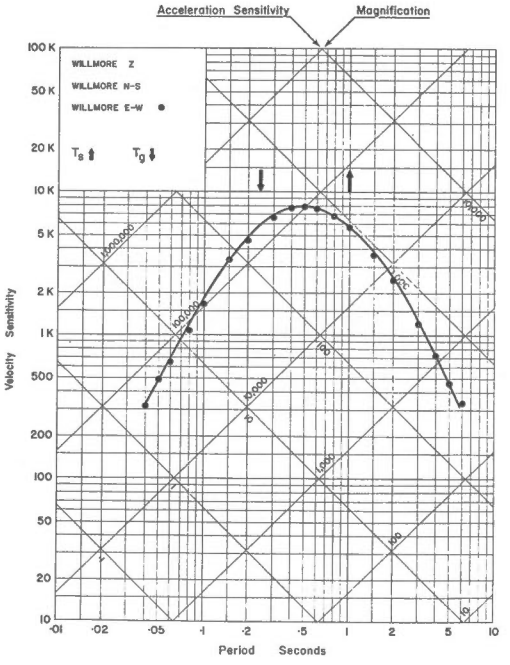
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● June 14, 1971
WILLMORE E-W

STATION: FORT CHURCHILL, MAN. (As found and left) (FCC)

ϕ= 58°45.7'N λ= 94°05.2'W Altitude 39 M

Foundation: Precambrian sediments and volcanic rocks.



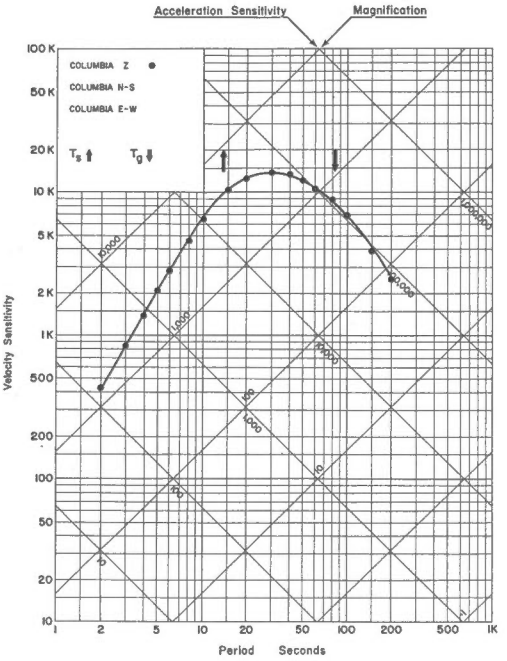
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● June 14, 1971

STATION: FORT CHURCHILL, MAN. (As left) (FCC)

ϕ= 58°45.7'N λ= 94°05.2'W Altitude 39 M

Foundation: Precambrian sediments and volcanic rocks.



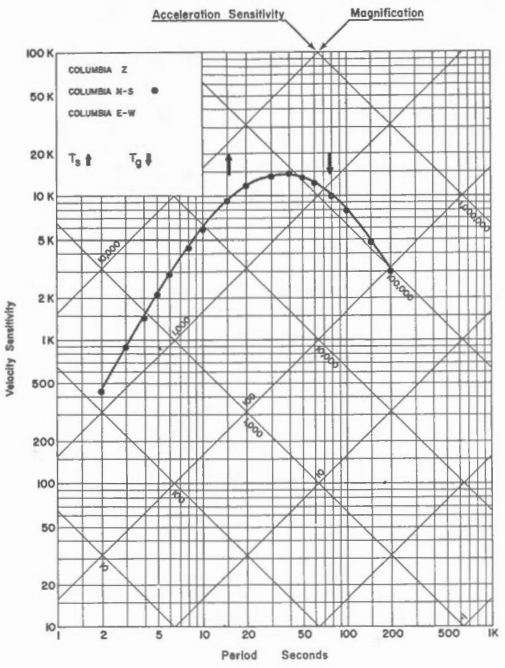
Dates of Calibration:

COLUMBIA Z ● June 15, 1971
COLUMBIA N-S
COLUMBIA E-W

STATION: FORT CHURCHILL, MAN. (As found and left) (FCC)

ϕ= 58°45.7'N λ= 94°05.2'W Altitude 39 M

Foundation: Precambrian sediments and volcanic rocks.



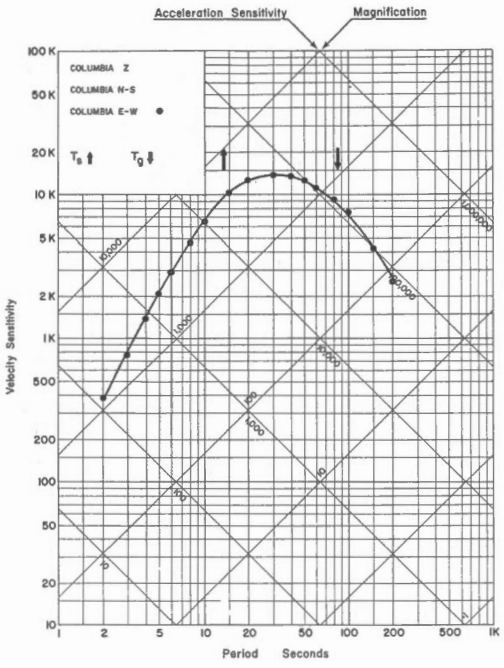
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● June 15, 1971
COLUMBIA E-W

STATION: FORT CHURCHILL, MAN. (As found and left) (FCC)

ϕ= 58°45.7'N λ= 94°05.2'W Altitude 39 M

Foundation: Precambrian sediments and volcanic rocks.



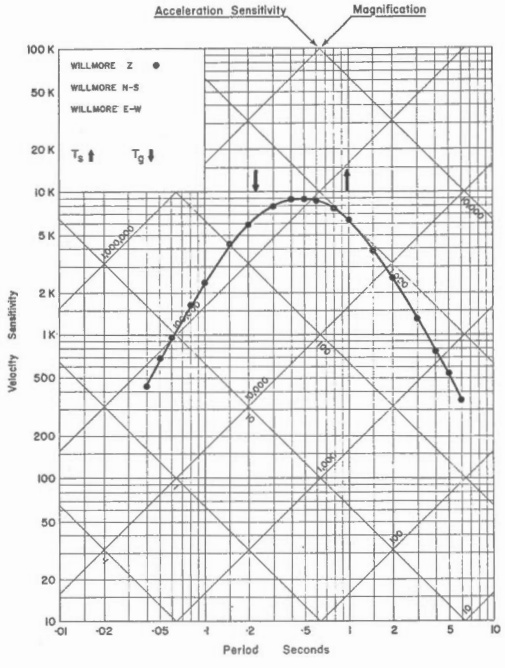
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● June 15, 1971

STATION: FLIN FLON, MANITOBA (As found and left) (FFC)

ϕ= 54°43'.5N λ= 101°58.7'W Altitude 338 M

Foundation: Granite Gneiss



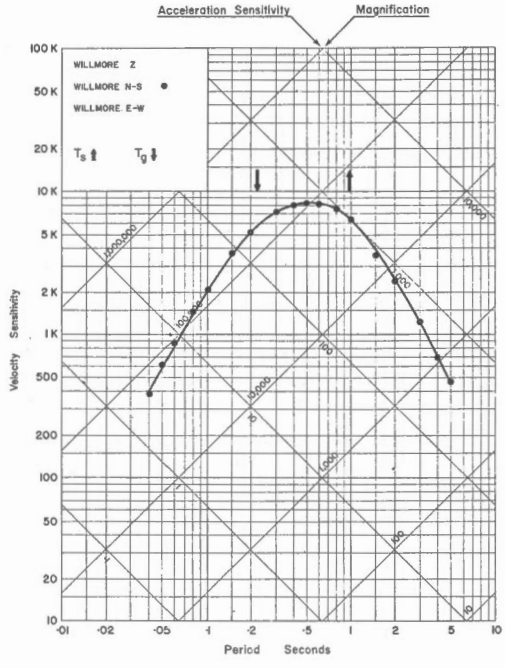
Dates of Calibration:

WILLMORE Z ● Oct. 22, 1971
WILLMORE N-S
WILLMORE E-W

STATION: FLIN FLON, MANITOBA (As found and left) (FFC)

ϕ= 54°43.5'N λ= 101°58.7'W Altitude 338 M

Foundation: Granite Gneiss



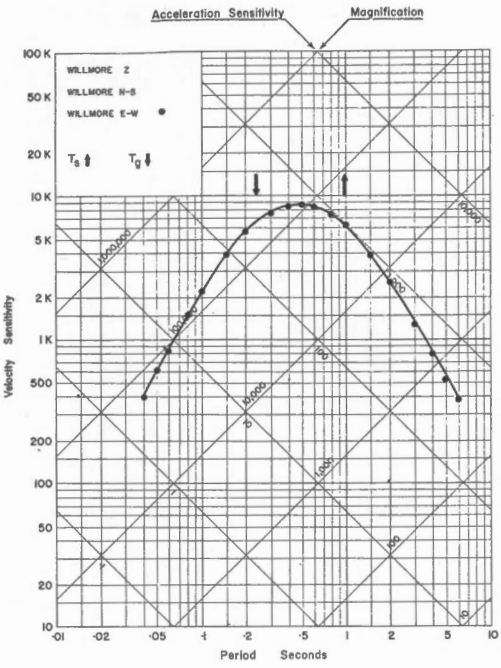
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● Oct. 22, 1971
WILLMORE E-W

STATION: FLIN FLON, MANITOBA (As found and left) (FFC)

ϕ= 54°43.5'N λ= 101°58.7'W Altitude 338 M

Foundation: Granite Gneiss



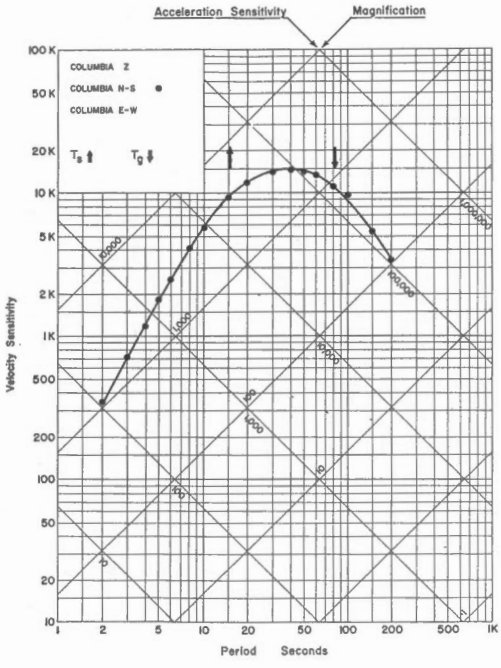
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W • Oct. 22, 1971

STATION: FLIN FLON, MANITOBA (As found and left) (FFC)

ϕ= 54°43.5'N λ= 101°58.7'W Altitude 338 M

Foundation: Granite Gneiss



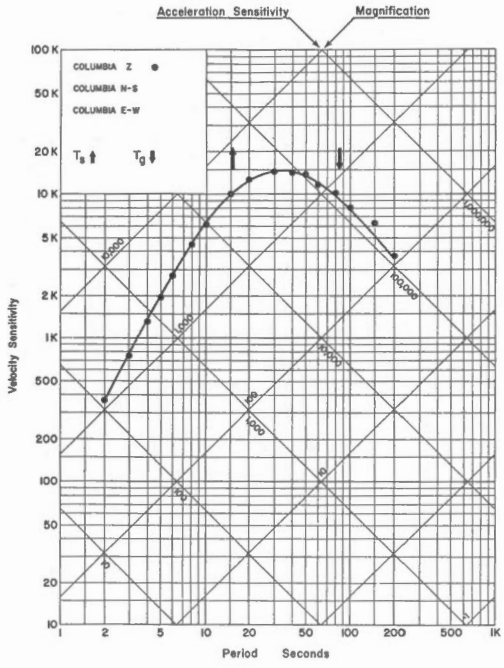
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S • Oct. 21, 1971
COLUMBIA E-W

STATION: FLIN FLON, MANITOBA (As found and left) (FFC)

ϕ= 54°43.5'N λ= 101°58.7'W Altitude 338 M

Foundation: Granite Gneiss



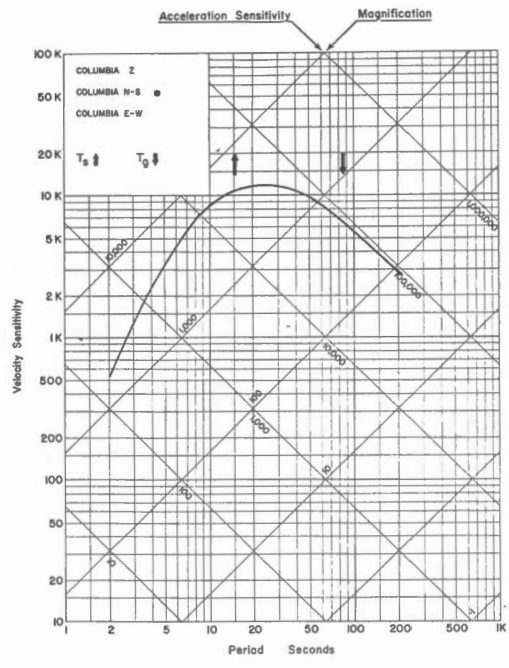
Dates of Calibration:

COLUMBIA Z • Oct. 20, 1971
COLUMBIA N-S
COLUMBIA E-W

STATION: FLIN FLON, MANITOBA (FFC)

ϕ= 54°43.5'N λ= 101°58.7'W Altitude 338 M

Foundation: Granite Gneiss



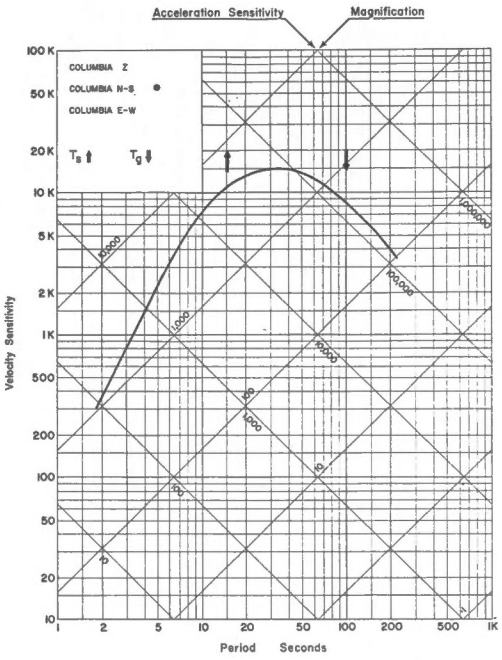
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S • Valid from May 7 to June 24, 1974.
COLUMBIA E-W (estimated in Ottawa)

STATION: FLIN FLON, MANITOBA (FFC)

ϕ= 54°43.5'N λ= 101°58.7W Altitude 338 M

Foundation: Granite Gneiss



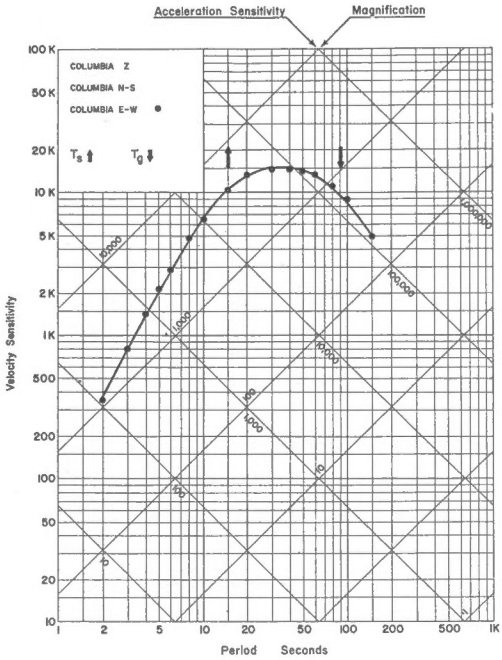
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● Valid from June 24 to Aug 26, 1974
COLUMBIA E-W (estimated in Ottawa)

STATION: FLIN FLON, MANITOBA (As left) (FFC)

ϕ= 54°43.5'N λ= 101°58.7'W Altitude 338 M

Foundation: Granite Gneiss



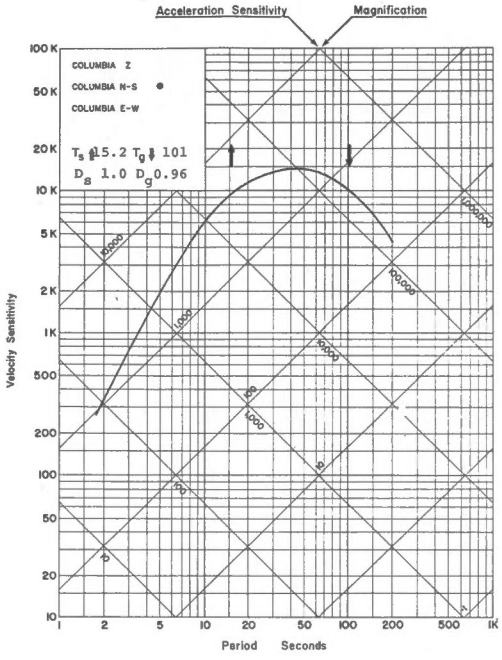
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● Oct. 25, 1971

STATION: FLIN FLON, MANITOBA (FFC)

ϕ= 54°43.5'N λ= 101°58.7'W Altitude 338 M

Foundation: Granite Gneiss



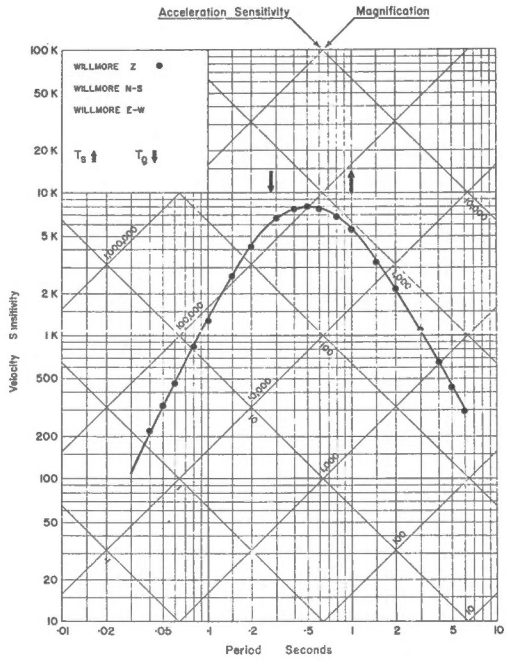
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● Aug. 26, 1974
COLUMBIA E-W (Estimated in Ottawa)

STATION: FROBISHER, N.W.T. (FRB) (FINAL)

ϕ= 63°44.8'N λ=68°32.8'W Altitude 18 M

Foundation: Precambrian metamorphic rock.



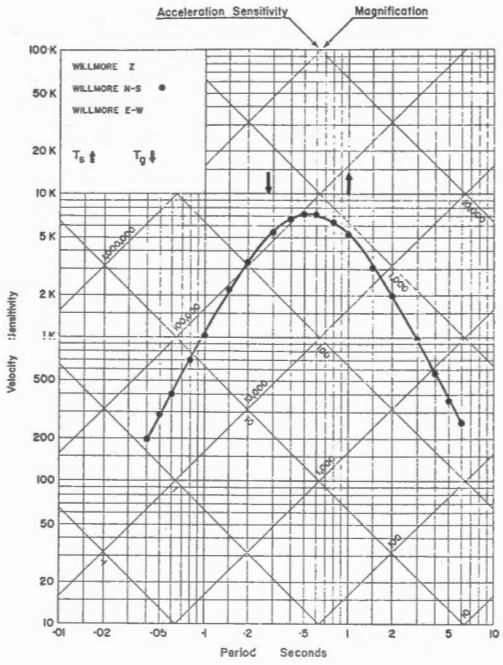
Dates of Calibration:

WILLMORE Z ● Nov. 28, 1972
WILLMORE N-S
WILLMORE E-W

STATION: FROBISHER, N.W.T. (FRB) (FINAL)

ϕ= 63°44.8'N λ= 68°32.8'W Altitude 18 M

Foundation: Precambrian metamorphic rock



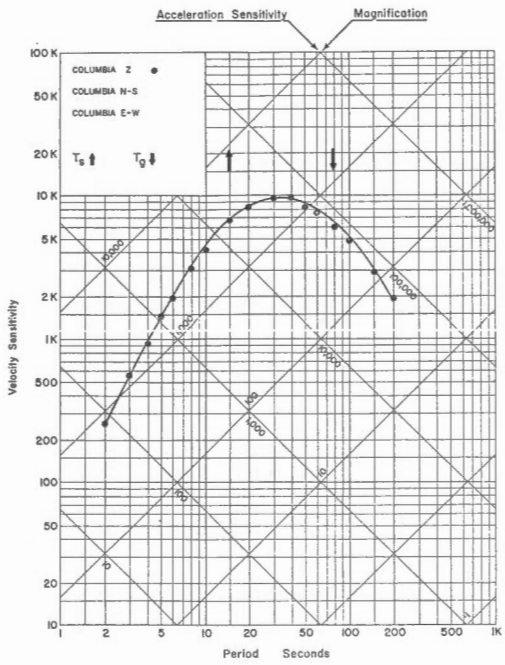
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● Nov. 28, 1972
WILLMORE E-W

STATION: FROBISHER, N.W.T. (FRB) (FINAL)

ϕ= 63°44.8'N λ= 68°32.8'W Altitude 18 M

Foundation: Precambrian metamorphic rock



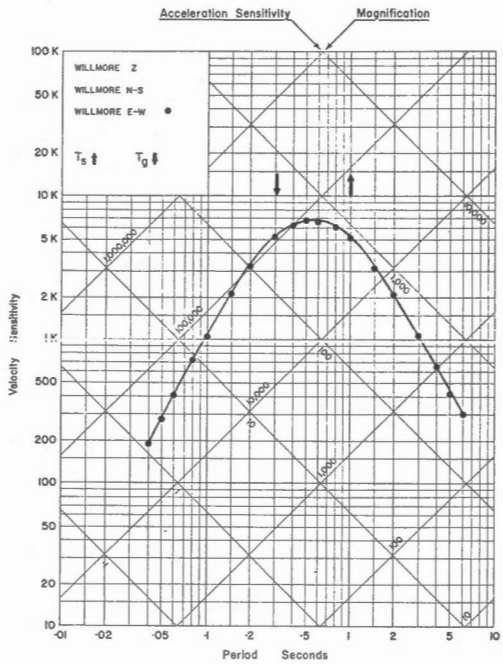
Dates of Calibration:

COLUMBIA Z ● Nov. 29, 1972 (Valid from June 26, 1973 onward).
COLUMBIA N-S
COLUMBIA E-W

STATION: FROBISHER, N.W.T. (FRB) (FINAL)

ϕ= 63°44.8'N λ= 68°32.8'W Altitude 18 M

Foundation: Precambrian metamorphic rock



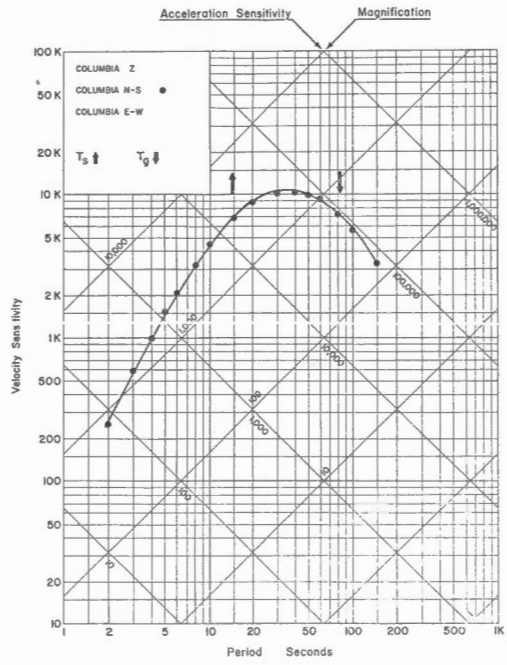
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● Nov. 28, 1972

STATION: FROBISHER, N.W.T. (FRB) (FINAL)

ϕ= 63°44.8'N λ= 68°32.8'W Altitude 18 M

Foundation: Precambrian metamorphic rock



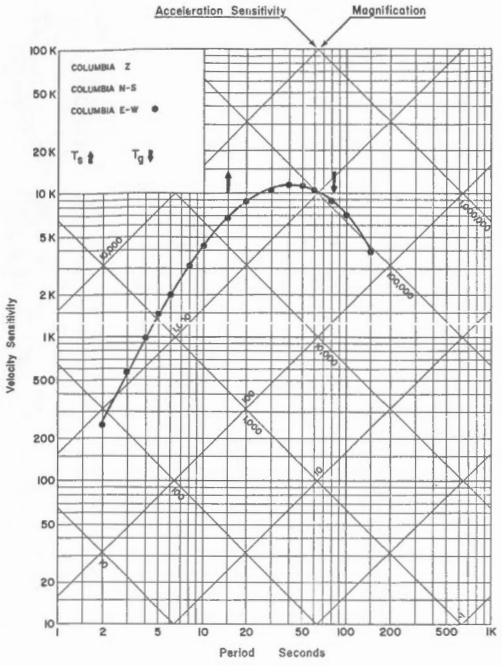
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● Nov. 29, 1972
COLUMBIA E-W

STATION: FROBISHER, N.W.T. (FRB) (FINAL)

ϕ = 63°44.8'N λ = 68°32.8'W Altitude 18 M

Foundation: Precambrian metamorphic rock



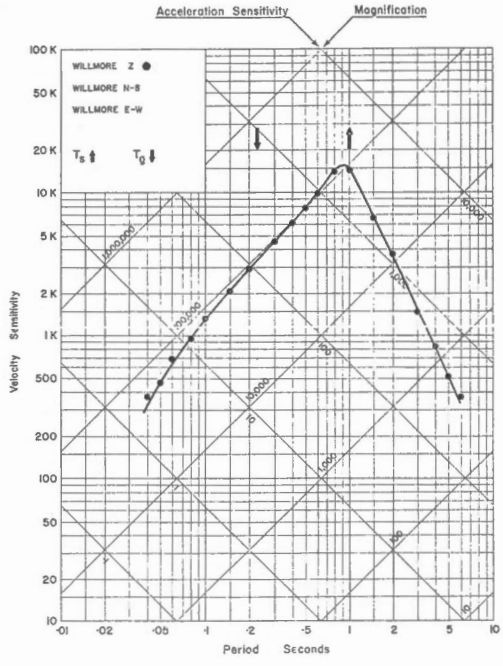
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● Nov. 30, 1972

STATION: FORT ST. JAMES, B.C. (FSJ)

ϕ = 54°26'N λ = 124°15'W Altitude 772 M

Foundation: Palaeozoic Sediments



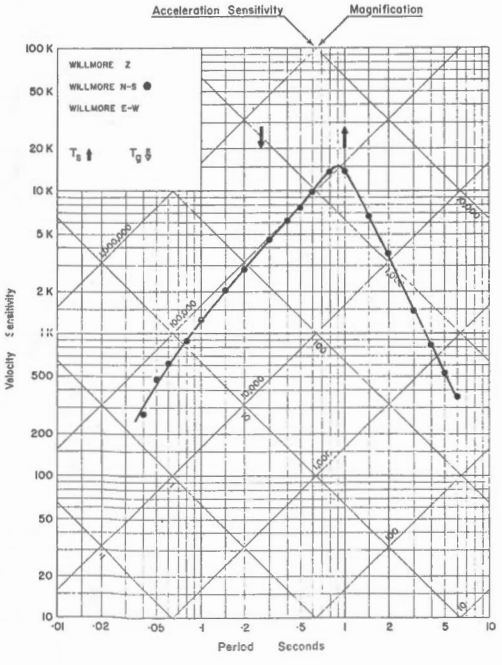
Dates of Calibration:

WILLMORE Z ● Oct. 29, 1970
WILLMORE N-S
WILLMORE E-W

STATION: FORT ST. JAMES, B.C. (FSJ)

ϕ = 54°26'N λ = 124°15'W Altitude 772

Foundation: Palaeozoic Sediments



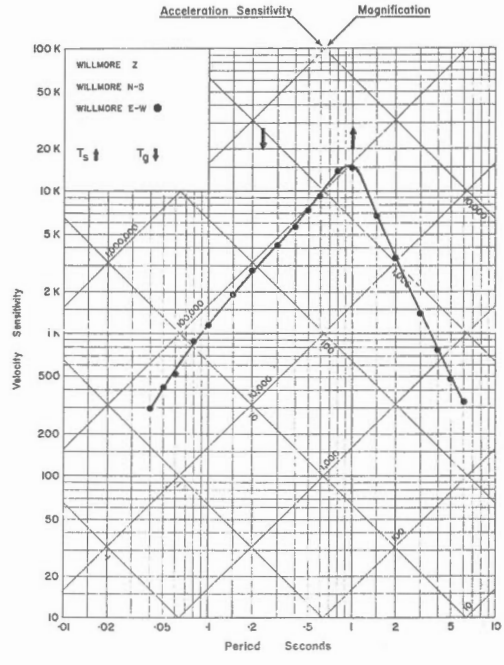
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● Oct. 29, 1970
WILLMORE E-W

STATION: FORT ST. JAMES, B.C. (FSJ)

ϕ = 54°26'N λ = 124°15'W Altitude 772

Foundation: Palaeozoic Sediments



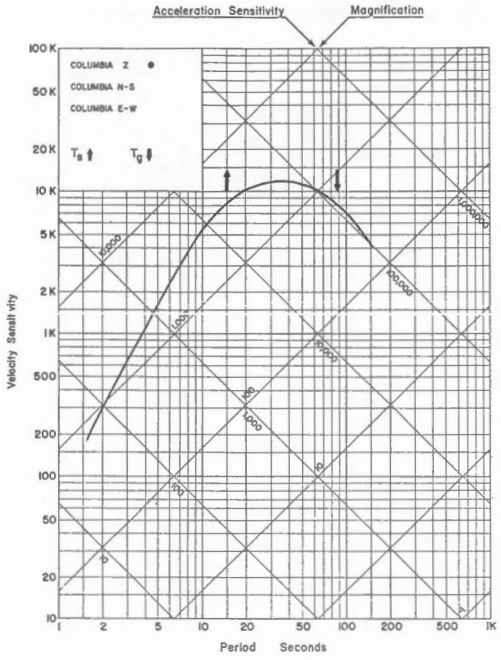
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● Oct. 29, 1970

STATION: FORT ST. JAMES, B.C. (FSJ)

ϕ= 54°26'N λ= 124°15'W Altitude 772 M

Foundation: Palaeozoic Sediments



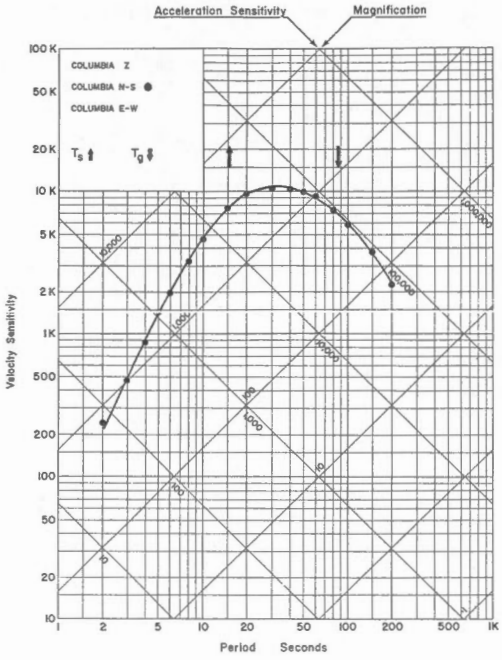
Dates of Calibration:

COLUMBIA Z ● 12 Jan. 1971
COLUMBIA N-S (Calibrated in Ottawa)
COLUMBIA E-W

STATION: FORT ST. JAMES, B.C. (FSJ)

ϕ= 54°26'N λ= 124°15'W Altitude 772 M

Foundation: Palaeozoic Sediments



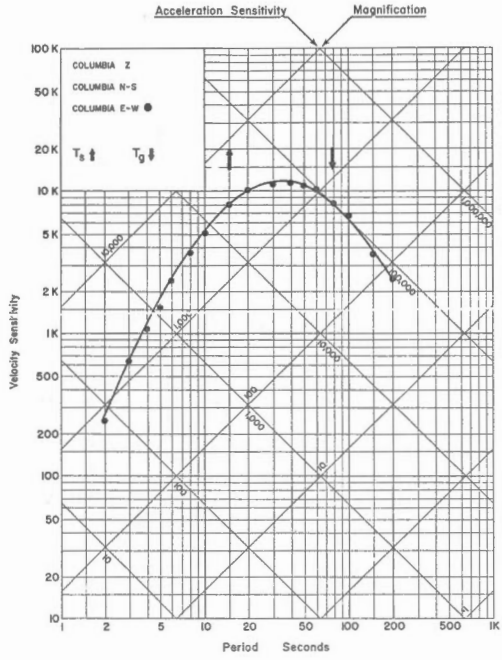
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● Oct. 27, 1970
COLUMBIA E-W

STATION: FORT ST. JAMES, B.C. (FSJ)

ϕ= 54°26'N λ= 124°15'W Altitude 772 M

Foundation: Palaeozoic Sediments



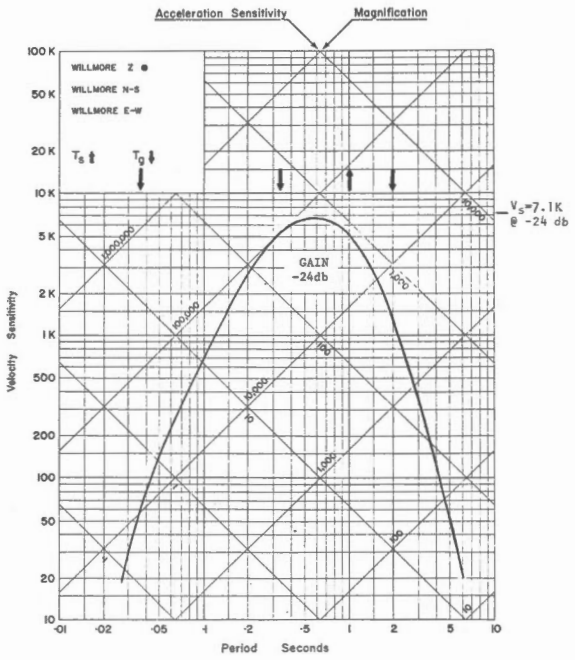
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● Oct. 28, 1970

STATION: HALIFAX, N.S. (HAL)

ϕ= 44°38'N λ= 63°36'W Altitude 56M

Foundation: Carbonaceous Slate



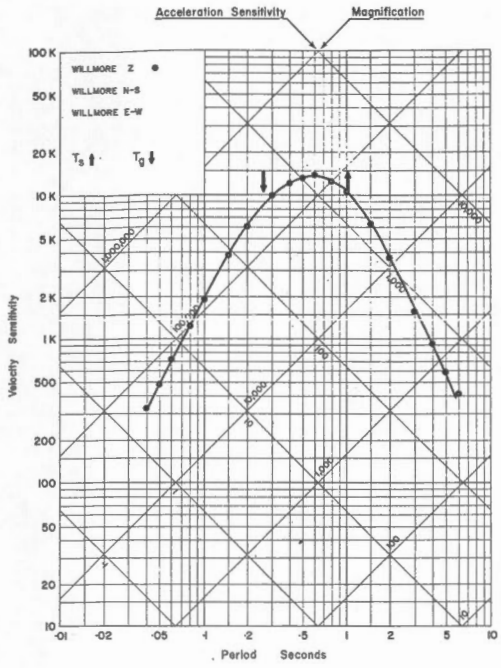
Dates of Calibration: March 9, 1973

SEISMOMETER: Willmore MKII G_L=1.96 v.s/cm
PREAMPLIFIER: Teledyne EA310 operated @ 30 db sep.
Filter Band Pass 0.5-3 Hz
HELICORDER: Model RV301 0-30 Hz
Corner frequencies indicated by "T_g" arrows.

STATION: INUVIK, N.W.T. (FINAL) (INK)

ϕ = 68°17.5'N λ = 133°30'W Altitude 40 M (approx.)

Foundation: Palaeozoic, Sediments Cambrian Limestone



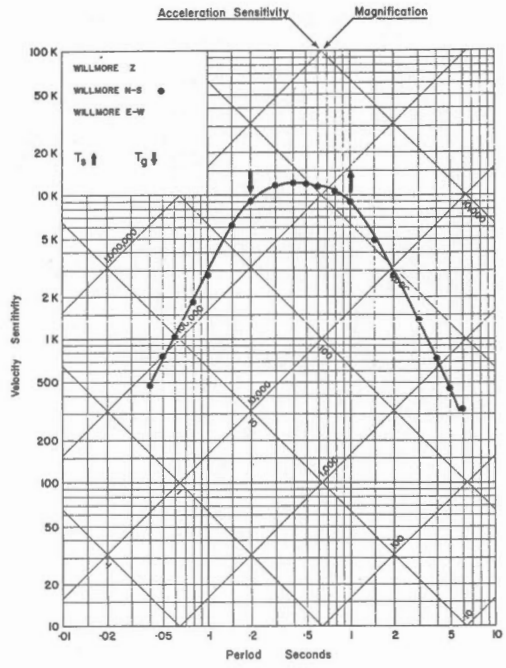
Dates of Calibration:

WILLMORE Z ● June 2, 1972
WILLMORE N-S
WILLMORE E-W

STATION: INUVIK, N.W.T. (FINAL) (INK)

ϕ = 68°17.5'N λ = 133°30'W Altitude 40 M (approx.)

Foundation: Palaeozoic, Sediments Cambrian Limestone



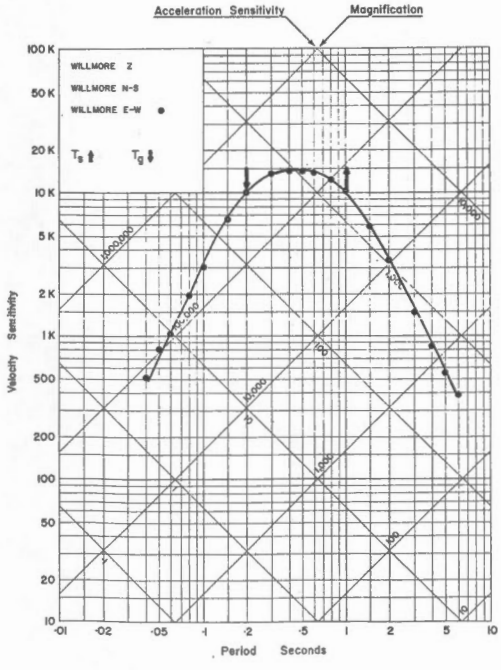
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● June 1, 1972
WILLMORE E-W

STATION: INUVIK, N.W.T. (FINAL) (INK)

ϕ = 68°17.5'N λ = 133°30'W Altitude 40 M (approx.)

Foundation: Palaeozoic, Sediments Cambrian Limestone



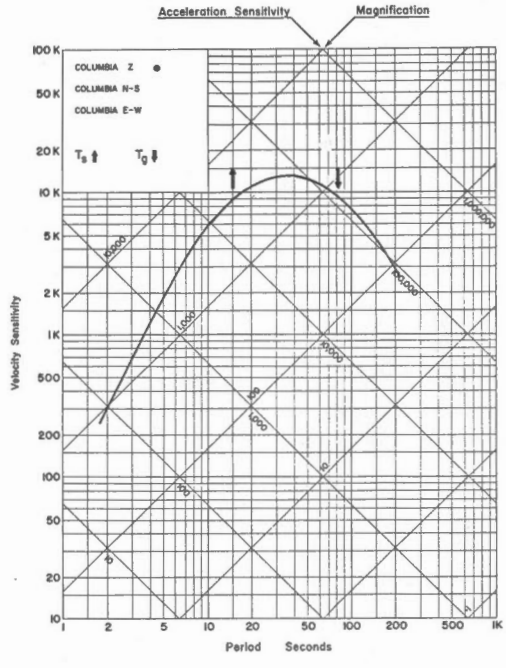
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● May 31, 1972

STATION: INUVIK, N.W.T. (INK)

ϕ = 68°17.5'N λ = 133°30'W Altitude 40 M (approx.)

Foundation: Palaeozoic, Sediments Cambrian Limestone



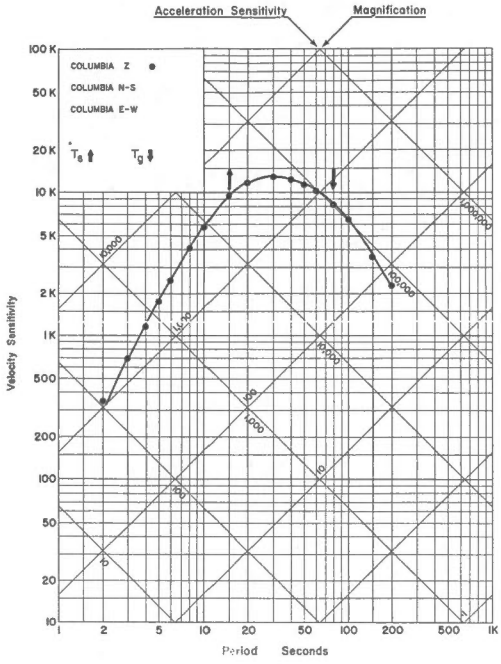
Dates of Calibration:

COLUMBIA Z ● Valid from July 22 to Aug. 26, 1974 (estimated in Ottawa)
COLUMBIA N-S
COLUMBIA E-W

STATION: INUVIK, N.W.T. (FINAL) (INK)

ϕ= 68°17.5'N λ= 133°30'W Altitude 40 M (approx.)

Foundation: Palaeozoic, Sediments Cambrian Limestone



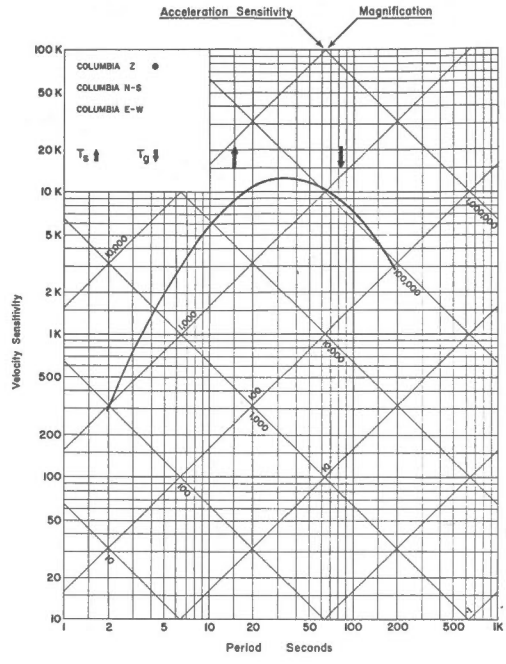
Dates of Calibration:

COLUMBIA Z ● May 31, 1972
COLUMBIA N-S
COLUMBIA E-W

STATION: INUVIK, N.W.T. (INK)

ϕ= 68°17.5'N λ= 133°30'W Altitude 40 M (approx.)

Foundation: Palaeozoic, Sediments Cambrian Limestone



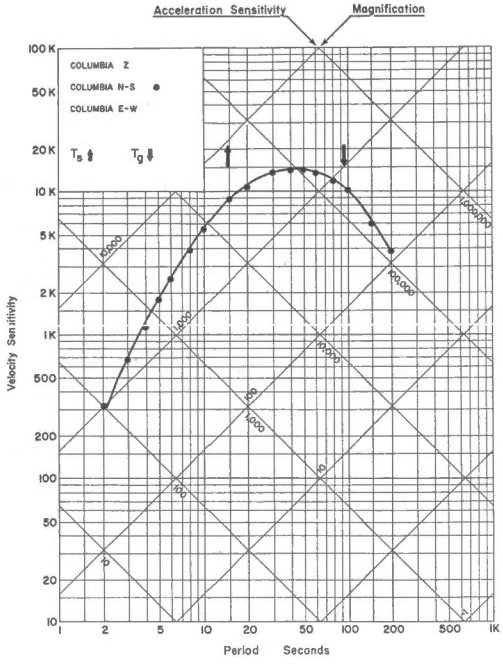
Dates of Calibration:

COLUMBIA Z ● Aug. 26, 1974 (estimated in Ottawa)
COLUMBIA N-S
COLUMBIA E-W

STATION: INUVIK, N.W.T. (FINAL) (INK)

ϕ= 68°17.5'N λ= 133°30'W Altitude 40 M (approx.)

Foundation: Palaeozoic, Sediments Cambrian Limestone



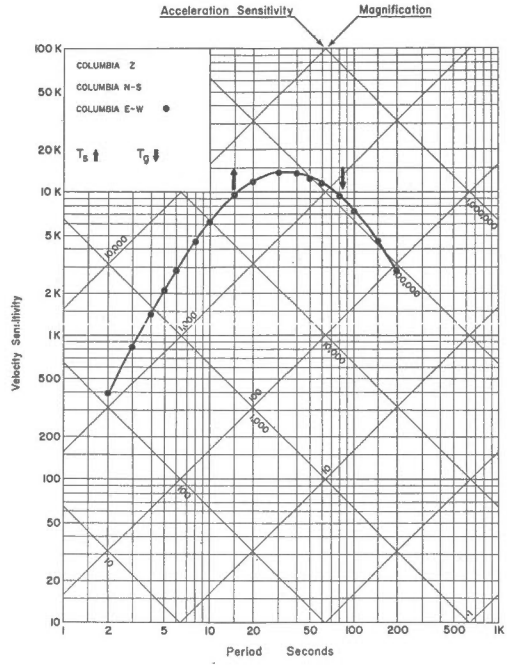
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● May 31, 1972
COLUMBIA E-W

STATION: INUVIK, N.W.T. (FINAL) (INK)

ϕ= 68°17.5'N λ= 133°30'W Altitude 40 M (approx.)

Foundation: Palaeozoic, Sediments Cambrian Limestone



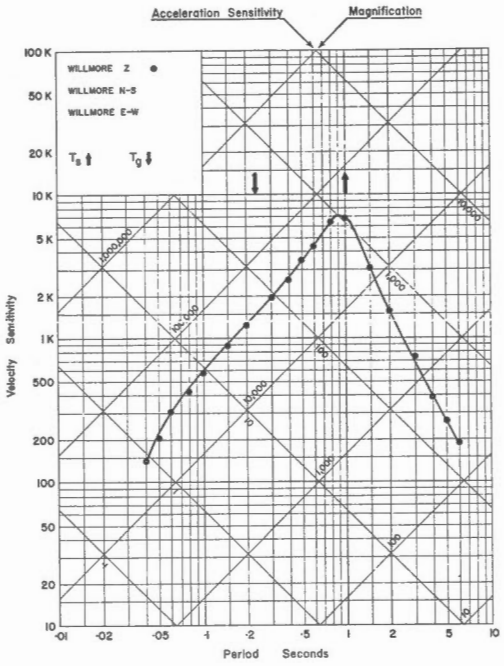
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● May 31, 1972

STATION: THUNDER BAY, ONT. (FINAL) (LHC)

ϕ= 48°25'N λ= 89°16'W Altitude 196 M

Foundation: Precambrian, upper gunflint, iron formation



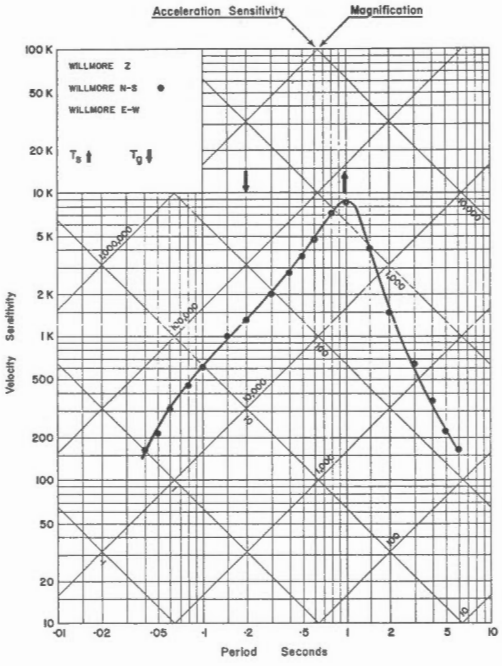
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● Sept. 19, 1972
WILLMORE E-W

STATION: THUNDER BAY, ONT. (FINAL) (LHC)

ϕ= 48°25'N λ= 89°16'W Altitude 196 M

Foundation: Precambrian, upper gunflint, iron formation



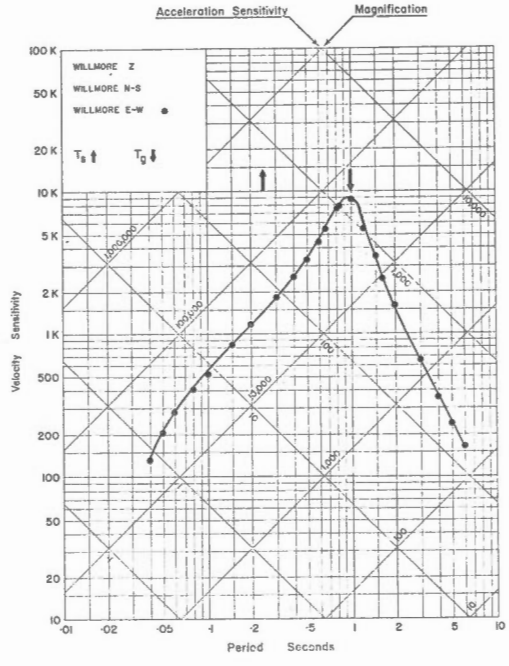
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● Sept. 20, 1972
WILLMORE E-W

STATION: THUNDER BAY, ONT. (Final) (LHC)

ϕ= 48°25'N λ= 89°16'W Altitude 196M

Foundation: Precambrian, upper gunflint, iron formation



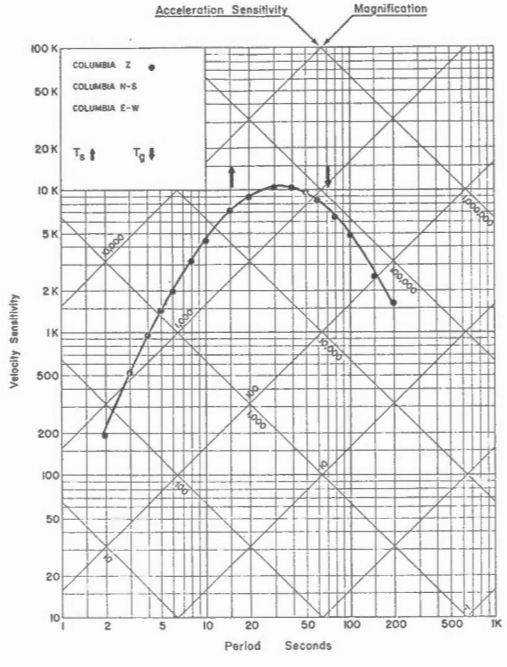
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● March 27, 1973

STATION: THUNDER BAY, ONT. (As found and left) (LHC)

ϕ= 48°25'N λ= 89°16'W Altitude 196M

Foundation: Precambrian, upper gunflint, iron formation



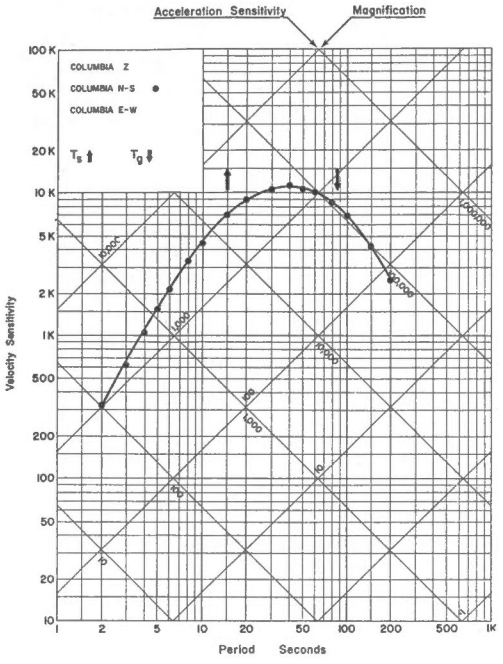
Dates of Calibration:

COLUMBIA Z ● March 27, 1973
COLUMBIA N-S
COLUMBIA E-W

STATION: THUNDER BAY, ONT. (As found and left) (LHC)

ϕ= 48°25'N λ= 89°16'W Altitude 196M

Foundation: Precambrian, upper gunflint, iron formation



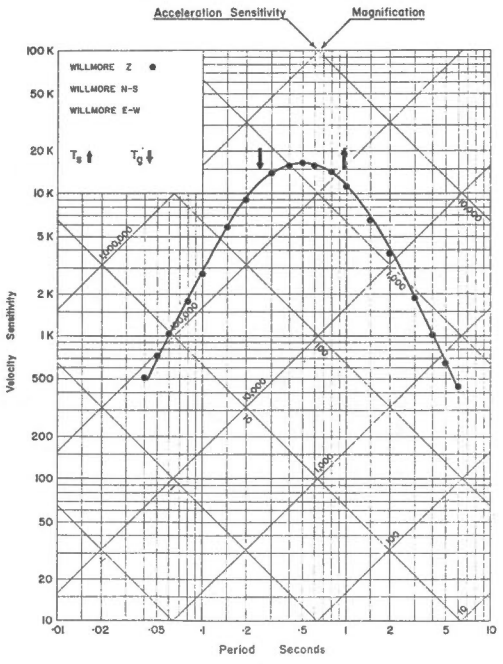
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● March 28, 1973
COLUMBIA E-W

STATION: MOULD BAY, N.W.T. (MBC)
(As found & left)

ϕ= 76°14.5'N λ= 119°21.6'W Altitude 15M

Foundation: Regolith and solifluxion deposits overlying Devonian sandstone (permafrost)



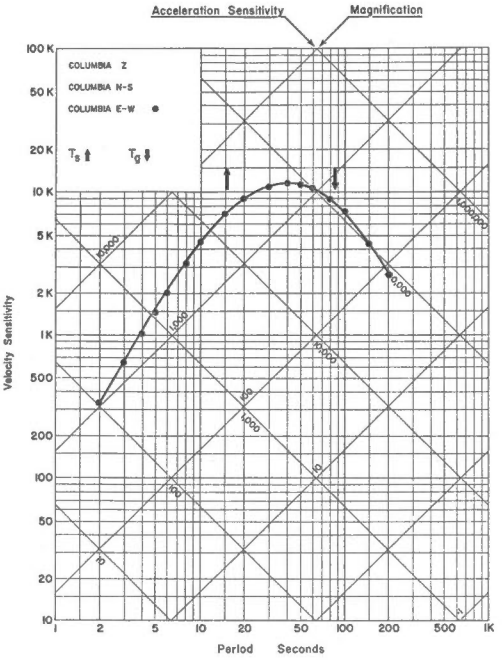
Dates of Calibration:

WILLMORE Z ● May 5, 1973
WILLMORE N-S
WILLMORE E-W

STATION: THUNDER BAY, ONT. (As found and left) (LHC)

ϕ= 48°25'N λ= 89°16'W Altitude 196M

Foundation: Precambrian, upper gunflint, iron formation



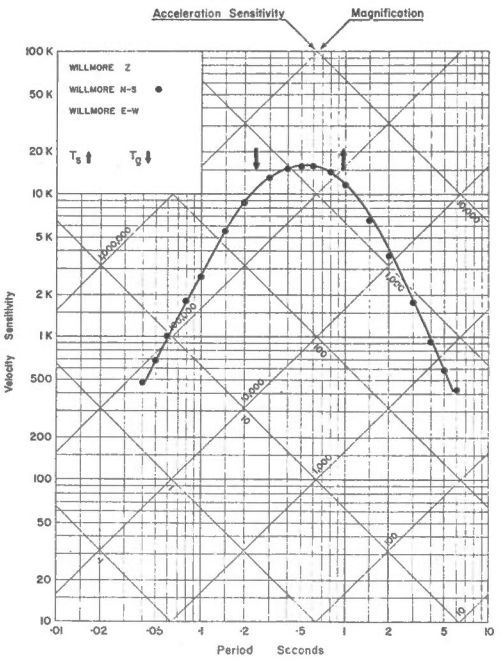
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● March 28, 1973

STATION: MOULD BAY, N.W.T. (MBC)
(As found & left)

ϕ= 76°14.5'N λ= 119°21.6'W Altitude 15M

Foundation: Regolith and solifluxion deposits overlying Devonian sandstone (permafrost)



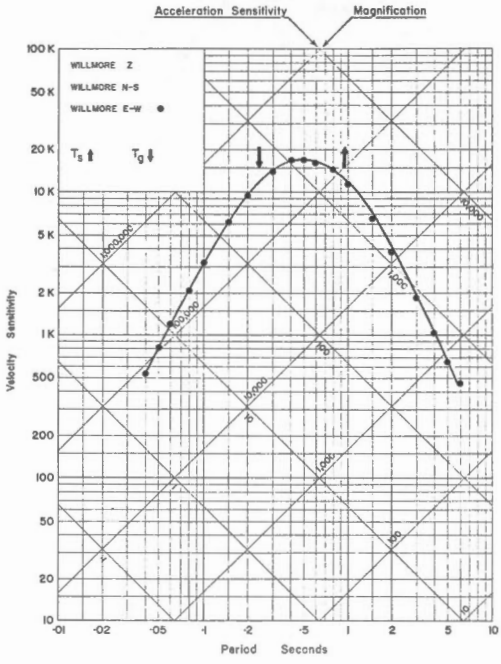
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● May 5, 1973
WILLMORE E-W

STATION: MOULD BAY, N.W.T. (MBC)
(As found & left)

ϕ= 76°14.5'N λ= 119°21.6'W Altitude 15 M

Foundation: Regolith and solifluxion deposits overlying Devonian sandstone (permafrost)



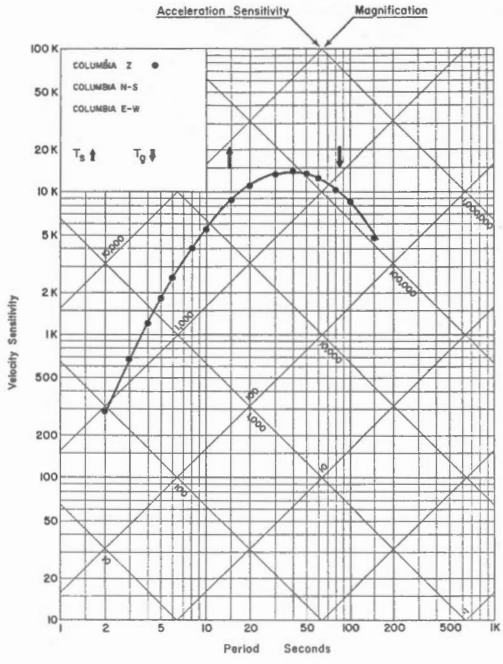
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● May 6, 1973

STATION: MOULD BAY, N.W.T. (MBC)
(As found & left)

ϕ= 76°14.5'N λ= 119°21.6'W Altitude 15 M

Foundation: Regolith and solifluxion deposits overlying Devonian sandstone (permafrost)



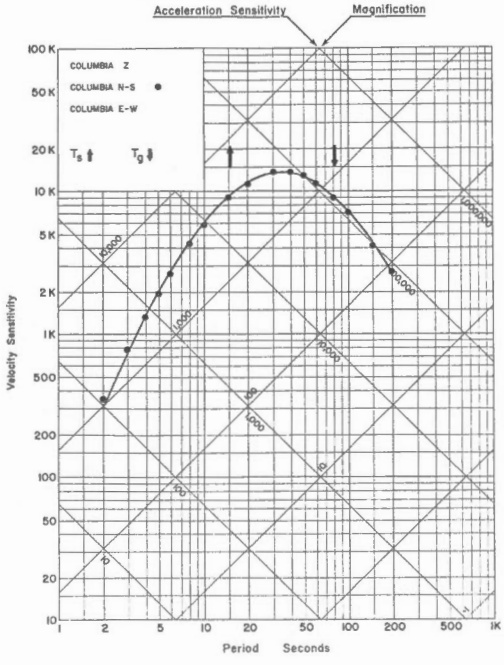
Dates of Calibration:

COLUMBIA Z ● May 5, 1973
COLUMBIA N-S
COLUMBIA E-W

STATION: MOULD BAY, N.W.T. (MBC)
(As found & left)

ϕ= 76°14.5'N λ= 119°21.6'W Altitude 15 M

Foundation: Regolith and solifluxion deposits overlying Devonian sandstone (permafrost)



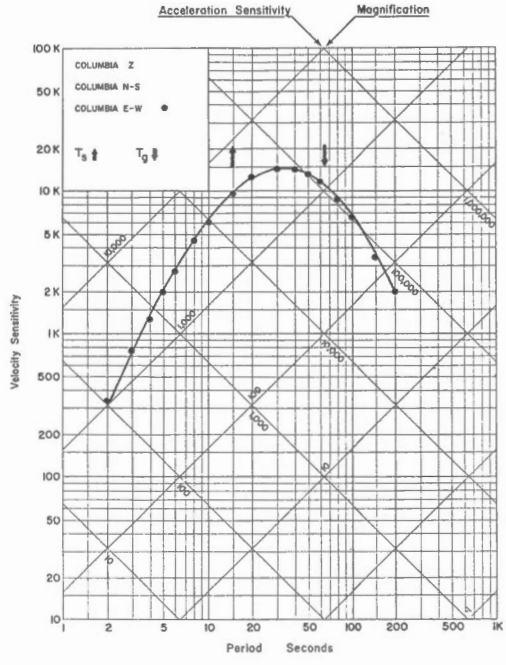
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● May 5, 1973
COLUMBIA E-W

STATION: MOULD BAY, N.W.T. (MBC)
(As found & left)

ϕ= 76°14.5'N λ= 119°21.6'W Altitude 15 M

Foundation: Regolith and solifluxion deposits overlying Devonian sandstone (permafrost)



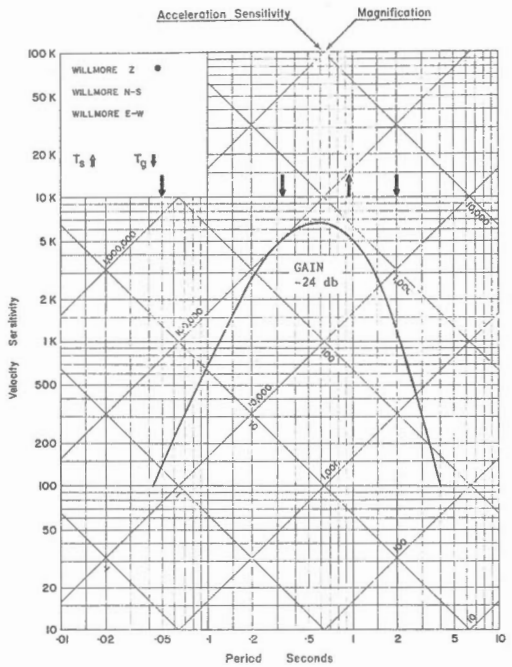
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● May 5, 1973

STATION: MICA CREEK, B.C. (MCC)

ϕ= 52°03'06"N λ= 118°35'07"W Altitude 578M

Foundation:



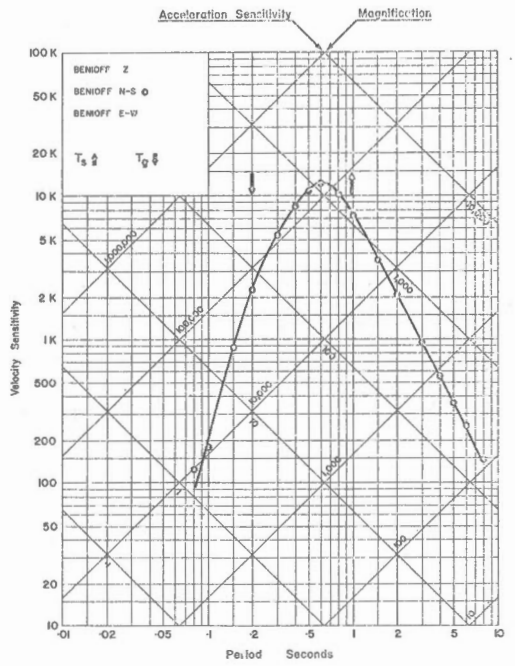
Dates of Calibration: June 18, 1971

WILLMORE Z ● Operating with Teledyne EA-310
WILLMORE N-S amplifier into Helicorder.
WILLMORE E-W Corner frequencies indicated by T_g arrows.

STATION: MONTREAL, QUE. (MNT)

ϕ= 45°30'09"N λ= 73°37'23"W Altitude 112 M

Foundation: Ordovician Limestone (Trenton)



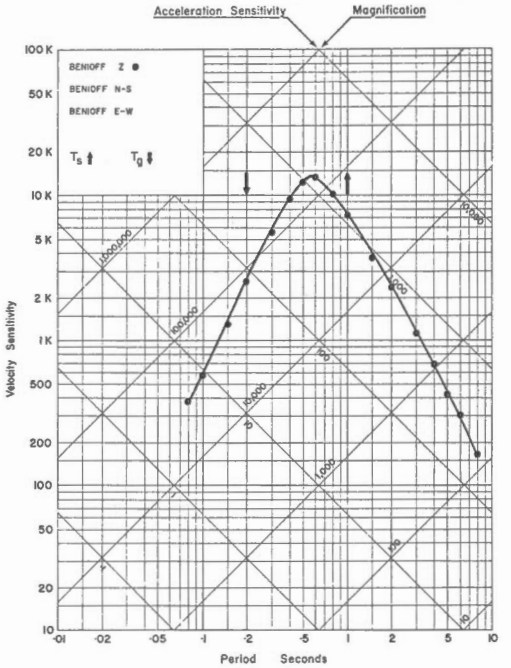
Dates of Calibration:

BENIOFF Z
BENIOFF N-S ○ November 26, 1969
BENIOFF E-W

STATION: MONTREAL, QUE. (MNT)

ϕ= 45°30'09"N λ= 73°37'23"W Altitude 112 M

Foundation: Ordovician Limestone (Trenton)



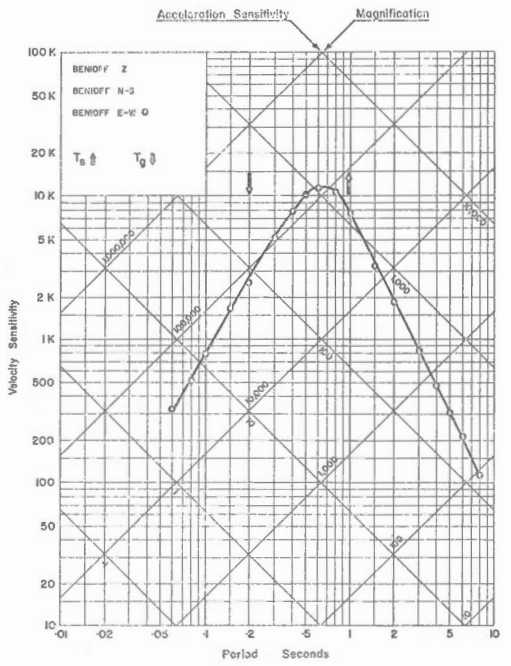
Dates of Calibration:

BENIOFF Z ● February 6, 1971
BENIOFF N-S
BENIOFF E-W

STATION: MONTREAL, QUE. (MNT)

ϕ= 45°30'09"N λ= 73°37'23"W Altitude 112 M

Foundation: Ordovician Limestone (Trenton)



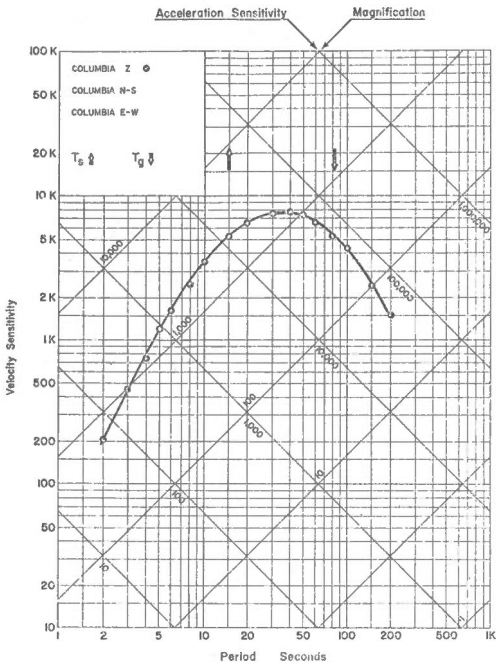
Dates of Calibration:

BENIOFF Z
BENIOFF N-S
BENIOFF E-W ○ November 26, 1969

STATION: MONTREAL, QUE. (MNT)

ϕ= 45°30'09"N λ= 73°37'23"W Altitude 112 M

Foundation: Ordovician Limestone (Trenton)



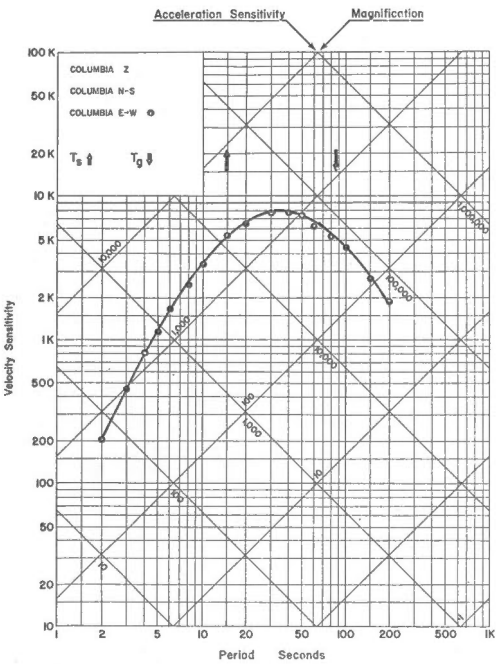
Dates of Calibration:

COLUMBIA Z ● December 1, 1969
COLUMBIA N-S
COLUMBIA E-W

STATION: MONTREAL, QUE. (MNT)

ϕ= 45°30'09"N λ= 73°37'23"W Altitude 112 M

Foundation: Ordovician Limestone (Trenton)



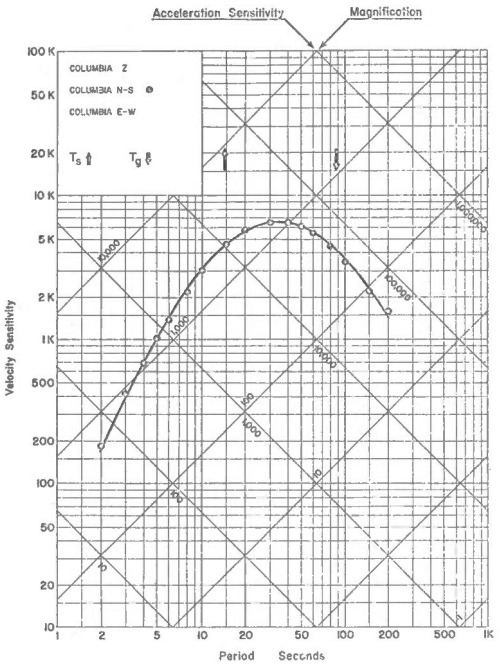
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● December 1, 1969
COLUMBIA E-W

STATION: MONTREAL, QUE. (MNT)

ϕ= 45°30'09"N λ= 73°37'23"W Altitude 112 M

Foundation: Ordovician Limestone (Trenton)



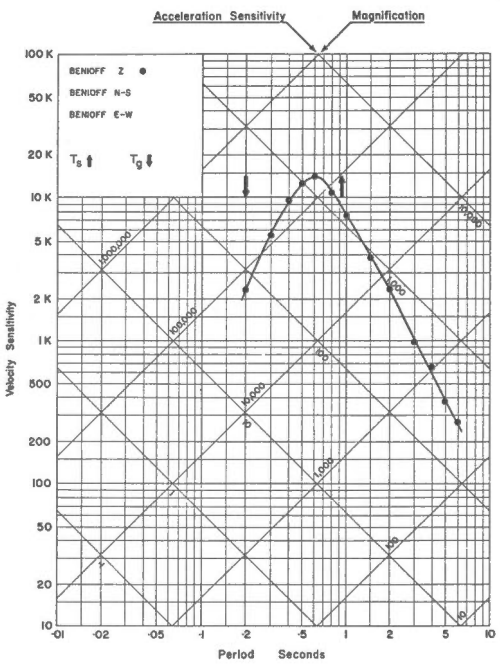
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● December 1, 1969

STATION: MONTREAL, QUE. (MNT) As Found, and final.

ϕ=45°30'09"N λ= 73°37'23"W. Altitude 112 M

Foundation: Ordovician limestone (Trenton)



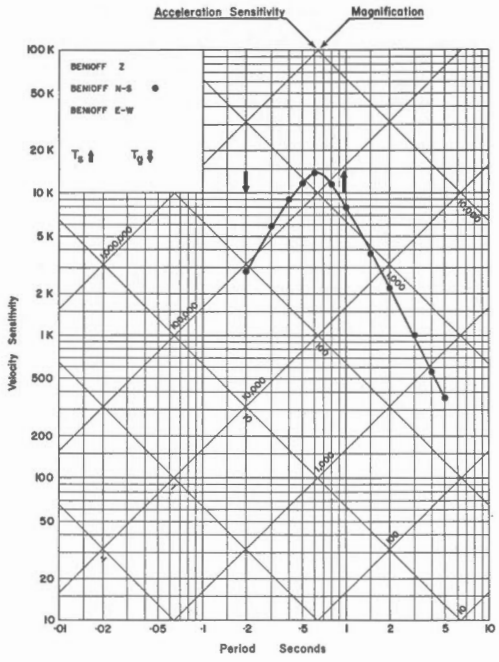
Dates of Calibration:

BENIOFF Z ● Feb. 13, 1974
BENIOFF N-S
BENIOFF E-W

STATION: MONTREAL, QUE. (MNT) As found and final.

ϕ= 45°30'09"N λ= 73°37'23"W Altitude 112 M

Foundation: Ordovician Limestone (Trenton)



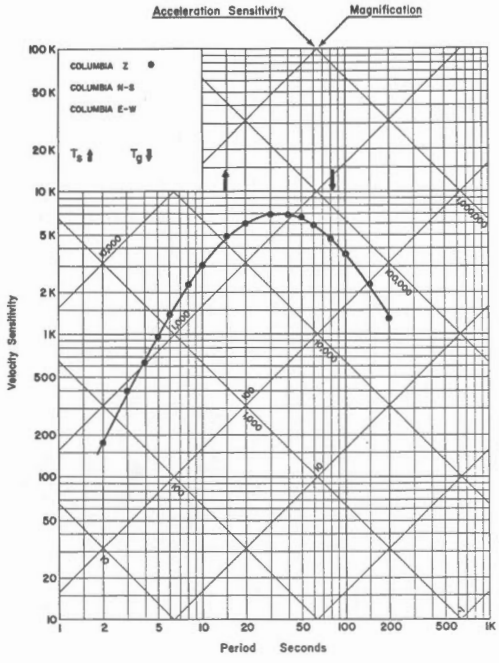
Dates of Calibration:

BENIOFF Z
BENIOFF N-S • Feb. 13, 1974
BENIOFF E-W

STATION: MONTREAL, QUE. (MNT) Final.

ϕ= 45°30'09"N λ= 73°37'23"W Altitude 112 M

Foundation: Ordovician Limestone (Trenton)



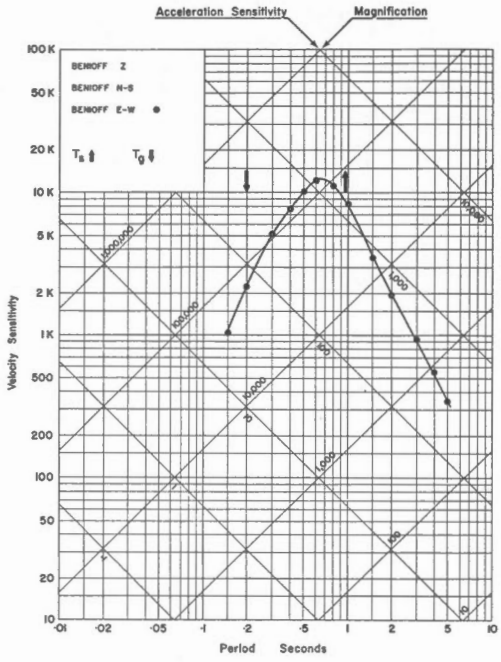
Dates of Calibration:

COLUMBIA Z • Feb. 14, 1974
COLUMBIA N-S
COLUMBIA E-W

STATION: MONTREAL, QUE. (MNT) As found and final.

ϕ= 45°30'09"N λ= 73°37'23"W Altitude 112 M

Foundation: Ordovician Limestone (Trenton)



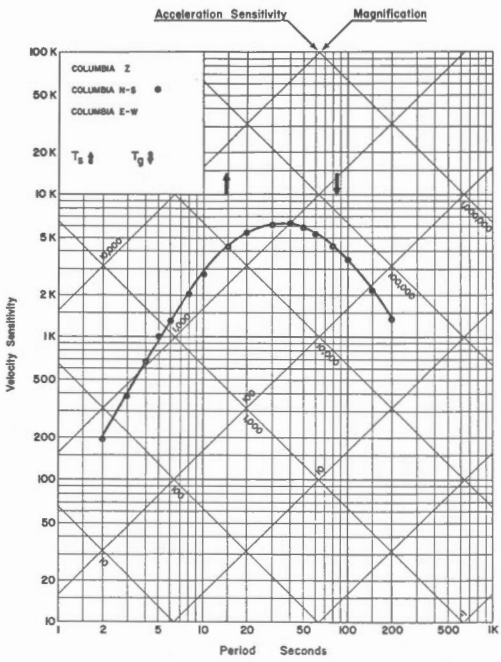
Dates of Calibration:

BENIOFF Z
BENIOFF N-S
BENIOFF E-W • Feb. 13, 1974

STATION: MONTREAL, QUE. (MNT) Final.

ϕ= 45°30'09"N λ= 73°37'23"W Altitude 112 M

Foundation: Ordovician Limestone (Trenton)



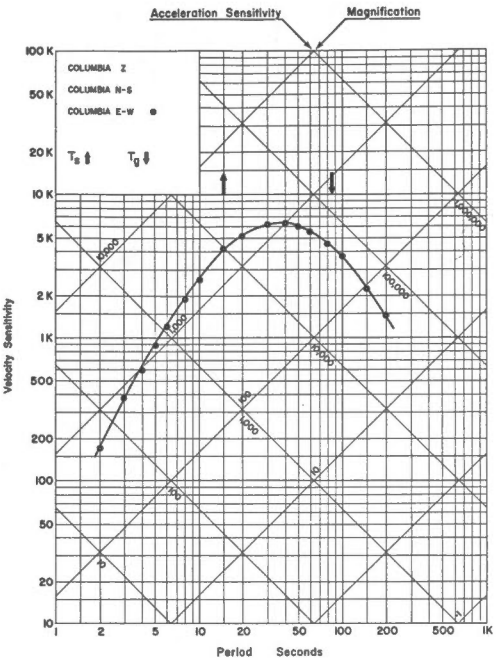
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S • Feb. 14, 1974
COLUMBIA E-W

STATION: MONTREAL, QUE. (MNT) Final.

ϕ= 45°30'09"N λ=73°37'23"W Altitude 112 M

Foundation: Ordovician Limestone (Trenton)



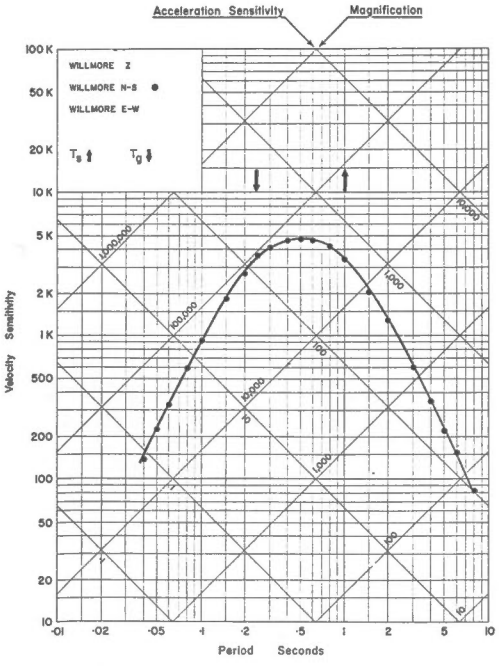
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● Feb. 14, 1974

STATION: OTTAWA, ONT. (OTT)

ϕ= 45°23'38"N λ= 75°42'57"W Altitude 83M

Foundation: Boulder clay on limestone



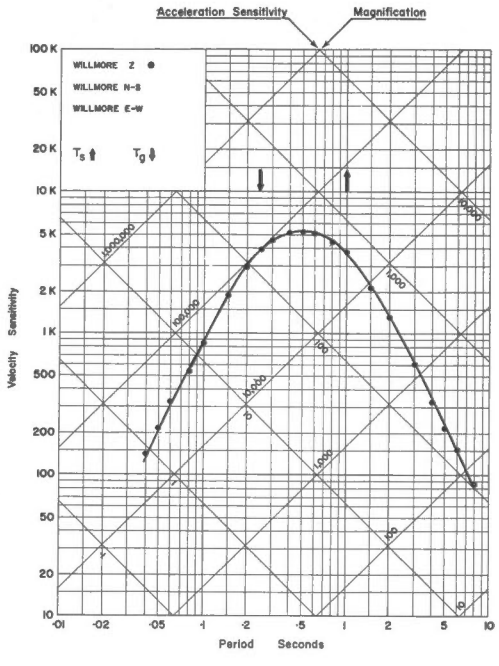
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● March 25 - 1969
WILLMORE E-W

STATION: OTTAWA, ONT. (OTT)

ϕ= 45°23'38"N λ= 75°42'57"W Altitude 83M

Foundation: Boulder clay on limestone



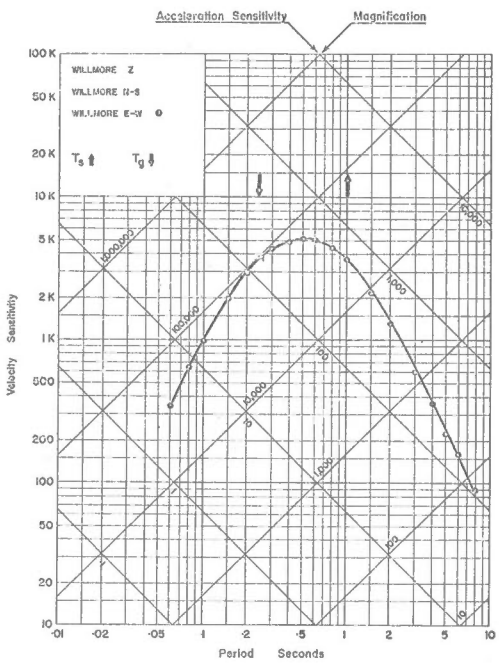
Dates of Calibration:

WILLMORE Z ● March 24 - 1969
WILLMORE N-S
WILLMORE E-W

STATION: OTTAWA, ONT. (OTT)

ϕ= 45°23'38"N λ= 75°42'57"W Altitude 83M

Foundation: Boulder clay on limestone



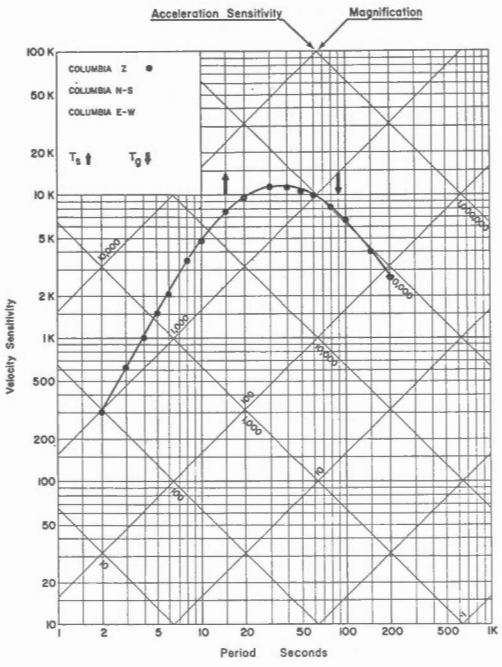
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● March 25 - 1969

STATION: OTTAWA, ONT. (OTT)
(Final)

ϕ= 45°23'38"N λ= 75°42'57"W Altitude 83 M

Foundation: Boulder Clay on Limestone



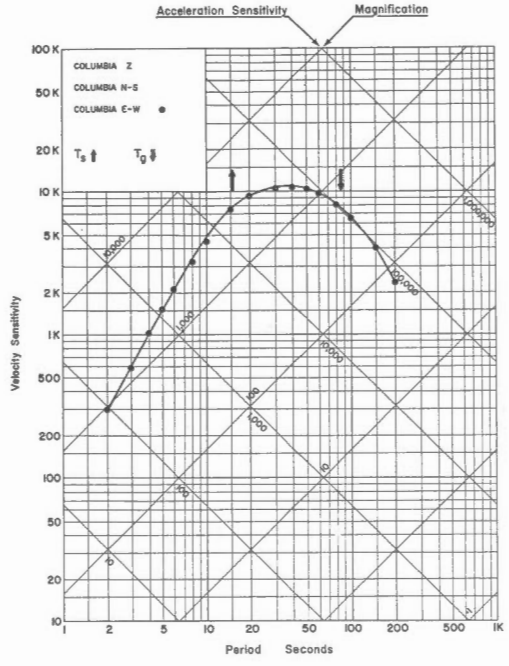
Dates of Calibration:

COLUMBIA Z ● February 13, 1973
COLUMBIA N-S
COLUMBIA E-W

STATION: OTTAWA, ONT. (OTT)
(As Found & Left)

ϕ= 45°23'38"N λ= 75°42'57"W Altitude 83 M

Foundation: Boulder Clay on Limestone



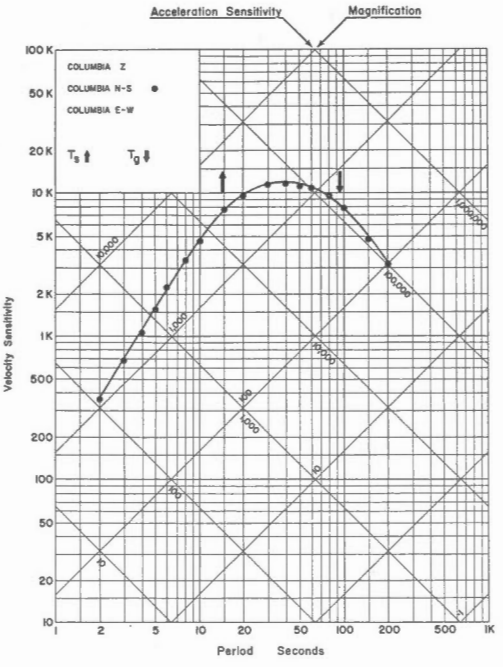
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● February 14, 1973

STATION: OTTAWA, ONT. (OTT)
(As Found & Left)

ϕ= 45°23'38"N λ= 75°42'57"W Altitude 83 M

Foundation: Boulder Clay on Limestone



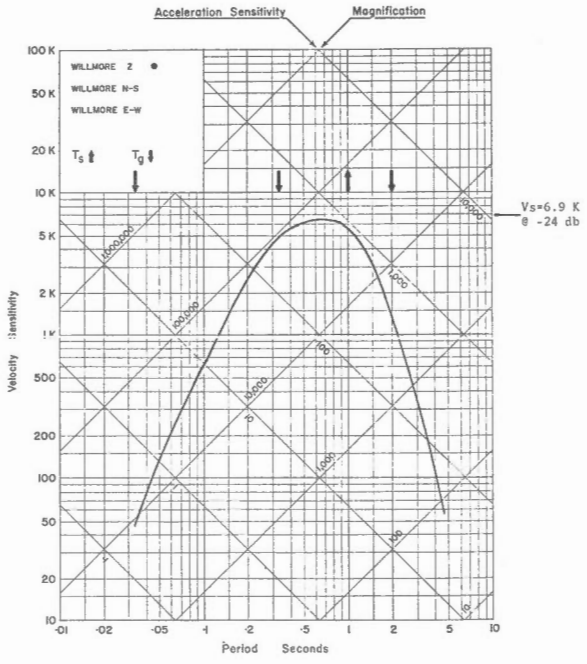
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● February 13, 1973
COLUMBIA E-W

STATION: POSTE DE LA BALEINE, QUE. (PBQ)

ϕ= 55°16.6'N λ= 77°44.6'W Altitude 20 M

Foundation: Granite Gneiss



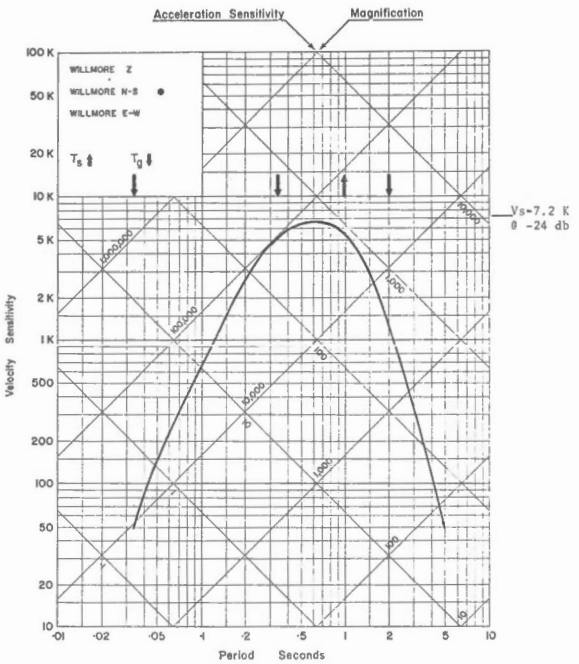
Dates of Calibration: 14 Sept. 1972

SEISMOMETER: Willmore Short Period Vertical
G_L = 1.1 v/cm/sec
AMPLIFIER: EA310 Filter Bandpass 0.5-3 Hz with 30 db sep. and max. gain of 100 k.
HELICORDER: RV301 Sensit. 1 cm/v
Response 0-30 Hz
Corner frequencies indicated by "T_g" arrows.

STATION: POSTE DE LA BALEINE, QUE. (PBQ)

ϕ= 55°16.6'N λ= 77°44.6'W Altitude 20 M

Foundation: Granite Gneiss



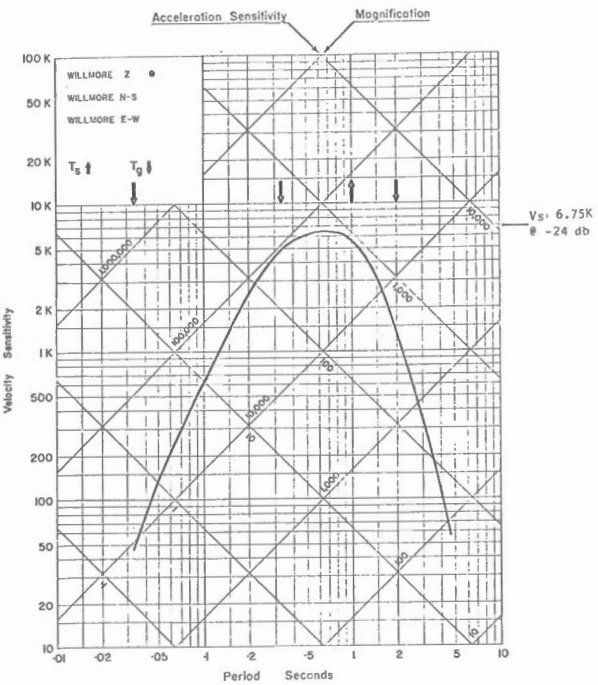
Dates of Calibration: 14 Sept. 1972

SEISMOMETER: Willmore Short Period North-South
G_L = 1.15 v/cm/sec
AMPLIFIER: EA310 Filter Bandpass 0.5-3 Hz with 30 db sep. and max. gain of 100 k.
HELICORDER: RV301 Sensit. 1 cm/v
Corner frequencies indicated by "T_g" arrows.

STATION: POSTE DE LA BALEINE, P.Q. (PBQ)

ϕ= 55°16.6'N λ= 77°44.6'W Altitude 20 M

Foundation: Granite Gneiss



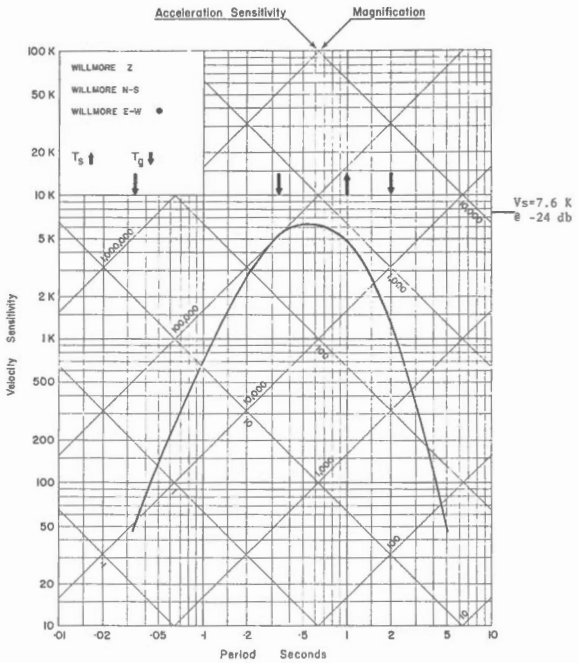
Dates of Calibration: May 24, 1974

SEISMOMETER: Willmore Short Period Vertical
G_L = 1.08 v/cm/sec
AMPLIFIER: EA310 Filter Bandpass 0.5-3 Hz with 30 db sep. and max. gain of 100 k.
HELICORDER: RV301 Sensit. 1 cm/v Response 0-30 Hz
Corner frequencies indicated by "Tg" arrows.

STATION: POSTE DE LA BALEINE, QUE. (PBQ)

ϕ= 55°16.6'N λ= 77°44.6'W Altitude 20 M

Foundation: Granite Gneiss



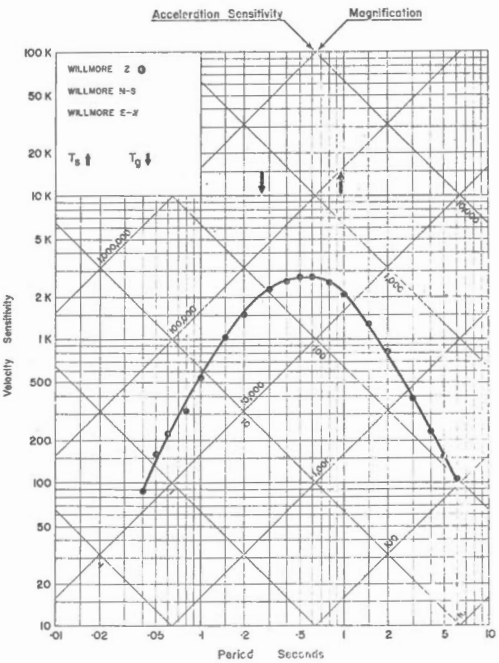
Dates of Calibration: 14 Sept. 1972

SEISMOMETER: Willmore Short Period East-West
G_L = 1.21 v/cm/sec
AMPLIFIER: EA310 Filter Bandpass 0.5-3 Hz with 30 db sep. and max. gain of 100 k.
HELICORDER: RV301 Sensit. 1 cm/v Response 0-30 Hz
Corner frequencies indicated by "T_g" arrows.

STATION: PORT HARDY, B.C. (PHC)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and volcanic rocks



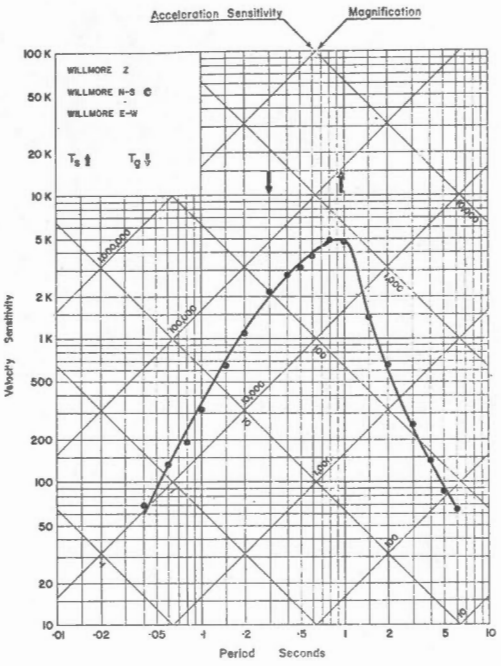
Dates of Calibration:

WILLMORE Z Oct. 20, 1970
WILLMORE N-S
WILLMORE E-W

STATION: PORT HARDY, B.C. (PHC)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and volcanic rocks



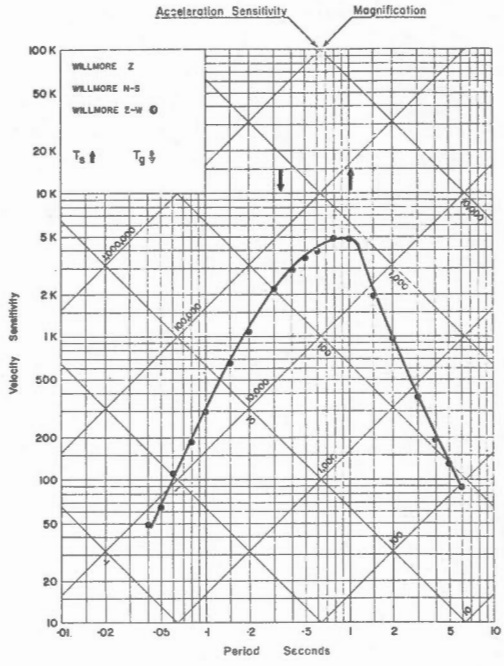
Dates of Calibration:

WILLMORE Z
WILLMORE N-S © Oct. 20, 1970
WILLMORE E-W

STATION: PORT HARDY, B.C. (PHC)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and volcanic rocks



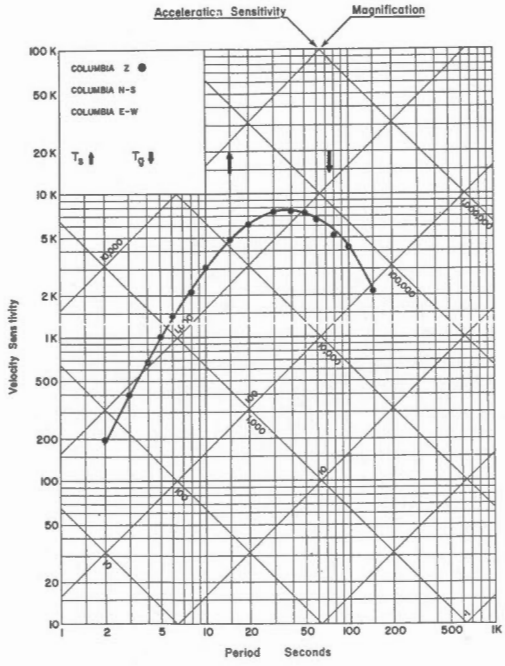
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● Oct. 21, 1970

STATION: PORT HARDY, B.C. (PHC)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and Volcanic rocks



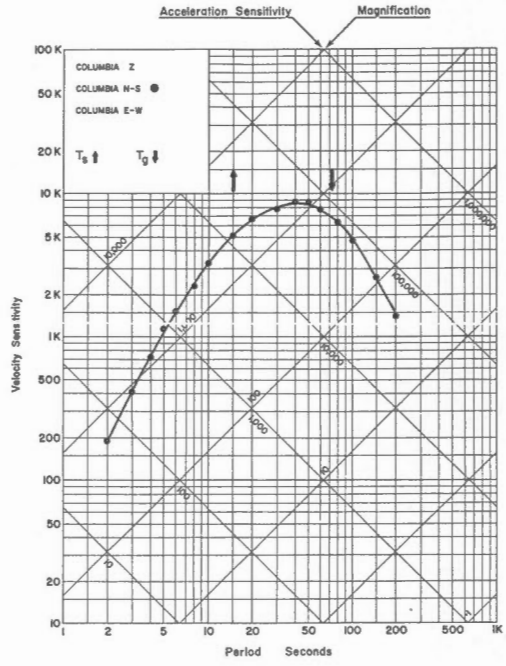
Dates of Calibration:

COLUMBIA Z ● Oct. 25, 1970
COLUMBIA N-S
COLUMBIA E-W

STATION: PORT HARDY, B.C. (PHC)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and volcanic rocks



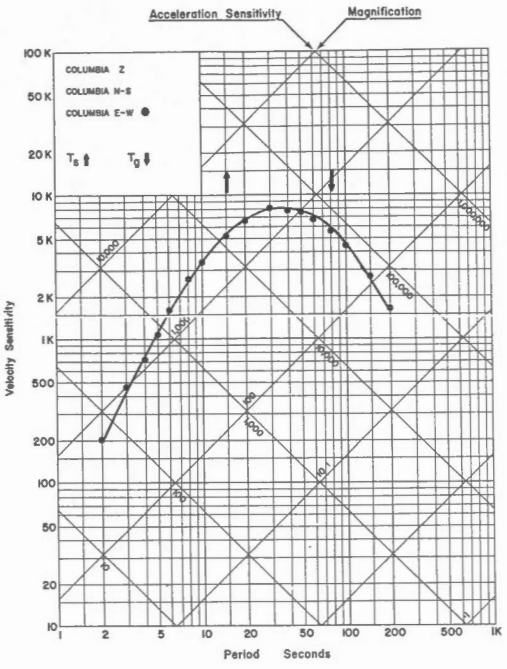
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● Oct. 24, 1970
COLUMBIA E-W

STATION: PORT HARDY, B.C. (PHC)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and volcanic rocks



Dates of Calibration:

COLUMBIA Z

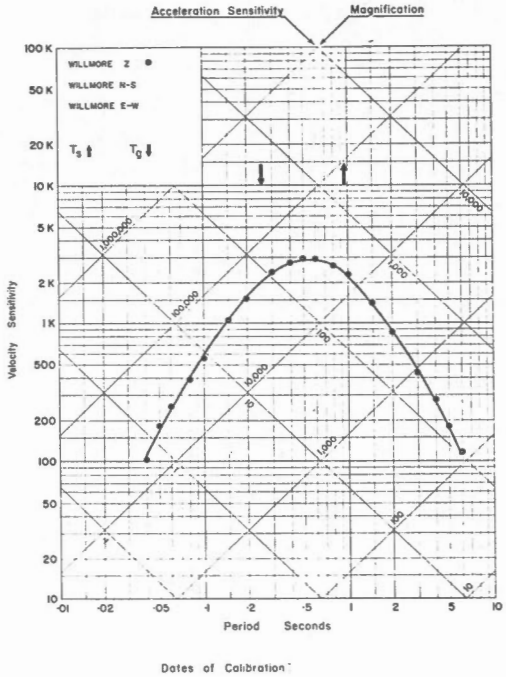
COLUMBIA N-S

COLUMBIA E-W ● Oct. 25, 1970

STATION: PORT HARDY, B.C. (PHC)
(As found and left)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and volcanic rock



Dates of Calibration:

WILLMORE Z ● June 27, 1974

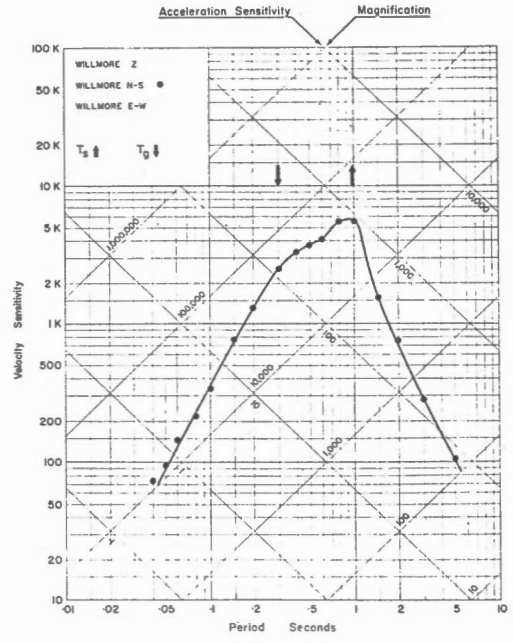
WILLMORE N-S

WILLMORE E-W

STATION: PORT HARDY, B.C. (PHC)
(As found and left)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and volcanic rock.



Dates of Calibration:

WILLMORE Z

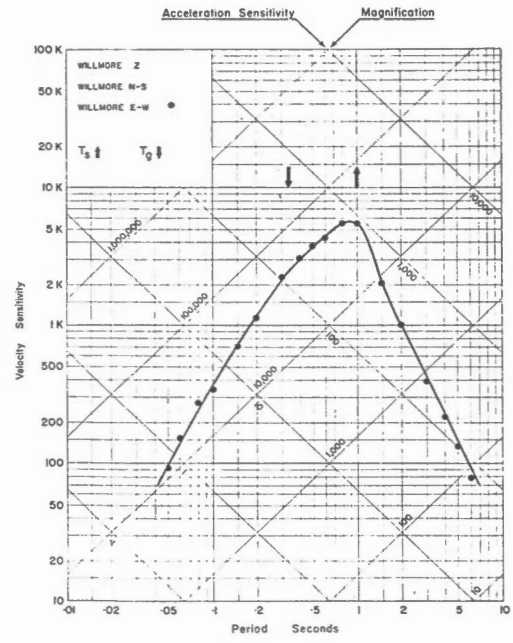
WILLMORE N-S ● June 27, 1974

WILLMORE E-W

STATION: PORT HARDY, B.C. (PHC)
(As found and left)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and volcanic rocks



Dates of Calibration:

WILLMORE Z

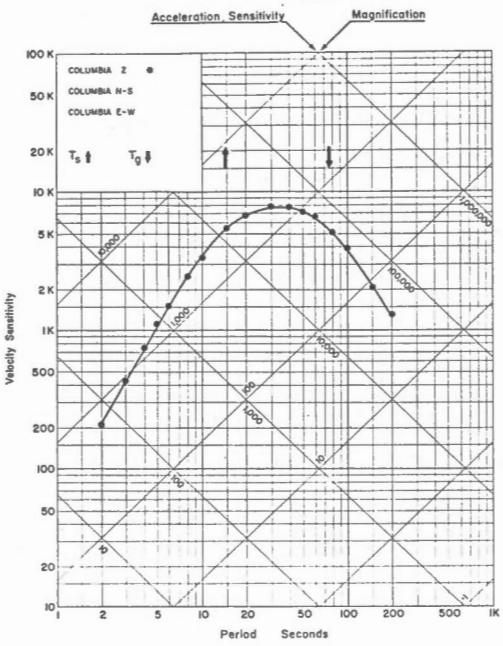
WILLMORE N-S

WILLMORE E-W ● June 27, 1974

STATION: PORT HARDY, B.C. (PHC)
(As found and left)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and volcanic rocks



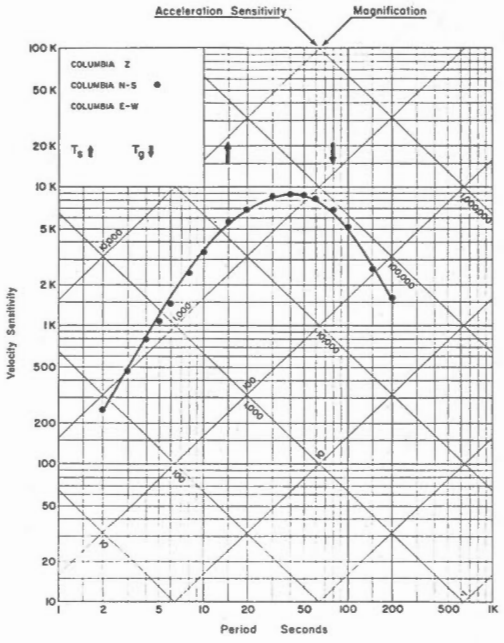
Dates of Calibration:

COLUMBIA Z ● June 24, 1974
COLUMBIA N-S
COLUMBIA E-W

STATION: PORT HARDY, B.C. (PHC)
(As found and left)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and volcanic rocks



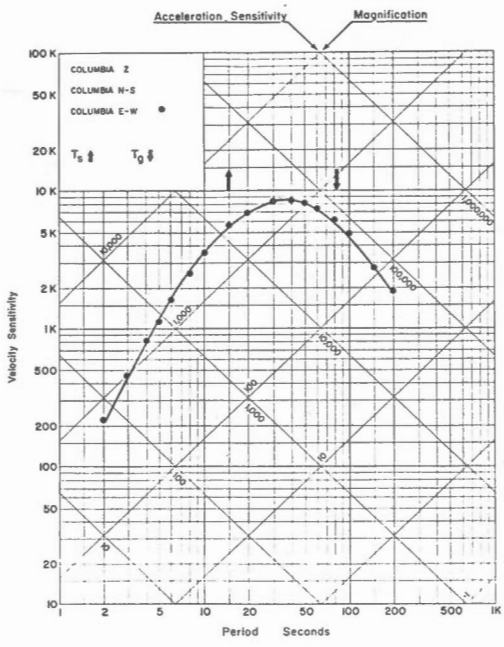
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● June 25, 1974
COLUMBIA E-W

STATION: PORT HARDY, B.C. (PHC)
(As found and left)

ϕ= 50°42.4'N λ= 127°25.9'W Altitude 33 M

Foundation: Mesozoic, Triassic sedimentary and volcanic rocks



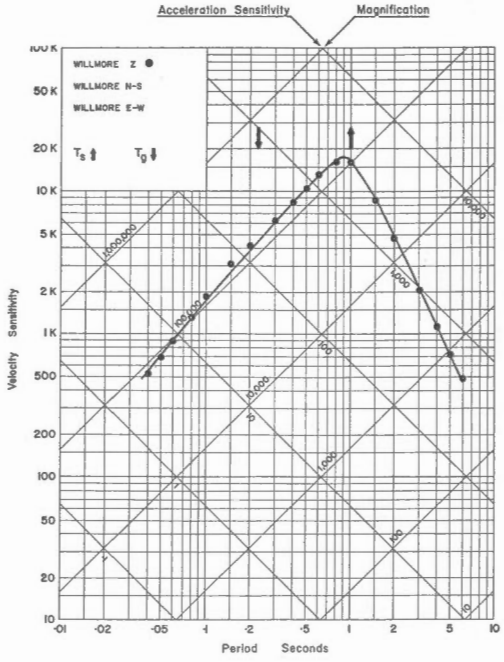
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● June 26, 1974

STATION: PENTICTON, B.C. (PNT)

ϕ= 49°19'N λ= 119°37'W Altitude 550 M

Foundation: Tertiary shale



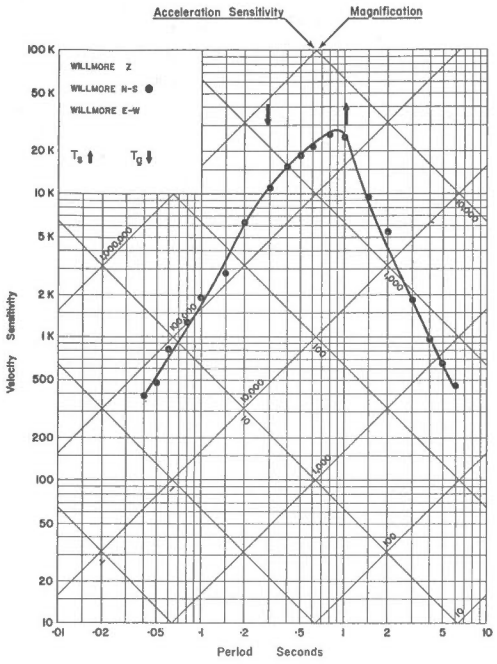
Dates of Calibration:

WILLMORE Z ● May 29, 1970
WILLMORE N-S
WILLMORE E-W

STATION: PENTICTON, B.C. (PNT)

ϕ= 49°19'N λ= 119°37'W Altitude 550 M

Foundation: Tertiary shale



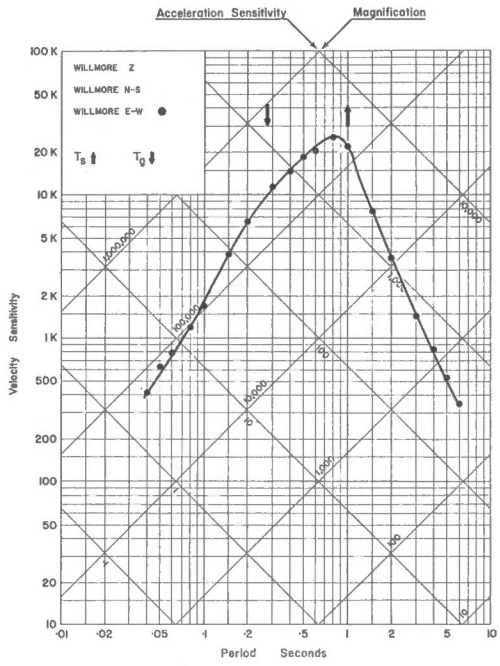
Dates of Calibration:

WILLMORE Z
WILLMORE N-S May 29, 1970
WILLMORE E-W

STATION: PENTICTON, B.C. (PNT)

ϕ= 49°19'N λ= 119°37'W Altitude 550 M

Foundation: Tertiary shale



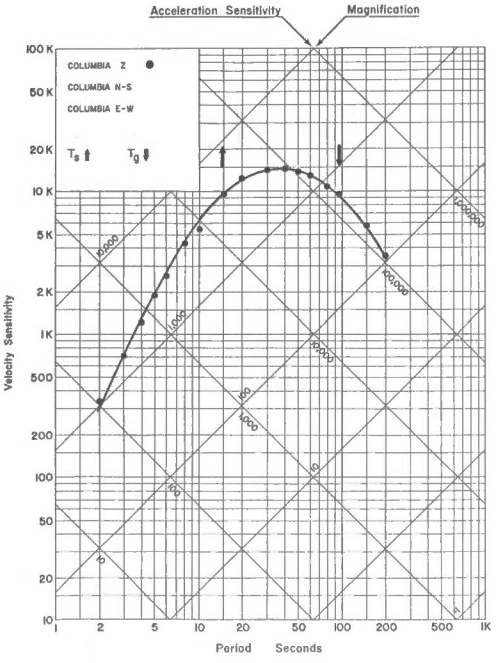
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W May 29, 1970

STATION: PENTICTON, B.C. (PNT)

ϕ= 49°19'N λ= 119°37'W Altitude 550 M

Foundation: Tertiary shale



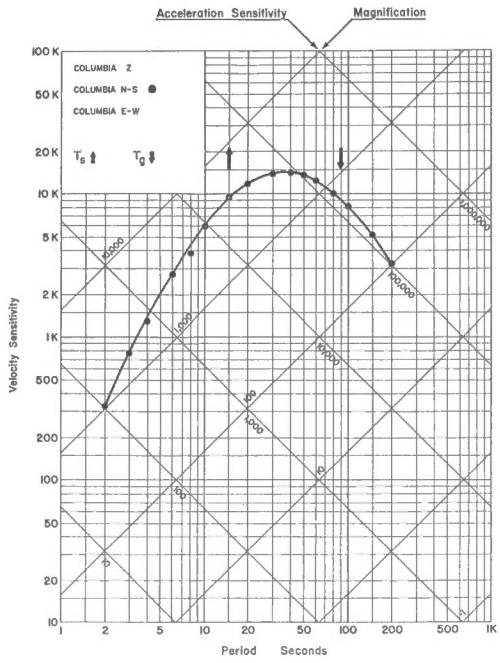
Dates of Calibration:

COLUMBIA Z May 29, 1970
COLUMBIA N-S
COLUMBIA E-W

STATION: PENTICTON, B.C. (PNT)

ϕ= 49°19'N λ= 119°37'W Altitude 550 M

Foundation: Tertiary shale



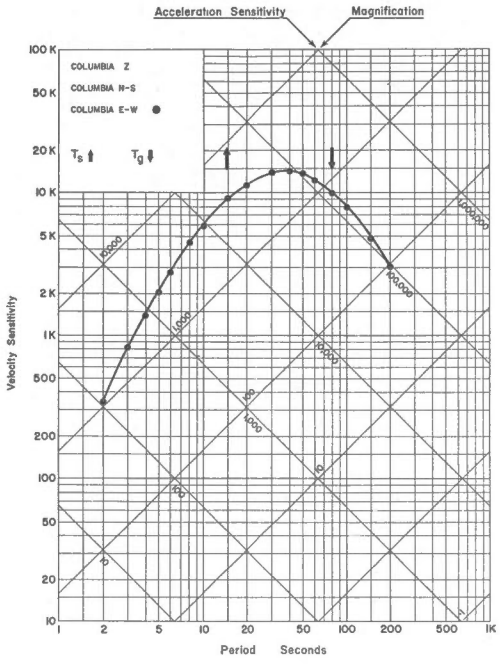
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S May 30, 1970
COLUMBIA E-W

STATION: PENTICTON, B.C. (PNT)

ϕ= 49°19'N λ= 119°37'W Altitude 550 M

Foundation: Tertiary shale



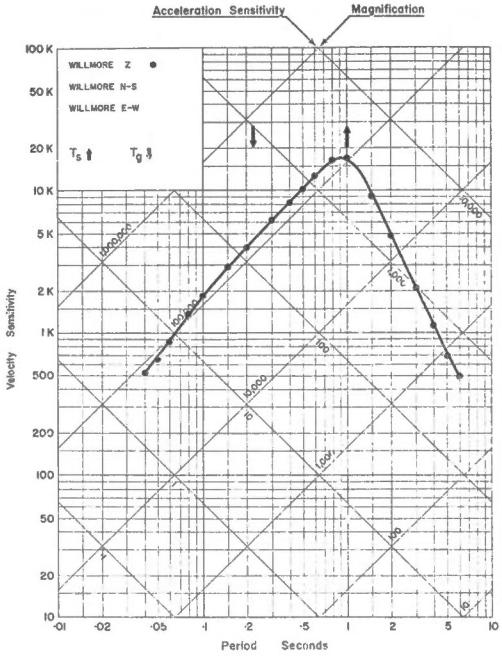
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● May 30, 1970

STATION: PENTICTON, B.C. (PNT)
(As found)

ϕ= 49°19'N λ= 119°37'W Altitude 550 m

Foundation: Tertiary shale



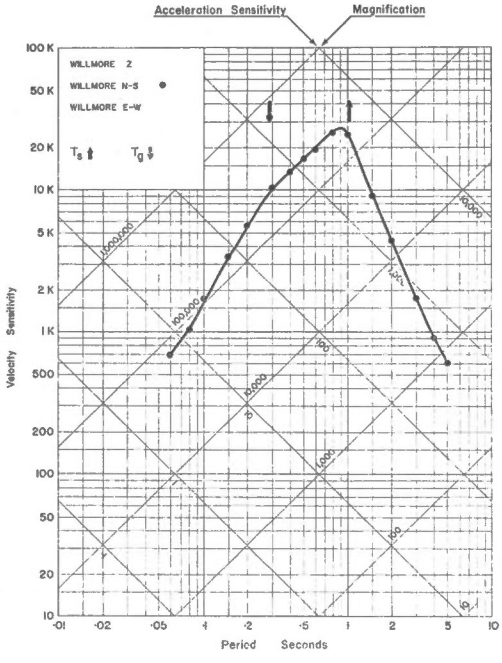
Dates of Calibration:

WILLMORE Z ● December 1, 1974
WILLMORE N-S
WILLMORE E-W

STATION: PENTICTON, B.C. (PNT)
(As found)

ϕ= 49°19'N λ= 119°37'W Altitude 550 m

Foundation: Tertiary Shale



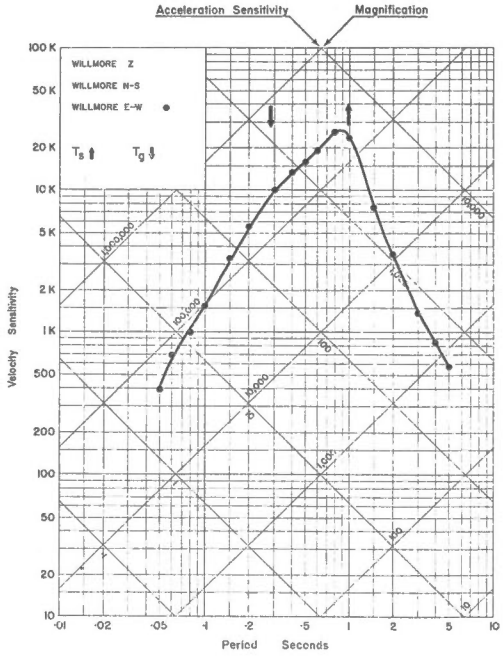
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● December 1, 1974
WILLMORE E-W

STATION: PENTICTON, B.C. (PNT)
(As found)

ϕ= 49°19'N λ= 119°37'W Altitude 550m

Foundation: Tertiary shale



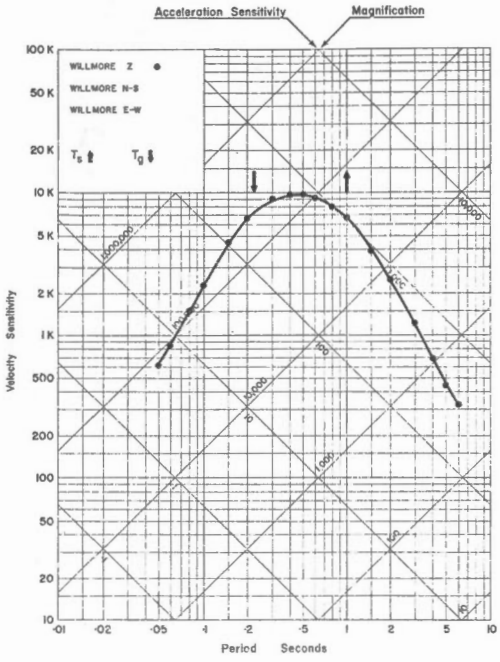
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● December 1, 1974

STATION: PENTICTON, B.C. (PNT)
(Final)

ϕ= 49°19'N λ= 119°37'W Altitude 550 m

Foundation: Tertiary shale



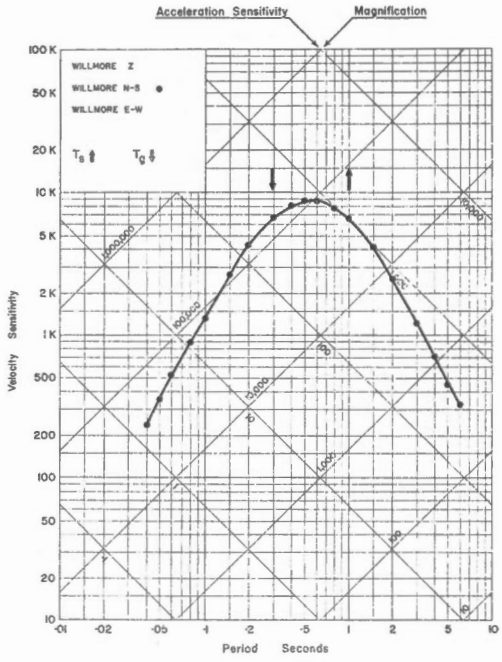
Dates of Calibration:

WILLMORE Z • December 2, 1974
WILLMORE N-S
WILLMORE E-W

STATION: PENTICTON, B.C. (PNT)
(Final)

ϕ= 49°19'N λ= 119°37'W Altitude 550 m

Foundation: Tertiary shale



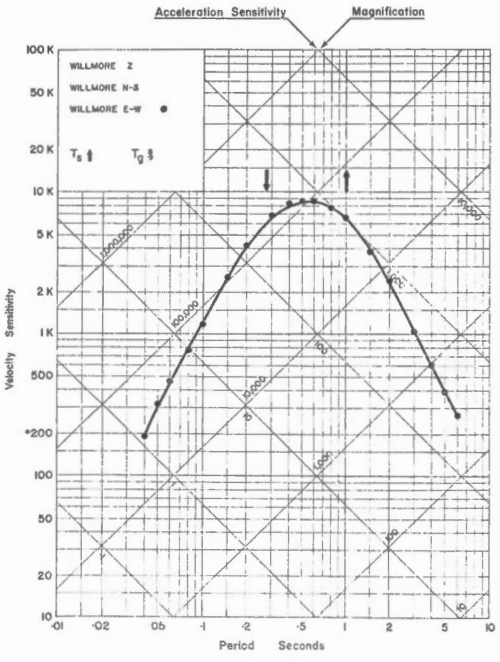
Dates of Calibration:

WILLMORE Z
WILLMORE N-S • December 2, 1974
WILLMORE E-W

STATION: PENTICTON, B.C. (PNT)
(Final)

ϕ= 49°19'N λ= 119°37'W Altitude 550 m

Foundation: Tertiary Shale



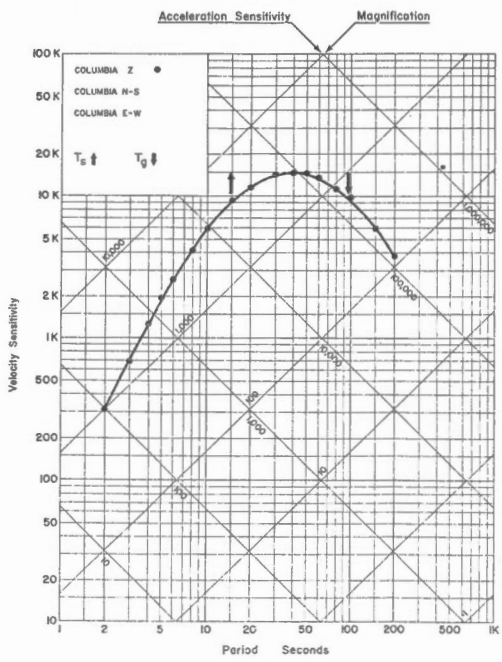
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W • December 2, 1974

STATION: PENTICTON, B.C. (PNT)
(As found and left)

ϕ= 49°19'N λ= 119°37'W Altitude 550 m

Foundation: Tertiary shale



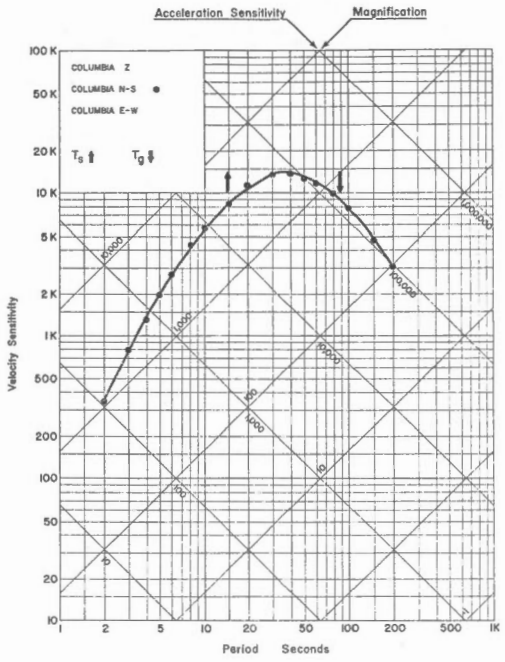
Dates of Calibration:

COLUMBIA Z • December 3, 1974
COLUMBIA N-S
COLUMBIA E-W

STATION: PENTICTON, B.C. (PNT)
(As found and left)

ϕ= 49°19'N λ= 119°37'W Altitude 550 m

Foundation: Tertiary shale



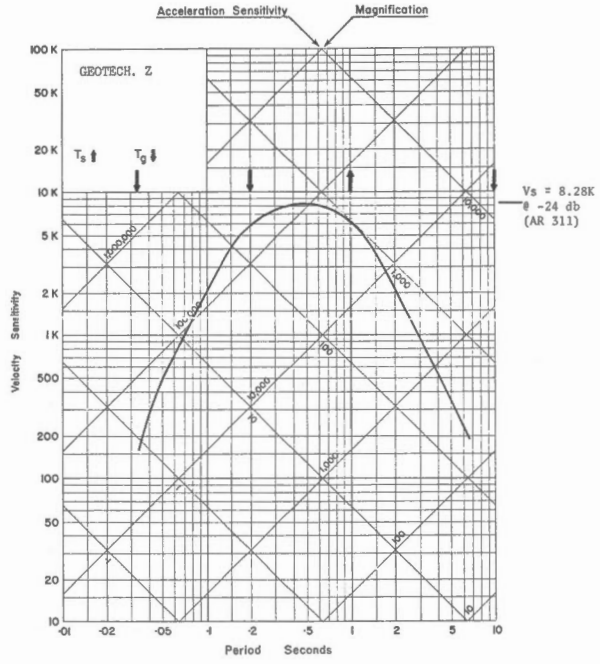
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S • December 4, 1974
COLUMBIA E-W

STATION: LA POCATIERE, QUE. (POC)

ϕ= 47°21'52"N λ= 70°02'27"W Altitude 61 m

Foundation: Quartzite



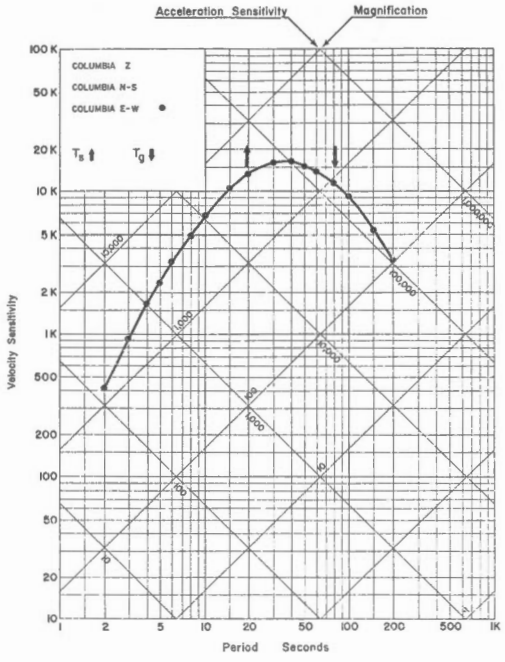
Dates of Calibration: October 1972

SEISMOMETER: Geotech S13 G_L = 2.62 V.S./C M.
PREAMPLIFIER: AS330 operated at 30-30 db (SEP.-ATT.)
Filter Bandpass 0.1-5 Hz
AMPLIFIER: AR 311 - 1 C M./Volt @ 24 db
HELICORDER: RV 301
Corner frequencies indicated by "T_R" arrows

STATION: PENTICTON, B.C. (PNT)
(As found and left)

ϕ= 49°19'N λ= 119°37'W Altitude 550 m

Foundation: Tertiary shale



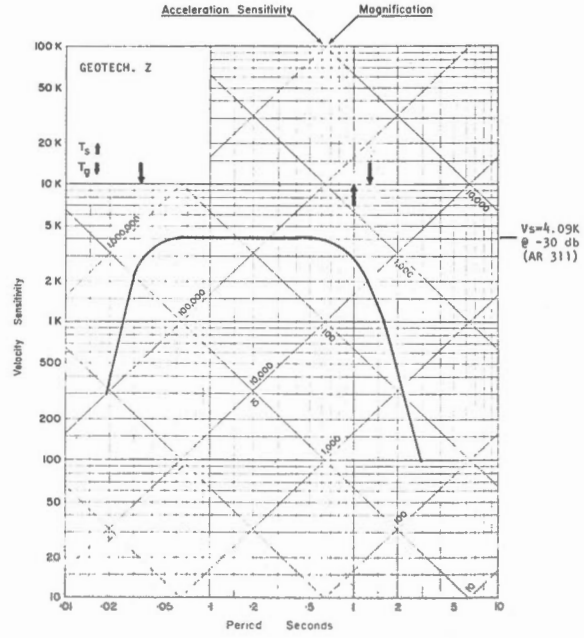
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W • December 4, 1974

STATION. LA POCATIERE, QUE. (POC)

ϕ= 47°21'52"N λ= 70°02'27"W Altitude 61 m

Foundation: Quartzite



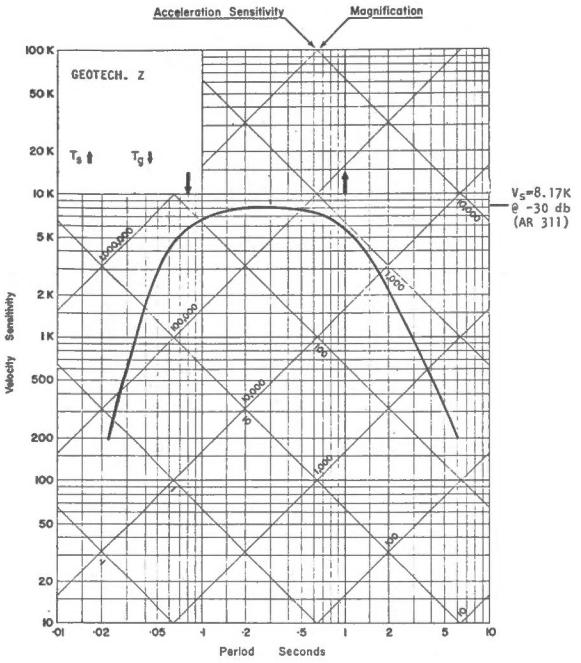
Dates of Calibration: June 10, 1974

SEISMOMETER: Geotech S13 G_L = 2.62 V.S./C M.
PREAMPLIFIER: AS330 operated at 30-36 db (SEP.-ATT.)
Filter Bandpass .75 - 30 Hz
AMPLIFIER: AR 311 - 1 C M./Volt @ -30 db
HELICORDER: RV 301
Corner frequencies indicated by "Tg" arrows

STATION: LA POCATIERE, QUE. (POC)

ϕ= 47°21'52"N λ= 70°02'27"W Altitude 61 m

Foundation: Quartzite



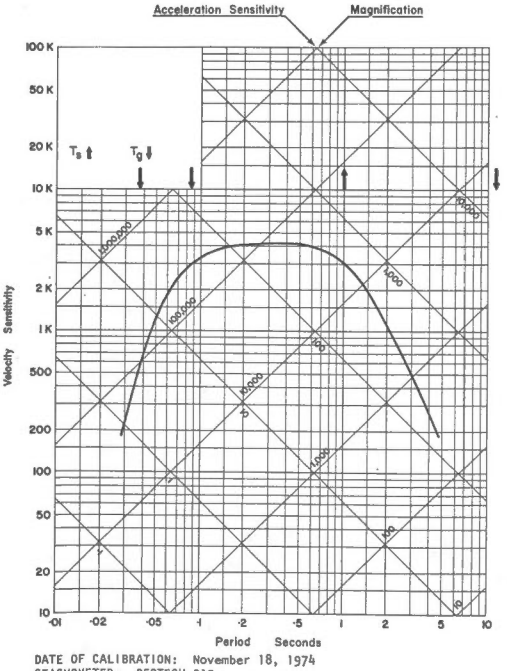
Dates of Calibration: July 26, 1974

SEISMOMETER: Geotech S13 G_L=2.62 V.S./CM
PREAMPLIFIER: AS330 operated at 30-30 db (SEP.-ATT.)
Filter Bandpass - .1-12.5 Hz
AMPLIFIER: AR 311 - 1 CM/Volt @ -30 db
HELICORDER: RV 301
Corner frequencies indicated bt "Tg" arrows

STATION: LA POCATIERE, QUE (POC)

ϕ= 47°21'52"N λ=70°02'27"W Altitude 61 M

Foundation: Quartzite

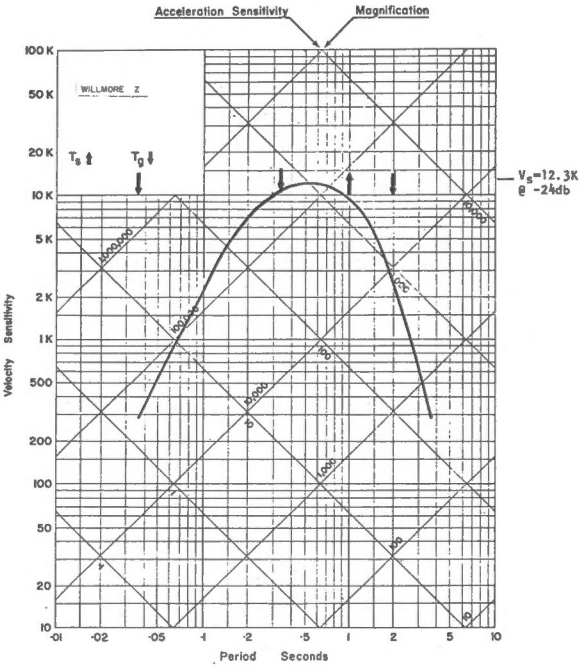


DATE OF CALIBRATION: November 18, 1974
SEISMOMETER: GEOTECH S13
PREAMPLIFIER: AS330
AMPLIFIER: AR311
HELICORDER: RV301
Corner frequencies indicated by Tg arrows.

STATION: La POCATIERE, QUE (POC)

ϕ= 47°21'52"N λ=70°02'27"W Altitude 61 m

Foundation: Quartzite



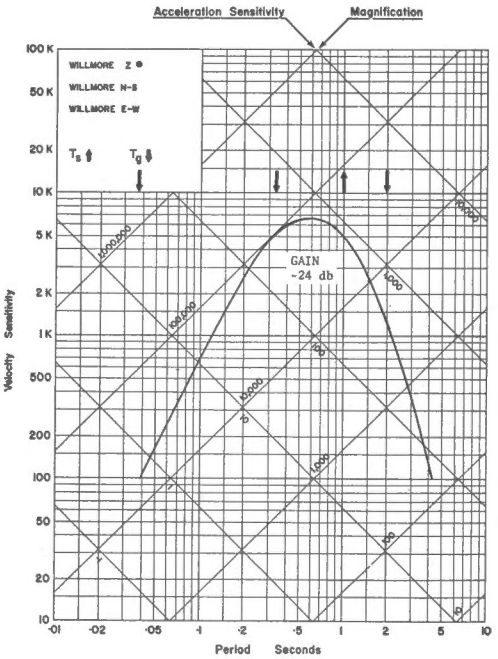
Dates of Calibration: October 10, 1974

SEISMOMETER: Willmore T_s=1.01 D_s=0.69
G_L=0.985 V.S/CM @ R_L=469 ohms
AMPLIFIER: AS330 - GAIN = 100K @ 0db
Bandpass - 0.5-3 Hz
HELICORDER: RV301 - 1 CM/V
Corner frequencies indicated by "Tg" arrows.

STATION: QUEEN CHARLOTTE, B.C. (QCC)

ϕ= 53°15.3'N λ= 132°05.3'W Altitude 3 M

Foundation: Sedimentary Rocks



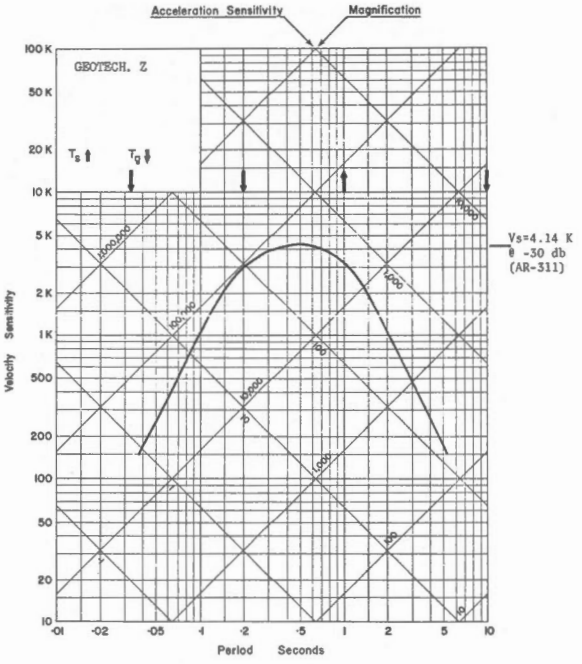
Dates of Calibration: Sept. 30, 1971

WILLMORE Z ● Operating with a Teledyne EA310 amplifier into a helicorder.
WILLMORE N-S
WILLMORE E-W
Corner frequencies indicated by "Tg" arrows.

STATION: QUEBEC, QUE. (QCQ)

ϕ= 46°46'44"N λ= 71°16'33"W Altitude 91 M

Foundation: Schist



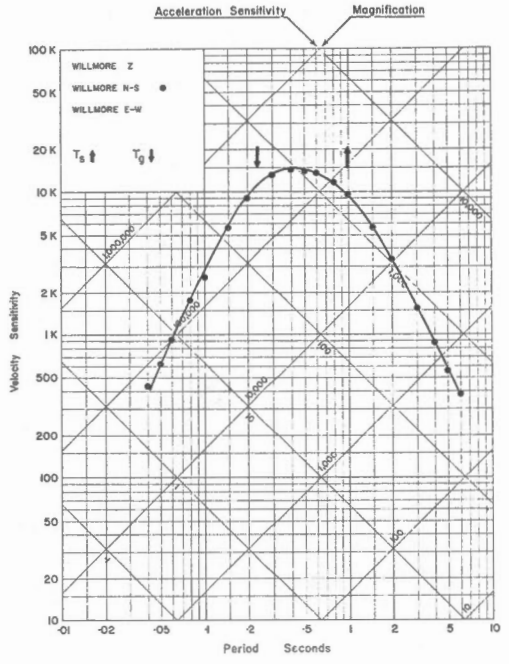
Dates of Calibration: October 1972
SEISMOMETER: Geotech, S13 G_L = 2.62 V.S./C M.
PREAMPLIFIER: AS330 operated at 30-30 db (SEP.-ATT.)
Filter Bandpass 0.1 - 5 Hz
AMPLIFIER: AR 311 - 1 C M./Volt @ 24 db
HELICORDER: RV 301 - 0-30 Hz

Corner frequencies indicated by "T_g" arrows.

STATION: RESOLUTE, N.W.T. (RES)
(As found & left)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



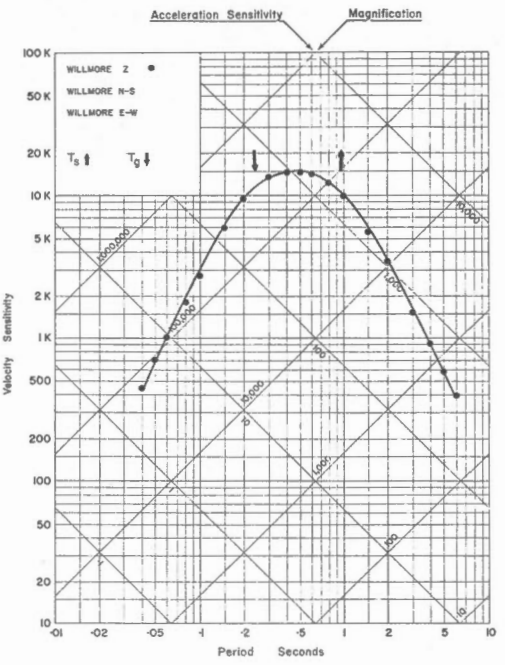
Dates of Calibration:

WILLMORE Z
WILLMORE N-S • May 3, 1973
WILLMORE E-W

STATION: RESOLUTE, N.W.T. (RES)
(As found & left)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



Dates of Calibration:

WILLMORE Z • May 3, 1973
WILLMORE N-S
WILLMORE E-W

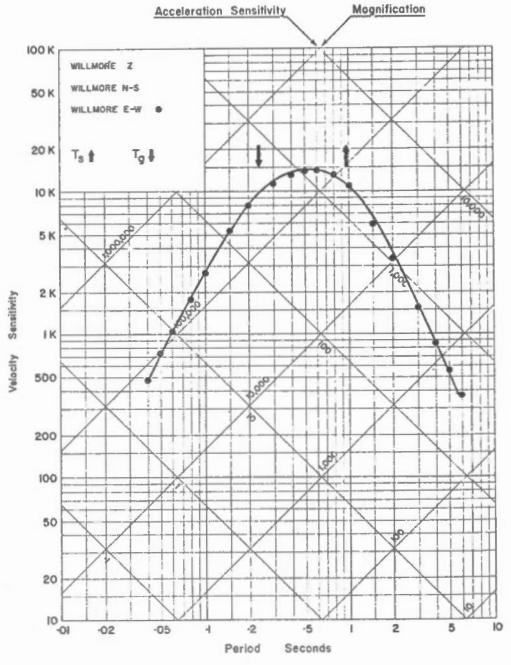
STATION: RESOLUTE, N.W.T. (RES)
(As found & left)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone

Dates of Calibration:

WILLMORE Z
WILLMORE N-S • May 3, 1973
WILLMORE E-W



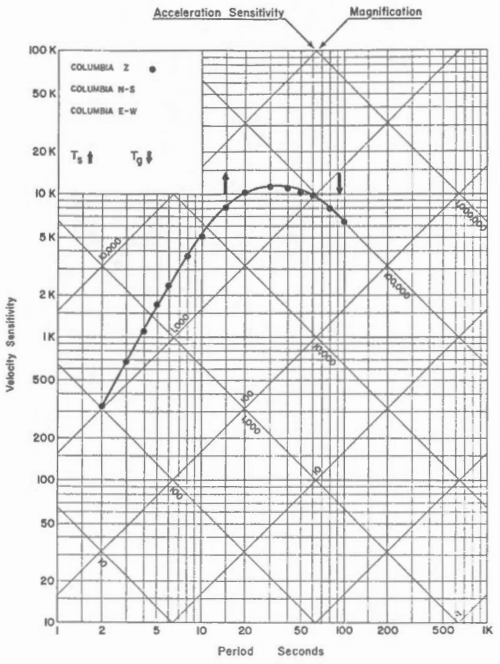
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W • May 3, 1973

STATION: RESOLUTE, N.W.T. (Final) (RES)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



Dates of Calibration:

COLUMBIA Z ● May 9, 1973

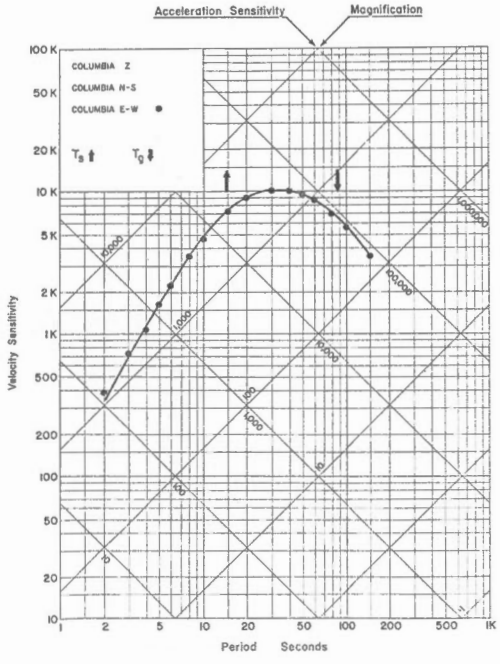
COLUMBIA N-S

COLUMBIA E-W

STATION: RESOLUTE, N.W.T. (Final) (RES)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



Dates of Calibration:

COLUMBIA Z

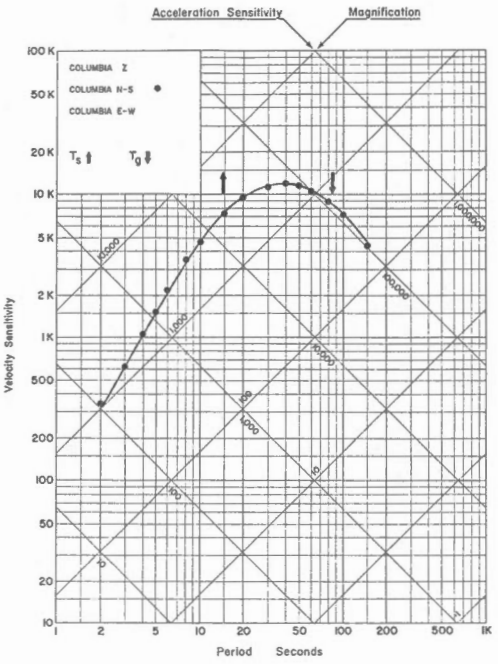
COLUMBIA N-S

COLUMBIA E-W ● May 10, 1973

STATION: RESOLUTE, N.W.T. (Final) (RES)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



Dates of Calibration:

COLUMBIA Z

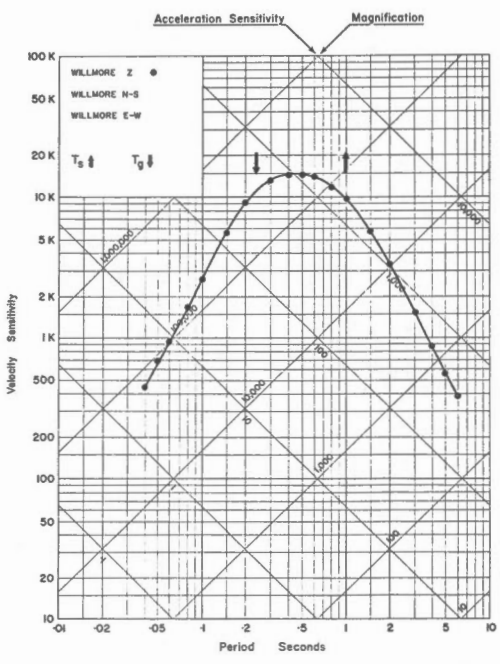
COLUMBIA N-S ● May 10, 1973

COLUMBIA E-W

STATION: RESOLUTE, N.W.T. (final) (RES)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



Dates of Calibration:

WILLMORE Z ● July 18, 1974

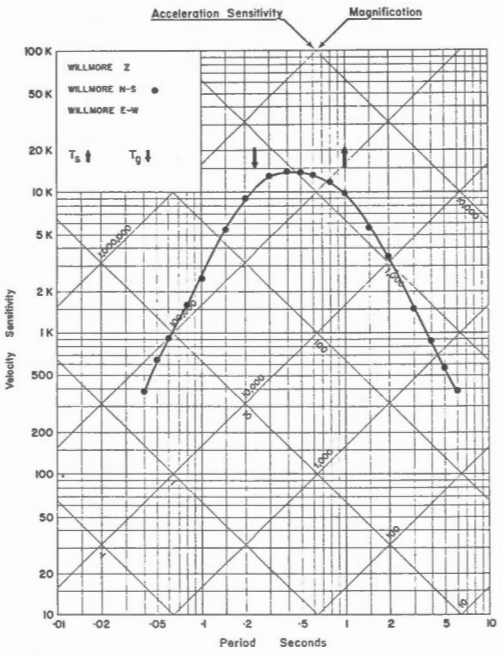
WILLMORE N-S

WILLMORE E-W

STATION: RESOLUTE, N.W.T. (RES)
(final)

ϕ= 74°41.2'N λ=94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



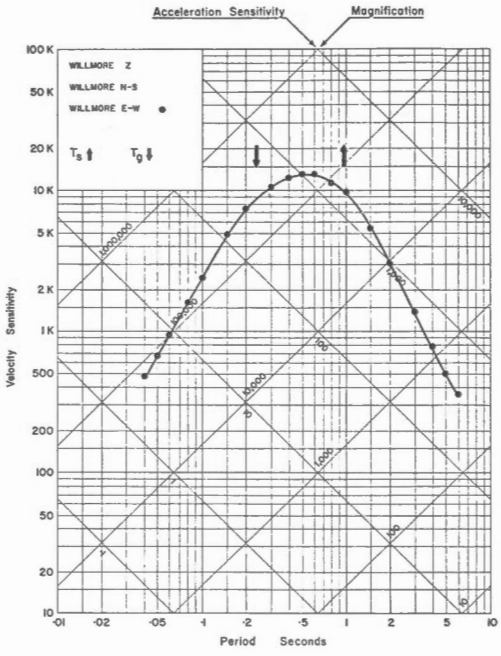
Dates of Calibration:

WILLMORE Z
WILLMORE N-S • July 19, 1974
WILLMORE E-W

STATION: RESOLUTE, N.W.T. (RES)
(final)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



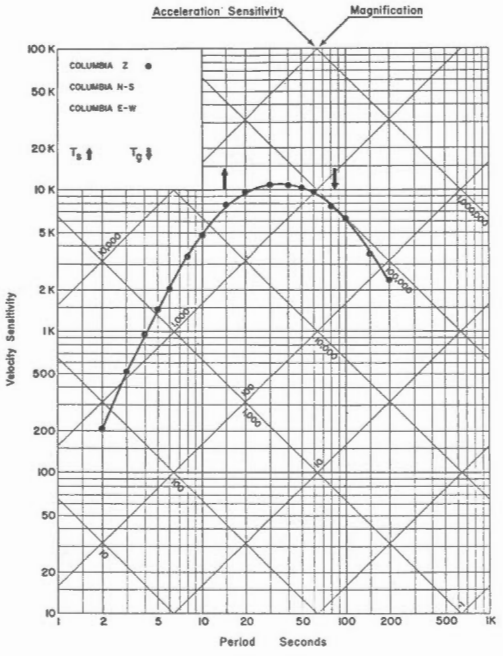
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W • July 19, 1974

STATION: RESOLUTE, N.W.T. (RES)
(final)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



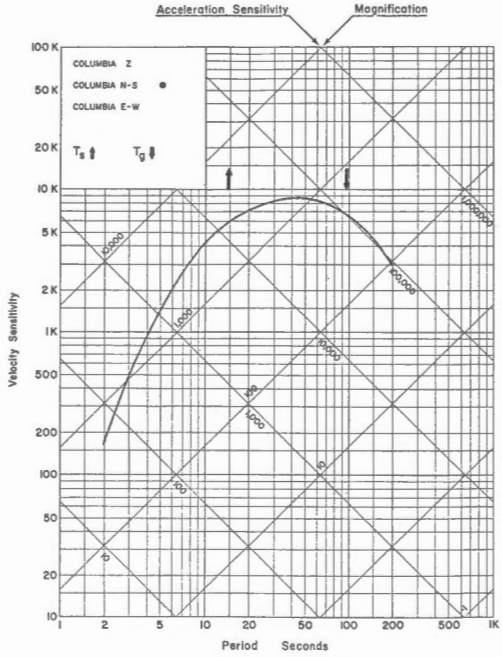
Dates of Calibration:

COLUMBIA Z • July 17, 1974
COLUMBIA N-S
COLUMBIA E-W

STATION: RESOLUTE, N.W.T. (RES)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



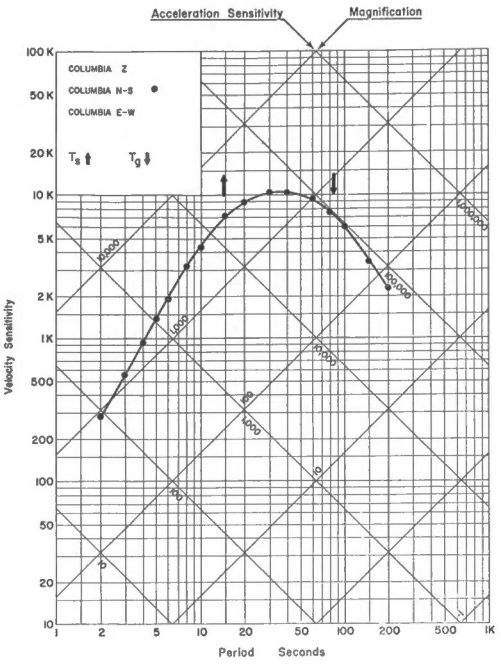
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S • Sept. 25, 1974
COLUMBIA E-W

STATION: RESOLUTE, N.W.T. (RES)
(final)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



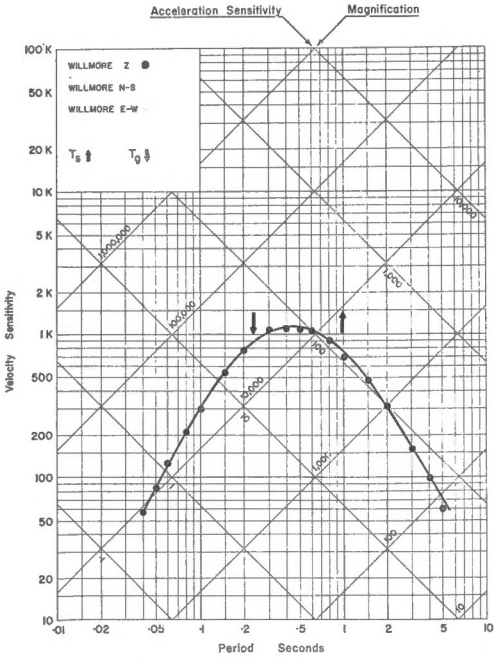
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● July 17, 1974
COLUMBIA E-W

STATION: SCARBOROUGH, ONT. (SCB)

ϕ= 43°43'N λ= 79°14'W Altitude 153M

Foundation: Glacial Till interlayered with river deposited sand



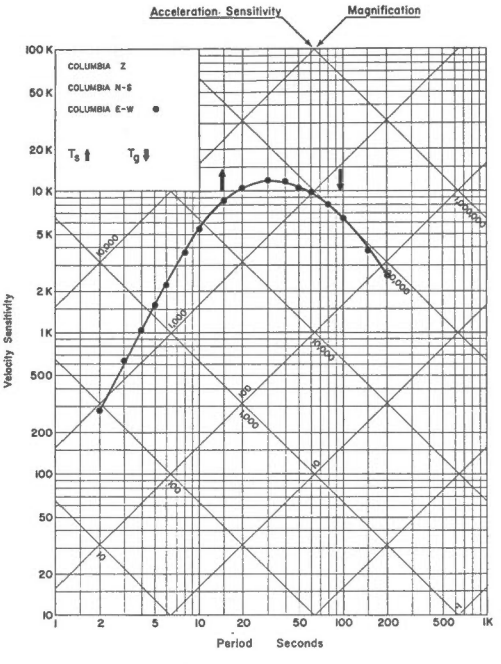
Dates of Calibration:

WILLMORE Z ● June 23 - 1969
WILLMORE N-S
WILLMORE E-W

STATION: RESOLUTE, N.W.T. (RES)
(final)

ϕ= 74°41.2'N λ= 94°54.0'W Altitude 15 M

Foundation: Early Palaeozoic limestone



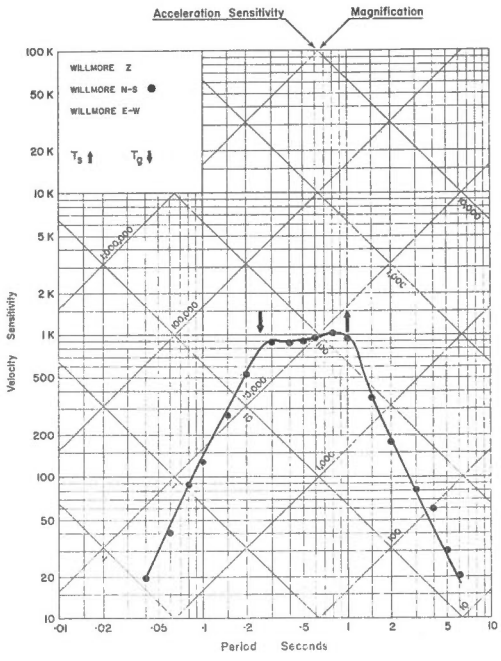
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● July 17, 1974

STATION: SCARBOROUGH, ONT. (SCB)

ϕ= 43°43'N λ= 79°14'W Altitude 153M

Foundation: Glacial Till interlayered with river deposited sand.



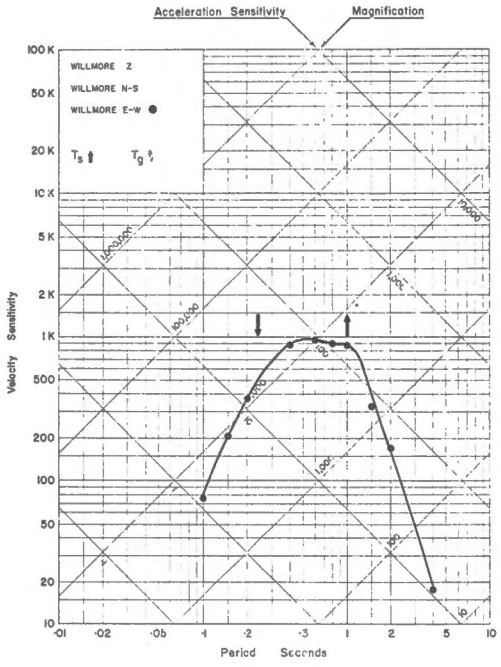
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● June 23 - 1969
WILLMORE E-W

STATION: SCARBOROUGH, ONT. (SCB)

ϕ= 43°43'N λ= 79°14'W Altitude 153M

Foundation: Glacial Till interlayered with river deposited sand



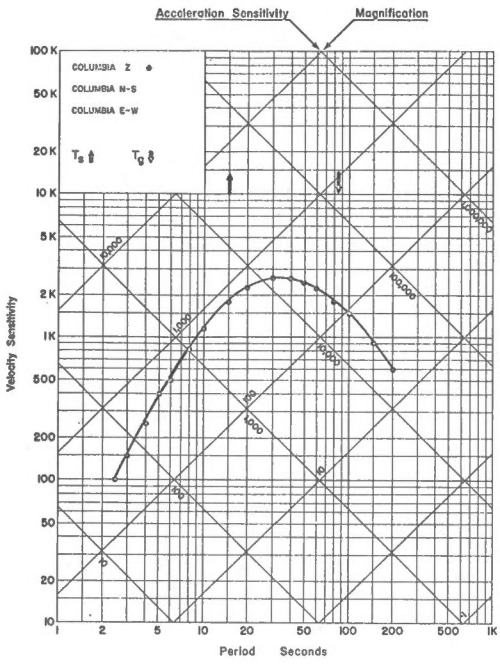
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● June 23 - 1969

STATION: SCARBOROUGH, ONT. (SCB)

ϕ= 43°43'N λ= 79°14'W Altitude 153M

Foundation: Glacial Till interlayered with river deposited sand.



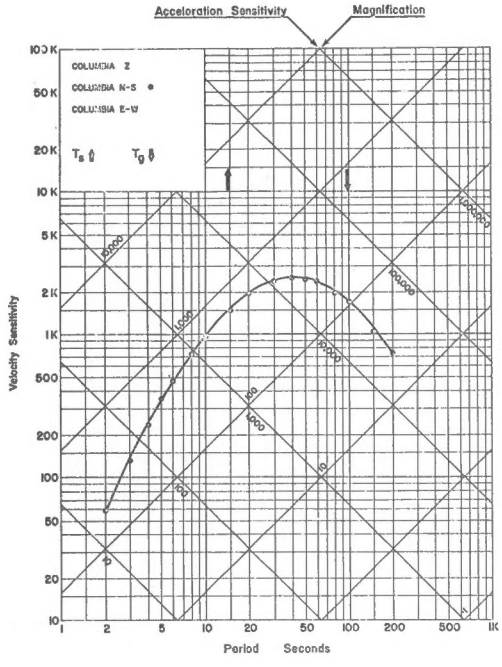
Dates of Calibration:

COLUMBIA Z ● Jan. 18, 1968
COLUMBIA N-S
COLUMBIA E-W

STATION: SCARBOROUGH, ONT. (SCB)

ϕ= 43°43'N λ= 79°14'W Altitude 153M

Foundation: Glacial Till interlayered with river deposited sand.



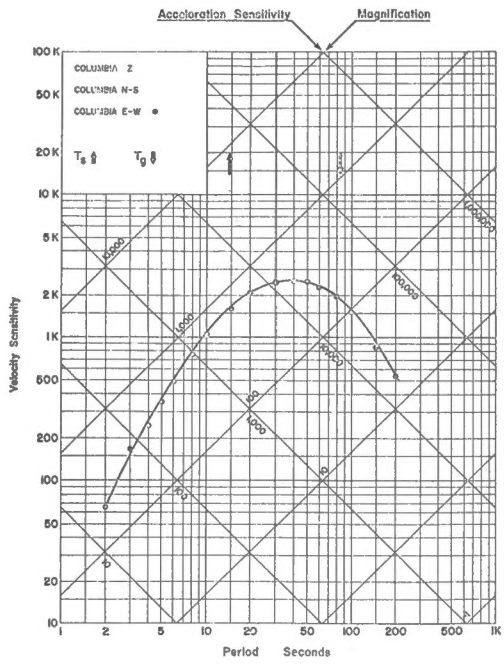
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● Jan. 19, 1968
COLUMBIA E-W

STATION: SCARBOROUGH, ONT. (SCB)

ϕ= 43°43'N λ= 79°14'W Altitude 153M

Foundation: Glacial Till interlayered with river deposited sand.



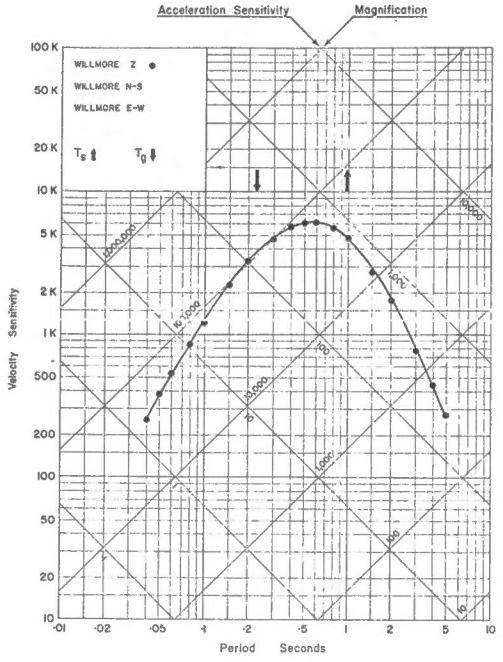
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● Jan. 19, 1968

STATION. SCHEFFERVILLE, QUE. (AS FOUND AND LEFT) (SCH)

ϕ= 54°49'N λ= 66°47'W Altitude 540 M

Foundation: Competent Precambrian state-shale



Dates of Calibration:

WILLMORE Z ● 22 Feb. 1973

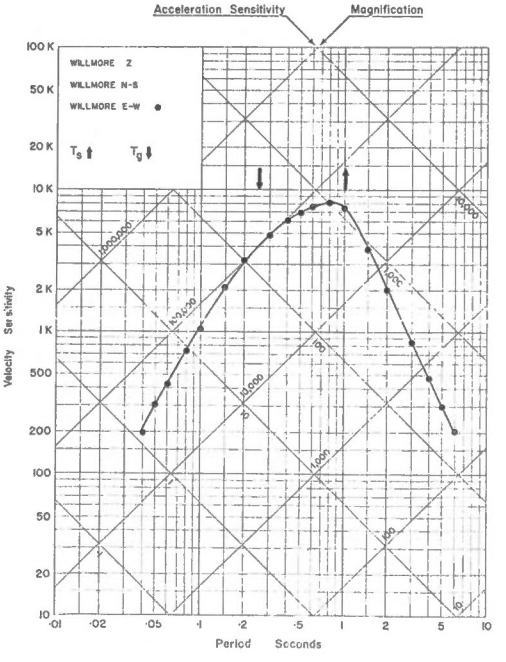
WILLMORE N-S

WILLMORE E-W

STATION. SCHEFFERVILLE, QUE. (AS FOUND AND LEFT) (SCH)

ϕ= 54°49'N λ=66°47'W Altitude 540 M

Foundation: Competent Precambrian state-shale



Dates of Calibration:

WILLMORE Z

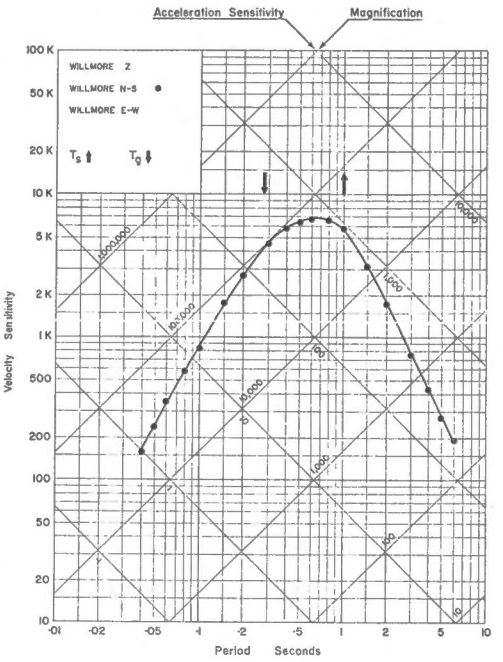
WILLMORE N-S

WILLMORE E-W ● 22 Feb. 1973

STATION: SCHEFFERVILLE, QUE. (AS FOUND AND LEFT) (SCH)

ϕ= 54°49'N λ=66°47'W Altitude 540 M

Foundation: Competent Precambrian slate-shale



Dates of Calibration:

WILLMORE Z

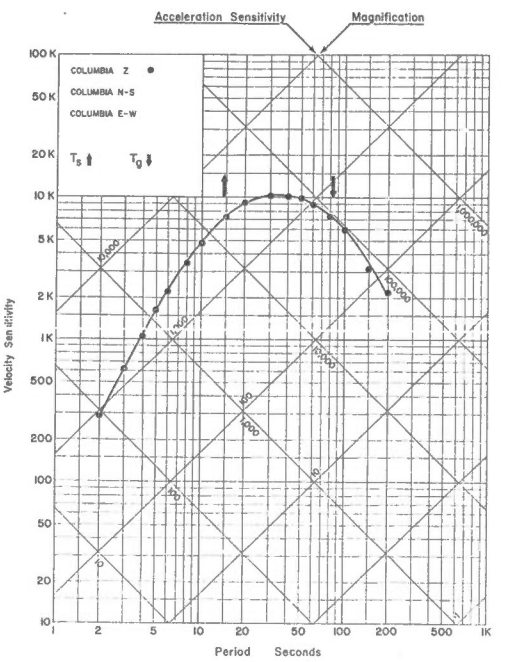
WILLMORE N-S ● 22 Feb. 1973

WILLMORE E-W

STATION: SCHEFFERVILLE, QUE. (AS FOUND AND LEFT) (SCH)

ϕ= 54°49'N λ= 66°47'W Altitude 540 M

Foundation: Competent Precambrian slate-shale



Dates of Calibration:

COLUMBIA Z ● 21 Feb. 1973

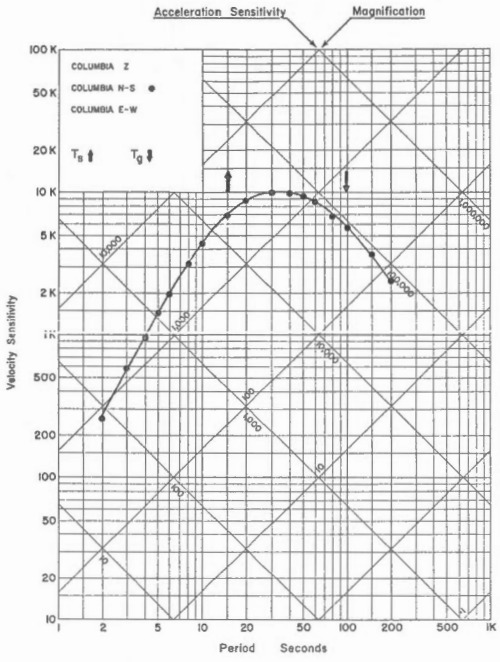
COLUMBIA N-S

COLUMBIA E-W

STATION: **SCHEFFERVILLE, QUE.** (AS FOUND AND LEFT) (SCH)

ϕ= 54°49'N λ=66°47'W Altitude 540 M

Foundation: Competent Precambrian slate-shale



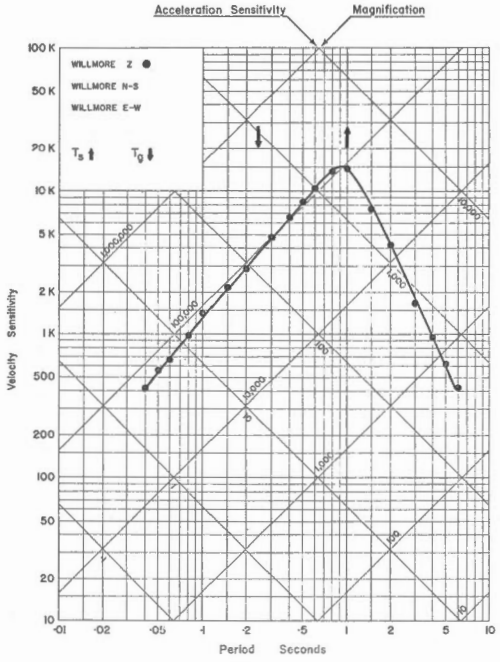
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● 22 Feb. 1973
COLUMBIA E-W

STATION: SUFFIELD, ALTA. (SES)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770 M

Foundation: Grey Competent Sandstone



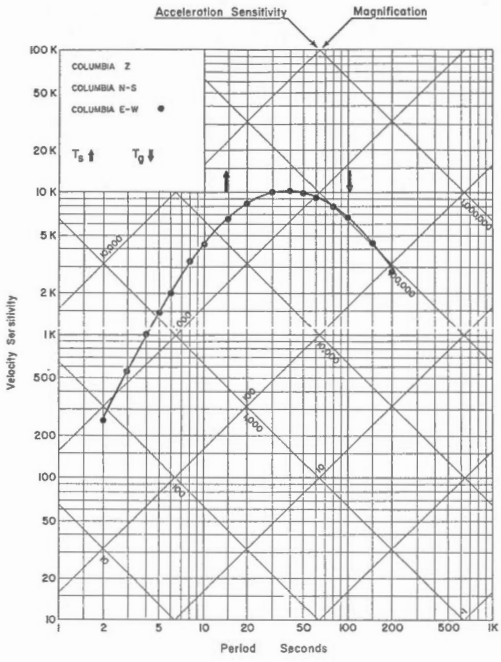
Dates of Calibration:

WILLMORE Z ● May 24, 1970
WILLMORE N-S
WILLMORE E-W

STATION: SCHEFFERVILLE, QUE. (AS FOUND AND LEFT) (SCH)

ϕ= 54°49'N λ= 66°47'W Altitude 540 M

Foundation: Competent Precambrian slate-shale



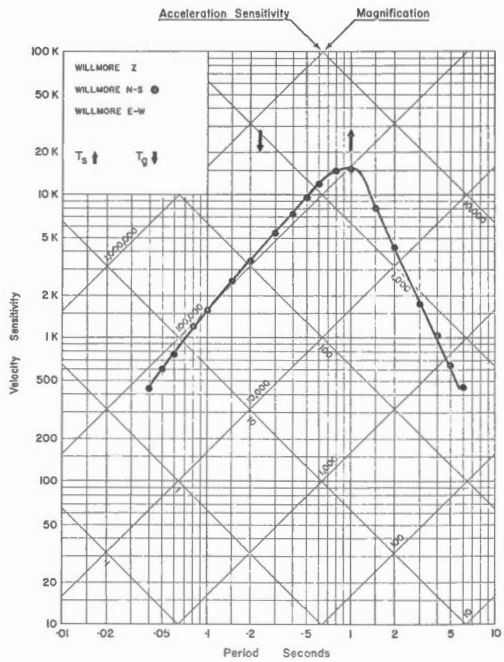
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● 22 Feb. 1973

STATION: SUFFIELD, ALTA. (SES)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



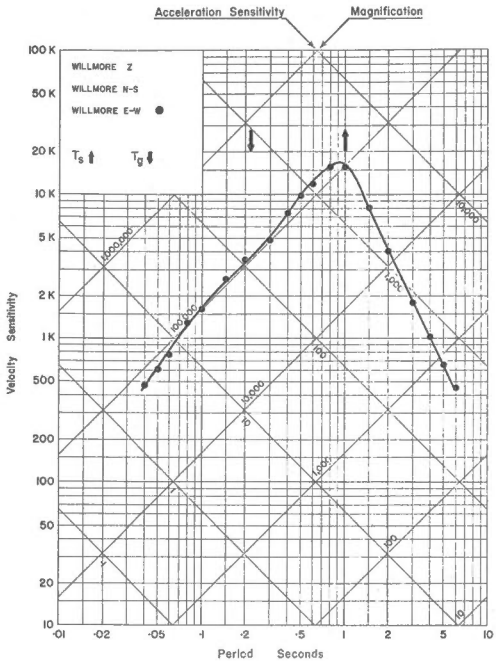
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● May 25, 1970
WILLMORE E-W

STATION: SUFFIELD, ALTA. (SES)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



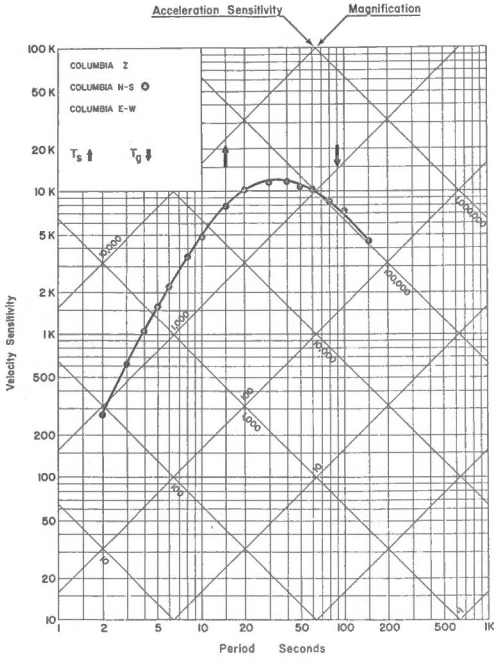
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● May 25, 1970

STATION: SUFFIELD, ALTA. (SES)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



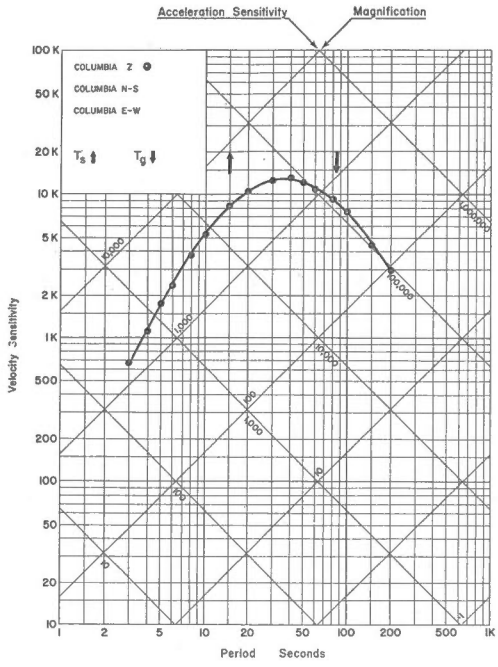
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ⊙ May 23, 1970
COLUMBIA E-W

STATION: SUFFIELD, ALTA. (SES)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



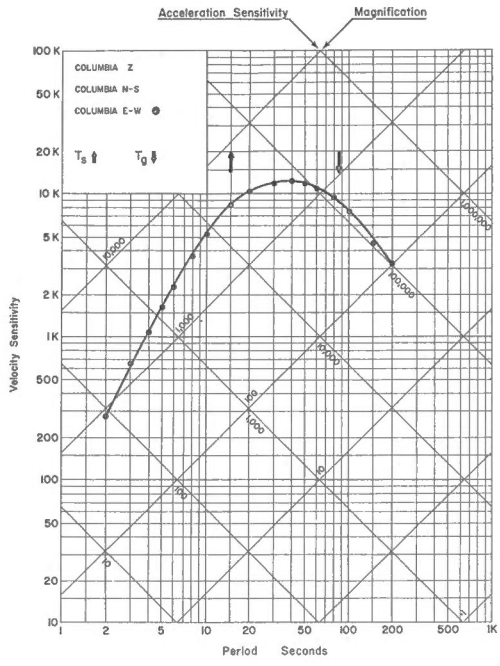
Dates of Calibration:

COLUMBIA Z ⊙ May 23, 1970
COLUMBIA N-S
COLUMBIA E-W

STATION: SUFFIELD, ALTA. (SES)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



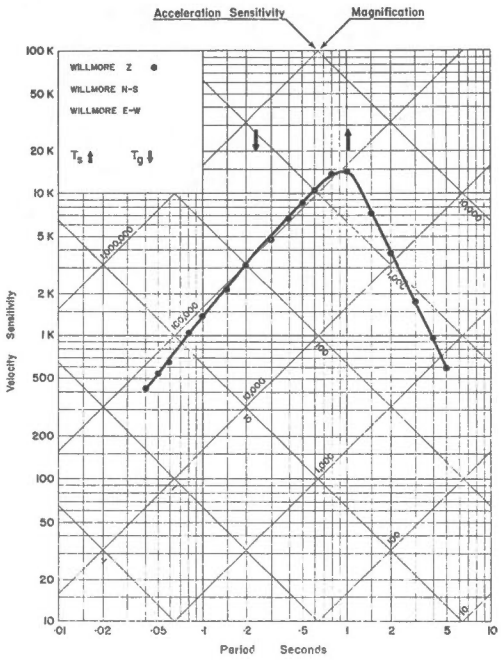
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ⊙ May 23, 1970

STATION: SUFFIELD, ALTA. (SES)
(As found)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



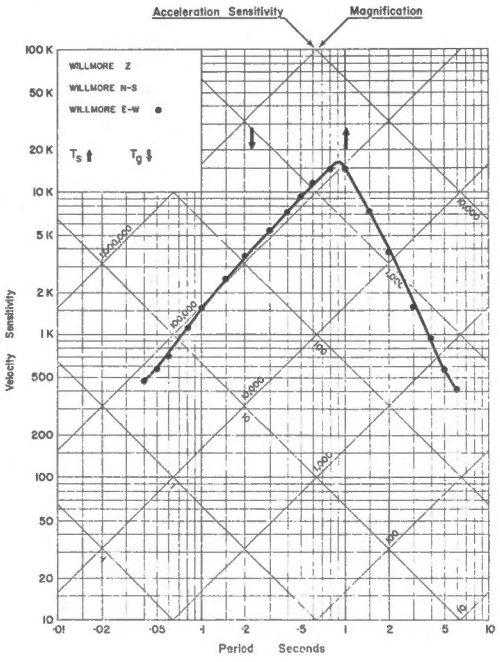
Dates of Calibration:

WILLMORE Z • December 6, 1974
WILLMORE N-S
WILLMORE E-W

STATION: SUFFIELD, ALTA. (SES)
(As found)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



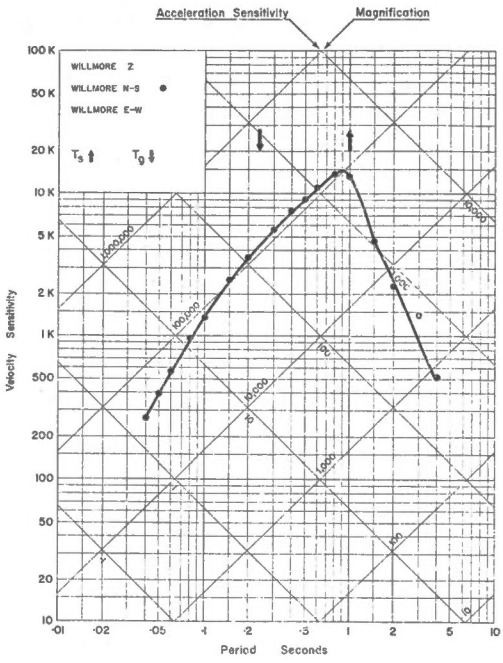
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W • December 6, 1974

STATION: SUFFIELD, ALTA. (SES)
(As found)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



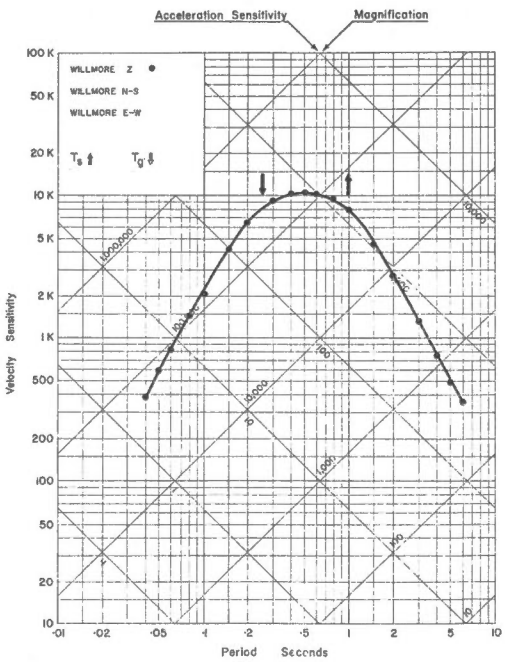
Dates of Calibration:

WILLMORE Z
WILLMORE N-S • December 6, 1974
WILLMORE E-W

STATION: SUFFIELD, ALTA. (SES)
(Final)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



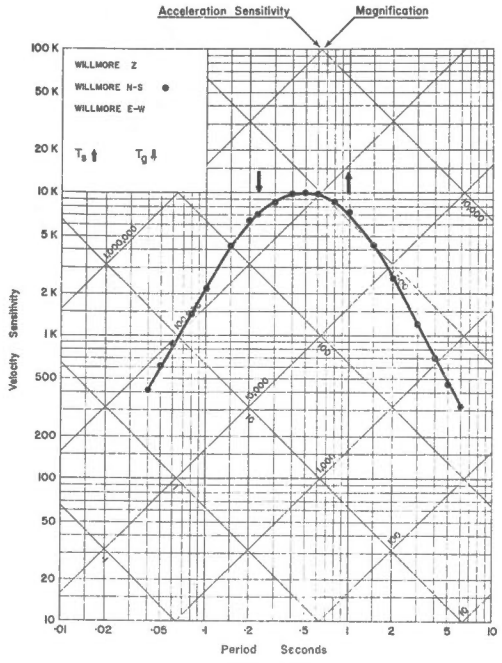
Dates of Calibration:

WILLMORE Z • December 7, 1974
WILLMORE N-S
WILLMORE E-W

STATION: SUFFIELD, ALTA. (SES)
(final)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



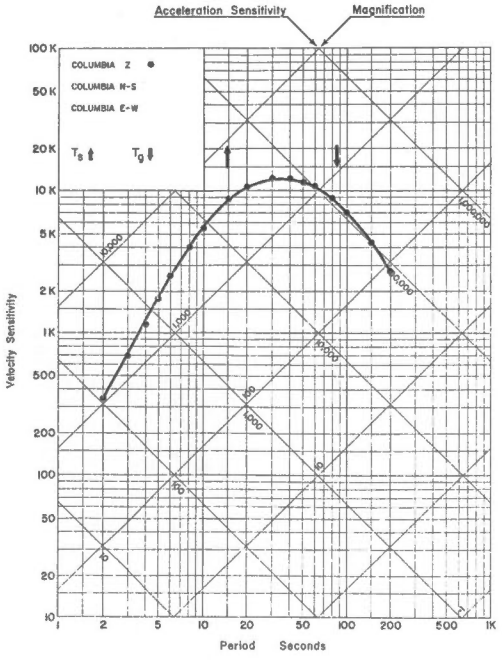
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● December 7, 1974
WILLMORE E-W

STATION: SUFFIELD, ALTA. (SES)
(As found and left)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



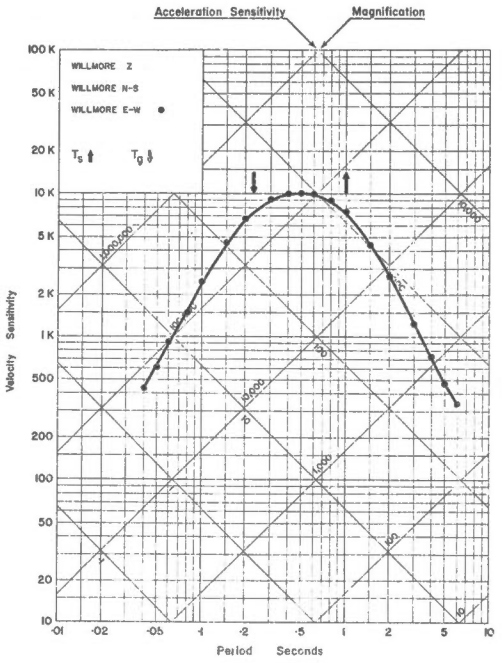
Dates of Calibration:

COLUMBIA Z ● December 7, 1974
COLUMBIA N-S
COLUMBIA E-W

STATION: SUFFIELD, ALTA. (SES)
(Final)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



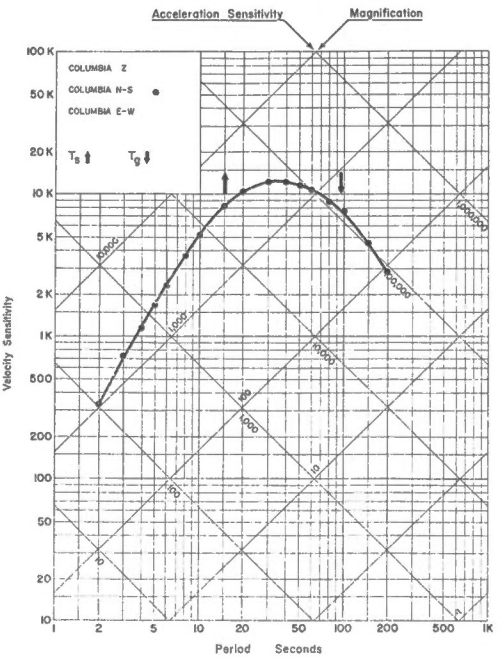
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● December 7, 1974

STATION: SUFFIELD, ALTA. (SES)
(as found and left)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



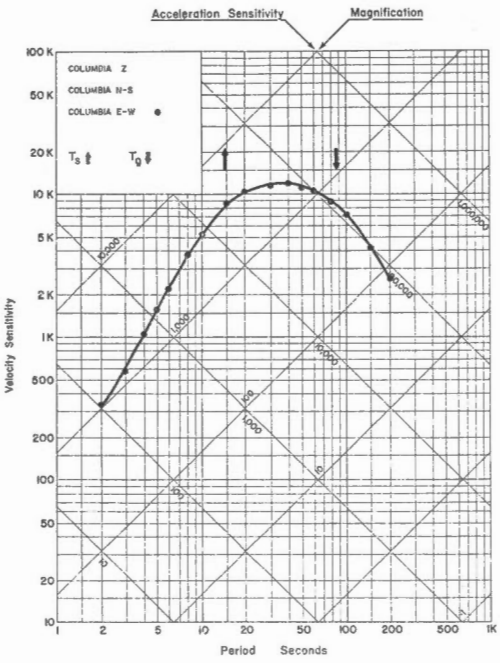
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● December 8, 1974
COLUMBIA E-W

STATION: SUFFIELD, ALTA. (SES)
(As found and left)

ϕ= 50°23'45"N λ= 111°02'30"W Altitude 770M

Foundation: Grey Competent Sandstone



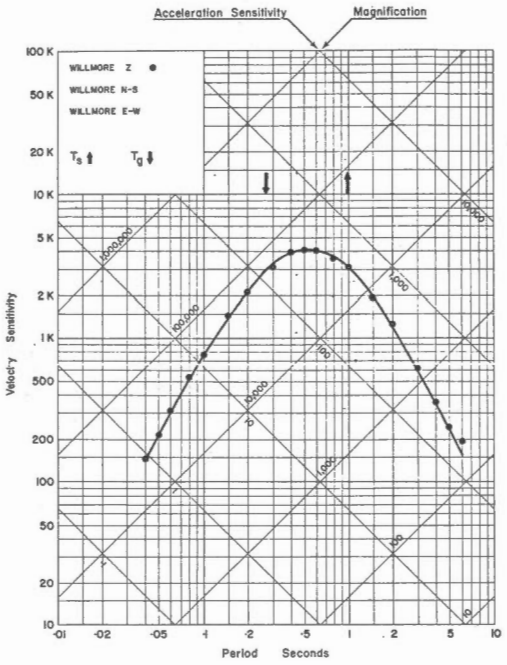
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● December 9, 1974

STATION: SEVEN FALLS, QUE. (SFA)

ϕ=47°07.4'N λ= 70°49.6'W Altitude 232 M

Foundation: Precambrian basement rocks



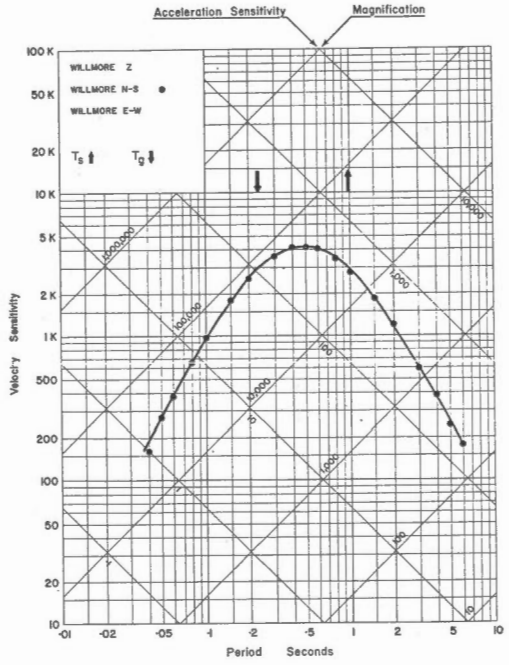
Dates of Calibration:

WILLMORE Z ● Feb. 9, 1972
WILLMORE N-S
WILLMORE E-W

STATION: SEVEN FALLS, QUE. (SFA)

ϕ=47°07.4'N λ= 70°49.6'W Altitude 232 M

Foundation: Precambrian basement rocks



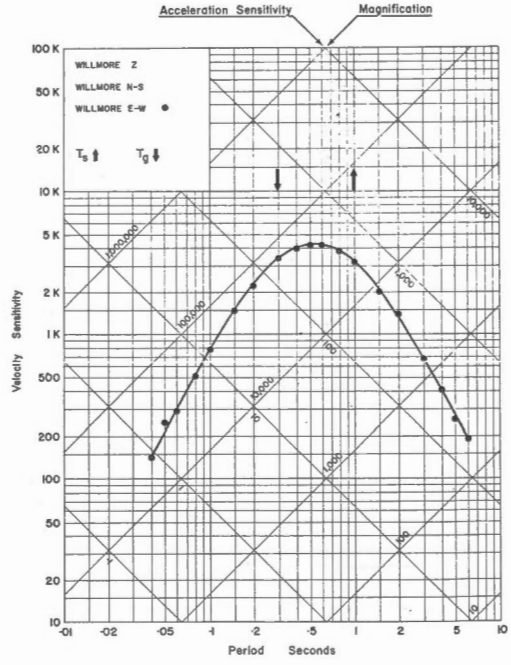
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● Feb. 9, 1972
WILLMORE E-W

STATION: SEVEN FALLS, QUE. (SFA)

ϕ=47°07.4'N λ= 70°49.6'W Altitude 232 M

Foundation: Precambrian basement rocks



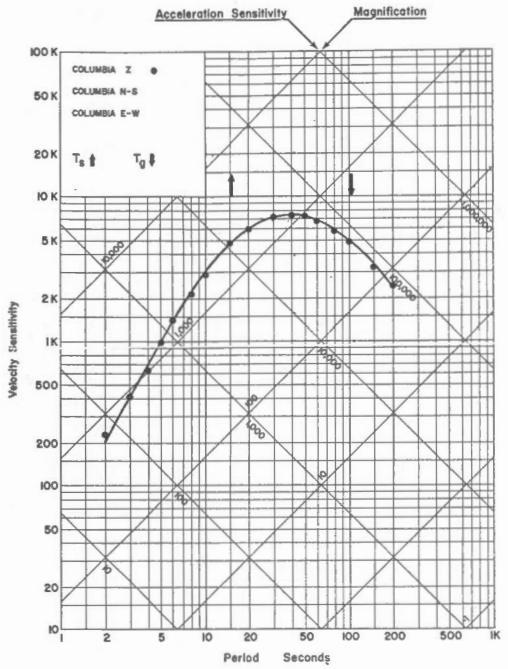
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● Feb. 11, 1972

STATION: SEVEN FALLS, QUE. (SFA)

ϕ= 47°07.4'N λ= 70°49.6'W Altitude 232 M

Foundation: Precambrian basement rocks



Dates of Calibration:

COLUMBIA Z ● Feb. 10, 1972 (see "Instrument Changes during 1972" - notes)

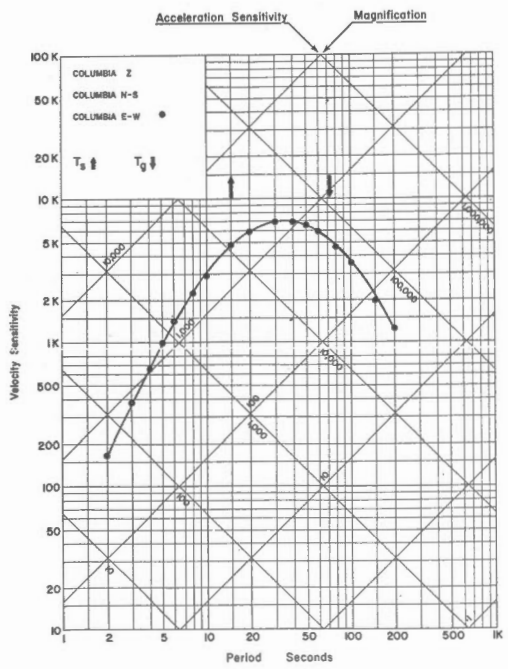
COLUMBIA N-S

COLUMBIA E-W

STATION: SEVEN FALLS, QUE. (SFA)

ϕ= 47°07.4'N λ= 70°49.6'W Altitude 232 M

Foundation: Precambrian basement rocks



Dates of Calibration:

COLUMBIA Z

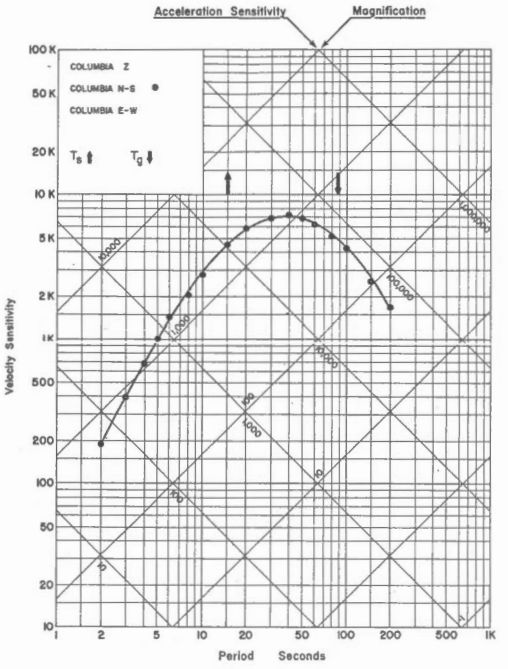
COLUMBIA N-S

COLUMBIA E-W ● Feb. 11, 1972

STATION: SEVEN FALLS, QUE. (SFA)

ϕ= 47°07.4'N λ= 70°49.6'W Altitude 232 M

Foundation: Precambrian basement rocks



Dates of Calibration:

COLUMBIA Z

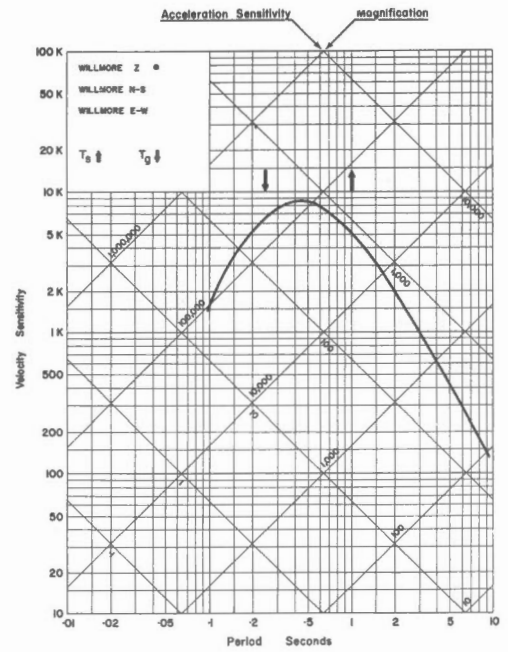
COLUMBIA N-S ● Feb. 10, 1972

COLUMBIA E-W

STATION: SEPT-ILES, QUE. (SIC)

ϕ= 50°11'20"N λ= 66°44'25"W Altitude 283 M

Foundation:



Dates of Calibration:

WILLMORE Z ● MAR. 11 - 1964

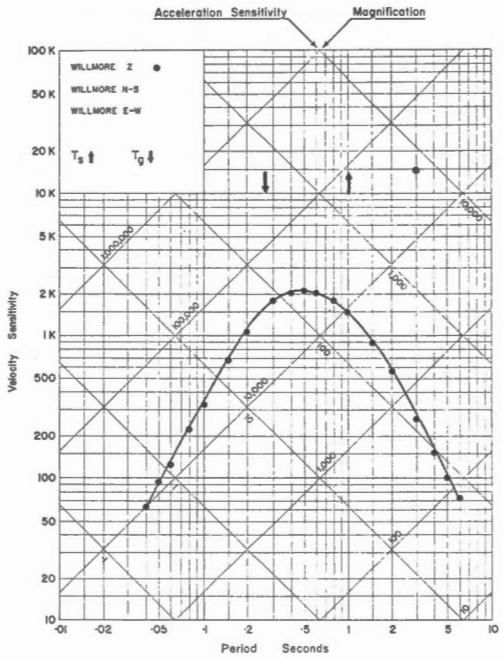
WILLMORE N-S

WILLMORE E-W

STATION: ST. JOHN'S, NFLD. (STJ)

ϕ= 47°34.3'N λ= 52°44.0'W Altitude 62 M

Foundation: Precambrian: Siliceous Mudstone



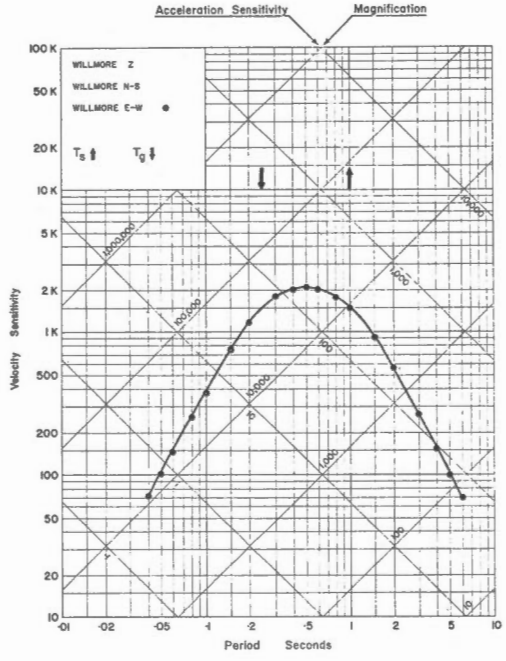
Dates of Calibration:

WILLMORE Z ● Aug. 14, 1973
WILLMORE N-S
WILLMORE E-W

STATION: ST. JOHN'S, NFLD. (STJ)

ϕ= 47°34.3'N λ= 52°44.0'W Altitude 62 M

Foundation: Precambrian: Siliceous Mudstone



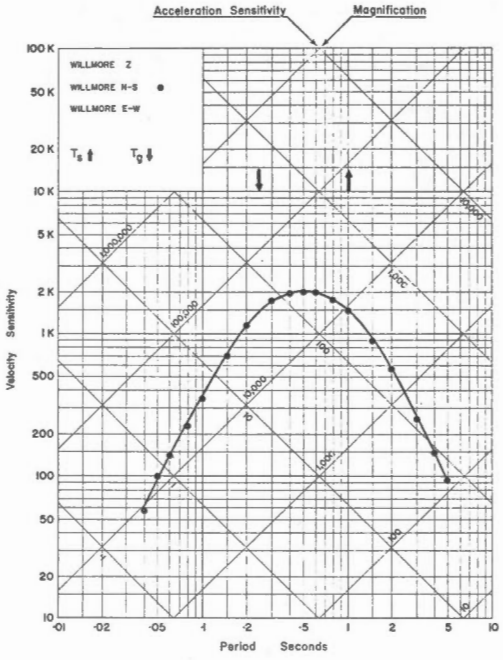
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W ● Aug. 15, 1973

STATION: ST. JOHN'S, NFLD. (STJ)

ϕ= 47°34.3'N λ= 52°44.0'W Altitude 62 M

Foundation: Precambrian: Siliceous Mudstone



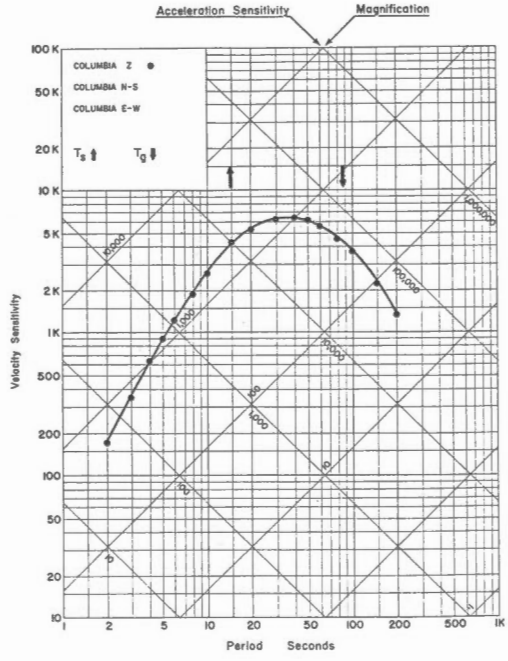
Dates of Calibration:

WILLMORE Z
WILLMORE N-S ● Aug. 14, 1973
WILLMORE E-W

STATION: ST. JOHN'S, NFLD. (STJ)

ϕ= 47°34.3'N λ= 52°44.0'W Altitude 62 M

Foundation: Precambrian: Siliceous Mudstone



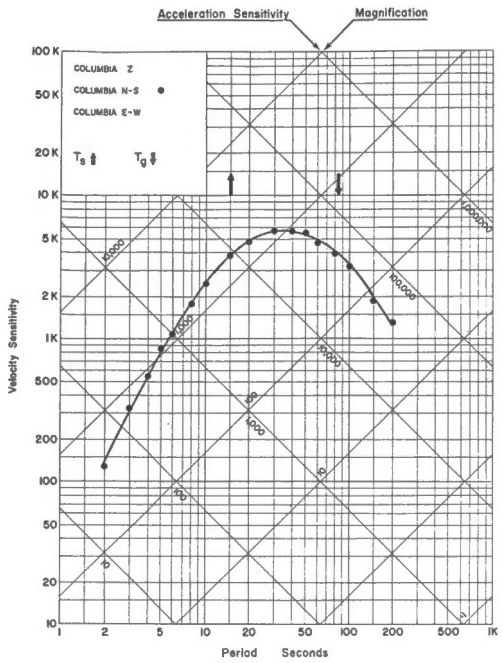
Dates of Calibration:

COLUMBIA Z ● Aug. 17, 1973
COLUMBIA N-S
COLUMBIA E-W

STATION: ST. JOHN'S, NFLD. (STJ)

ϕ= 47°34.3'N λ= 52°44.0'W Altitude 62 M

Foundation: Precambrian: Siliceous Mudstone



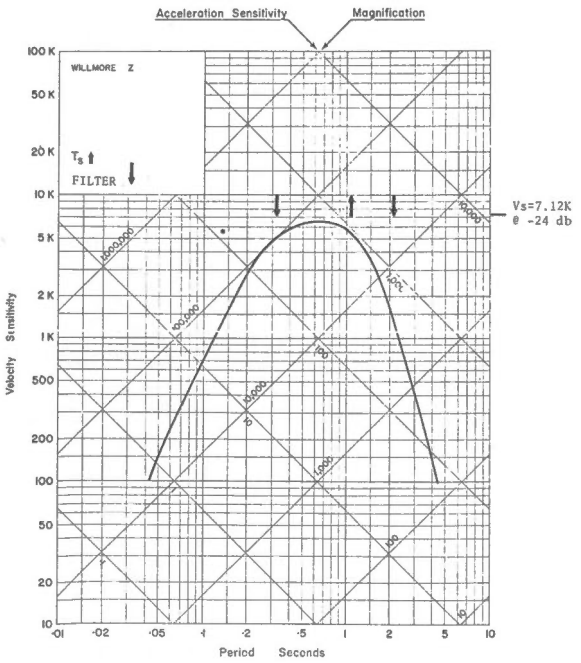
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● Aug. 17, 1973
COLUMBIA E-W

STATION: SUDBURY, ONTARIO (SUD)

ϕ=46°28'N λ=80°58'N Altitude 267 M

Foundation: Proterozoic, Huronian, Wanapitae Quartzite



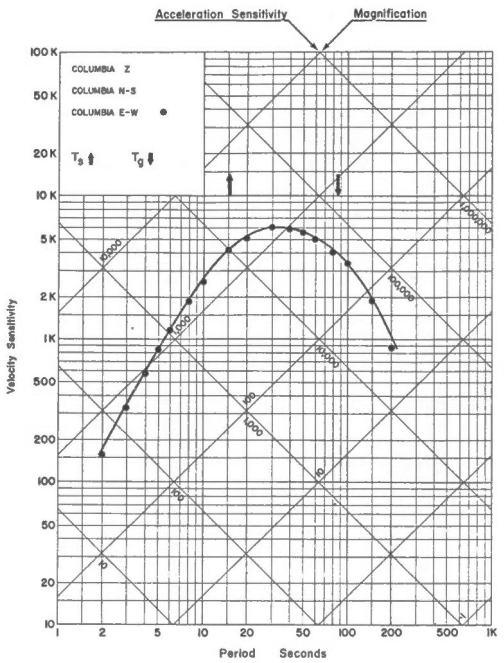
Dates of Calibration: Dec. 13, 1972

SEISMOMETER: Willmore K = 1.90 V/$\frac{cm}{sec}$
PREAMPLIFIER: AS310 operated at
24 - 30 (ATT-SEP)
Filter Bandpass - 0.5 - 3 Hz
HELICORDER: RV301 - Bandpass - 0 - 30 Hz
Sensitivity - 1 cm/Volt

STATION: ST. JOHN'S, NFLD. (STJ)

ϕ= 47°34.3'N λ= 52°44.0'W Altitude 62 M

Foundation: Precambrian: Siliceous Mudstone



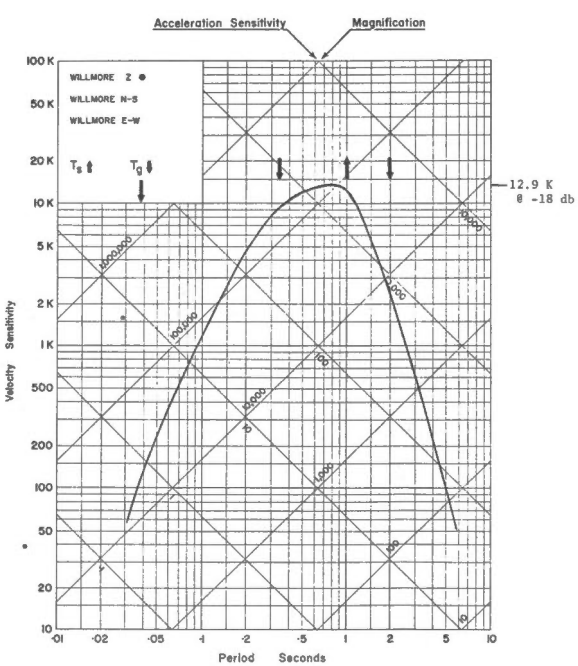
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● Aug. 18, 1973

STATION: FREDERICTON, N.B. (UNB)

ϕ= 45°57'N λ= 66°38'W Altitude 56 M

Foundation: Cenozoic, early post-glacial rock



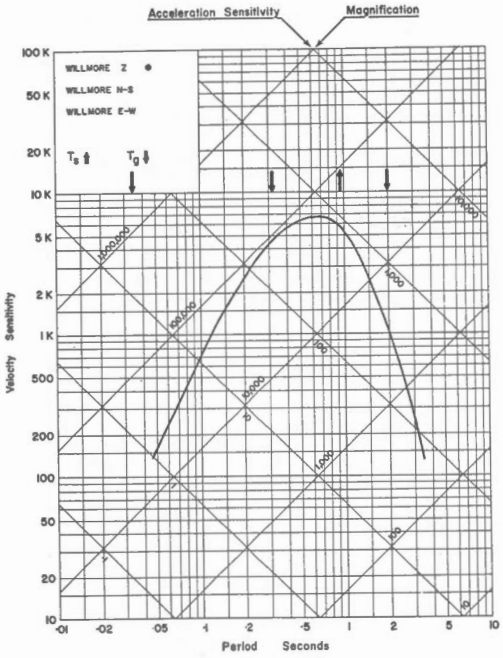
Dates of Calibration: February 7, 1973

SEISMOMETER: Willmore MKII G_L=1.75 v.s./cm
PREAMPLIFIER: Teledyne EA310 operated at 30 db sep.
Filter Bandpass 0.5-3 Hz
HELICORDER: 2484 0-25Hz
Corner frequencies indicated by "T_g" arrows.

STATION: FREDERICTON, N.B. (UNB)

ϕ= 45°57'N λ=66°38'W Altitude 56 M

Foundation: Cenozoic, early post-glacial rock

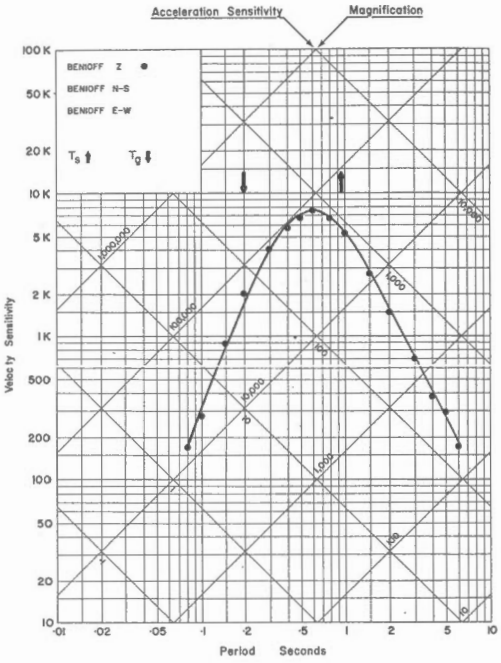


DATE OF CALIBRATION: May 8, 1975
SEISMOMETER: WILLMORE MKII
PREAMPLIFIER: TELEDYNE EA310
HELICORDER: GEOTECH RV301
Corner frequencies indicated by T_g arrows.

STATION: VICTORIA, B.C. (VIC)

ϕ= 48°31'10"N λ= 123°24'55"W Altitude 197 M

Foundation: Quartz Diorite



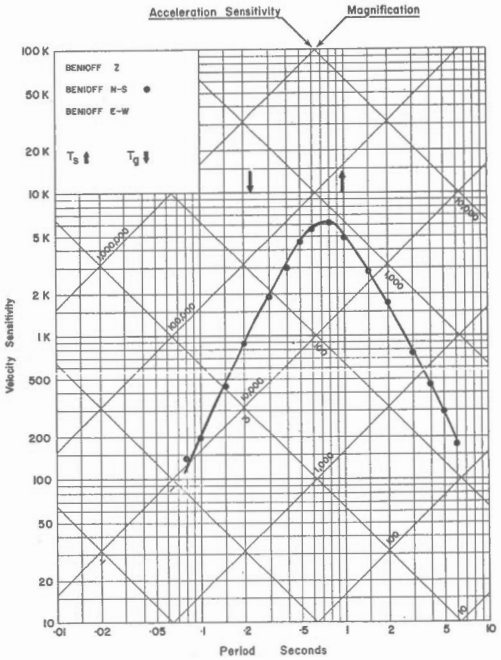
Dates of Calibration:

BENIOFF Z ● Oct. 1, 1971
BENIOFF N-S
BENIOFF E-W

STATION: VICTORIA, B.C. (VIC)

ϕ= 48°31'10"N λ= 123°24'55"W Altitude 197 M

Foundation: Quartz Diorite



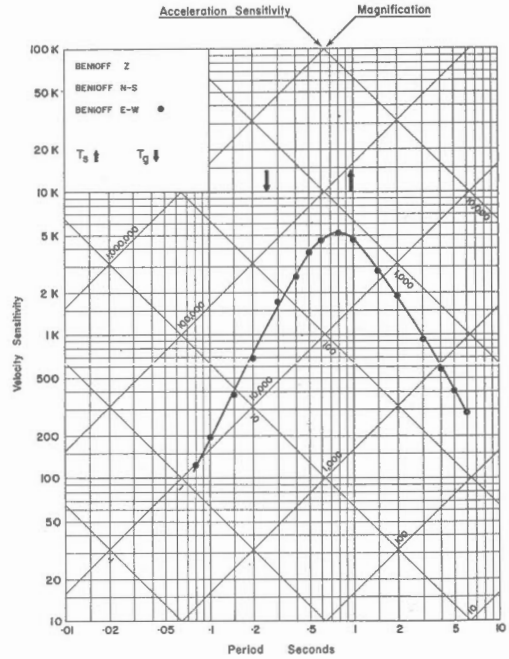
Dates of Calibration:

BENIOFF Z
BENIOFF N-S ● Dec. 10, 1971
BENIOFF E-W

STATION: VICTORIA, B.C. (VIC)

ϕ= 48°31'10"N λ= 123°24'55"W Altitude 197 M

Foundation: Quartz Diorite



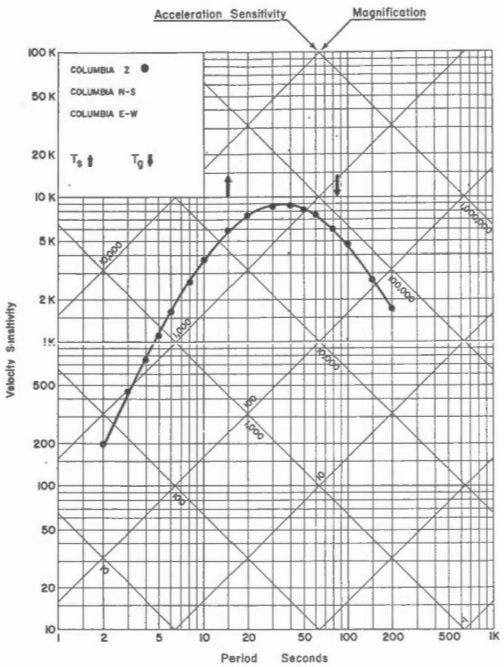
Dates of Calibration:

BENIOFF Z
BENIOFF N-S
BENIOFF E-W ● Dec. 10, 1971

STATION: VICTORIA, B.C. (VIC)

ϕ= 48°31'10"N λ= 123°24'55"W Altitude 197 M

Foundation: Quartz Diorite



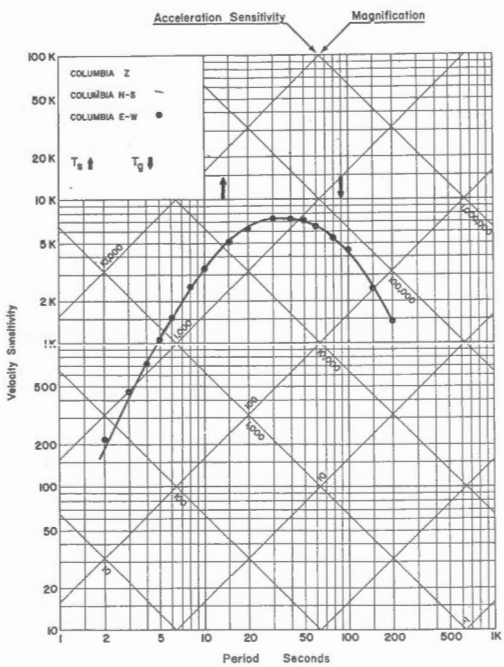
Dates of Calibration:

COLUMBIA Z ● Nov. 2, 1970
COLUMBIA N-S
COLUMBIA E-W

STATION: VICTORIA, B.C. (VIC)

ϕ= 48°31'10"N λ= 123°24'55"W Altitude 197 M

Foundation: Quartz Diorite



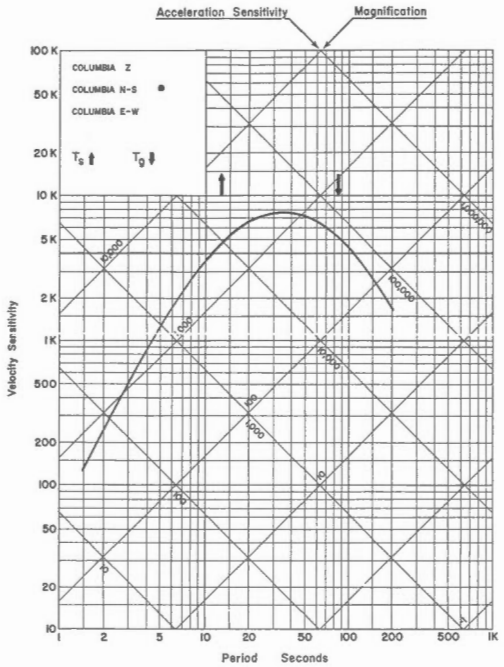
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W ● Jan. 28, 1972

STATION: VICTORIA, B.C (VIC)

ϕ= 48°31'10"N λ= 123°24'55"W Altitude 197 M

Foundation: Quartz Diorite



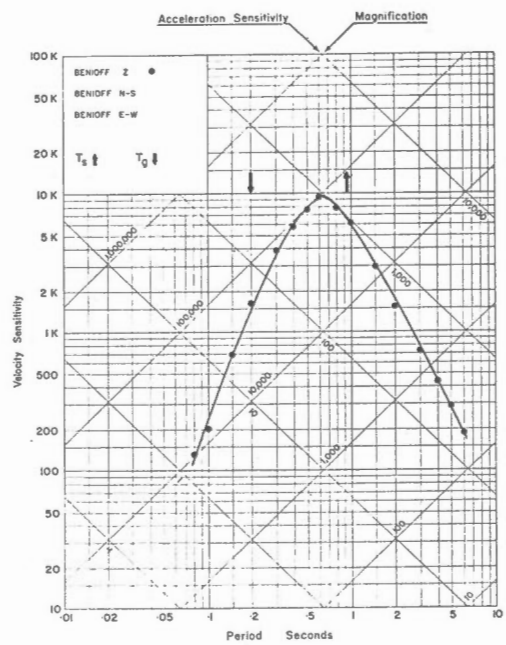
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S ● Nov. 7, 1972
COLUMBIA E-W

STATION: VICTORIA, B.C. (VIC)
(As Found and Left)

ϕ= 48°31'10"N λ=123°24'55"W Altitude 197 M

Foundation: Quartz Diorite



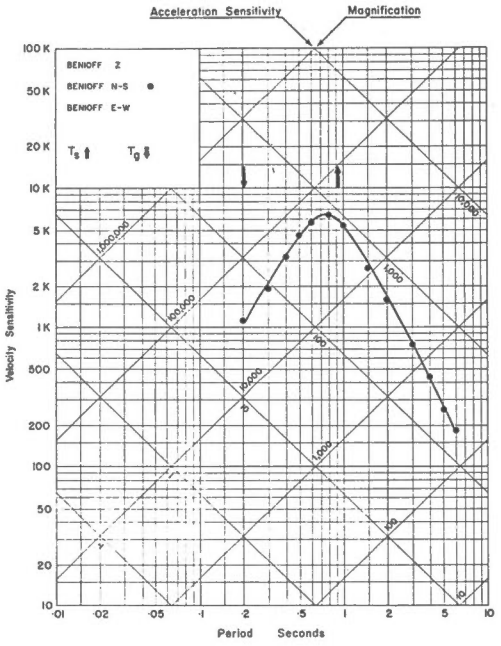
Dates of Calibration:

BENIOFF Z ● June 22, 1974
BENIOFF N-S
BENIOFF E-W

STATION: VICTORIA, B.C. (VIC)

ϕ= 48°31'10"N λ= 123°24'55"W Altitude 197 M

Foundation: Quarz Diorite



Dates of Calibration:

BENIOFF Z

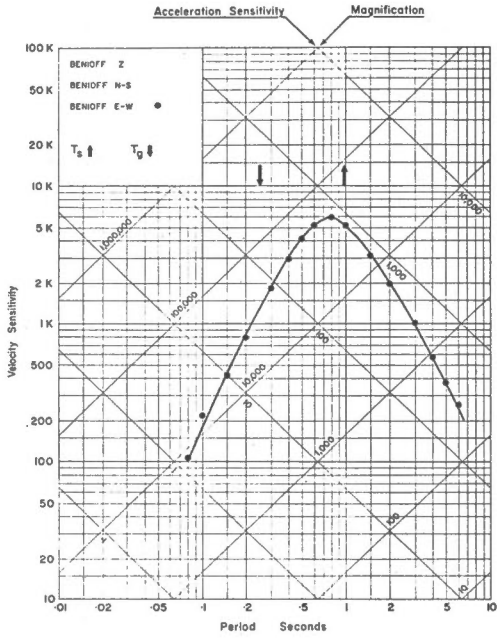
BENIOFF N-S • June 22, 1974

BENIOFF E-W

STATION: VICTORIA, B.C. (VIC)
(As found and left)

ϕ= 48°31'10"N λ= 123°24'55"W Altitude 197M

Foundation: Quartz Diorite



Dates of Calibration:

BENIOFF Z

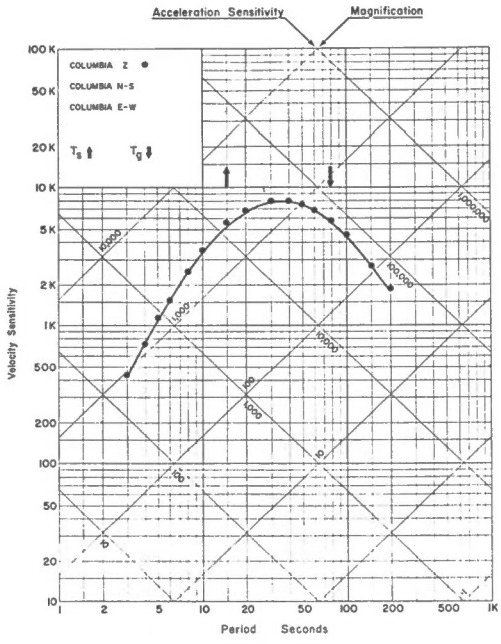
BENIOFF N-S

BENIOFF E-W • June 22, 1974

STATION: VICTORIA, B.C. (VIC)
(As found and left)

ϕ= 48°31'10"N λ= 123°24'55"W Altitude 197M

Foundation: Quartz Diorite



Dates of Calibration:

COLUMBIA Z • June 18, 1974

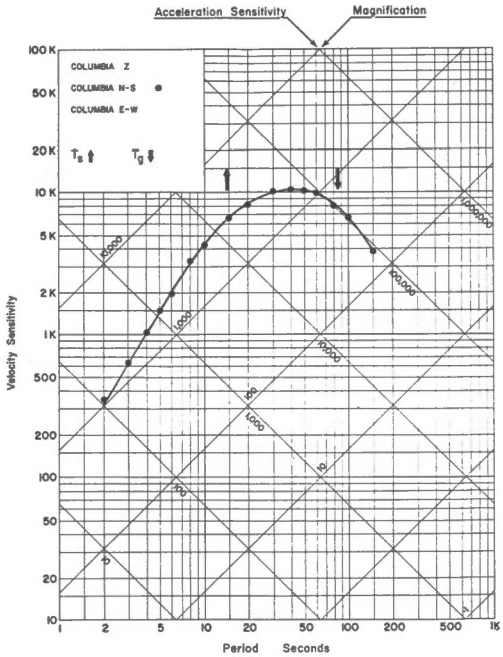
COLUMBIA N-S

COLUMBIA E-W

STATION: VICTORIA, B.C. (VIC)
(As found)

ϕ= 48°31'10"N λ= 123°24'55"W Altitude 197 M

Foundation: Quartz Diorite



Dates of Calibration:

COLUMBIA Z

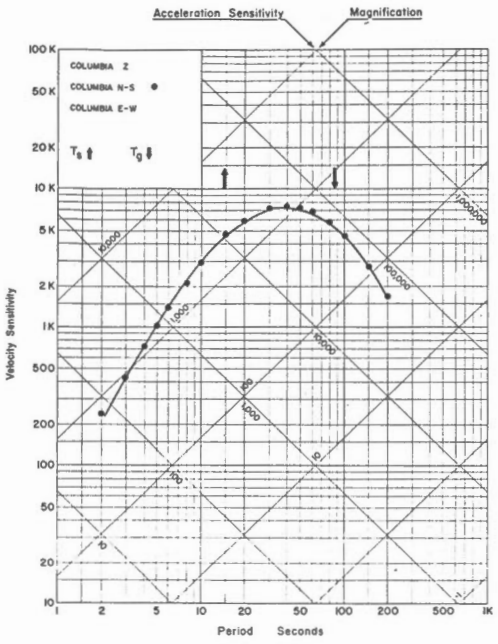
COLUMBIA N-S • June 19, 1974.

COLUMBIA E-W

STATION: VICTORIA, B.C. (VIC) FINAL

ϕ= 48°31'10"N λ=123°24'55"W Altitude 197 M

Foundation: Quartz Diorite



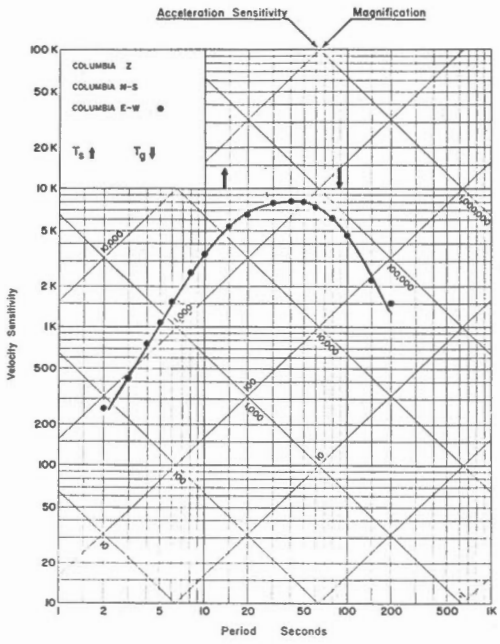
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S • June 20, 1974
COLUMBIA E-W

STATION: VICTORIA, B.C. (VIC)
(As found and left)

ϕ= 48°31'10"N λ=123°24'55"W Altitude 197 M

Foundation: Quartz Diorite



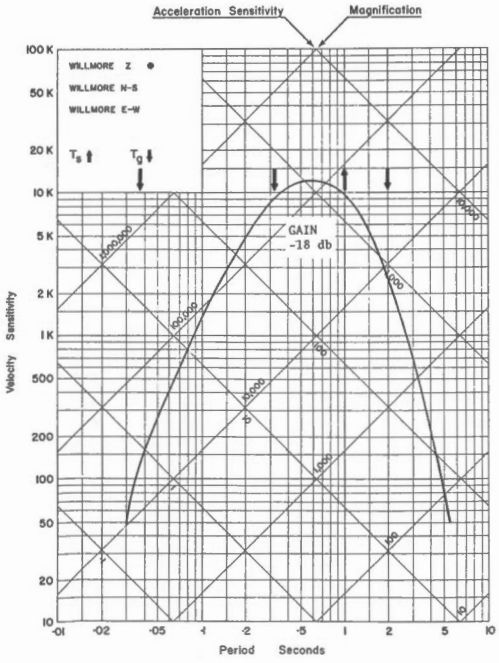
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S
COLUMBIA E-W • June 20, 1974

STATION: WHITEHORSE, Y.T. (WHC)

ϕ= 60°44.2'N λ= 135°05.9'W Altitude 732 M

Foundation: Granodiorite



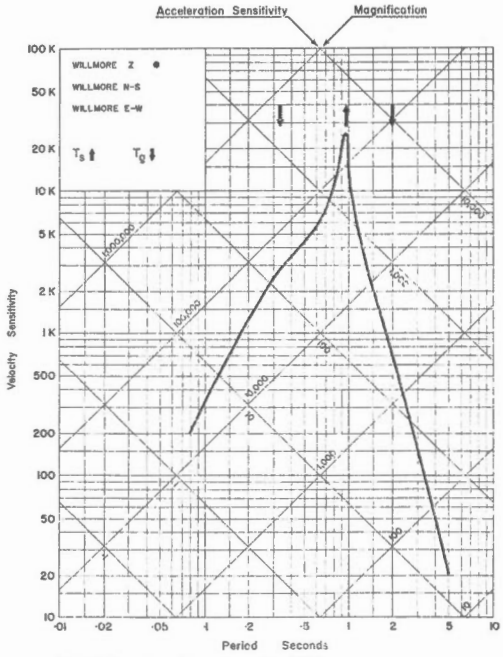
Dates of Calibration: Sept. 28, 1971

WILLMORE Z • Operating with a Teledyne EA310
WILLMORE N-S amplifier into helicorder.
WILLMORE E-W Corner frequencies indicated by "T_g" arrows.

STATION: WHITEHORSE, Y.T. (As found) (WHC)

ϕ= 60°44.2'N λ= 135°05.9'W Altitude 732 M

Foundation: Granodiorite



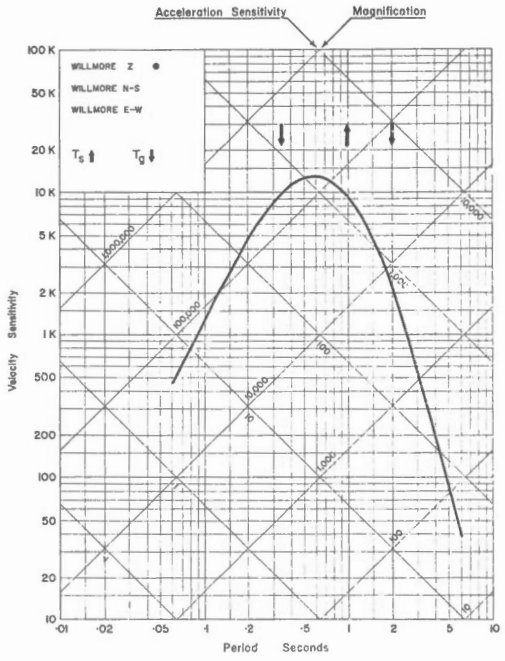
(Valid from Aug. 12 to Nov. 26, 1974)

SEISMOMETER: Willmore MkII T_s 0.96 D_s 1.07
G_L = 0.278 v.s./cm @ R_L = 545 ohms
AMPLIFIER: Teledyne EA310 - Gain 12.5K @ -18db
HELICORDER: RV301 - 1 cm/v
Corner frequencies indicated by "T_g" arrows.

STATION: WHITEHORSE, Y.T. (Final) (WHC)

ϕ= 60°44.2'N λ= 135°05.9'W Altitude 734 M

Foundation: Grandiorite



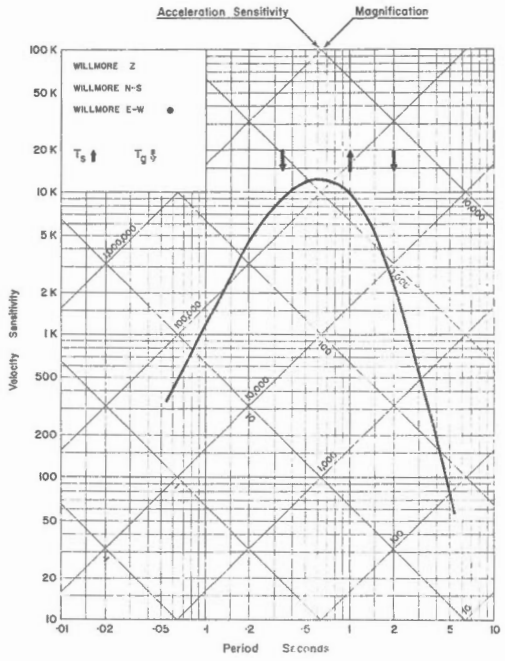
DATE OF CALIBRATION: November 28, 1974

SEISMOMETER: Willmore MKII T_s 0.96 D_s 0.68
G_L = 1.11 v.s./cm @ R_L = 545 ohms
AMPLIFIER: Teledyne EA310 - Gain 12.5K @ -18db
HELICORDER: RV301 - 1 cm/v
Corner frequencies indicated by "T_g" arrows.

STATION: WHITEHORSE, Y.T. (WHC)

ϕ= 60°44.2'N λ= 135°05.9'W Altitude 734 M

Foundation: Granodiorite



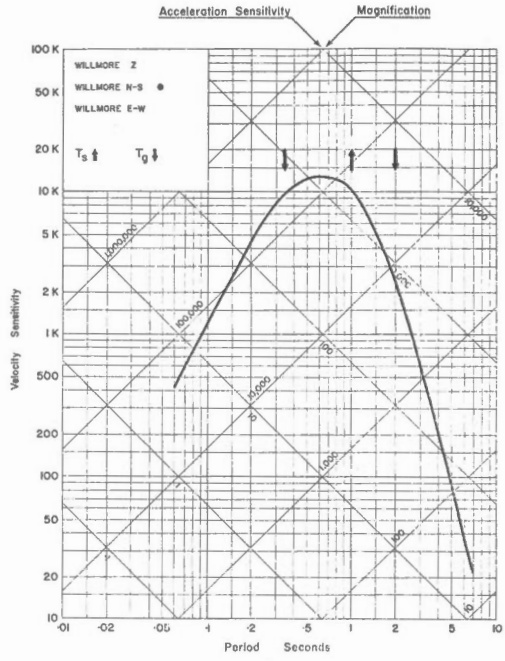
DATE OF CALIBRATION: November 28, 1974

SEISMOMETER: Willmore MKII T_s 1.0 D_s 0.61
G_L = 1.04 v.s./cm @ R_L = 545 ohms
AMPLIFIER: Teledyne EA310 - Gain 12.5K @ -18 db
HELICORDER: RV301 - 1 cm/v
Corner frequencies indicated by "T_g" arrows.

STATION: WHITEHORSE, Y.T. (WHC)

ϕ= 60°44.2'N λ= 135°05.9'W Altitude 734 M

Foundation: Granodiorite



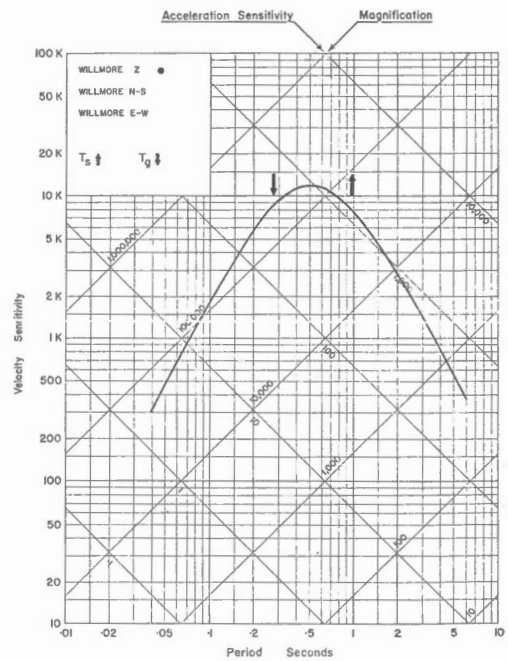
DATE OF CALIBRATION: November 28, 1974

SEISMOMETER: Willmore MKII T_s 1.0 D_s 0.60
G_L = 1.04 v.s./cm @ R_L = 545 ohms
AMPLIFIER: Teledyne EA310 - Gain 12.5K @ -18 db
HELICORDER: RV301 - 1 cm/v
Corner frequencies indicated by "T_g" arrows.

STATION: YELLOWKNIFE, N.W.T. (YKC)

ϕ= 62°28.7'N λ= 114°28.7'W Altitude 198 M

Foundation: Granite



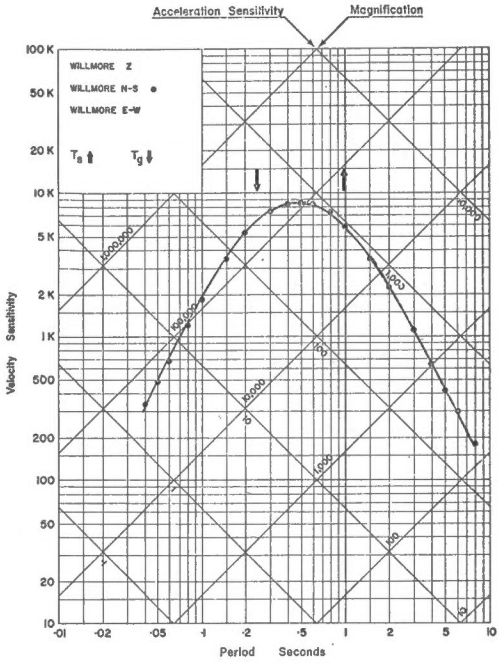
Dates of Calibration:

WILLMORE Z ● 23 July 1971
WILLMORE N-S
WILLMORE E-W

STATION: YELLOWKNIFE, N.W.T. (YKC)

ϕ= 62°28.7'N λ= 114°28.7'W Altitude 198M

Foundation: GRANITE



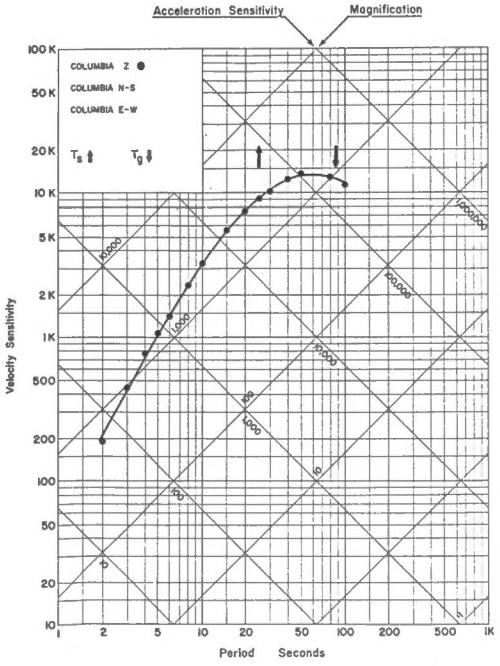
Dates of Calibration:

WILLMORE Z
WILLMORE N-S • APRIL 17, 1969
WILLMORE E-W

STATION: YELLOWKNIFE, N.W.T. (YKC)

ϕ= 62°28.7'N λ= 114°28.7'W Altitude 198 M

Foundation: GRANITE



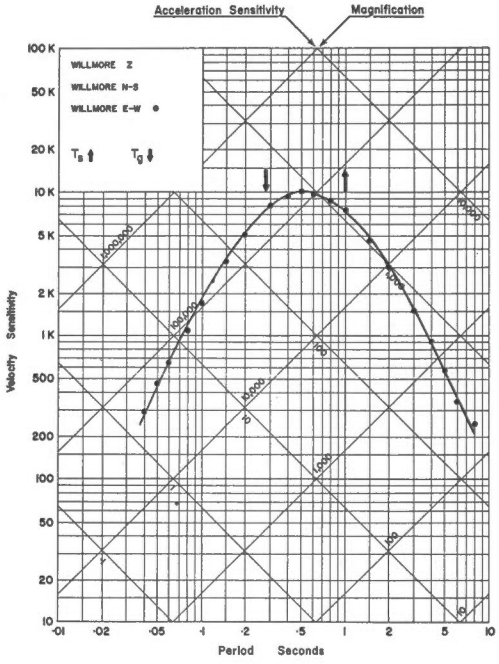
Dates of Calibration:

COLUMBIA Z • Feb. 5, 1971
COLUMBIA N-S
COLUMBIA E-W

STATION: YELLOWKNIFE, N.W.T. (YKC)

ϕ= 62°28.7'N λ= 114°28.7'W Altitude 198M

Foundation: GRANITE



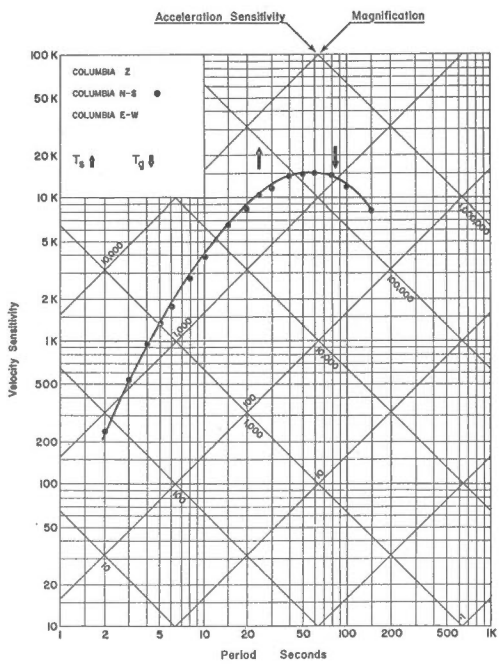
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W • APRIL 17, 1969

STATION: YELLOWKNIFE, N.W.T. (YKC)

ϕ= 62°28.7'N λ= 114°28.7'W Altitude 198M

Foundation:



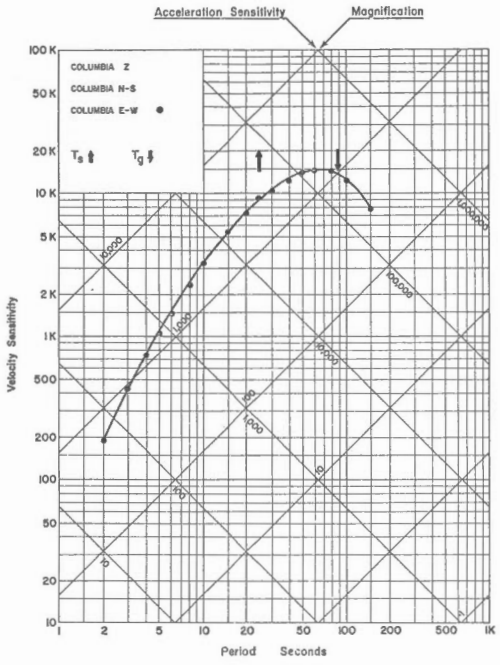
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S • APRIL 21, 1969
COLUMBIA E-W

STATION: YELLOWKNIFE, N.W.T. (YKC)

ϕ= 62°28.7'N λ= 114°28.7'W Altitude 198M

Foundation:



Dates of Calibration:

COLUMBIA Z

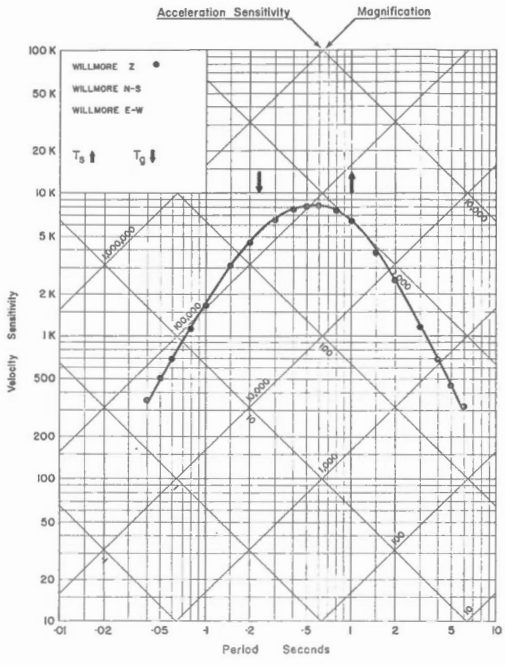
COLUMBIA N-S

COLUMBIA E-W • APRIL 22, 1969

STATION: YELLOWKNIFE, N.W.T. (YKC) As Found

ϕ= 62°28.7'N λ= 114°28.7'W Altitude 198 M

Foundation: Granite



Dates of Calibration:

WILLMORE Z • March 20, 1974

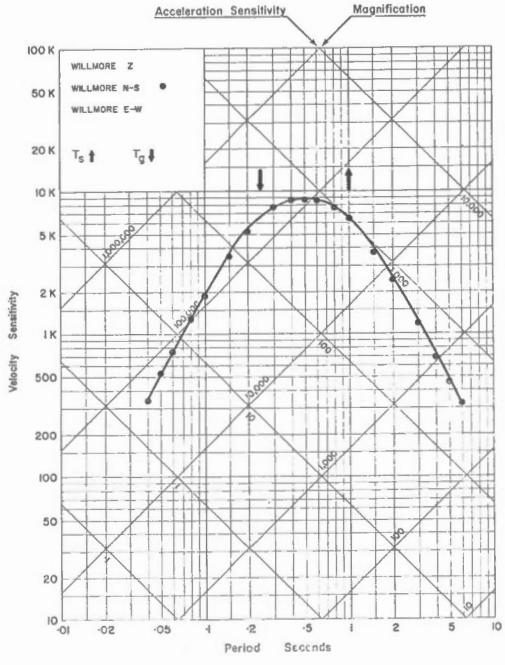
WILLMORE N-S

WILLMORE E-W

STATION: YELLOWKNIFE, N.W.T. (YKC) As Found

ϕ= 62°28.7'N λ= 144°28.7'W Altitude 198 M

Foundation: Granite



Dates of Calibration:

WILLMORE Z

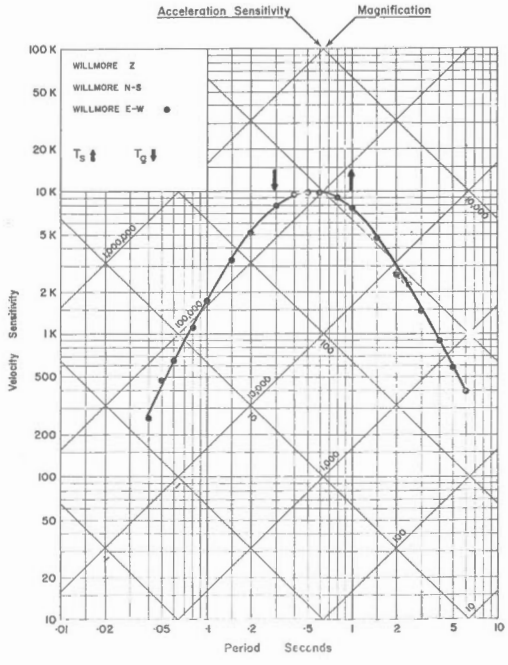
WILLMORE N-S • March 20, 1974

WILLMORE E-W

STATION: YELLOWKNIFE, N.W.T. (YKC) As Found

ϕ= 62°28.7'N λ= 144°28.7'W Altitude 198 M

Foundation: Granite



Dates of Calibration:

WILLMORE Z

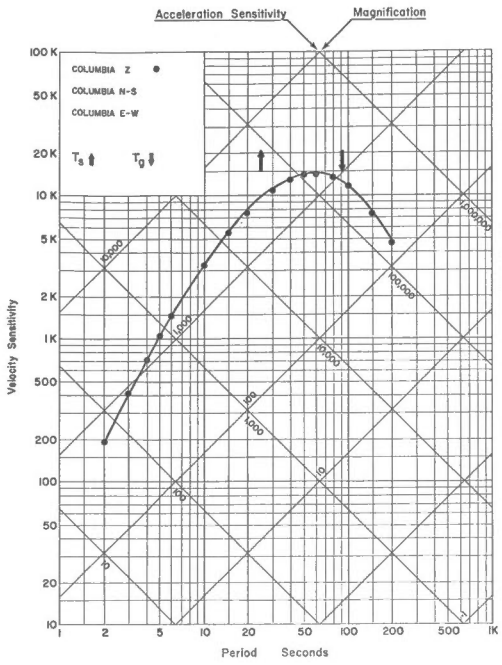
WILLMORE N-S

WILLMORE E-W • March 20, 1974

STATION: YELLOWKNIFE, N.W.T. (YKC) As Found

ϕ= 62°28.7'N λ= 144°28.7'W Altitude 198 M

Foundation: Granite



Dates of Calibration:

COLUMBIA Z ● March 22, 1974

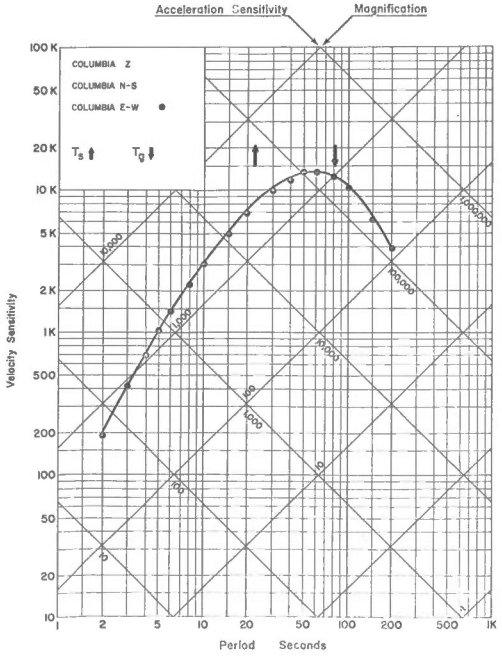
COLUMBIA N-S

COLUMBIA E-W

STATION: YELLOWKNIFE, N.W.T. (YKC) As Found

ϕ= 62°28.7'N λ= 144°28.7'W Altitude 198 M

Foundation: Granite



Dates of Calibration:

COLUMBIA Z

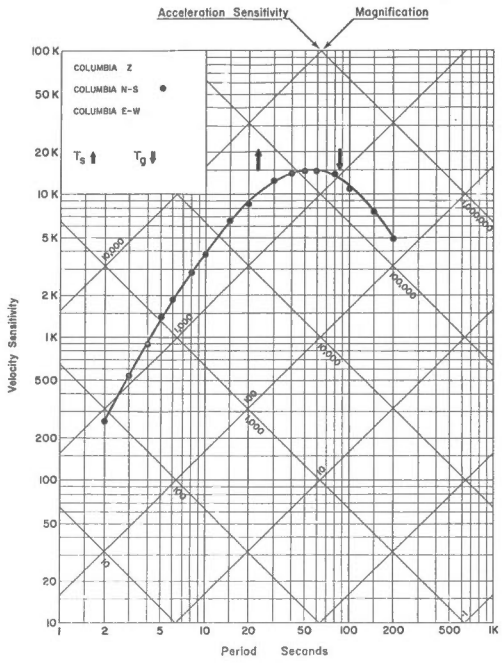
COLUMBIA N-S

COLUMBIA E-W ● March 22, 1974

STATION: YELLOWKNIFE, N.W.T. (YKC) As Found

ϕ= 62°28.7'N λ= 144°28.7'W Altitude 198 M

Foundation: Granite



Dates of Calibration:

COLUMBIA Z

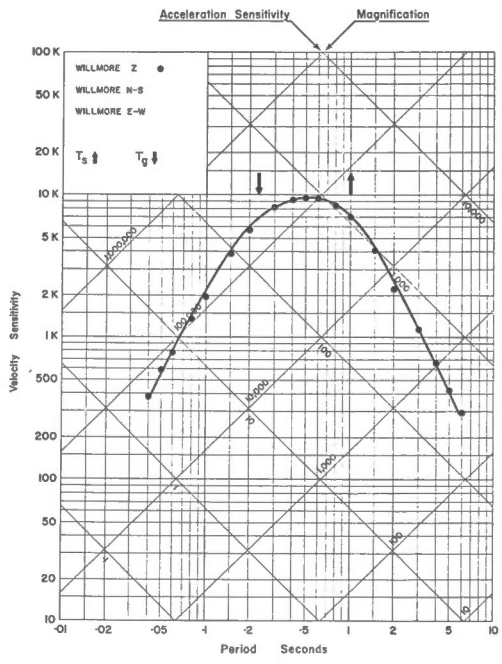
COLUMBIA N-S ● March 22, 1974

COLUMBIA E-W

STATION: YELLOWKNIFE, N.W.T. (YKC) Final

ϕ= 62°28.7'N λ= 144°28.7W Altitude 198 M

Foundation: Granite



Dates of Calibration:

WILLMORE Z ● March 23, 1974

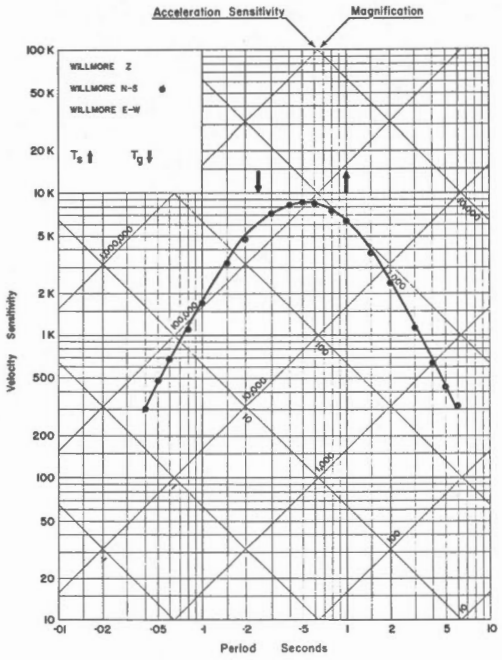
WILLMORE N-S

WILLMORE E-W

STATION: YELLOWKNIFE, N.W.T. (YKC) Final

ϕ= 62°28.7'N λ= 144°28.7'W Altitude 198 M

Foundation: Granite



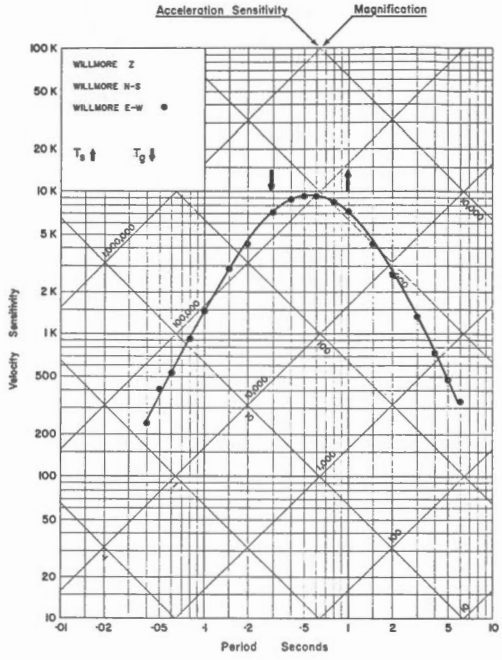
Dates of Calibration:

WILLMORE Z
WILLMORE N-S • March 23, 1974
WILLMORE E-W

STATION: YELLOWKNIFE, N.W.T. (YKC) Final

ϕ= 62°28.7'N λ= 144°28.7'W Altitude 198 M

Foundation: Granite



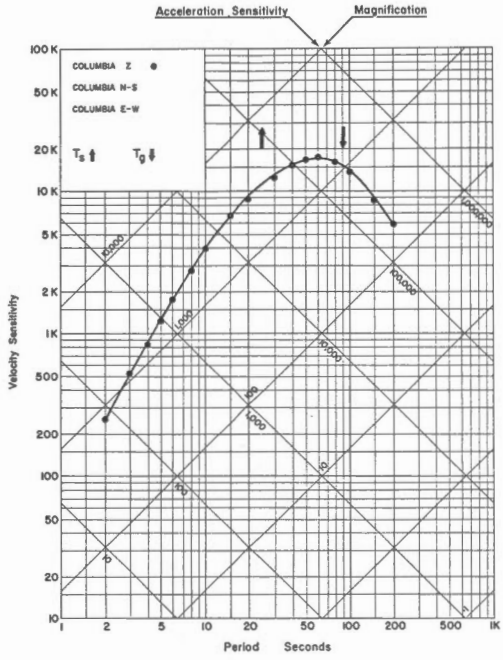
Dates of Calibration:

WILLMORE Z
WILLMORE N-S
WILLMORE E-W • March 23, 1974

STATION: YELLOWKNIFE, N.W.T. (YKC) Final

ϕ= 62°28.7'N λ= 144°28.7'W Altitude 198 M

Foundation: Granite



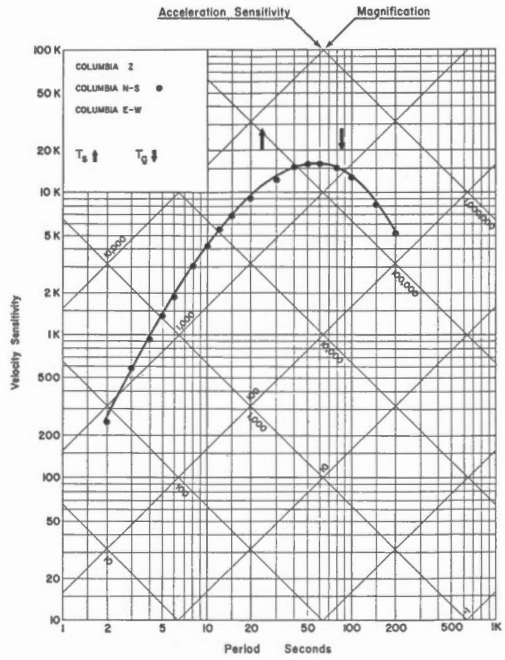
Dates of Calibration:

COLUMBIA Z • March 24, 1974
COLUMBIA N-S
COLUMBIA E-W

STATION: YELLOWKNIFE, N.W.T. (YKC) Final

ϕ= 62°28.7'N λ= 144°28.7'W Altitude 198 M

Foundation: Granite



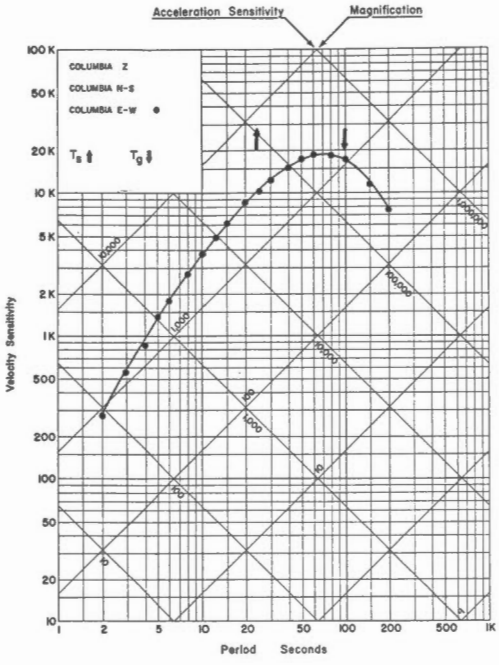
Dates of Calibration:

COLUMBIA Z
COLUMBIA N-S • March 25, 1974
COLUMBIA E-W

STATION: YELLOWKNIFE, N.W.T. (YKC) Final

ϕ= 62°28.7'N λ= 144°28.7'W Altitude 198 M

Foundation: Granite



Dates of Calibration:

COLUMBIA Z

COLUMBIA N-S

COLUMBIA E-W • March 25, 1974