

APPENDIX B

Data Sheets for Boreholes Planned to be Drilled in FY'93

APPENDIX B

~~920~~ 9306280275 -
PART 2

PLANNED DRILLING

ID: USW UZ-14

WBS No.: 1.2.3.5.3.5 - contractor support; 1.2.3.3.1.2.3 - testing
Study Plan No.: 8.3.1.2.2.3, "Characterization of Yucca Mountain Unsaturated Zone Percolation Surface Based Studies"
8.3.1.2.2.7, " Hydrochemical Characterization of Yucca Mountain"
SCP No.: 8.3.1.2.2.3.2 (Site Vertical Borehole Studies)
8.3.1.2.2.7.1 (Gaseous-Phase Chemical Investigations)
8.3.1.2.2.7.2 (Aqueous-Phase Chemical Investigations)

Lead Organization: USGS
Other Participants: LANL
Principal Investigator: (5 to 7); list:

Purpose: To collect information on hydrologic properties, moisture content, gas chemistry, and moisture potential in the Unsaturated Zone. To measure permeabilities of Unsaturated Zone and fractures.

Location: (Coordinates, plus description) ~N771276/E560221; on USW UZ-1 drill pad
Elevation:

Land Ownership:
Road Access: Existing road
Surface Preparation: Backfill soil remediation excavation; possibly regrade drilling pad
Disturbance Area: Uses existing drill pad, from USW UZ-1

Rig Size/ID: LM-300
Proposed Depth of Borehole: 1900-2000 feet
Finished Hole Size: Reamed to 12.25"
Minimum Core Size: HA-MD=2.5"
Drilling Fluids: Dry air, tagged
Tracers: Sulfur hexafluoride or other tracer gas added continuously to drilling air
Estimated Amount of Discharged Water:

Drilling Method: Dry core, reamed to water table

Well Construction Requirements: Case to ~5 feet below base of Qal/Qc; minimum of 25 feet. Steel casing, ID=18". Set casing with grout
Scheduled Start Date: Mid-June 1993
Scheduled Completion Date:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED BOREHOLE LOGGING, SAMPLING, AND TESTING

ID No.: USW UZ-14

Sample Collection and Sampling Interval: Continuous core, cuttings @ _____ feet intervals

Principal Organization/Investigator: USGS/

Surveying:

Geophysical Logging: Caliper, gamma-gamma (density), induction log, borehole video imaging camera (like Raax system), check-shot velocity, neutron, borehole gravimeter, spectral gamma, dielectric , magnetic field, magnetic susceptibility

Special Considerations:

Test A: **Matrix hydrologic properties**

Purpose:

Principal Organization/Investigator:

Specific Needs:

Method:

Equipment Needed:

- a.
- b.
- c.

Testing Interval:

Time Requirements:

Zone of Influence:

Possible Problems:

Support Needed:

ID No. SW UZ-14

Test B: Air permeability

Purpose:

Principal Organization/Investigator:

Specific Needs:

Method:

Equipment Needed:

a.

b.

c.

Testing Interval:

Time Requirements:

Zone of Influence:

Possible Problems:

Support Needed:

Test C: Hydrochemical analyses

Purpose:

Principal Organization/Investigator:

Specific Needs:

Method:

Equipment Needed:

a.

b.

c.

Testing Interval:

Time Requirements:

Zone of Influence:

Possible Problems:

Support Needed:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

ID No.: USW UZ-14

Test D: Gaseous phase circulation

Purpose:

Principal Organization/Investigator:

Specific Needs:

Method:

Equipment Needed:

a.

b.

c.

Testing Interval:

Time Requirements:

Zone of Influence:

Possible Problems:

Support Needed:

Test E: Geologic framework

Purpose:

Principal Organization/Investigator:

Specific Needs:

Method:

Equipment Needed:

a.

b.

c.

Testing Interval:

Time Requirements:

Zone of Influence:

Possible Problems:

Support Needed:

ID No. SW UZ-14

Test F: Mineralogy-petrology

Purpose:

Principal Organization/Investigator:

Specific Needs:

Method:

Equipment Needed:

a.

b.

c.

Testing Interval:

Time Requirements:

Zone of Influence:

Possible Problems:

Support Needed:

LOGISTICAL/SUPPORT EQUIPMENT AND SITE RESTORATION

Pre-Drilling Preparation:

During Drilling:

Pre-Testing:

During Testing:

Closure:

Restoration:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED DRILLING

ID: UE-25, UZ-16 (VSP-2)

WBS No.: 1.2.3.5.3.5 - Contractor Support
1.2.3.3.1.2.3 - Testing

Study Plan No.: 8.3.1.2.2.3, "Characterization of Yucca Mountain Unsaturated Zone Percolation Surface Based Studies"
8.3.1.2.2.7, "Hydrochemical Characterization of Yucca Mountain"

SCP No.: 8.3.1.2.2.3.2 (Site Vertical Borehole Studies)
8.3.1.2.2.7.1 (Gaseous-Phase Chemical Investigations)
8.3.1.2.2.7.2 (Aqueous Phase Chemical Investigations)

Lead Organization: USGS
Other Participants: LANL
Principal Investigator: (5 to 7); list:

Purpose: To collect information on hydrologic properties, moisture content, gas chemistry, and moisture potential in the UZ. To measure permeability of UZ and fractures.

VSP: to define major structures and stratigraphic features between boreholes UZ-16 and UZ-15; measure permeability of UZ and fractures. Collect halide, Cl-36 data for infiltration rates in unsaturated zone and across lithologic boundaries.

Location: (Coordinates, plus description) Area 25, Nye County, N 760,400 feet, E 565,000 feet, in small valley west of Exile Hill

Rationale for Location:

Elevation: 4020 ± 10 feet

Land Ownership:

Road Access: Existing road

Surface Preparation: No additional surface preparation required

Disturbance Area:

Rig Size/ID: LM-300

Proposed Depth of Borehole: 1635 feet

Finished Hole Size: Reamed to 12.25"

Minimum Core Size: HQ - MD = 2.5"

Drilling Fluids: Dry air, tagged

Tracers: Sulfur hexafluoride or other trace gas added continuously to drilling air

Estimated Amount of Discharged Water:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

ID: UE-25, UZ-16 (VSP-2)

Drilling Method: Dry cored, reamed to water table

Well Construction Requirements: Case to ~5 feet below base of Qal/Qc; minimum of 25 feet. Steel casing, ID=18". Set casing with grout.

Scheduled Start Date: May 27, 1992

Scheduled Completion Date: May, 1993

PLANNED BOREHOLE LOGGING, SAMPLING, AND TESTING

Sample Collection and Sampling Interval: Continuous core.

Principal Organization/Investigator:

Surveying: Run single shot directional survey @ every 100 feet as coring and reaming progresses downhole

Geophysical Logging: 11 different logs. Run after completion of drilling to TD

Special Considerations: Notify PI and stop coring immediately, if perched water encountered. Provide as straight (plumb) a hole as possible to prevent contact of geophones to wallrock during stemming.

Test A: Gas Chemical Sampling

Purpose:

Principal Organization/Investigator:

Specific Needs: Conduct 12 to 48 hours after drilling is completed.

Method:

Equipment Needed:

- a.
- b.
- c.

Testing Interval:

Time Requirements:

Zone of Influence:

Possible Problems:

Support Needed: RSN, SMF

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

ID: UE-25, UZ-16 (VSP-2)

Test B: In-hole Gas Sampling

Purpose:

Principal Organization/Investigator:

Specific Needs:

Method:

Equipment Needed:

a.

b.

c.

Testing Interval:

Time Requirements:

Zone of Influence:

Possible Problems:

Support Needed:

Test C: Air Permeability Testing

Purpose:

Principal Organization/Investigator:

Specific Needs:

Method:

Equipment Needed:

a.

b.

c.

Testing Interval:

Time Requirements:

Zone of Influence:

Possible Problems:

Support Needed:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

ID: UE-25, UZ-16 (VSP-2)

Test D: Vertical Seismic Profiling

Purpose:

Principal Organization/Investigator:

Specific Needs:

Method:

Equipment Needed:

a.

b.

c.

Testing Interval:

Time Requirements:

Zone of Influence:

Possible Problems:

Support Needed:

LOGISTICAL/SUPPORT EQUIPMENT AND SITE RESTORATION

Pre-Drilling Preparation:

During Drilling:

Pre-Testing:

During Testing:

Closure:

Restoration:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED DRILLING

ID: UZN-39

WBS No.:

Study Plan No.: 8.3.1.2.2.1

SCP No.:

Lead Organization: USGS

Other Participants:

Principal Investigator: Alan Flint

Purpose: To characterize natural infiltration rates, water content, water potential and evapotranspiration of the surficial materials of Yucca Mountain under present climatic conditions

Location: (Coordinates, plus description) N756500/E614500

Rationale for Location:

Elevation:

Land Ownership: NTS

Road Access:

Surface Preparation: No grading required

Disturbance Area: up to 100 x 100 feet

Rig Size/ID: CME-850

Proposed Depth of Borehole: 125 feet

Finished Hole Size: 6"

Minimum Core Size: HQ-MD=2.5"

Drilling Fluids: Air

Tracers: None

Estimated Amount of Discharged Water:

Drilling Method: ODEX-115/Dry drilling

Well Construction Requirements: 5 1/2" OD steel casing to TD; cut easing off ~2' above ground; cover with locking cap

Scheduled Start Date:

Scheduled Completion Date:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED BOREHOLE LOGGING, SAMPLING, AND TESTING

ID No.: UZN-39

Sample Collection and Sampling Interval: Continuous core
Principal Organization/Investigator: USGS/Alan Flint
Surveying: As-built surveying required
Geophysical Logging:

Special Considerations:

Test A: Neutron moisture logging in the unsaturated zone

Purpose:

Principal Organization/Investigator:

Specific Needs:

Method:

Equipment Needed:

- a.
- b.
- c.

Testing Interval:

Time Requirements:

Zone of Influence:

Possible Problems:

Support Needed:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG
LOGISTICAL/SUPPORT EQUIPMENT AND SITE RESTORATION

ID No.: UZN-39

Pre-Drilling Preparation:

During Drilling:

Pre-Testing:

During Testing:

Closure:

Restoration:

PLANNED DRILLING

ID: UZN-62

WBS No.:

Study Plan No.: 8.3.1.2.2.1

SCP No.:

Lead Organization: USGS

Other Participants:

Principal Investigator: Alan Flint

Purpose: To characterize natural infiltration rates, water content, water potential and evapotranspiration of the surficial materials of Yucca Mountain under present climatic conditions

Location: (Coordinates, plus description) N755200/E558800

Rationale for Location:

Elevation:

Land Ownership: BLM

Road Access: Existing road part way

Surface Preparation: no grading required

Disturbance Area: up to 100 x 100 feet

Rig Size/ID: CME-850

Proposed Depth of Borehole: 60 feet

Finished Hole Size: 6"

Minimum Core Size: HQ-MD=2.5"

Drilling Fluids: Air

Tracers: None

Estimated Amount of Discharged Water:

Drilling Method: ODEX-115/dry drilling

Well Construction Requirements: 5 1/2" OD steel casing to TD; cut casing off ~2' above ground; cover with locking cap

Scheduled Start Date:

Scheduled Completion Date:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED BOREHOLE LOGGING, SAMPLING, AND TESTING

ID No.: UZN-62

Sample Collection and Sampling Interval: Continuous core
Principal Organization/Investigator: USGS/Alan Flint

Surveying: As-built surveying required
Geophysical Logging:

Special Considerations:

Test A: Neutron moisture logging in the unsaturated zone

Purpose:
Principal Organization/Investigator: USGS/Alan Flint

Specific Needs:
Method:
Equipment Needed:
a.
b.
c.

Testing Interval:
Time Requirements:
Zone of Influence:

Possible Problems:
Support Needed:

YMP SURFACE-BASED TESTING/REHOLE/DRILLING CATALOG

LOGISTICAL/SUPPORT EQUIPMENT AND SITE RESTORATION

ID No.: UZN-62

Pre-Drilling Preparation:

During Drilling:

Pre-Testing:

During Testing:

Closure:

Restoration:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED DRILLING

ID: UE-25 NRG-2

WBS No.:

Study Plan No.: 8.3.1.14.2.1

SCP No.:

Lead Organization: USGS

Other Participants:

Principal Investigator: Clay Hunter

Purposes: Rock properties, stratigraphy, and Bow Ridge fault zone

Location: (Coordinates, plus description) N765760/E569185; Bow Ridge Fault area

Rationale for Location: Located along north ramp alignment, offset approximately 40 feet to the north of centerline

Elevation:

Land Ownership: NTS

Road Access: Existing road available part way

Surface Preparation: Construct drill pad

Disturbance Area: Approximately 20 x 30 feet

Rig Size/ID: CME-850

Proposed Depth of Borehole: 210- feet; approximately 20 feet below planned invert

Finished Hole Size: 6"

Minimum Core Size: HQ-MD=2.5"

Drilling Fluids: Air

Tracers: Sulfur hexafluoride (SF₆)

Estimated Amount of Discharged Water:

Drilling Method: Dry drilling, reverse circulation; angled approximately 30° from vertical

Well Construction Requirements: ODEX casing to total depth

Start Date: January 8, 1993

Completion Date: January 28, 1993

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED BOREHOLE LOGGING, SAMPLING, AND TESTING

ID No.: UE-25 NRG-2

Sample Collection and Sampling Interval: Continuous core

Principal Organization/Investigator: Clay Hunter

Surveying: As-built surveying required

Geophysical Logging: Caliper, density, borehole video imaging camera, check-shot velocity, neutron, gyroscopic survey, total gamma, magnetic susceptibility

Special Considerations:

LOGISTICAL/SUPPORT EQUIPMENT AND SITE RESTORATION

Pre-Drilling Preparation:

During Drilling:

Pre-Testing:

During Testing:

Closure:

Restoration:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED DRILLING

ID: UE-25 NRG-3

WBS No.:

Study Plan No.: 8.3.1.14.2.1

SCP No.:

Lead Organization: USGS

Other Participants:

Principal Investigator: Clay Hunter

Purposes: Rock properties, stratigraphy, and presence of small faults

Location: (Coordinates, plus description) N766250/E568300; valley east of Azreal Ridge

Rationale for Location: Located along the north ramp tunnel alignment, offset approximately 40 feet to the north of centerline

Elevation:

Land Ownership: NTS

Road Access: Access road construction required

Surface Preparation: Construct drill pad

Disturbance Area: Up to 150 x 200 feet

Rig Size/ID: CME-850

Proposed Depth of Borehole: 475 feet; approximately 20 feet below planned invert

Finished Hole Size: 6"

Minimum Core Size: HQ-MD=2.5"

Drilling Fluids: Air

Tracers: Sulfur hexafluoride (SF₆)

Estimated Amount of Discharged Water:

Drilling Method: Dry drilling, reverse circulation; angled approximately 30° from vertical

Well Construction Requirements: ODEX casing to total depth

Scheduled Start Date: March 22, 1993

Scheduled Completion Date: April 26, 1993

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED BOREHOLE LOGGING, SAMPLING, AND TESTING

ID No.: UE-25 NRG-3

Sample Collection and Sampling Interval: Continuous core
Principal Organization/Investigator: USGS/Clay Hunter

Surveying: As-built survey required

Geophysical Logging: Caliper, density, borehole video imaging camera, check-shot velocity, neutron, gyroscopic survey, total gamma, magnetic susceptibility

Special Considerations:

LOGISTICAL/SUPPORT EQUIPMENT AND SITE RESTORATION

Pre-Drilling Preparation:

During Drilling:

Pre-Testing:

During Testing:

Closure:

Restoration:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED DRILLING

ID: UE-25 NRG-4

WBS No.:

Study Plan No.: 8.3.1.14.2.1

SCP No.:

Lead Organization: USGS

Other Participants:

Principal Investigator: Clay Hunter

Purpose: Rock properties, stratigraphy, especially the thickness and character bedded tuffs between the Tiva and Topopah

Location: (Coordinates, plus description) N767080/E566820; Azreal Ridge

Rationale for Location: Located along north ramp alignment; offset approximately 40 feet to the north of centerline

Elevation:

Land Ownership: NTS

Road Access: Access road construction required

Surface Preparation: Constant drill pad

Disturbance Area: Up to 150 x 200 feet

Rig Size/ID: CME-850

Proposed Depth of Borehole: 735 feet; approximately 20 feet below planned invert

Finished Hole Size: 6"

Minimum Core Size: HQ-MD=2.5"

Drilling Fluids: Air

Tracers: Sulfur hexafluoride (SF₆)

Estimated Amount of Discharged Water:

Drilling Method: Dry drilling with reverse circulation into Topopah Spring member of the Paintbrush Tuff; dry drilling with conventional methods from there to total depth

Well Construction Requirements: ODEX casing into the top of the Topopah Spring member of the Paintbrush Tuff

Scheduled Start Date: May 4, 1993

Scheduled Completion Date: June 16, 1993

YMP SURFACE-BASED TESTIN REHOLE/DRILLING CATALOG

PLANNED BOREHOLE LOGGING, SAMPLING, AND TESTING

ID No.: UE-25 NRG-4

Sample Collection and Sampling Interval: Core 275'-735'; cuttings over remainder of hole

Principal Organization/Investigator: USGS/Clay Hunter

Surveying: As-built survey required

Geophysical Logging: Caliper, density, induction log, borehole video imaging camera, check-shot velocity, neutron, gyroscopic survey, total gamma, spectral gamma, magnetic susceptibility

Special Considerations:

LOGISTICAL/SUPPORT EQUIPMENT AND SITE RESTORATION

Pre-Drilling Preparation:

During Drilling:

Pre-Testing:

During Testing:

Closure:

Restoration:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED DRILLING

ID: UE-25 NRG-5

WBS No.:

Study Plan No.: 8.3.1.14.2.1

SCP No.:

Lead Organization: USGS

Other Participants:

Principal Investigator: Clay Hunter

Purpose: Rock properties, investigate bedded tuffs and contact between Tsw1 and Tsw2

Location: (Coordinates, plus description) N767790E564770

Rationale for Location: Located along the north ramp tunnel alignment; offset approximately 40 feet to the north of centerline

Elevation:

Land Ownership: NTS

Road Access: Existing road available part way

Surface Preparation: Construct drill pad

Disturbance Area: Up to 150 x 200 feet

Rig Size/ID: CME-850

Proposed Depth of Borehole: 1000 feet; approximately 20 feet below planned invert

Finished Hole Size: 6"

Minimum Core Size: HQ-MD=2.5"

Drilling Fluids: Air

Tracers: Sulfur hexafluoride (SF₆)

Estimated Amount of Discharged Water:

Drilling Method: Dry drilling with reverse circulation into Topopah Spring member of the Paintbrush Tuff, dry drilling with conventional methods from there to total depth

Well Construction Requirements: ODEX casing into the Topopah Spring member of the Paintbrush Tuff

Scheduled Start Date: March 11, 1993

Scheduled Completion Date: May 3, 1993

YMP SURFACE-BASED TESTING REHOLE/DRILLING CATALOG

PLANNED BOREHOLE LOGGING, SAMPLING, AND TESTING

ID No.: UE-25 NRG-5

Sample Collection and Sampling Interval: Core 0-300', 650-1000'; cuttings over remainder of hole
Principal Organization/Investigator: Clay Hunter

Surveying: As-built survey required

Geophysical Logging: Caliper, density, induction log, borehole video imaging camera, check-shot velocity, neutron, gyroscopic survey, total gamma, spectral gamma, magnetic susceptibility

Special Considerations:

LOGISTICAL/SUPPORT EQUIPMENT AND SITE RESTORATION

Pre-Drilling Preparation:

During Drilling:

Pre-Testing:

During Testing:

Closure:

Restoration:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED DRILLING

ID: USW NRG-6

WBS No.:

Study Plan No.: 8.3.1.14.2

SCP No.:

Lead Organization: USGS

Other Participants:

Principal Investigator: Clay Hunter

Purpose: Rock properties, investigate stratigraphy and fracture network for the ESF; investigate bedded tuffs and contact between Tsw1 and Tsw2

Location: (Coordinates, plus description) N776726/E564187

Rationale for Location: Located along north ramp alignment, off set approximately 40 feet to the right of centerline

Elevation:

Land Ownership: Nellis AFB

Road Access: Existing road part way

Surface Preparation: Construct drill pad

Disturbance Area: Up to 150 x 200 feet

Rig Size/ID: CME-850

Proposed Depth of Borehole: 1100 feet

Finished Hole Size: 6"

Minimum Core Size: HQ-MD=2.5"

Drilling Fluids: Air

Tracers: Sulfur hexafluoride (SF₆)

Estimated Amount of Discharged Water:

Drilling Method: ODEX

Well Construction Requirements: ODEX casing

Start Date: November 18, 1992

Scheduled Completion Date: March 10, 1993

YMP SURFACE-BASED TESTING REHOLE/DRILLING CATALOG

PLANNED BOREHOLE LOGGING, SAMPLING, AND TESTING

ID No.: USW NRG-6

Sample Collection and Sampling Interval: Continuous core

Principal Organization/Investigator: Clay Hunter

Surveying:

Geophysical Logging: Caliper, density, induction log, borehole video imaging camera, check-shot velocity, neutron, gyroscopic survey, total gamma, spectral gamma, magnetic susceptibility

Special Considerations:

LOGISTICAL/SUPPORT EQUIPMENT AND SITE RESTORATION

Pre-Drilling Preparation:

During Drilling:

Pre-Testing:

During Testing:

Closure:

Restoration:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED DRILLING

ID: USW SRG-5

WBS No.:

Study Plan No.: 8.3.1.14.2.1

SCP No.:

Lead Organization: USGS

Other Participants:

Principal Investigator: Clay Hunter

Purpose: Rock properties, investigate stratigraphy through the bedded tuffs, Tsw1 and Tsw2 contact

Location: (Coordinates, plus description) N758175/E558315; near crest of Yucca Mountain

Rationale for Location: Located along the south ramp alignment; offset approximately 40 feet to the right of centerline

Elevation:

Land Ownership: BLM

Road Access: Existing road available (Yucca Crest Road)

Surface Preparation: Construct drill pad

Disturbance Area: Up to 150 x 200 fet

Rig Size/ID: CME-850

Proposed Depth of Borehole: 1150 feet

Finished Hole Size: 6"

Minimum Core Size: HQ-MD=2.5"

Drilling Fluids: Air

Tracers: Sulfur hexafluoride (SF₆)

Estimated Amount of Discharged Water:

Drilling Method: ODEX

Well Construction Requirements: ODEX casing

Scheduled Start Date: July 1, 1993

Scheduled Completion Date:

YMP SURFACE-BASED TESTIN REHOLE/DRILLING CATALOG

PLANNED BOREHOLE LOGGING, SAMPLING, AND TESTING

ID No.: USW SRG-5

Sample Collection and Sampling Interval: Core 0-400', 750-1150'; cuttings over remainder of hole

Principal Organization/Investigator: USGS/Clay Hunter

Surveying:

Geophysical Logging: Caliper, density, induction log, borehole video imaging camera, check-shot velocity, neutron, gyroscopic suvey, total gamma, spectral gamma, magnetic susceptibility

Special Considerations:

LOGISTICAL/SUPPORT EQUIPMENT AND SITE RESTORATION

Pre-Drilling Preparation:

During Drilling:

Pre-Testing:

During Testing:

Closure:

Restoration:

YMP SURFACE-BASED TESTING BOREHOLE/DRILLING CATALOG

PLANNED BOREHOLE LOGGING, SAMPLING, AND TESTING

ID No.: USW SRG-5

Sample Collection and Sampling Interval: Core 0-400', 750-1150'; cuttings over remainder of hole

Principal Organization/Investigator: Clay Hunter

Surveying:

Geophysical Logging: Caliper, density, induction log, borehole video imaging camera, check-shot velocity, neutron, gyroscopic survey, total gamma, spectral gamma, magnetic susceptibility

Special Considerations:

LOGISTICAL/SUPPORT EQUIPMENT AND SITE RESTORATION

Pre-Drilling Preparation:

During Drilling:

Pre-Testing:

During Testing:

Closure:

Restoration:

APPENDIX C

Data Sheets for Trenches and Test Pits Planned for FY'93

~~9306084753 Part 2~~

TRENCH/TEST PIT CATALOG
Summary by Study

Trench/Test Pit Name	Study Supported	SP/WBS Reference	Proposed Time of Work
MWV T-3 (includes cleaning existing trench A-1)	Evaluating the location and recency of faulting near prospective surface facilities	SP 8.3.1.17.4.2/WBS 1.2.3.2.8.4.2	FY93
MWV T-8	"	"	"
Test Pit MWV -P11	"	"	"
MWV -P18	"	"	"
MWV -P27 to -P28	"	"	"
MWV -P34 to -P36	"	"	"
Test Pits PSF TP-1 to TP-6	Studies to provide soil and rock properties of potential locations of subsurface access facilities	SP 8.3.1.14.2/WBS 1.2.3.2.6.2	FY93
Test Pit BSF-TP-1 to 2 (booster station)	"	"	"

Trench/Test Pit Name	Study Supported	SP/WBS Reference	Proposed Time of Work
Trench BMT-1	Quaternary faulting within 100km of Yucca Mountain, including the Walker Lane	SP 8.3.1.17.4.3/WBS 1.2.3.2.8.4.3	FY93
Test Pit BMT-2	"	"	"
Trench SCF-T2	Quaternary Faulting within the site area	SP 8.3.1.17.4.6/WBS 1.2.3.2.8.4.6	FY93
Trench SCF-T3	"	"	"
Trench SCF-T4 to T6	"	"	"
Trench BRF-1	"	"	"
Trench FWF-T1	"	"	"
Trench WWF-T1	"	"	"
Additional cleanup work at existing trenches or exposures; including west side Busted Butte, trenches GA1A, GA1B; trench 12; and possibly parts of trenches SCR-T1 and SCR-T3	"	"	"
Sleeping Butte -1 to -10	Characterization of volcanic features	SP 8.3.1.8.5.1/WBS 1.2.3.2.5.5.1	FY93
Crater Flat -1 to -40	"	"	"

Trench/Test Pit Name	Study Supported	SP/WBS Reference	Proposed Time of Work
Trench RVF-T1	Quaternary strike-slip faulting proximal to the site within northeast-trending fault zones	SP 8.3.1.17.4.4/WBS 1.2.3.2.8.4.4	FY93

TRENCH/TEST PIT CATALOG
Study Summary

Study Name: Quaternary faulting within 100km of Yucca Mountain, including the Walker Lane

SP/WBS References: SP 8.3.1.17.4.3/WBS 1.2.3.2.8.4.3

Principal/Participatory Organizations: USGS/USBR

PI/Contact Officer (telephone number): John Whitney/Larry Anderson

(303-236-4195)

Trench/Test Pit Name	Approximate Location (Northing, Easting)	Estimated Pit Dimensions (m)	Planned Testing	Planned date
Trench BMT-1	Near mouth of Tarantula Canyon, on east side of Bare Mountain	15-20 x 5 x 3-4	Logging, sampling	FY93
BMT-2	Existing prospect pit directly east of Wildcat Mtn	"	"	FY93

TRENCH/TEST PIT CATALOG

Trench Summary Sheet

1) Name of Trench BMT-1

Purpose of Trench

Evaluate the potential for Quaternary activity on the Bare Mountain Fault

Study Supported

Quaternary faulting within 100km of Yucca Mountain, including the Walker Lane

SP reference/WBS reference

SP 8.3.1.17.4.3/WBS 1.2.3.2.8.4.3

2) Estimated Location by:

Northing, easting coordinates:

To be determined

Physical description, using common names:

Near mouth of Tarantula Canyon, on east side of Bare Mtn, approximately 20 to 50 feet south of existing dirt road

Reason why that location was chosen:

Potential for exposure of Bare Mountain Fault, based on previous work

3) Construction Parameters:

Dimensions of hole (2), (3):

50 x 1 x depth to be determined (m)

Excavation requirements:

Activities needed to restore site upon completion of tests:

Backfill and compact with backhoe

Logistical needs for access to trench location, excavation, and restoration upon completion of tests:

Land Access; Environmental clearance; backhoe with operators; laborers; as-built survey

Trench Summary Sheet Continued
Name of Trench: BMT-1

4) Testing Parameters:

Tests and sampling to be conducted at that trench (1), (2):
Geologic mapping, geologic logging and soil description, sampling for age dating

Logistical needs for testing and sampling (1):
Standard geological field equipment

5) Estimated Schedule:

Estimated start date (4):
4/15/93

Estimated duration of construction (2):
3 to 6 months

- Estimated sequence of activities at the trench (2):
- a) Excavation
 - b) Mapping
 - c) Description of soil profile and stratigraphic section
 - d) Backfilling

Notes/References:

- (1) Study Plan 8.3.1.17.4.3, R0: Quaternary faulting within 100km of Yucca Mountain, including the Walker Lane
- (2) USGS input to TPP92-17; letter dated 10/2/92
- (3) John Savino, personal communication, 1993
- (4) SAIC; Composite status of ENV/WI/TIF/TFM Analyses as of 1/28/93

TRENCH/TEST PIT CATALOG

Test Pit Summary Sheet

- 1) Name of Test Pit: BMT-2

Purpose of Test Pit:

Evaluate the potential for Quaternary activity on the Bare Mountain Fault

Study Supported

Quaternary faulting within 100km of Yucca Mountain, including the Walker Lane

SP reference/WBS reference

SP 8.3.1.17.4.3/WBS 1.2.3.2.8.4.3

- 2) Estimated Location by:

Northing, easting coordinates:

To be determined

Physical description, using common names:

Existing prospect pit directly east of Wildcat Mountain, approximately 3 1/2 miles north of Steve's Pass

Reason why that location was chosen (1), (2):

Potential for exposure of the Bare Mountain Fault, based on previous work

- 3) Construction Parameters:

Dimensions of hole:

Approximately 1.5 x 8 (m)

Excavation Requirements (2), (3):

Widen existing prospector pit
(hole will not be deepened)

Activities needed to restore site upon completion of tests (2):

Backfill probably not necessary, since pit already exists

Logistical needs for access to test pit location, excavation, and restoration upon completion of tests:

Land Access; Environmental clearance; backhoe with operators; laborers; as-built survey

Test Pit Activity Sheet Continued
Name of Test Pit: BMT-2

4) Testing Parameters:

Tests and sampling to be conducted at that test pit (1), (2):
Geological mapping, logging and soils description;
sampling for age-dating

Logistical needs for testing and sampling (1):
Standard geological field equipment

6) Estimated Schedule:

Estimated start and completion dates (4):
4/15/93

Estimated duration of construction (2):
Possibly indefinitely if hole need not be backfilled

- Estimated sequence of activities at the test pit:
- a) Excavation
 - b) Mapping
 - c) Description of soil profile and stratigraphic section
 - d) Backfilling

Notes/References:

- (1) Study Plan 8.3.1.17.4.3, R0: Quaternary faulting within 100km of Yucca Mountain, including the Walker Lane
- (2) USGS input to TPP92-17; letter dated 10/2/92
- (3) John Savino, personal communication, 1993
- (4) SAIC; Composite status of ENV/WI/TIF/TFM Analyses as of 1/28/93

TRENCH/TEST PIT CATALOG
Study Summary

Study Name: Evaluating the location and recency of faulting near prospective surface facilities

SP/WBS References: SP 8.3.1.17.4.2/WBS 1.2.3.2.8.4.2

Principal/Participatory Organizations: Geomatrix

PI/Contact Officer (telephone number): Bert Swan/John Wesling
(415-434-9400)

Trench/Test Pit Name	Approximate Location (Northing, Easting)	Estimated Pit Dimensions (m)	Planned Testing	Date Planned (FY)
Trench MWV -T3 (Alice Ridge)		approx. 30-50 x 1-2 x 3	geologic logging & Sampling	FY93
Trench End Points:				
East	N770730/E576300			
West	N770990/E575910			
Trench MWV -T8	To be determined	approx. 100 x 1-2 x 3	geologic logging & Sampling	FY93
Test Pit MWV-P11	N761120/E573015	approx. 10 x 1 x 3	geologic logging & Sampling	"

Trench/Test Pit Name	Approximate Location (Northing, Easting)	Estimated Pit Dimensions (m)	Planned Testing	Date Planned (FY)
-P18	N759705/E572935	"	"	proposed, low priority
-P27	N769910/E572580	"	"	"
-P28	N768320/E572465	"	"	"
-P34	N765155/E572275	"	"	FY93
-P35	N765155/E572990	"	"	"
-P36	N765140/E571990	"	"	"

TRENCH/TEST PIT CATALOG

Trench Summary Sheet

- 1) Name of Trenches MWV T-3, T-8

Purpose of Trenches

Gather information on the Paintbrush Canyon Fault and a possible buried bedrock fault in central Midway Valley; including fault orientation, location and width; and location, amounts, and directions of offsets of Quaternary datums

Study Supported

Evaluate the location and recency of faulting near prospective surface facilities

SP reference/WBS reference

SP 8.3.1.17.4.2/WBS 1.2.3.2.8.4.2

- 2) Estimated Location by:

Northing, easting coordinates (3), (4):

MWV-T3 east end; N770730/E576300
west end; N770990/E575910
MWV-T8 location to be determined

Physical description, using common names (4):

MWV-T3 east side of Alice Ridge
MWV-T8 approximately central Midway Valley

Reason why that location was chosen (4):

MWV-T3; location with respect to Paintbrush Canyon Fault and existing trench A-1
MWV-T8; location with respect to possible buried bedrock faulting in central Midway Valley, as indicated by geophysics

- 3) Construction Parameters:

Dimensions of hole (4):

MWV-T3; standard trench (SW), single bench
MWV-T8; approx. 100 x 1-2 x 3 (m)

Excavation requirements (4):

MWV-T2; to be determined
MWV-T3; standard trench (SW), single bench;
also clean existing trench A-1 during this effort
MWV-T8; standard trench (SW), single bench

Trench Summary Sheet Continued

Name of Trenches: MWV T-3, MWV T-8

Activities needed to restore site upon completion of tests:
Backfill and compact with backhoe

Logistical needs for access to trench/test pit location, excavation, and restoration upon completion of tests:
Environmental clearance; track-mounted backhoe, operating crew; laborers; fencing and possibly shoring if hole is to remain open; as-built survey

4) Testing Parameters:

Tests and sampling to be conducted at that trench pit:
geological logging and soil description;
sampling for age-dating

Logistical needs for testing and sampling:
Standard geological field equipment

5) Estimated Schedule:

Estimated start and completion dates:

Estimated duration of construction (4):
MWV-T3: 2-3 days
MWV-T8: 2-3 days

Estimated sequence of activities at the trenches (3):
a) Excavation
b) Mapping
c) Description of soil profile and stratigraphic section
d) Backfilling

Notes/References:

- (1) Study Plan 8.3.1.17.4.2: Evaluating the location and recency of faulting near prospective surface facilities
- (2) Criteria letter for SP 8.3.1.17.4.2
- (3) John Wesling, personal communication, 1993
- (4) Chris Menges, personal communication, 1993
- (5) Bert Swann, personal communication, 1993

TRENCH/TEST PIT CATALOG

Test Pit Summary Sheet

- 1) Name of Test Pits MWV-P11,P18; P27-P28; P34-P36

Purpose of Test Pits

To provide information on Quaternary soil stratigraphy and faulting, which will be used to support long trench studies

Study Supported

Evaluate the location and recency of faulting near prospective surface facilities

SP reference/WBS reference

SP 8.3.1.17.4.2/WBS 1.2.3.2.8.4.2

- 2) Estimated Location by (3):

Northing, easting coordinates:

P11: N761120/E573015	P18: N759705/E572935
P27: N769910/E572580	P28: N768320/E572465
P34: N765155/E572275	P35: N765155/E572990
P36: N765140/E571990	

Physical description, using common names:

Midway Valley

Reason why that location was chosen (5):

Locations may be subject to change based on results of ongoing investigations under this study

- 3) Construction Parameters:

Dimensions of hole (3):

Approximately 10 x 1 x 3 (m)

Excavation requirements:

Standard test pit; PI or representative present during excavation; as-built survey

Activities needed to restore site upon completion of tests:

Backfill and compact with backhoe

Logistical needs for access to trench/test pit location, excavation, and restoration upon completion of tests (2):

Environmental clearance;
track-mounted backhoe with operating crew;
laborers; fencing and possibly shoring if hole remains open; as-built survey

Test Pit Summary Sheet Continued

Name of Test Pits: MWV-P11,P18; P27-P28; P34-P36

4) Testing Parameters:

Tests and sampling to be conducted at that trench/test pit (1):
geologic logging and soil description;
sampling for age dating

Logistical needs for testing and sampling (1):
Standard geologic field equipment

6) Estimated Schedule (5):

Estimated start and completion dates:
To be determined

Estimated duration of construction:
To be determined

Estimated sequence of activities:
at the test pit (3):

- a) Excavation
- b) Mapping
- c) Description of soil profile and stratigraphic section
- d) Backfilling

Notes/References:

- (1) Study Plan 8.3.1.17.4.2: Evaluating the location and recency of faulting near prospective surface facilities
- (2) Criteria letter for SP 8.3.1.17.4.2
- (3) John Wesling, personal communication, 1993
- (4) Chris Menges, personal communication, 1993
- (5) Bert Swann, personal communication, 1993

TRENCH/TEST PIT CATALOG

Study Summary

Study Name: Studies to provide soil and rock properties of potential locations of subsurface access facilities

SP/WBS References: SP 8.3.1.14.2/WBS 1.2.3.2.6.2

Principal/Participatory Organizations: USGS

PI/Contact Officer (telephone number): Clay Hunter (303) 236-1123

Test Pit Name	Approximate Location (northing, Easting)	Estimated Pit Dimensions (m)	Planned Testing	Planned Date (FY)
PSF-TP-1	N764,760/E570,890	up to 1.2 x 6 x 1.5-4.5	geologic logging, sampling, in-situ percolation tests	FY93
PSF-TP-2	N764,750/E570,970	"	"	"
PSF-TP-3	N764,995/E570,880	"	"	"
PSF-TP-4	N764,995/E570,995	"	"	"

Test Pit Name	Approximate Location (northing, Easting)	Estimated Pit Dimensions (m)	Planned Testing	Planned Date (FY)
PSF-TP-5	N764,895/E571,10 0	"	"	"
PSF-TP-6	N764,895/E571,32 0	"	"	"
BSF-TP-1		"	To be determined	"
BSF-TP-2		"	"	"

TRENCH/TEST PIT CATALOG

Test Pit Summary Sheet

1) Name of Test Pits PSF TP-1 to TP-6

Purpose of test pits(1):

To provide soil and rock samples for testing of engineering properties
To conduct in-situ percolation tests for proposed leach field;
To identify faults

Study Supported

Studies to provide soil and rock properties of potential locations of subsurface access facilities

SP reference/WBS reference

SP 8.3.1.14.2, R0/WBS 1.2.3.2.6.2

2) Estimated Location by:

Northing, easting coordinates (2):

TP-1: N764,760/E570,890	TP-2: N764,750/E570,970
TP-3: N764,995/E570,880	TP-4: N764,995/E570,995
TP-5: N764,895/E571,100	TP-6: N764,895/E571,320

Physical description, using common names:

Near proposed surface facilities leach field

Reason why that location was chosen:

Location with respect to proposed surface facilities leach field

3) Construction Parameters (2):

Dimensions of hole:

up to 1.2 x 6 x 1.5-4.5 (m)

Excavation requirements:

Exploration locations must be surveyed before and after excavation. An area approximately 10 feet square adjacent to the deeper part of the test pit may have to be excavated as directed by the PI. Excavation of the pits will generally require equipment able to excavate to a depth of 4.5 meters. Methods or equipment should also be available to excavated well-cemented caliche if needed. Personnel access into the pits is required. Each pit must remain open until logging and sampling of the pit are completed.

Test Pit Summary Sheet Continued

Name of Test Pit: PSF TP-1 to TP-6

Activities needed to restore site upon completion of tests (2):

backfill and compact test pit with backhoe

Logistical needs for access to test pit location, excavation, and restoration upon completion of tests

Environmental clearance; tracked backhoe with 30 inch to 4 foot buckets and hoe-ram for breaking through caliche; possibly shoring; possibly fencing if pit is to remain open; as-built survey

4) Testing Parameters:

Tests and sampling to be conducted at that test pit (2):

Geologic logging and sampling, in-situ percolation tests

Logistical needs for testing and sampling (2):

Standard geologic field equipment;
Up to 150 gallons of water for percolation test

5) Estimated Schedule (3), (4):

Estimated start and completion dates: To be determined

Estimated duration of construction: To be determined

Estimated sequence of activities at the test pit:
To be determined

Notes/References:

- (1) Study Plan 8.3.1.14.2: Studies to provide soil and rock properties of potential locations of subsurface access facilities
- (2) Criteria letter for SP 8.3.1.14.2
- (3) Clay Hunter, personal communication, 1993
- (4) Mark McKeown, personal communication, 1993

TRENCH/TEST PIT CATALOG

Test Pit Summary Sheet

1) Name of Test Pit BSF-TP-1 to TP-2

Purpose of test pit (1), (4):
To provide soil and rock samples for testing
of engineering properties of proposed booster pump station
To identify faults

Study Supported
Studies to provide soil and rock properties for of
potential locations of subsurface access facilities

SP reference/WBS reference
SP 8.3.1.14.2/WBS 1.2.3.2.6.2

2) Estimated Location by:

Northing, easting coordinates: To be determined

Physical description, using common names:
Proposed booster pump station site

Reason why that location was chosen:
Location with respect to proposed booster pump station

3) Construction Parameters:

Dimensions of hole:

up to 1.2 x 6 x 1.5-4.5 (m)

Excavation requirements:
To be determined (3), (4)

Activities needed to restore site upon
completion of tests:
To be determined (3), (4)

Logistical needs for access to test pit location,
excavation, and restoration upon completion of tests
To be determined (3), (4)

Test Pit Summary Sheet Continued

Name of Test Pit: BSF TP-1 to TP-2

4) Testing Parameters:

Tests and sampling to be conducted at that test pit:
To be determined (3), (4)

Logistical needs for testing and sampling:
To be determined (3), (4)

5) Estimated Schedule: To be determined (3), (4)

Estimated start and completion dates:
Estimated duration of construction:
Estimated sequence of activities at the test pit:

Notes/References:

- (1) Study Plan 8.3.1.14.2: Studies to provide soil and rock properties of potential locations of subsurface access facilities
- (2) Criteria letter for SP 8.3.1.14.2
- (3) Clay Hunter, personal communication, 1993
- (4) Mark McKeown, personal communication, 1993

TRENCH/TEST PIT CATALOG
Study Summary

Study Name: Quaternary faulting within the site area

SP/WBS References: SP 8.3.1.17.4.6/WBS 1.2.3.2.8.4.6

Principal/Participatory Organizations: USGS

PI/Contact Officer (telephone number): John Whitney/Chris Menges
(702-794-7201)

Trench/Test Pit Name	Approximate Location (Northing, Easting to be determined)	Estimated Pit Dimensions (m)	Planned Testing	Date planned
Solitario Canyon Fault:				
Trench SCF-T2	Low bedrock ridge south of main Yucca Mountain Crest	up to 50 meters long	Geologic logging, mapping	FY93
SCF-T3	South of main Yucca Mountain crest, near USW WT-11 drill pad	50 x 1-2 x 3	"	"
SCF-T4	at base of Solitario Canyon escarpment	10-20 x 1-2 x 1.5-2	"	"
SCF-T5	"	"	"	"
SCF-T6	"	"	"	"
Bow Ridge Fault Zone:				

Trench/Test Pit Name	Approximate Location (Northing, Easting to be determined)	Estimated Pit Dimensions (m)	Planned Testing	Date planned
Trench BRF T-1	Southwest corner of Midway Valley	30-50 x 1-2 x 3	"	"
Fatigue Wash Fault:				
Trench FWF-T1	Central section of Fatigue Wash Fault, either north or south of main scarp	20-30 x 1-2 x 3	"	"
Windy Wash Fault Zone:				
Trench WWF-T1	possibly near south end of scarp towards Lathrop Wells cone	20-50 x 1-2 x 3	"	"
Additional cleanup work at existing trenches or exposures; including west side Busted Butte; trenches GA1A, GA1B; trench 12; and possibly parts of trenches SCR-T1 and SCR-T3				"

TRENCH/TEST PIT CATALOG

Trench Summary Sheet

- 1) Name of Trench SCF-T2

Purpose of Trench (1):

Evaluate the Solitario Canyon Fault; gather information including fault orientation and width, and locations, amounts, and directions of offset of Quaternary datums

Study Supported

Quaternary faulting within the site area

SP reference/WBS reference

SP 8.3.1.17.4.6/WBS 1.2.3.2.8.4.6

- 2) Estimated Location by:

Northing, easting coordinates:

To be determined

Physical description, using common names (2):

Along north section of low bedrock ridge, to south of main crest of Yucca Mountain

Reason why that location was chosen (1):

Selected based on work conducted previously as part of this study

- 3) Construction Parameters:

Dimensions of hole (2):

up to 50 meters long; may change slightly at the discretion of the onsite geologist.

Excavation requirements (2):

primarily cleaning and paving back of fault exposure in arroyo wall

Activities needed to restore site upon completion of tests:

backfill and compact with backhoe or bulldozer

Logistical needs for access to trench location, excavation, and restoration upon completion of tests (2):

Environmental clearance; track-mounted backhoe, operating crew, laborers

Trench Summary Sheet Continued

Name of Trench: SCF-T2

4) Testing Parameters:

Tests and sampling to be conducted at that trench (1):
geologic logging and soil description,
sampling for age dating

Logistical needs for testing and sampling (1):
standard geological field equipment

5) Estimated Schedule:

Estimated start date:
To be determined

Estimated duration of construction (2):
1-2 days

Estimated sequence of activities at the trench (2):
a) Excavation
b) Cleaning and flagging
c) Logging, soil description, and sampling
d) Backfilling

Notes/References:

- (1) Study Plan 8.3.1.17.4.6, R0: Quaternary faulting within the site area
- (2) Chris Menges, personal communication, 1993
- (3) Criteria letter for Quaternary faulting within the site area; dated May 13, 1992

TRENCH/TEST PIT CATALOG

Trench Summary Sheet

- 1) Name of Trench SCF-T3

Purpose of Trench (1):

Evaluate the Solitario Canyon Fault;
gather information including fault orientation and
width, and locations, amounts, and directions of offset
of Quaternary datums

Study Supported

Quaternary faulting within the site area

SP reference/WBS reference

SP 8.3.1.17.4.6/WBS 1.2.3.2.8.4.6

- 2) Estimated Location by:

Northing, easting coordinates: To be determined

Physical description, using common names (2):

To be determined; at base of escarpment to south of
main crest of Yucca Mountain, near drillpad USW WT-11

Reason why that location was chosen (1):

Selected based on field work conducted previously as
part of this study

- 3) Construction Parameters:

Dimensions of hole (2):

50 x 1-2 x 3 (m); may change slightly
at the discretion of the onsite geologist.

Excavation requirements (2):

Standard trench, single bench (if feasible)

Activities needed to restore site upon
completion of tests:

backfill and compact with backhoe or bulldozer

Logistical needs for access to trench location,
excavation, and restoration upon completion
of tests (1), (2):

Environmental permit; track-mounted backhoe, operating
crew, laborers; as-built survey

Trench Summary Sheet Continued

Name of Trench: SCF-T3

4) Testing Parameters:

Tests and sampling to be conducted at that trench (1):
geologic logging and soil description,
sampling for age dating

Logistical needs for testing and sampling (1):
standard geological field equipment

5) Estimated Schedule:

Estimated start date: To be determined

Estimated duration of construction activities (2):
2-3 days

Estimated sequence of activities at the trench (2):

- a) Excavation
- b) Cleaning and flagging
- c) Logging, soil description, and sampling
- d) Backfilling

Notes/References:

- (1) Study Plan 8.3.1.17.4.6, R0: Quaternary faulting within the site area
- (2) Chris Menges, personal communication, 1993
- (3) Criteria letter for Quaternary faulting within the site area; letter dated May 13, 1992

TRENCH/TEST PIT/PAVEMENT CATALOG

Trench Summary Sheet

- 1) Name of Trench SCF-T4 to T6

Purpose of Trench (1):

Evaluate the Solitario Canyon Fault;
gather information including fault orientation
and width, and locations, amounts, and directions
of offset of Quaternary datums.

Study Supported

Quaternary faulting within the site area

SP reference/WBS reference

SP 8.3.1.17.4.6/WBS 1.2.3.2.8.4.6

- 2) Estimated Location by:

Northing, easting coordinates: To be determined

Physical description, using common names (2):

2-3 sites to be selected along base of Solitario
Canyon escarpment; one site probably located upstream
from existing trench 10B

Reason why that location was chosen (1):

Selected based on field work conducted previously as
part of this study

- 3) Construction Parameters:

Dimensions of hole (2):

10-20 x 1-2 x 1.5-2(m); may change slightly at the
discretion of the onsite geologist.

Excavation requirements (2):

small trenches with no or only small benches; also
cleaning existing trench 10B

Activities needed to restore site upon
completion of tests:

backfill and compact with backhoe or bulldozer

Logistical needs for access to trench,
location, excavation, and restoration upon
completion of tests (2):

Environmental permit; track-mounted backhoe, operating
crew, laborers; as-built survey

Trench Summary Sheet Continued

Name of Trenches: SCF-T4 to T6

4) Testing Parameters:

Tests and sampling to be conducted at those trenches (1):
geologic logging and soils description,
sampling for age-dating

Logistical needs for testing and sampling (1):
standard geological field equipment

5) Estimated Schedule:

Estimated start date:
To be determined

Estimated duration of construction:
4-5 days for all sites

Estimated sequence of activities at the trench:
a) Excavation
b) Cleaning and flagging
c) Logging, soil description, and sampling
d) Backfilling

Notes/References:

- (1) Study Plan 8.3.1.17.4.6, R0: Quaternary faulting within the site area
- (2) Chris Menges, personal communication, 1993
- (3) Criteria letter for Quaternary faulting within the site area; letter dated May 13, 1992

TRENCH/TEST PIT/PAVEMENT CATALOG

Trench Summary Sheet

- 1) Name of Trench FWF-T1

Purpose of Trench (1):

Evaluate the Fatigue Wash Fault; gather information including fault orientation and width, and locations, amounts, and directions of offset of Quaternary datums

Study Supported

Quaternary faulting within the site area

SP reference/WBS reference

SP 8.3.1.17.4.6/WBS 1.2.3.2.8.4.6

- 2) Estimated Location by:

Northing, easting coordinates: To be determined

Physical description, using common names (2):

Central segment of Fatigue Wash Fault Zone, either north end of main piedmont fault scarp, or nearby antithetic (E-facing) fault scarp

Reason why that location was chosen (1):

Selected based on field work conducted previously as part of this study

- 3) Construction Parameters:

Dimensions of hole (2):

20-30 x 1-2 x 3 (m); may change slightly at the discretion of the onsite geologist.

Excavation requirements (2):

Standard trench, single bench

Activities needed to restore site

upon completion of tests:

backfill and compact with backhoe or bulldozer

Logistical needs for access to trench

location, excavation, and restoration

upon completion of tests (2):

Environmental clearance; Track-mounted backhoe, but may need bulldozer if thick calcrete, operating crew, laborers, possibly some shoring required, as-built survey

Trench Summary Sheet Continued
Name of Trench: FWF-T1

4) Testing Parameters:

Tests and sampling to be conducted at that trench (1):
Geologic logging and soils description,
sampling for age dating

Logistical needs for testing and sampling (1):
standard geological field equipment

5) Estimated Schedule:

Estimated start date:
To be determined

Estimated duration of construction:
2-3 days

Estimated sequence of activities at the trench:

- a) Excavation
- b) Cleaning and flagging
- c) Logging, soil description, and sampling
- d) Backfilling

Notes/References:

- (1) Study Plan 8.3.1.17.4.6, R0: Quaternary faulting within the site area
- (2) Chris Menges, personal communication, 1993
- (3) Criteria letter for Quaternary faulting within the site area; letter dated May 13, 1992

TRENCH/TEST PIT/PAVEMENT CATALOG

Trench Summary Sheet

- 1) Name of Trench WWF-T1

Purpose of Trench (1):

Evaluate the Windy Wash Fault; gather information including fault orientation and width, and locations, amounts, and directions of offset of Quaternary datums

Study Supported

Quaternary faulting within the site area

SP reference/WBS reference

SP 8.3.1.17.4.6/WBS 1.2.3.2.8.4.6

- 2) Estimated Location by:

Northing, easting coordinates: To be determined

Physical description, using common names (2):

Possibly near south end of Windy Wash Fault where it crosses escarpment toward Lathrop Wells Cone

Reason why that location was chosen (1):

Selected based on field work conducted previously as part of this study

- 3) Construction Parameters:

Dimensions of hole (2):

20-50 x 1-2 x 3(m); may change slightly at the discretion of the onsite geologist.

Excavation requirements (2):

Standard trench, single bench

Activities needed to restore site upon completion of tests:

backfill and compact with backhoe or bulldozer

Logistical needs for access to trench location, excavation, and restoration upon completion of tests (2):

Environmental clearance; track-mounted backhoe (or possibly a bulldozer), operating crew; laborers

Trench Summary Sheet Continued

Name of Trench: WWF-T1

4) Testing Parameters:

Tests and sampling to be conducted at that trench (1):
geologic logging and soils description,
sampling for age dating

Logistical needs for testing and sampling (1):
standard geological field equipment

5) Estimated Schedule:

Estimated start date: To be determined

Estimated duration of construction activities:
2-4 days

Estimated sequence of activities at the trench:
a) Excavation
b) Cleaning and flagging
c) Logging, soil description, and sampling
d) Backfilling

Notes/References:

- (1) Study Plan 8.3.1.17.4.6, R0: Quaternary faulting within the site area
- (2) Chris Menges, personal communication, 1993
- (3) Criteria letter for Quaternary faulting within the site area; letter dated May 13, 1992

TRENCH/TEST PIT/PAVEMENT CATALOG

Trench Summary Sheet

- 1) Name of Trench BRF-T1

Purpose of Trench (1):

Evaluate the Bow Ridge Fault; gather information including fault orientation and width, and locations, amounts, and directions of offset of Quaternary datums.

Study Supported

Quaternary faulting within the site area

SP reference/WBS reference

SP 8.3.1.17.4.6/WBS 1.2.3.2.8.4.6

- 2) Estimated Location by:

Northing, easting coordinates: To be determined

Physical description, using common names (2):

Southwest corner of Midway Valley

Reason why that location was chosen (1):

Selected based on field work conducted previously as part of this

- 3) Construction Parameters:

Dimensions of hole (2):

30-50 x 1-2 x 3 (m); may change slightly at the discretion of the onsite geologist

Excavation requirements (2):

Standard trench, single bench

Activities needed to restore site upon completion of tests:

backfill and compact with backhoe or bulldoz

Logistical needs for access to trench location, excavation, and restoration upon completion of tests (2):

Track-mounted backhoe, operating crew; laborers

Trench Summary Sheet Continued

Name of Trench: BRF-T1

4) Testing Parameters:

Tests and sampling to be conducted
at that trench (1):
geologic logging and soil description,
sampling for age-dating

Logistical needs for testing and sampling (1):
standard geological field equipment

5) Estimated Schedule:

Estimated start date: To be determined

Estimated duration of construction
activities (2):
2-3 days

Estimated sequence of activities at the trench:
a) Excavation
b) Cleaning and flagging
c) Logging, soil description, and sampling
d) Backfilling

Notes/References:

- (1) Study Plan 8.3.1.17.4.6, R0: Quaternary faulting within the site area
- (2) Chris Menges, personal communication, 1993
- (3) Criteria letter for Quaternary faulting within the site area; letter dated May 13, 1992

TRENCH/TEST PIT CATALOG
Study Summary

Study Name: Characterization of volcanic features

SP/WBS References: SP 8.3.1.8.5.1/WBS 1.2.3.2.5.5.1

Principal/Participatory Organizations: LANL

PI/Contact Officer (telephone number):

Bruce Crowe/Andrew Burningham
(702) 794-7155

Trench/Test Pit Name	Approximate Location (Northing, Easting)	Estimated Pit Dimensions (m)	Planned Testing	Date Finished (d/m/yr) / Date Planned (FY)
Sleeping Butte -1 to -10	Sleeping Butte	1.5 x 1 x 3	geologic logging, sampling	FY93
Crater Flat -1 to -40	Crater Flat	1.5 x 1 x 3	"	FY93

TRENCH/TEST PIT CATALOG

Test Pit Summary Sheet

- 1) Name of Test Pits: Sleeping Butte -1 to -10

Purpose of Test Pits (1):

Mapping and sampling of volcanic deposits and their alteration, for use in volcanic stratigraphic correlation and dating

Study Supported

Characterization of volcanic features

SP reference/WBS reference

SP 8.3.1.8.5.1/WBS 1.2.3.2.5.5.1

- 2) Estimated Location by (2):

Northing, easting coordinates:

To be determined

Physical description, using common names:

Study area covers approximately the northern half of Sleeping Butte and its margin; exact location of each test pit to be established once field work begins

Reason why that location was chosen (3):

Location with respect to volcanic landform (Sleeping Butte)

- 3) Construction Parameters:

Dimensions of hole(s) (2):

1.5x1x3 (m)

Excavation requirements (3):

Holes are to be backfilled within 2 days of opening

Activities needed to restore site

upon completion of tests (1), (3):

Backfill and compact with backhoe

Logistical needs for access to test pit

location, excavation, and restoration

upon completion of tests (2), (3):

Land access and environmental surveys;
four-wheel drive truck mounted backhoe

Test Pit Summary Sheet Continued

Name of Test Pits: Sleeping Butte -1 to -10

4) Testing Parameters:

Tests and sampling to be conducted at that
test pit (1), (3):

Geological logging and sampling for age dating;
paleomagnetic sampling

Logistical needs for testing and sampling (1), (3):

Standard geologic and paleomagnetic
field equipment

5) Estimated Schedule:

Estimated start date (3):

3/93

Estimated duration of construction (3):

2 days

Estimated sequence of activities at
the test pit (3):

- a) Excavation
- b) Geologic mapping, logging, and sampling
- c) Soils Description

Notes/References:

- (1) Study Plan 8.3.1.8.5.1, R0: Characterization of volcanic features
- (2) Draft of Addendum III to TPP91-32
- (3) Andrew Burningham, personal communication, 1993

TRENCH/TEST PIT CATALOG CATALOG
Test Pit Summary Sheet

1) Name of Test Pits: Crater Flat -1 to -40

Purpose of Test Pits (1), (3):

Mapping and sampling of volcanic deposits and their alteration, for use in volcanic stratigraphic correlation and dating

Study Supported

Characterization of volcanic features

SP reference/WBS reference

SP 8.3.1.8.5.1/WBS 1.2.3.2.5.5.1

2) Estimated Location by:

Northing, easting coordinates (2), (3):
To be determined

Physical description, using common names (2), (3):
Study area includes six target areas on the margins of Little Cones, Red Cone, and Black Cone, in Crater Flat; exact location of each test pit to be determined once field work begins

Reason why that location was chosen (3):
Location with respect to volcanic landforms in Crater Flat

3) Construction Parameters:

Dimensions of hole(s) (2):
1.5x1x3 (m)

Excavation requirements (2):
Holes are to be backfilled within 2 days of opening

Activities needed to restore site upon completion of tests (3):
Backfill and compact with backhoe, possibly rake

Logistical needs for access to test pits location, excavation, and restoration upon completion of tests (2), (3):
Land access and environmental surveys;
four-wheel drive truck mounted backhoe

Test Pit Activity Sheet Continued

Name of Test Pits: Crater Flat -1 to -40

4) Testing Parameters:

Tests and sampling to be conducted at that test pit (1), (3):

Geological logging and sampling for age-dating;
paleomagnetic sampling

Logistical needs for testing and sampling (1), (3):

Standard geologic and paleomagnetic
field equipment

5) Estimated Schedule:

Estimated start and completion dates:

To be determined

Estimated duration of construction (3):

2 days

Estimated sequence of activities at the test pits (3):

- a) Excavation
- b) Geologic mapping, logging, and sampling
- c) Soils Description

Notes/References:

- (1) Study Plan 8.3.1.8.5.1, R0: Characterization of volcanic features
- (2) Draft of Addendum IV to TPP91-32
- (3) Andrew Burningham, personal communication, 1993

TRENCH/TEST PIT CATALOG
Study Summary

Study Name: Quaternary strike-slip faulting proximal to the site
within northeast-trending fault zones

SP/WBS References: SP 8.3.1.17.4..4/WBS 1.2.3.2.8.4.4

Principal/Participatory Organizations: USGS

PI/Contact Officer (telephone number): John Whitney/Dennis O'Leary
(303)-236-0022)

Trench/Test Pit Name	Approximate Location (Northing, Easting)	Estimated Pit Dimensions (m)	Planned Testing	Date Planned
Rock Valley Fault Zone:				
RVF-T1	Rock Valley Fault Zone in central or southwestern Rock Valley	50-200 x 1-2 x 3	logging, sampling	FY93

TRENCH/TEST PIT CATALOG
Trench/Test Pit Summary Sheet

1) Name of Trench RVF-T1

Purpose of Trench

Study Supported

Quaternary strike-slip faulting proximal to the site
within northeast-trending fault zones

SP reference/WBS reference

SP 8.3.1.17.4.4/WBS 1.2.3.2.8.4.4

2) Estimated Location by:

Northing, easting coordinates (2):

To be determined

Physical description, using common names (2):

Rock Valley Fault Zone, in Rock Valley south of Skull
Mountain or at northwest edge of Specter Range

Reason why that location was chosen (1):

Based on previous work associated with this study

3) Construction Parameters:

Dimensions of hole (2):

50-200 x 1-2 x 3 (m)

Excavation requirements (2):

Standard trench, single or possibly compound bench

Activities needed to restore site upon
completion of tests:

Backfill with backhoe and compact

Logistical needs for access to trench
location, excavation, and restoration upon
completion of tests (2):

Track-mounted backhoe, operating crew, laborers,
possibly some shoring required

4) Testing Parameters:

Tests and sampling to be conducted at that
trench (1):

Geologic mapping, logging, and sampling for age dating

Logistical needs for testing and sampling (1):

Standard geologic field equipment

Trench/Test Pit Activity Sheet Continued
Name of Trench: RVF-T1

6) Estimated Schedule:

Estimated start and completion dates (3):
To be determined

Estimated duration of construction (2):
2-4 days

Estimated sequence of activities at
the trench (1):

- a) Excavation
- b) Geologic mapping, logging, and sampling
- c) Backfilling

Notes/References:

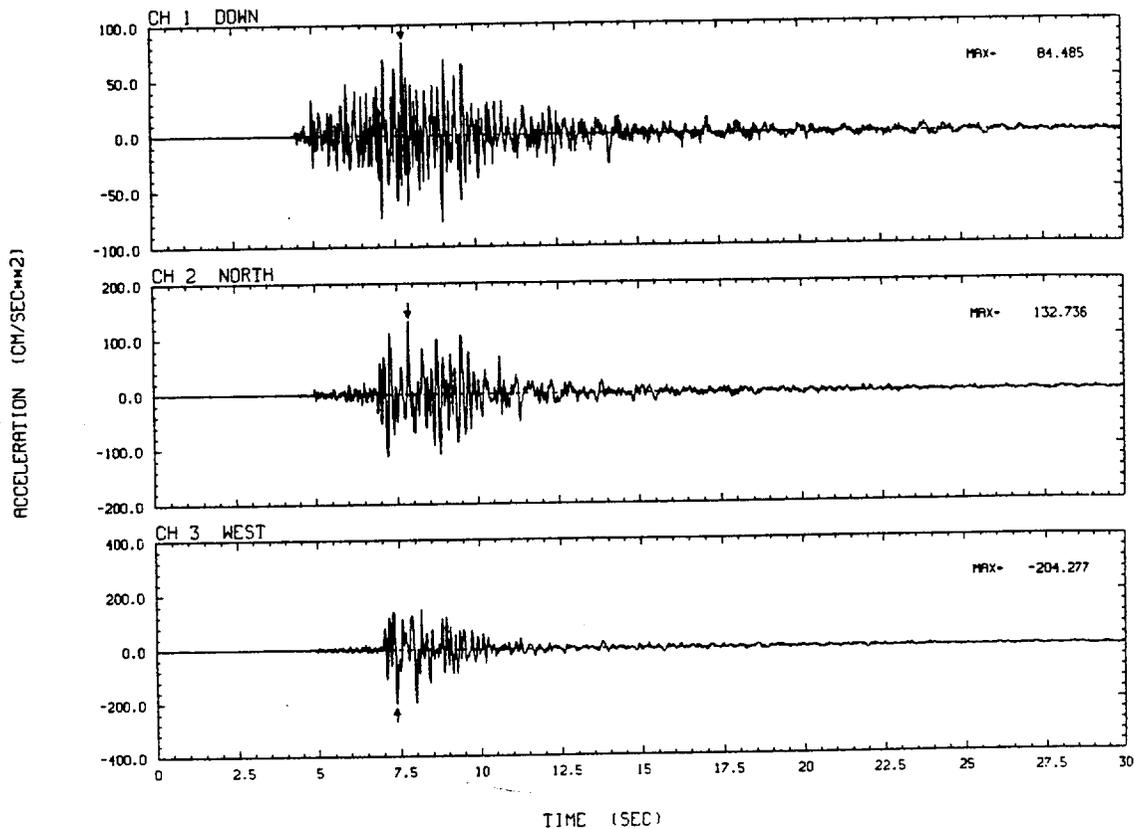
- (1) Study Plan 8.3.1.17.4.4: Quaternary strike-slip faulting proximal to the site within northeast-trending fault zones
- (2) Chris Menges, personal communication, 1993
- (3) SAIC; Composite status of ENV/WI/TIF/TFM analyses as of 1/28/93

PROCESSED SEISMIC MOTION RECORDS FROM
LITTLE SKULL MOUNTAIN, NEVADA

EARTHQUAKE of JUNE 29, 1992

RECORDED AT

STATIONS IN SOUTHERN NEVADA



Prepared for
The U.S. Department of Energy
Under Contract DE-AC08-89NV10733

Prepared by
URS/John A. Blume & Associates, Engineers
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PROCESSED SEISMIC MOTION RECORDS FROM
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RECORDED AT

STATIONS IN SOUTHERN NEVADA

Peter K. Lum

Kenneth K. Honda

Prepared for
The U.S. Department of Energy
Under Contract DE-AC08-89NV10733

Prepared by
URS/John A. Blume & Associates, Engineers
100 California Street, San Francisco, CA 94111

LITTLE SKULL MOUNTAIN, NEVADA EARTHQUAKE OF 29 JUNE 1992

Background

As part of the contract with the U.S. Department of Energy, Nevada Field Office (DOE/NV), URS/John A. Blume & Associates, Engineers (URS/Blume) maintains a network of seismographs in southern Nevada to monitor the ground motion generated by the underground nuclear explosions (UNEs) at the Nevada Test Site (NTS). The seismographs are located in the communities surrounding the NTS and the Las Vegas valley. When these seismographs are not used for monitoring the UNE generated motions, a limited number of seismographs are maintained for monitoring motion generated by other than UNEs (e.g. motion generated by earthquakes, wind, blast). During the subject earthquake of June 29, 1992, a total of 20 of these systems recorded the earthquake motions. Due to the potential benefit of these data for the scientific community, DOE/NV authorizes the release of these records.

Description of Equipment

Three types of seismographs are used in the monitoring program. They are L-7 velocity meter manufactured by the Precision Instrument Company (L-7B system) and by Develco, Inc. (L-7D system); PDR-1 by Kinometrics; and PDAS-100 by Teledyne Geotech.

L-7 Velocity Meter: It is a continuously recording velocity seismograph which records the motion on an analog magnetic tape. It has a recording capability of 5 continuous days.

PDR-1: The acceleration signal is converted to a digital form and recorded on a digital cassette tape. The system is set to trigger on a short-term average (STA) and long-term average (LTA) threshold. It has a pre-event memory of about 5 seconds and has a recording capability of approximately 20 minutes.

PDAS-100: The acceleration signal is converted to a digital form and recorded on a random access memory (RAM) within the system. The system is set to trigger on a short-term average (STA) and long-term average (LTA) threshold. The selectable pre-event memory is set for 20 seconds and has a recording capability of approximately 20 minutes.

Earthquake Parameters

The earthquake appeared to have occurred under the Little Skull Mountain about 10 km northeast of Lathrop Wells, Nevada. The National Earthquake Information Center has estimated the earthquake magnitude as 5.6 M_b . The U.S. National Seismic Network determined that the type of faulting is primarily normal faulting on a northeasterly striking plane. The earthquake was felt by many of the people in the communities surrounding the NTS and Las Vegas, about 115 km from the epicenter.

The earthquake parameters obtained from various sources are:

Epicenter:	36.718 N, 116.289 W
Depth:	9 Km
Magnitude:	5.6 M_B (body-wave magnitude)
Date:	29 June 1992
Origin time:	Day 181 Hr 10 Min 14 Sec 22 (GMT)
Local time:	3:14 a.m. (PDT)

Seismic Recordings

The subject earthquake was recorded at 20 ground stations. The stations that recorded the motion in area around the NTS are shown on Figure 1. Those in the Las Vegas valley are detailed in Figure 2. Table 1 tabulates the system type, location, geodetic coordinates and distance from the epicenter for each station. At several selected sites, the station was monitored by a secondary system. When both systems recorded the motion, the system numbers are designated A and B.

Conversion and Processing

The records obtained from the earthquake were retrieved and converted from field data to a computer compatible format for processing. The processing was performed using URS/Blume's standard signal processing as described in Reference 1.

In general, the processing is performed in three phases:

In Phase 1 (DP1), the seismic signal is converted from field data to a computer compatible format using special interface equipment. The data are scaled to an engineering unit (cm/sec² or cm/sec). The resulting plots are checked for any error and reviewed for additional processing requirements.

In Phase 2 (DP2), the records are processed using noise reduction techniques. The techniques include baseline correction, cosine tapering and application of low-pass and high-pass filtering using the Order 4, Butterworth filter. For ground stations, the data are generally band-pass filtered from .1 to 33Hz. Fourier amplitude spectra are generated before and after the DP2 processing. The corrected acceleration, velocity and displacement time histories are generated using numerical differentiation and integration. The pseudo relative velocity spectrum (PSRV) of 49 periods and 5 percent of critical damping-is computed. The 49 periods are equally spaced on a logarithmic scale from 0.05 to 6.072 seconds.

In the final phase (DPF), the records are arranged for long-term preservation and for report preparation. The final product contains data plots in chronological order of data processing; original recording, uncorrected and corrected Fourier amplitude spectra, corrected acceleration, velocity, displacement and PSRV.

Results

Table 2 tabulates the uncorrected peak acceleration or velocity, corrected peak acceleration, velocity and displacement values and any data processing comments. The data are written in the data format which are compatible with the standard tape format for CSMIP strong-motion data tapes [Ref. 2]. Table 3 summaries the standard data format.

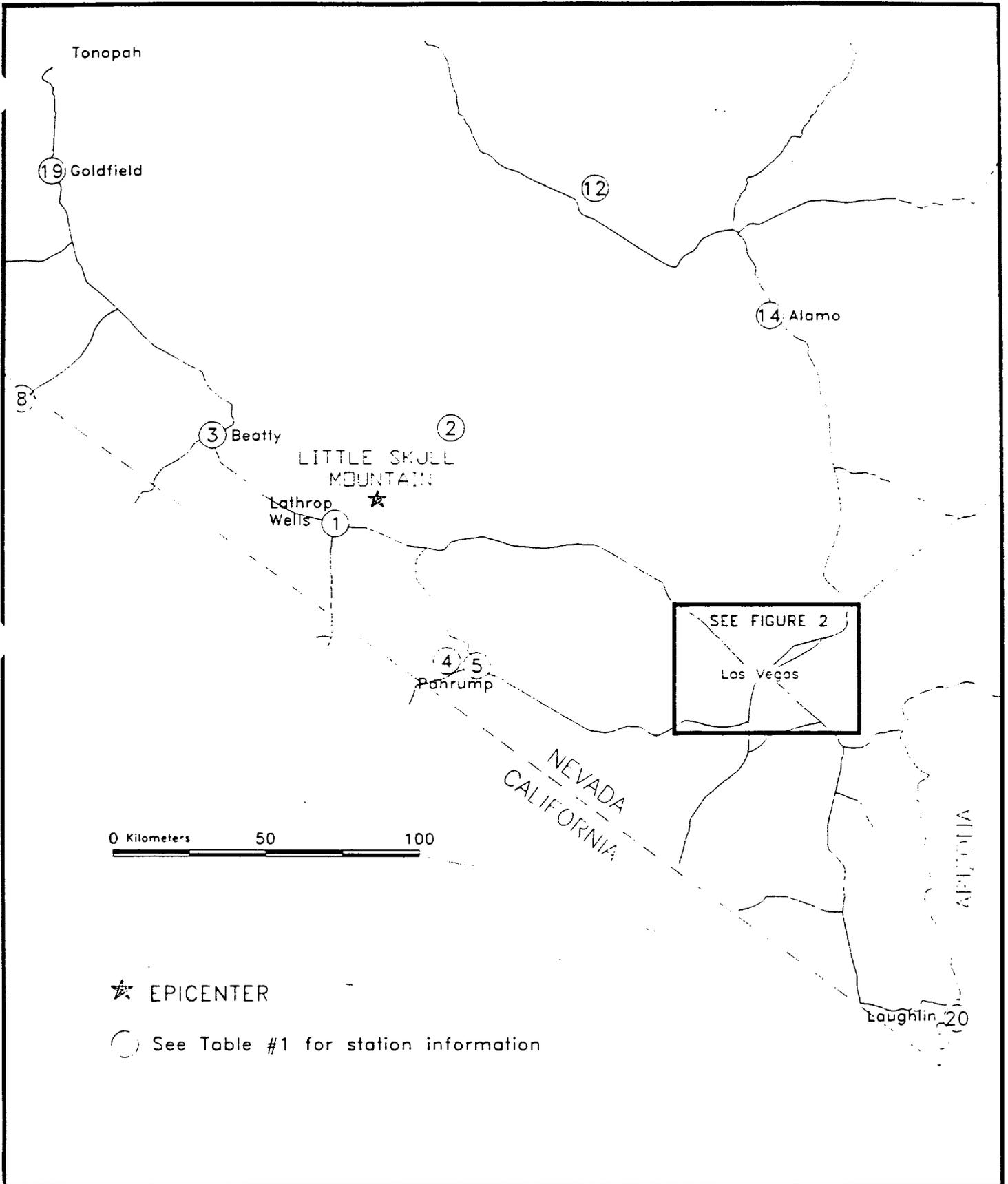
The data are available on 8MM tape, ASCII format (record length=80, blocksize=2000). Table 4 gives examples of VAX/VMS commands on how the data tape was created and how to retrieve the data files.

Acknowledgment

The network of seismographs in southern Nevada to monitor the ground motion generated by the UNEs at the NTS is maintained by the staff of electronic technicians consisting of Ray Bradley, Don Morgan, Robert Stewart, Lori Forrester and Jim Graham. The seismic records conversion and processing staff includes Vickie Ross, Stephanie Miller, Rosemarie Musso, Ben Gacula and Cory Lieber.

References

1. Lum, P. K., "Overview of Seismic Signal Conversion and Processing Operations", URS/John A. Blume & Associates, Engineers, San Francisco, JAB-10733-TM3, March 1991.
2. Shakal, A. F. and Huang, M. J., "Standard Tape Format for CSMIP Strong-Motion Data Tapes", California Department of Conservation, Division of Mines and Geology, Office of Strong Motion Studies, Report OSMS 85-03, December 1985.

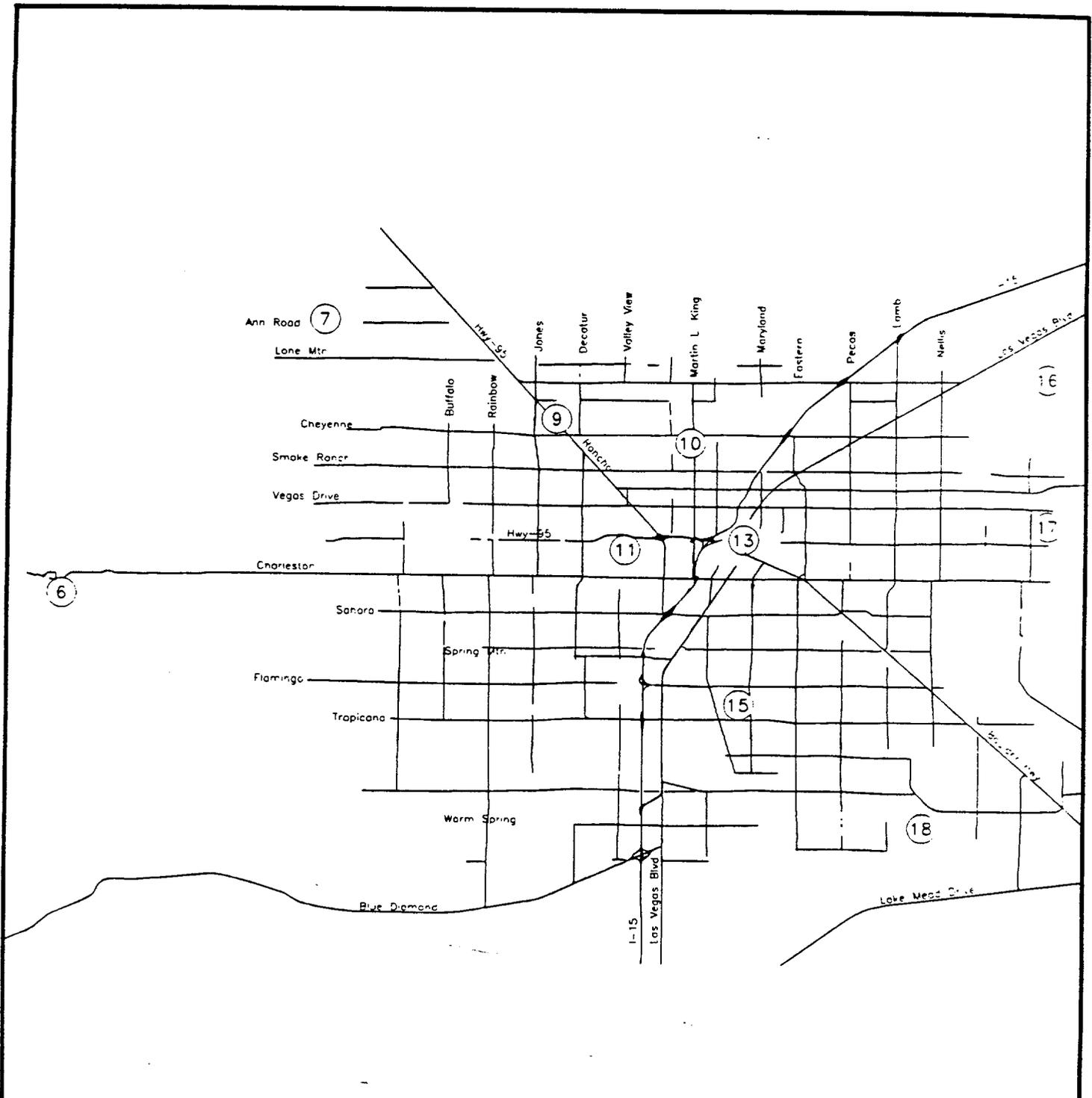


URS/BLUME

100 CALIFORNIA STREET
SAN FRANCISCO, CA 94111

FIGURE 1: STATIONS RECORDING THE LITTLE SKULL MT.,
NEVADA EARTHQUAKE OF 6/29/92
IN SOUTHERN NEVADA





0 Kilometers 10

○ See Table #1 for station information

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FIGURE 2: STATIONS RECORDING THE LITTLE SKULL MT., NEVADA EARTHQUAKE OF 6/29/92 IN LAS VEGAS VALLEY



TABLE 1: LOCATIONS OF THE RECORDING STATIONS

<u>Station No.</u>	<u>System Type</u>	<u>Location</u>	<u>Coordinates</u>		<u>Distance from Epicenter (Km)</u>
1A 1B	PDR-1 PDAS-100	Lathrop Wells	116.40W	36.64N	15
2A 2B	PDR-1 PDAS-100	Nevada Test Site	116.06W	36.93N	30
3	PDR-1	Beatty	116.76W	36.91N	49
4	PDAS-100	Pahrump Site 2	116.07W	36.23N	58
5	PDR-1	Pahrump Site 1	115.98W	36.21N	62
6	PDR-1	Las Vegas	115.41W	36.15N	99
7	PDR-1	Las Vegas	115.31W	36.26N	99
8	PDR-1	Death Valley	117.34W	37.03N	102
9	PDR-1	Las Vegas	115.22W	36.22N	109
10	PDR-1	Las Vegas	115.16W	36.21N	113
11	L-7	Las Vegas	115.19W	36.17N	114
12	PDR-1	Tempiute	115.63W	37.65N	117
13	PDR-1	Las Vegas	115.14W	36.17N	117
14A 14B	PDR-1 PDAS-100	Alamo	115.12W	37.27N	118
15A 15B	L-7 PDR-1	Las Vegas	115.14W	36.11N	121
16	PDAS-100	Las Vegas	115.02W	36.24N	123
17	PDR-1	Las Vegas	115.02W	36.18N	126
18	PDR-1	Las Vegas	115.07W	36.06N	130
19	PDR-1	Goldfield	117.23W	37.71N	139
20	PDAS-100	Laughlin	114.58W	35.15N	232

TABLE 2: PEAK AMPLITUDES

Station No.	Comp	<-- Uncorrected -->		<----- Corrected ----->			Comments
		Accel. (cm/sec ²)	Velocity (cm/sec)	Accel. (cm/sec ²)	Velocity (cm/sec)	Disp (cm)	
1 A	DOWN	85.097	0.000	84.485	-2.465	0.455	
1 A	NORTH	133.153	0.000	132.736	4.234	0.524	
1 A	WEST	-205.720	0.000	-204.277	11.247	0.773	
1 B	DOWN	81.519	0.000	80.697	-2.405	0.429	
1 B	NORTH	129.151	0.000	128.704	-4.114	-0.471	
1 B	WEST	-210.499	0.000	-208.734	11.477	-0.825	
2 A	DOWN	-65.351	0.000	-66.300	2.567	0.267	
2 A	NORTH	-118.222	0.000	-118.275	5.044	-0.499	
2 A	WEST	88.490	0.000	89.243	-4.609	-0.576	
2 B	DOWN	-68.666	0.000	-68.179	2.615	0.252	
2 B	NORTH	-116.522	0.000	-116.673	5.053	-0.497	
2 B	WEST	88.534	0.000	88.807	-4.642	-0.623	
3	DOWN	-35.887	0.000	-33.004	-0.669	-0.191	
3	NORTH	-36.328	0.000	-35.931	-1.069	-0.109	
3	WEST	-60.028	0.000	-60.592	-2.065	0.183	
4	DOWN	15.056	0.000	15.120	-0.558	0.160	
4	NORTH	-18.694	0.000	-18.631	1.055	0.193	
4	WEST	21.013	0.000	20.999	1.263	-0.232	
5	DOWN	-10.772	0.000	-11.009	0.423	-0.170	
5	NORTH	-15.724	0.000	-15.785	0.833	-0.199	
5	WEST	14.829	0.000	14.812	0.744	-0.147	
6	DOWN	-5.395	0.000	-5.505	0.218	-0.116	
6	NORTH	7.633	0.000	7.631	0.266	-0.080	
6	WEST	-8.377	0.000	-8.173	0.309	-0.134	
7	DOWN	-4.762	0.000	-4.746	0.326	-0.159	
7	NORTH	-6.994	0.000	-7.039	0.524	0.119	
7	WEST	-5.386	0.000	-5.345	0.364	-0.125	
8	DOWN	8.558	0.000	8.602	-0.305	0.084	
8	NORTH	12.056	0.000	12.101	-0.521	-0.092	
8	WEST	12.676	0.000	12.637	0.432	-0.084	
9	DOWN	-2.585	0.000	-2.570	-0.273	-0.074	Short Record
9	NORTH	-4.007	0.000	-3.987	-0.412	0.085	Short Record
9	WEST	-6.322	0.000	-6.288	-0.511	0.088	Short Record
10	DOWN	5.416	0.000	5.408	0.369	-0.140	
10	NORTH	8.895	0.000	8.896	-0.768	-0.192	
10	WEST	8.952	0.000	8.961	-0.914	-0.311	
11	DOWN	0.000	0.337	4.951	0.330	-0.136	
11	NORTH	0.000	0.369	10.842	0.371	0.156	Clipped
11	WEST	0.000	0.270	8.521	0.324	0.164	Clipped
12	DOWN	15.078	0.000	15.126	0.905	0.110	
12	NORTH	9.597	0.000	9.622	-0.822	0.128	
12	WEST	19.789	0.000	19.704	0.796	-0.111	

TABLE 4: READ / WRITE DATA ON 8MM ASCII FORMATTED TAPE

WRITE DATA ON ASCII FORMATTED 8MM TAPE

Below is an example to save files on 8MM ASCII formatted tape with record length=80, block size = 2000 using the VAX/VMS operating system utilities TWRITE:

```
$ INIT MUB0: EQ0422
$ MOUNT/NOASSIST/FOR/RECORD=80/BLOCK=2000 MUB0:
$ TWRITE/ASCII/RECORD=80/BLOCK=2000/OUTPUT=MUB0:  STATN1.V1
$ TWRITE/ASCII/RECORD=80/BLOCK=2000/OUTPUT=MUB0:  STATN1.V2
$ TWRITE/ASCII/RECORD=80/BLOCK=2000/OUTPUT=MUB0:  STATN1.V3
$ TWRITE/ASCII/RECORD=80/BLOCK=2000/OUTPUT=MUB0:  STATN1.V4
$ TWRITE/ASCII/RECORD=80/BLOCK=2000/OUTPUT=MUB0:  STATN2.V1
$ TWRITE/ASCII/RECORD=80/BLOCK=2000/OUTPUT=MUB0:  STATN2.V2
$ TWRITE/ASCII/RECORD=80/BLOCK=2000/OUTPUT=MUB0:  STATN2.V3
$ TWRITE/ASCII/RECORD=80/BLOCK=2000/OUTPUT=MUB0:  STATN2.V4

... etc.. (for all stations, each with v1,v2,v3 and v4 data)

$ EXIT
```

READ/RETRIEVE DATA FROM ASCII FORMATTED 8MM TAPE

Below is an example to read/retrieve files from an 8MM ASCII formatted tape with record length=80, block size = 2000 using the VAX/VMS operating system utilities TREAD:

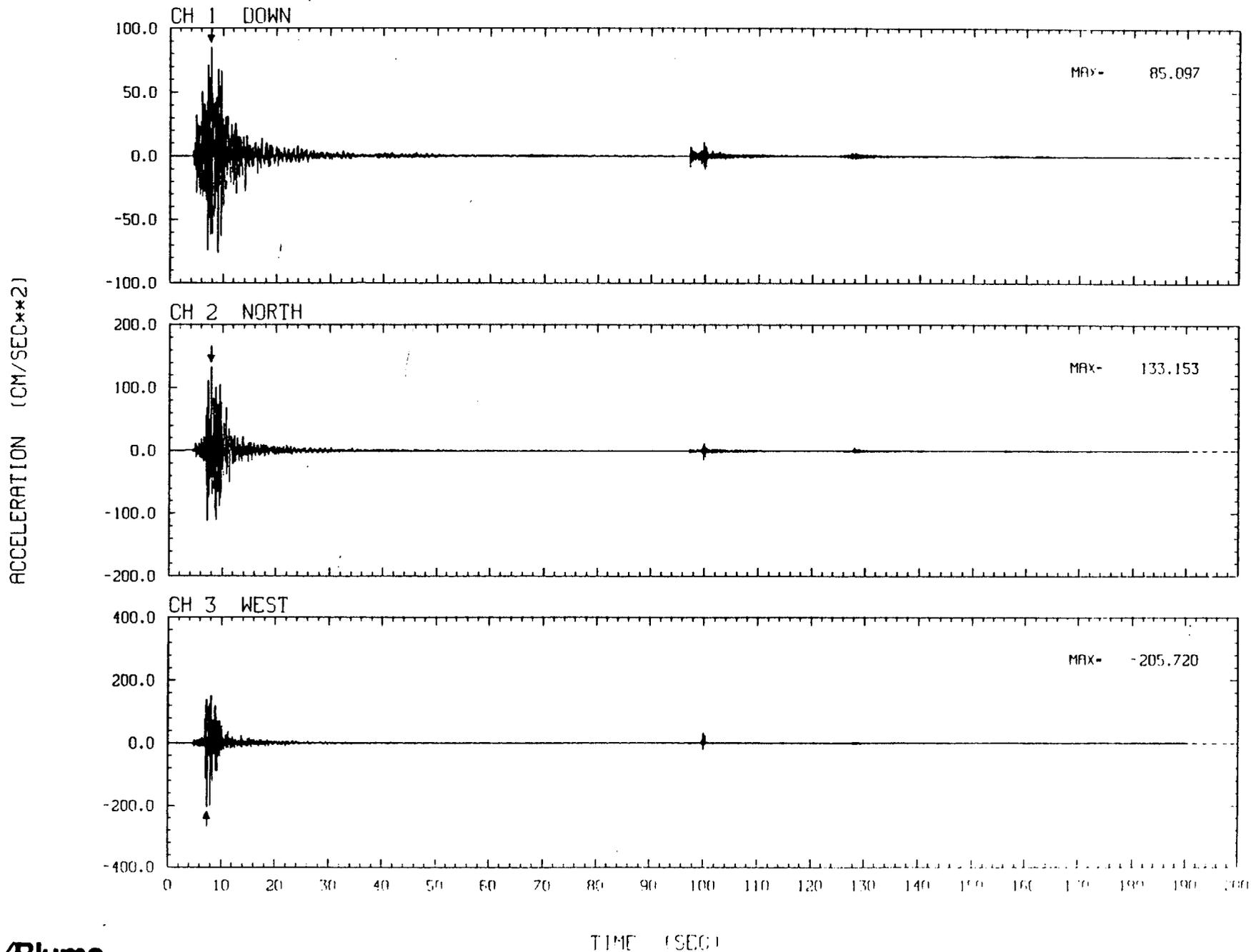
```
$ MOUNT/NOASSIST/FOR/RECORD=80/BLOCK=2000 MUB0:
$ TREAD/ASCII/RECORD=80/BLOCK=2000/INPUT=MUB0:  STATN1.V1
$ TREAD/ASCII/RECORD=80/BLOCK=2000/INPUT=MUB0:  STATN1.V2
$ TREAD/ASCII/RECORD=80/BLOCK=2000/INPUT=MUB0:  STATN1.V3
$ TREAD/ASCII/RECORD=80/BLOCK=2000/INPUT=MUB0:  STATN1.V4
$ TREAD/ASCII/RECORD=80/BLOCK=2000/INPUT=MUB0:  STATN2.V1
$ TREAD/ASCII/RECORD=80/BLOCK=2000/INPUT=MUB0:  STATN2.V2
$ TREAD/ASCII/RECORD=80/BLOCK=2000/INPUT=MUB0:  STATN2.V3
$ TREAD/ASCII/RECORD=80/BLOCK=2000/INPUT=MUB0:  STATN2.V4

... etc.. (for all stations, each with v1,v2,v3 and v4 data)

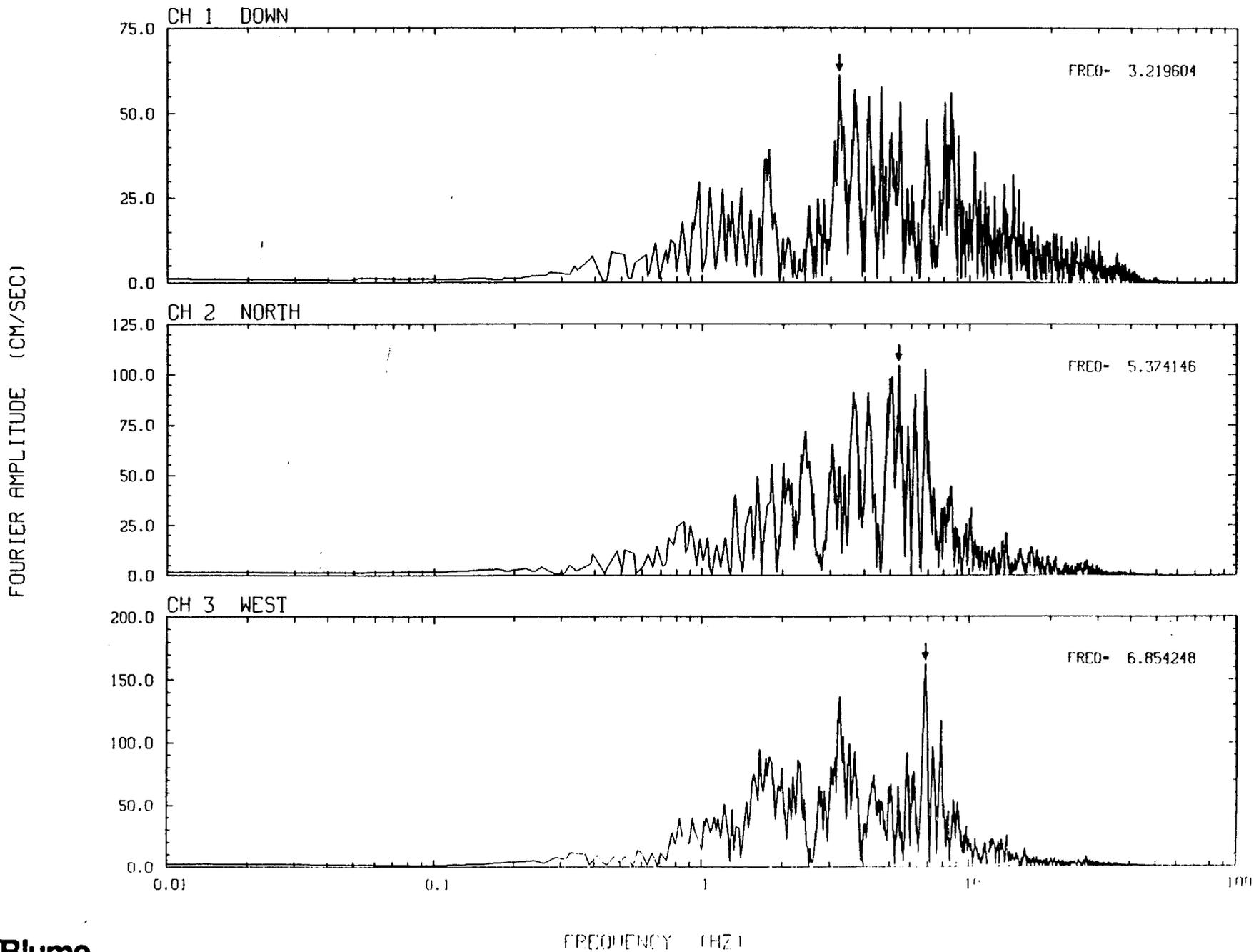
$ EXIT
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STATION NO. 1 SYSTEM A

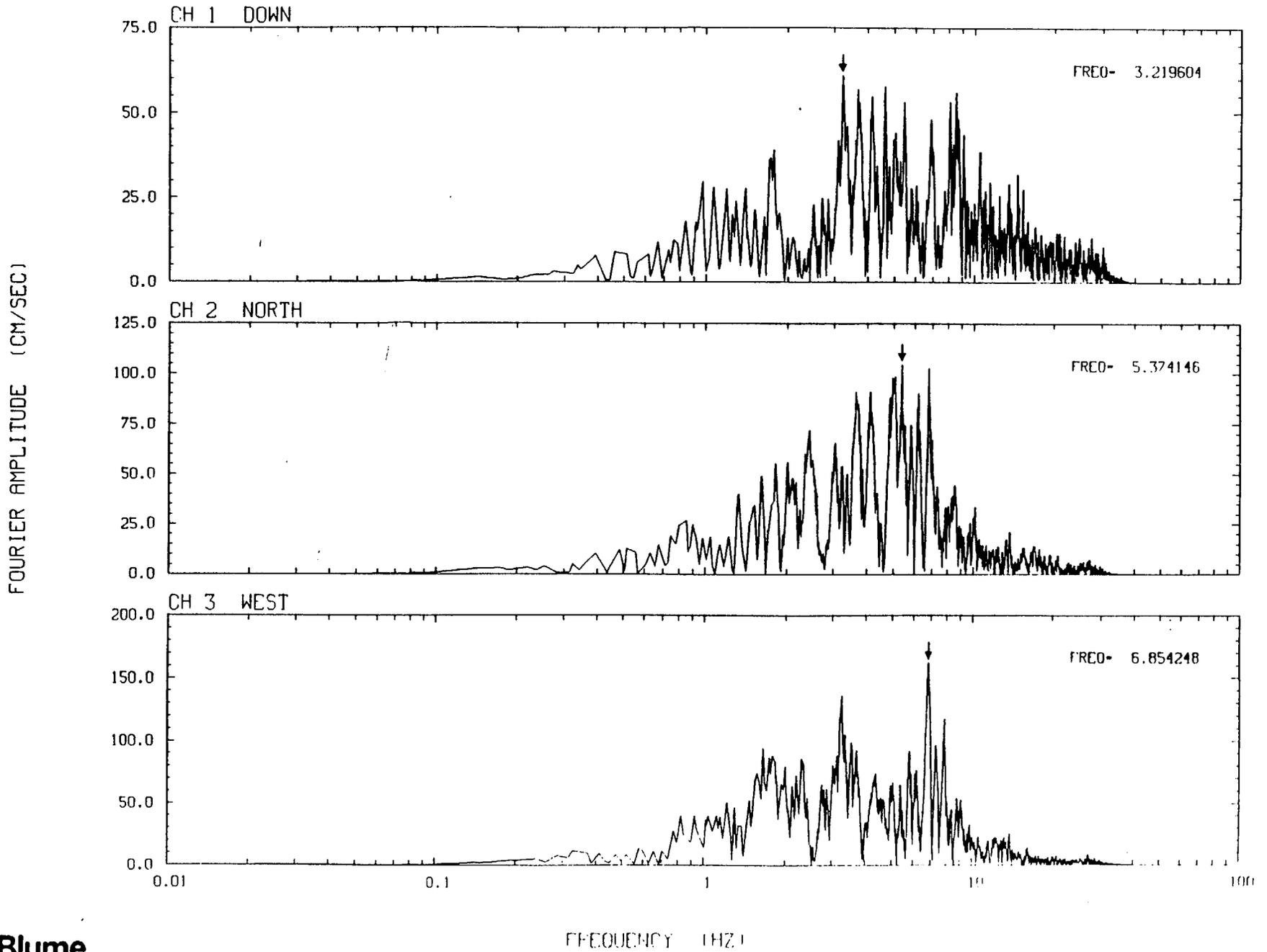
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM A
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM A
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

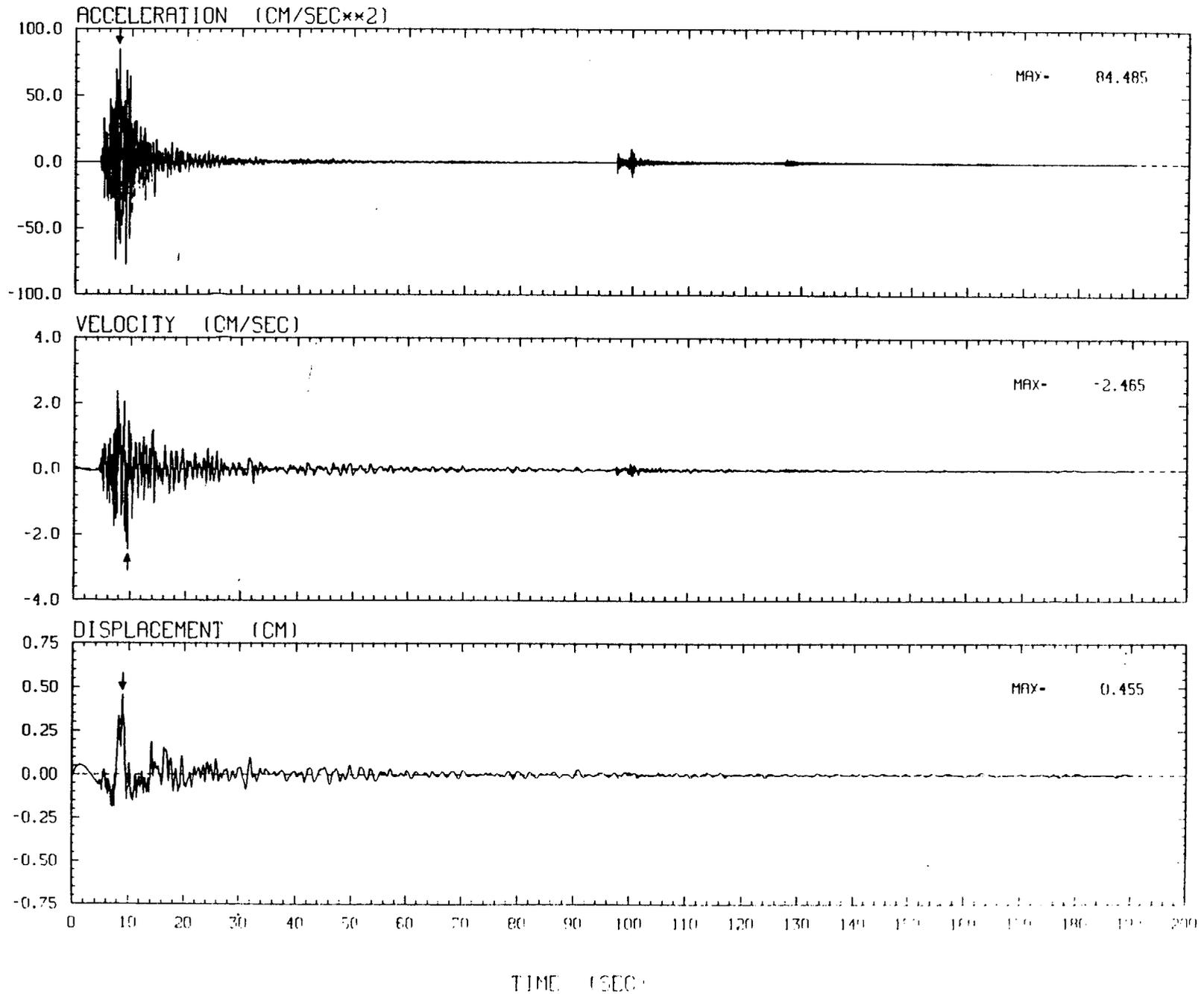


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM A
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



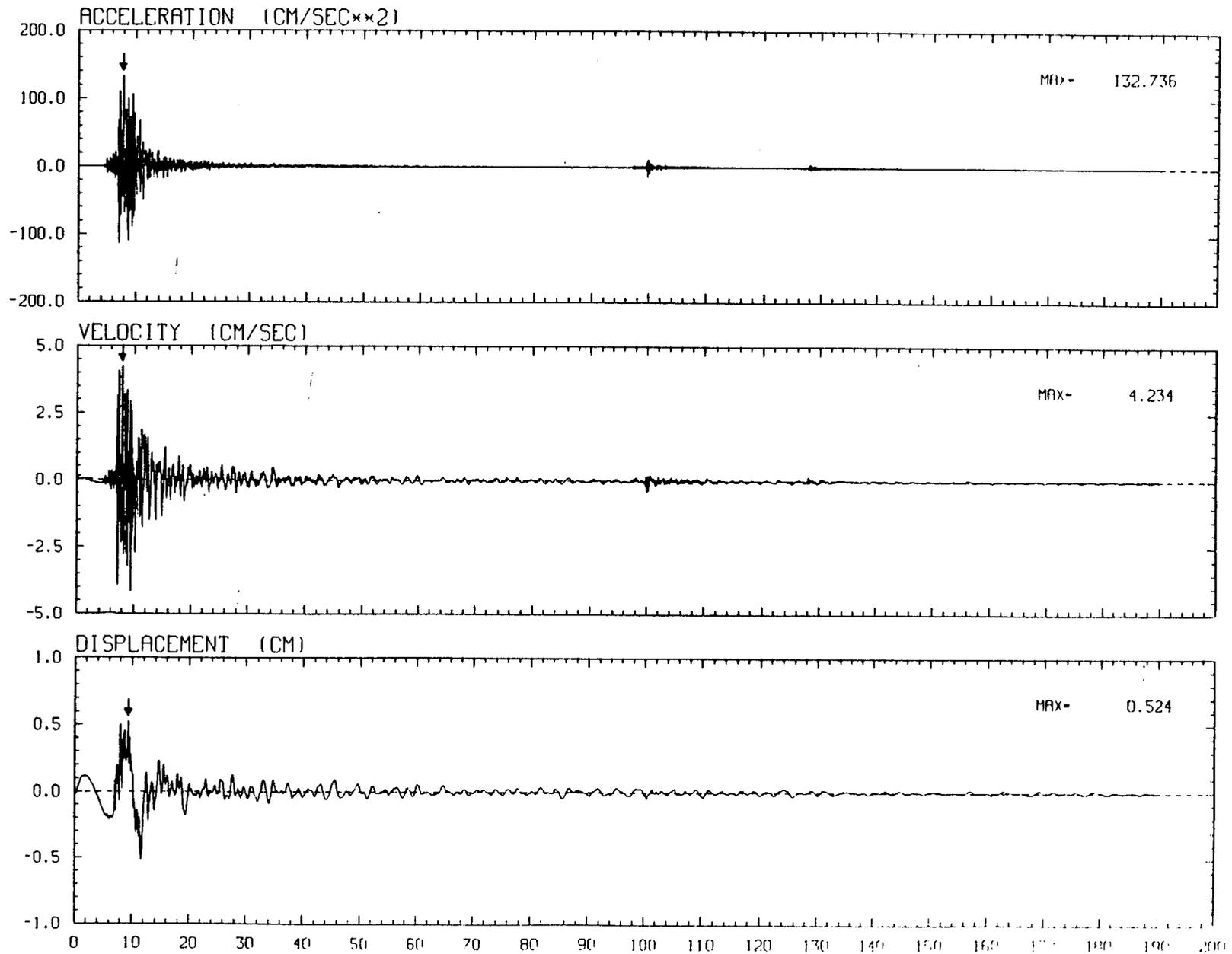
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM A CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



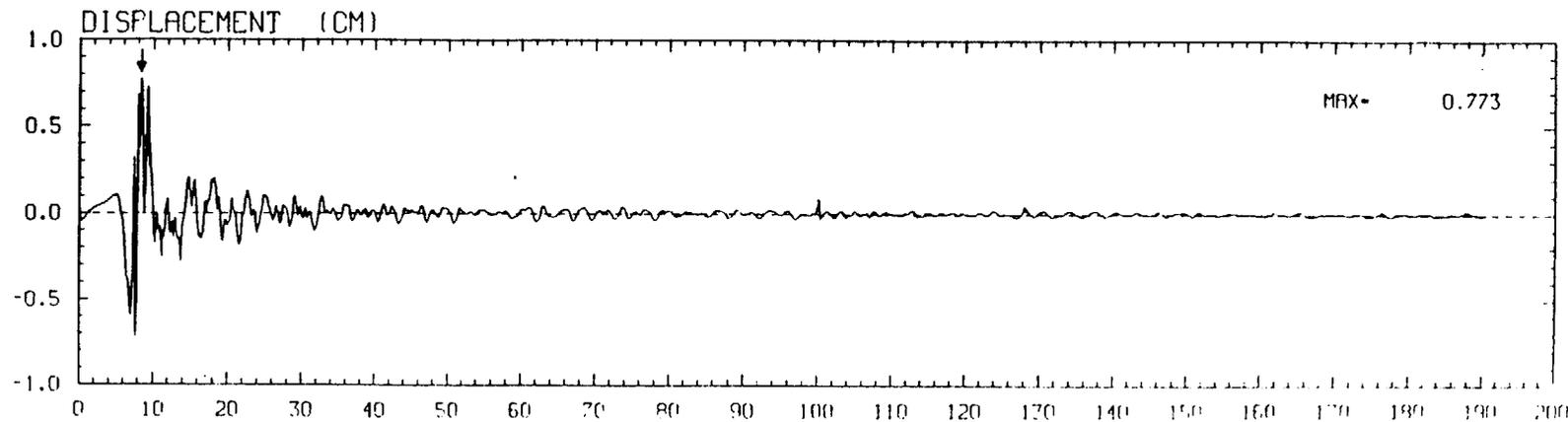
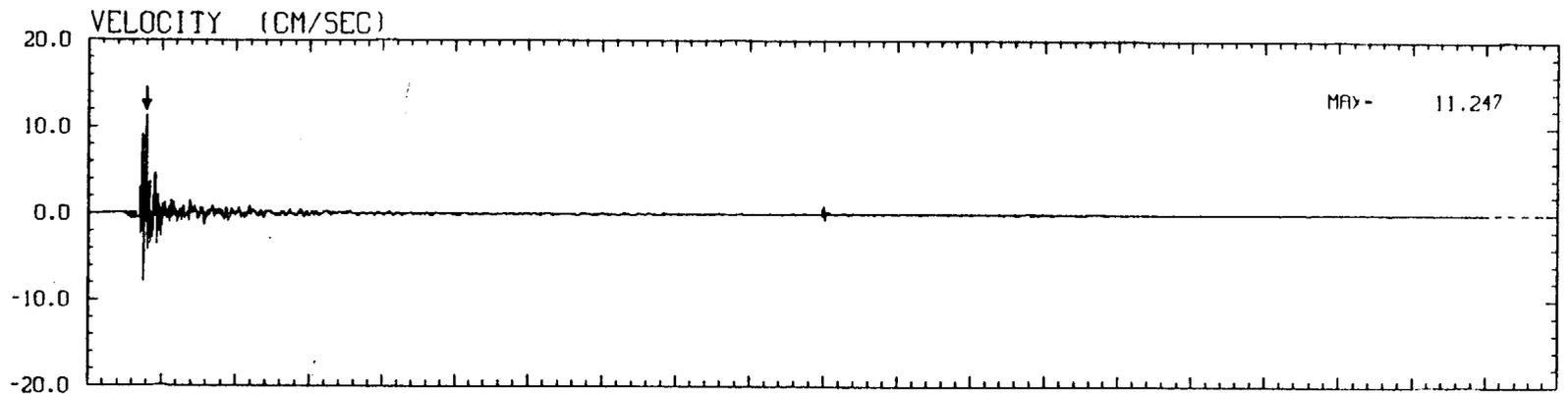
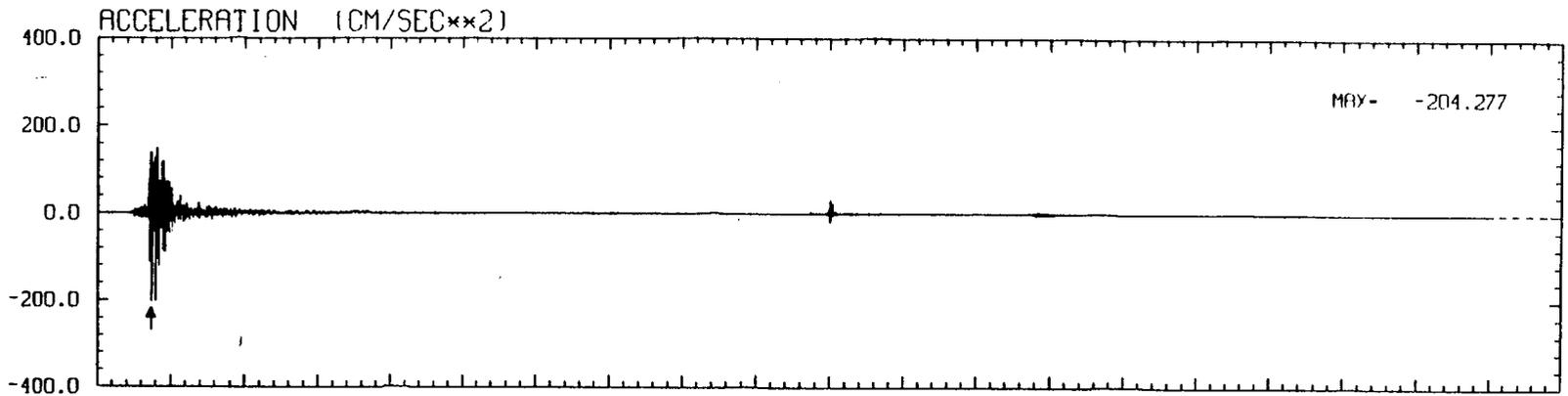
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM A CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM A CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



TIME (SEC)

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM A

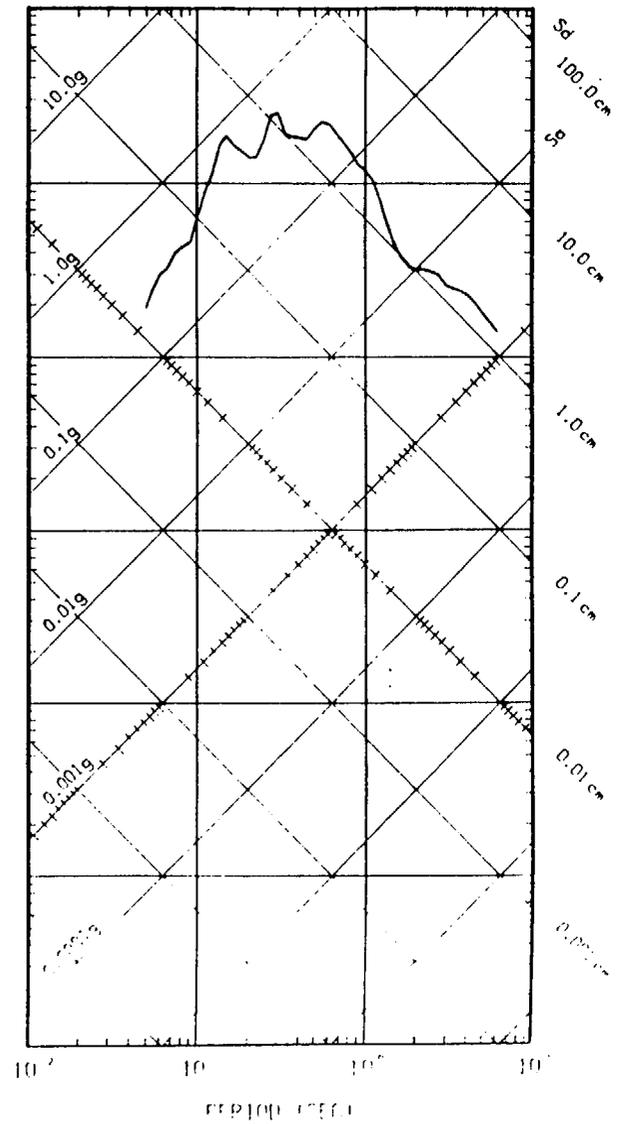
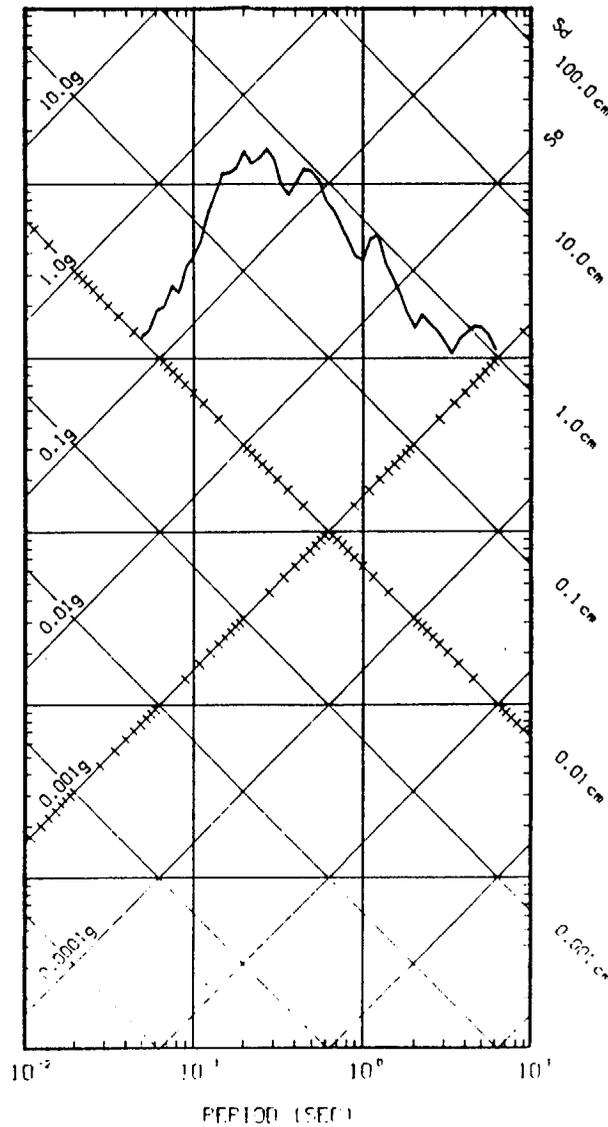
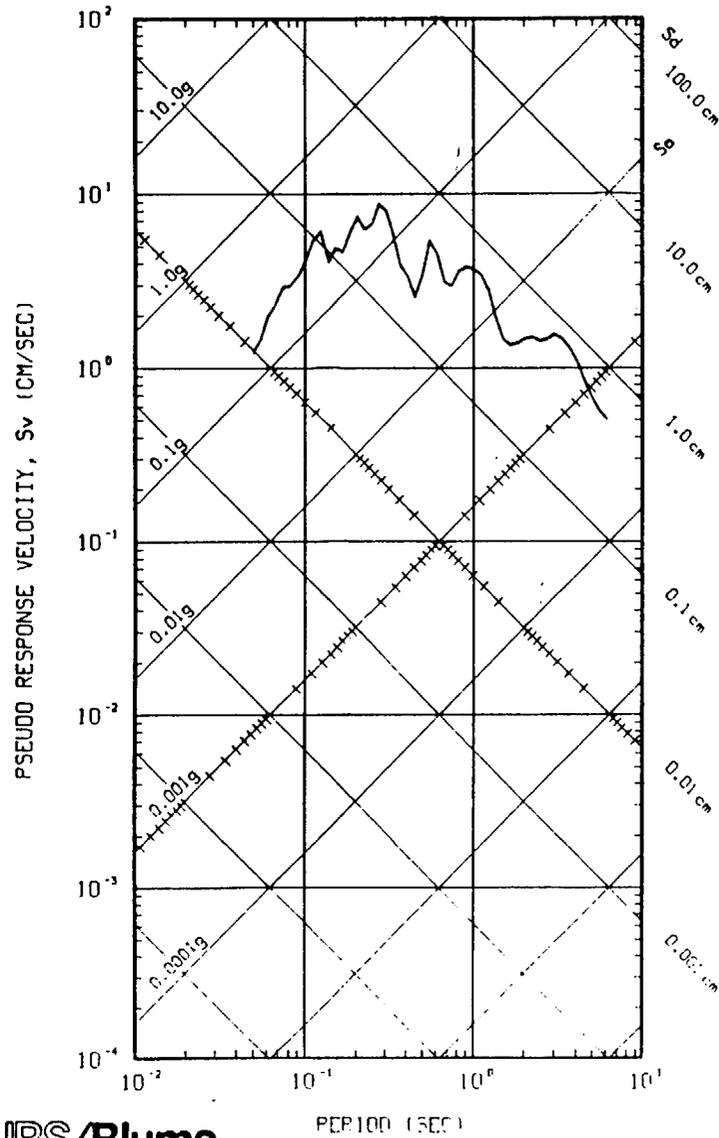
5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

PC 77

CH 1 DOWN

CH 2 NORTH

CH 3 WEST

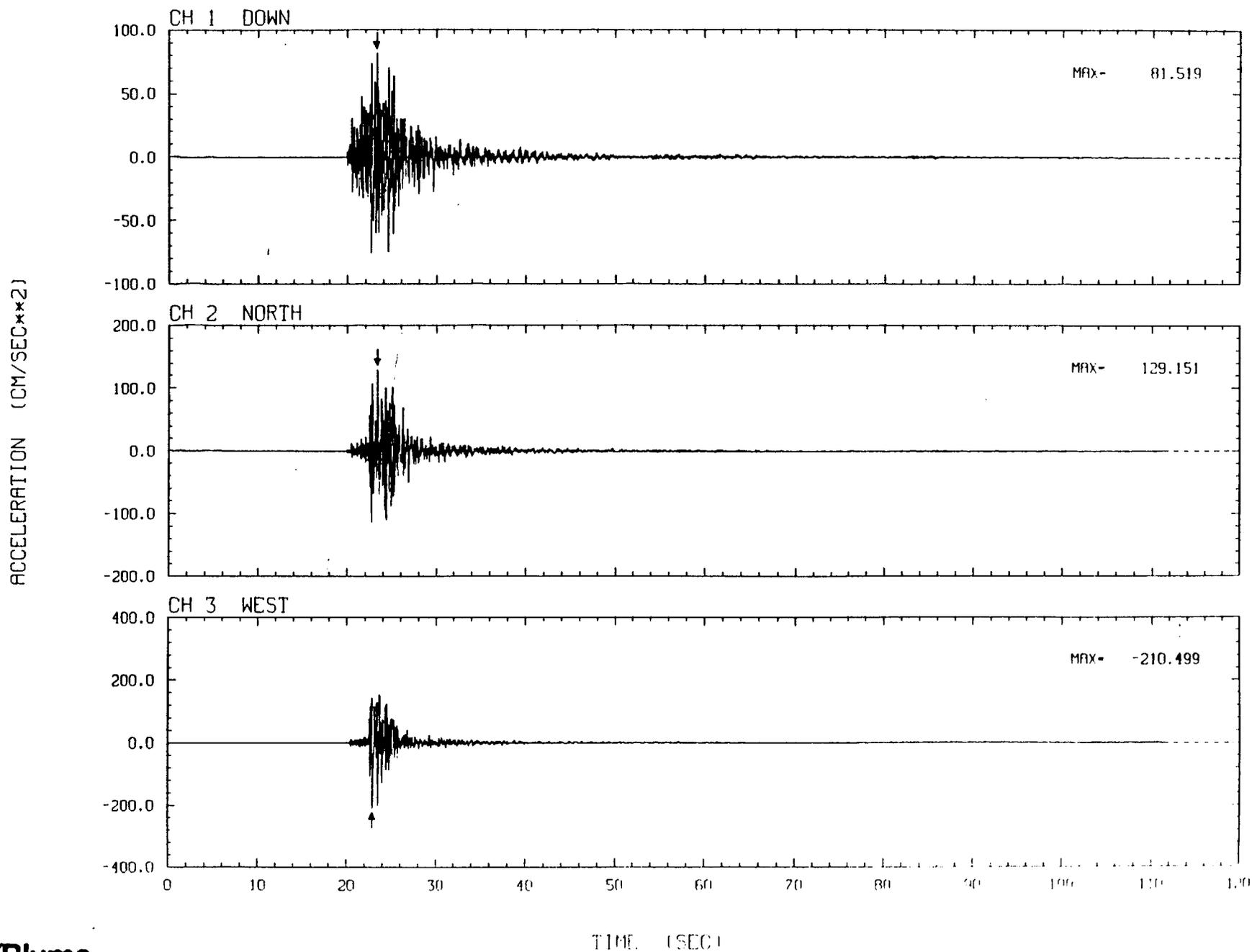


STATION NO. 1 SYSTEM B

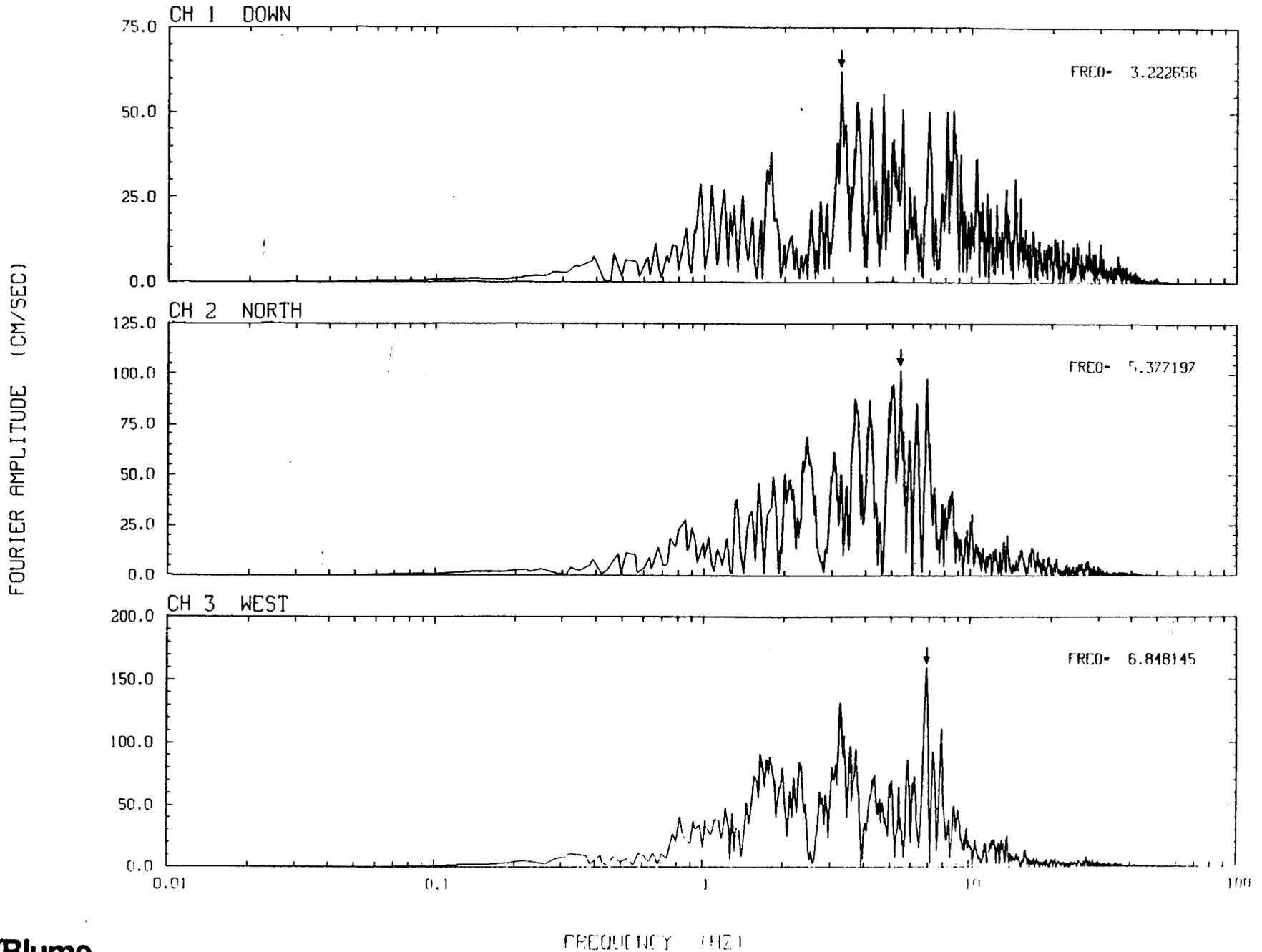
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 1 SYSTEM B

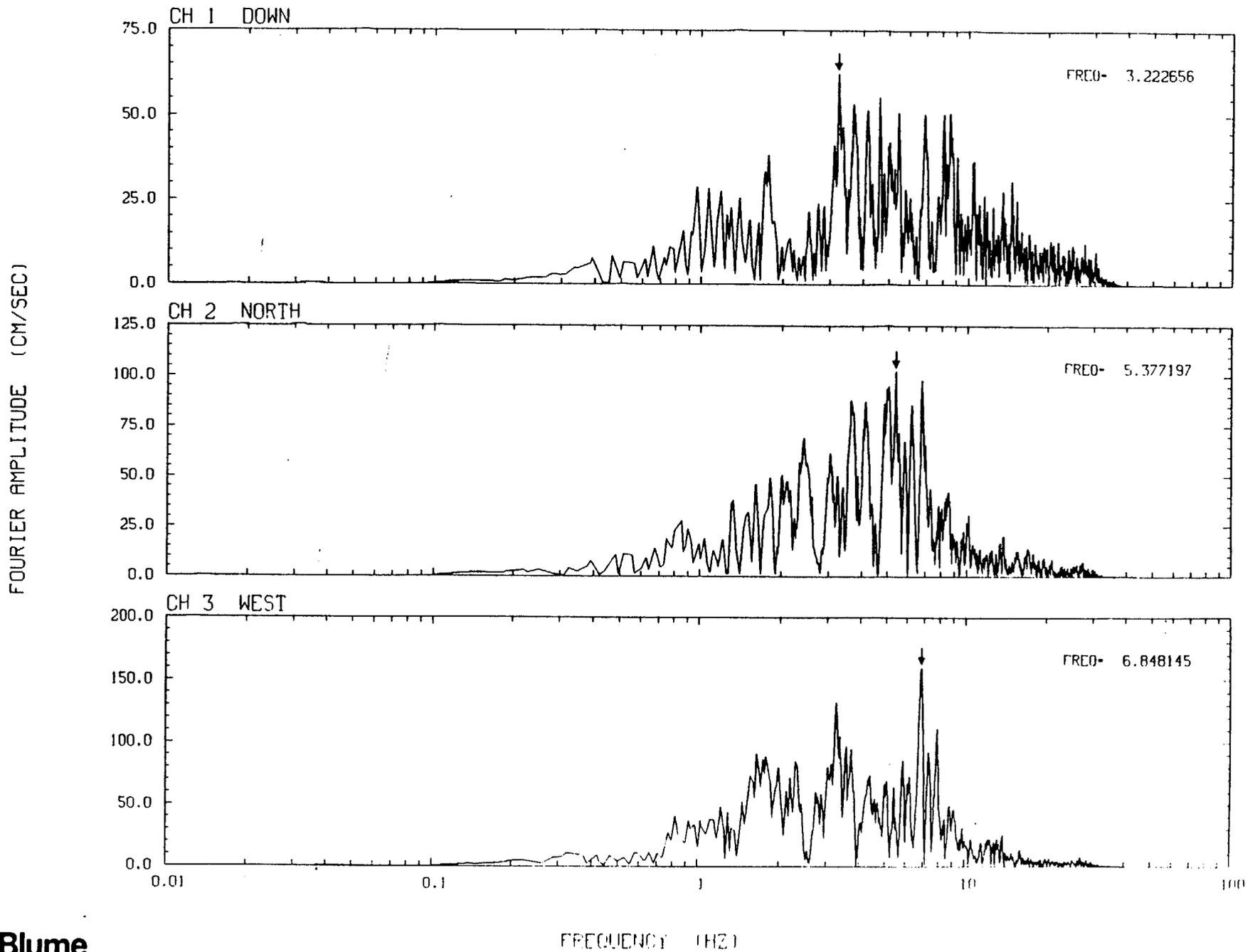
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM B
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

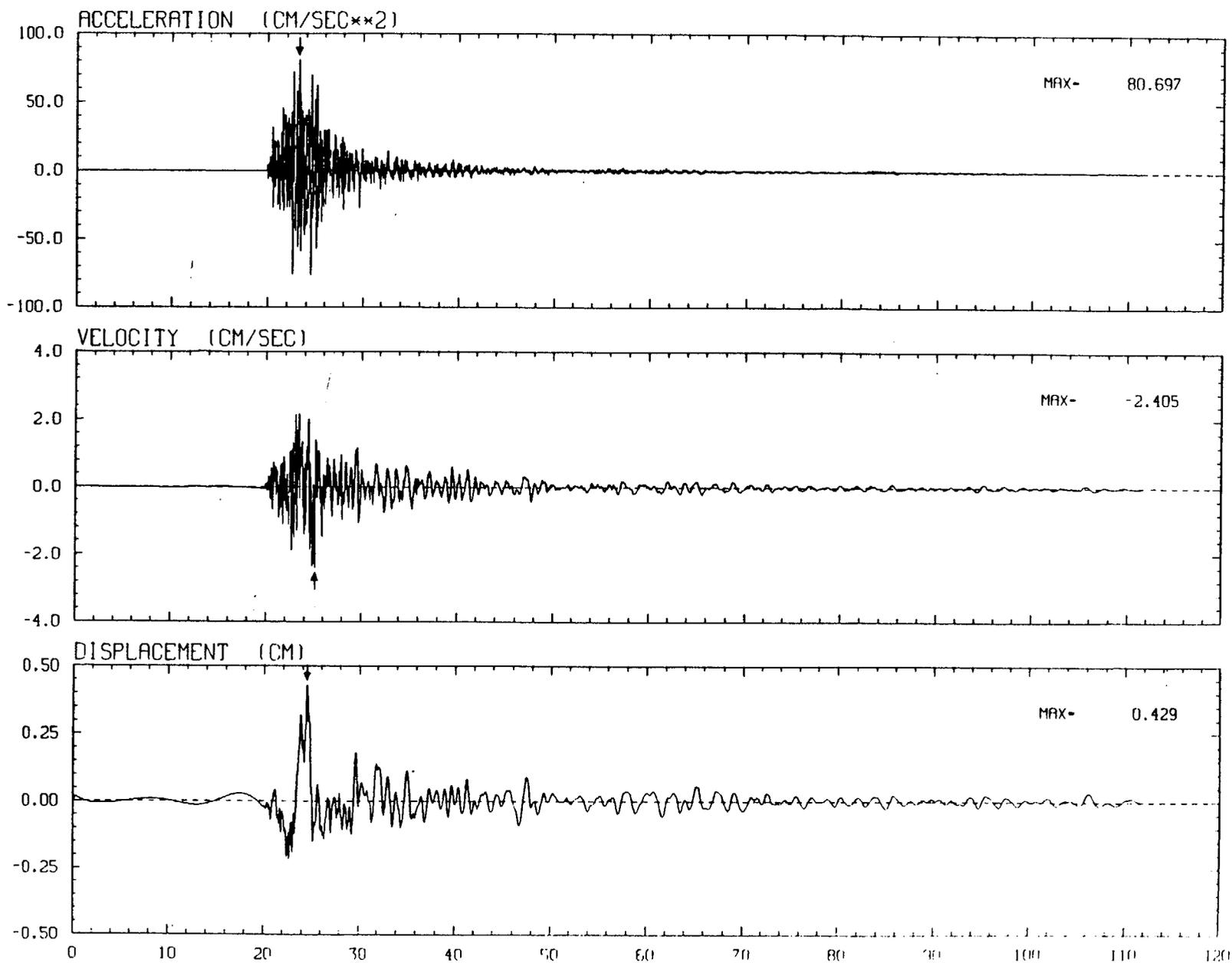


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM B
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



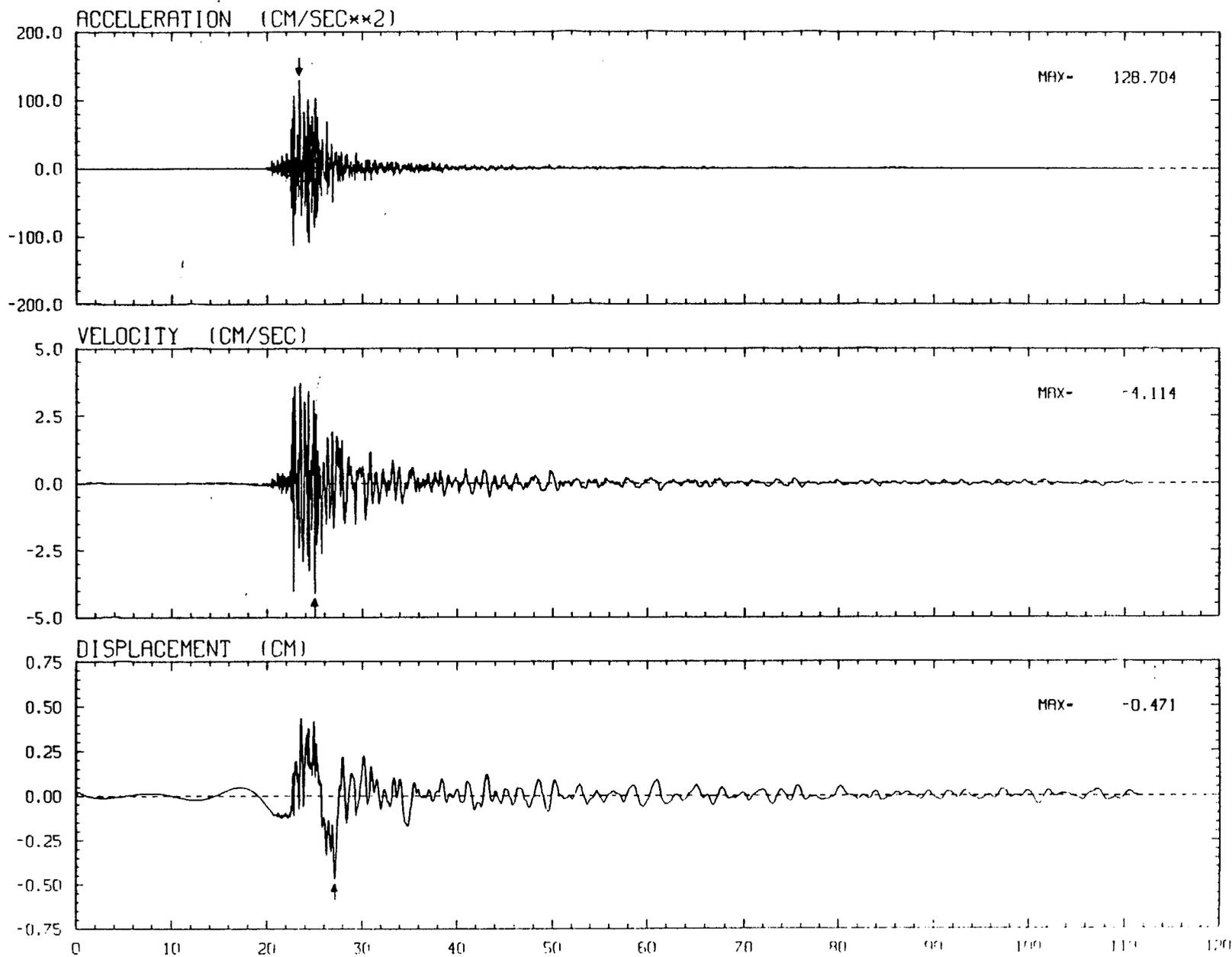
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM B CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE

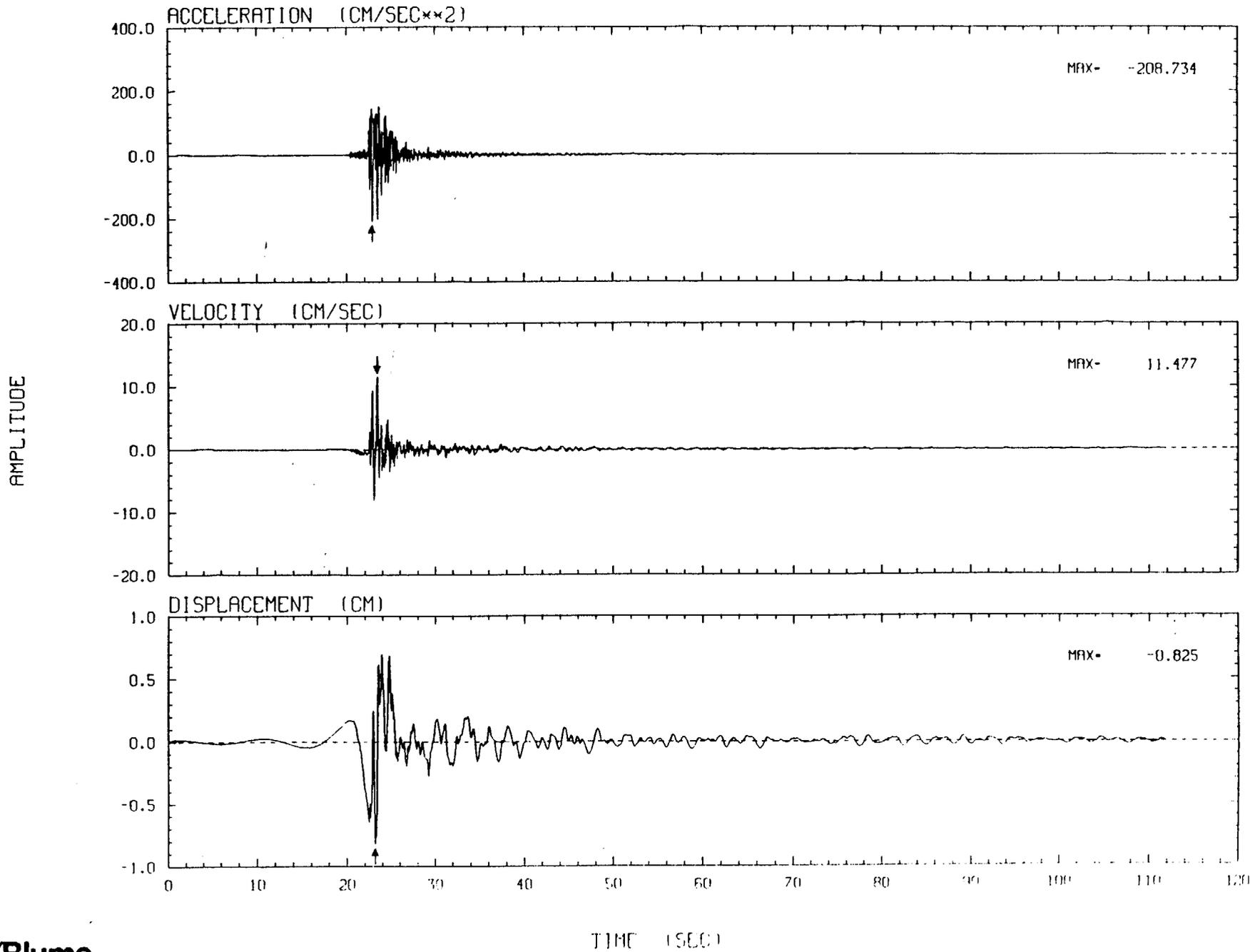


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM B CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM B CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 1 SYSTEM B

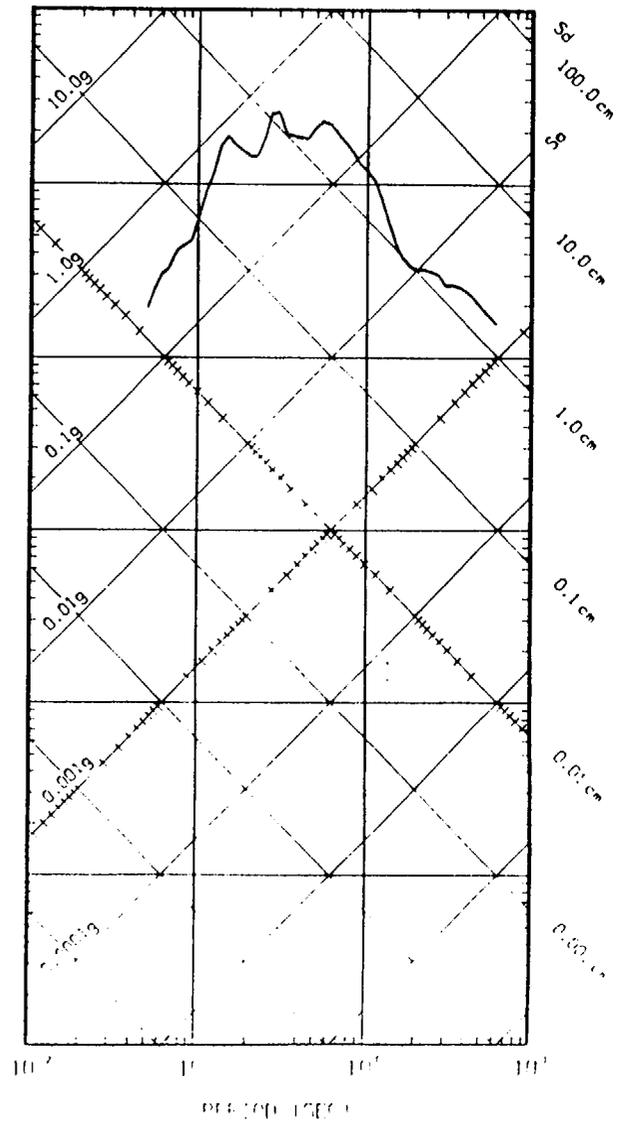
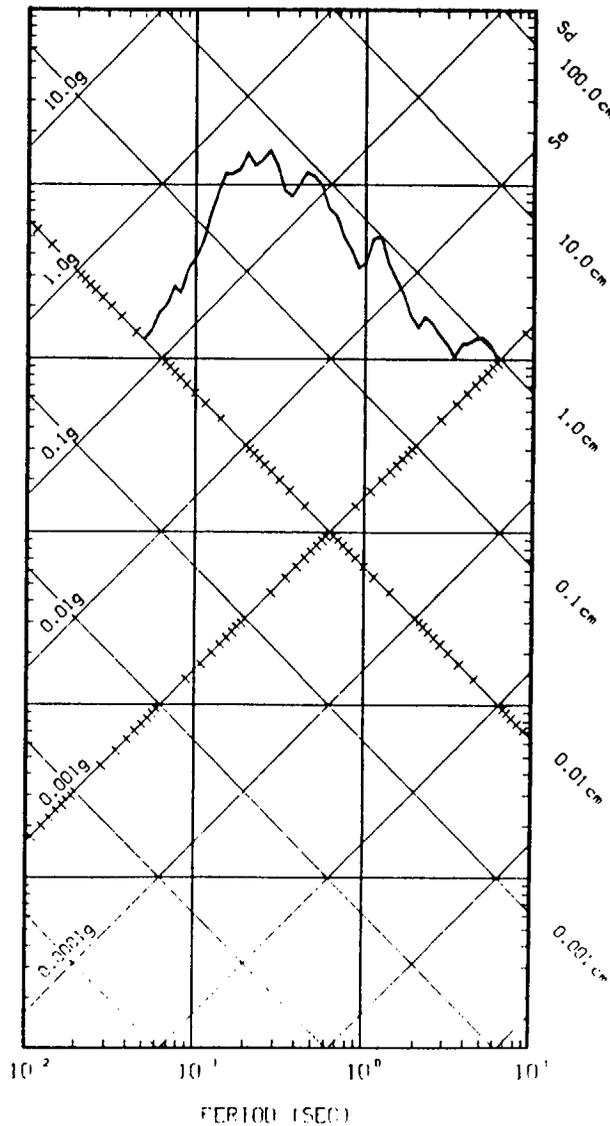
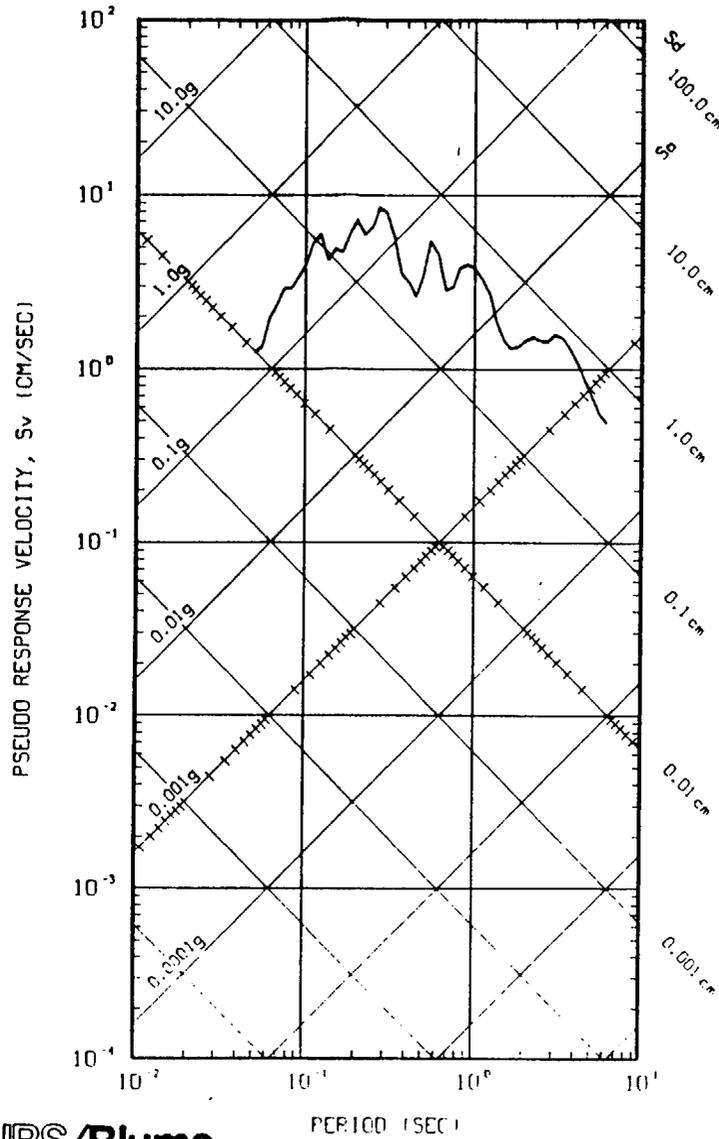
5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

0.001g
0.01g
0.1g
1.0g
10.0g

CH 1 DOWN

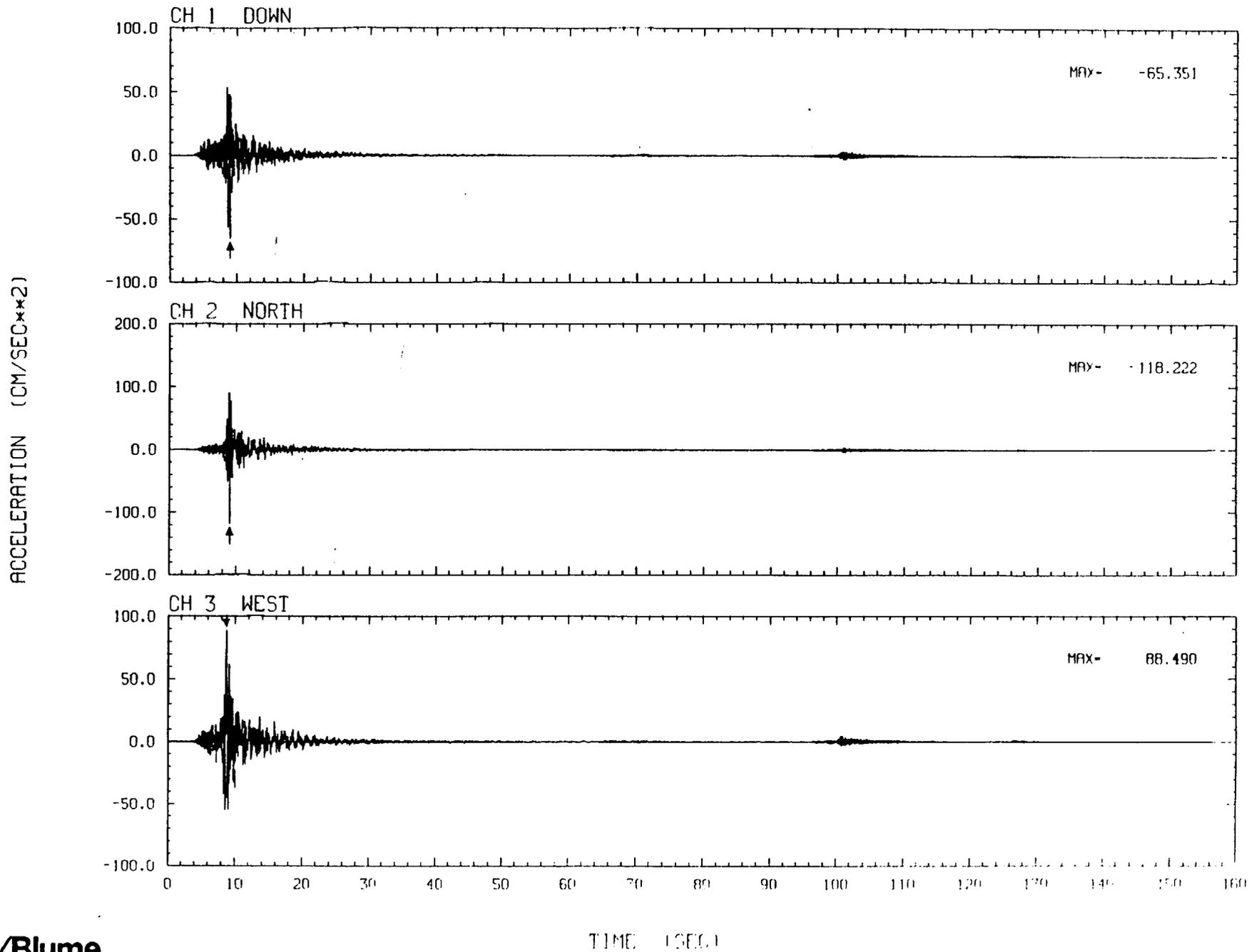
CH 2 NORTH

CH 3 WEST

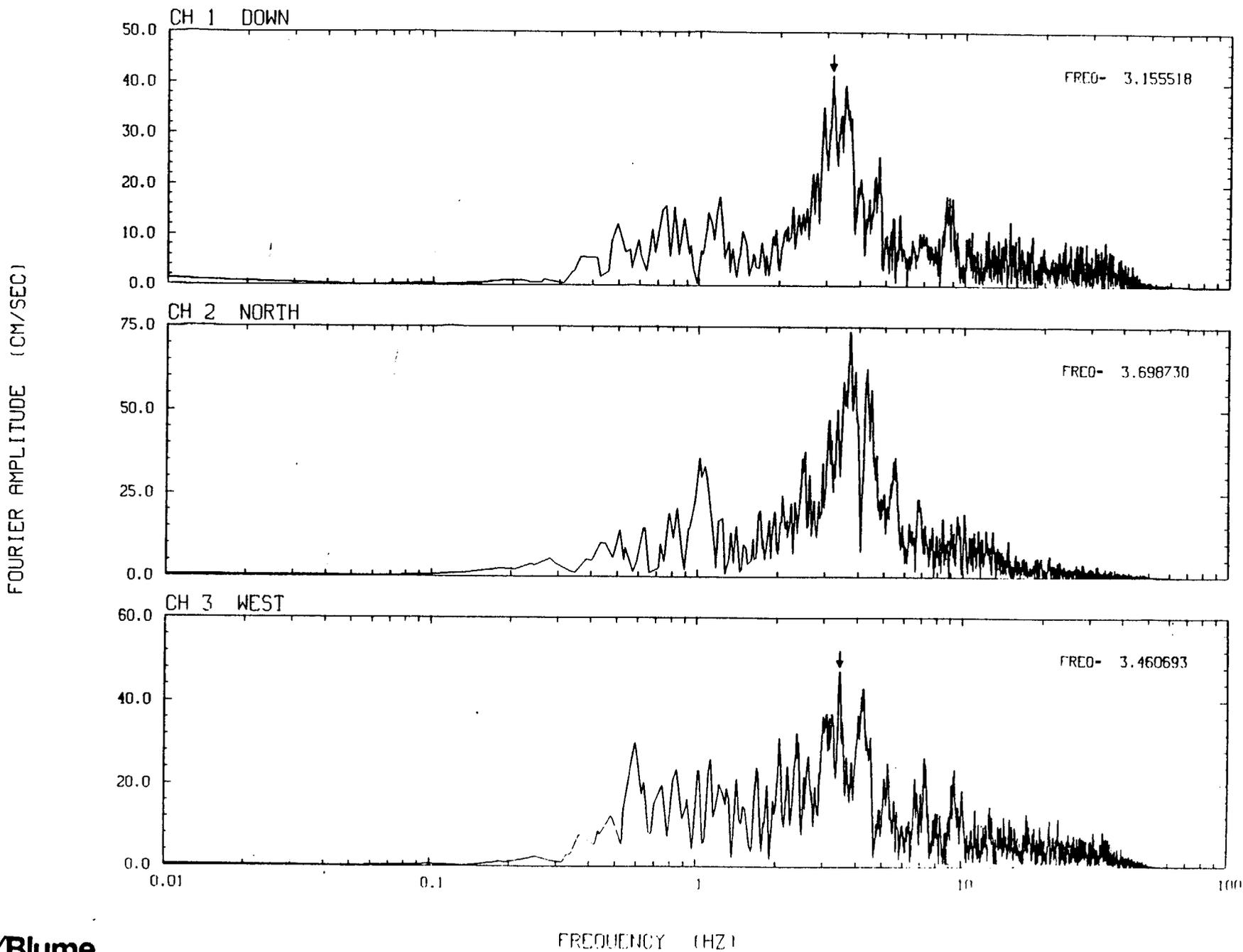


STATION NO. 2 SYSTEM A

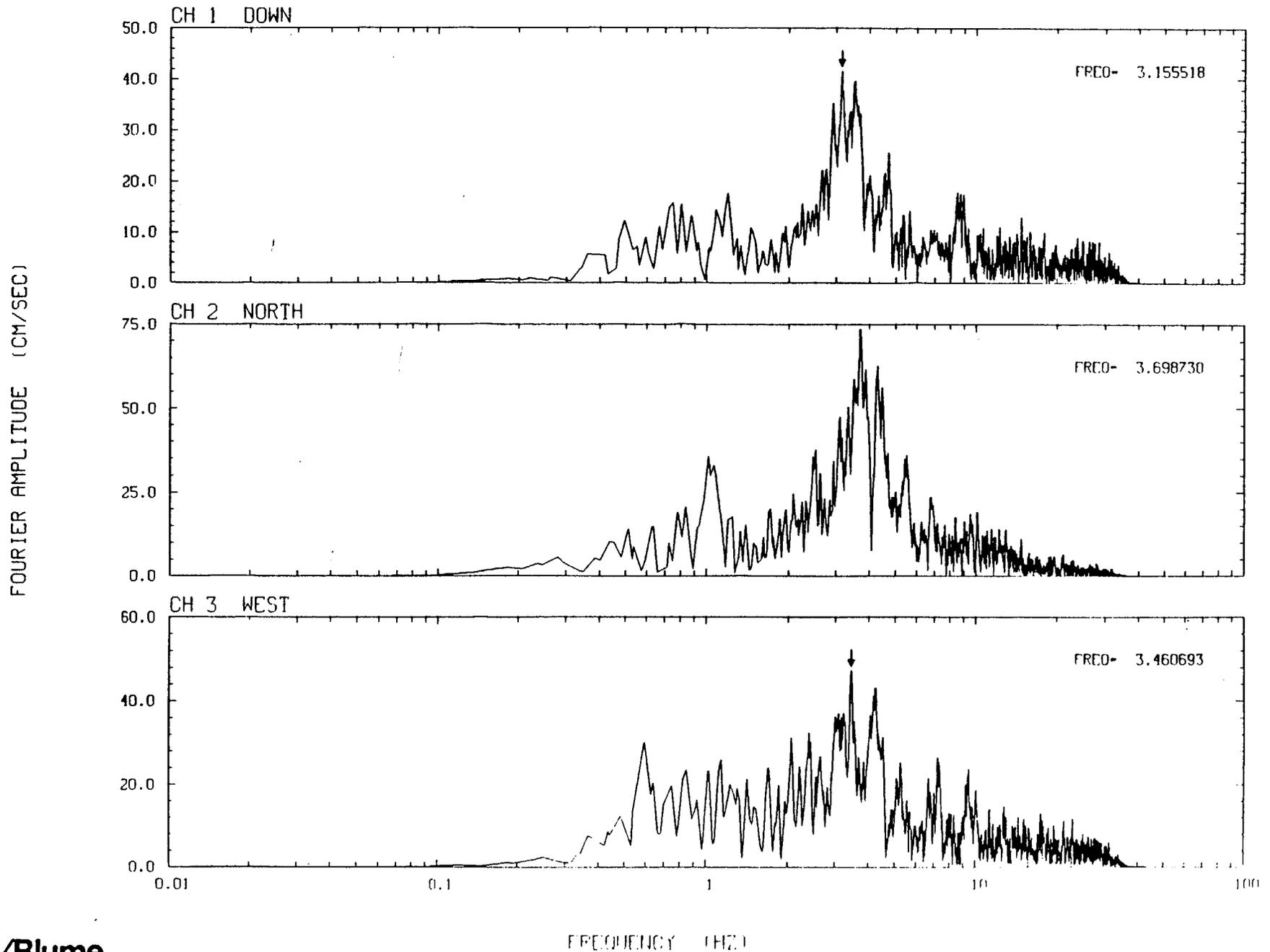
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM A
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM A
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

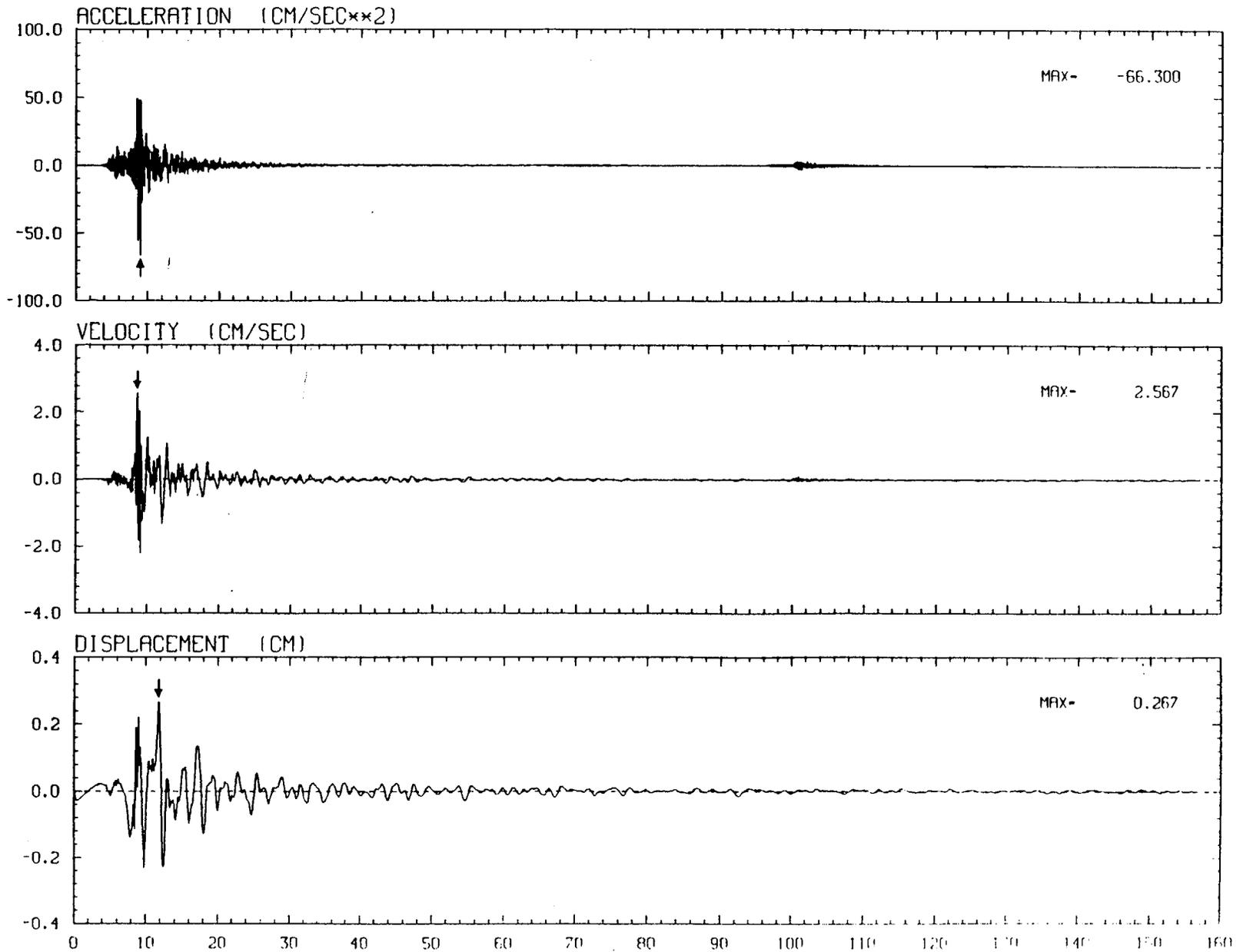


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM A
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



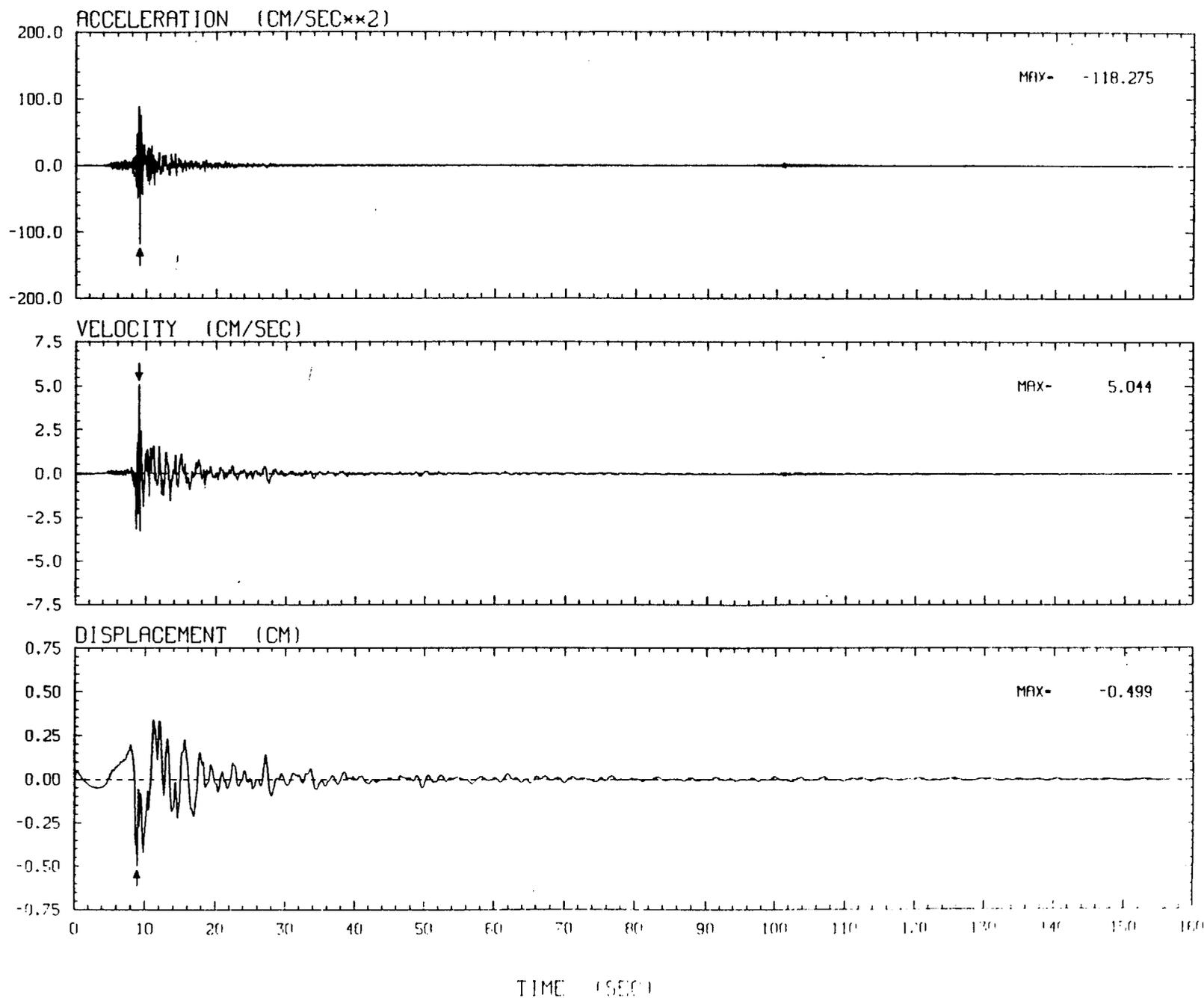
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM A CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



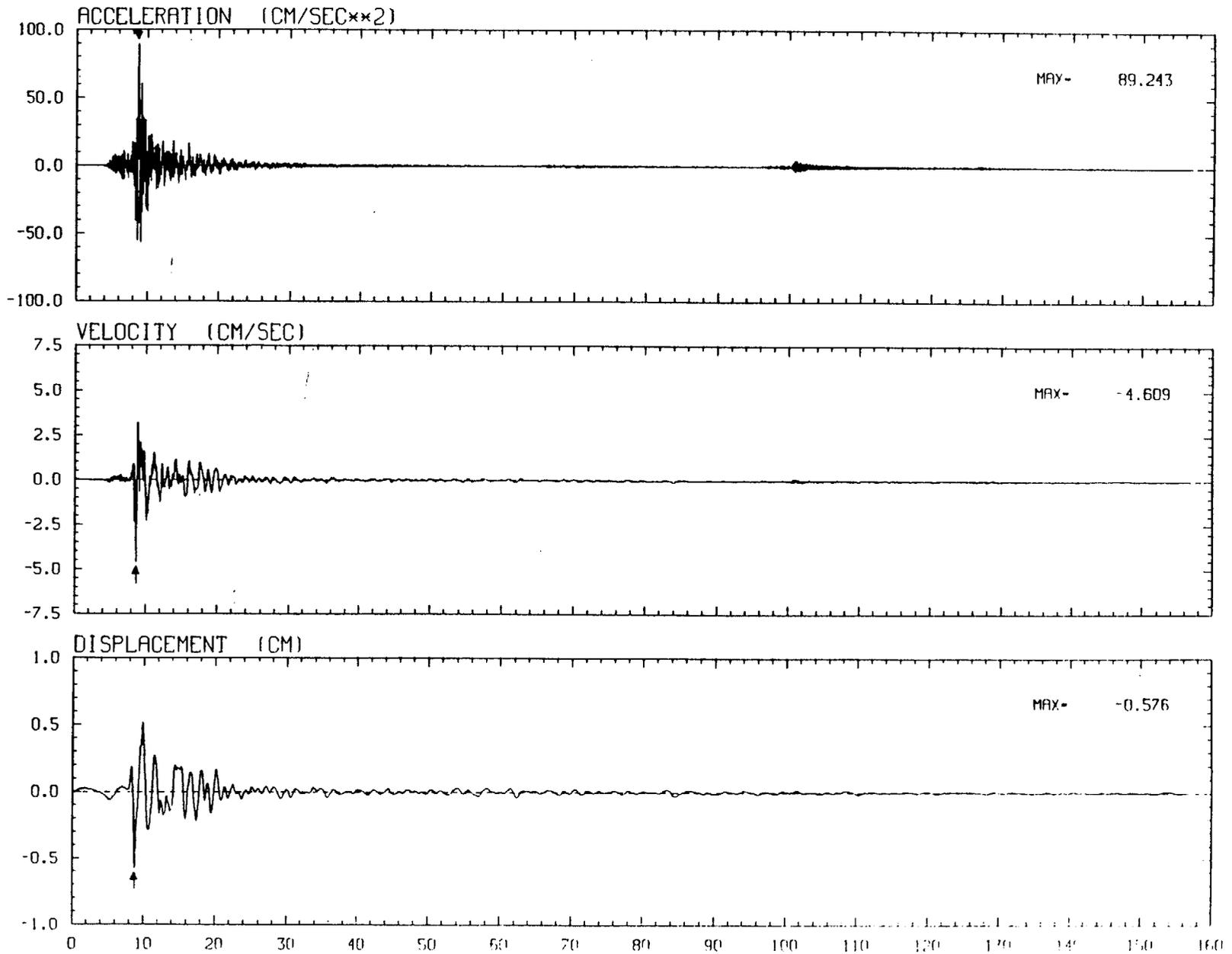
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM A CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



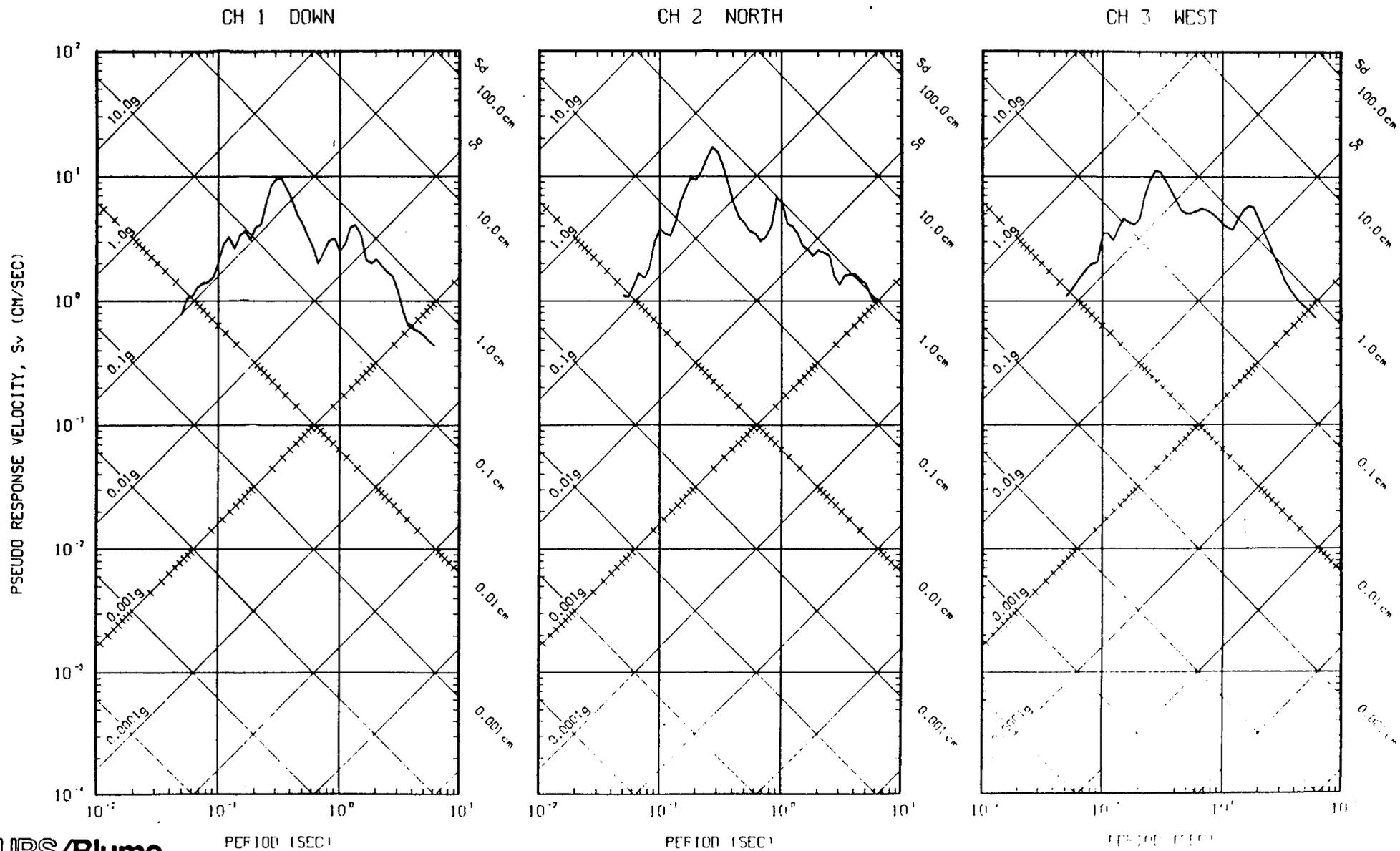
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM A CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



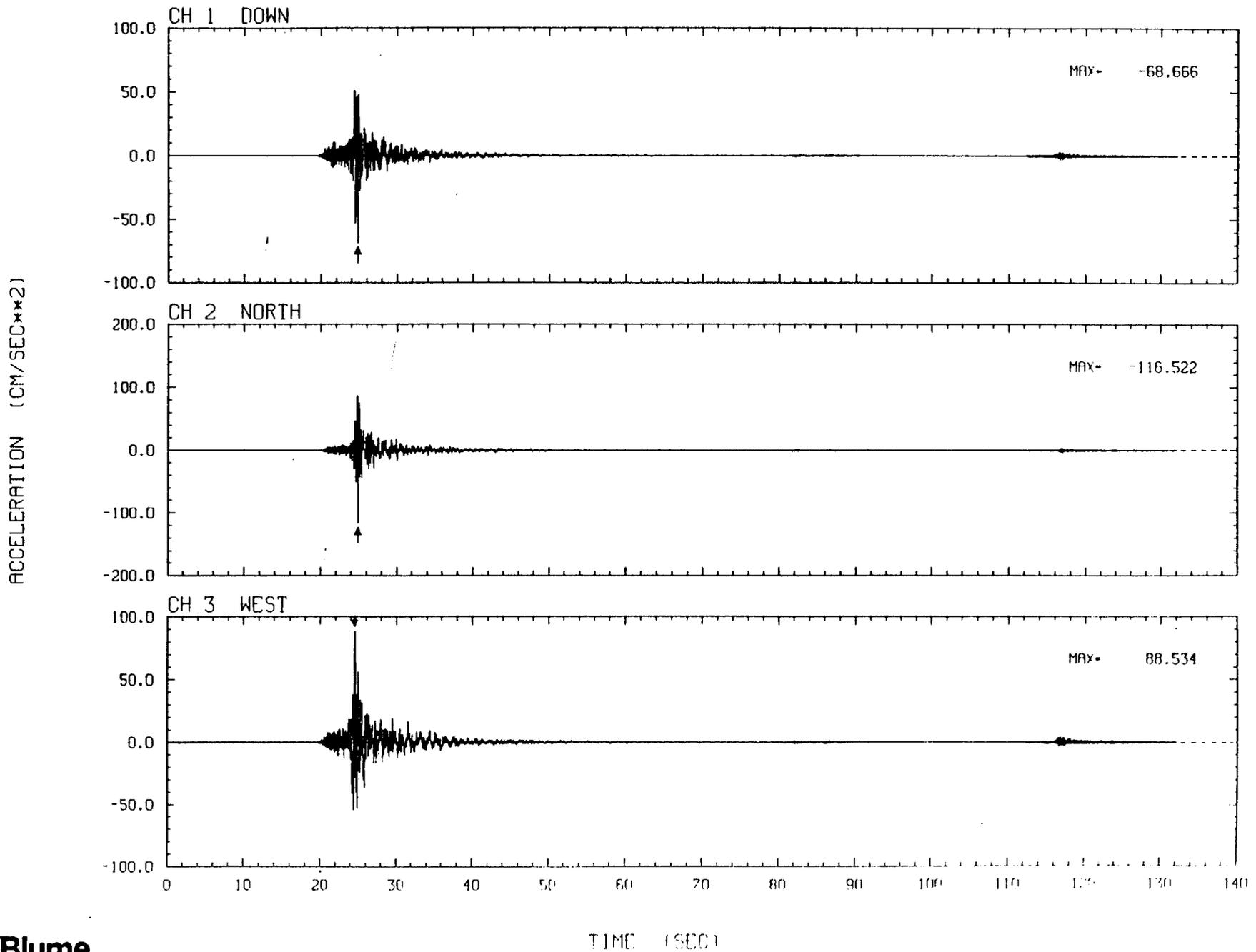
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM A

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

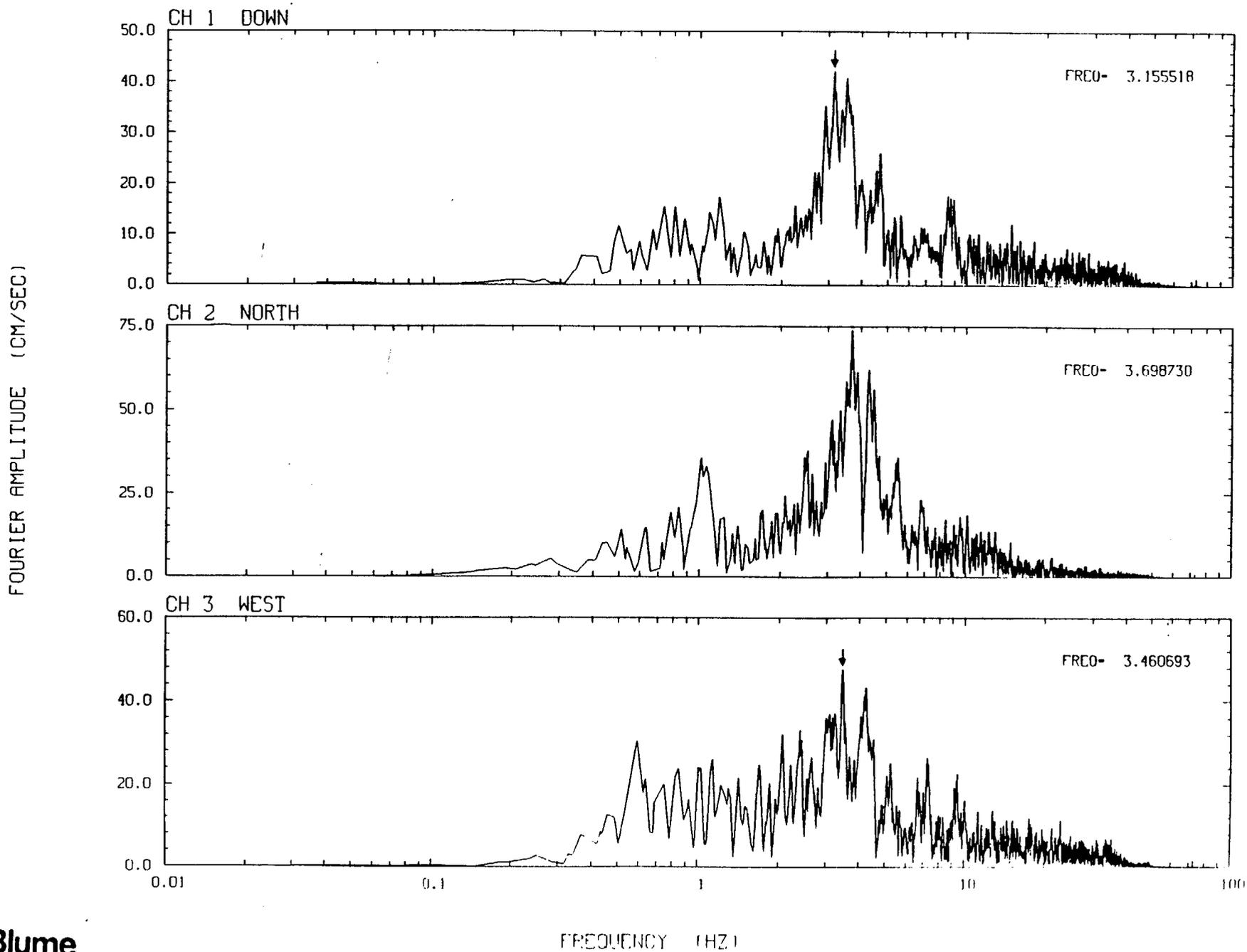


STATION NO. 2 SYSTEM B

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM B
UNCORRECTED ACCELERATION TIME HISTORIES



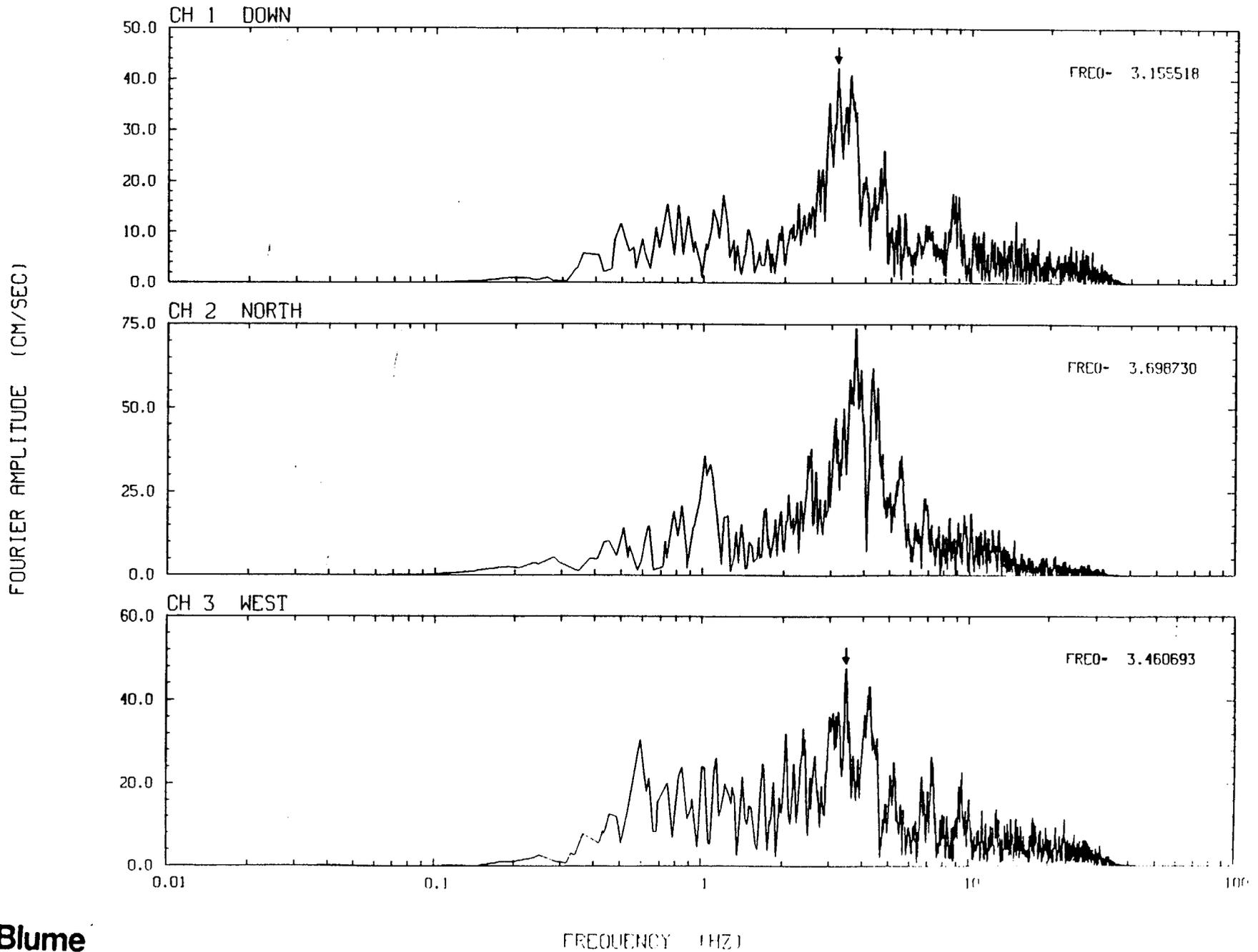
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM B
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

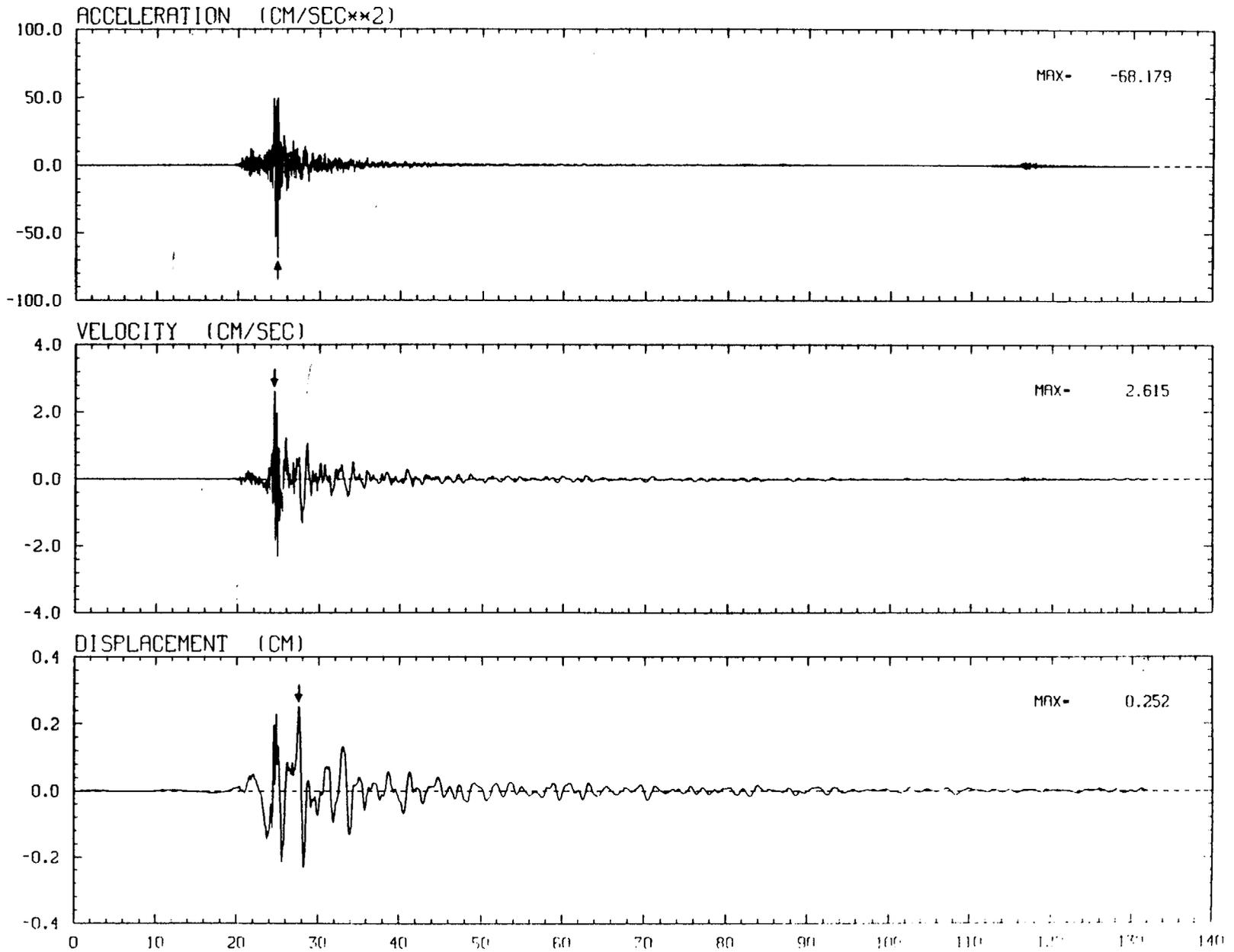
STATION NO. 2 SYSTEM B

CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

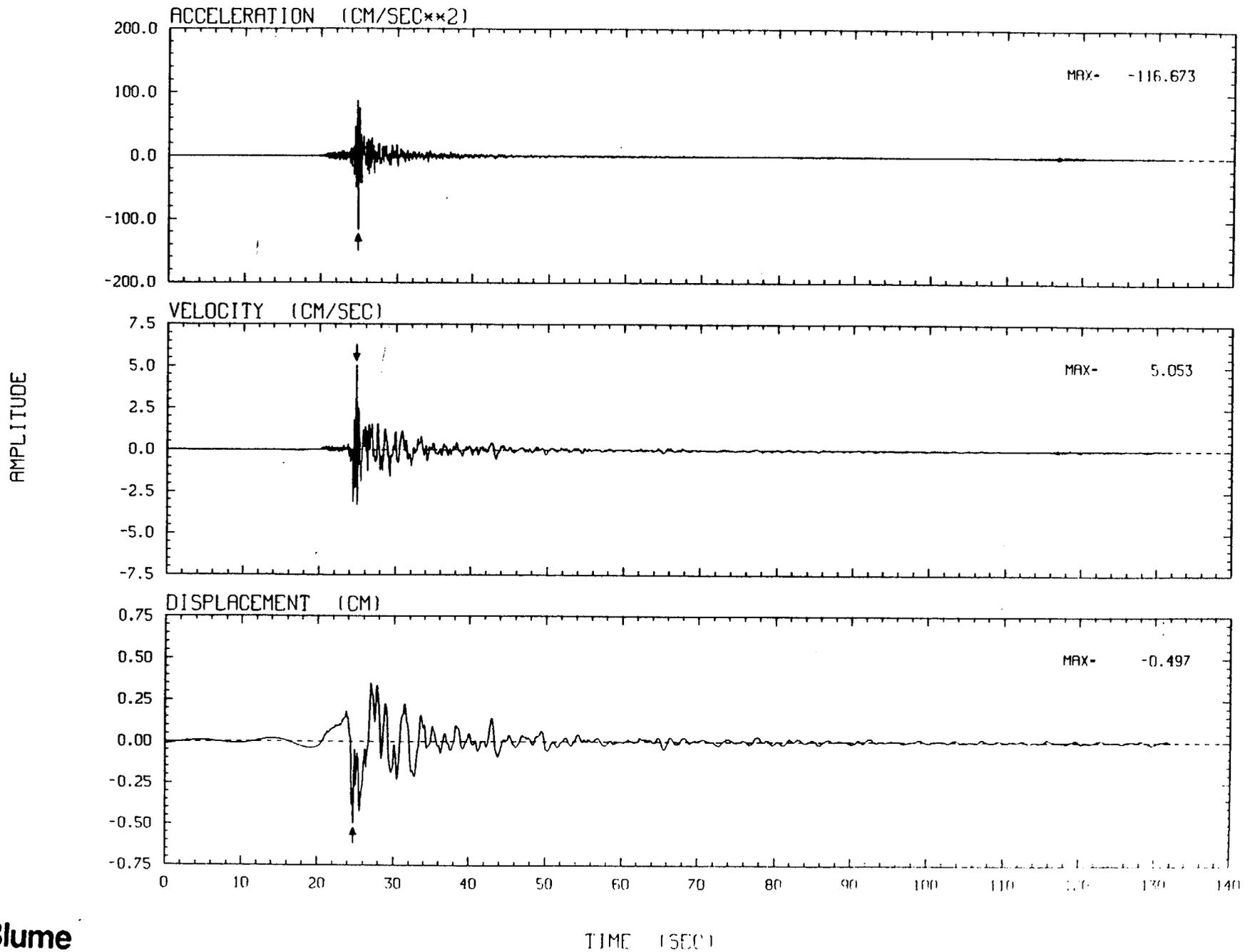


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM B CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE

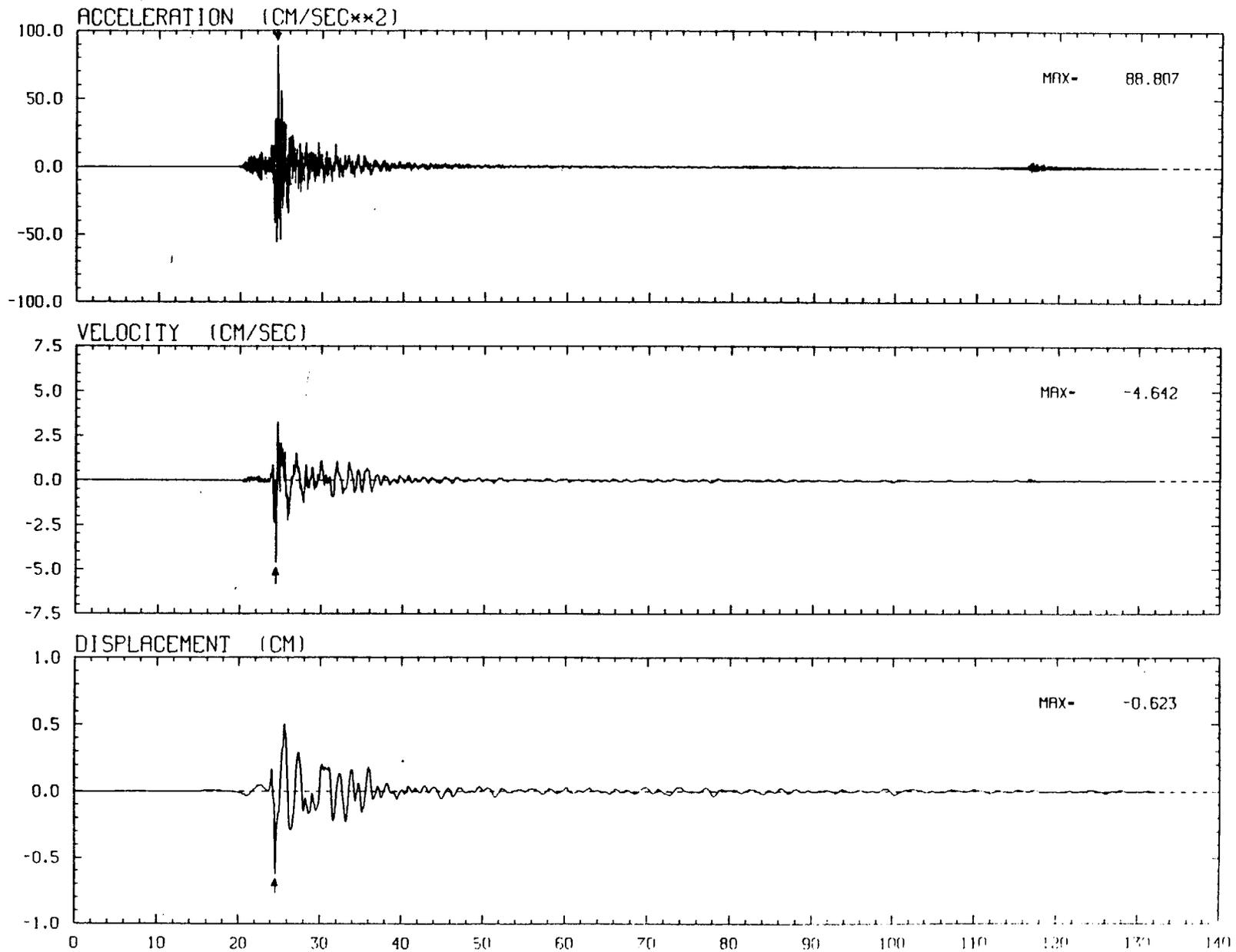


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM B CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM B CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

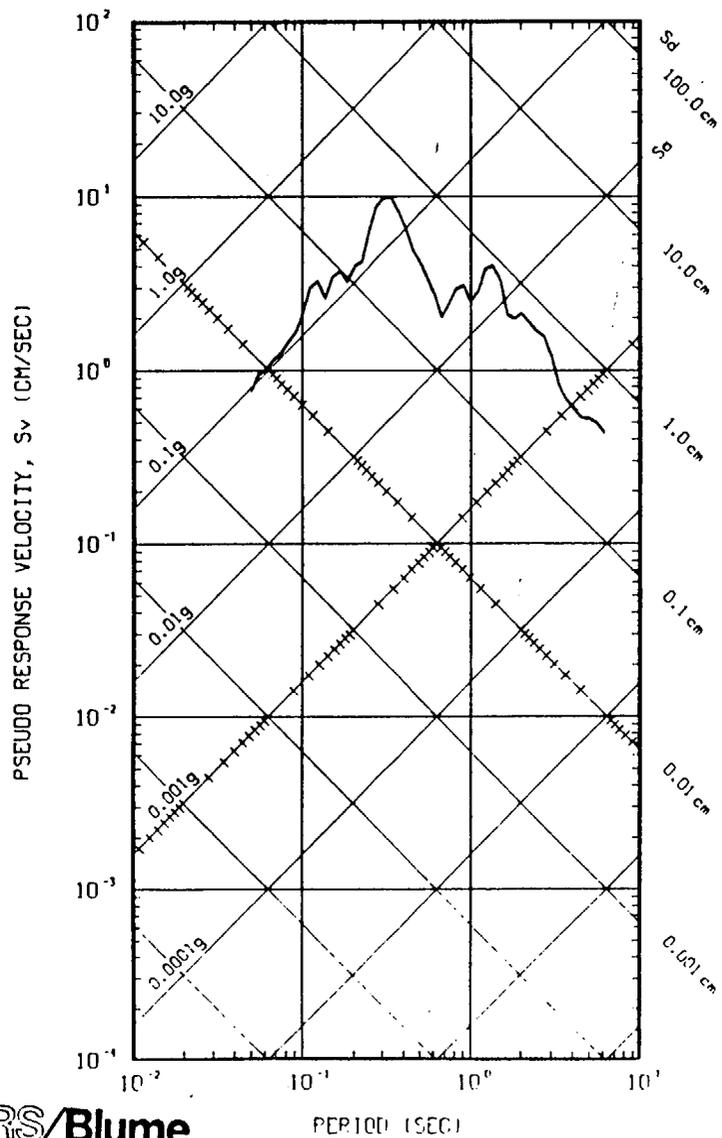
AMPLITUDE



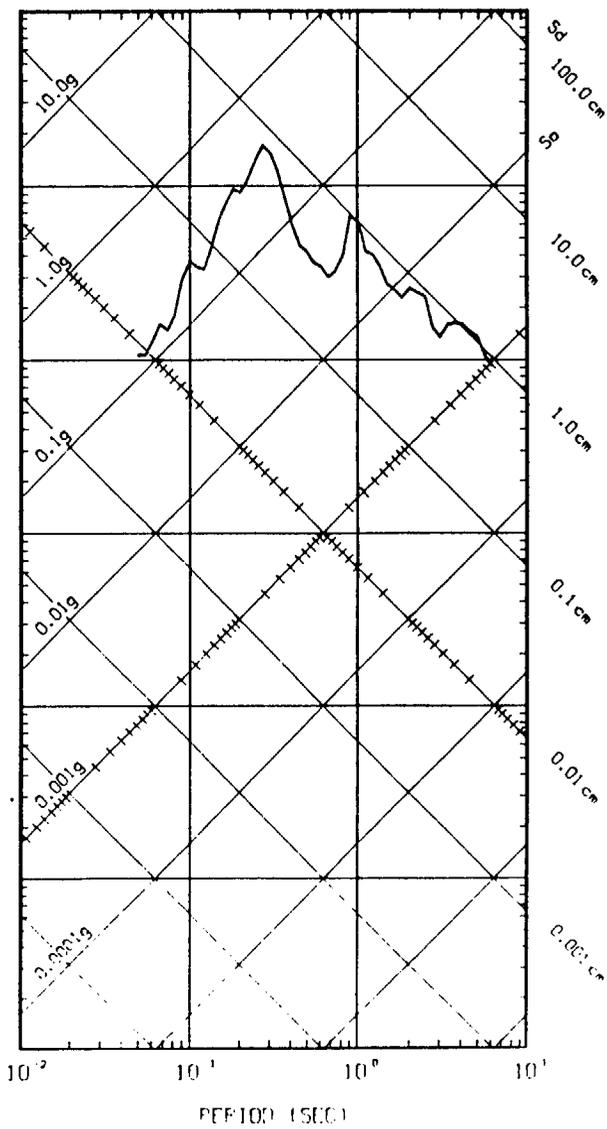
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 2 SYSTEM B

5 PCT DAMPED PESUDO VELOCITY RESPONSE SPECTRA

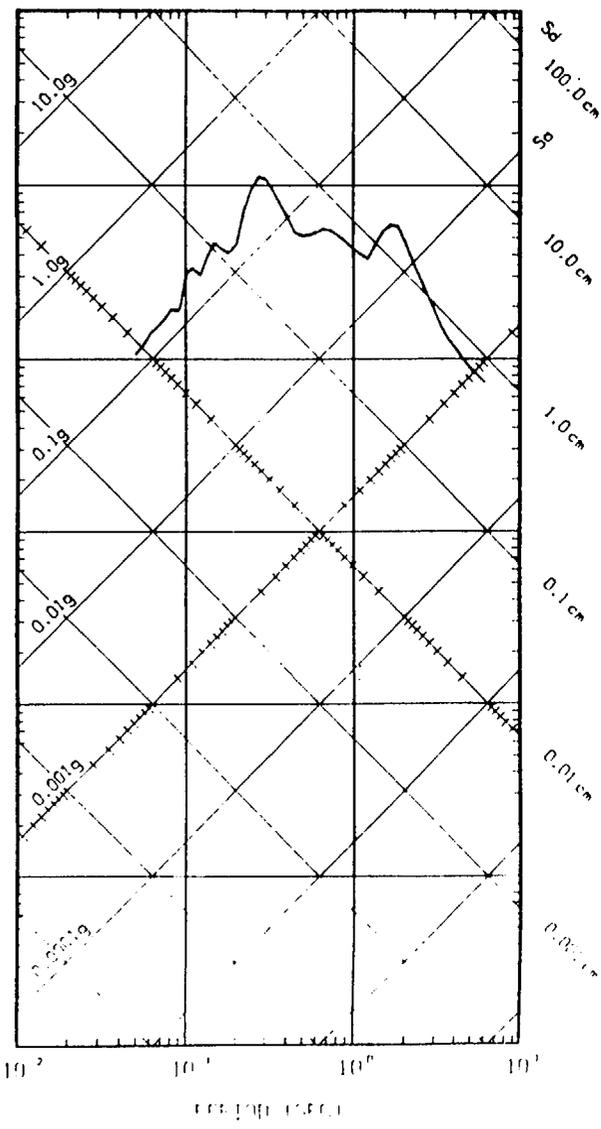
CH 1 DOWN



CH 2 NORTH



CH 3 WEST

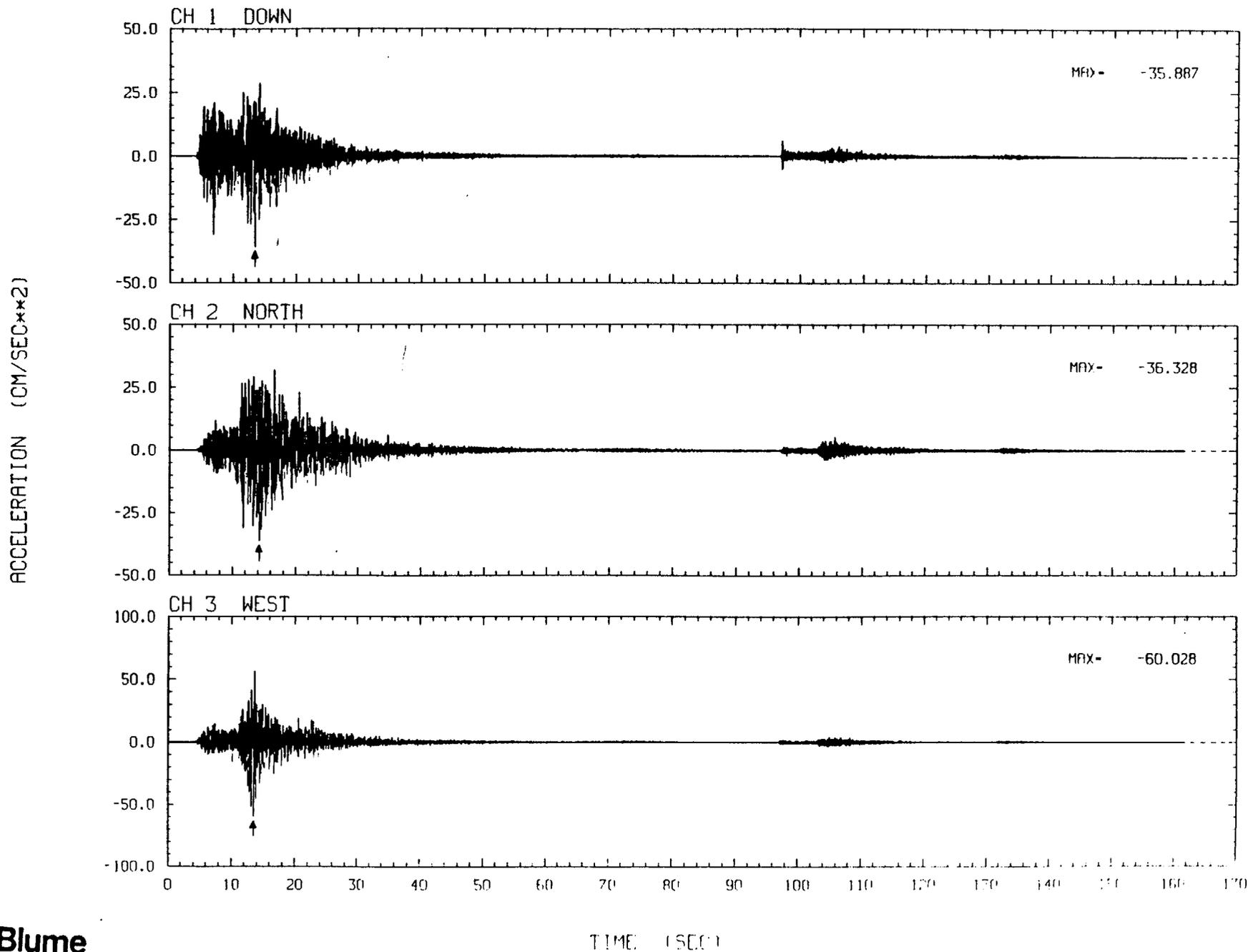


STATION NO. 3

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 3

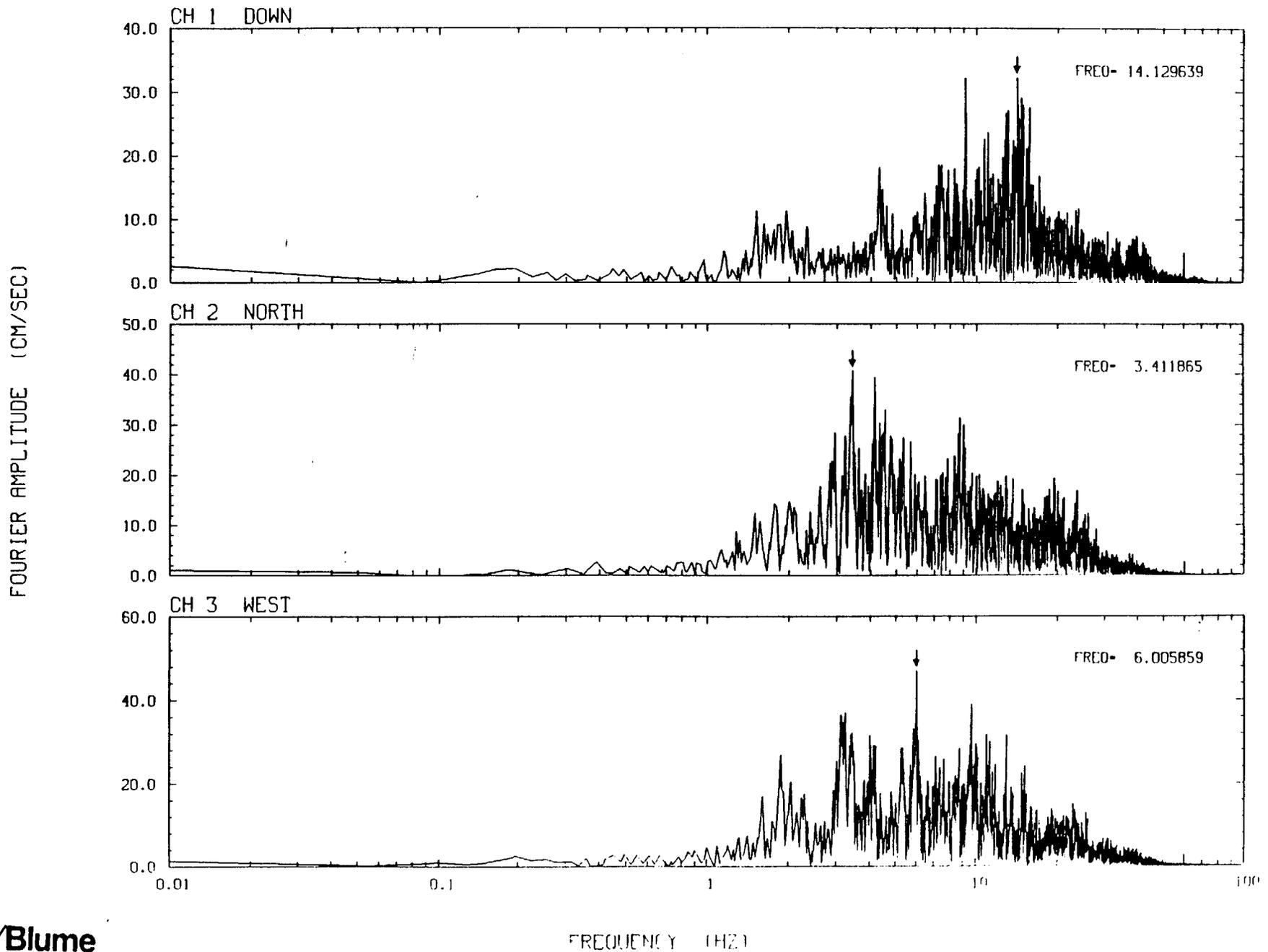
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 3

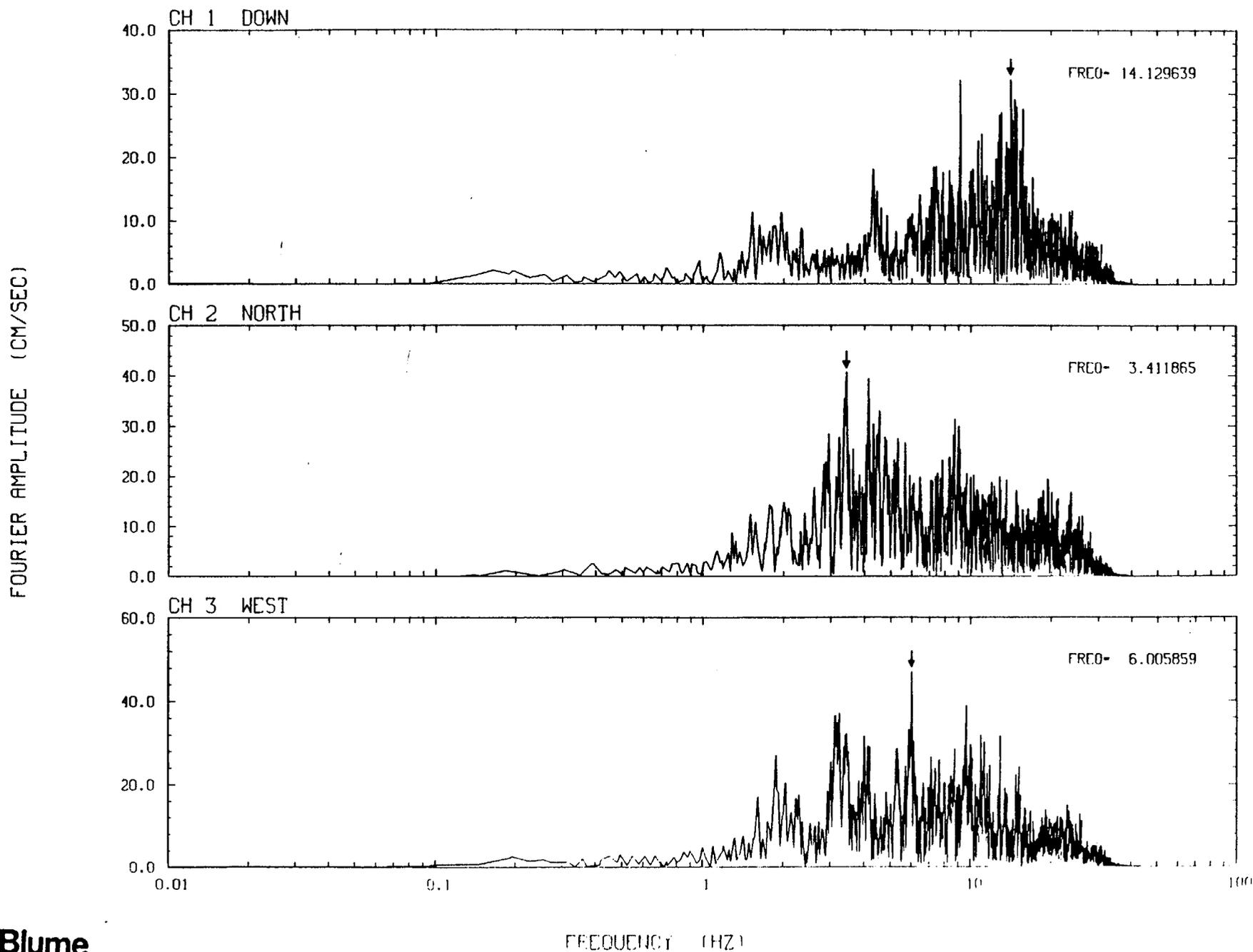
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

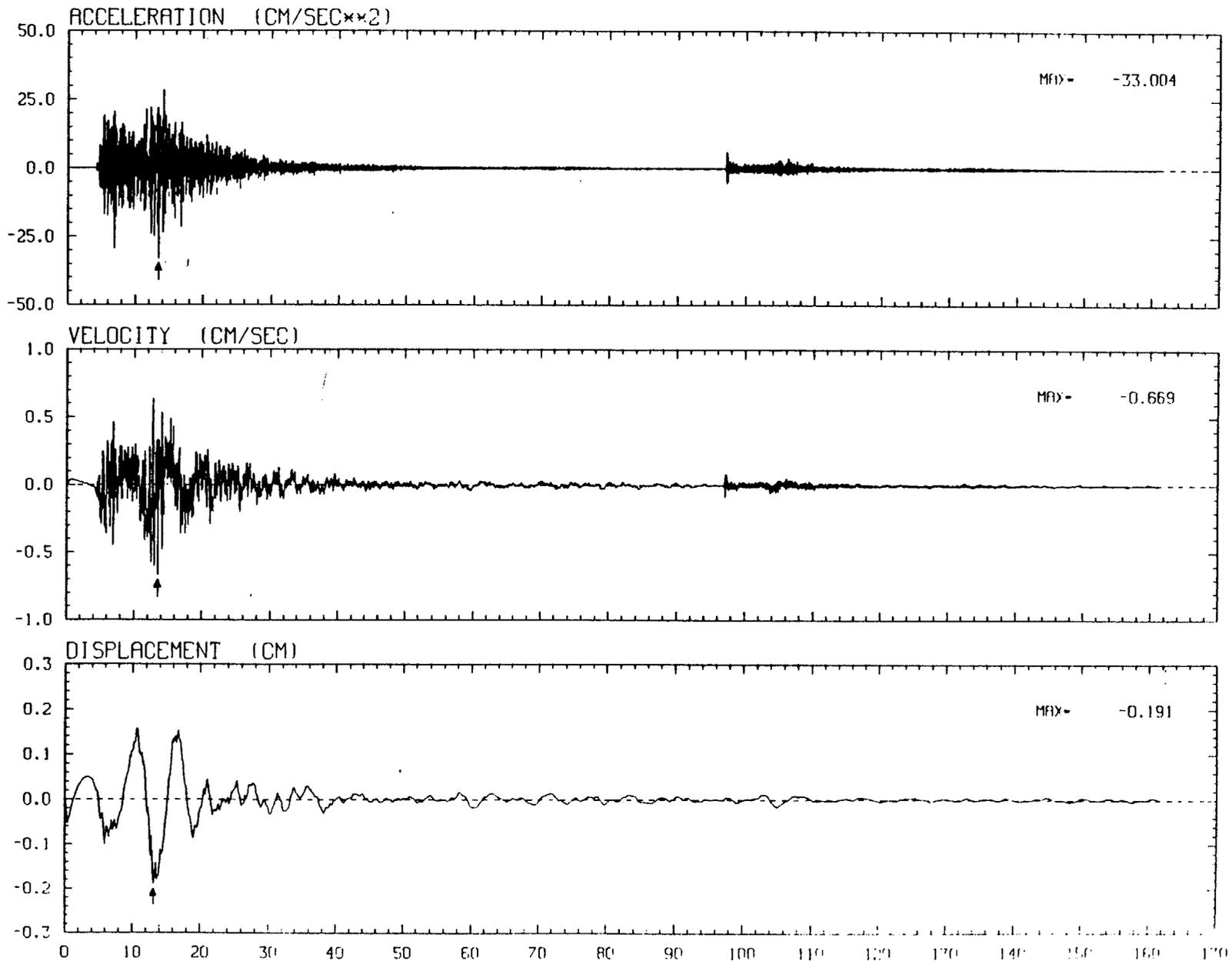
STATION NO. 3

CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



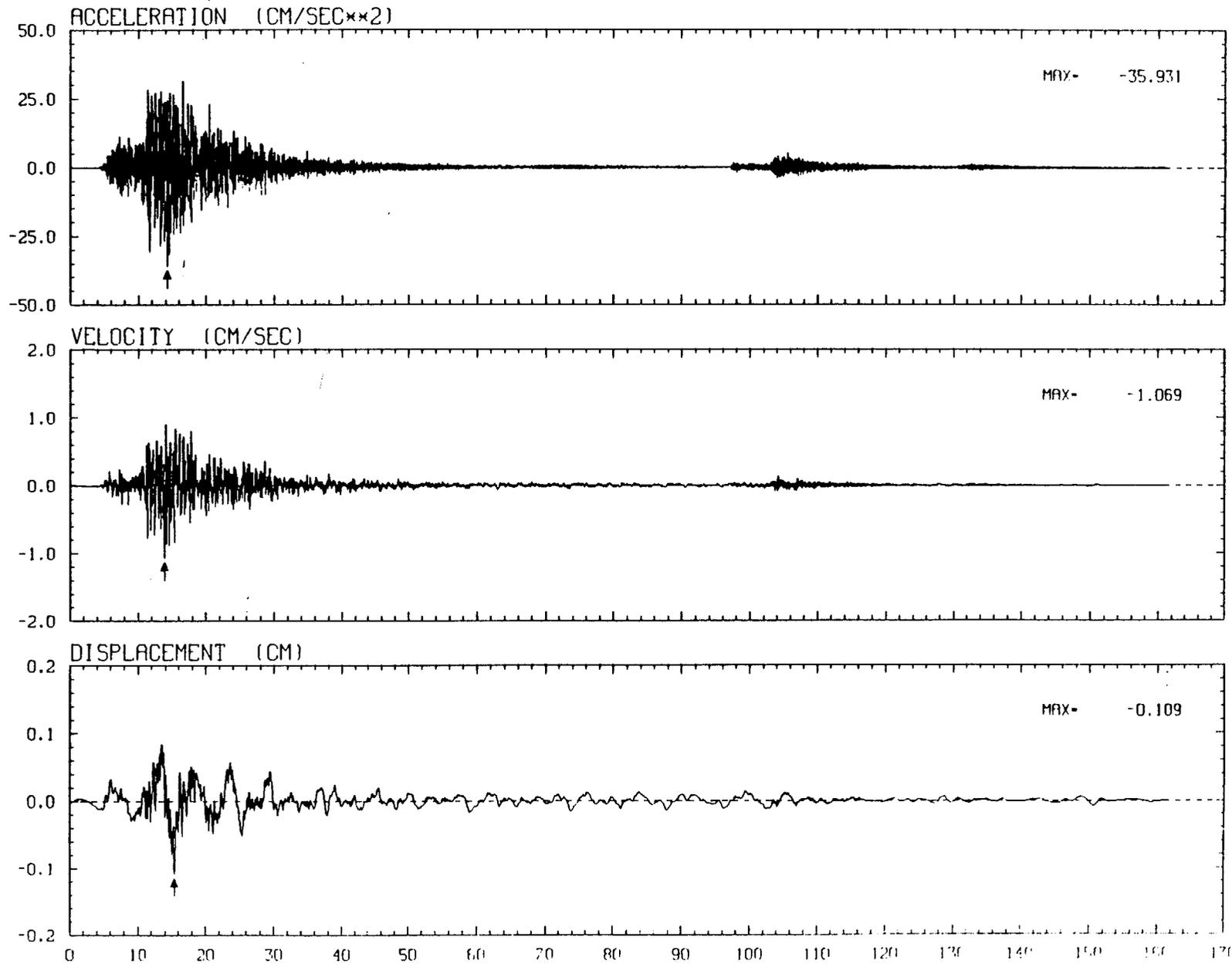
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 3 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



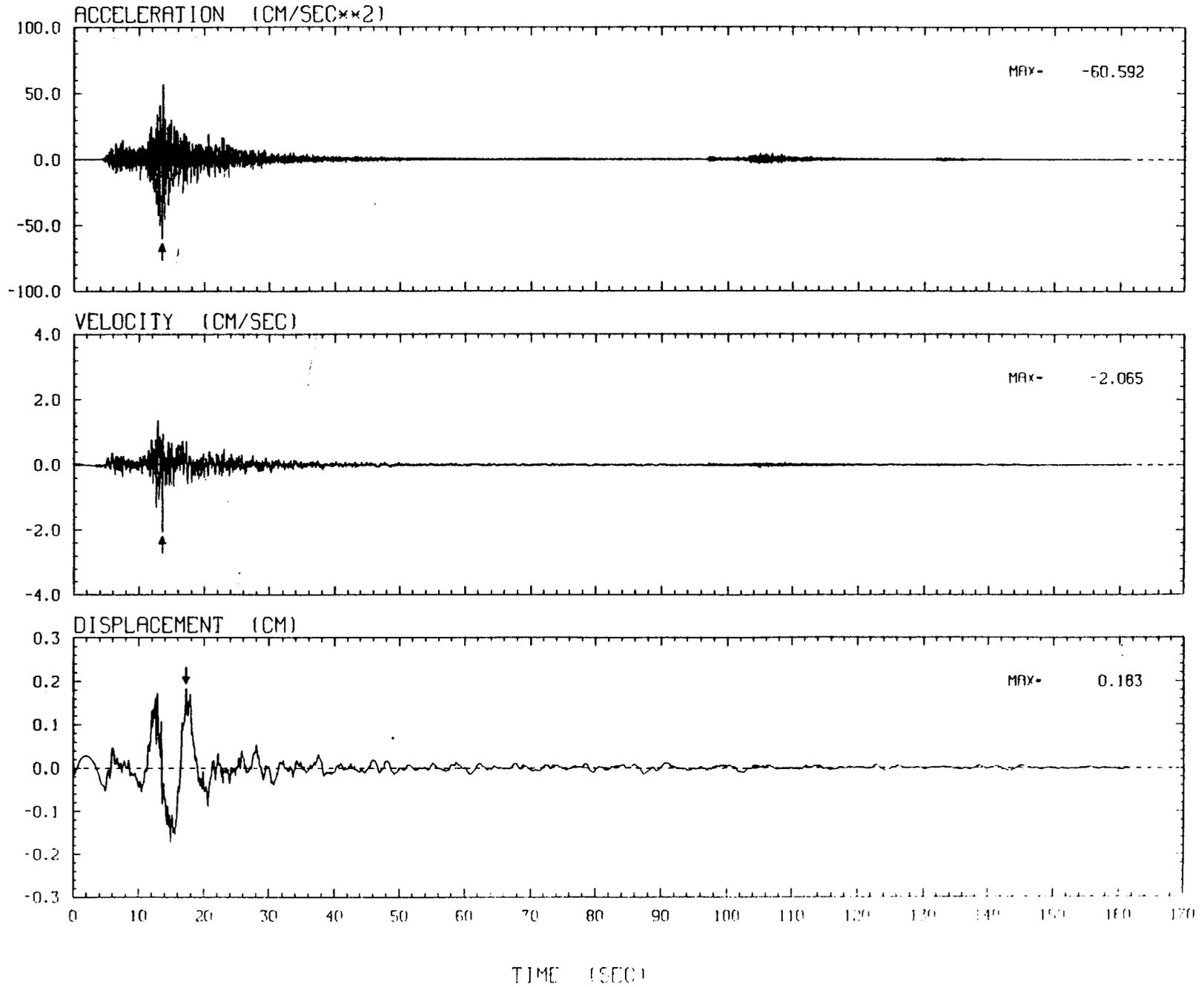
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 3 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 3 CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



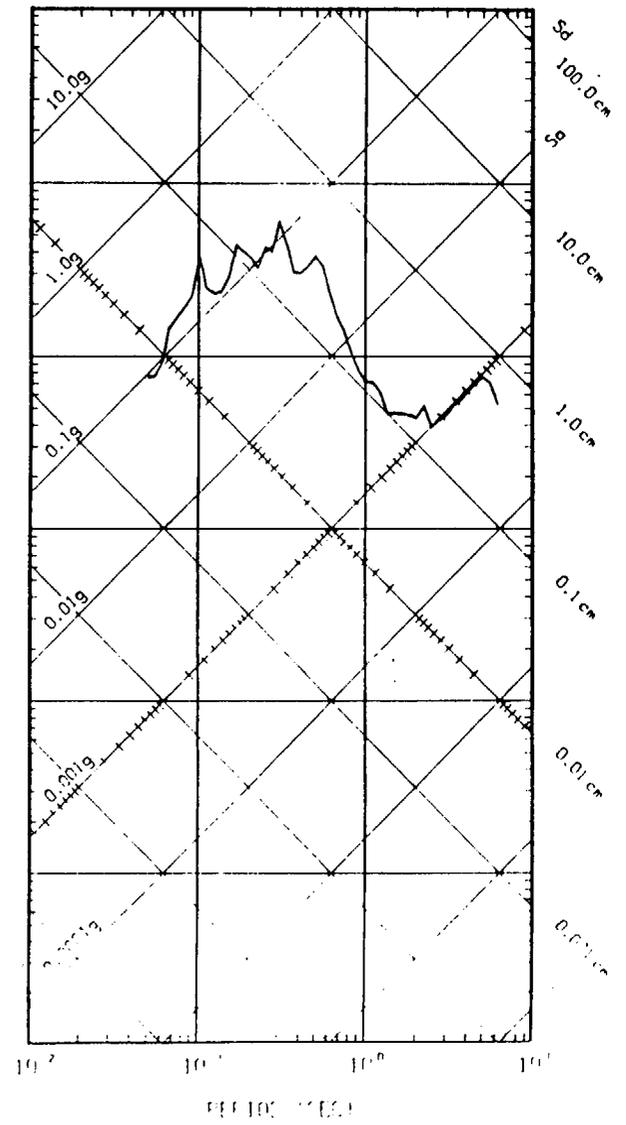
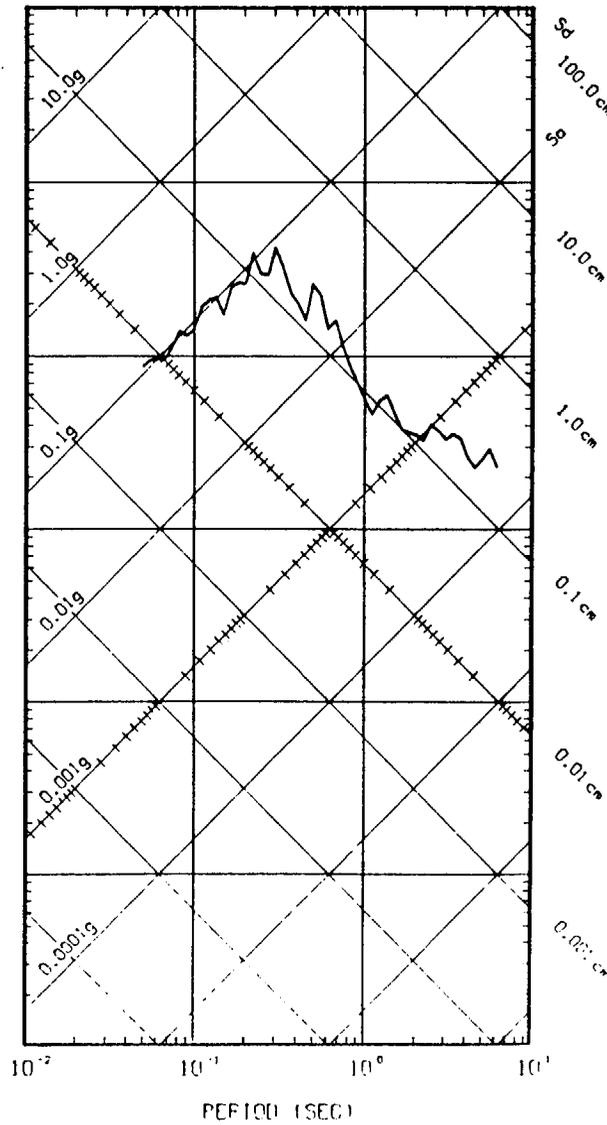
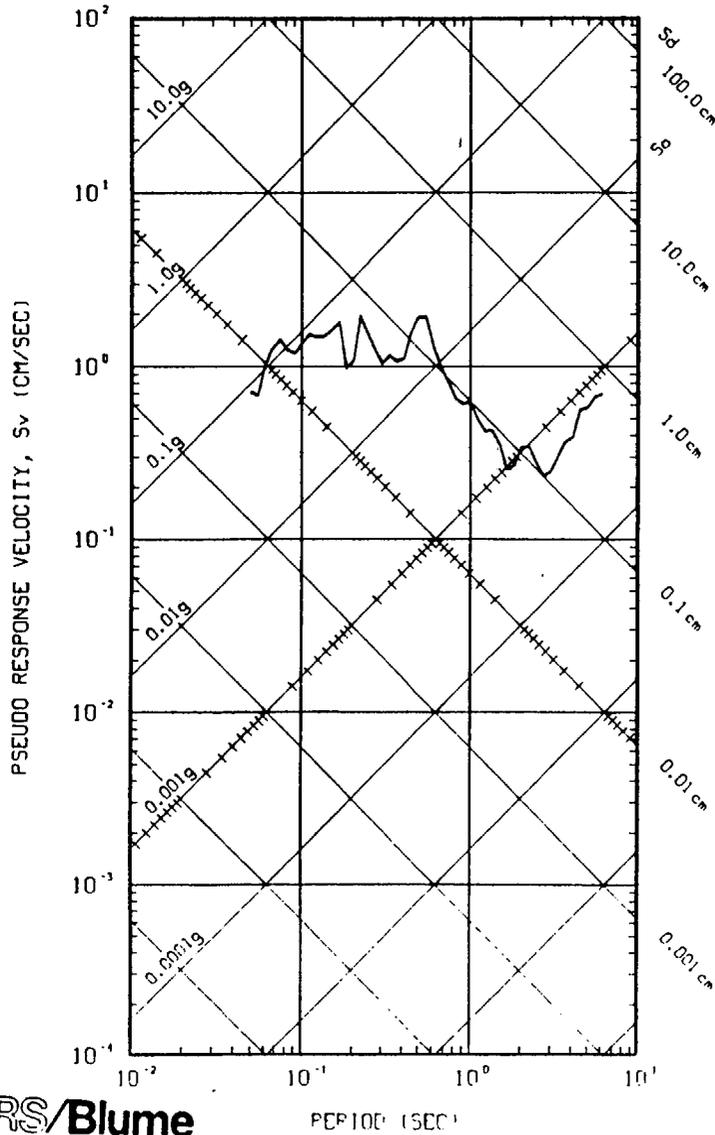
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 3

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

CH 1 DOWN

CH 2 NORTH

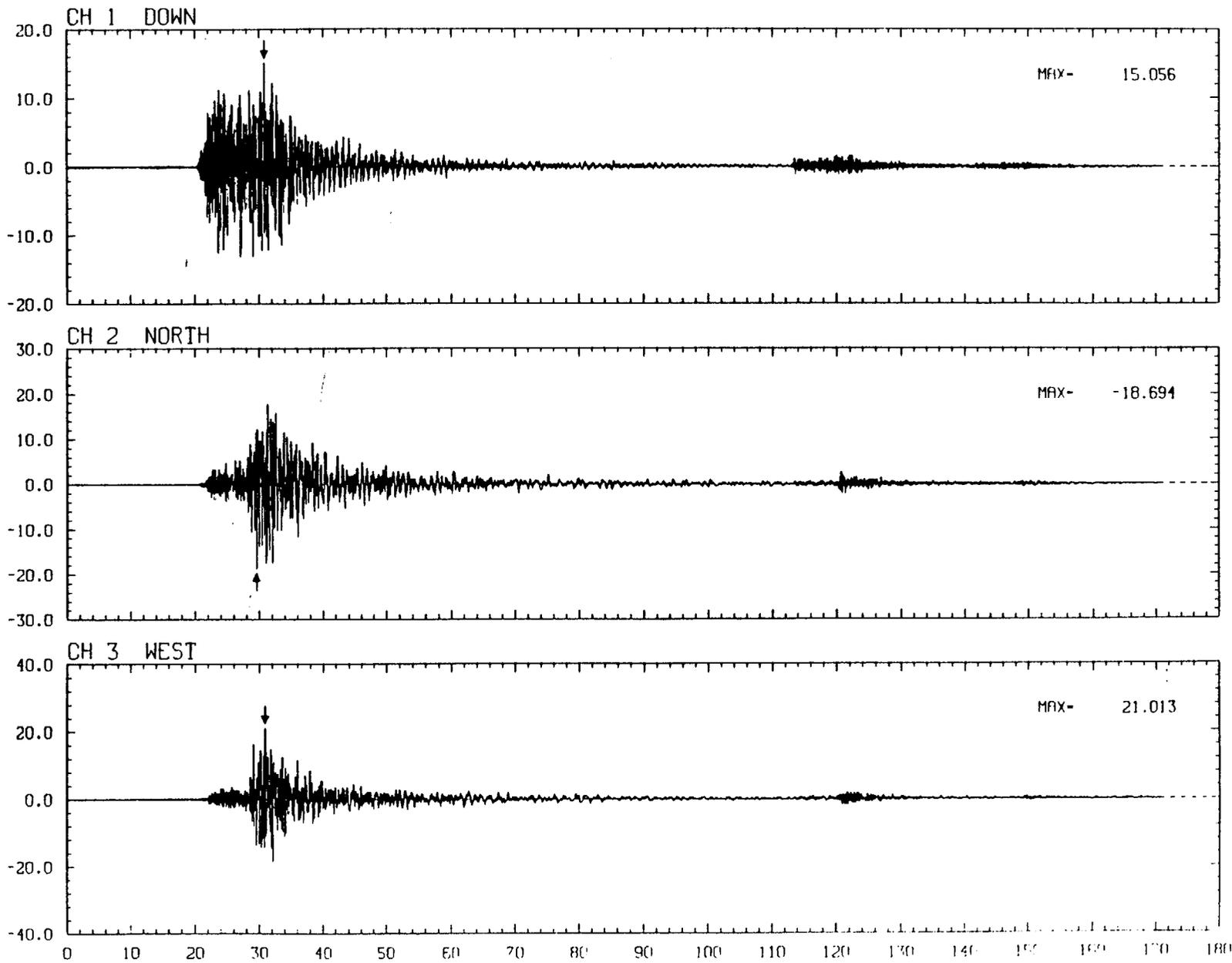
CH 3 WEST



STATION NO. 4

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 4
UNCORRECTED ACCELERATION TIME HISTORIES

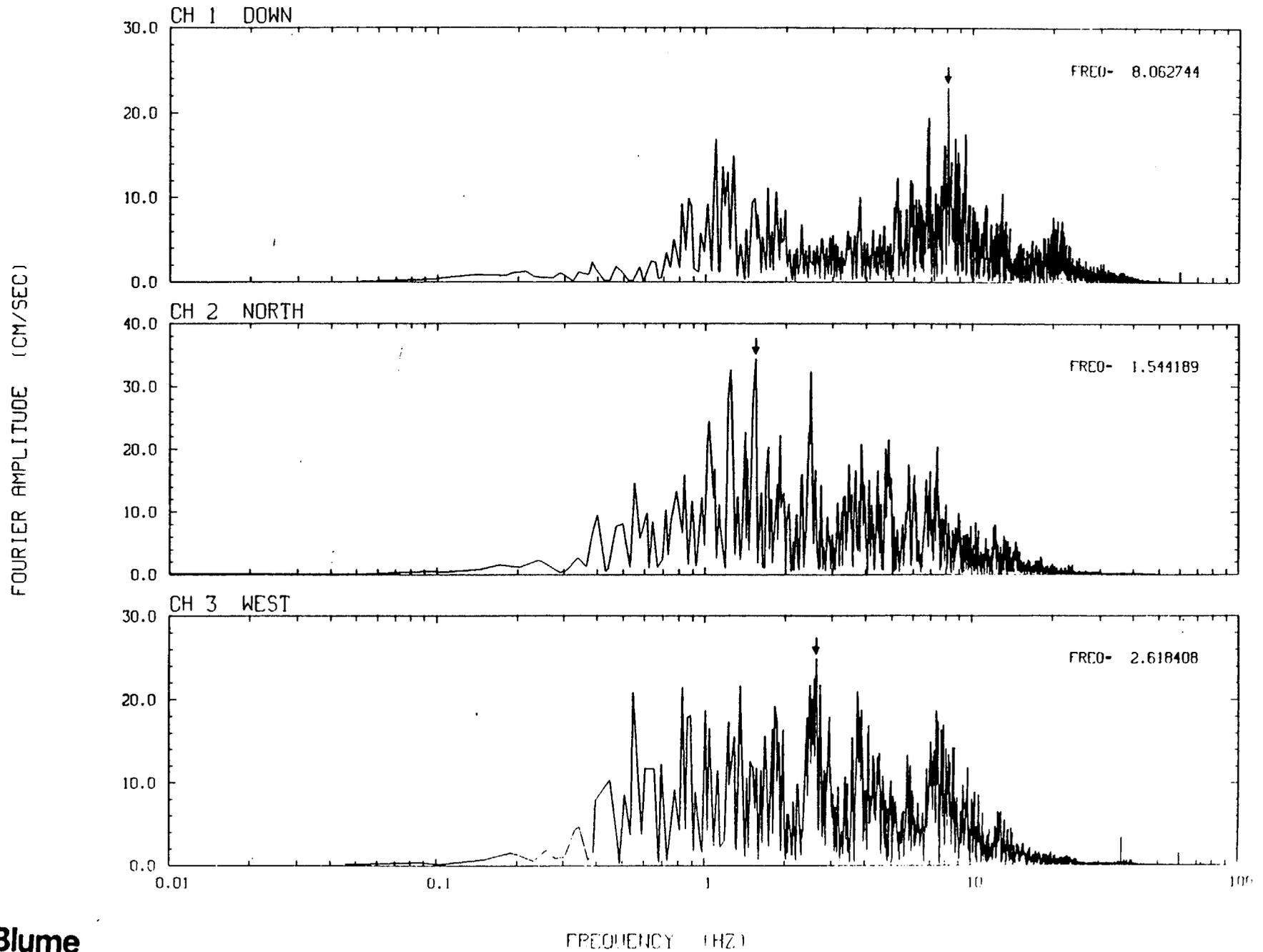
ACCELERATION (CM/SEC**2)



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 4

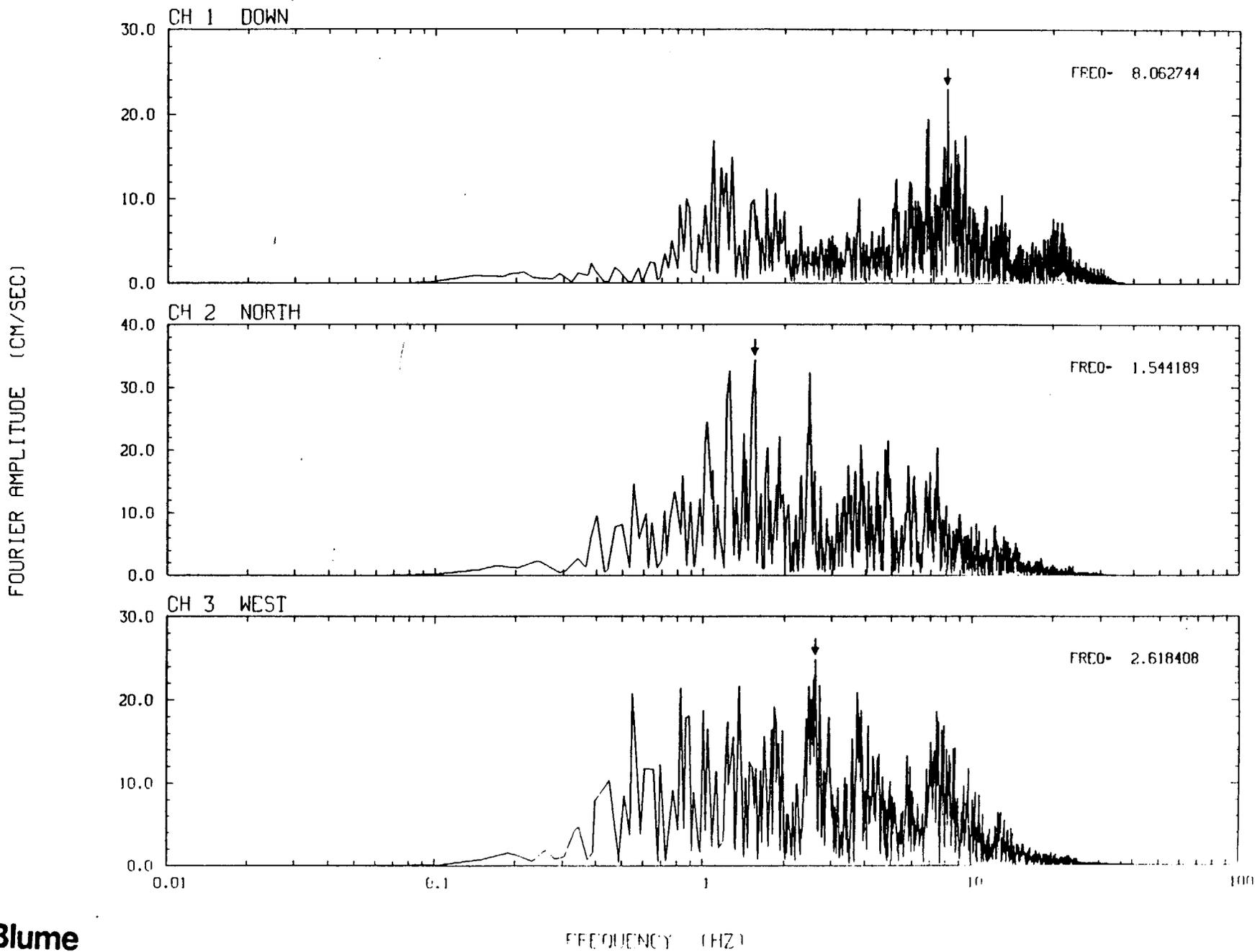
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



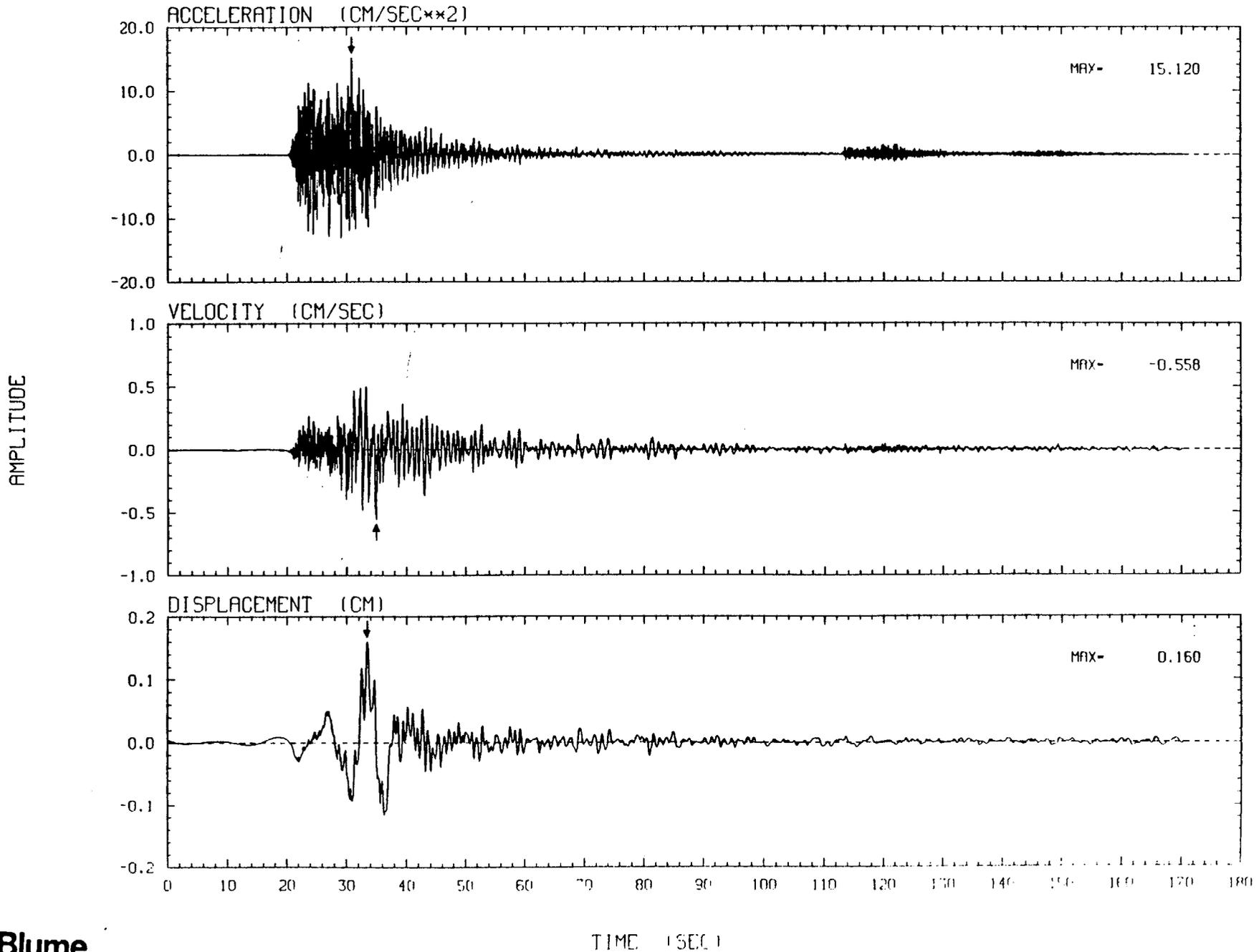
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 4

CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

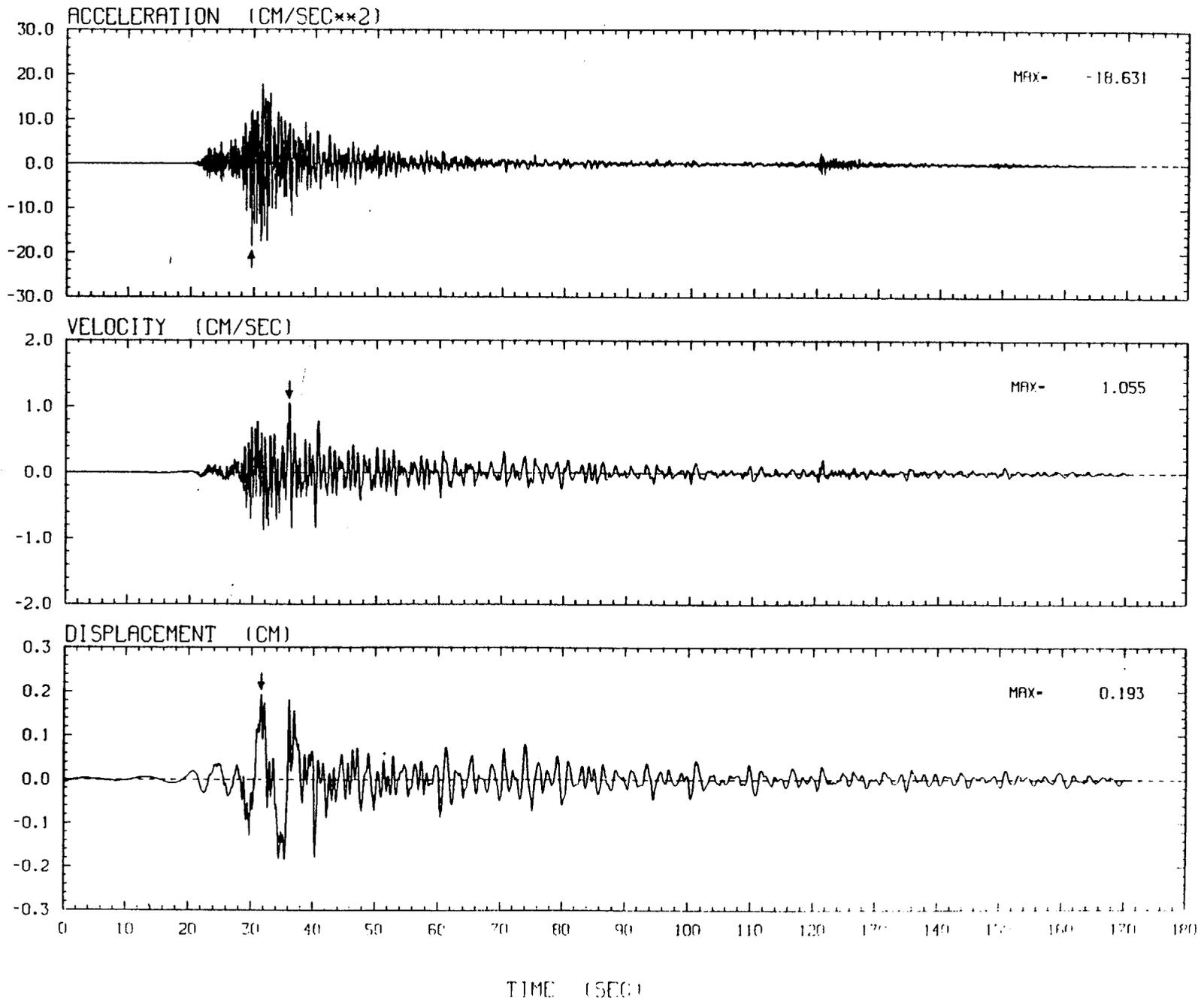


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 4 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT



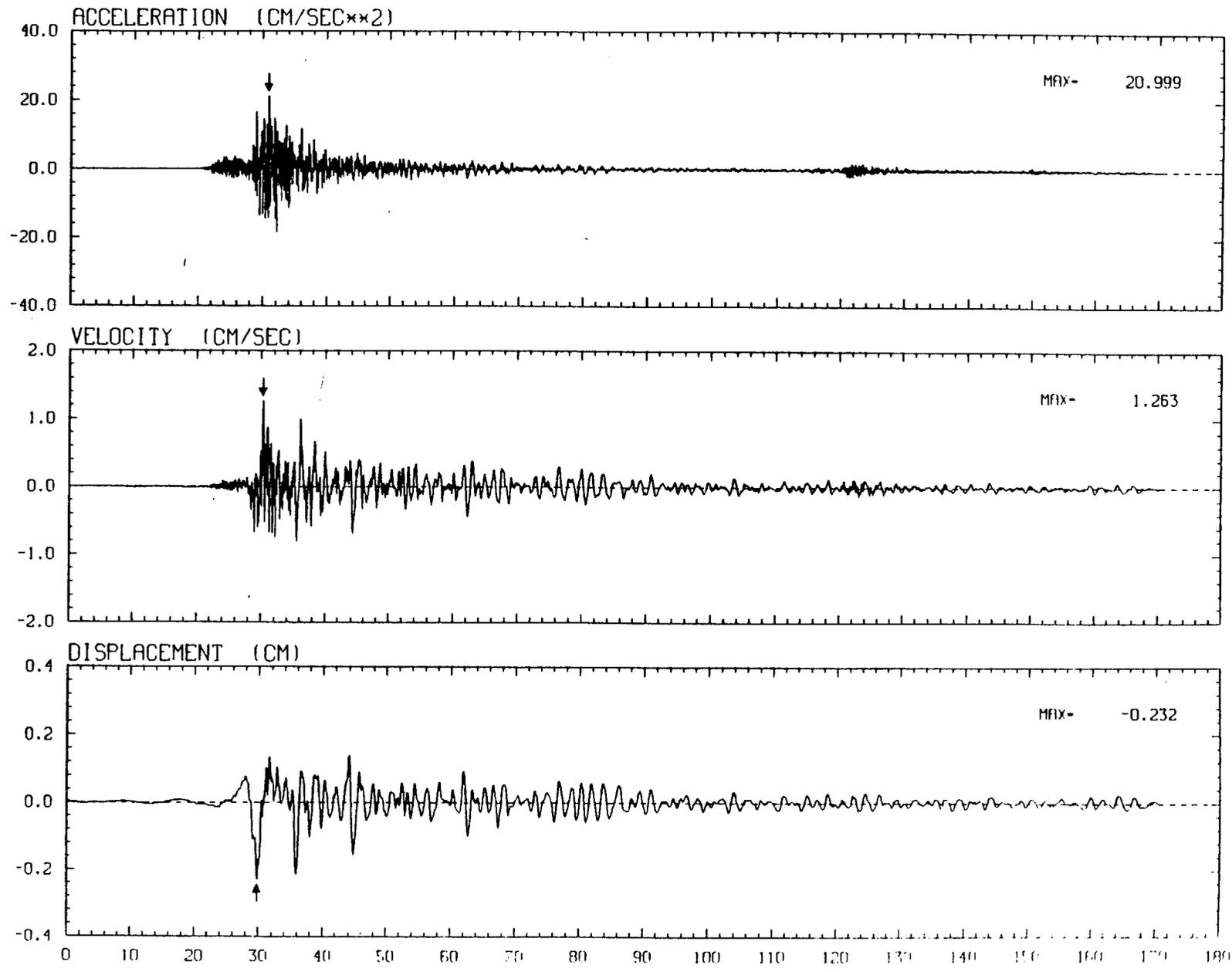
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 4 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



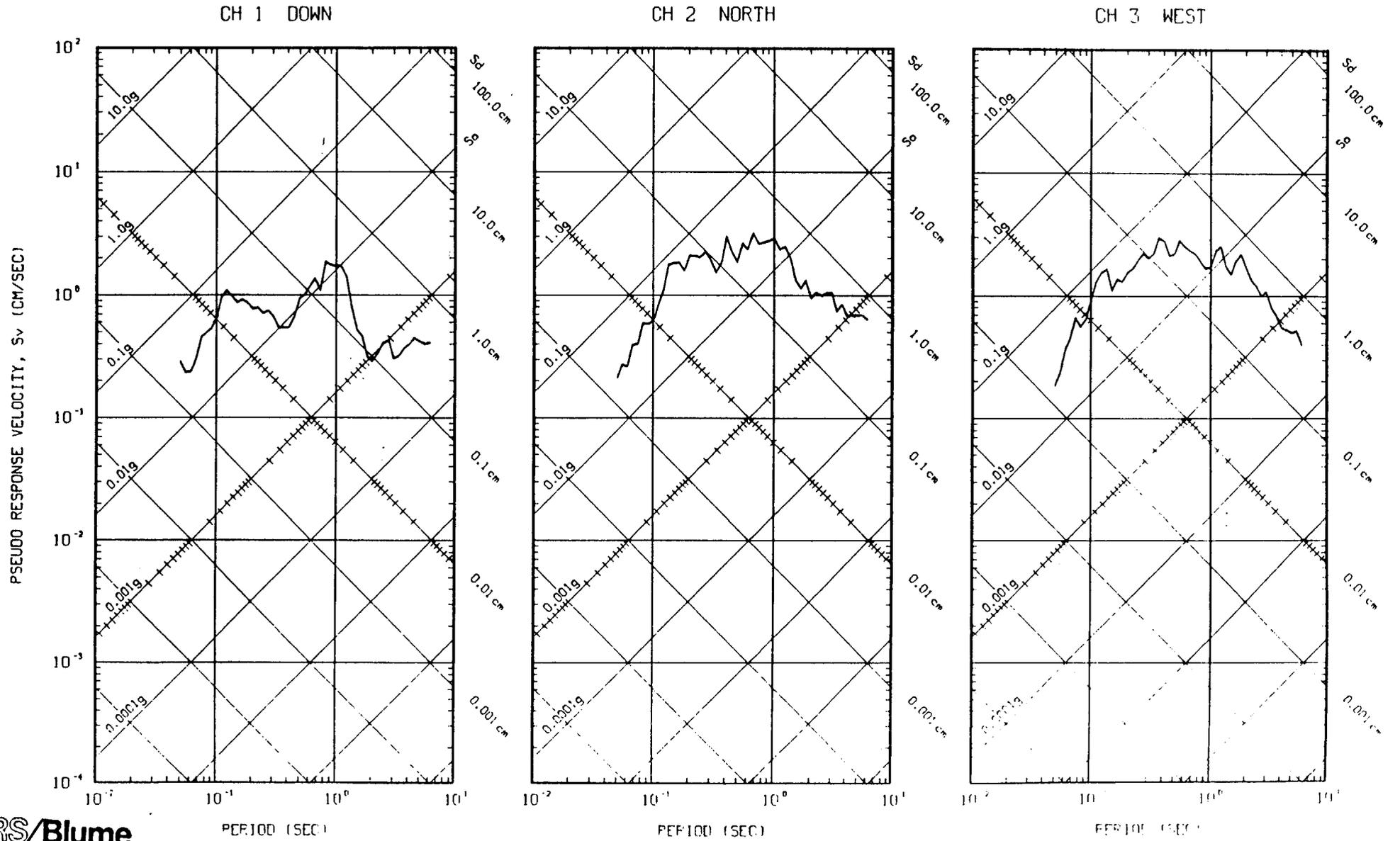
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 4 CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 4

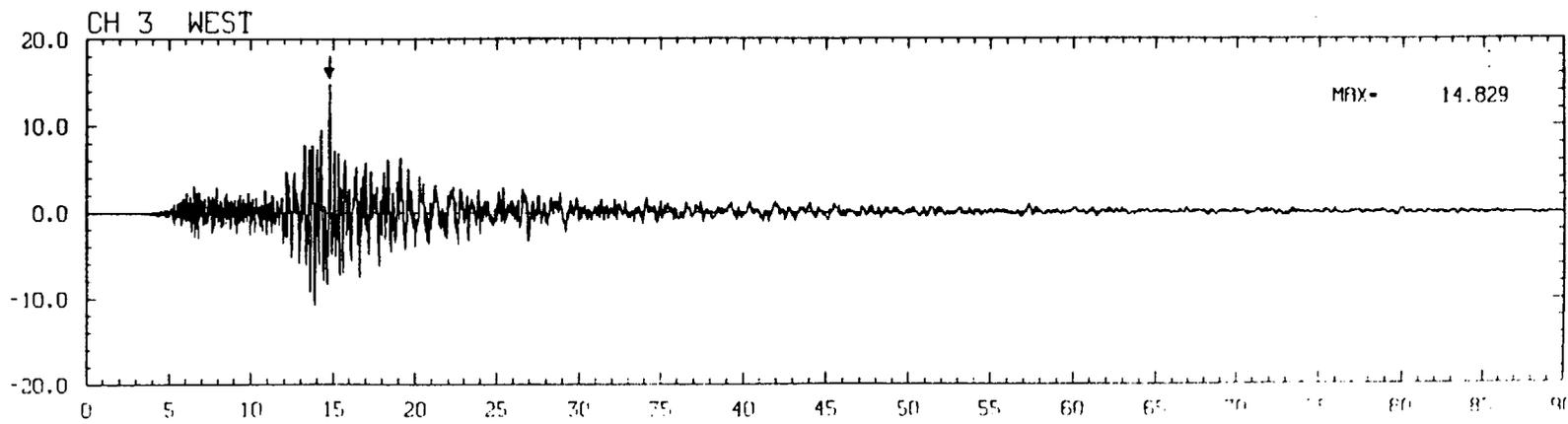
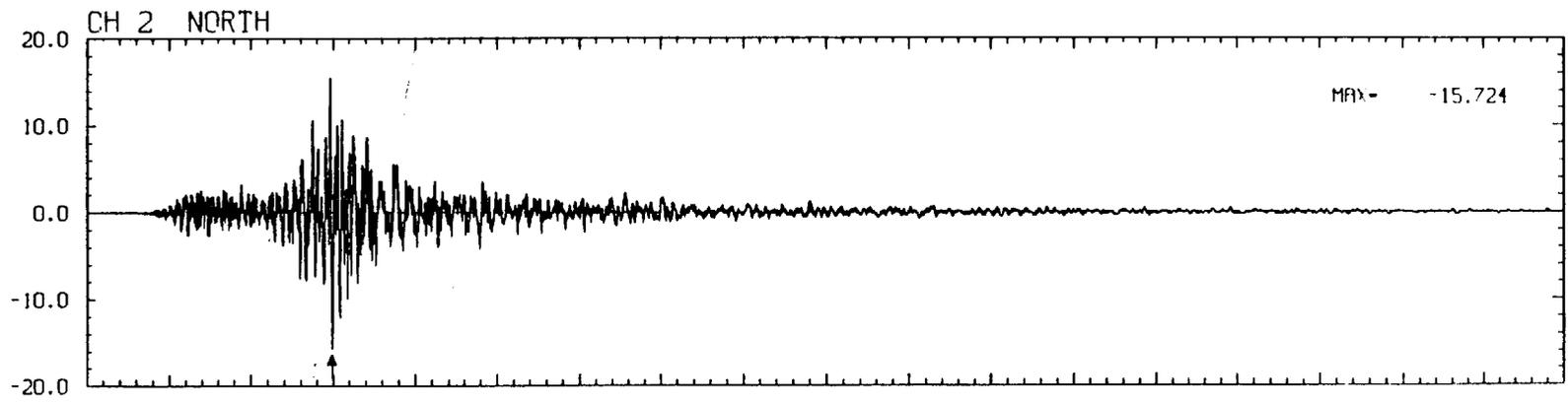
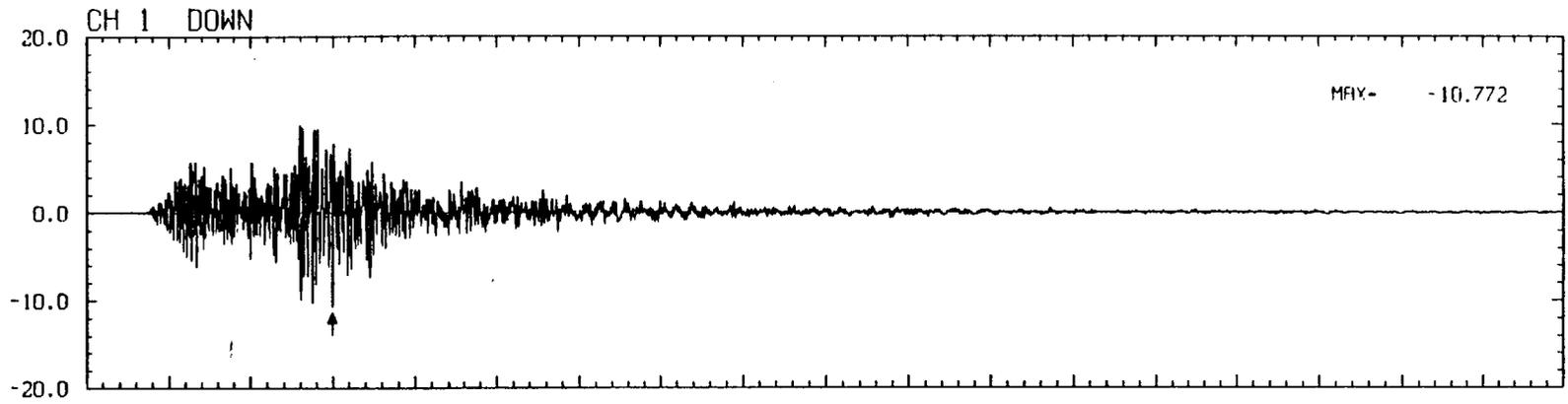
5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA



STATION NO. 5

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 5
UNCORRECTED ACCELERATION TIME HISTORIES

ACCELERATION (CM/SEC**2)

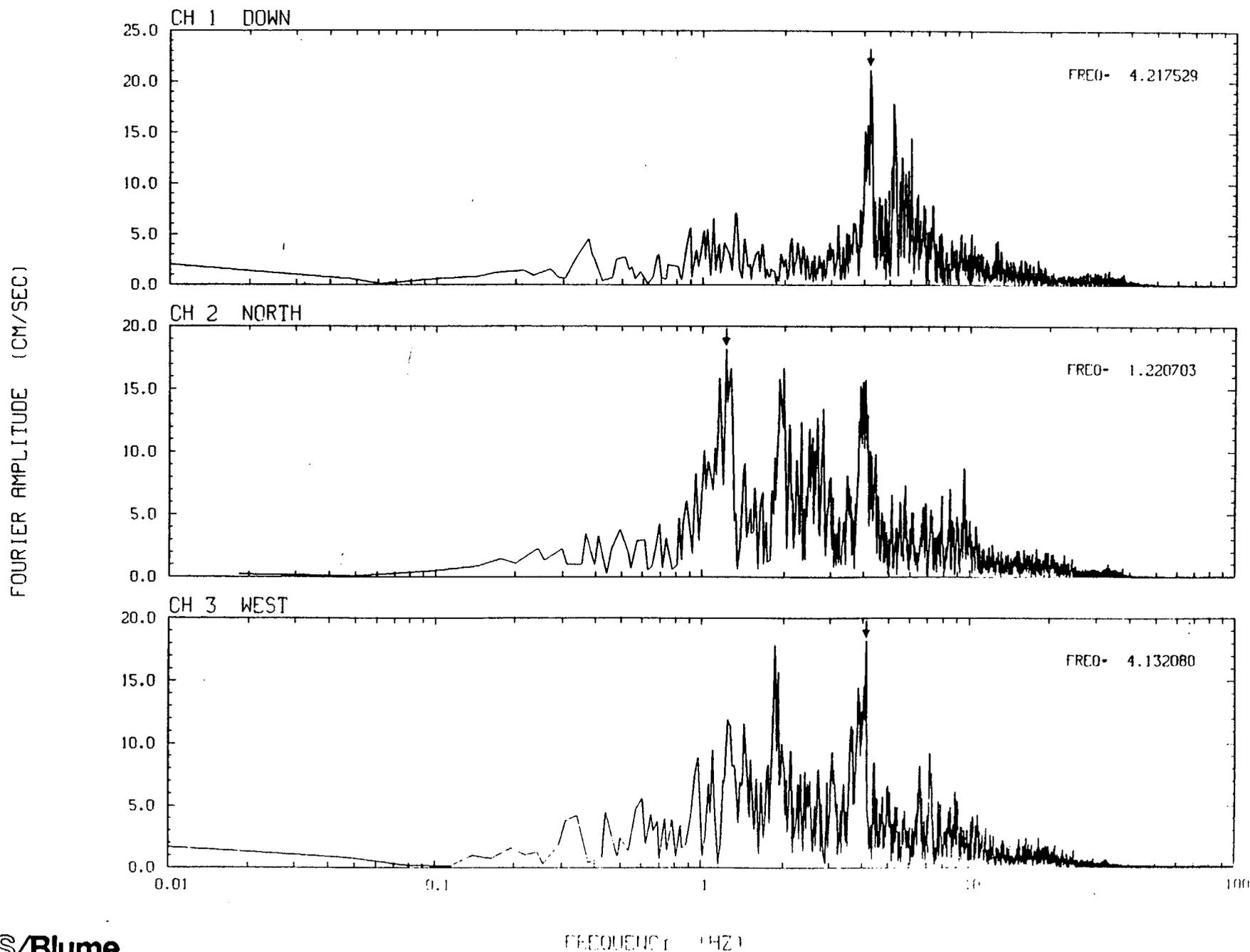


TIME (SEC)

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 5

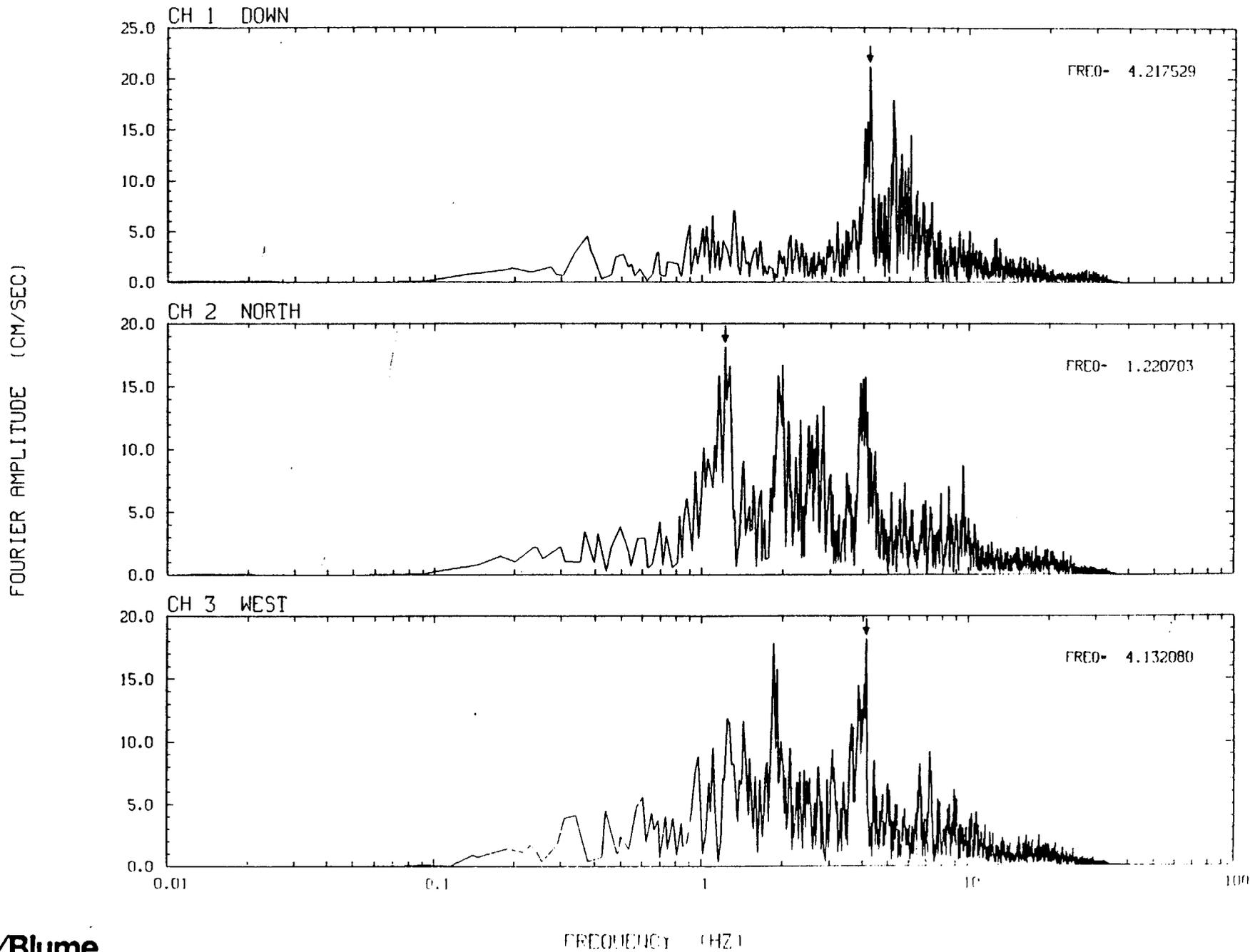
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

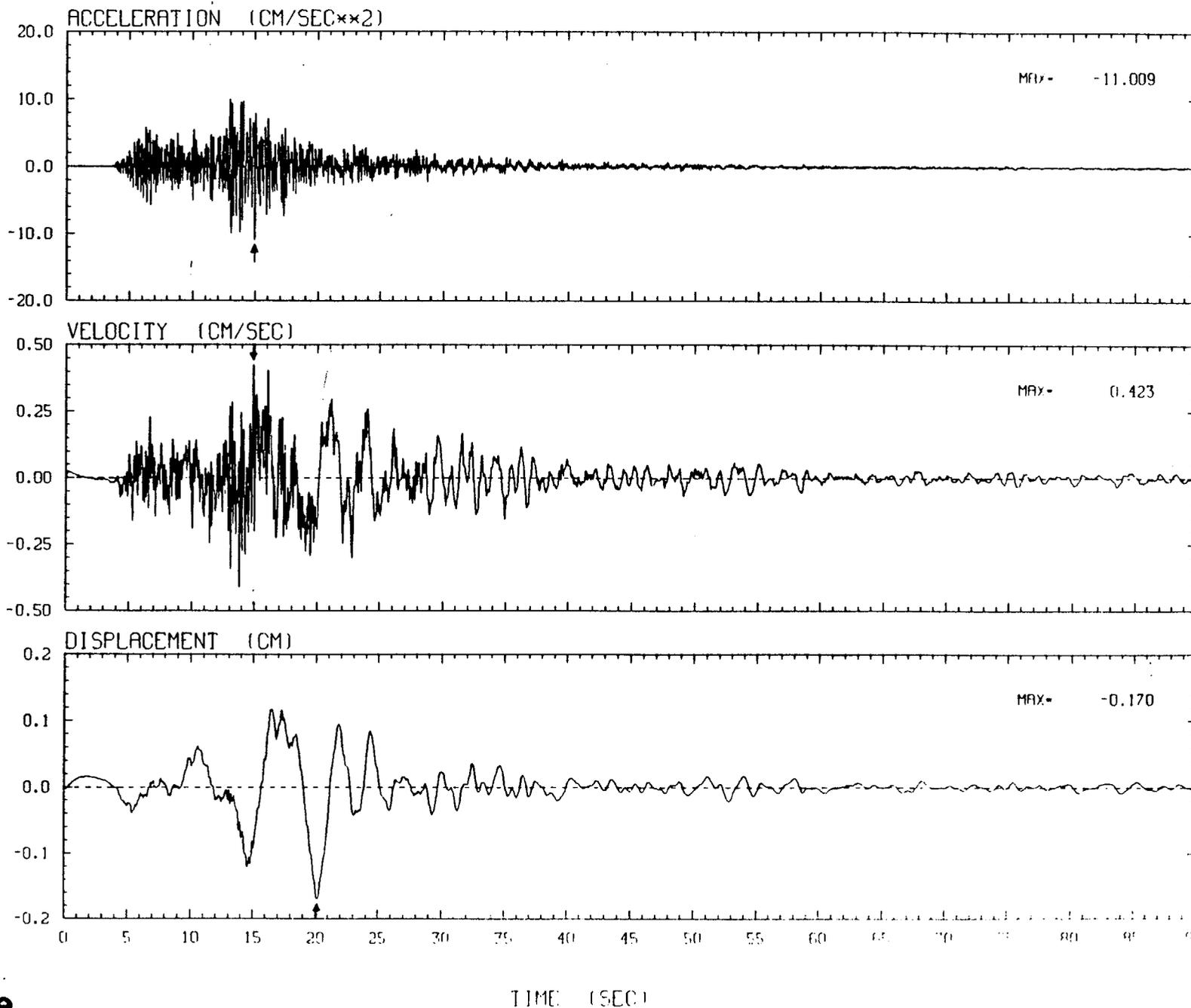
STATION NO. 5

CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



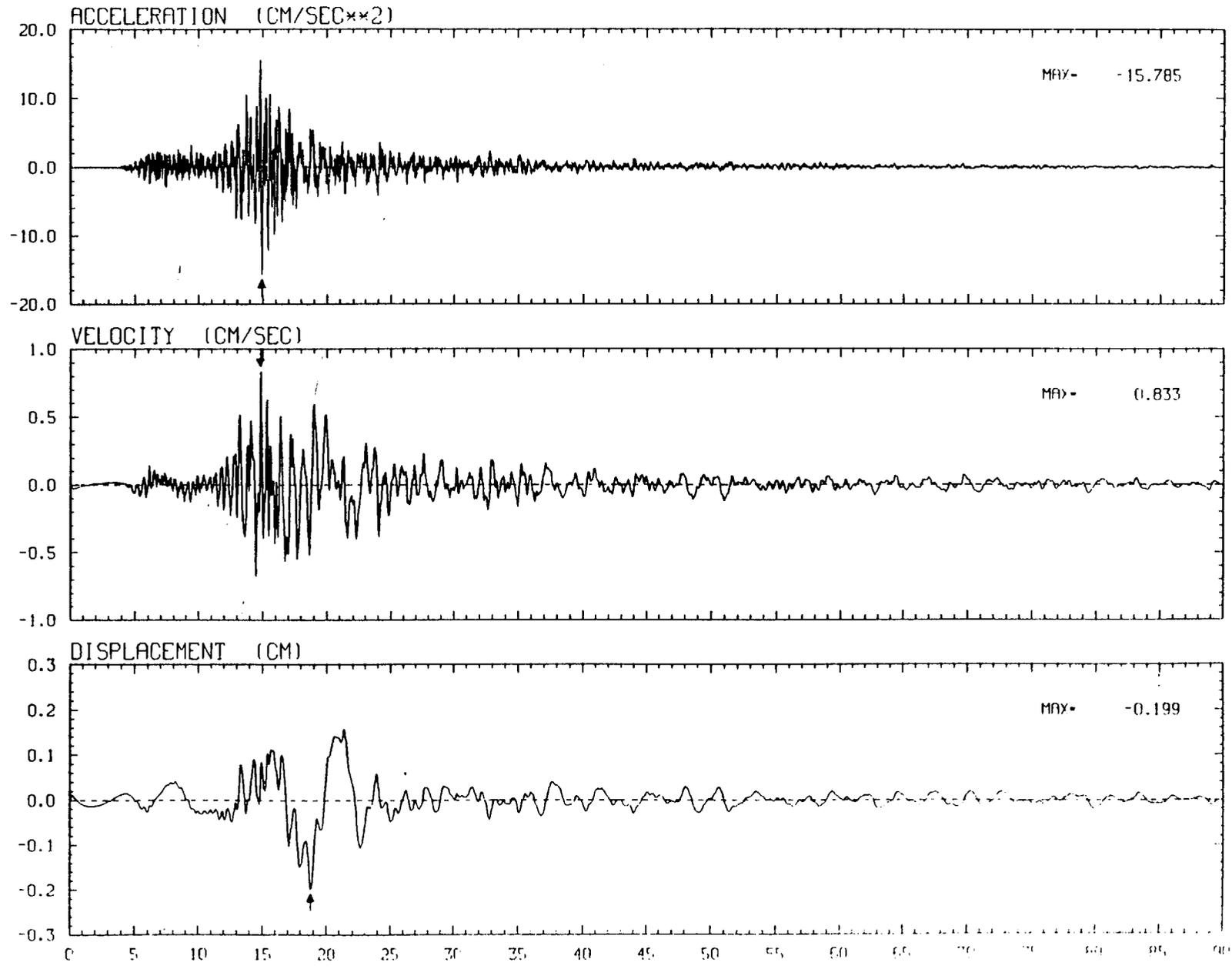
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 5 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



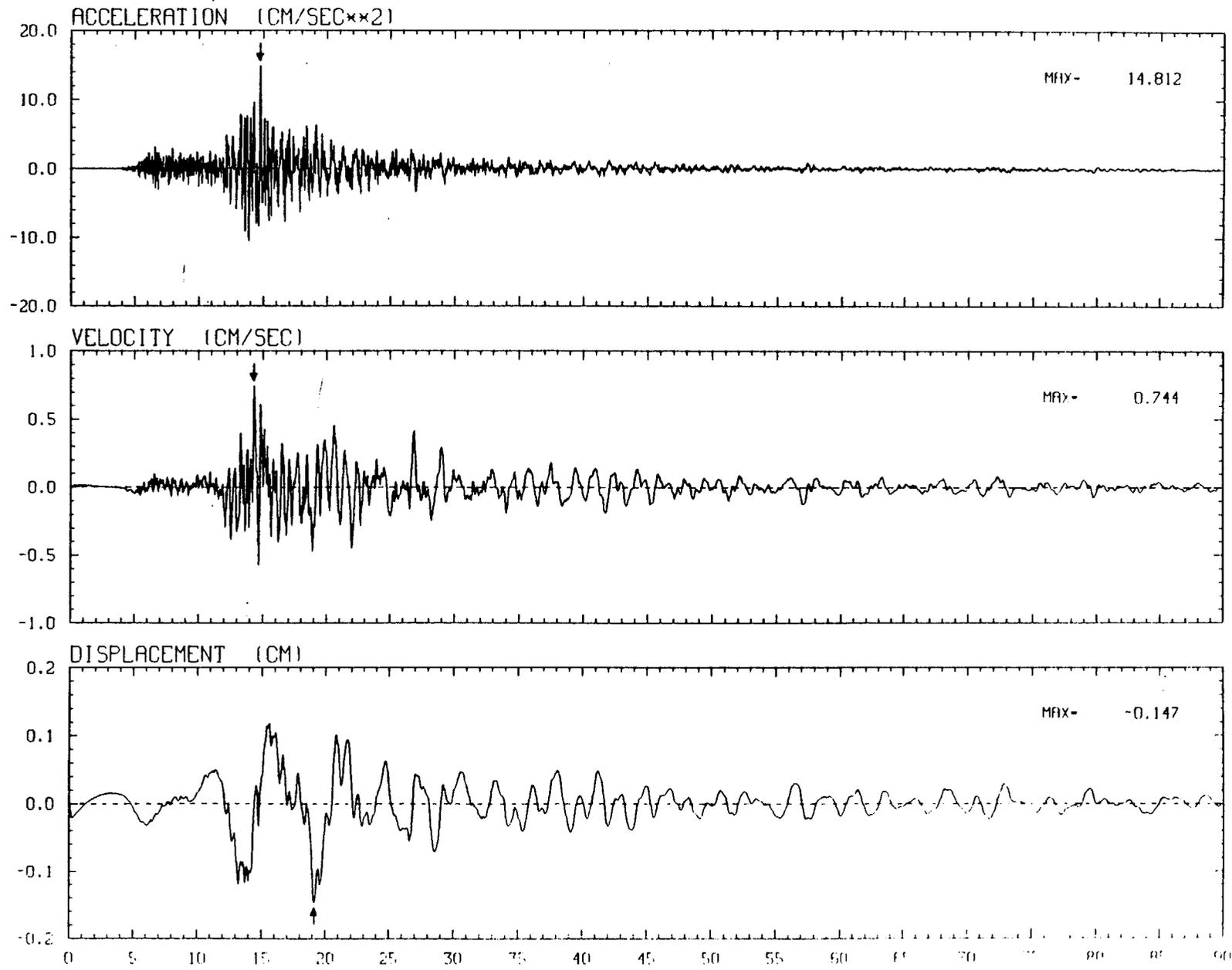
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 5 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 5 CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

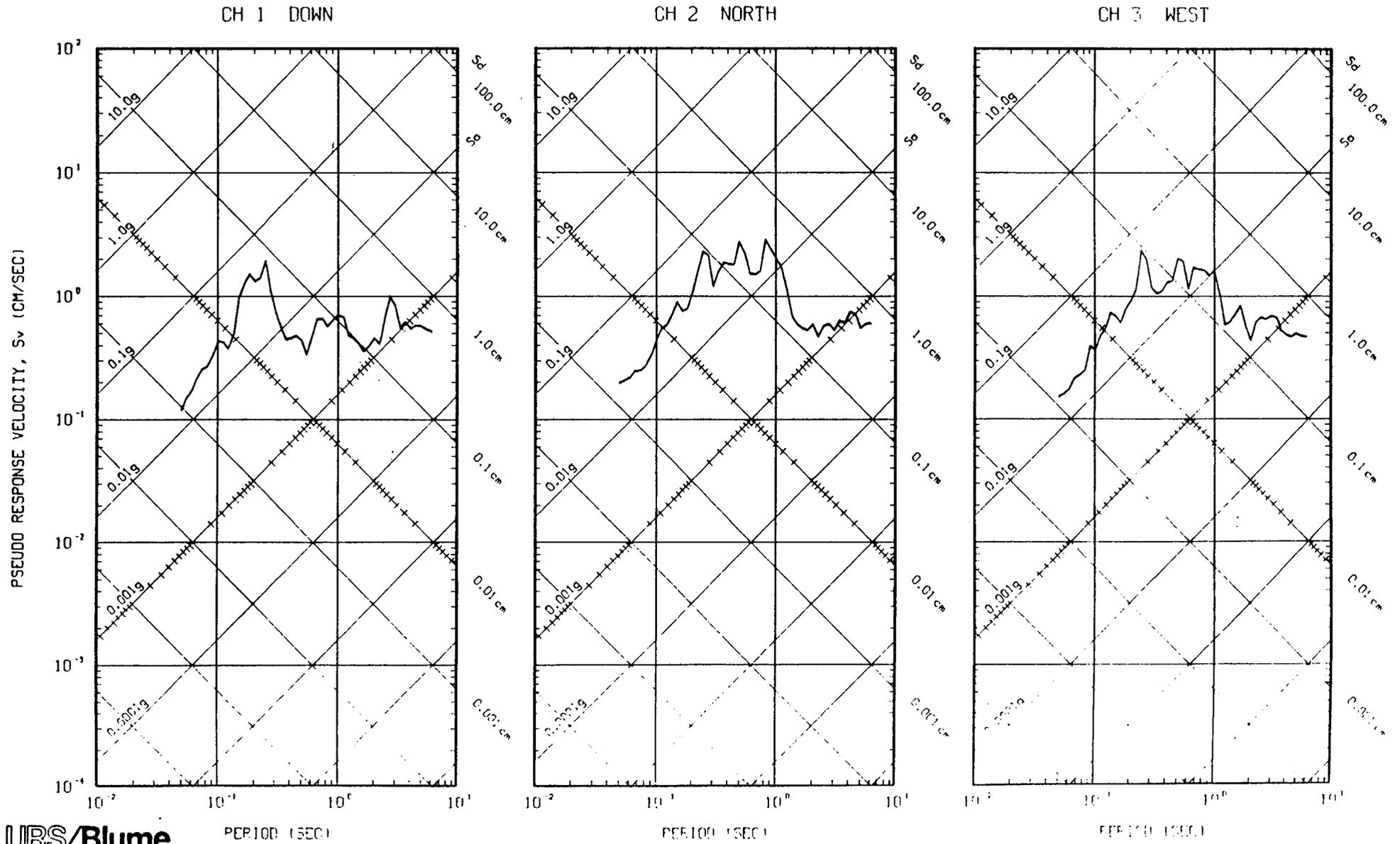
AMPLITUDE



TIME (SEC)

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 5

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

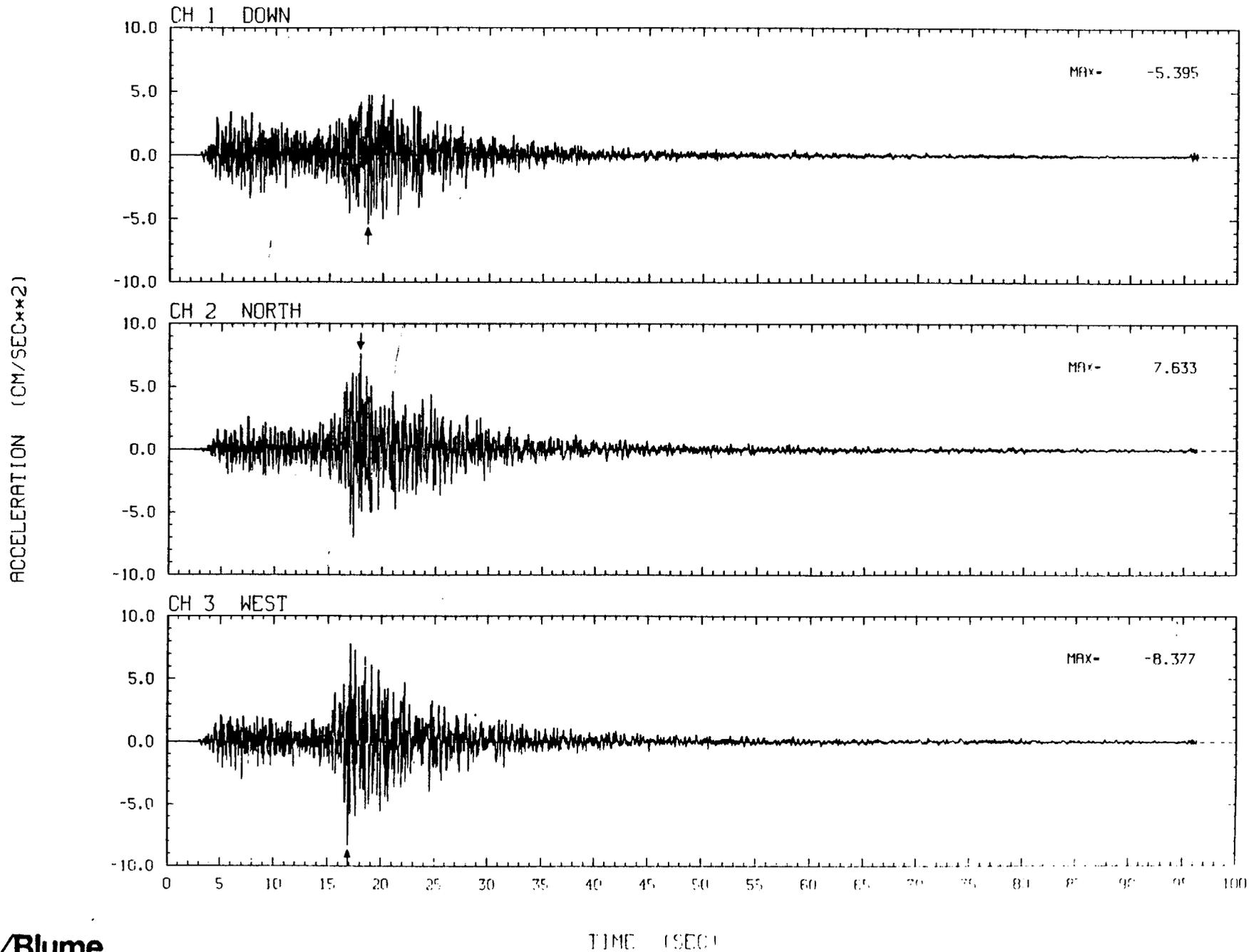


STATION NO. 6

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 6

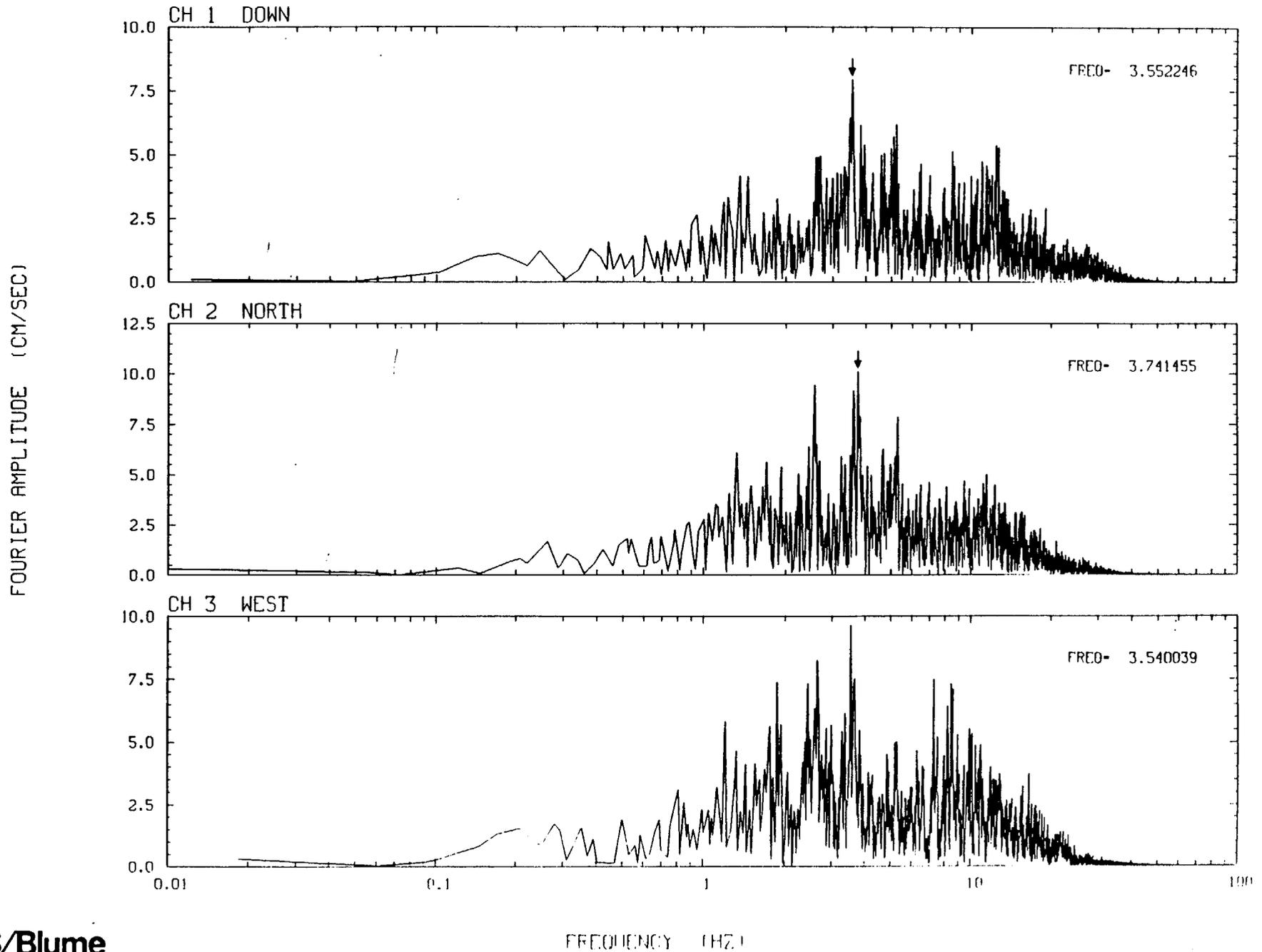
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 6

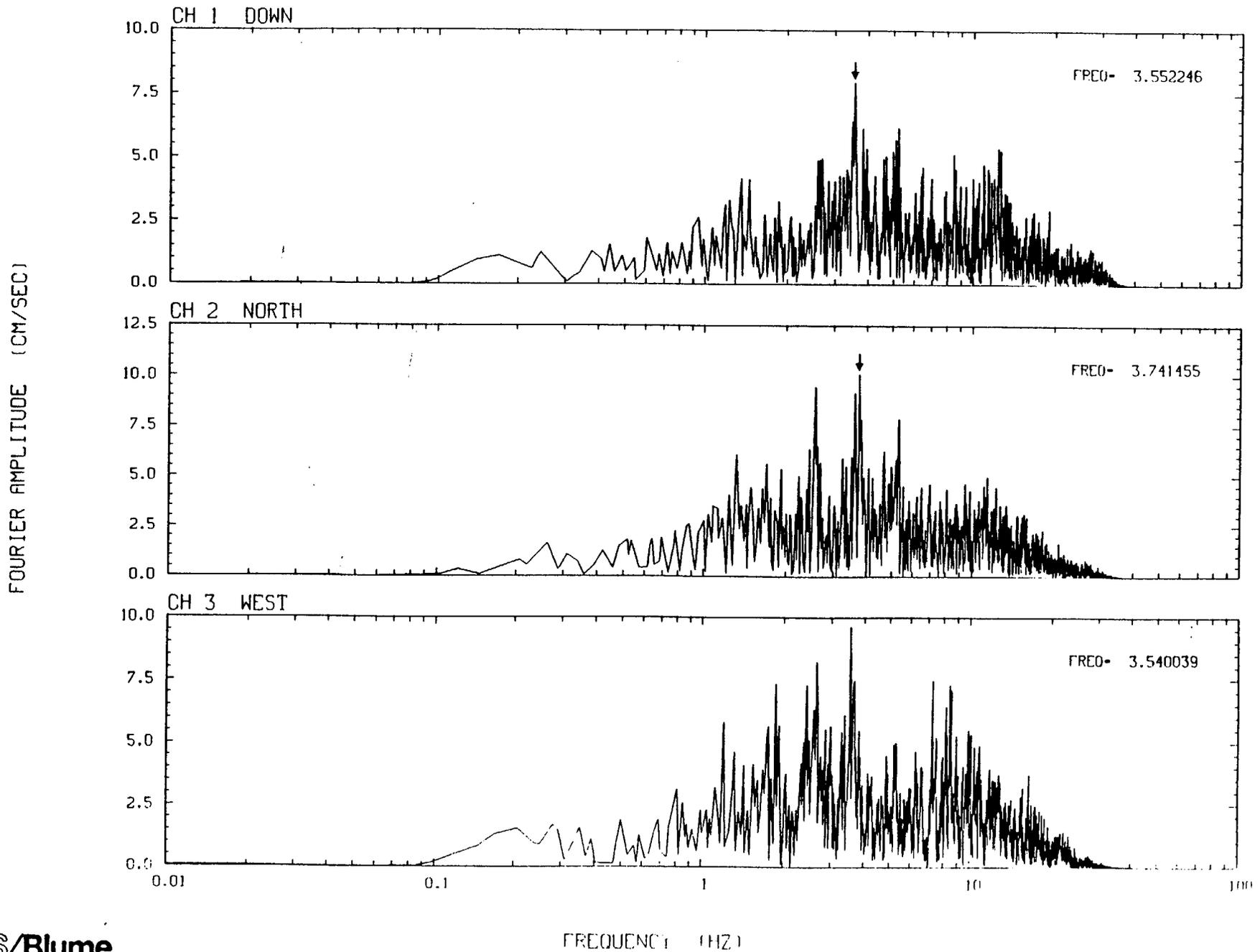
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

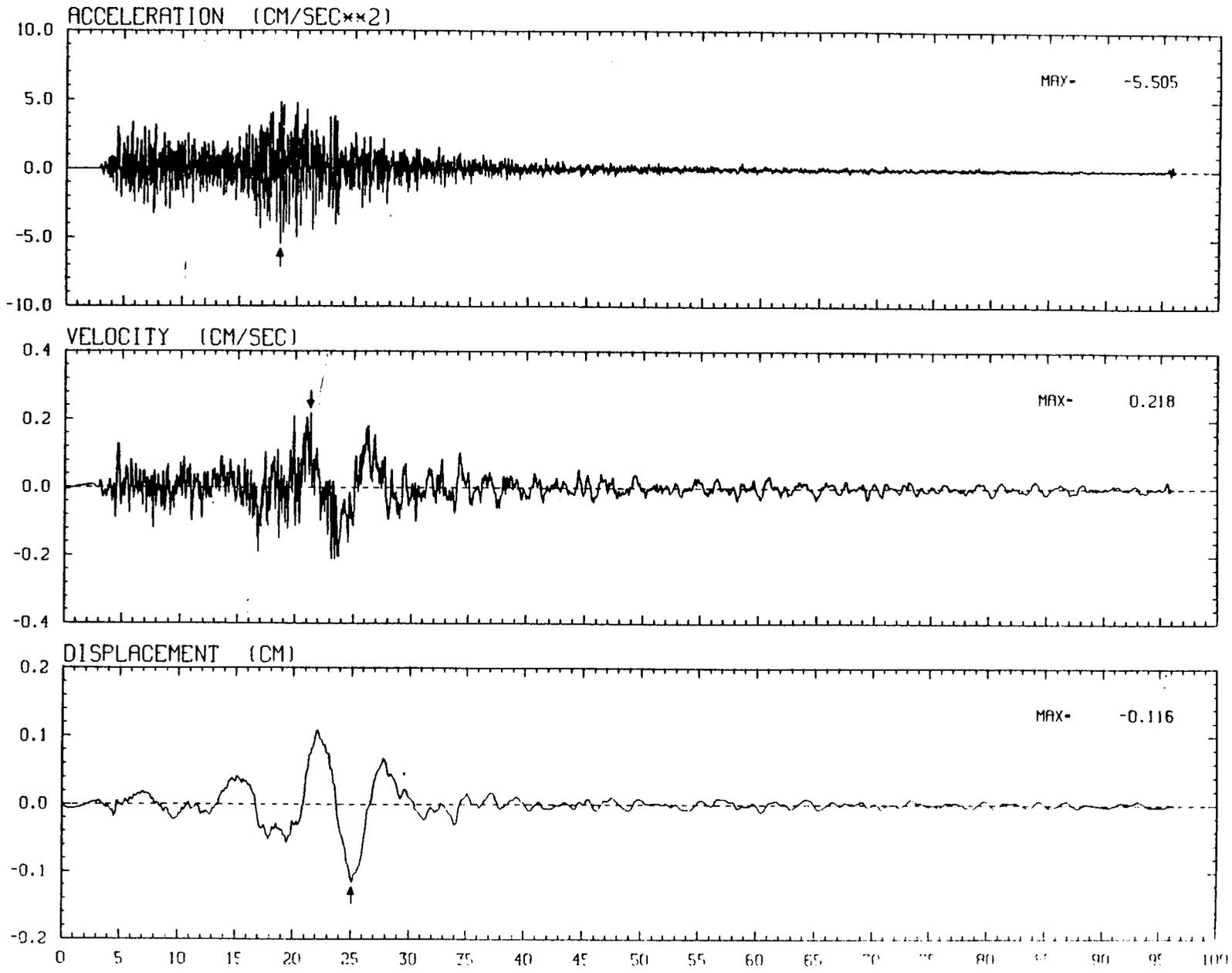
STATION NO. 6

CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



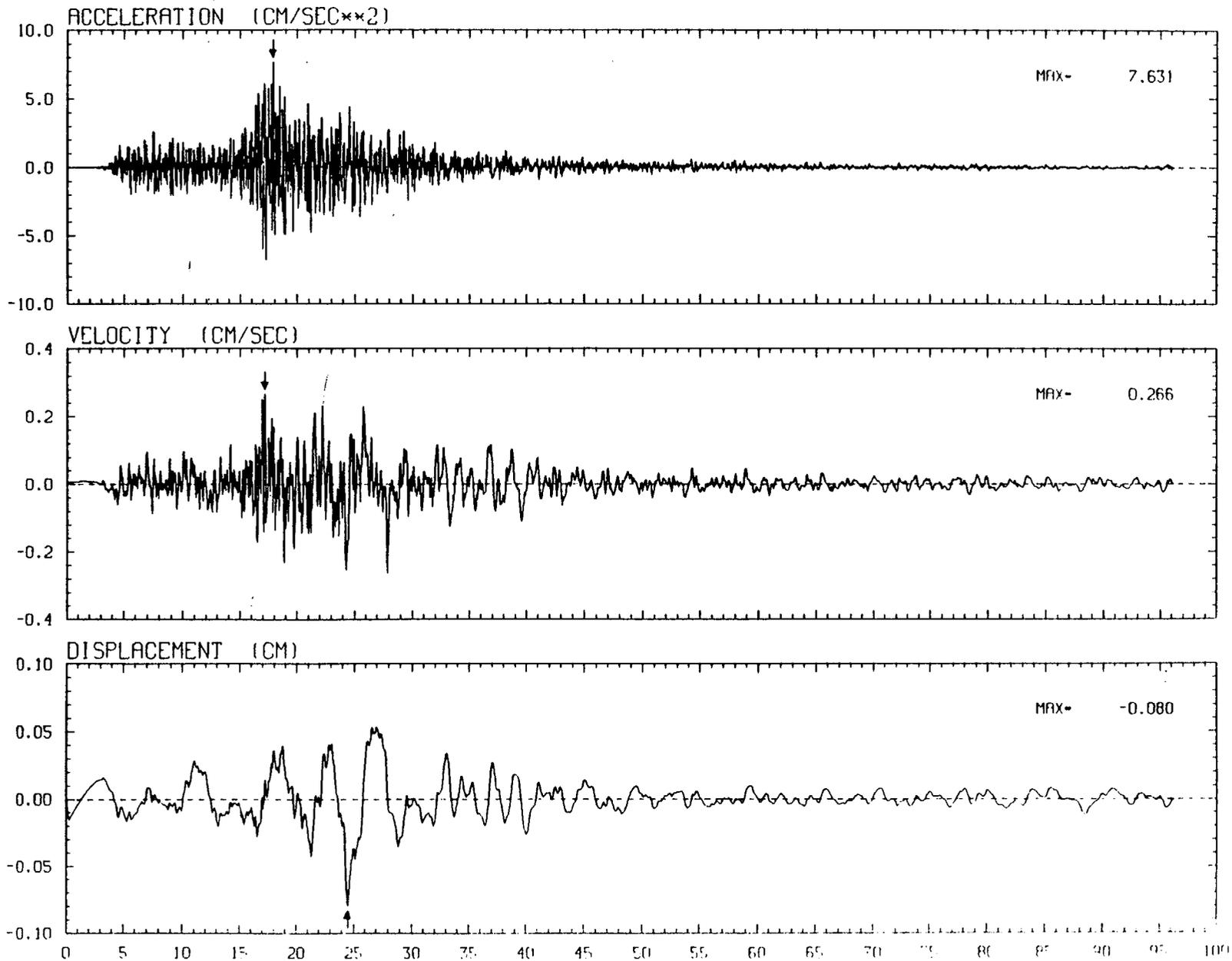
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 6 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 6 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE

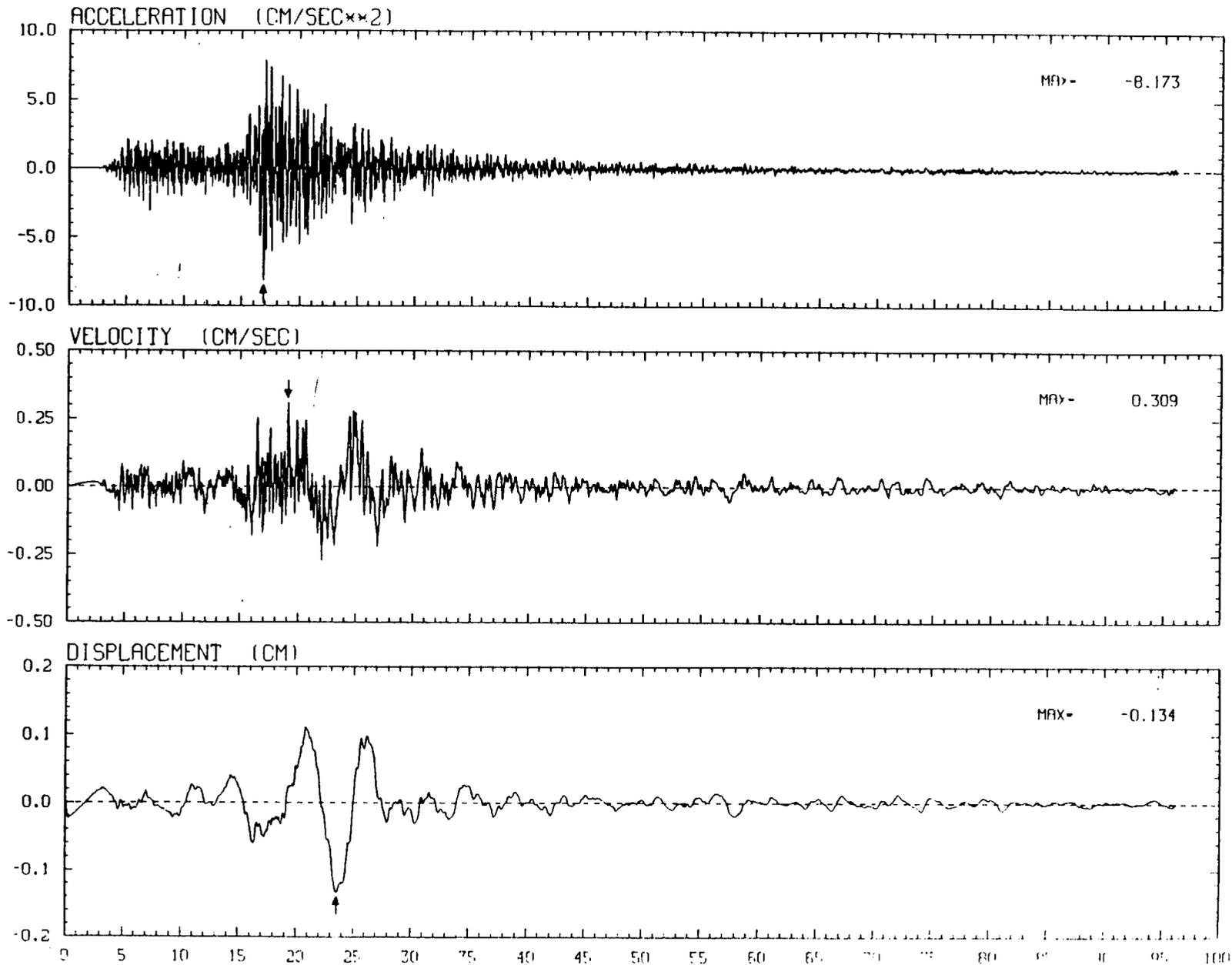


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 6 CH 3 WEST

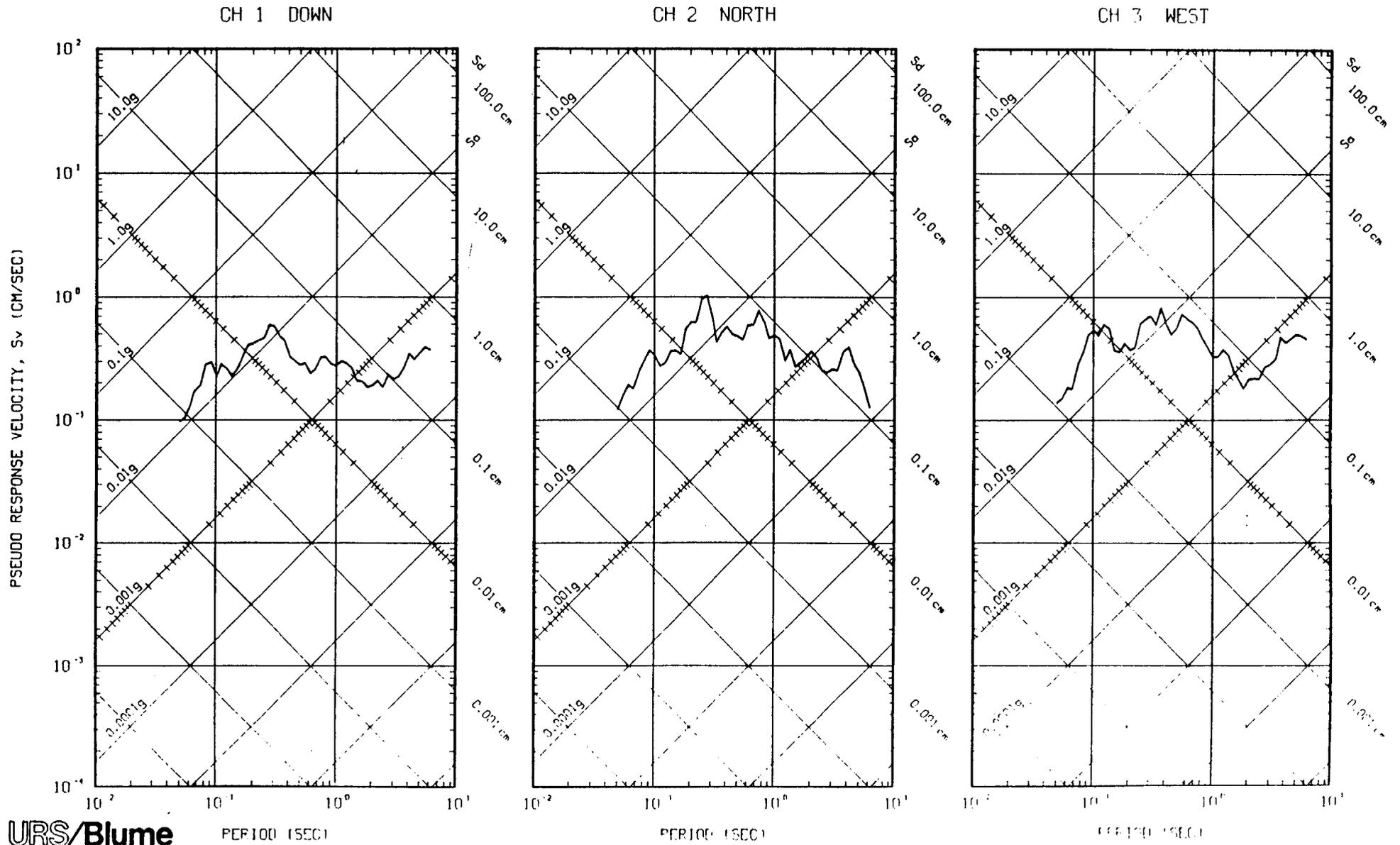
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



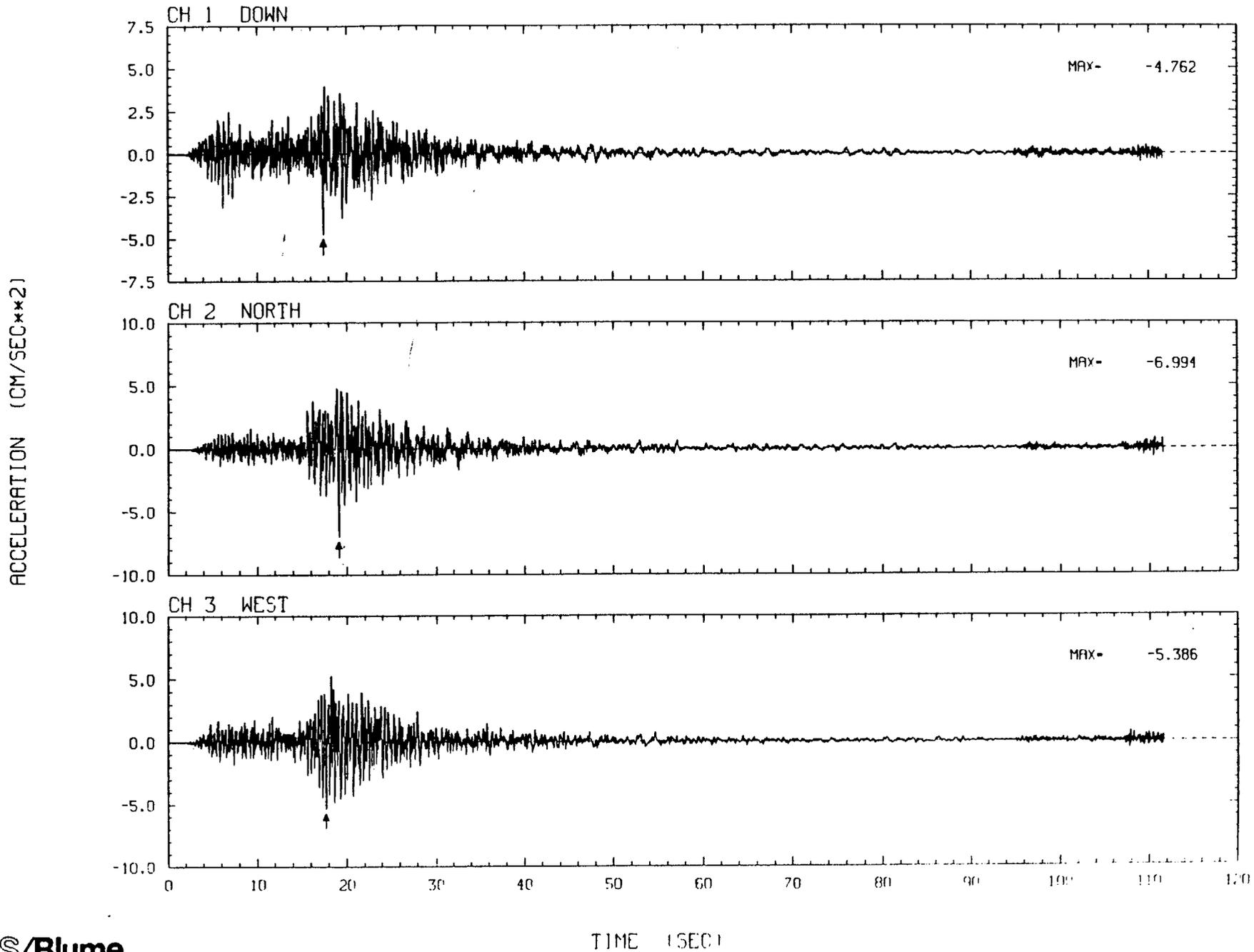
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 6

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA



STATION NO. 7

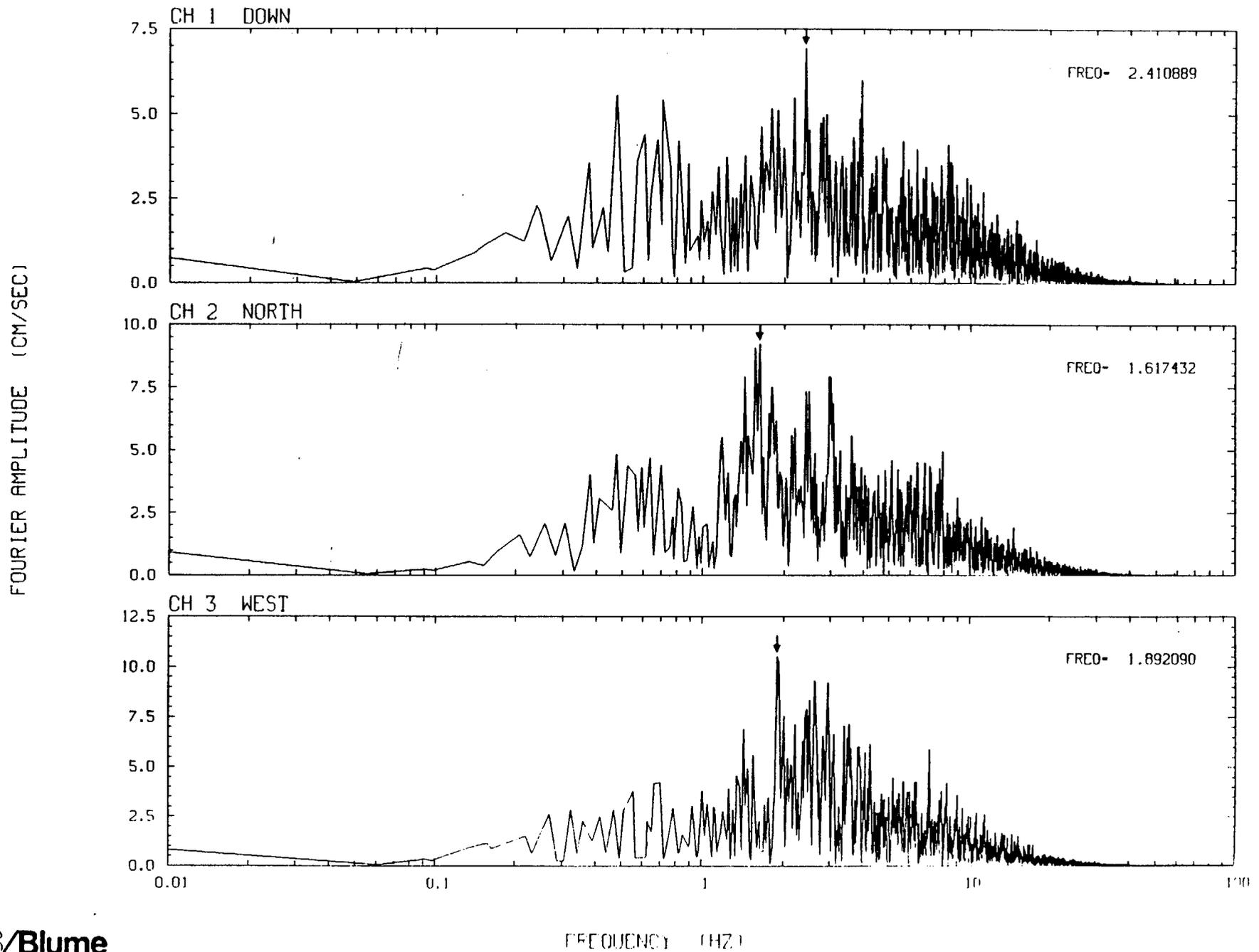
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 7
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 7

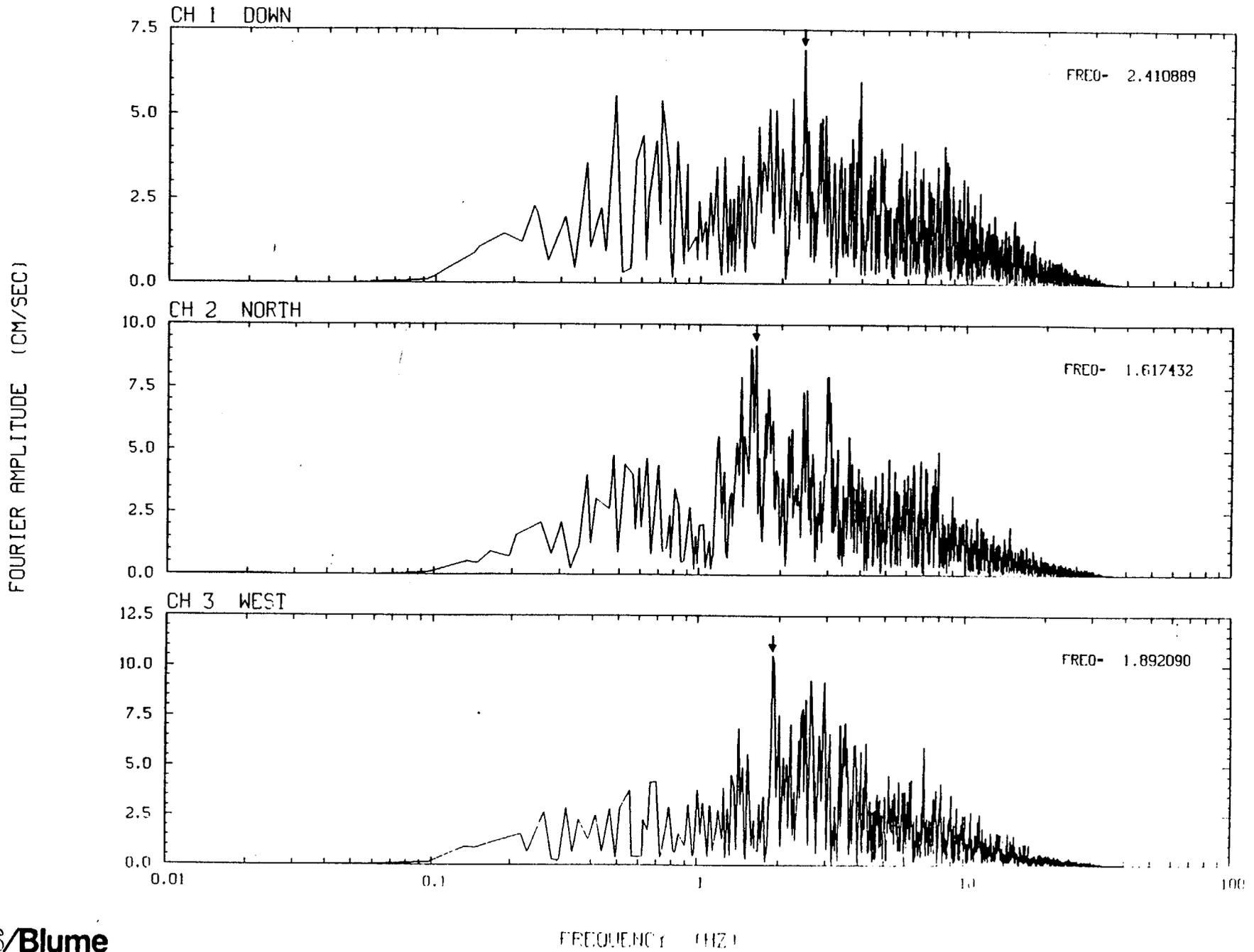
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 7

CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

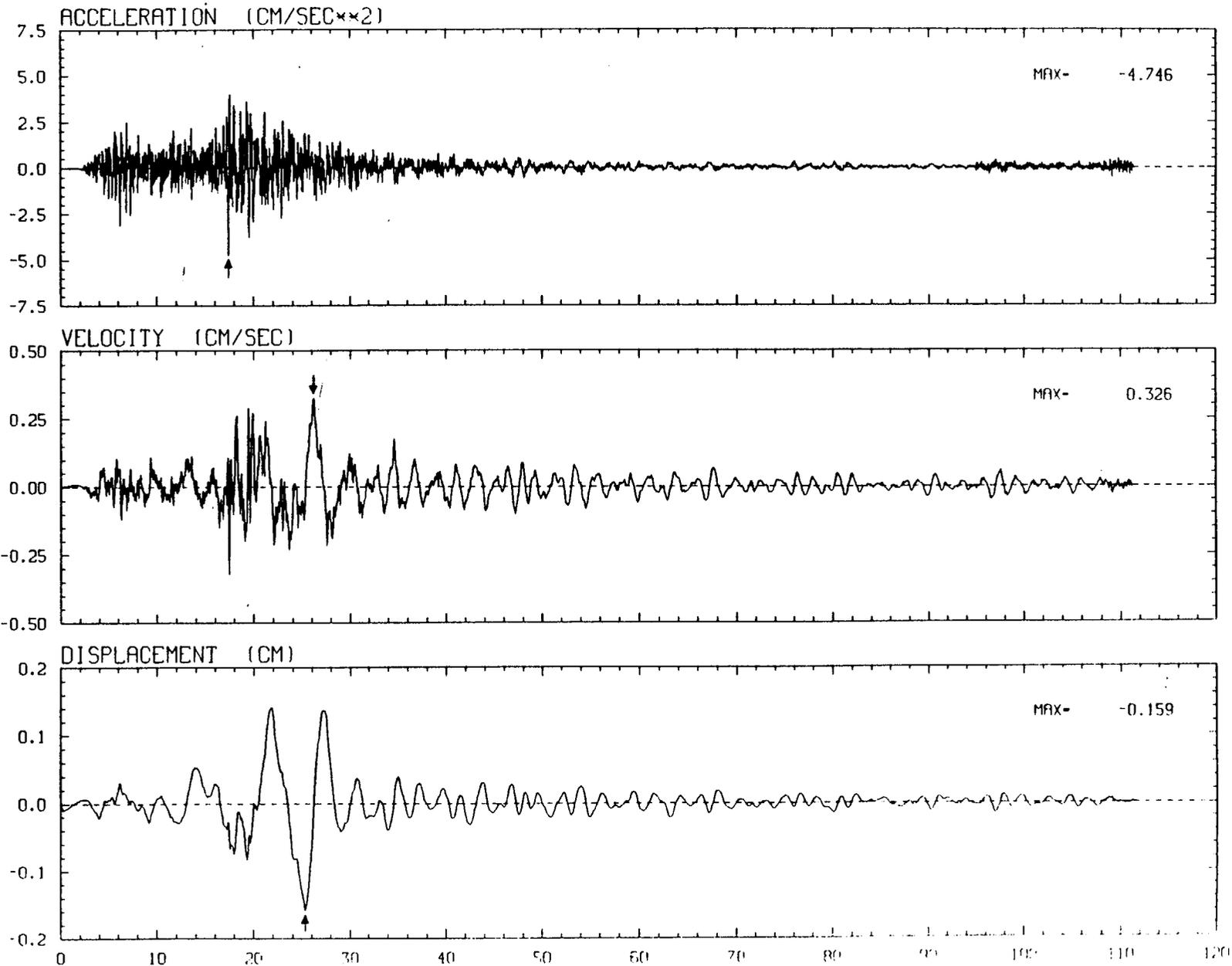


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 7 CH 1 DOWN

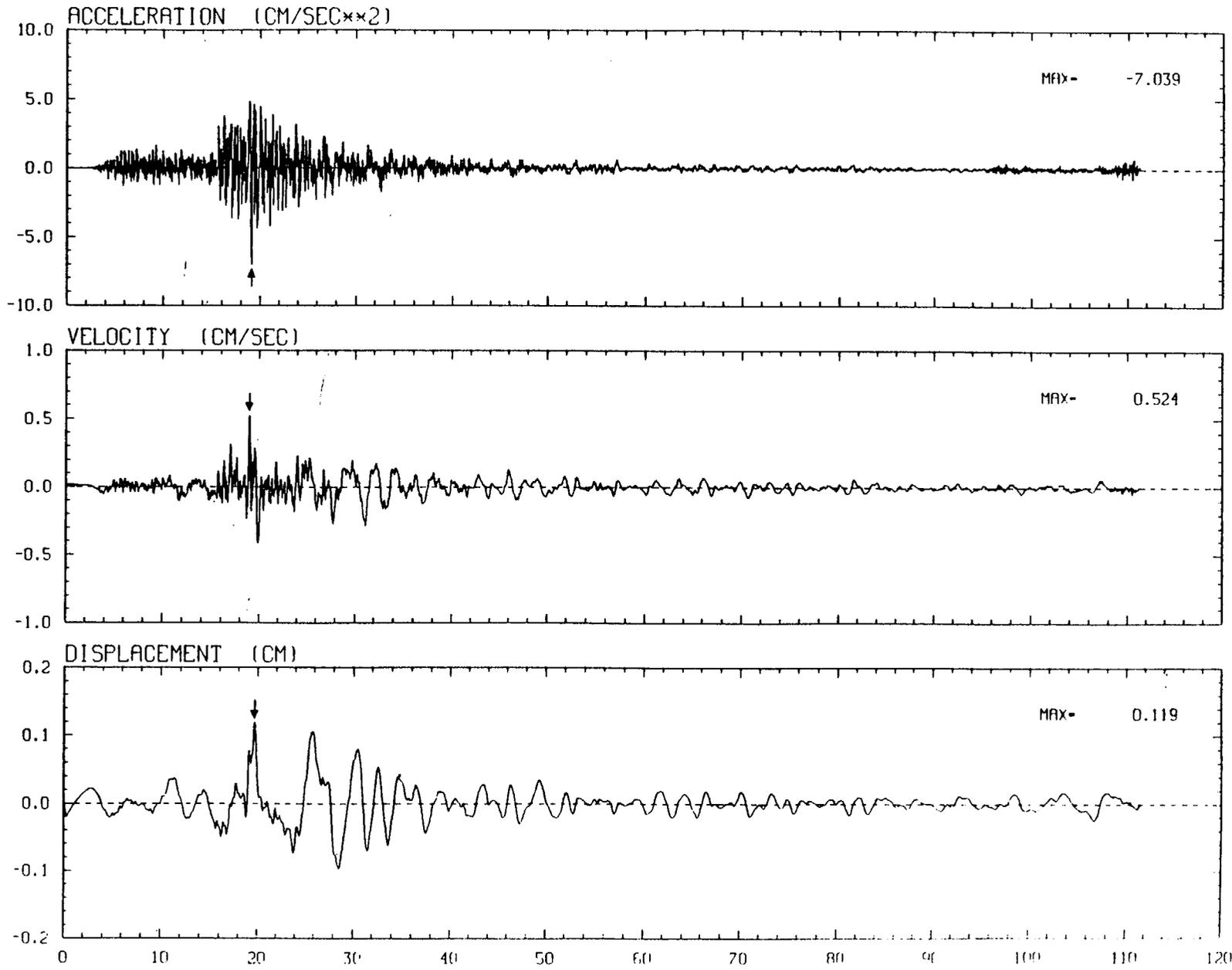
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



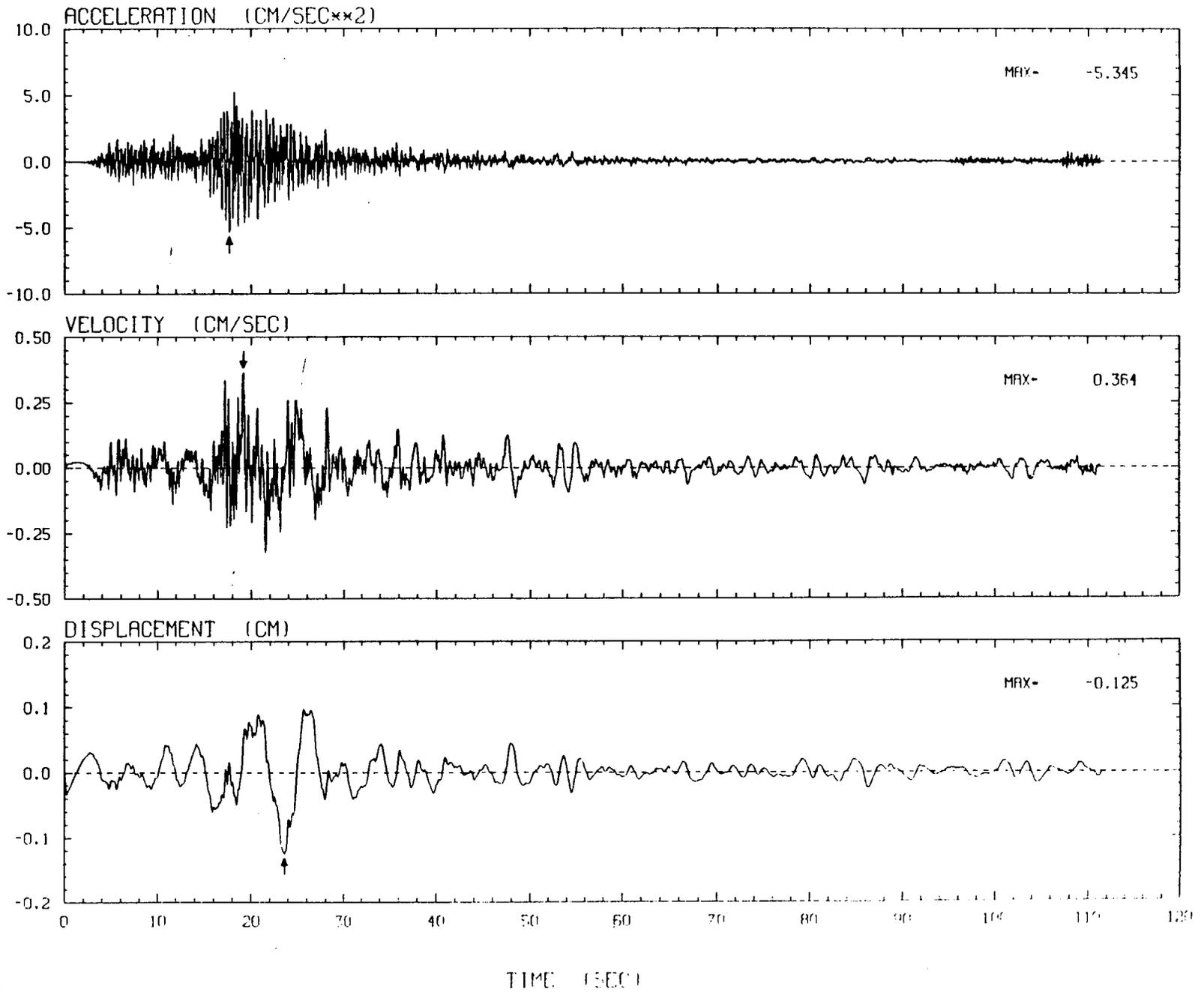
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 7 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 7 CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

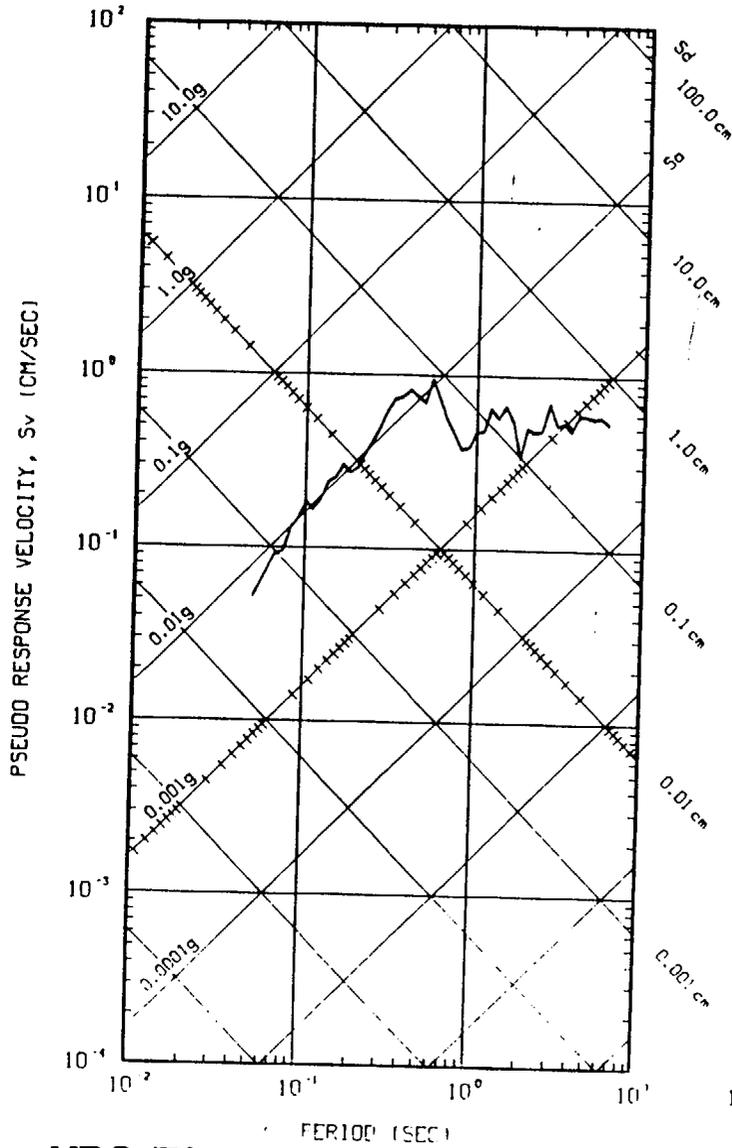
AMPLITUDE



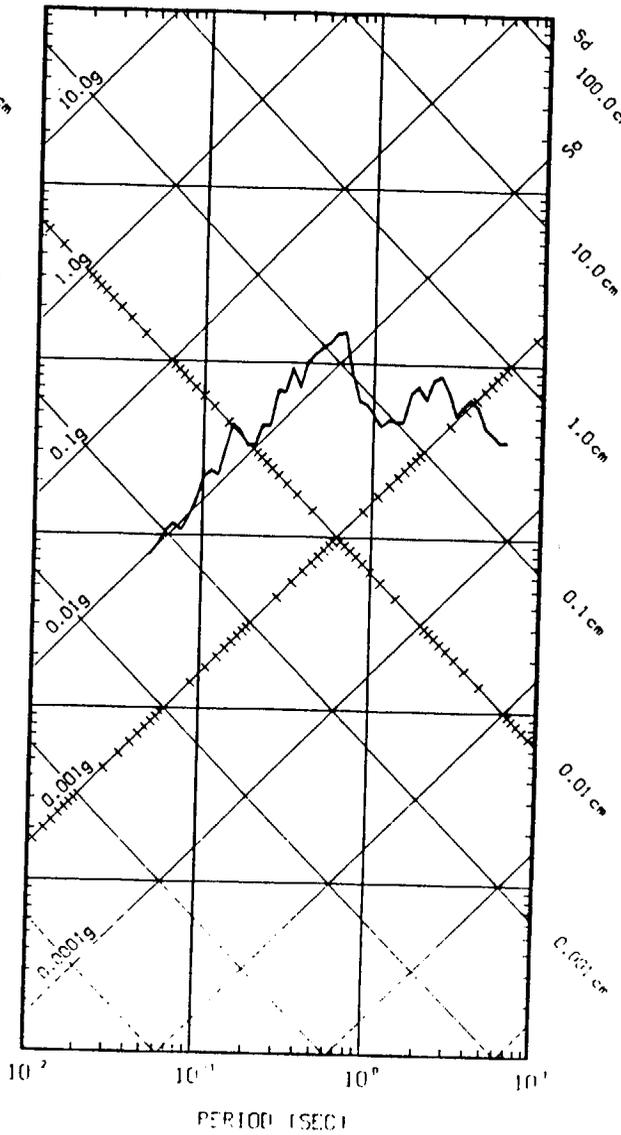
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 7

5 PCT DAMPED PESUDO VELOCITY RESPONSE SPECTRA

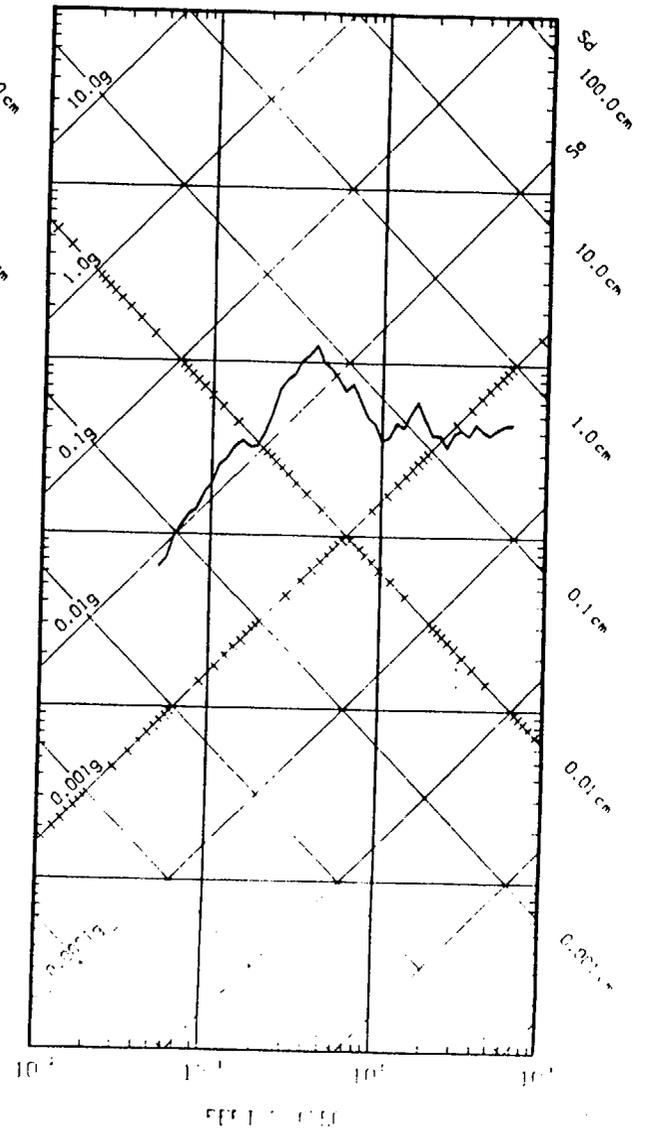
CH 1 DOWN



CH 2 NORTH



CH 3 WEST

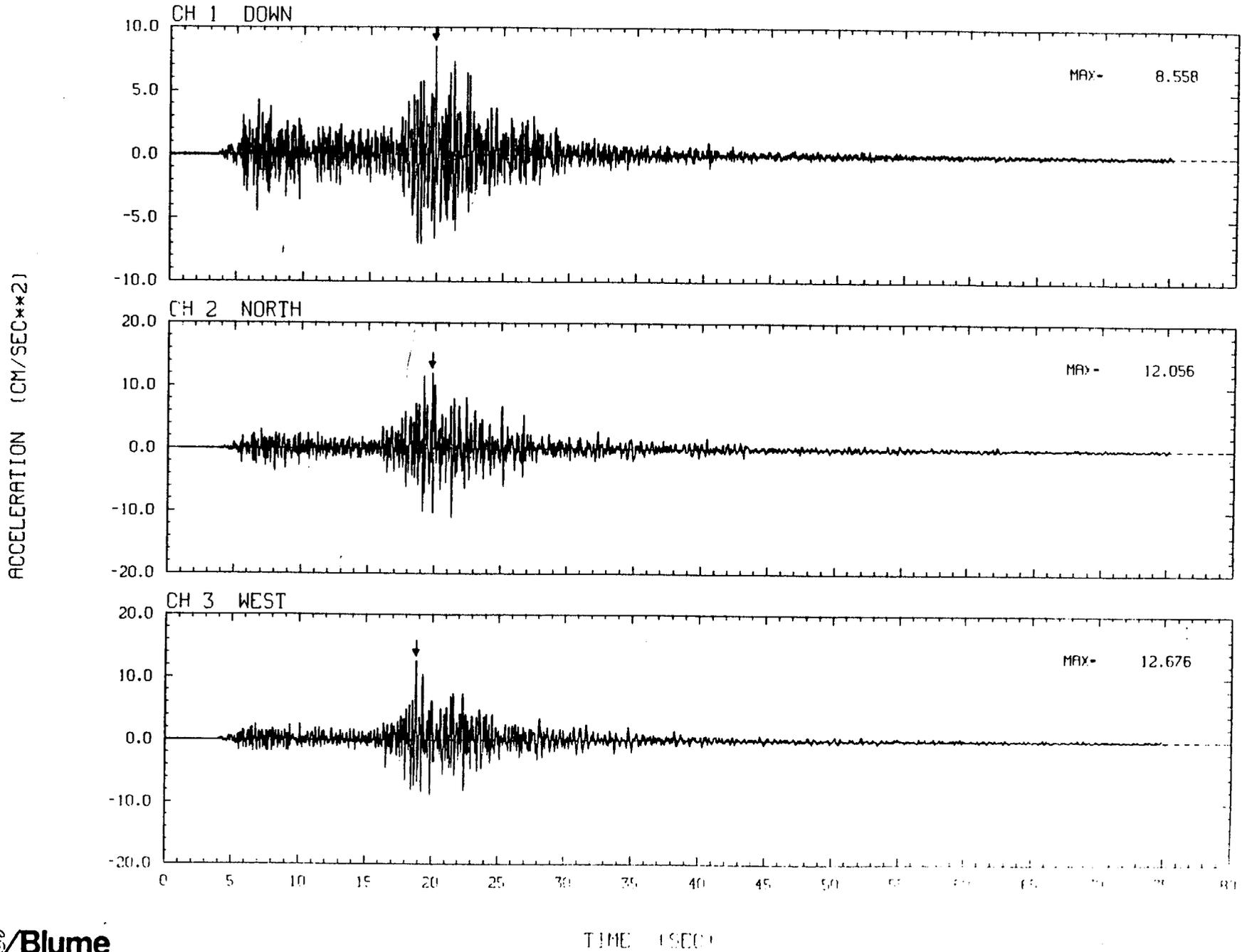


STATION NO. 8

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 8

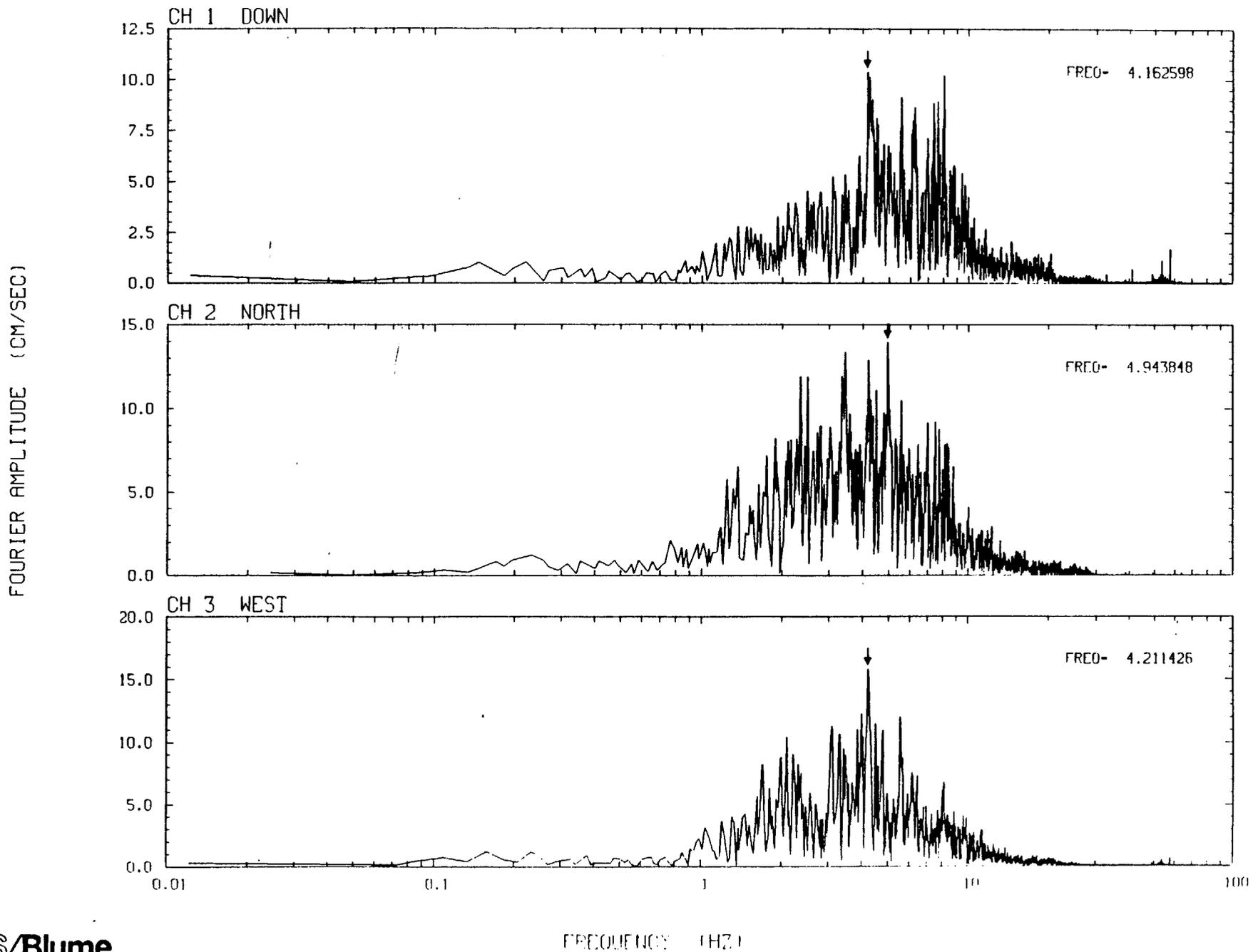
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 8

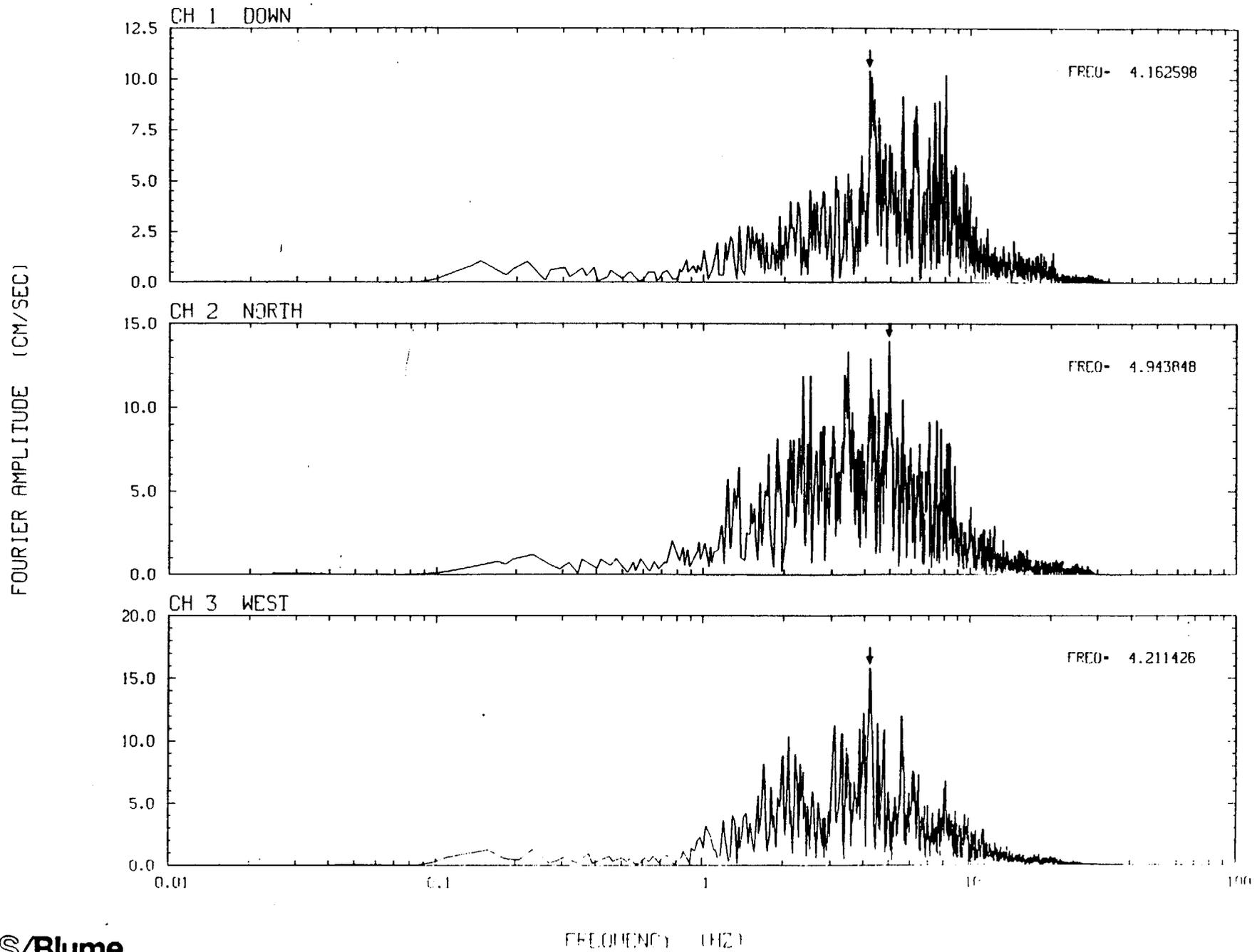
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 8

CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

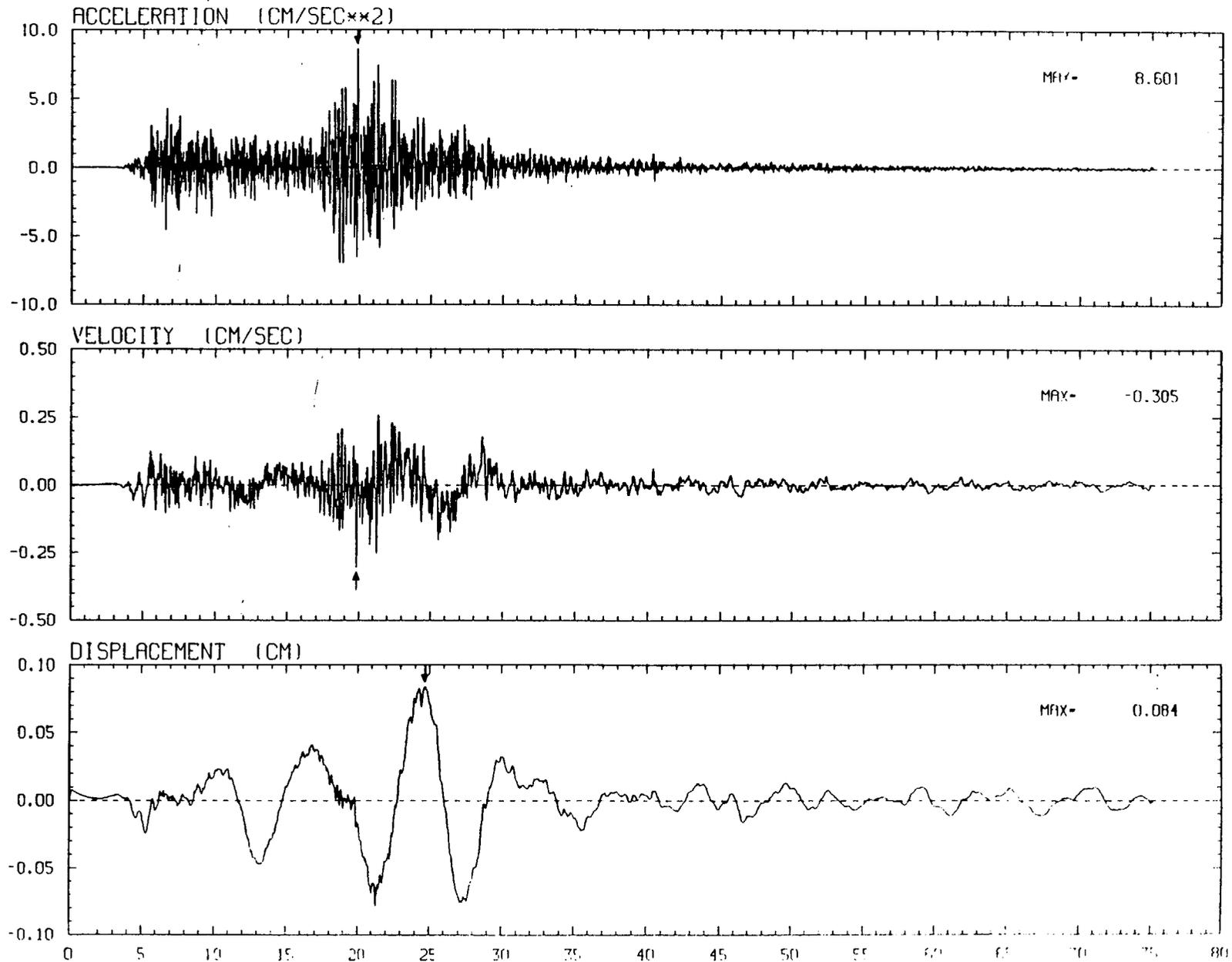


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 8 CH 1 DOWN

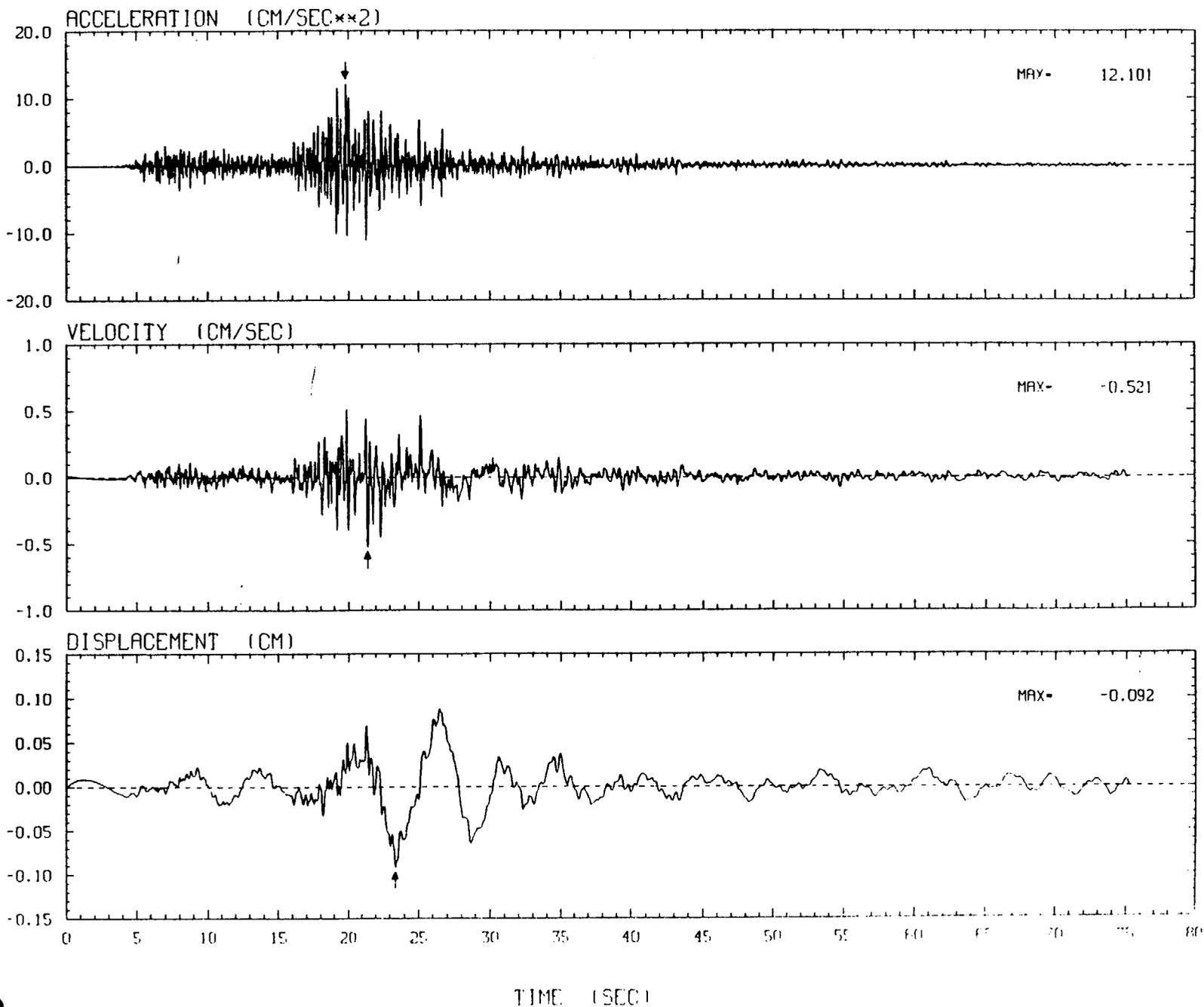
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 8 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE

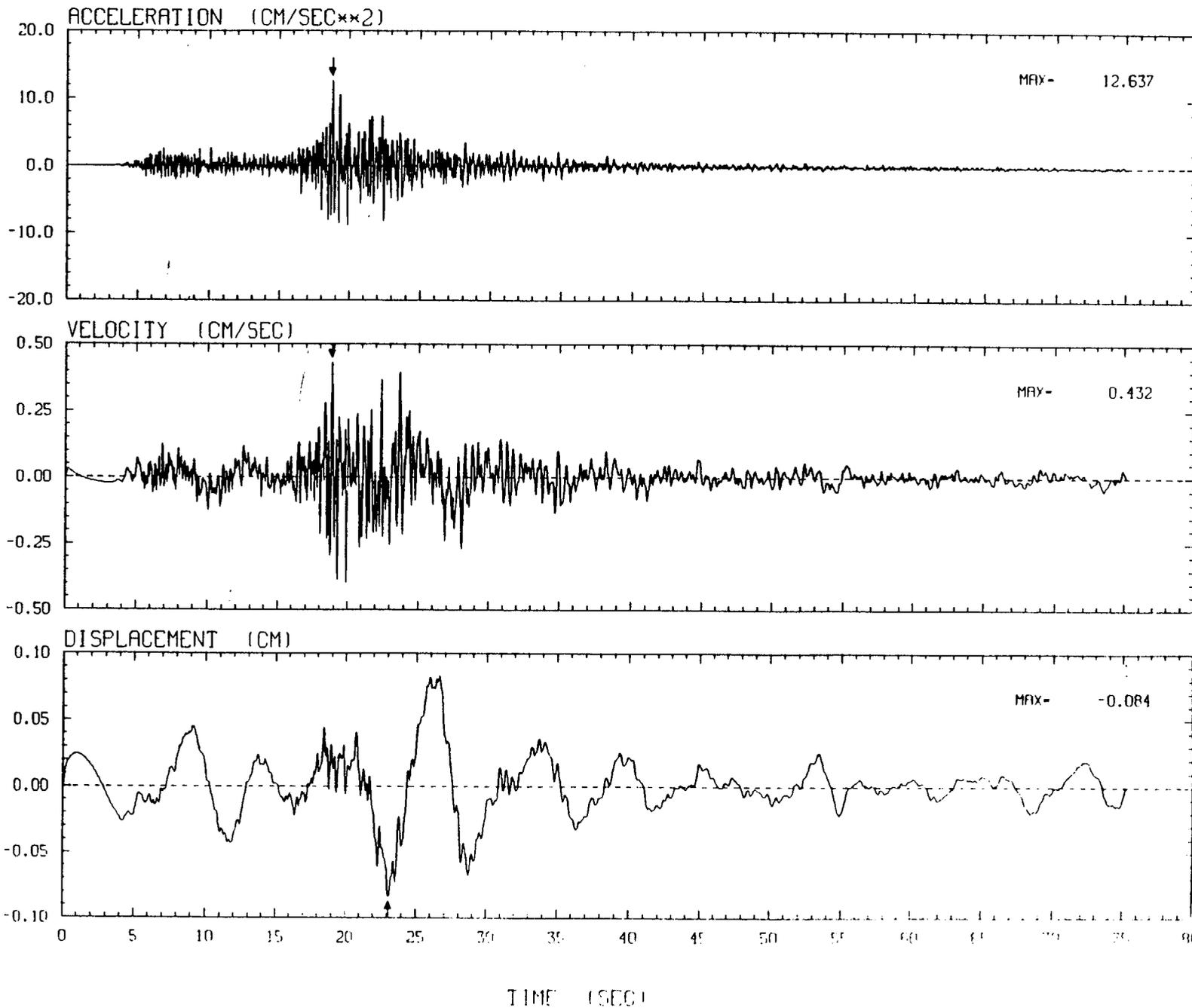


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 8 CH 3 WEST

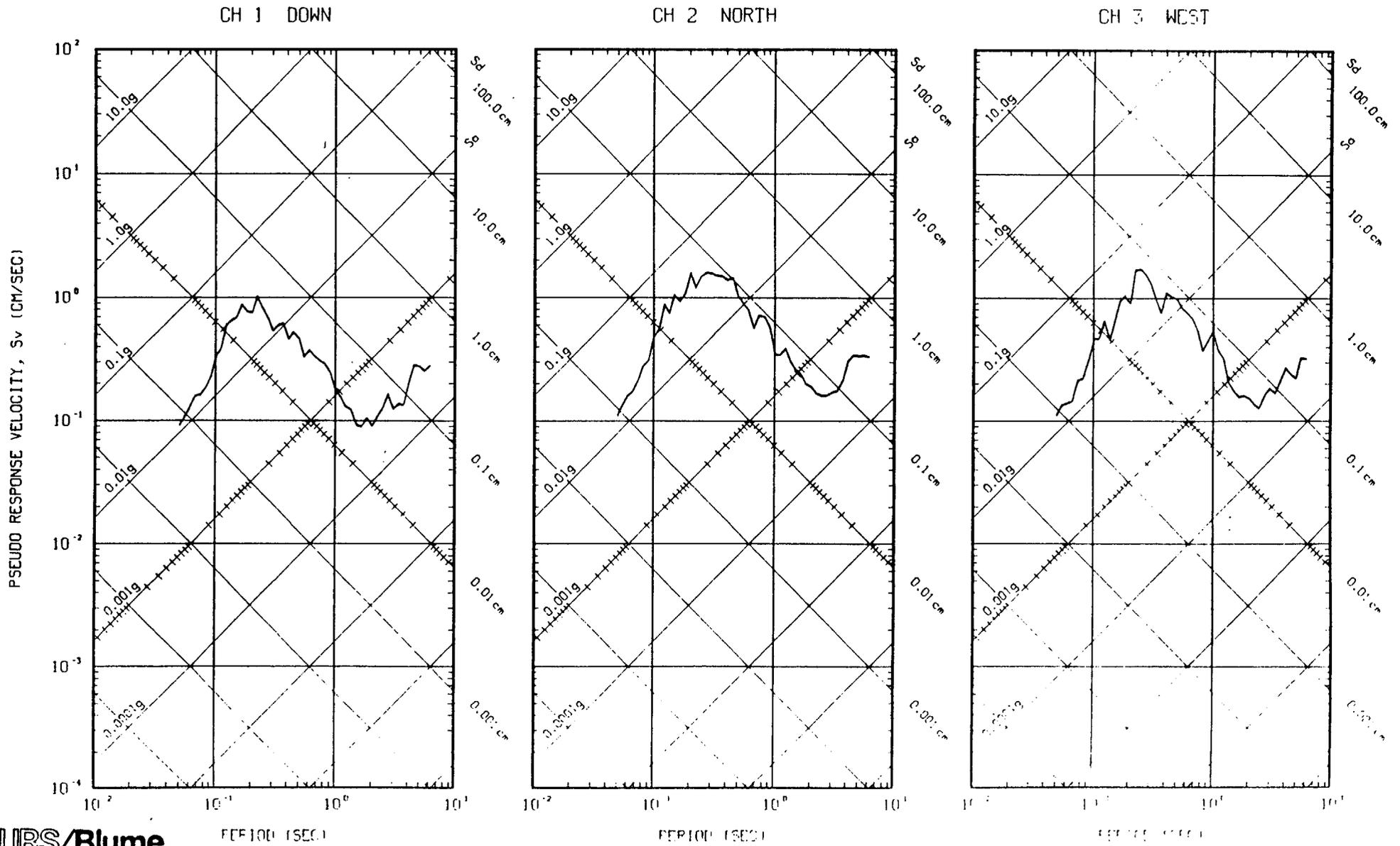
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 8

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

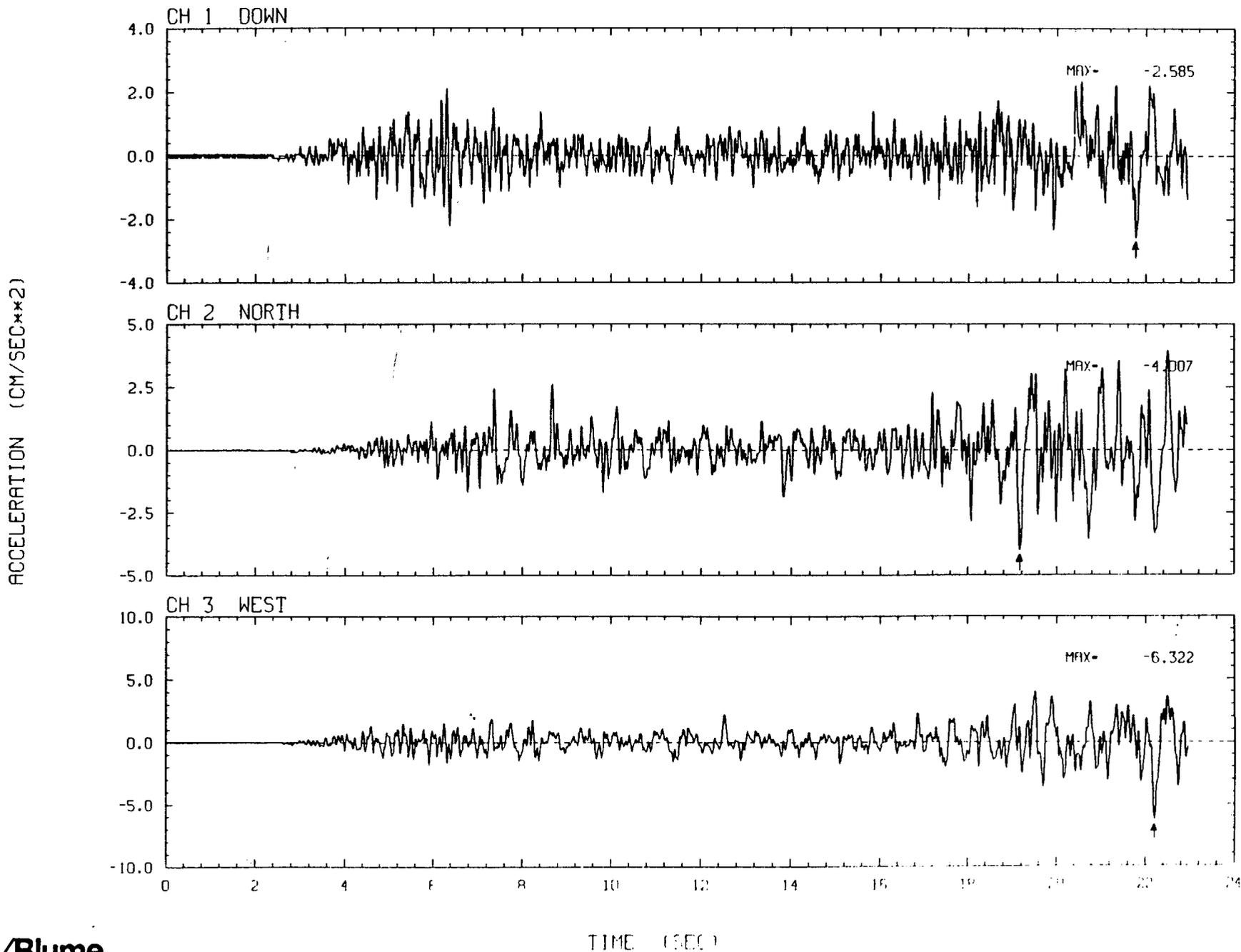


STATION NO. 9

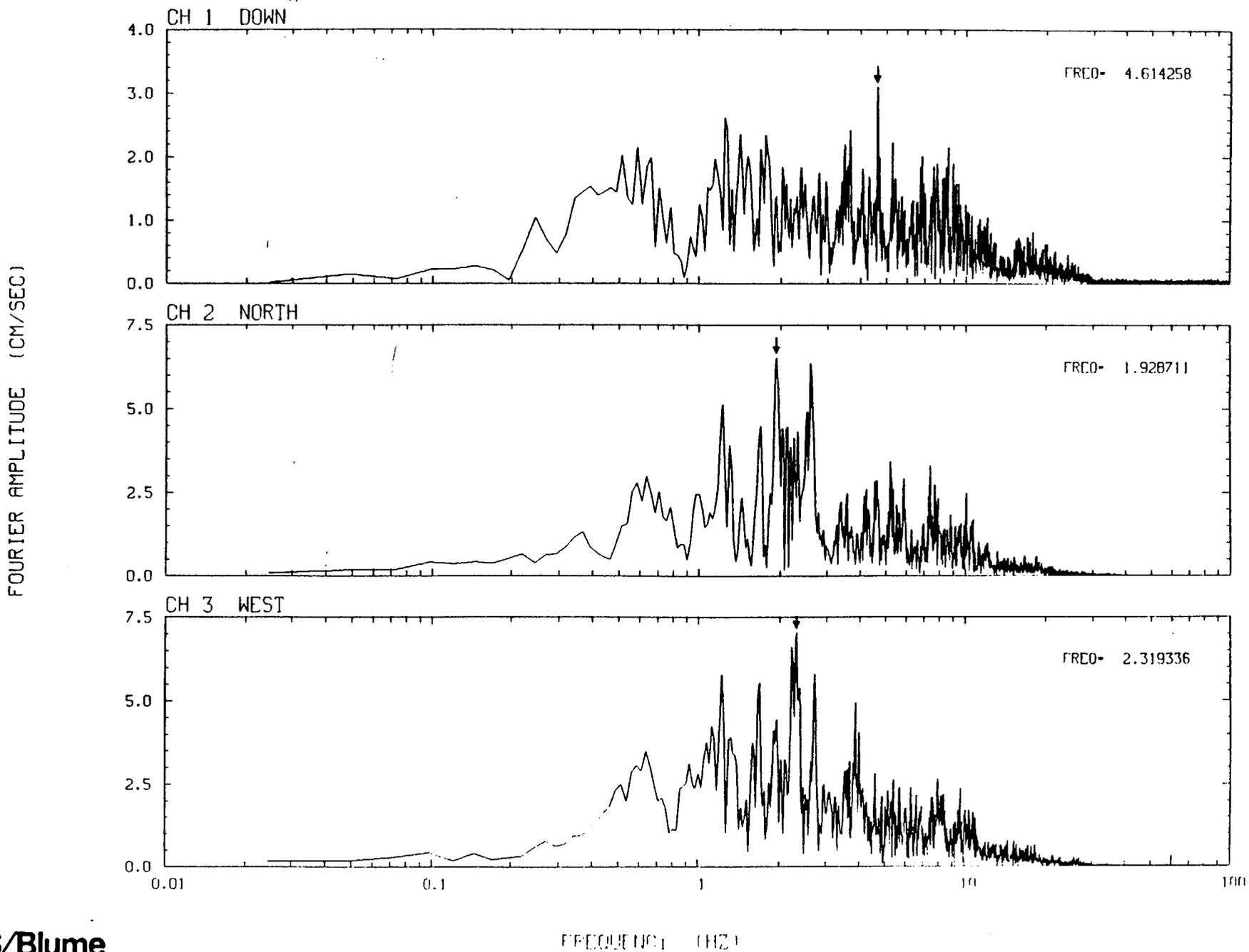
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 9

UNCORRECTED ACCELERATION TIME HISTORIES



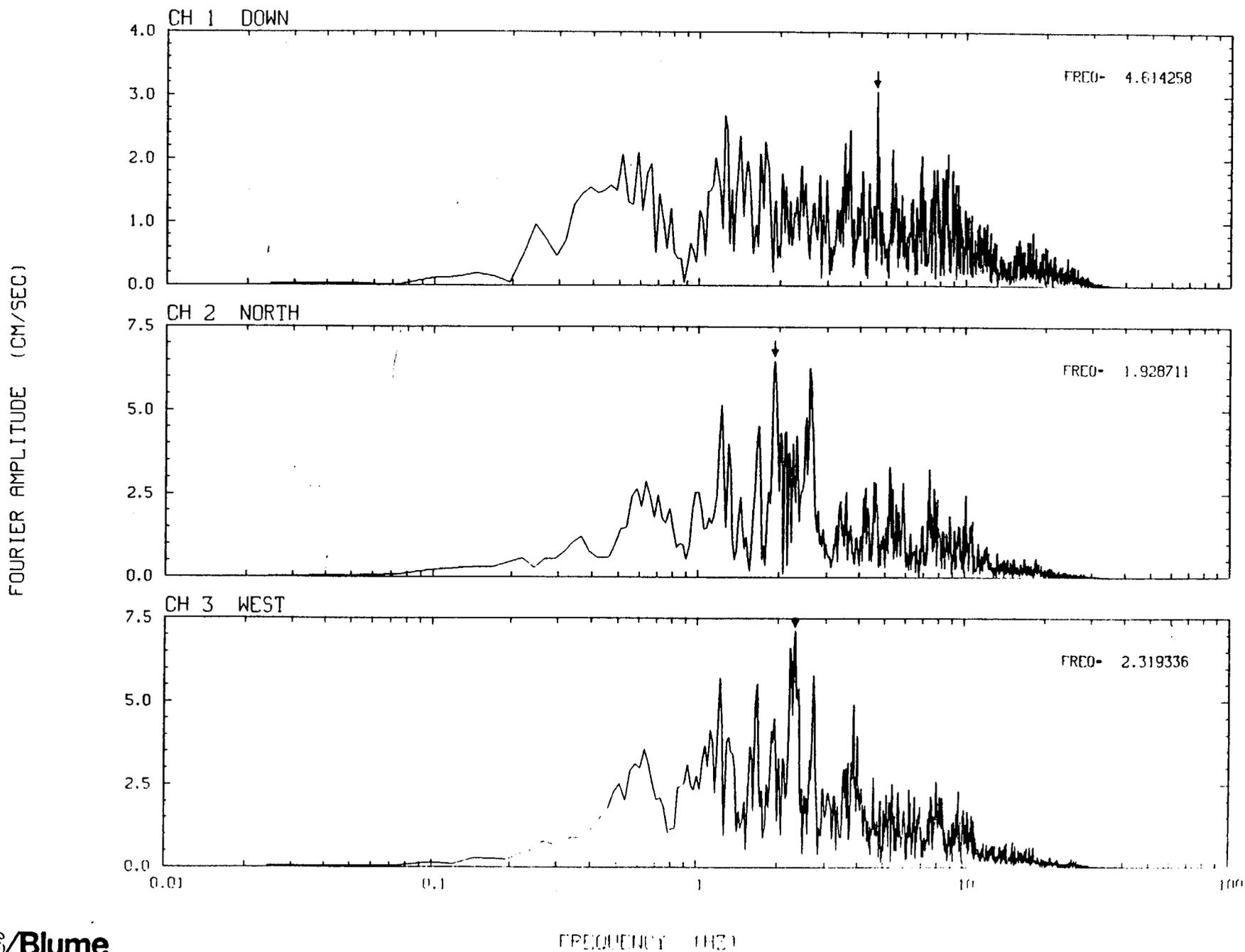
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 9
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 9

CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

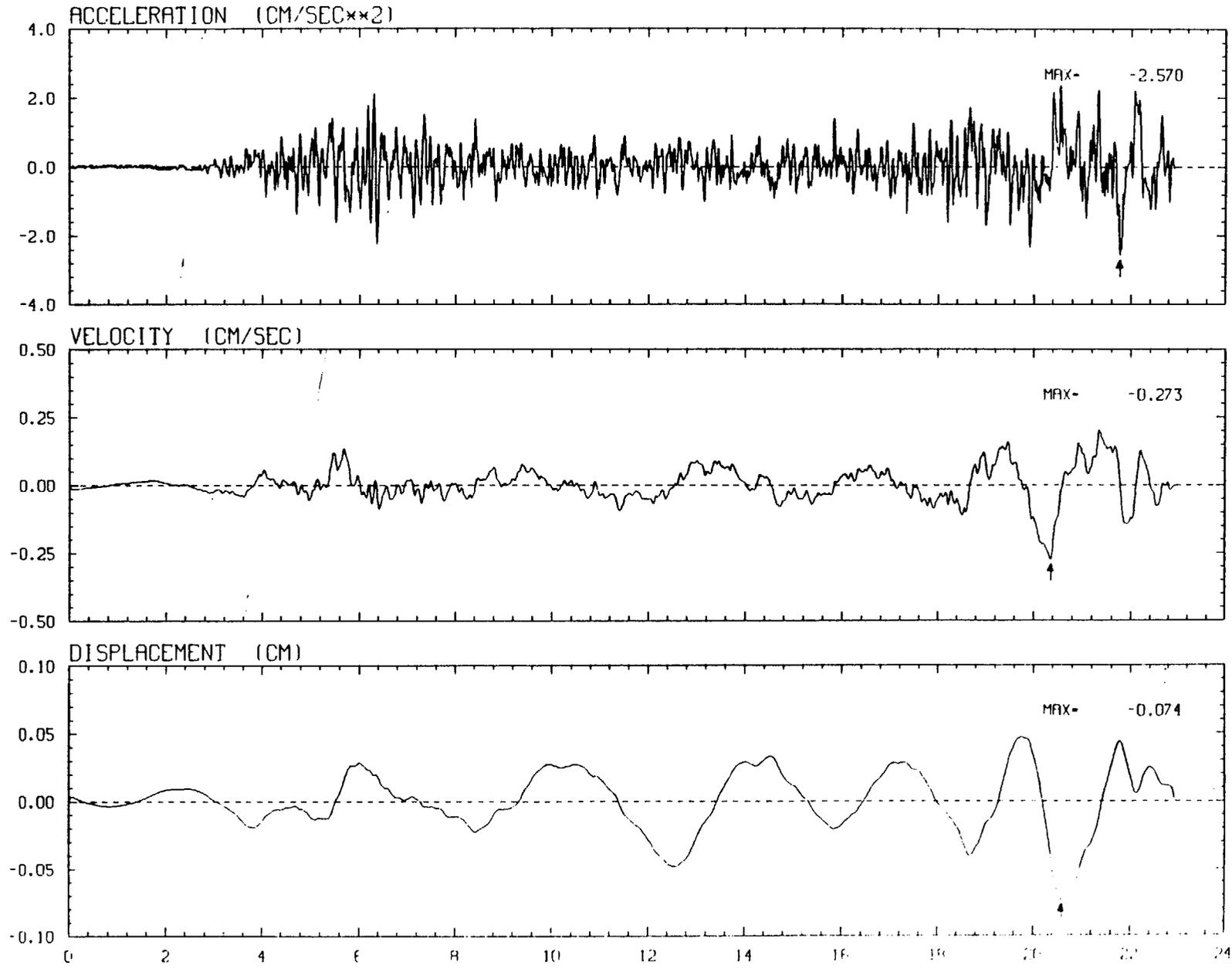


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 9 CH 1 DOWN

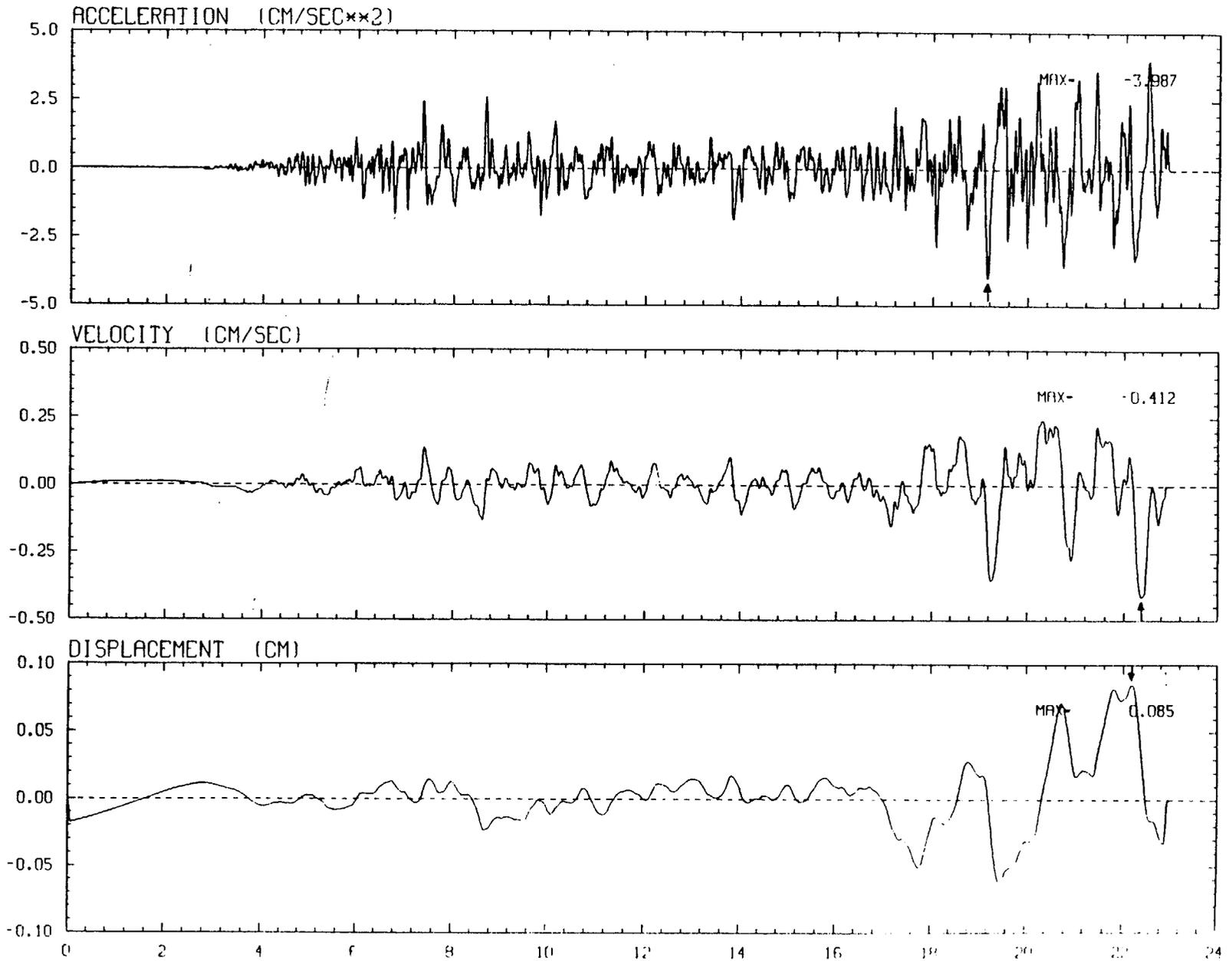
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE

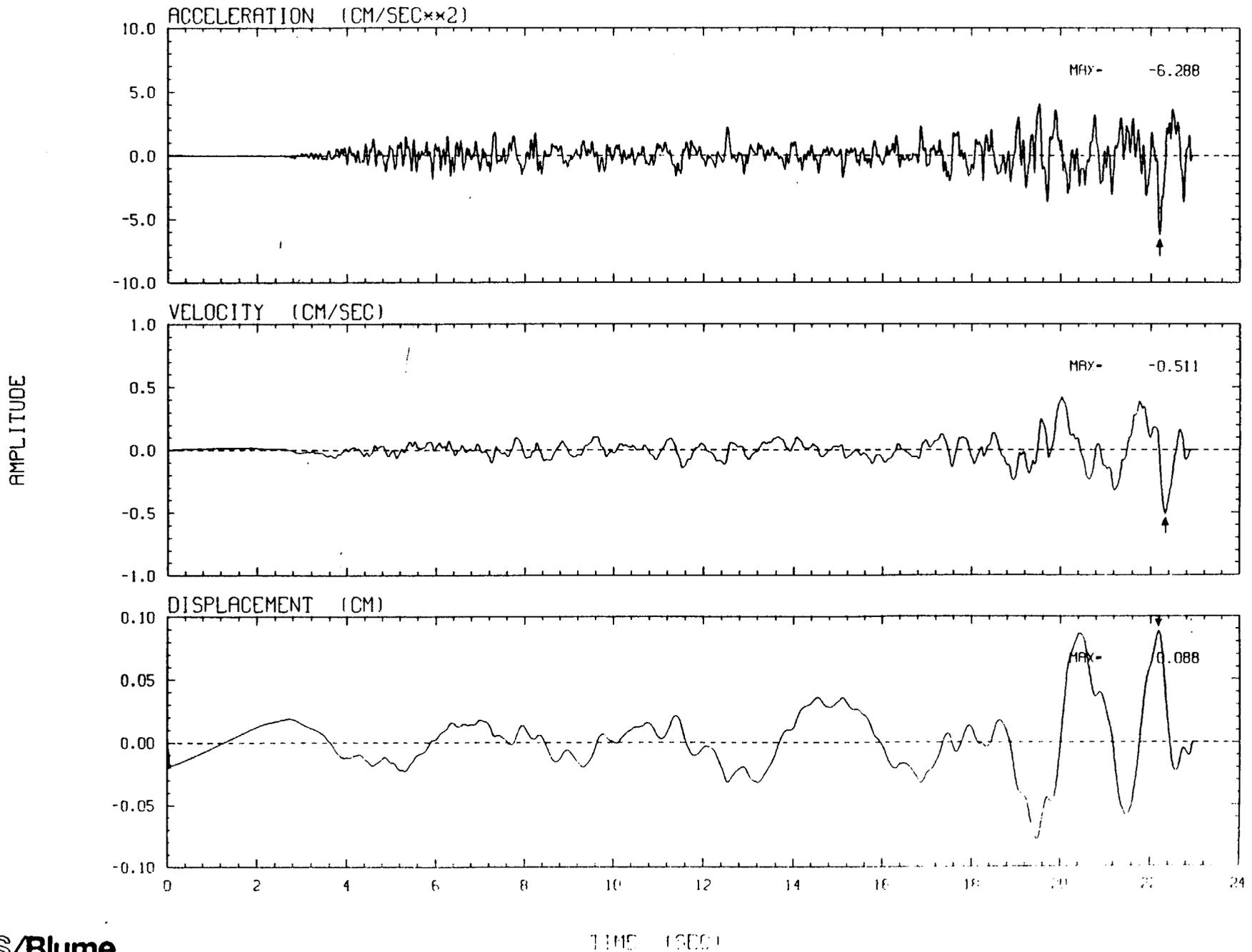


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 9 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE

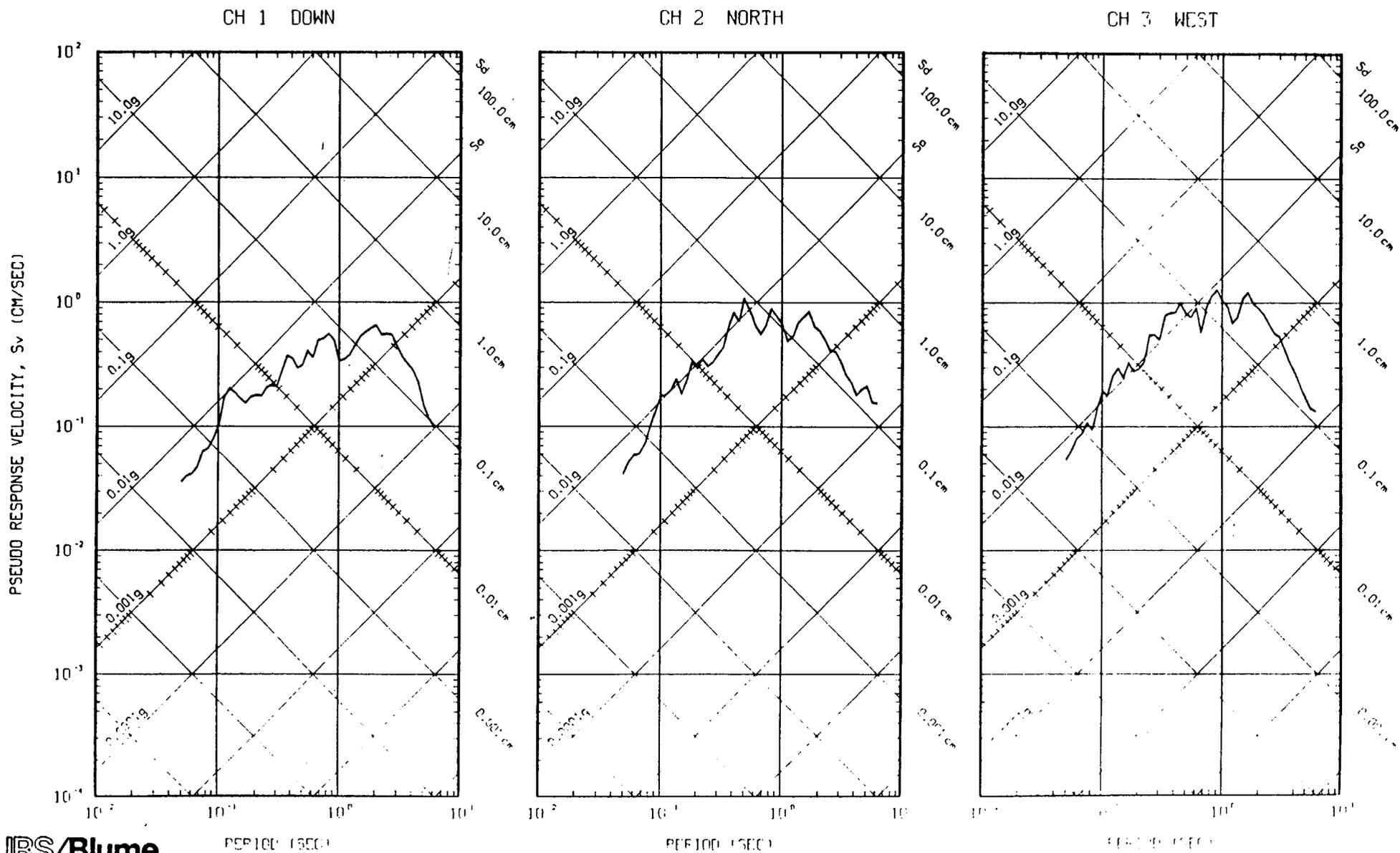


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 9 CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 9

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

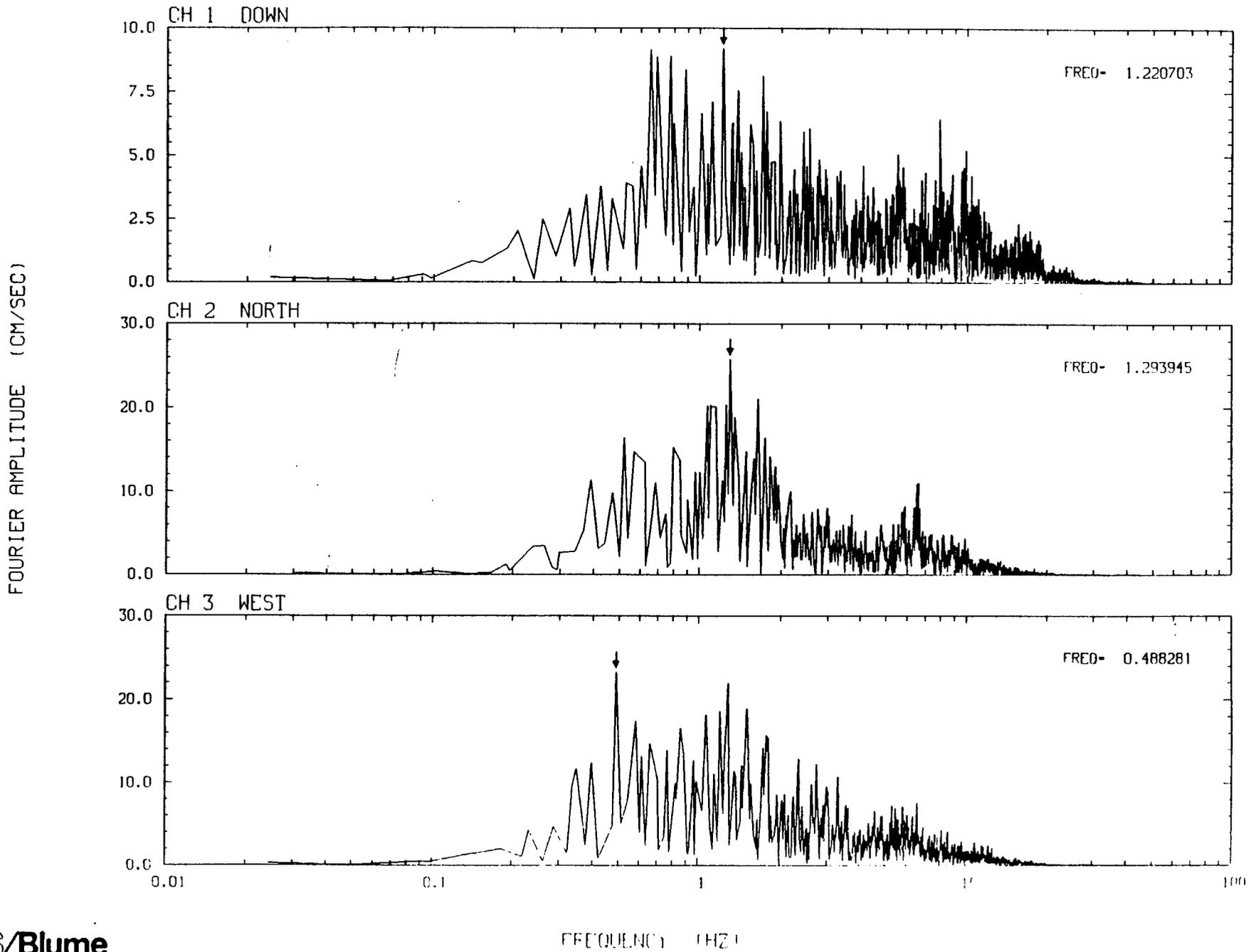


STATION NO. 10

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 10

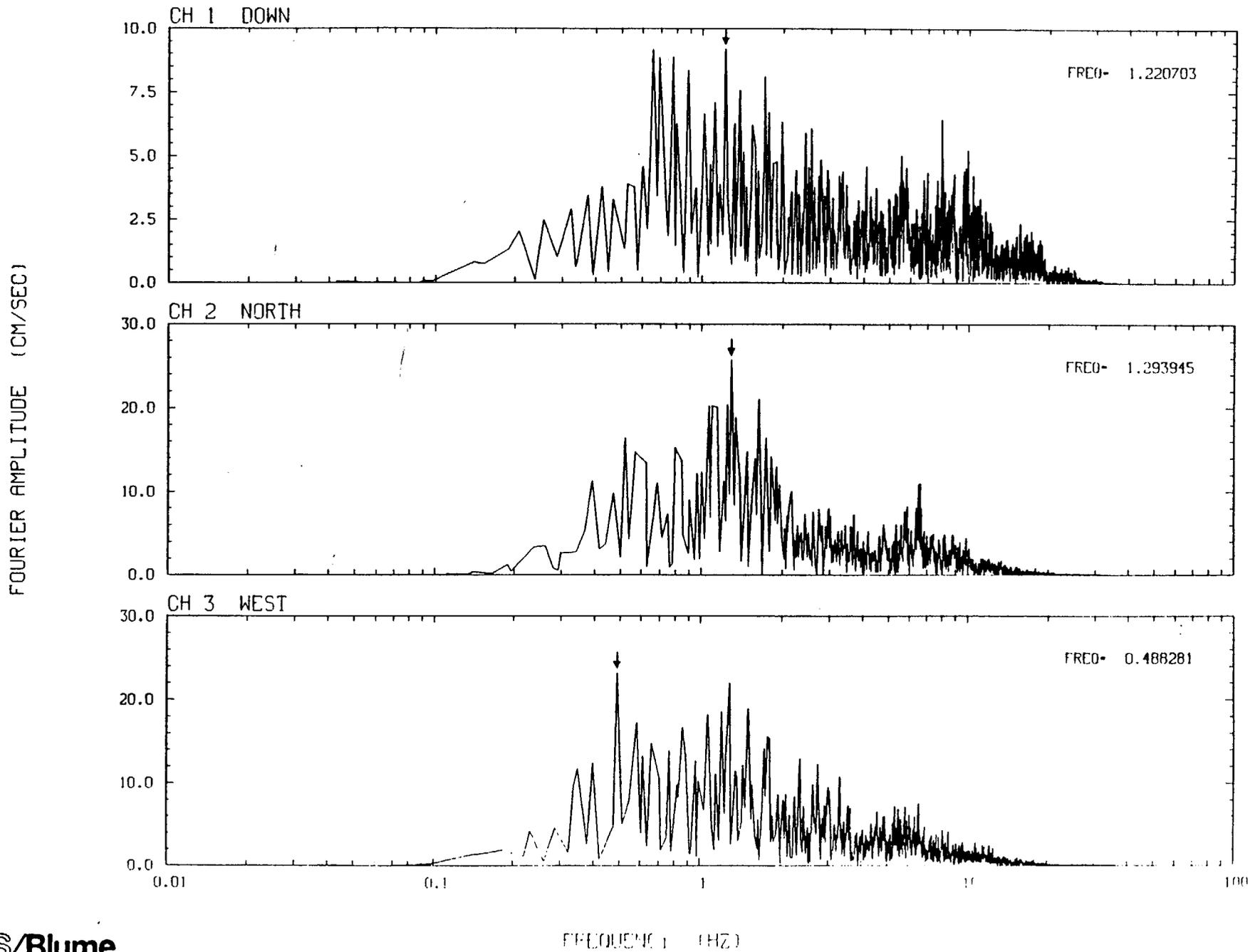
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

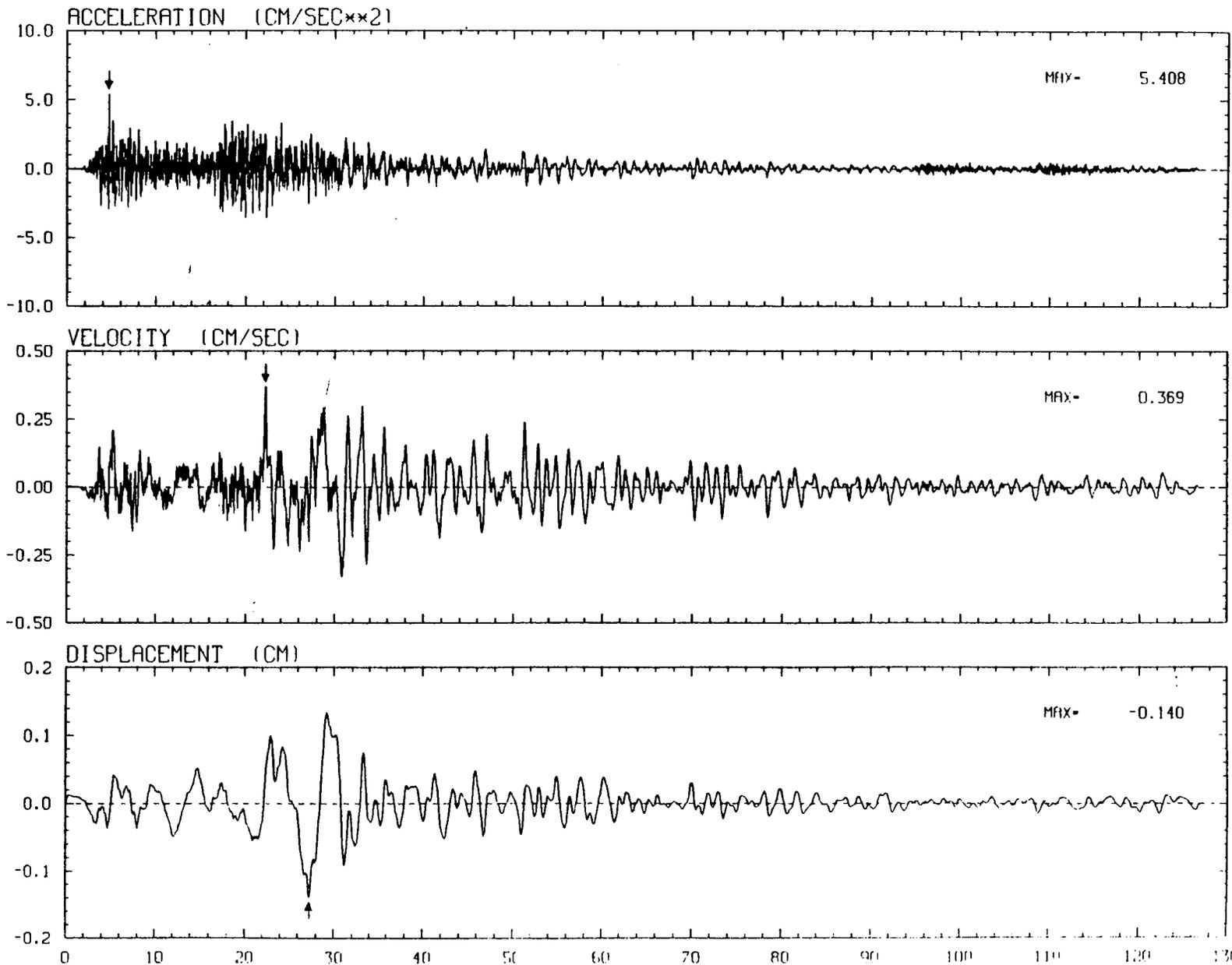
STATION NO. 10

CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 10 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE

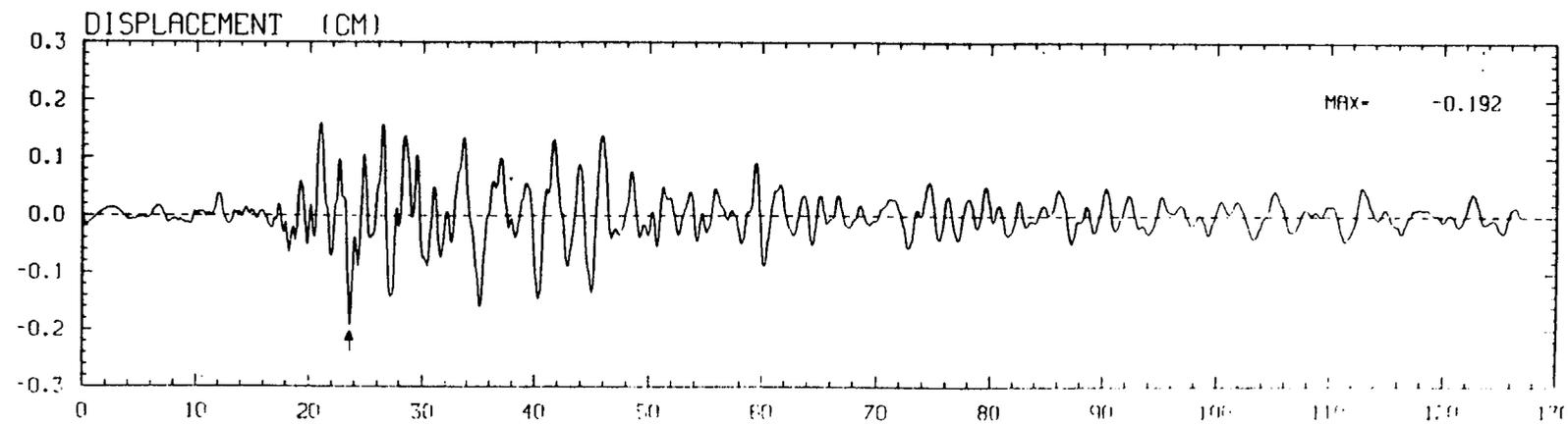
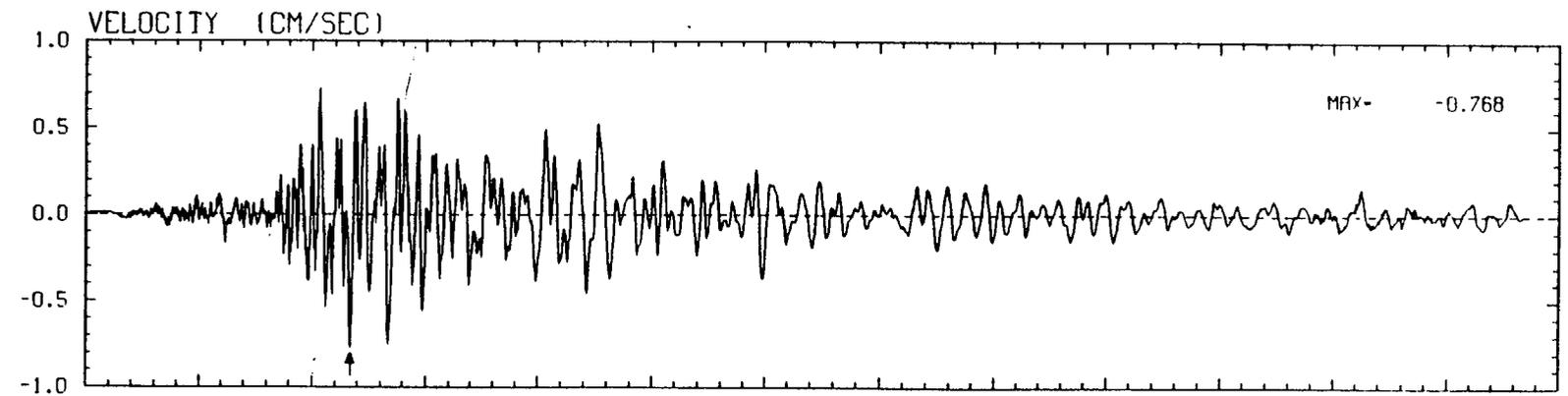
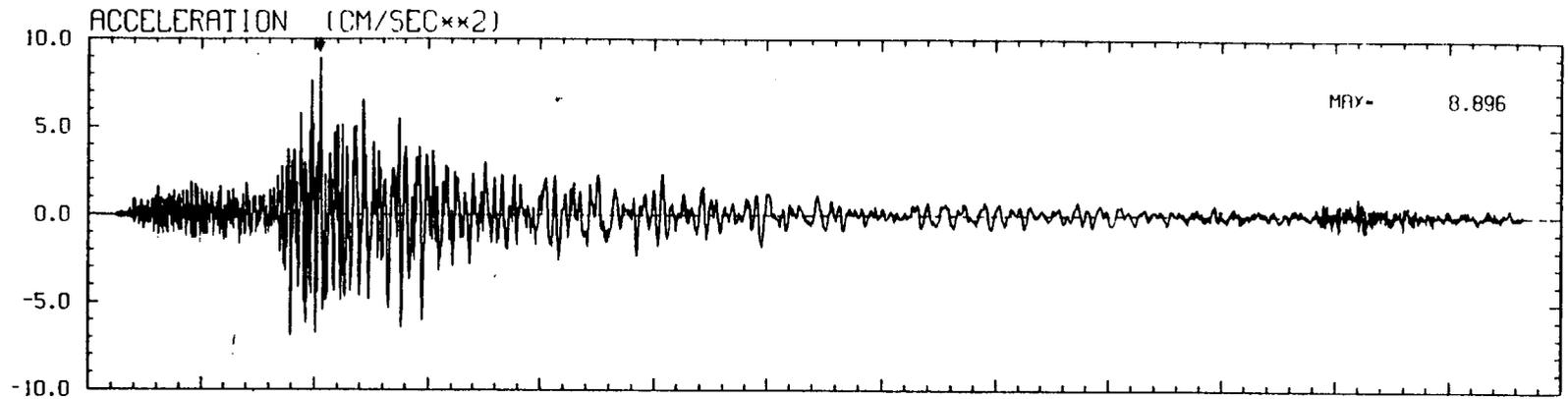


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 10 CH 2 NORTH

CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

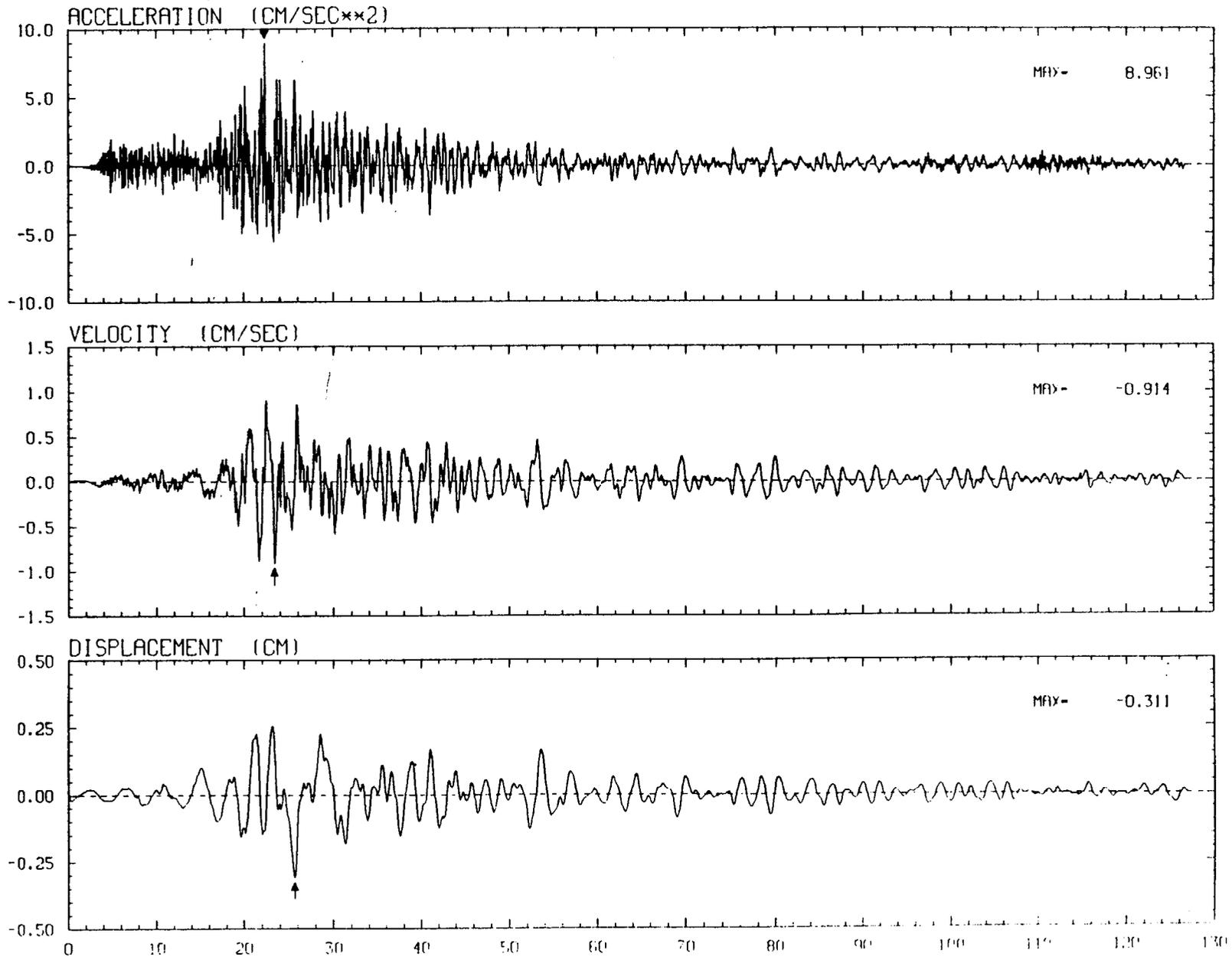
AMPLITUDE



TIME (SEC)

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 10 CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

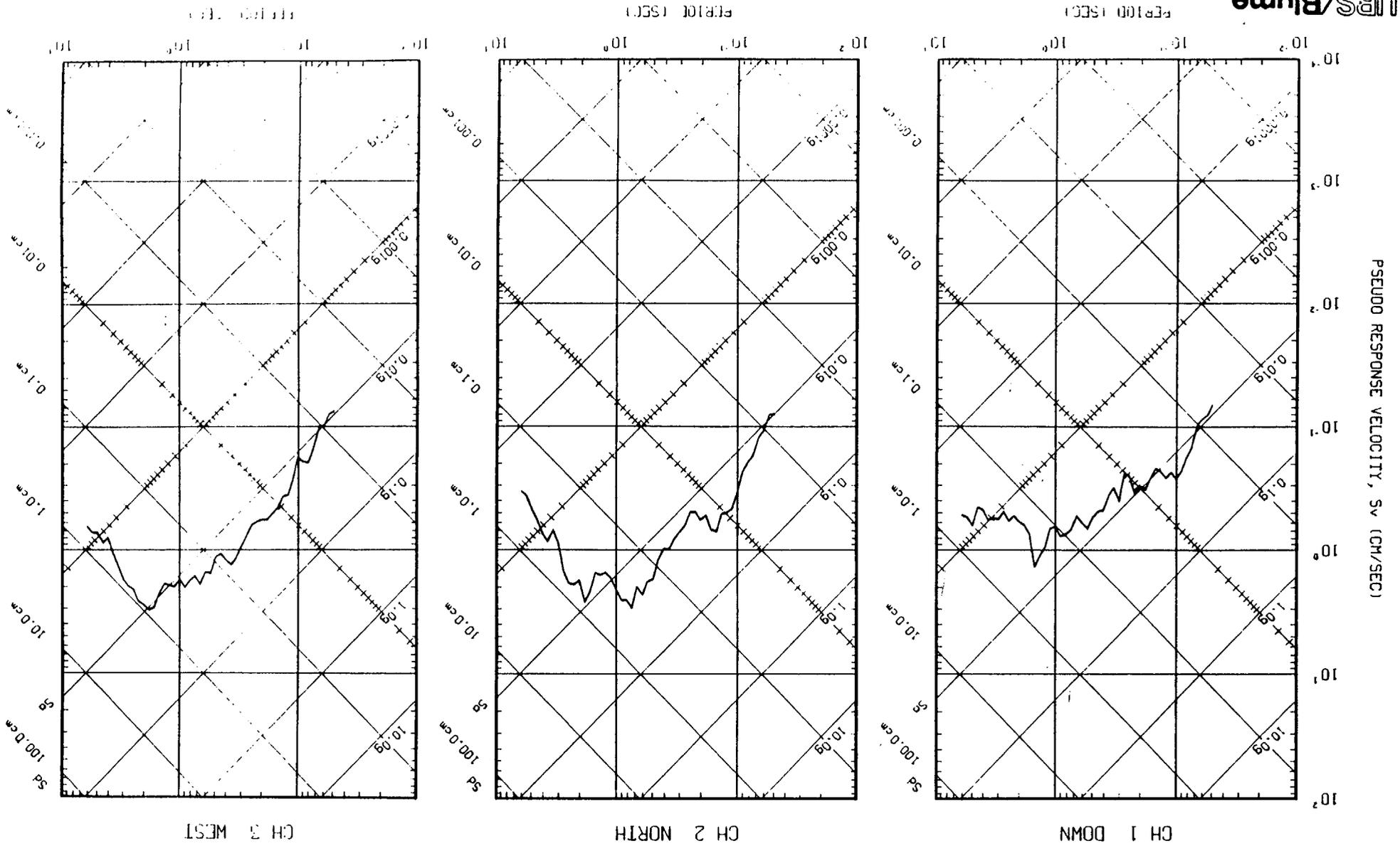
AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 10

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

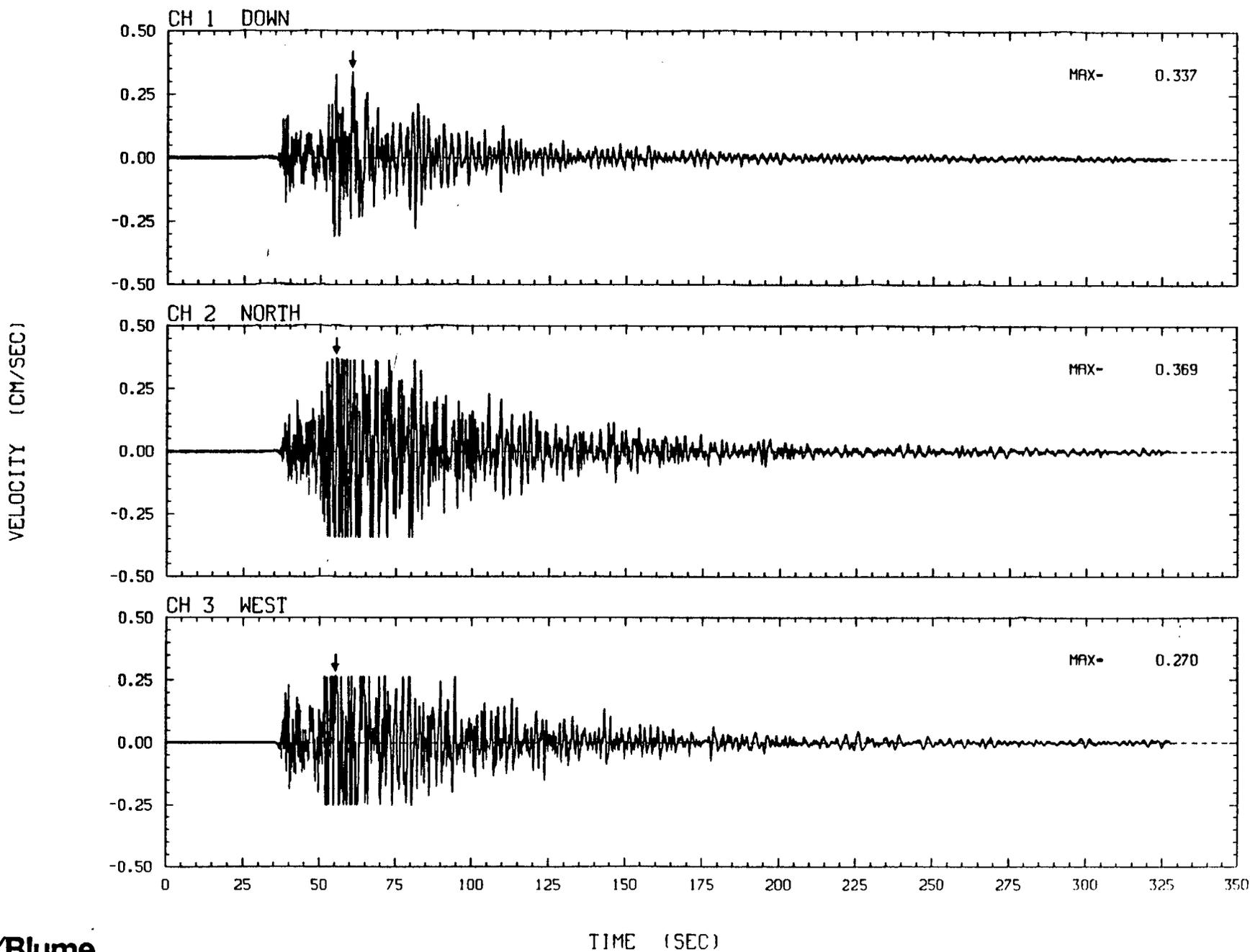


STATION NO. 11

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 11

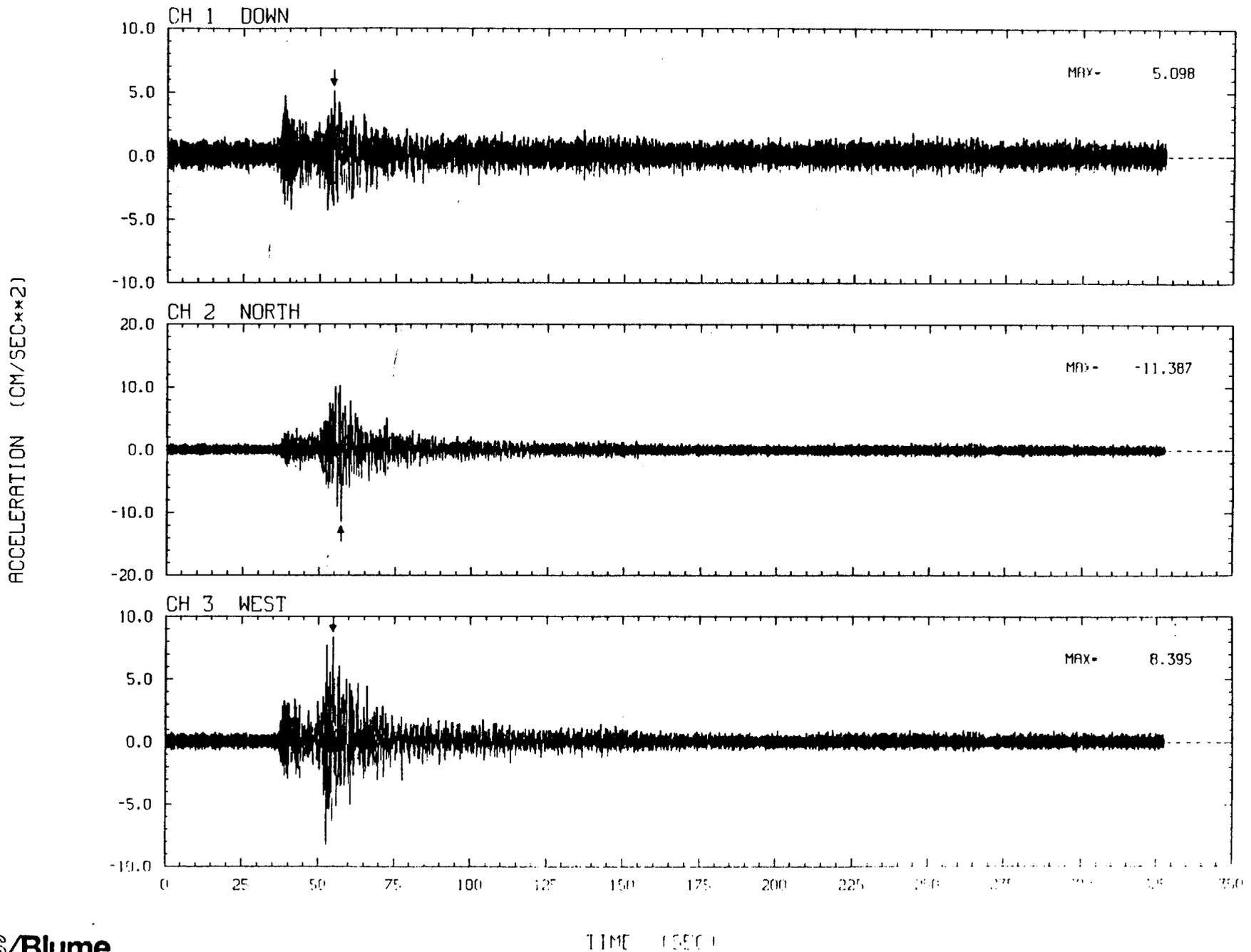
UNCORRECTED VELOCITY TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 11

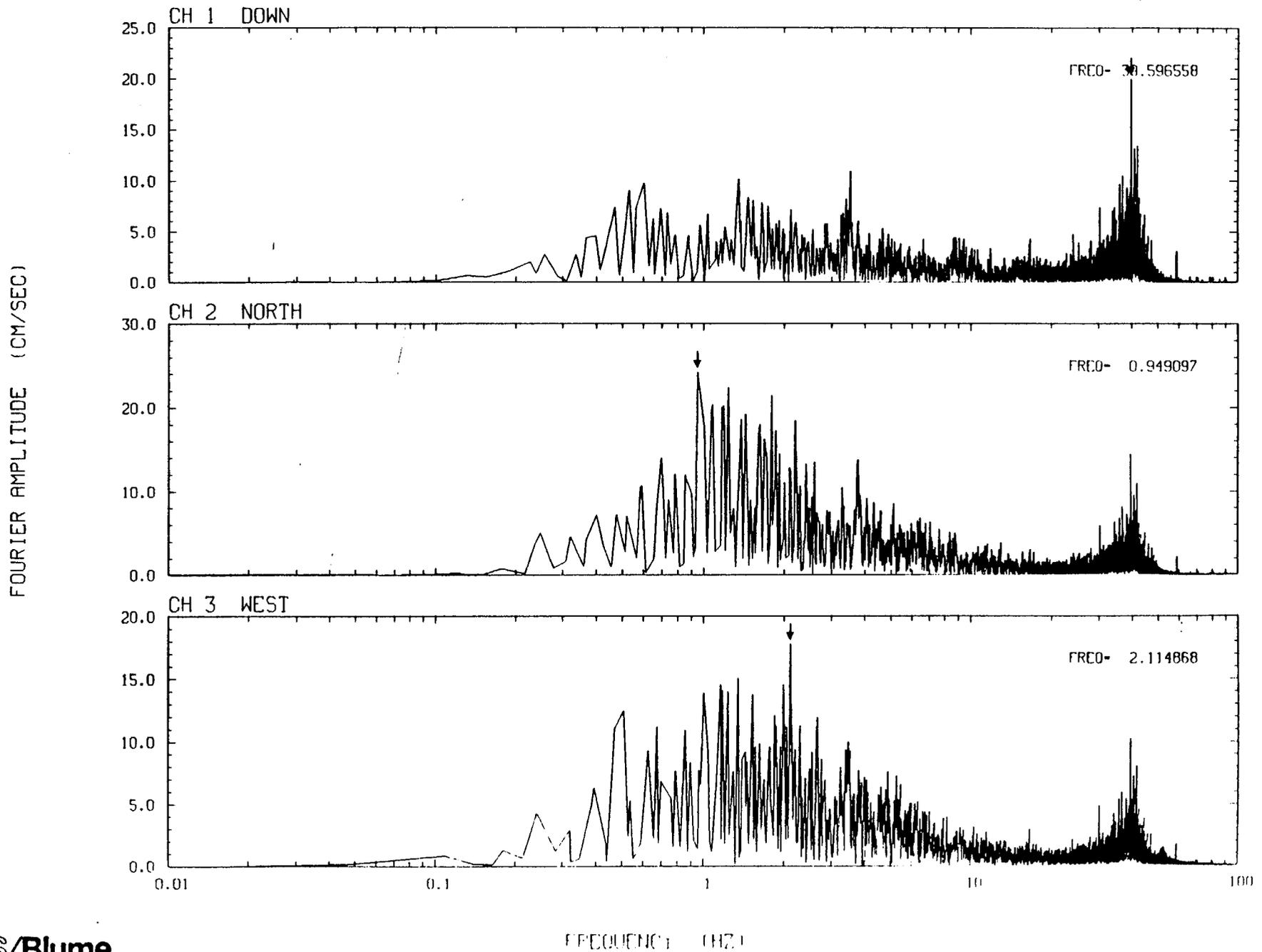
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 11

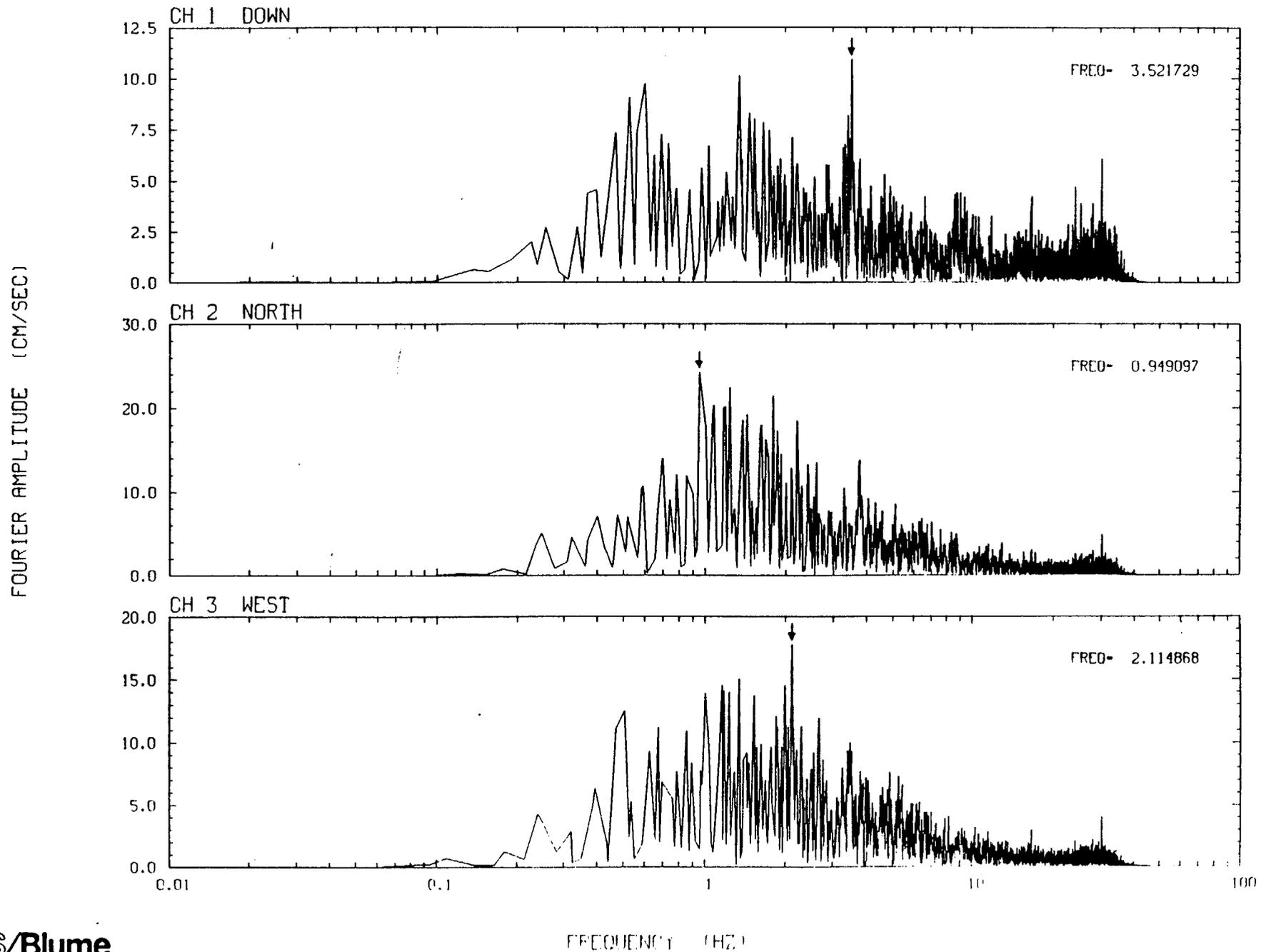
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 11

CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

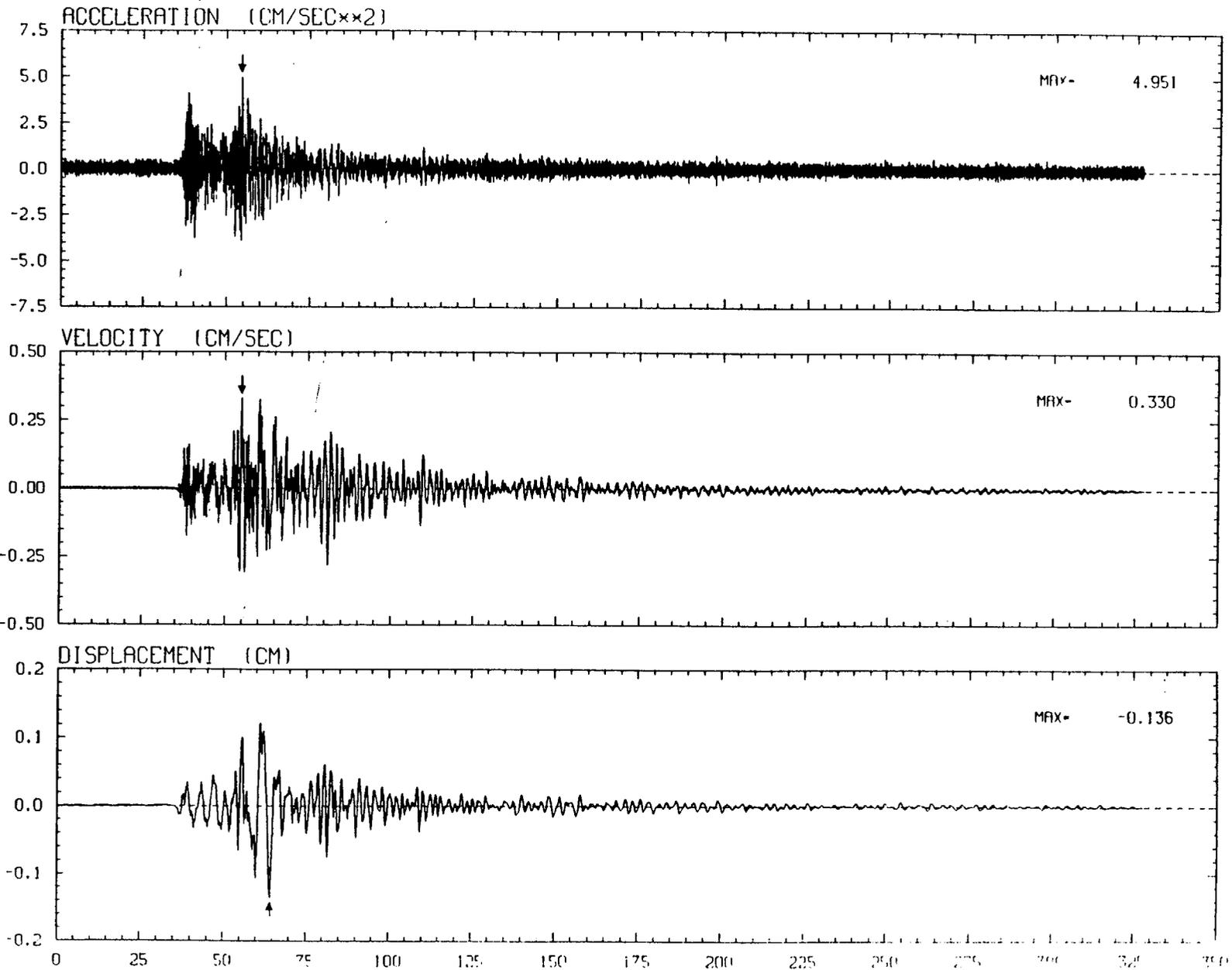


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 11 CH 1 DOWN

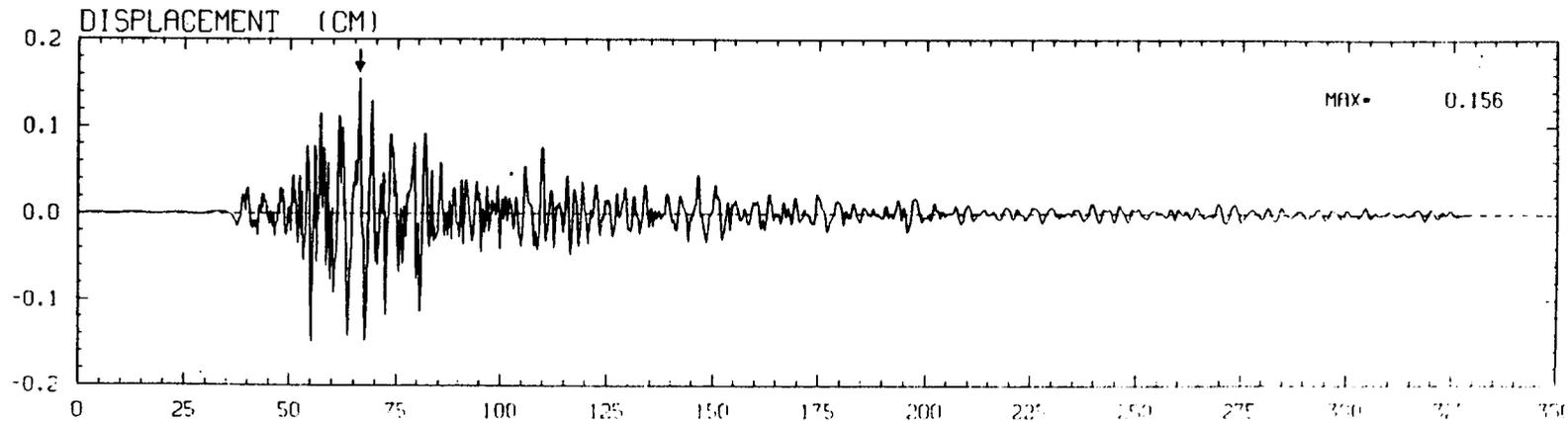
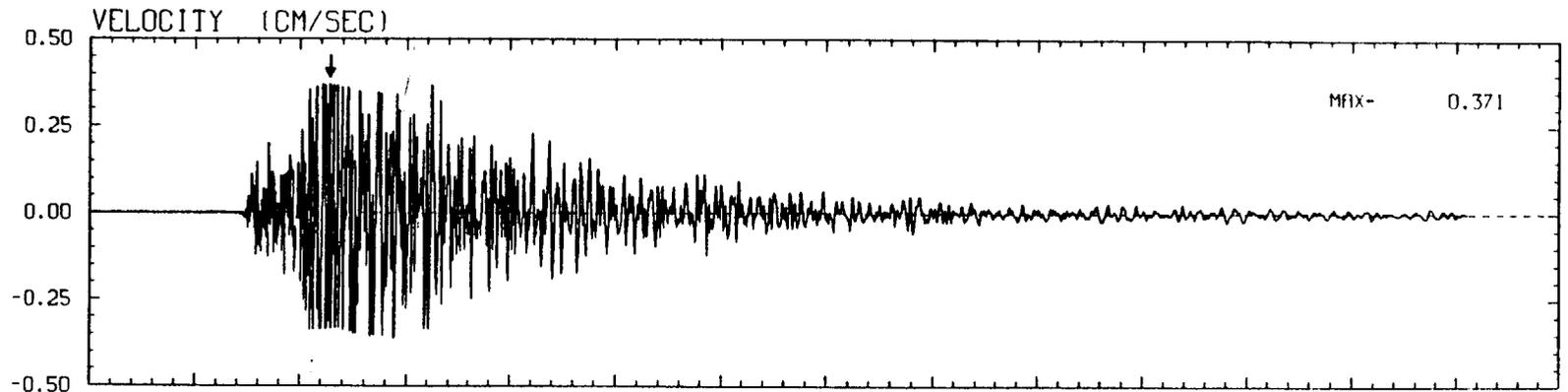
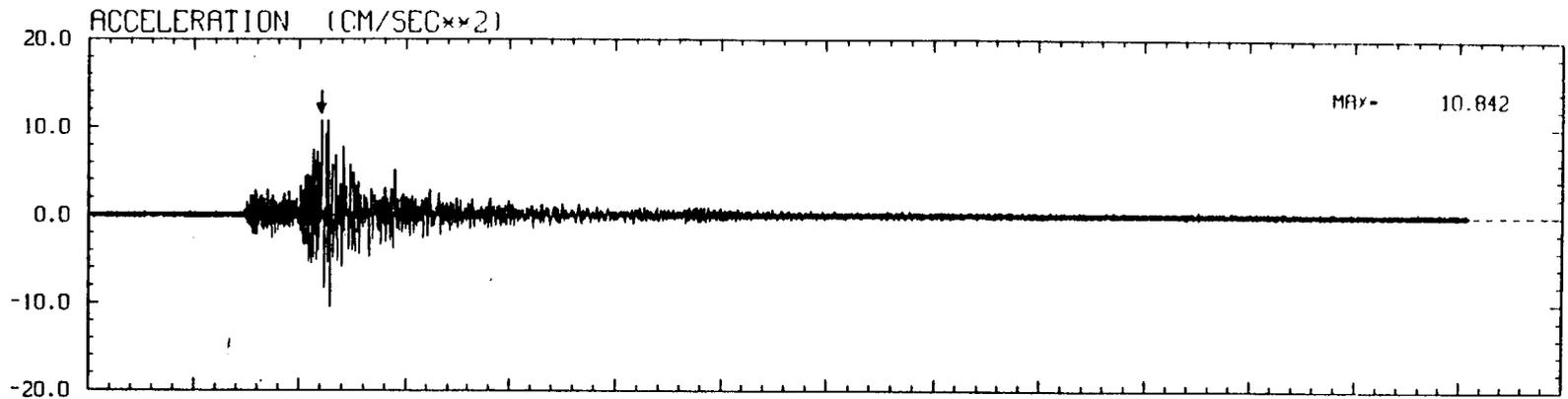
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 11 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE

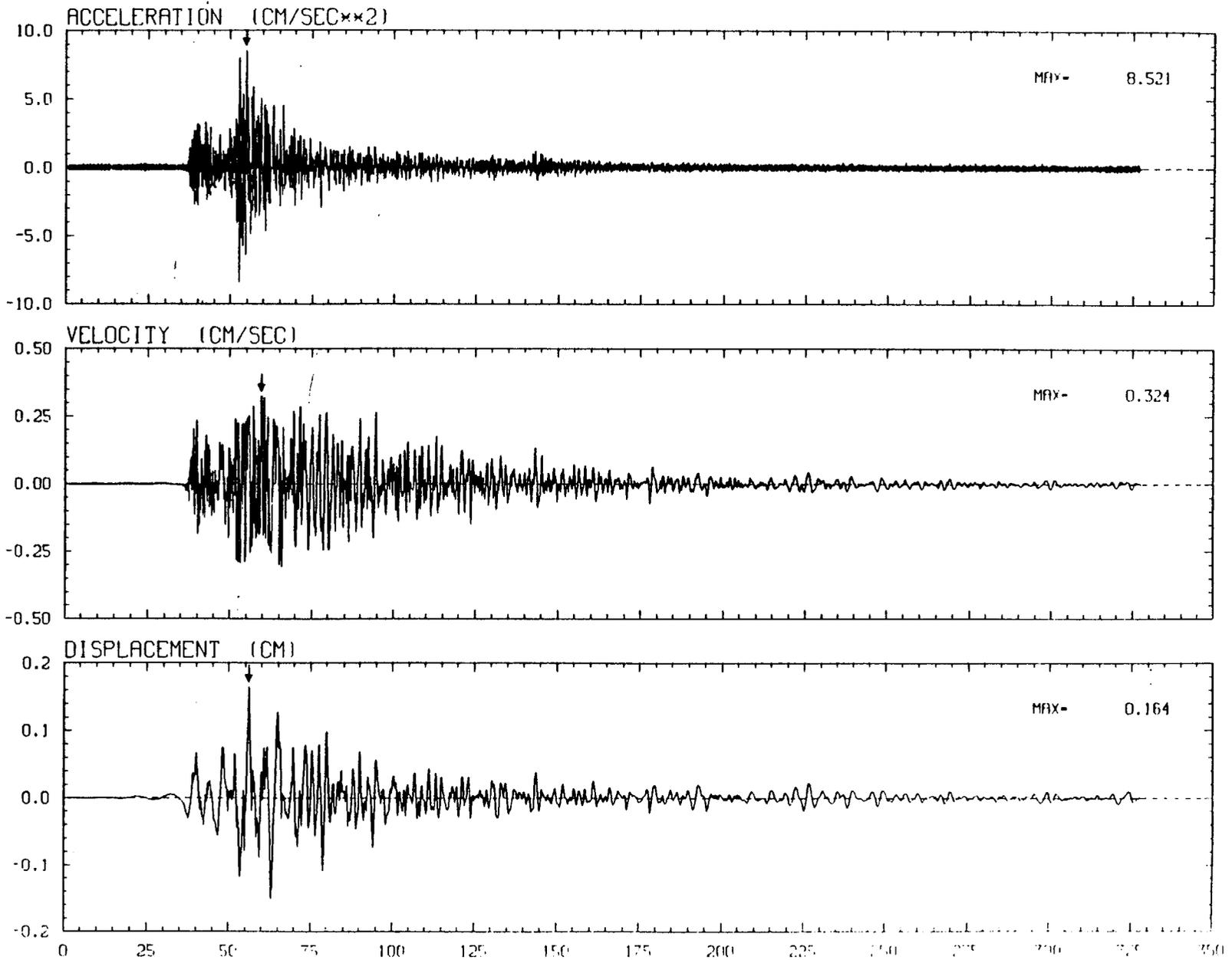


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TIME (SEC)

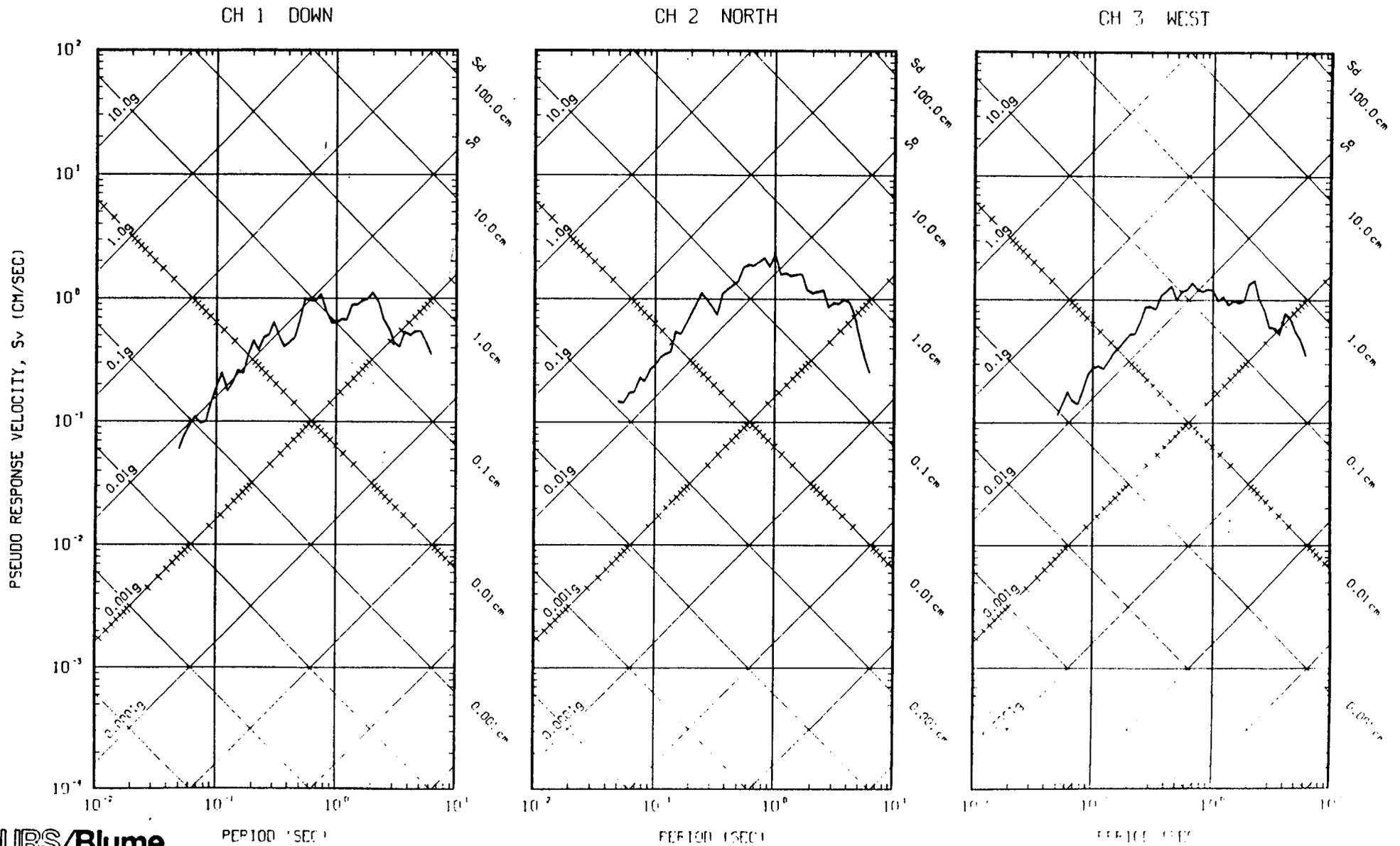
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 11 CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 11

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

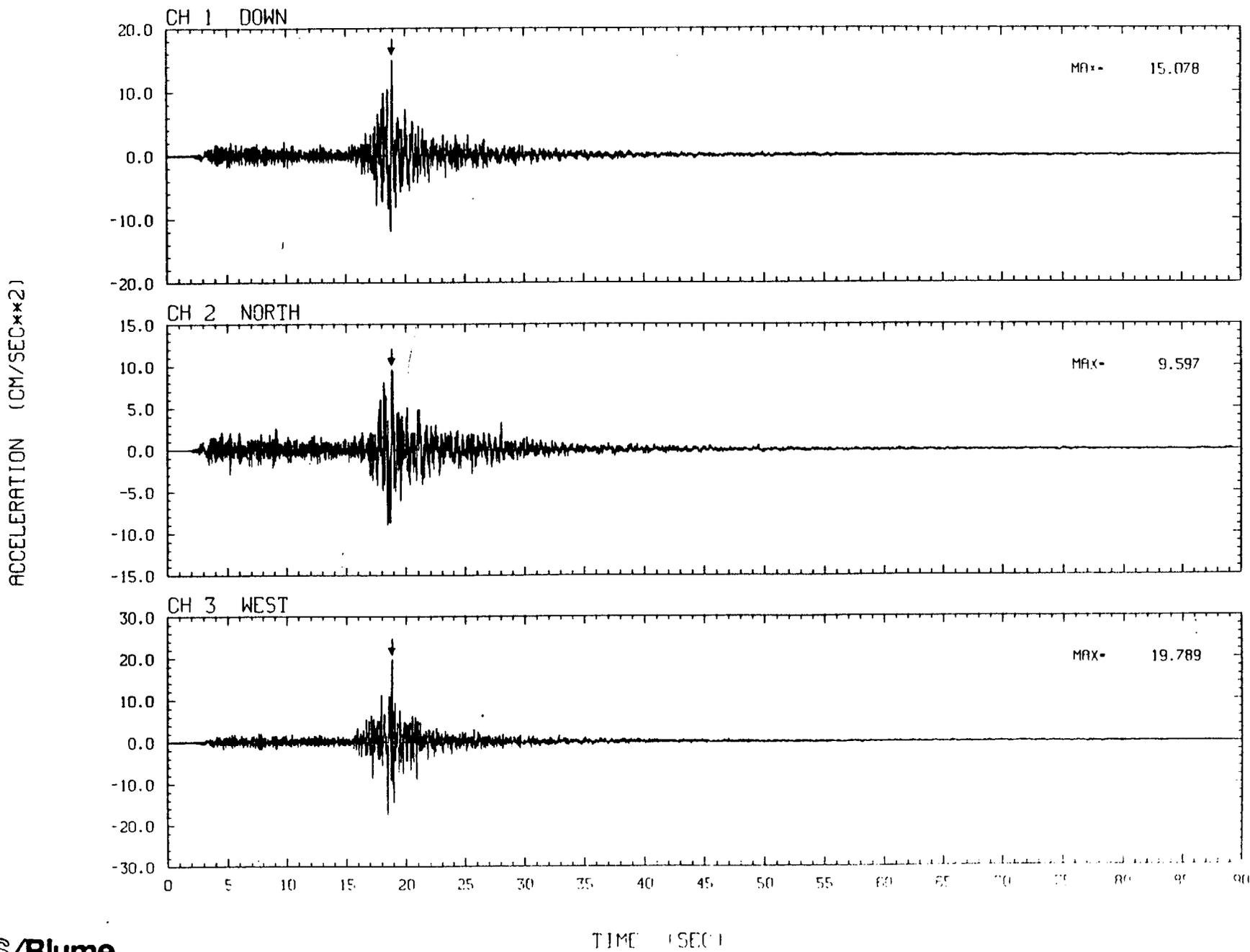


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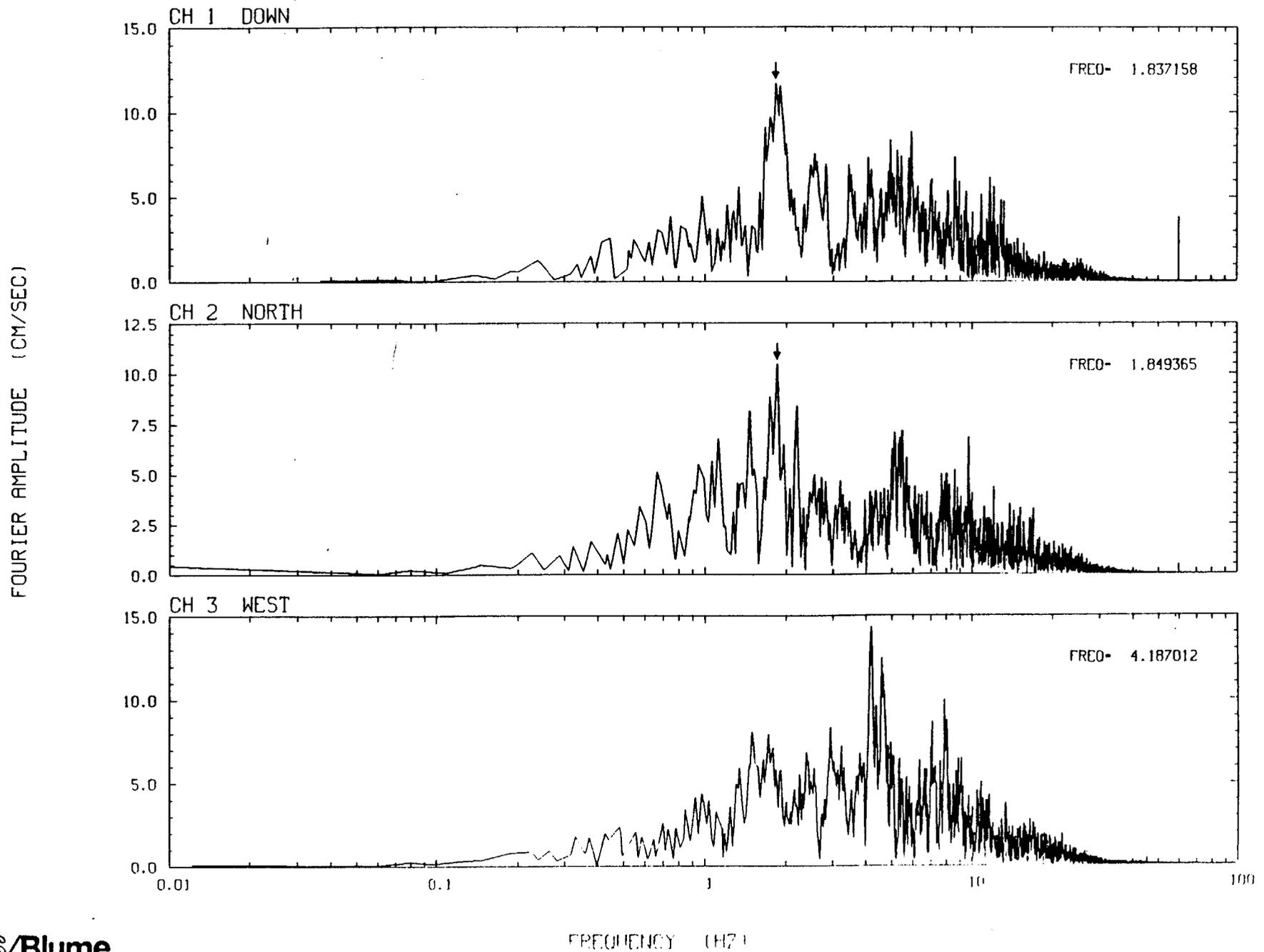
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 12

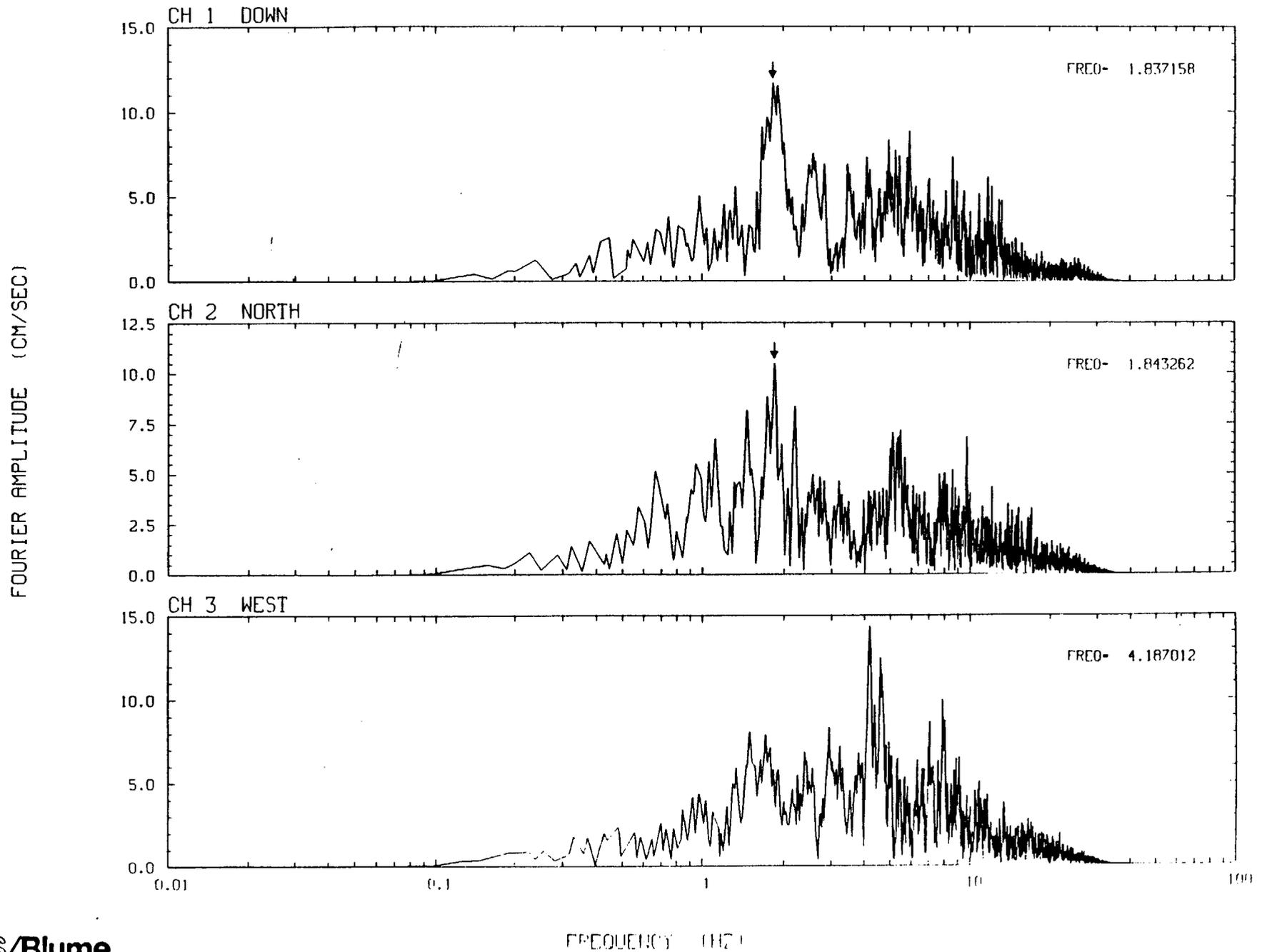
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 12
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

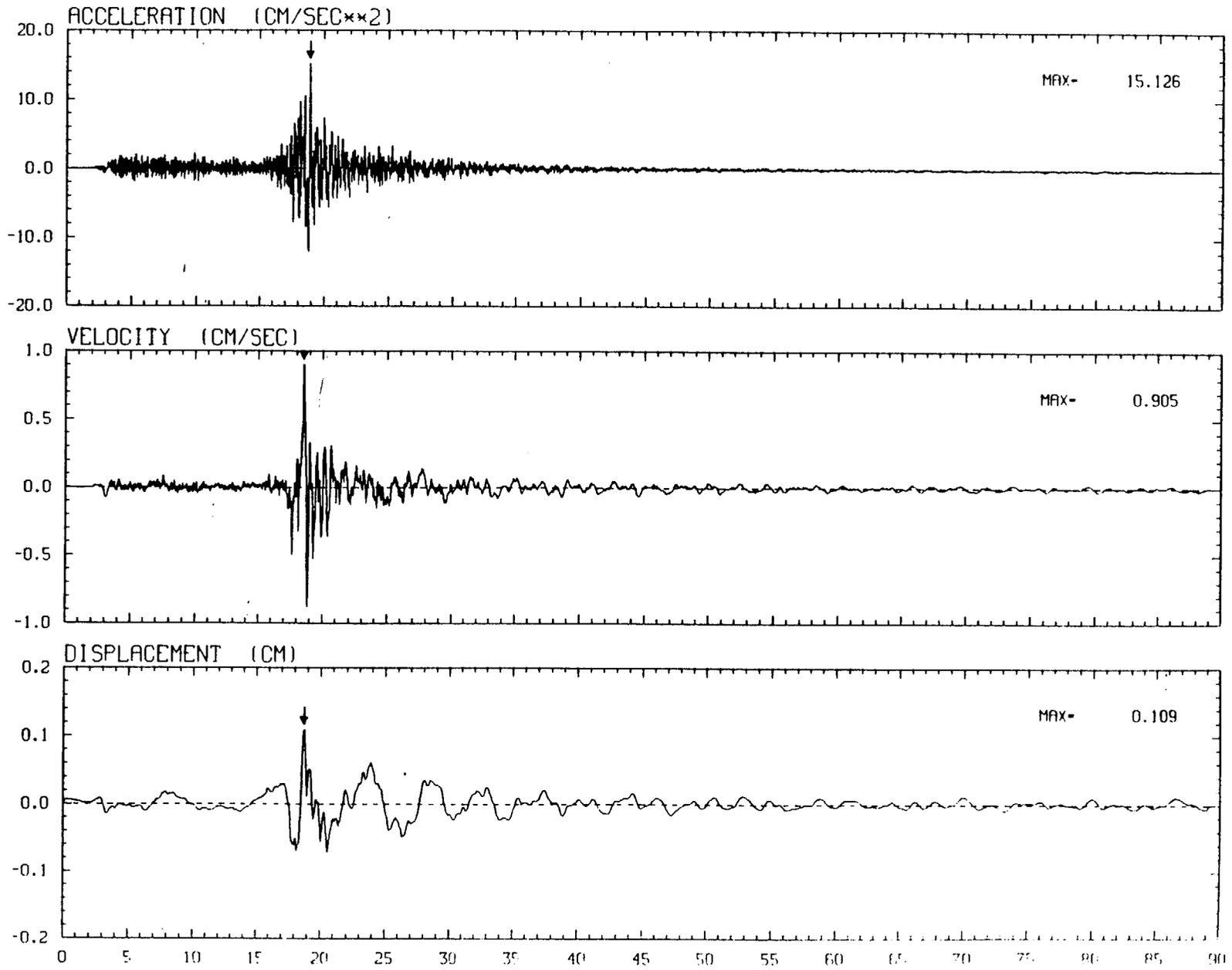


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 12
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



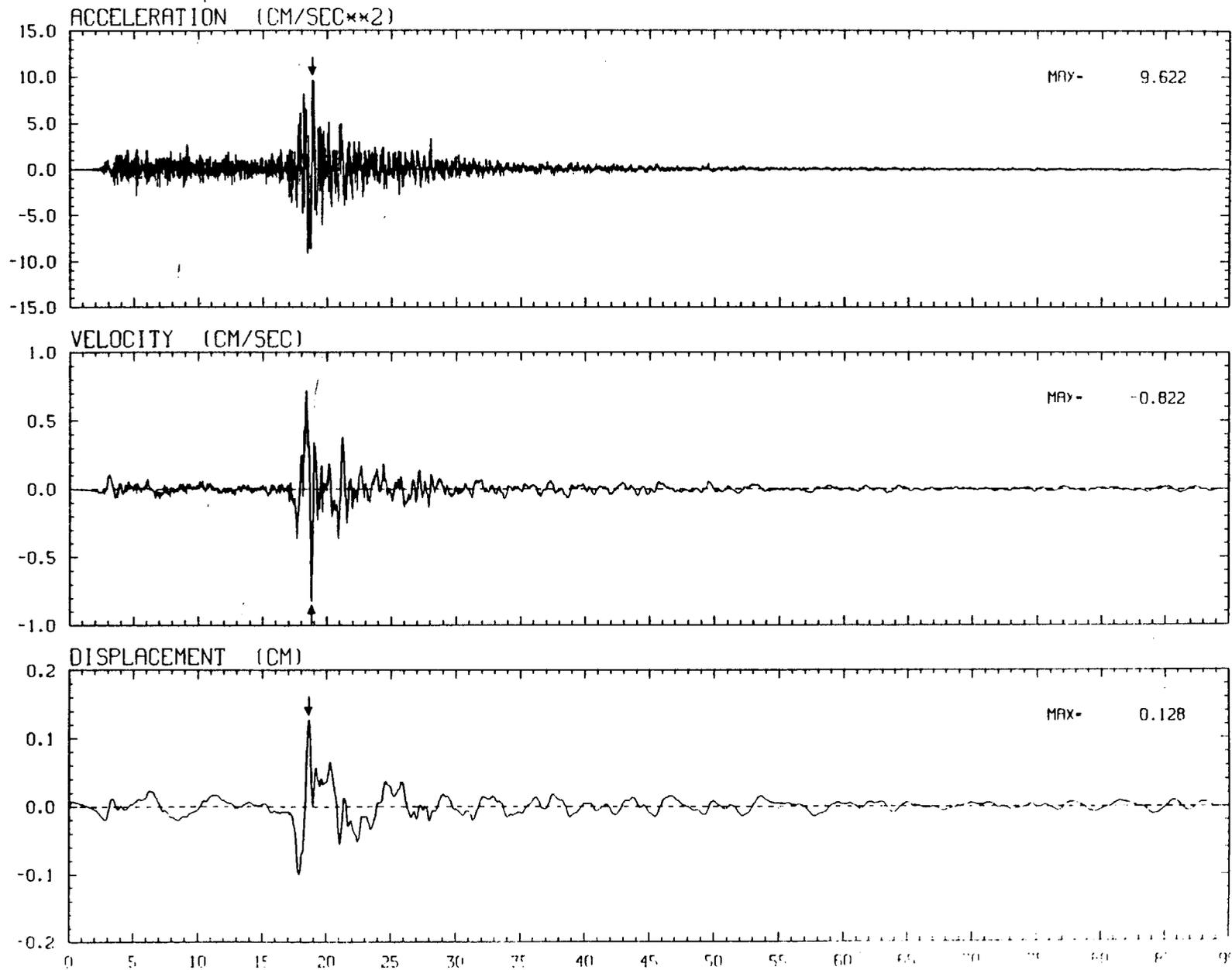
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 12 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



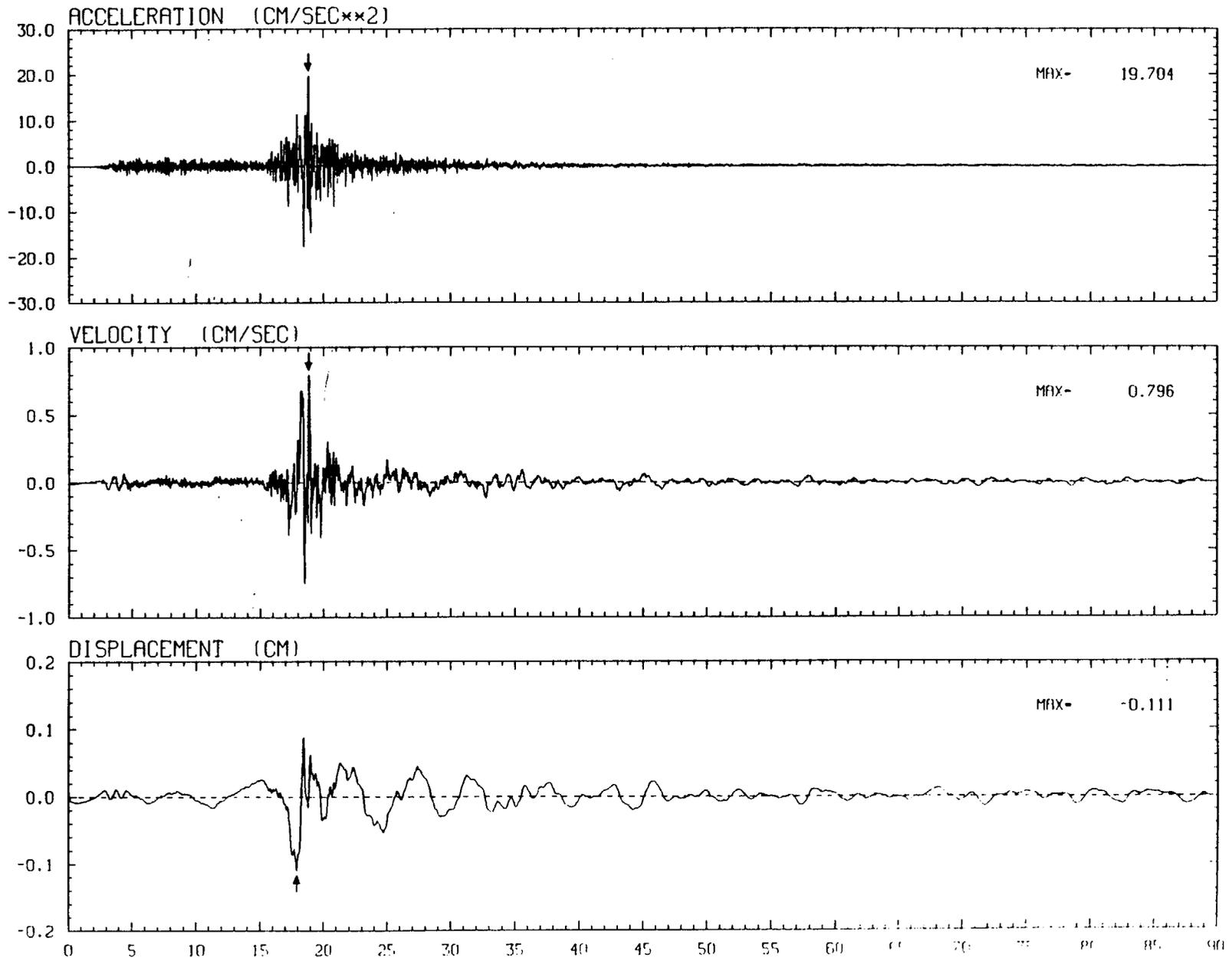
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 12 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 12 CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



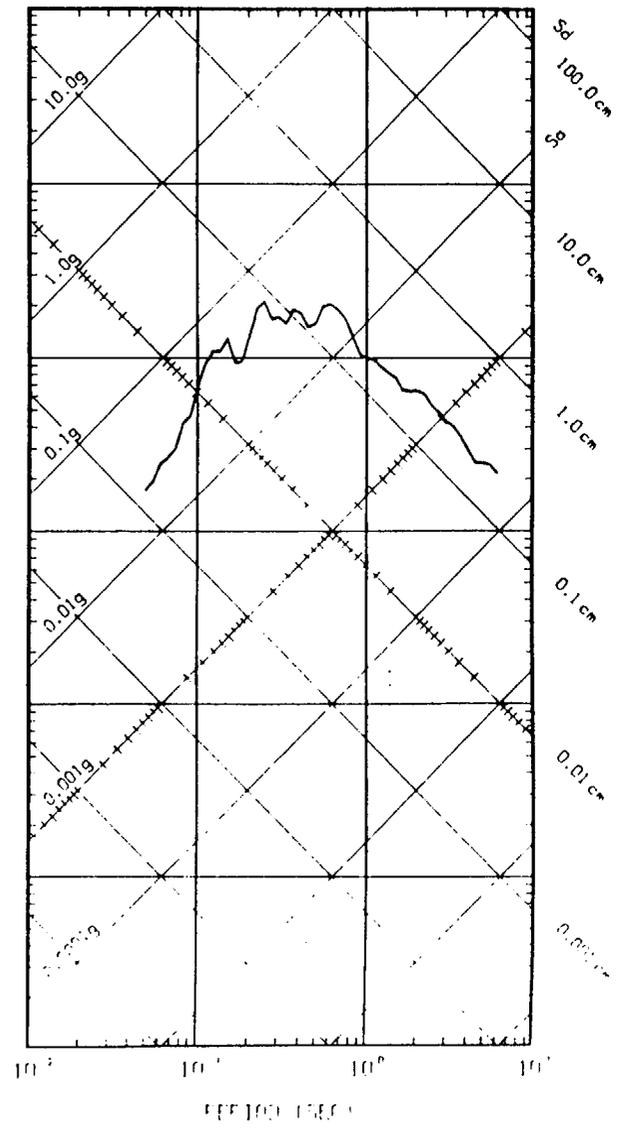
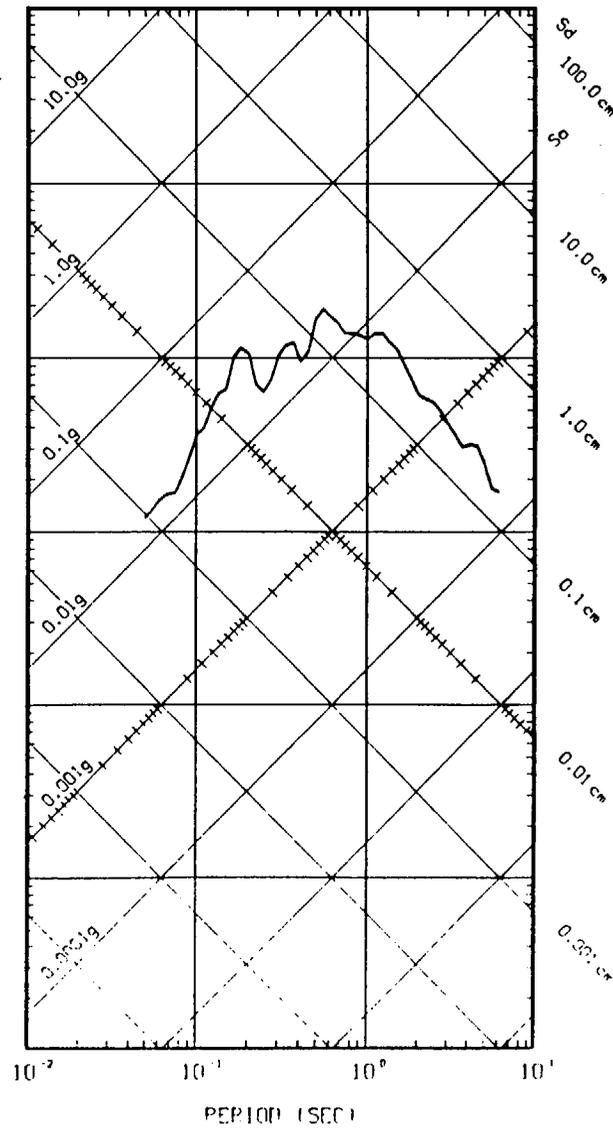
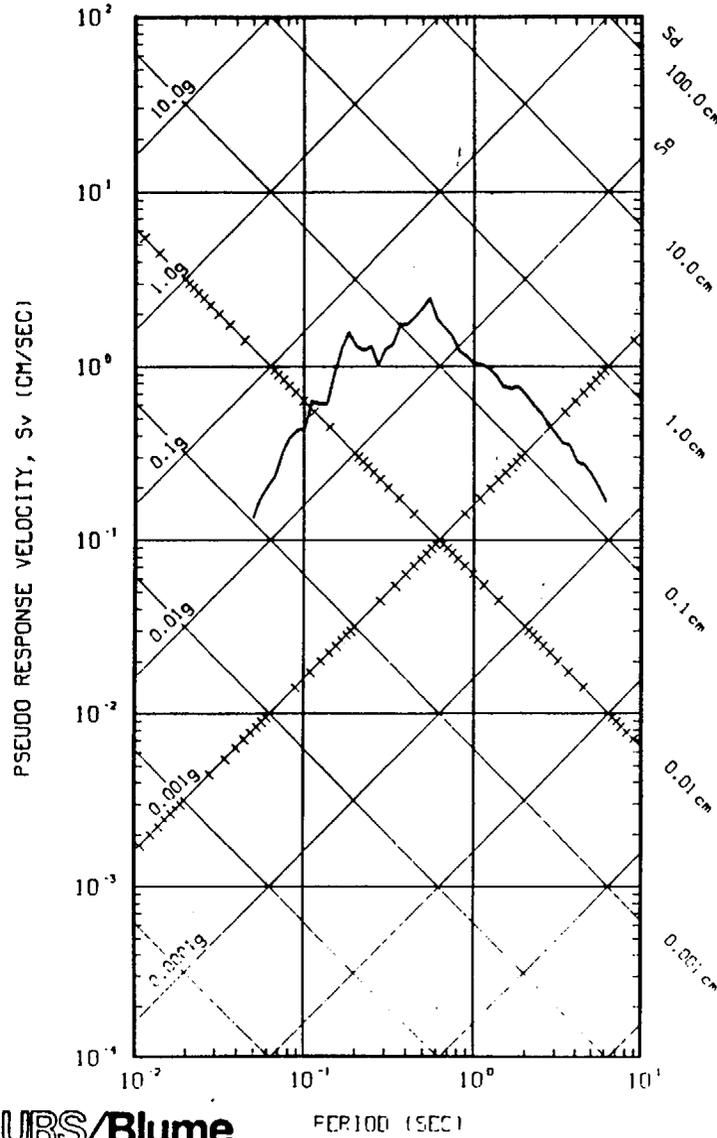
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 12

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

CH 1 DOWN

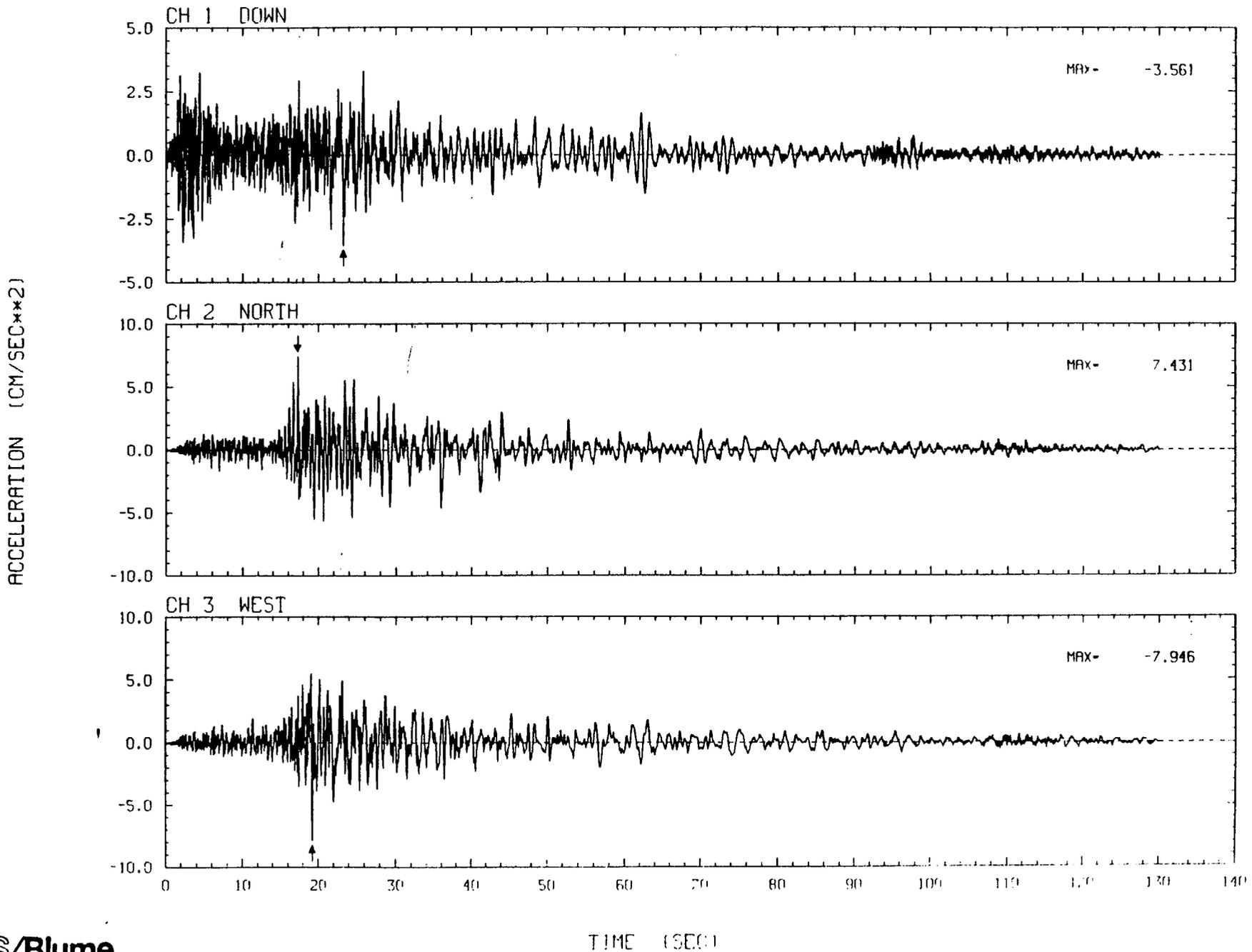
CH 2 NORTH

CH 3 WEST

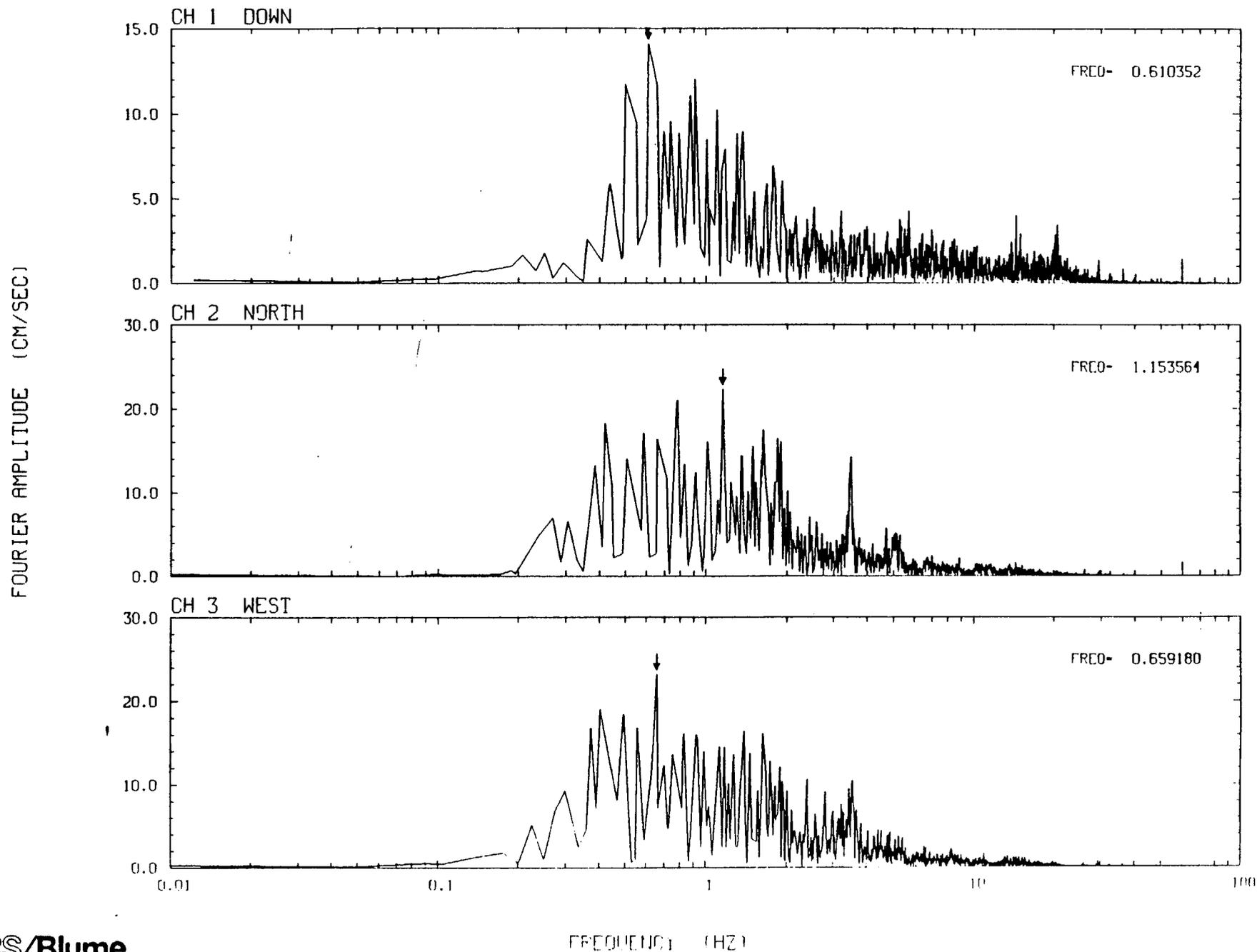


STATION NO. 13

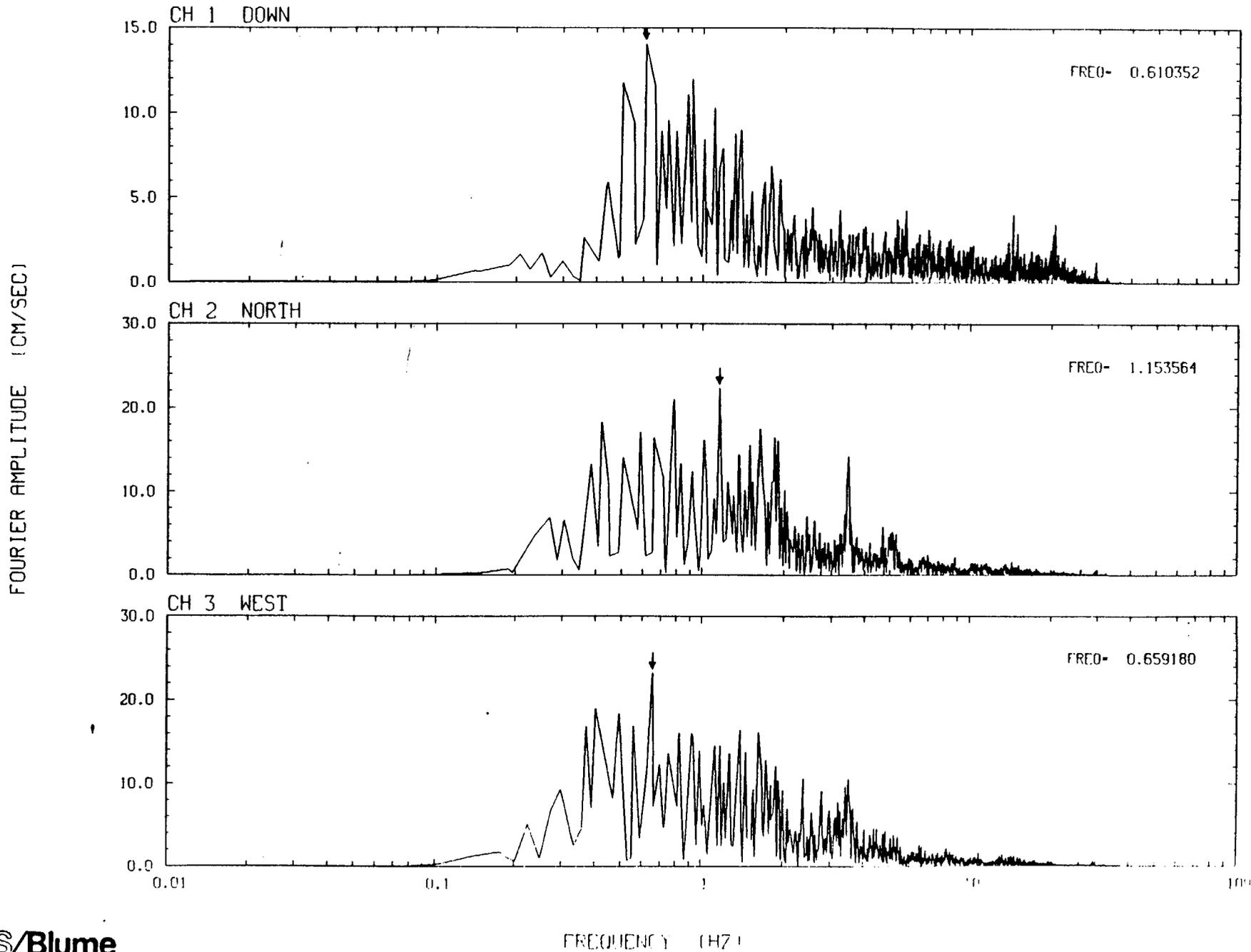
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 13
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 13
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

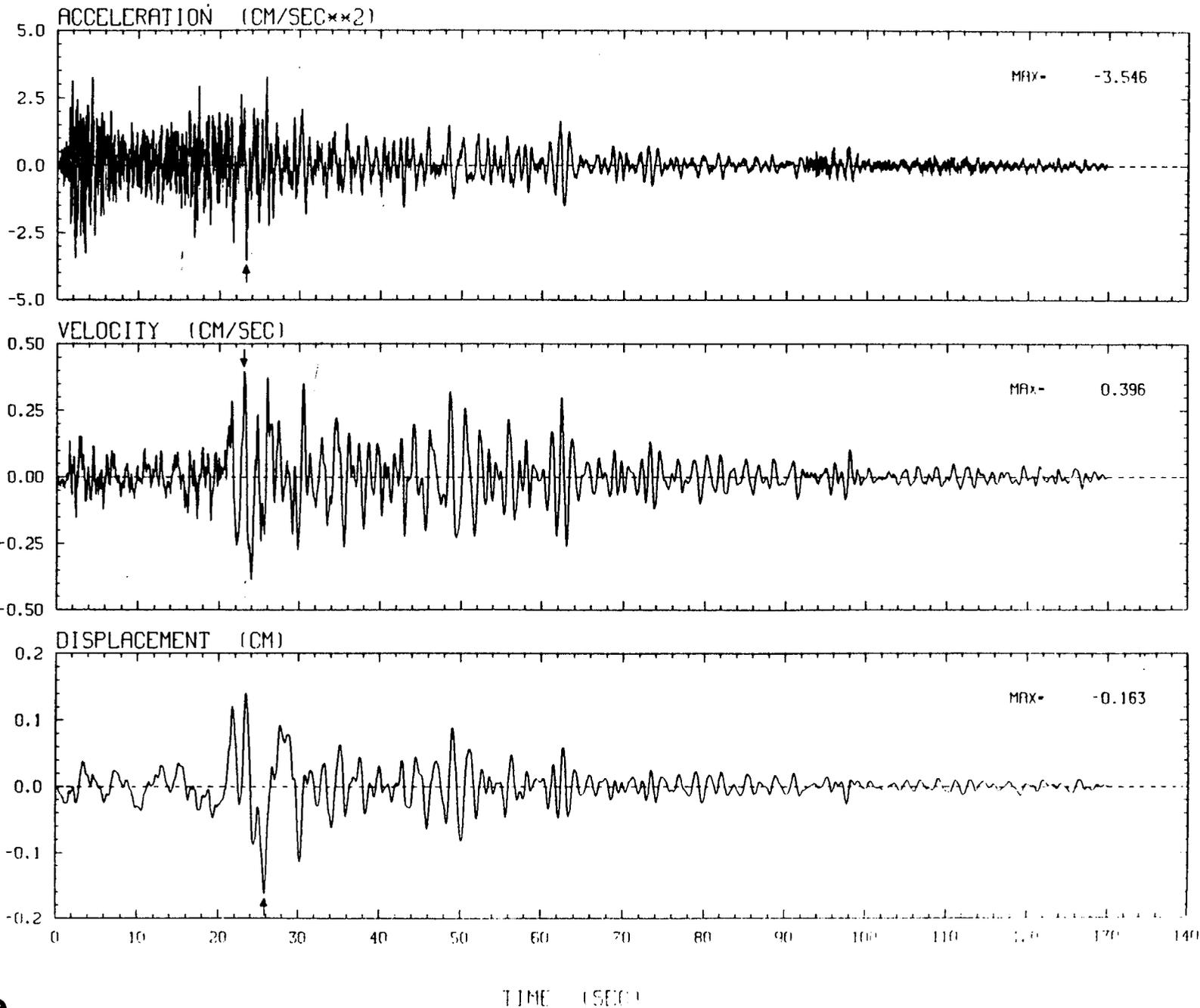


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 13
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

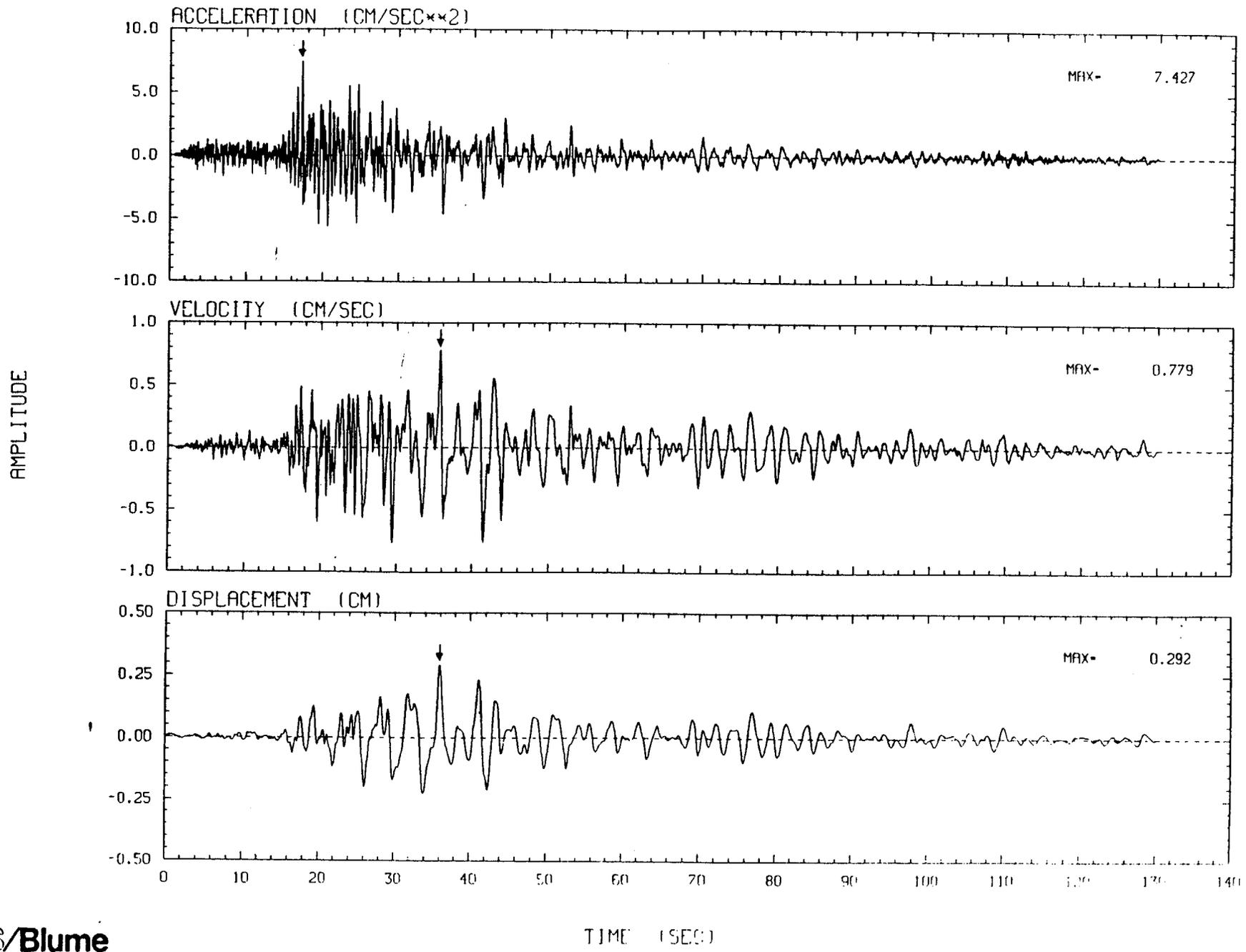


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 13 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 13 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

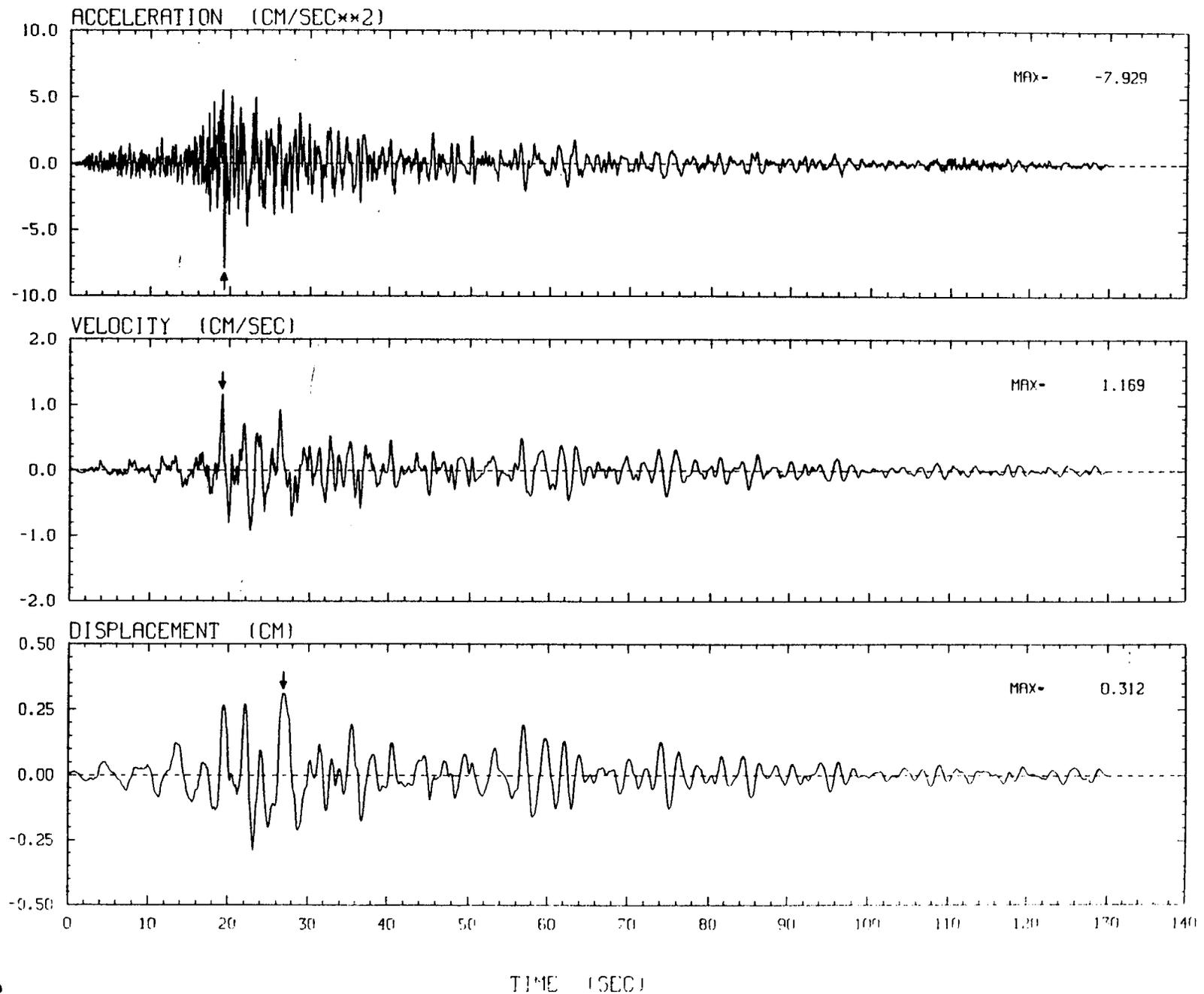


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 13 CH 3 WEST

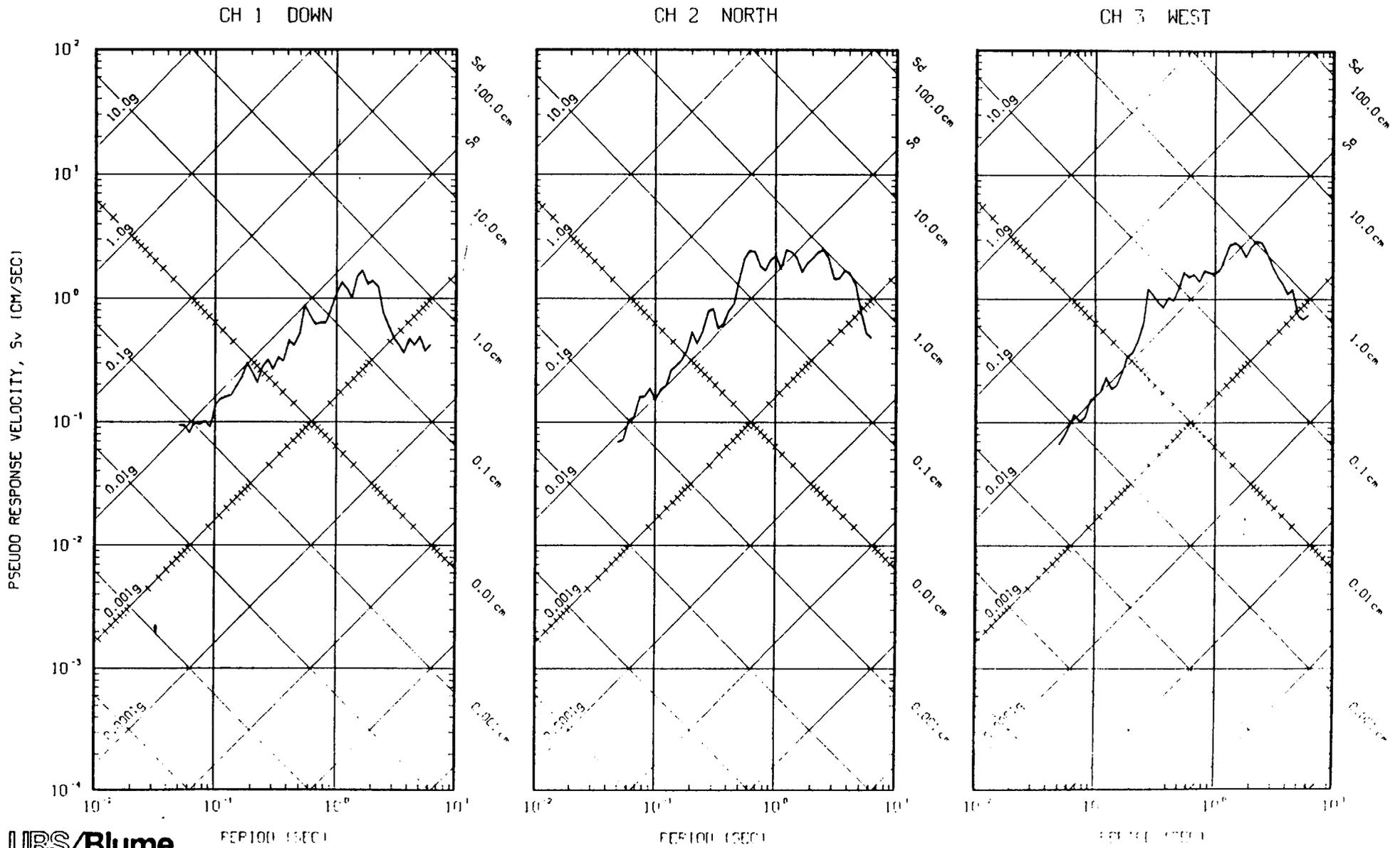
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



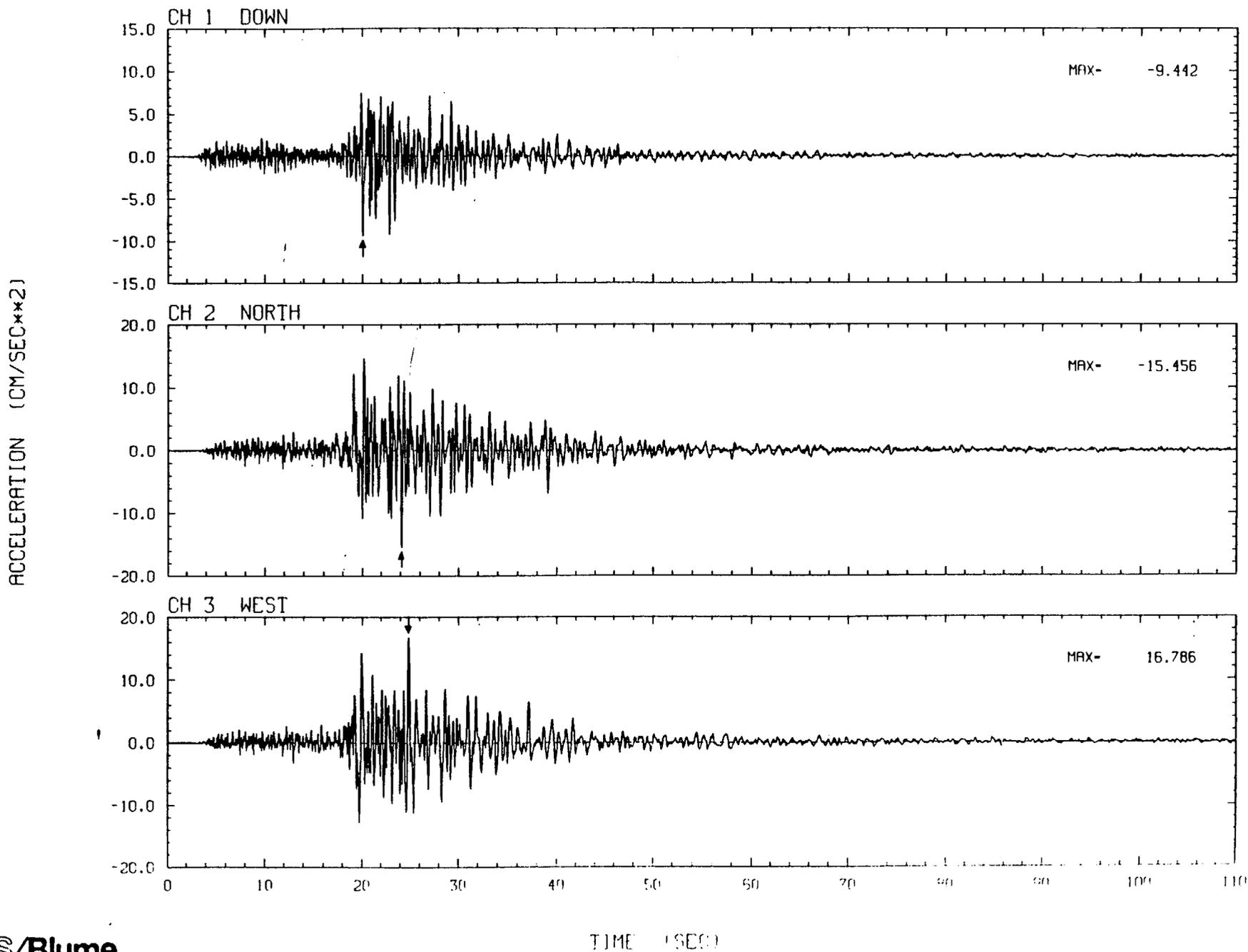
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 13

5 PCT DAMPED PESUDO VELOCITY RESPONSE SPECTRA

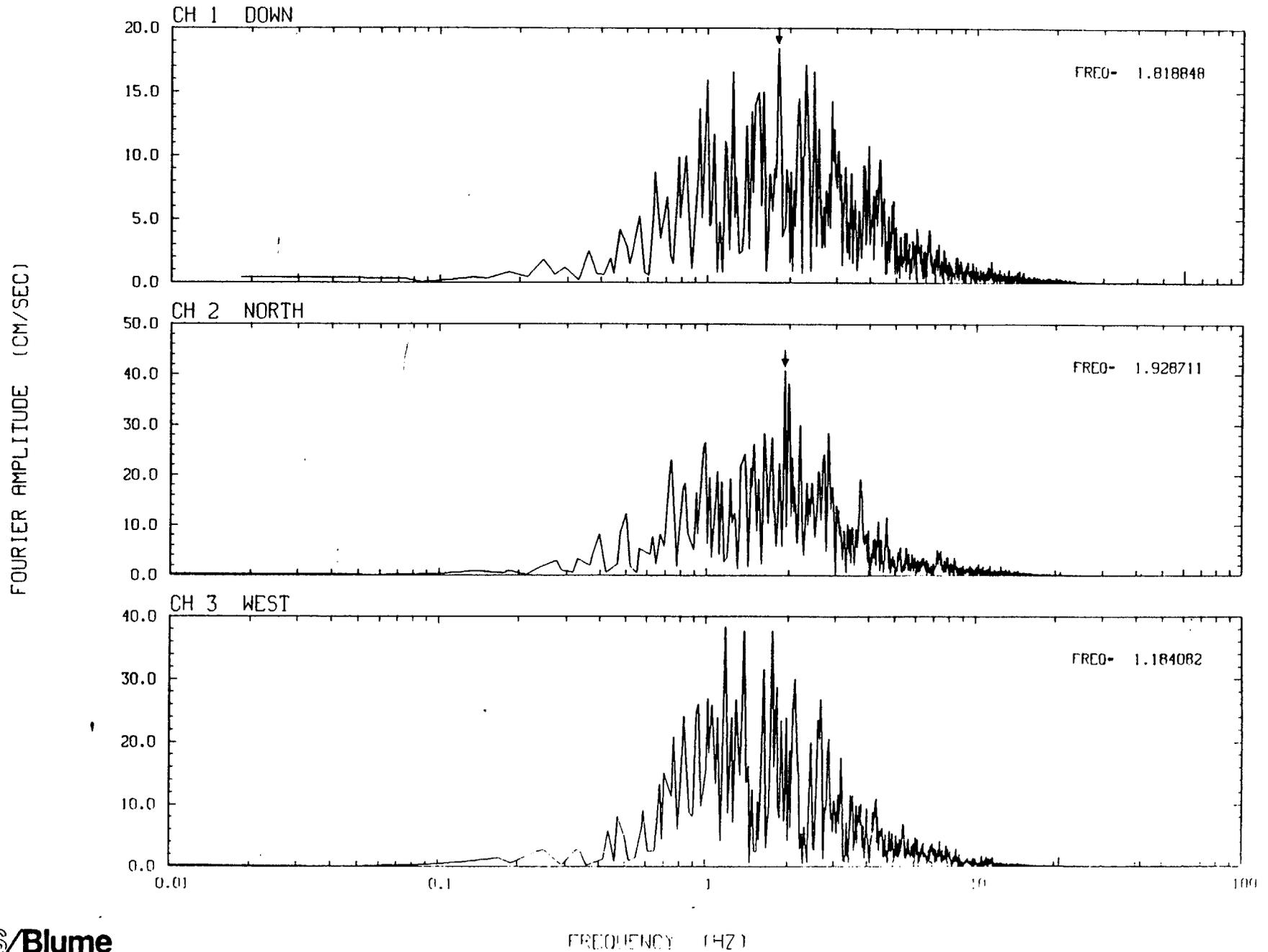


STATION NO. 14 SYSTEM A

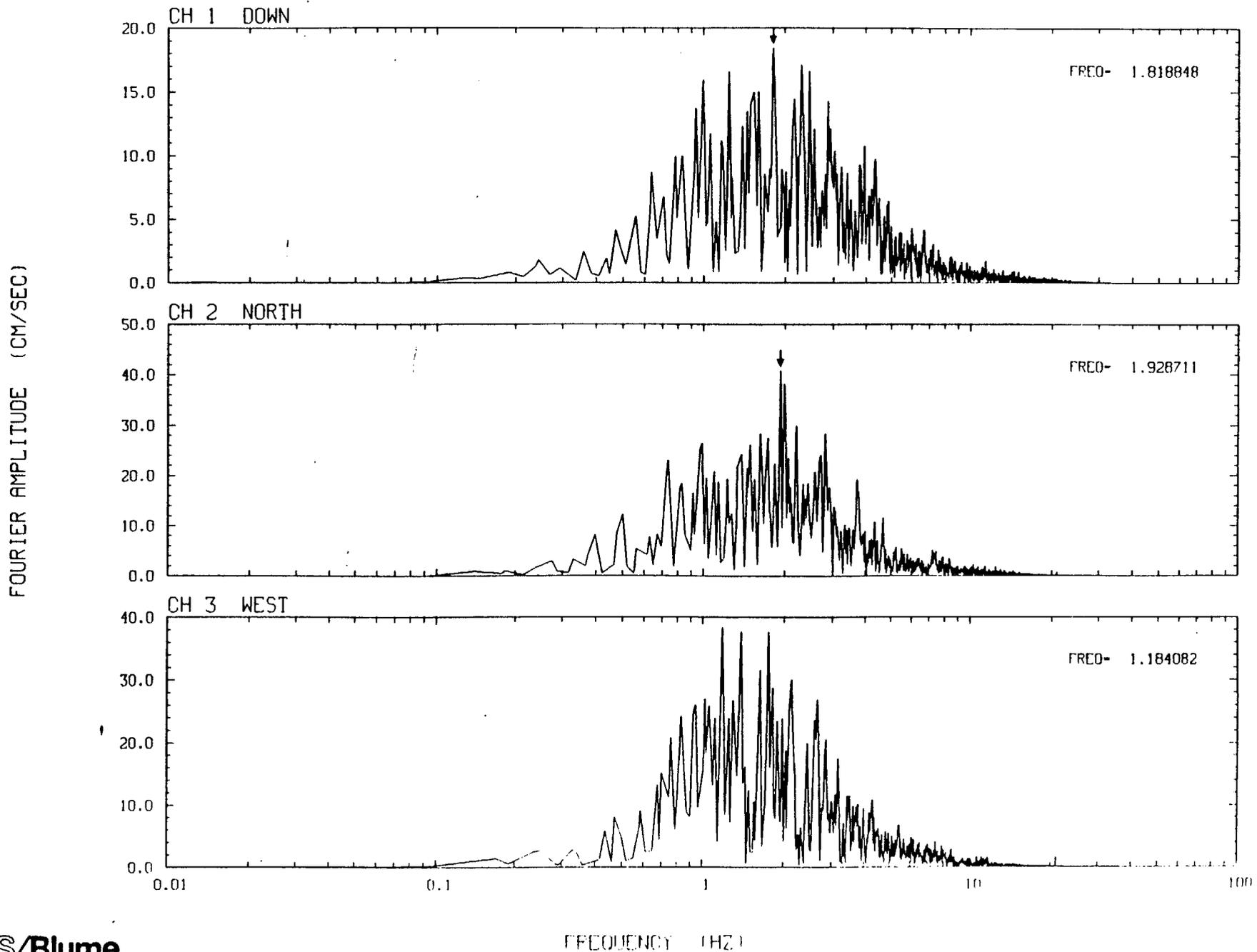
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM A
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM A
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

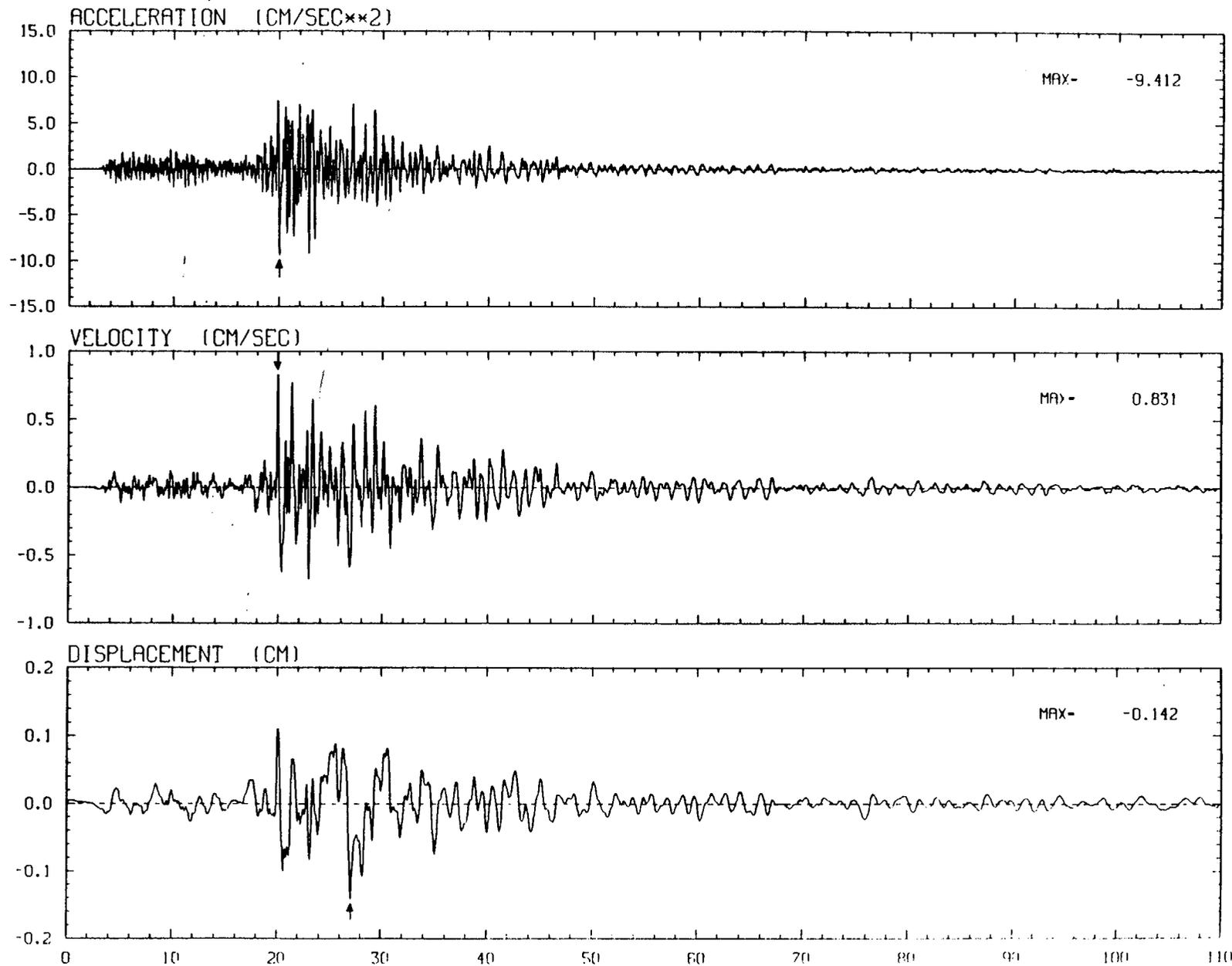


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM A
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

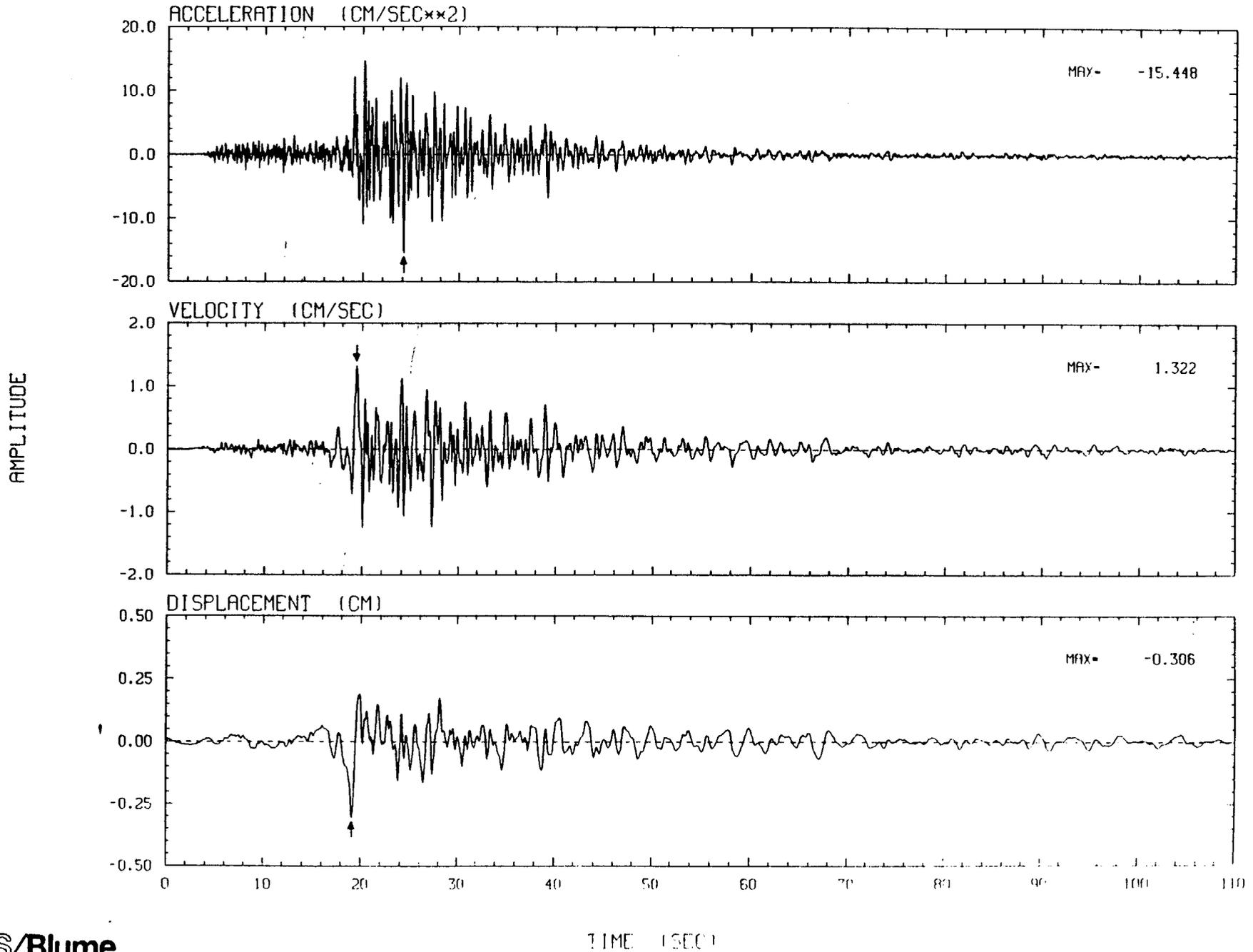


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM A CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE

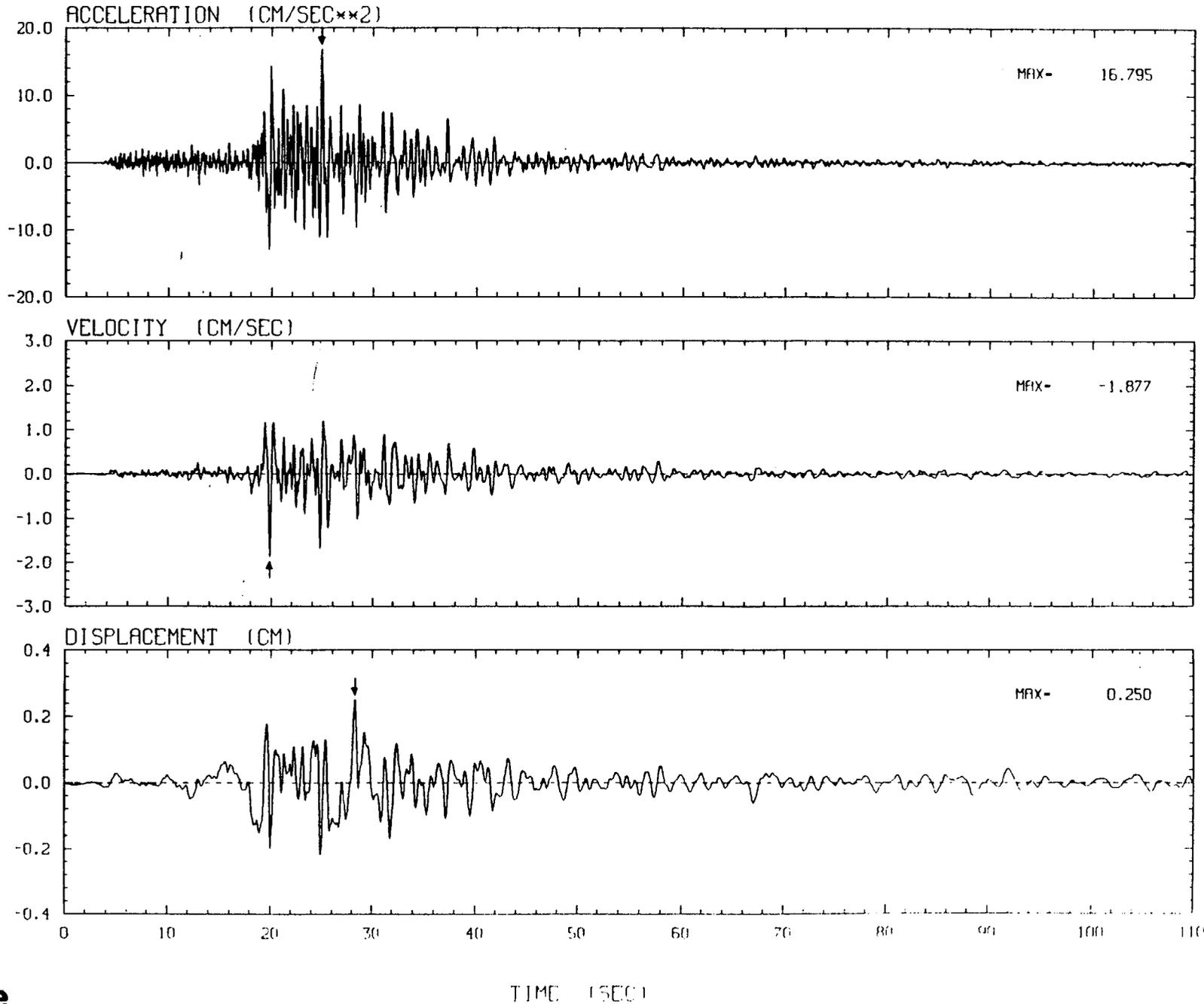


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM A CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT



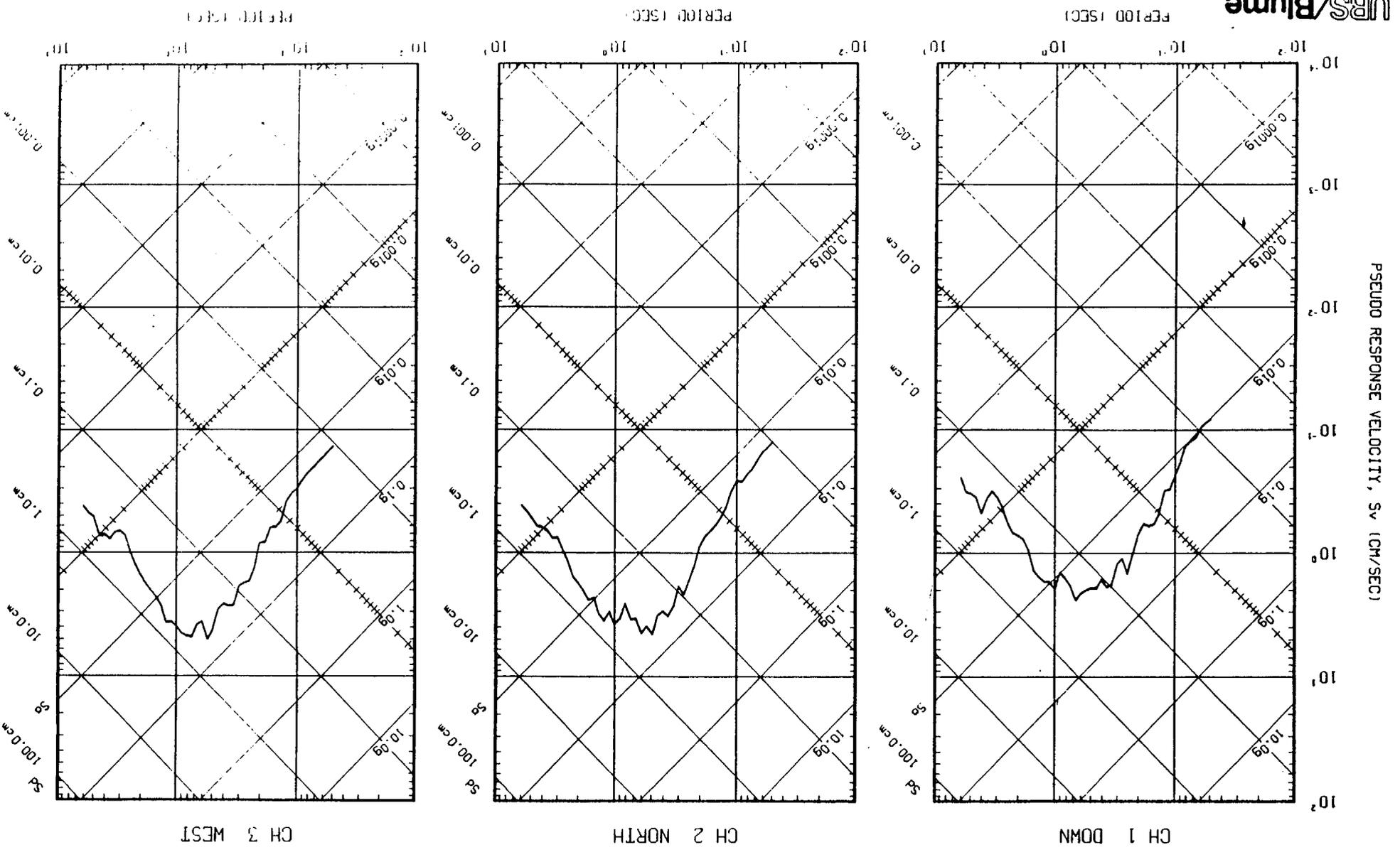
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM A CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



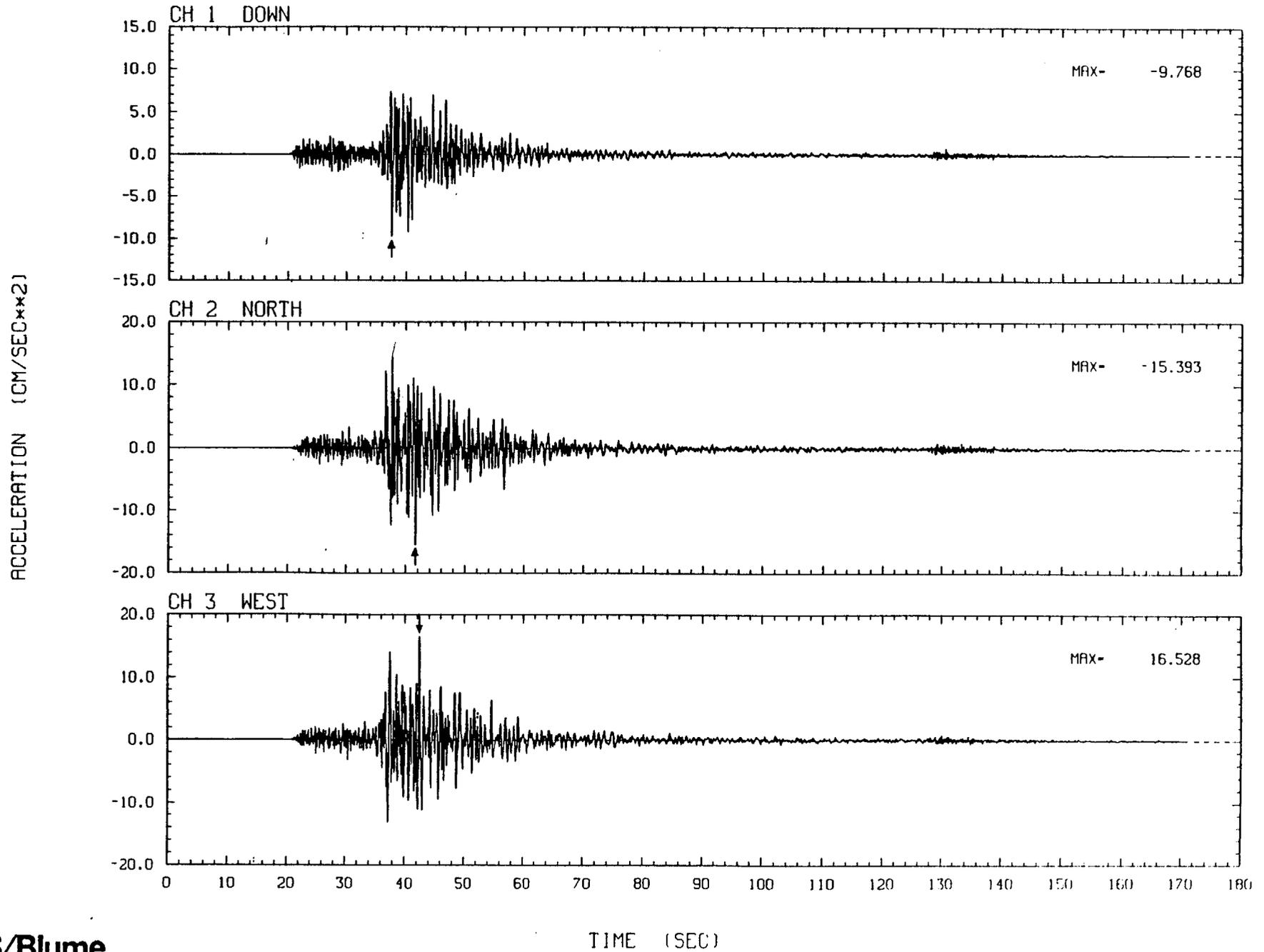
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
 STATION NO. 14 - SYSTEM A

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

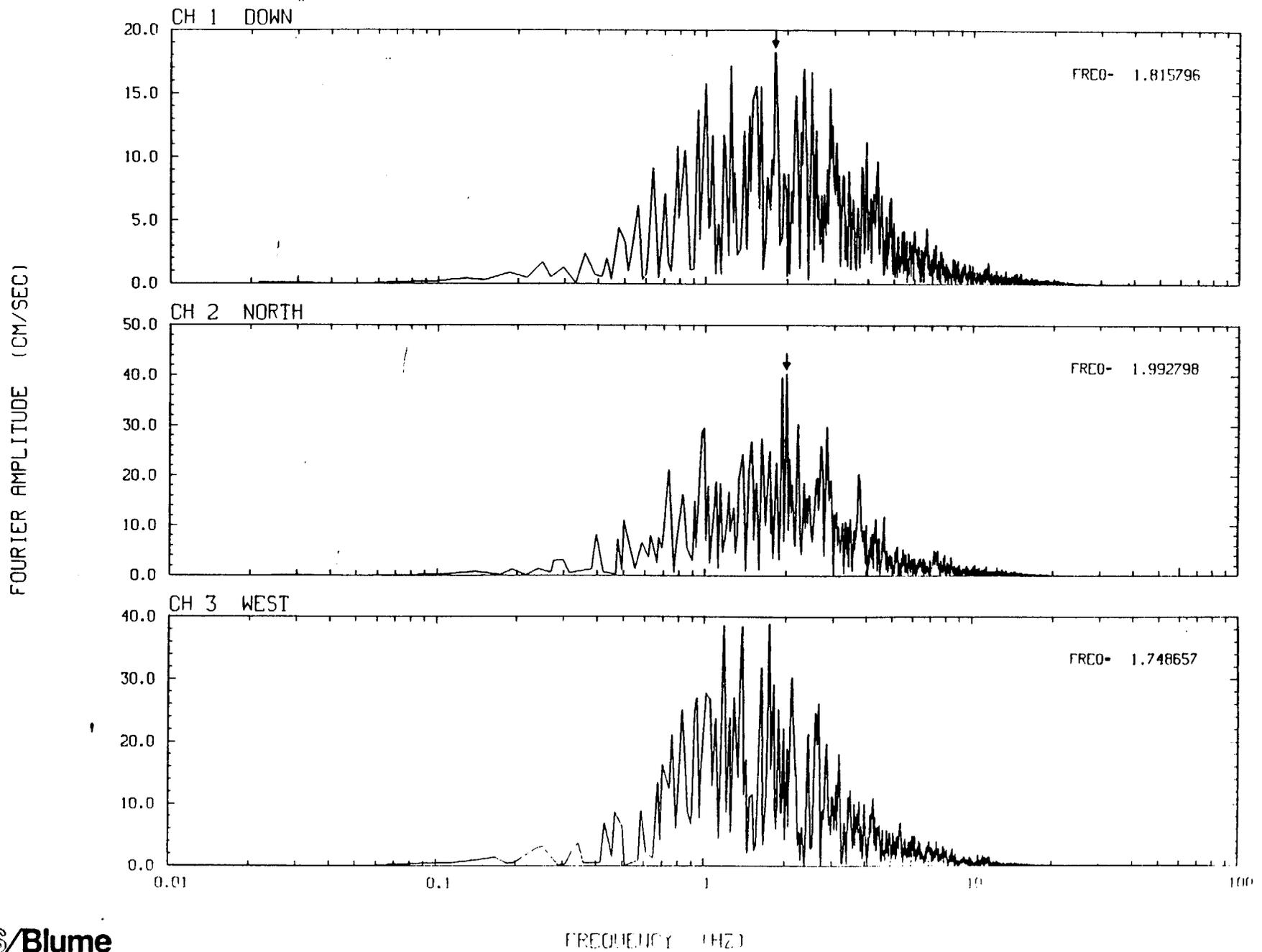


STATION NO. 14 SYSTEM B

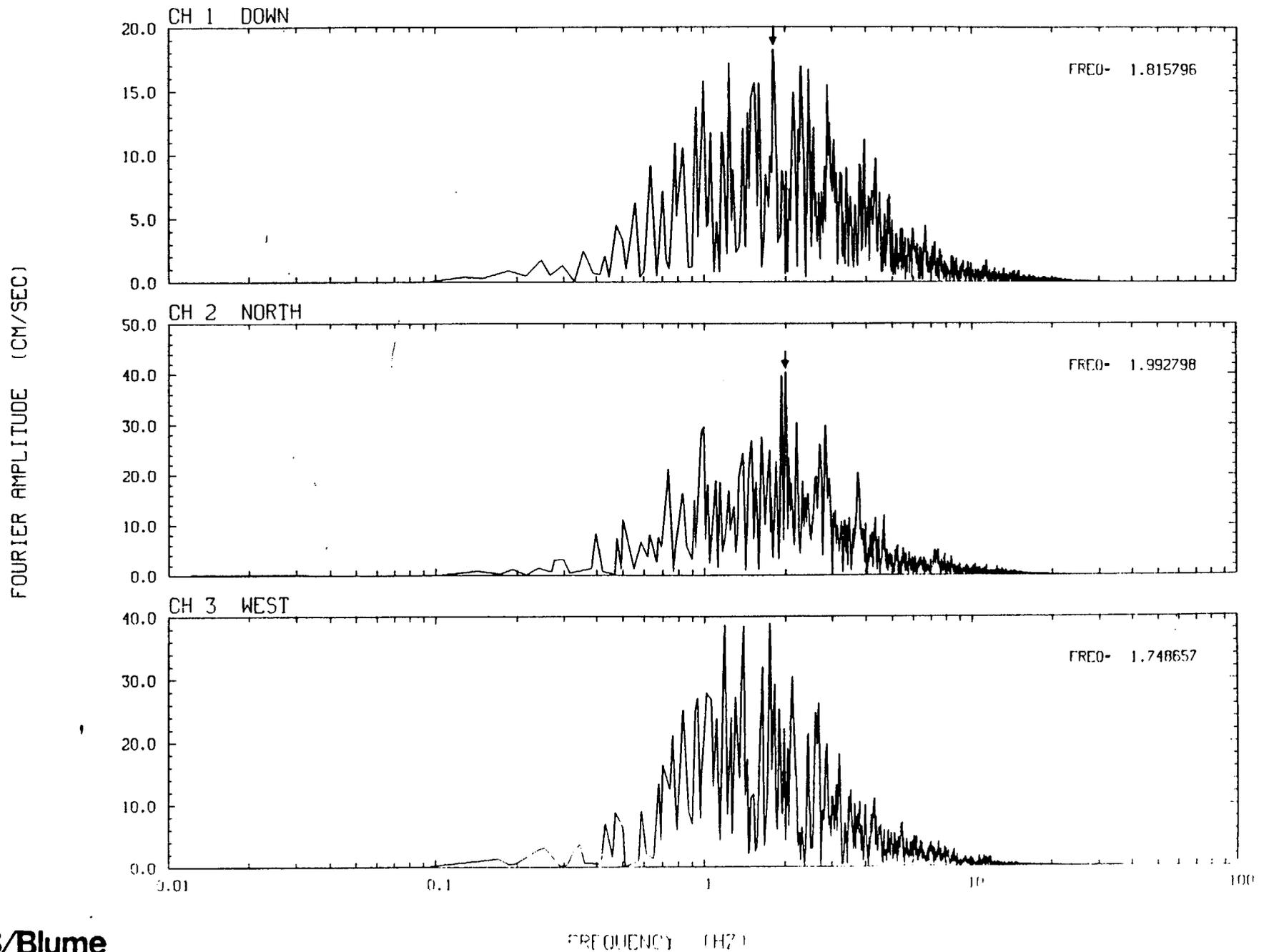
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM B
UNCORRECTED ACCELERATION TIME HISTORIES



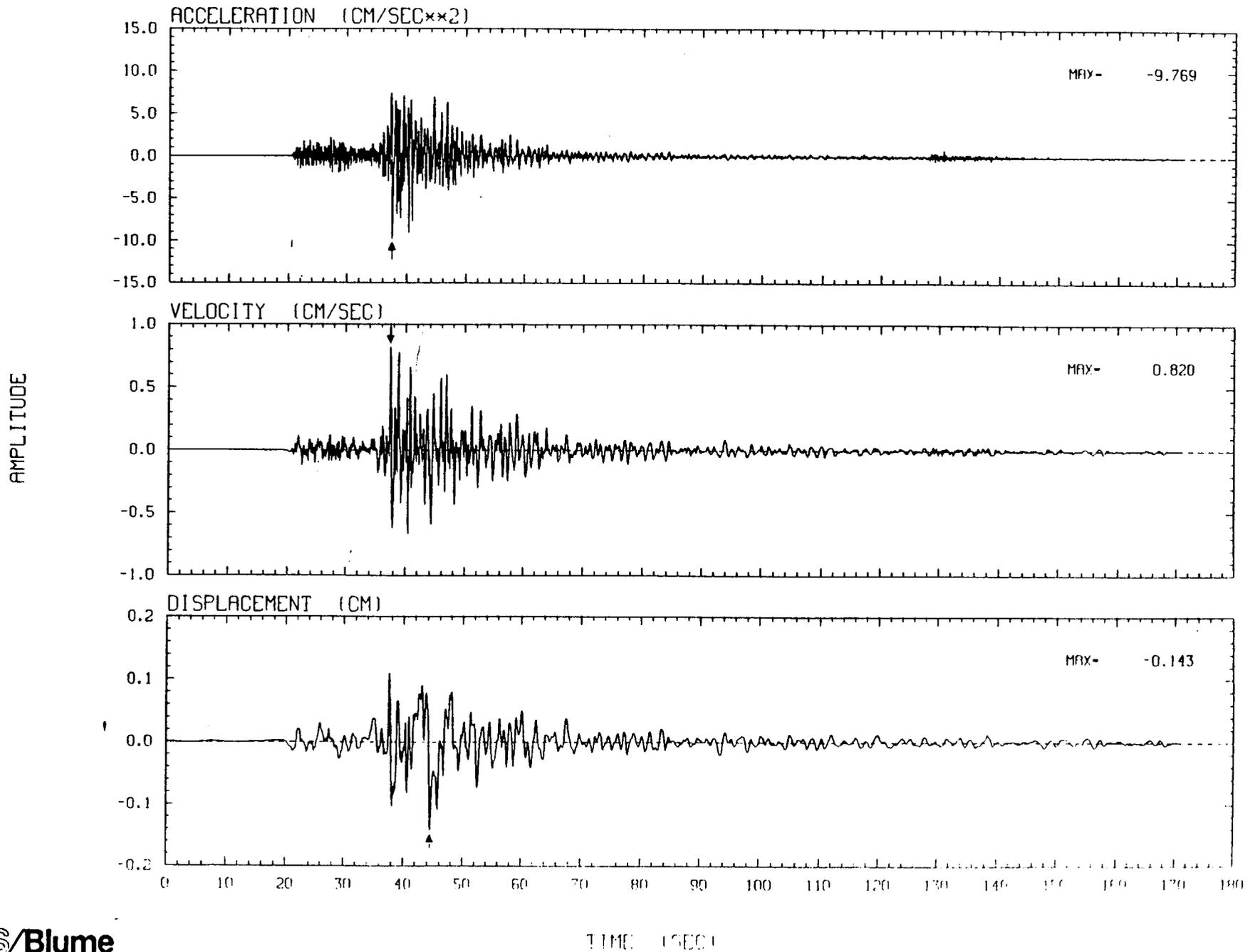
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM B
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



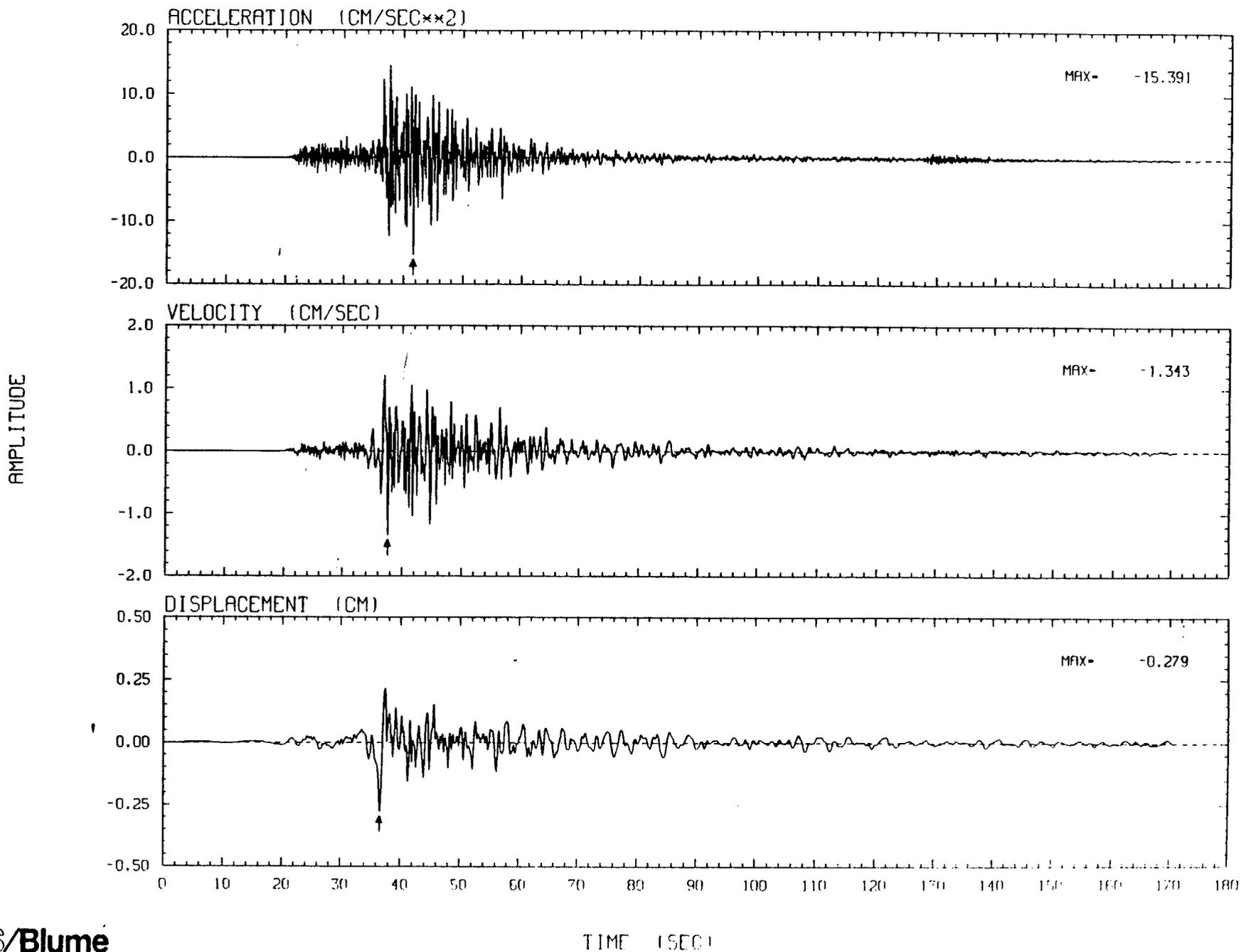
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM B
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM B CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

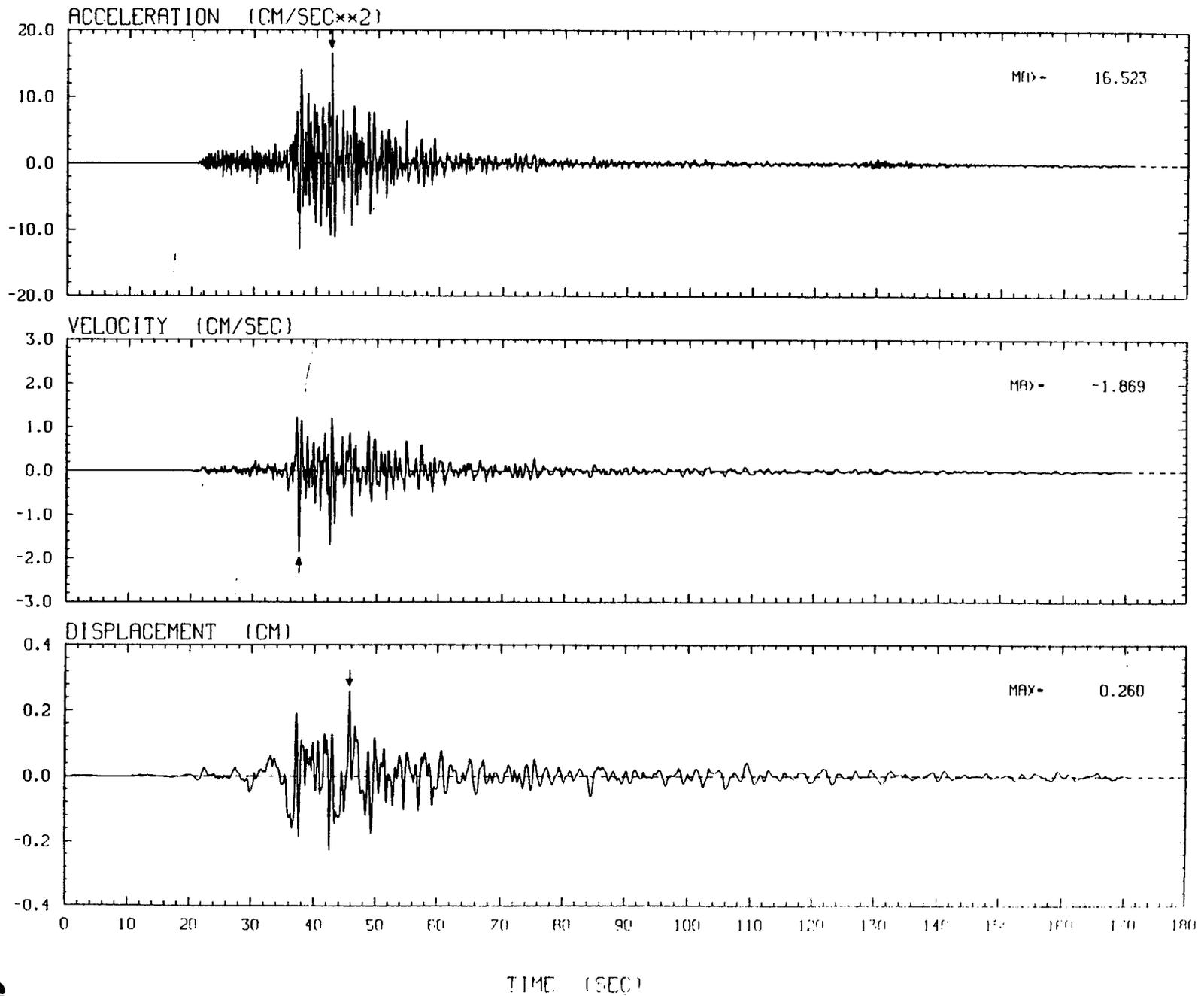


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM B CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT



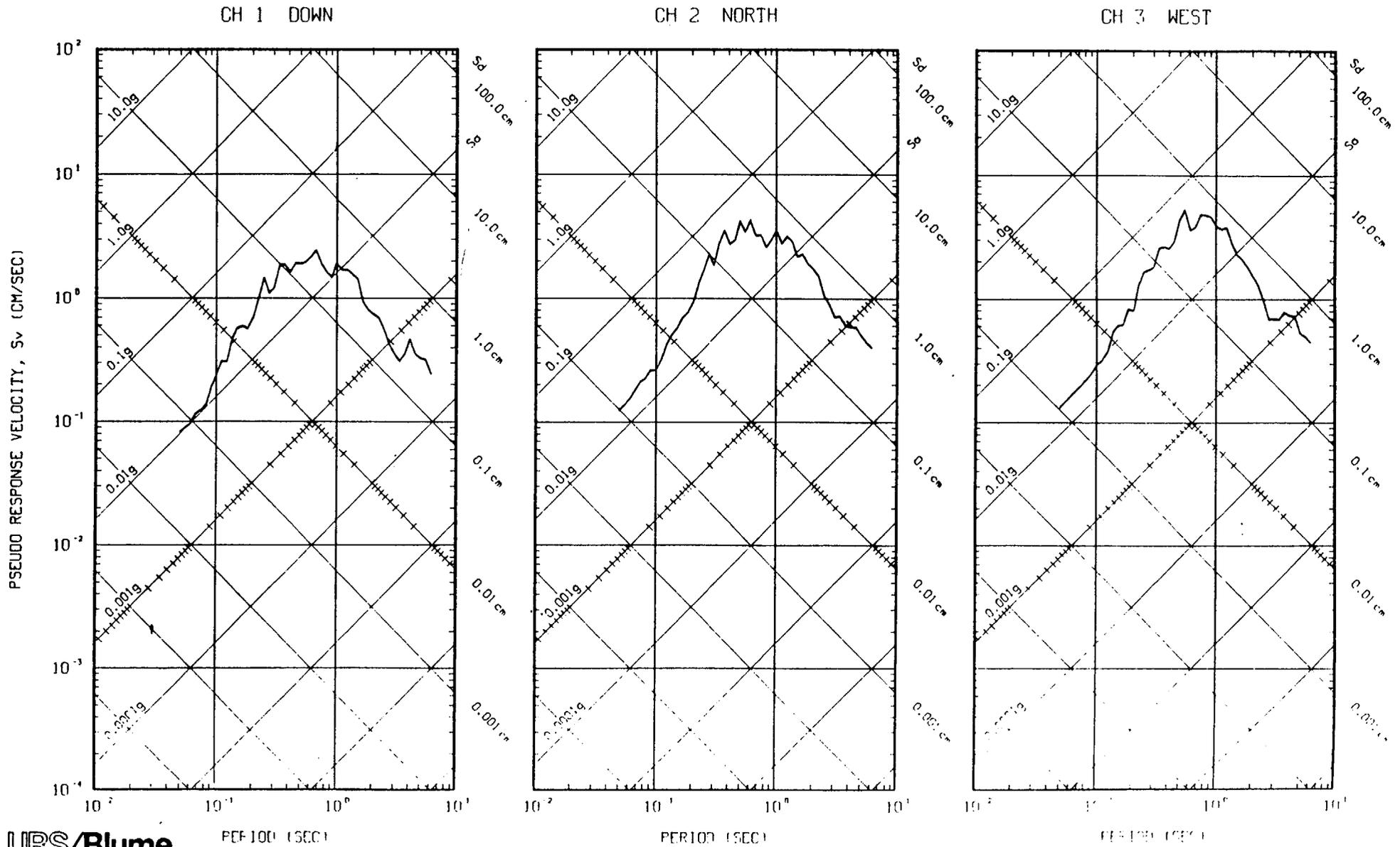
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM B CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



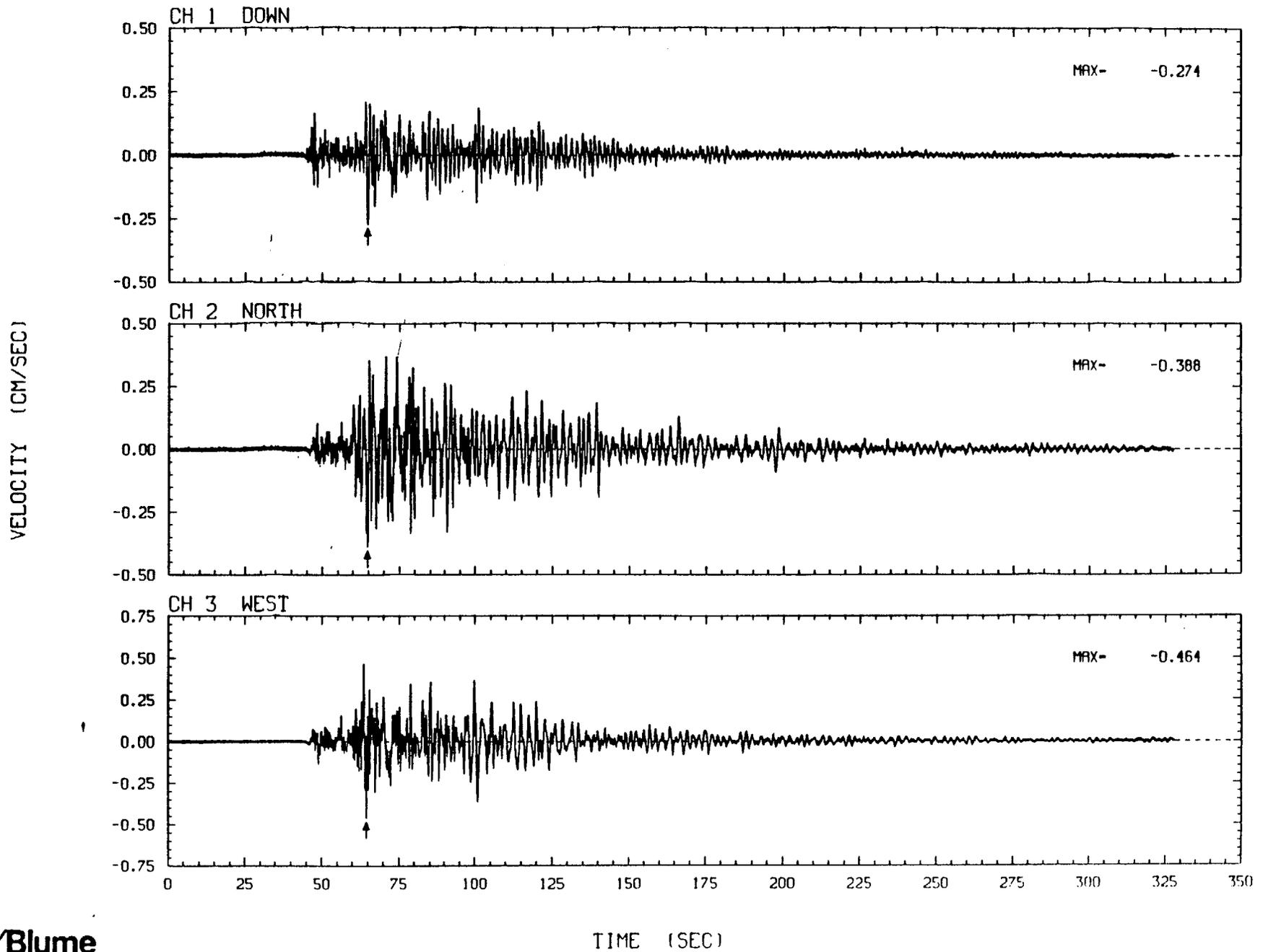
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 14 SYSTEM B

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

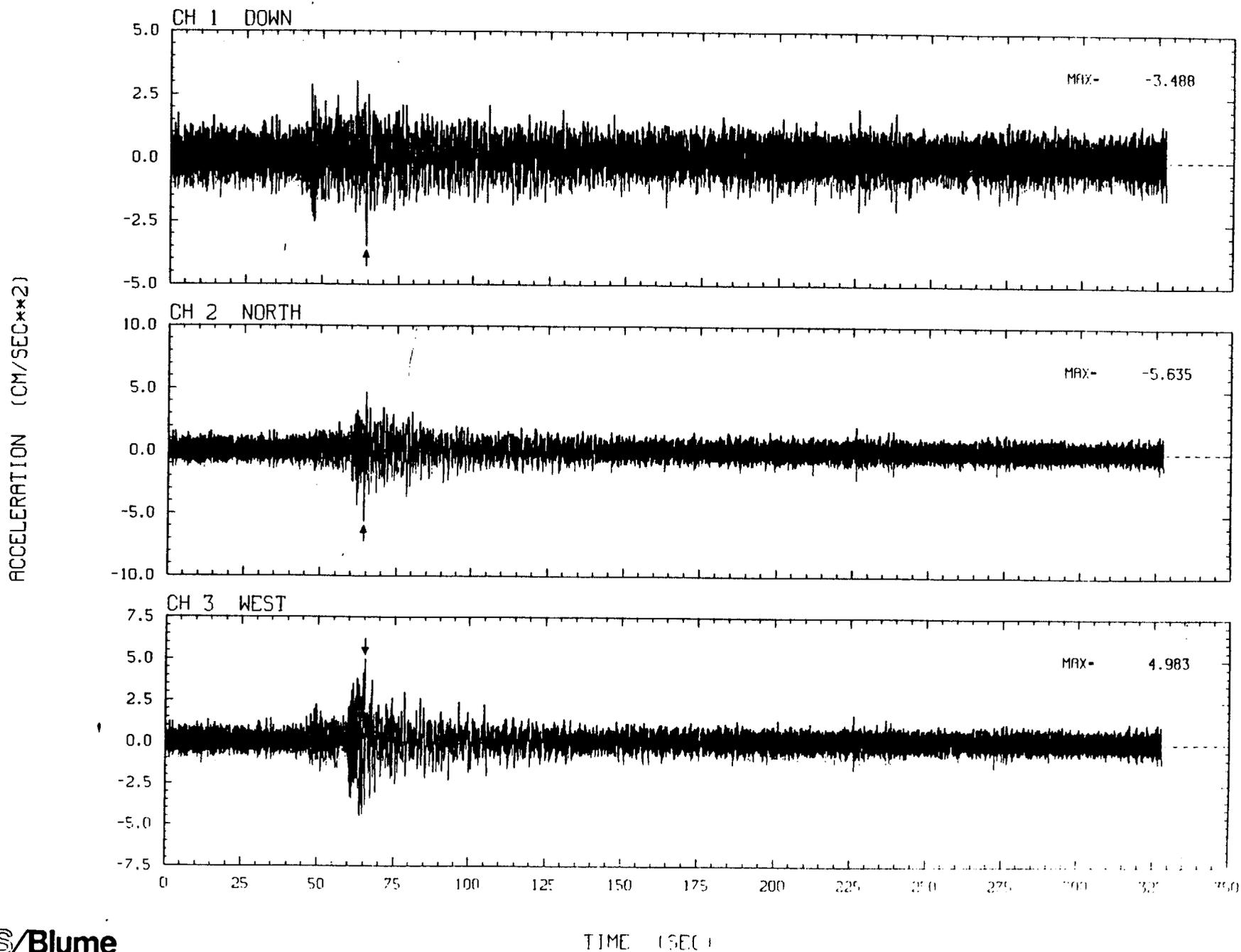


STATION NO. 15 SYSTEM A

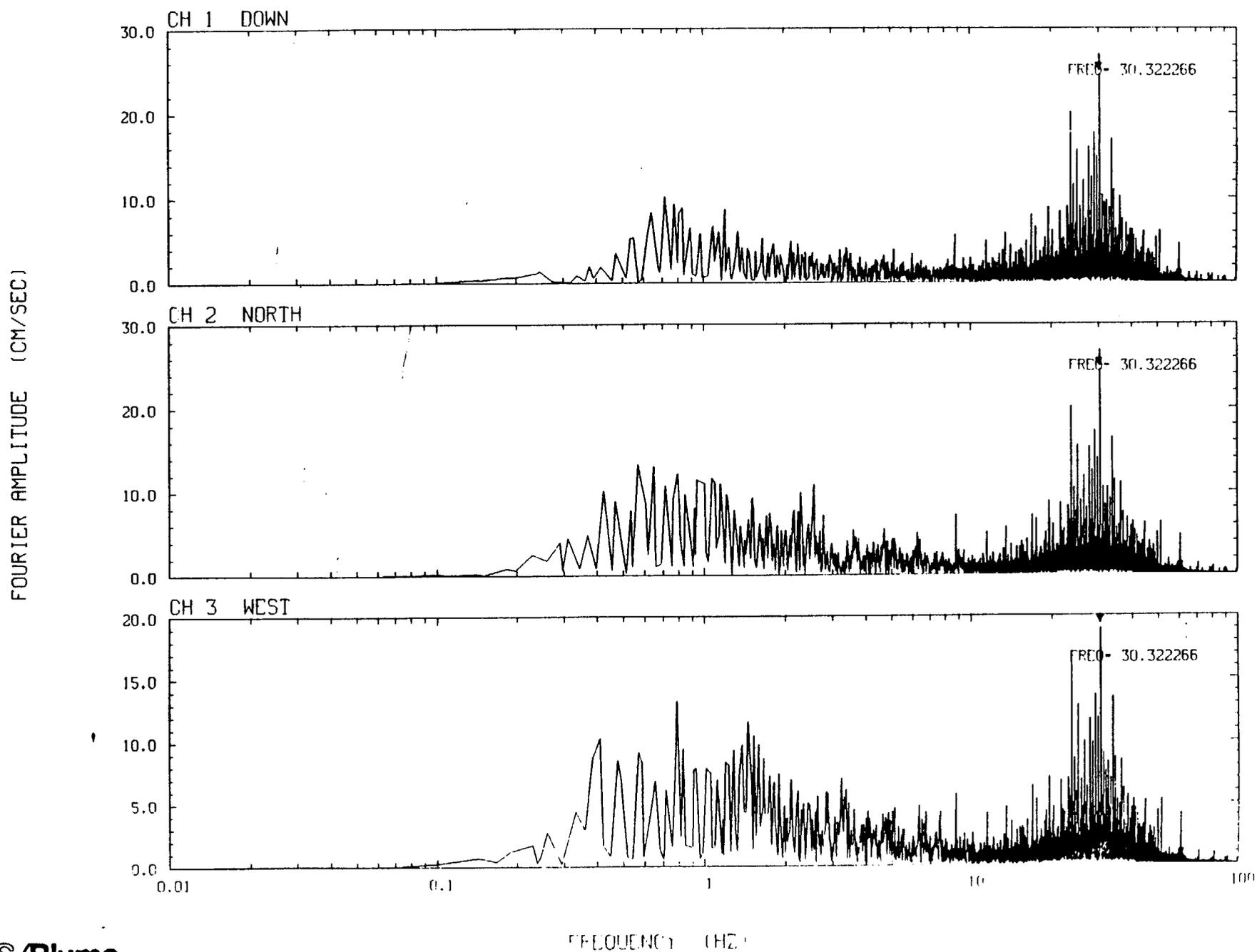
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM A
UNCORRECTED VELOCITY TIME HISTORIES



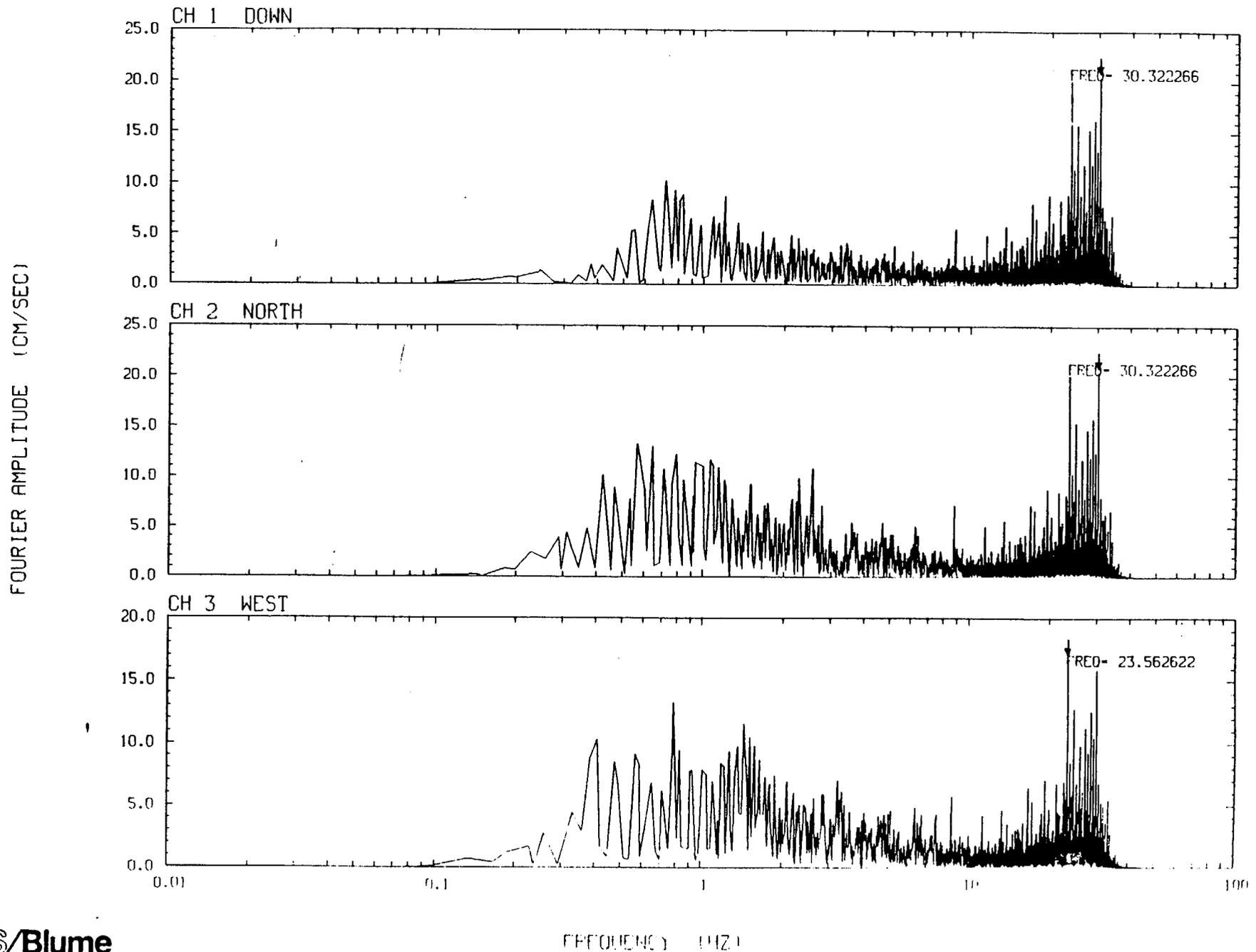
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM A
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM A
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

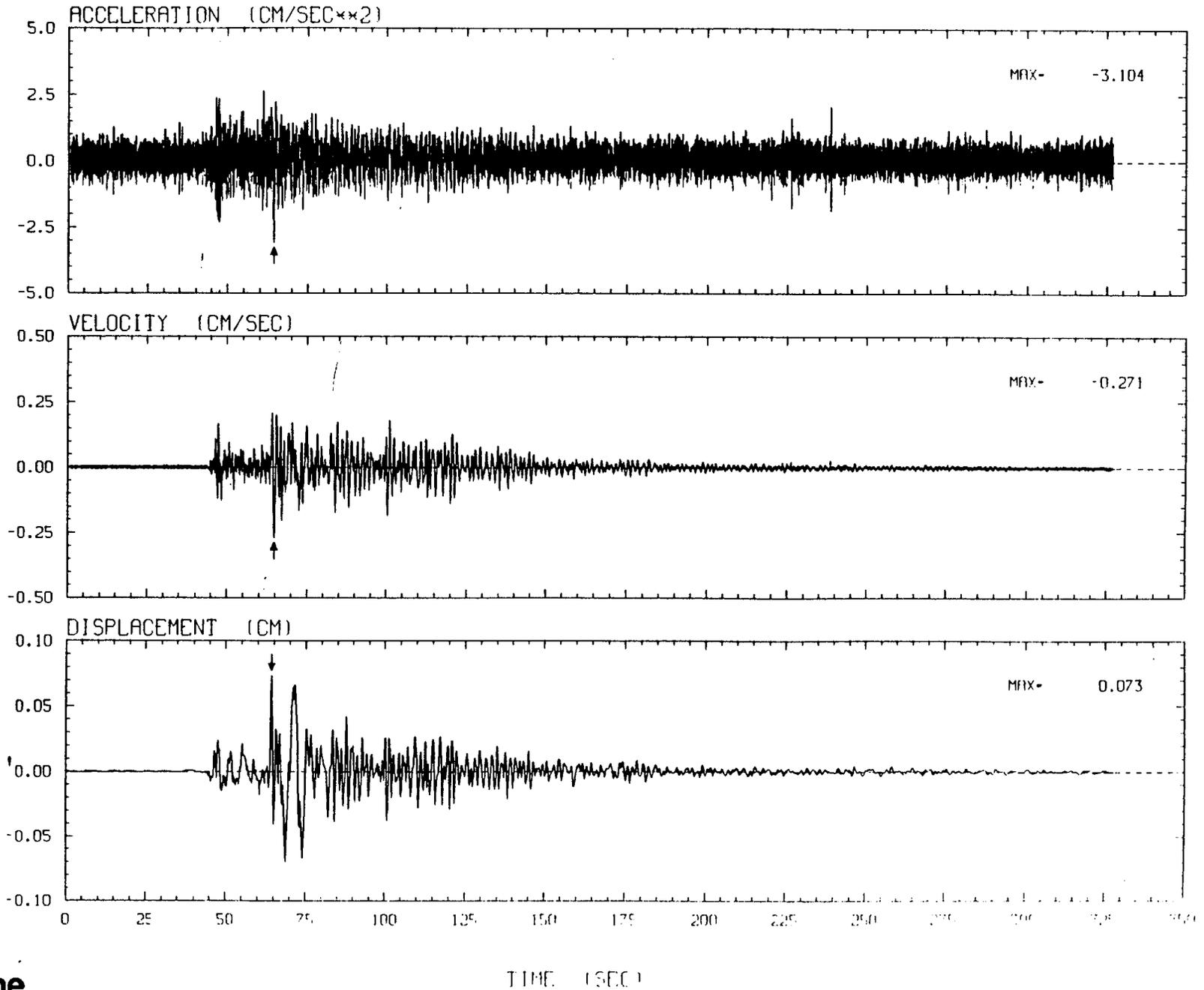


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM A
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



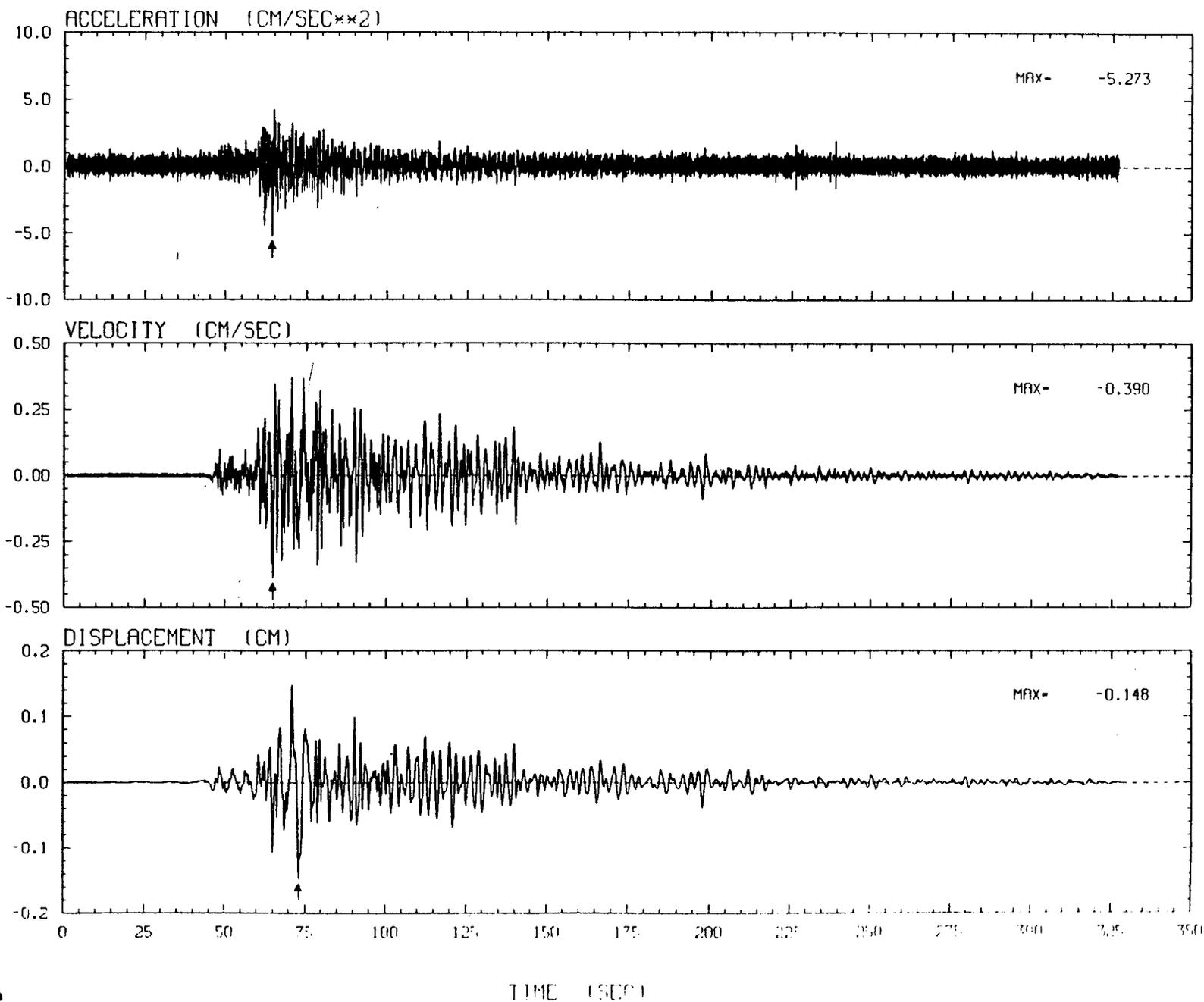
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM A CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



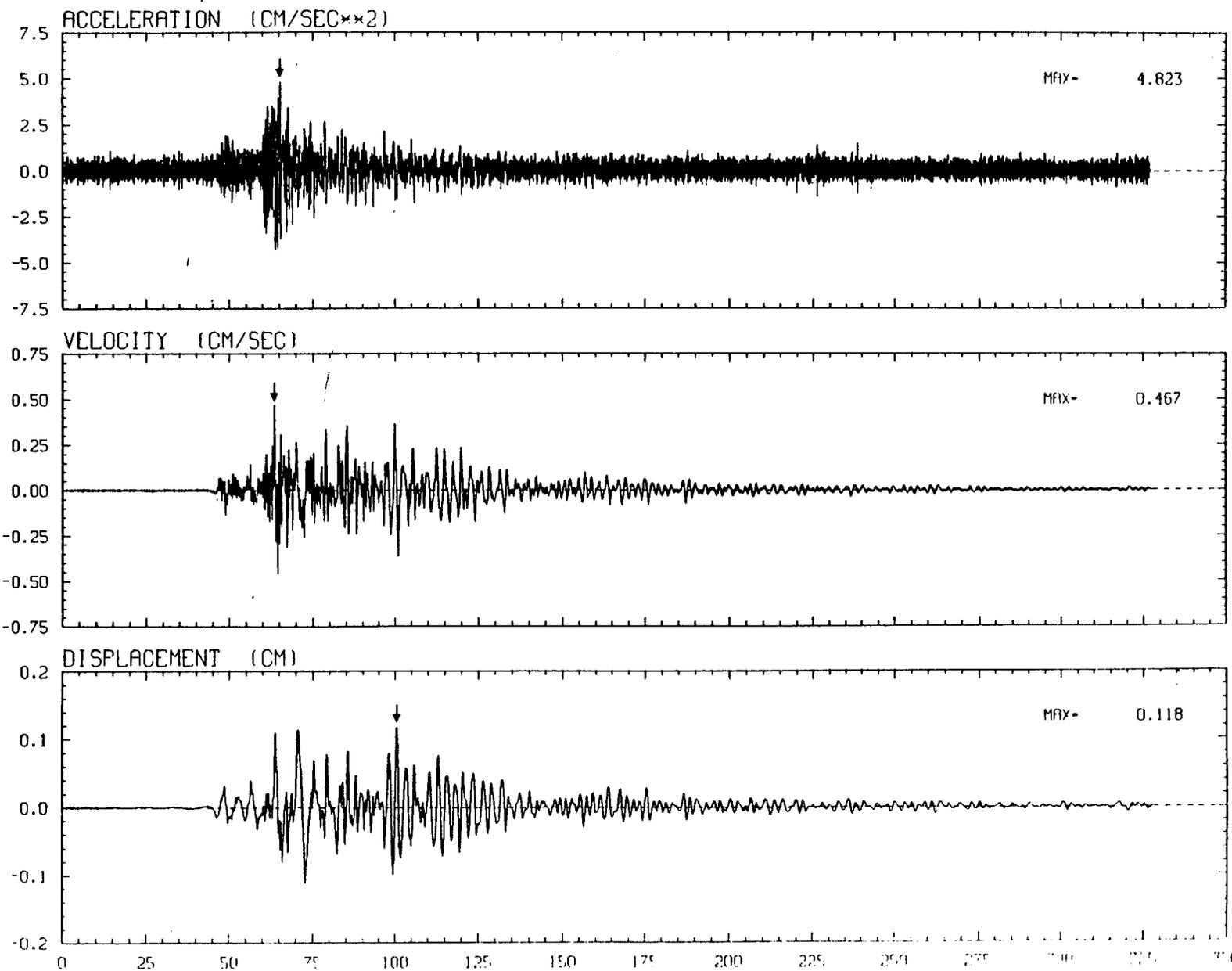
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM A CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



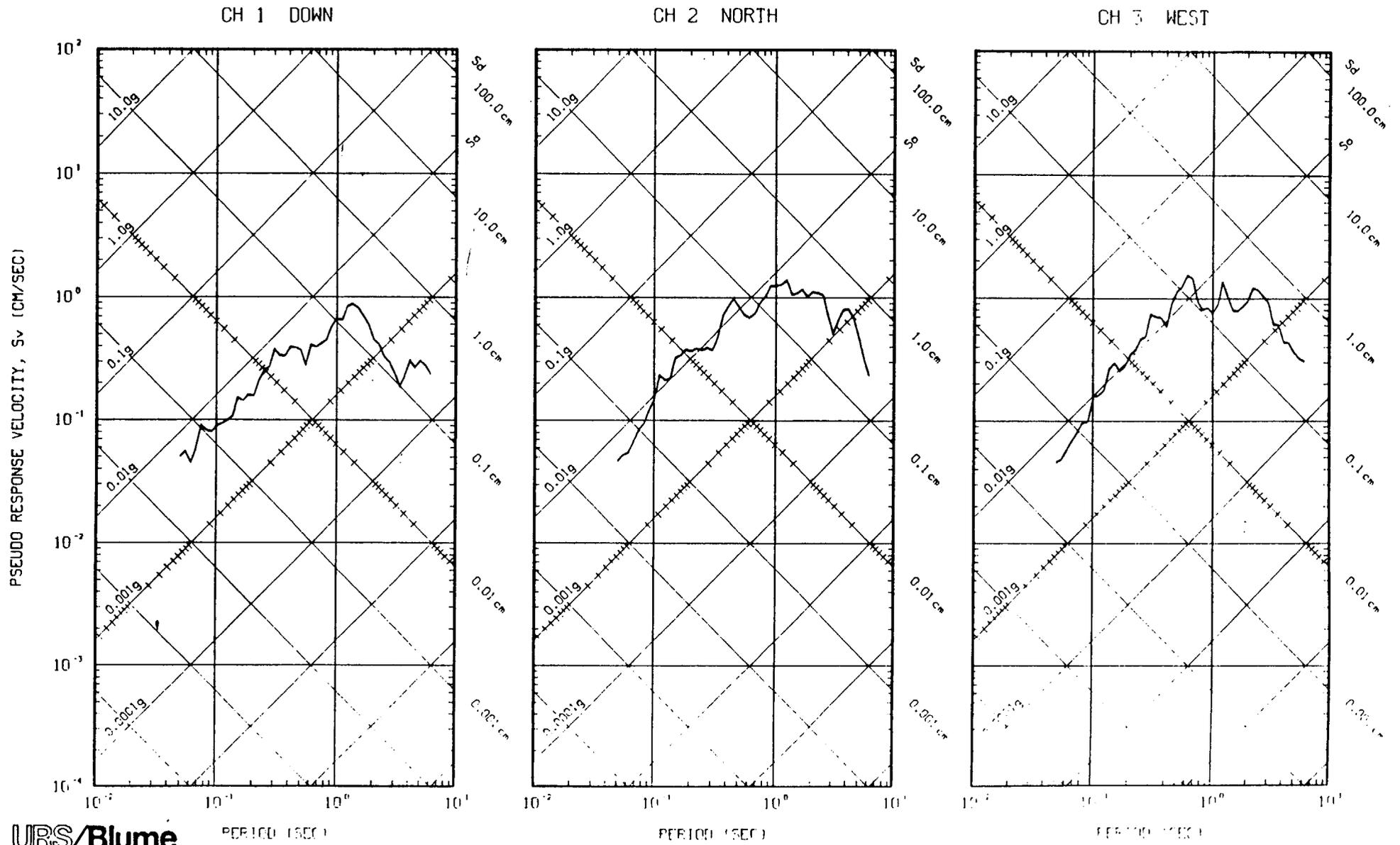
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM A CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM A

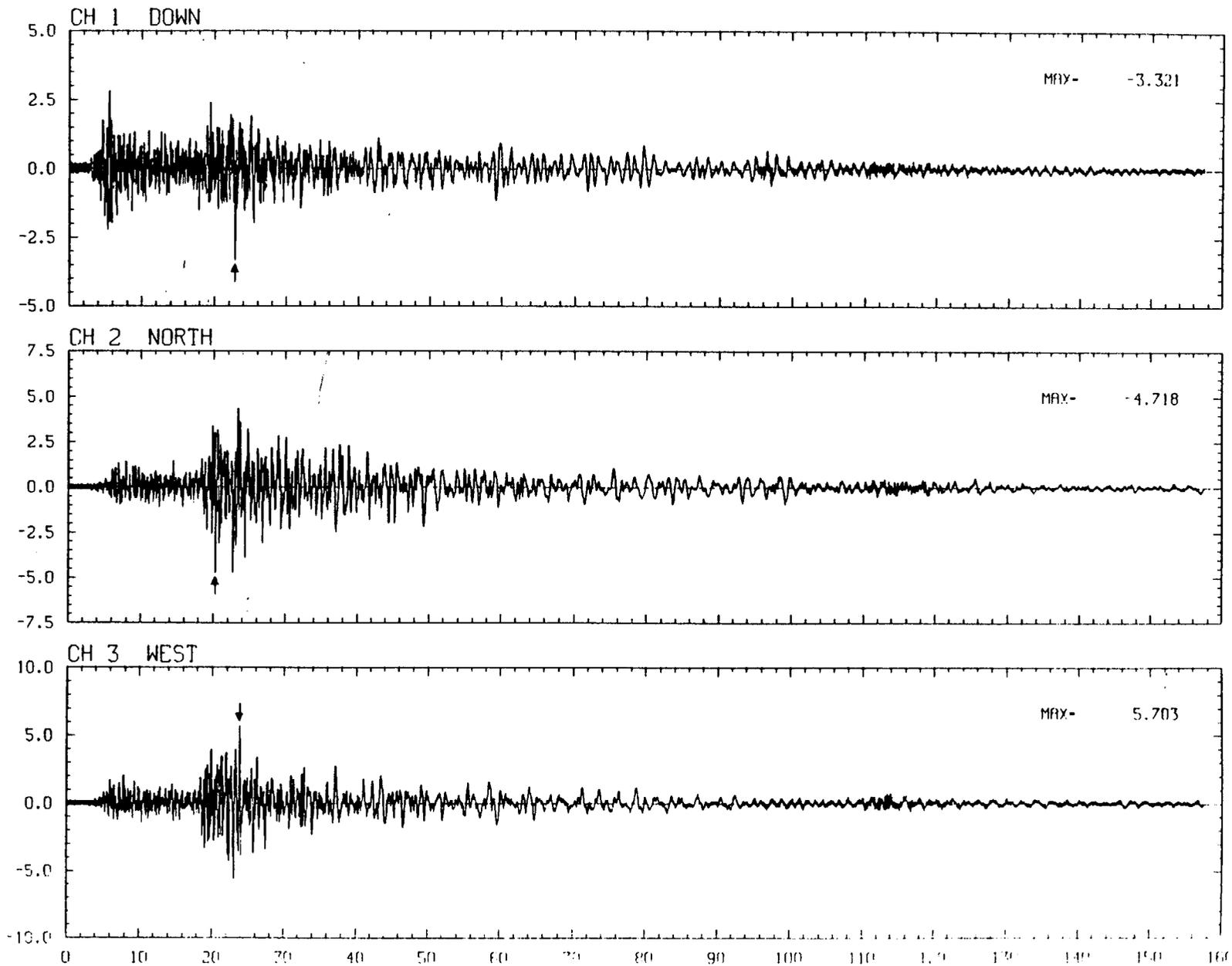
5 PCT DAMPED PESUDO VELOCITY RESPONSE SPECTRA



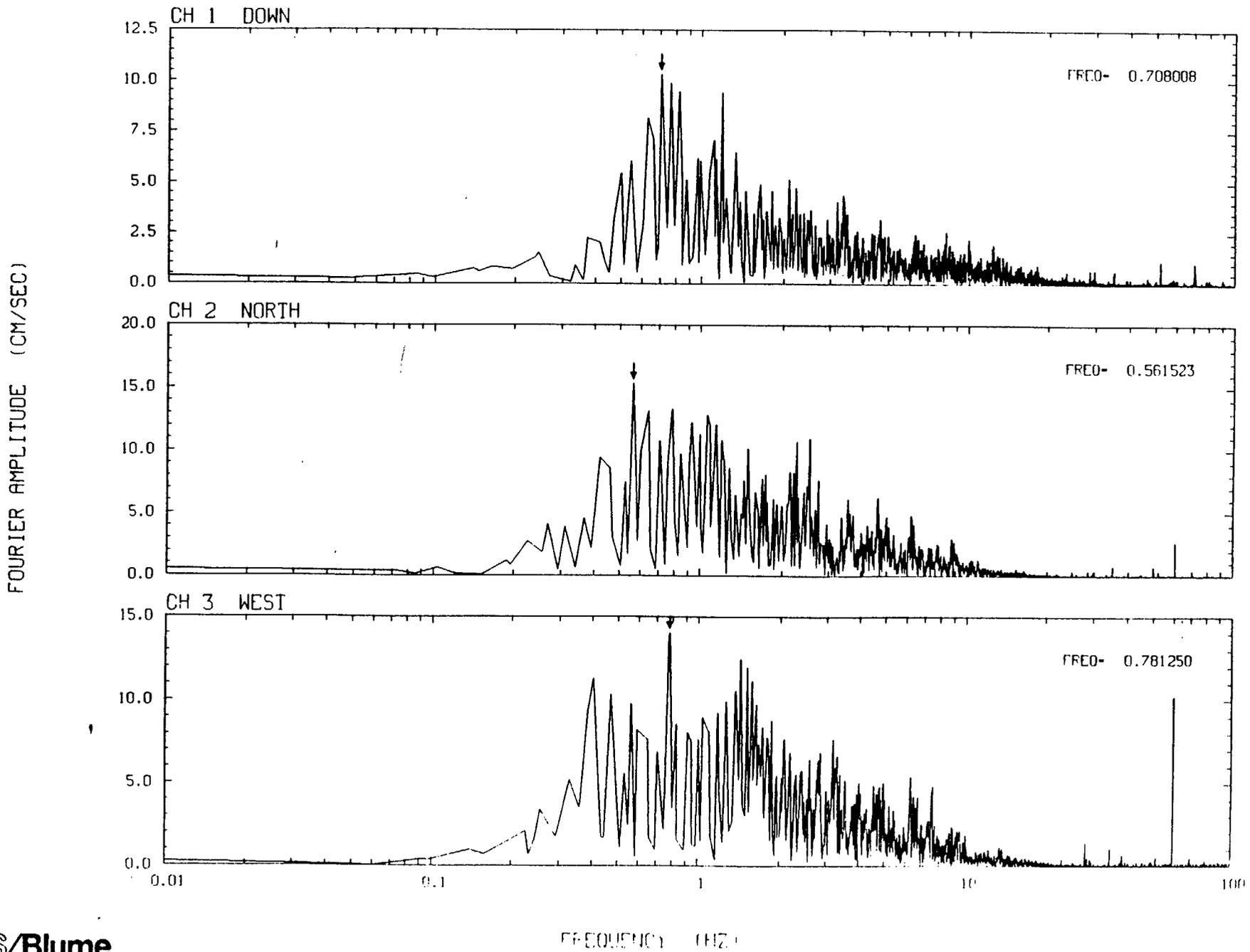
STATION NO. 15 SYSTEM B

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM B
UNCORRECTED ACCELERATION TIME HISTORIES

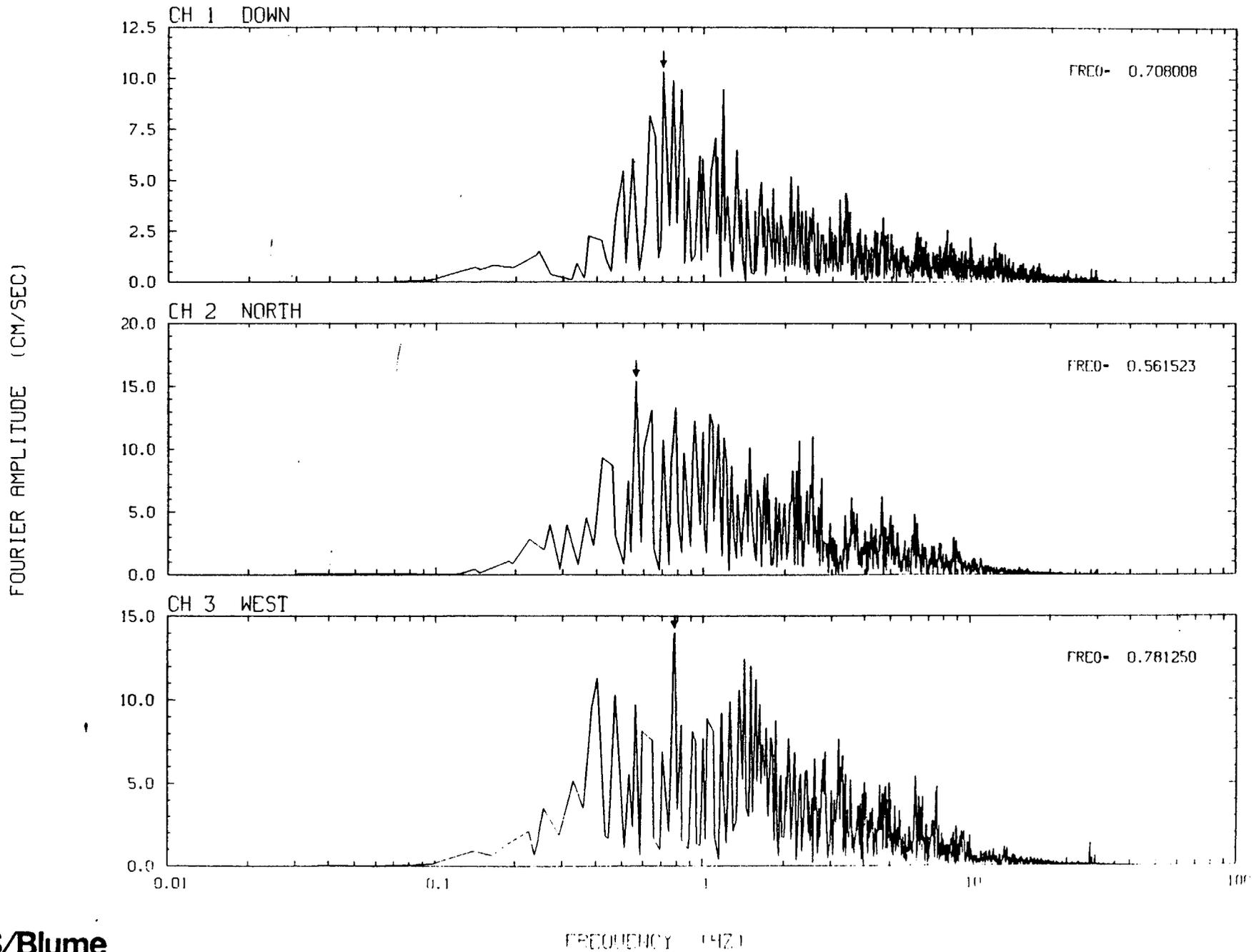
ACCELERATION (CM/SEC**2)



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM B
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

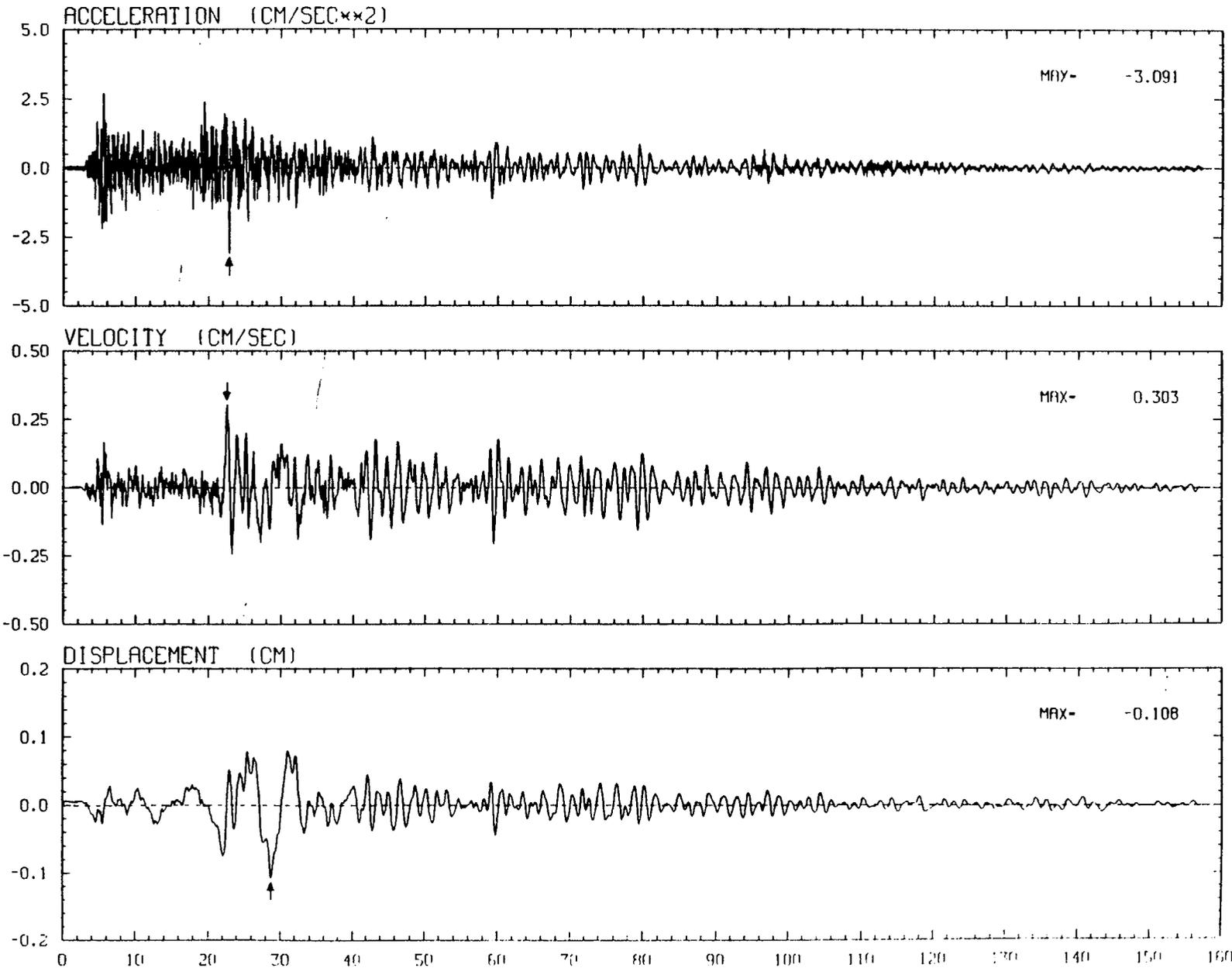


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM B
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



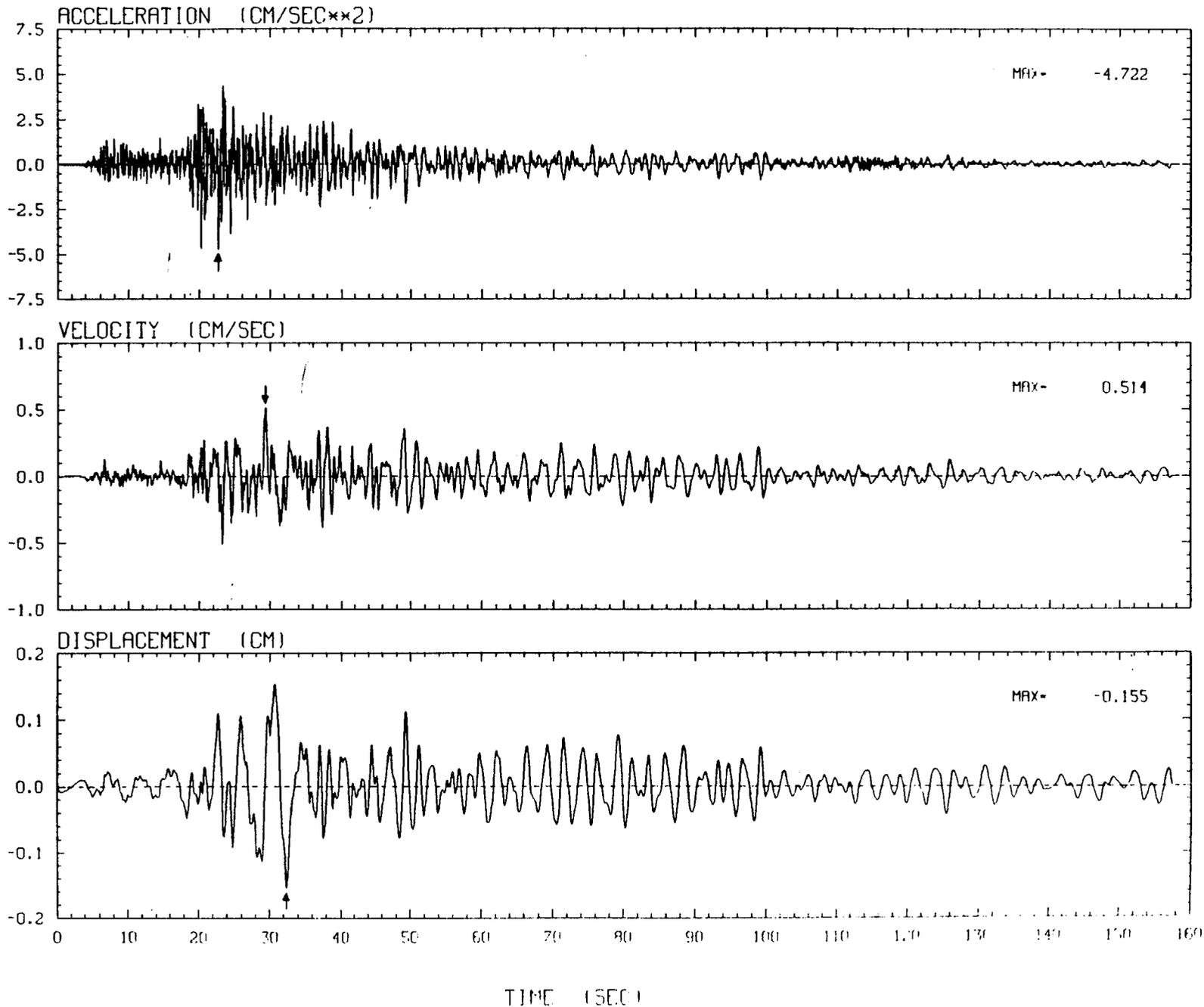
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM B CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



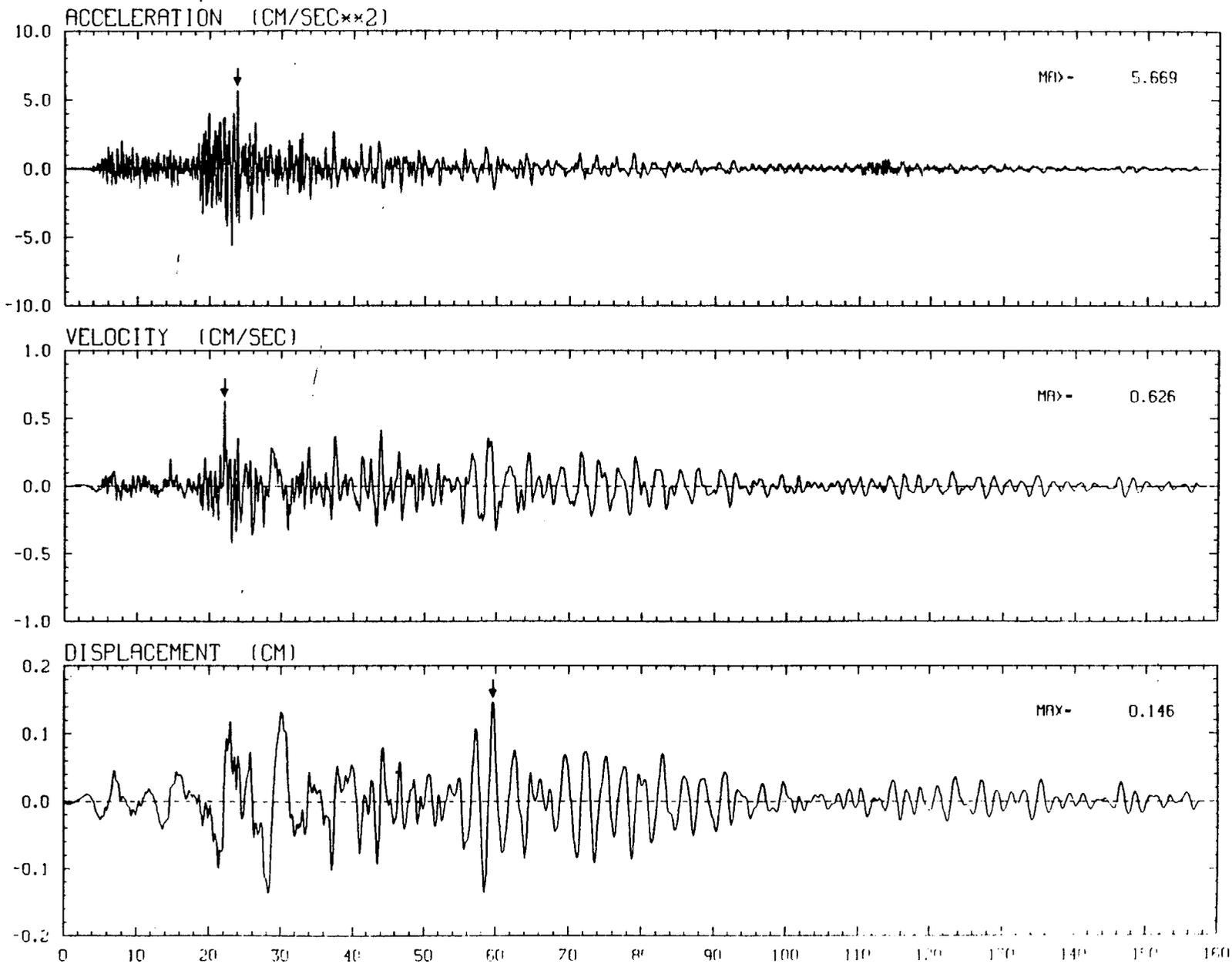
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM B CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



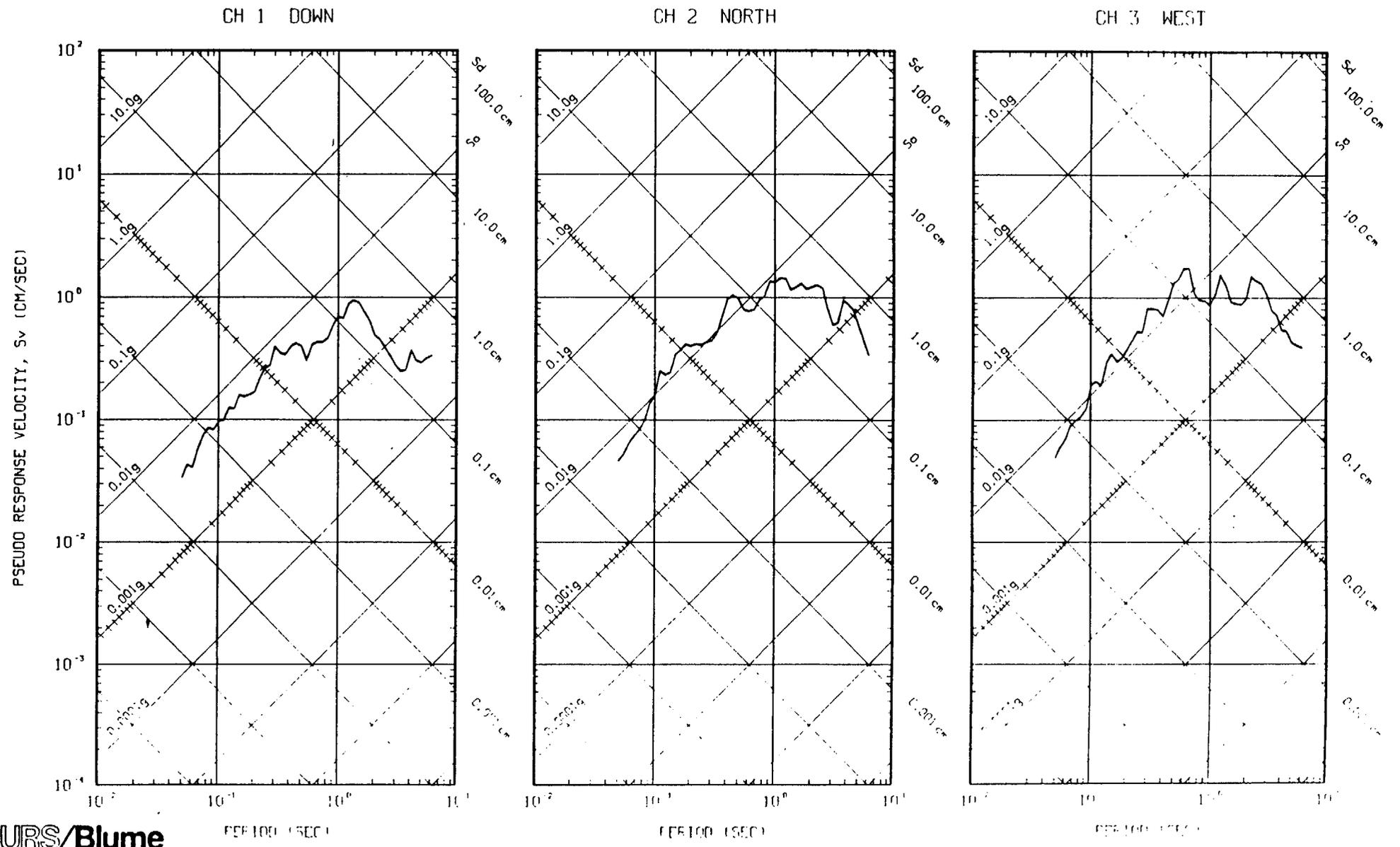
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM B CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



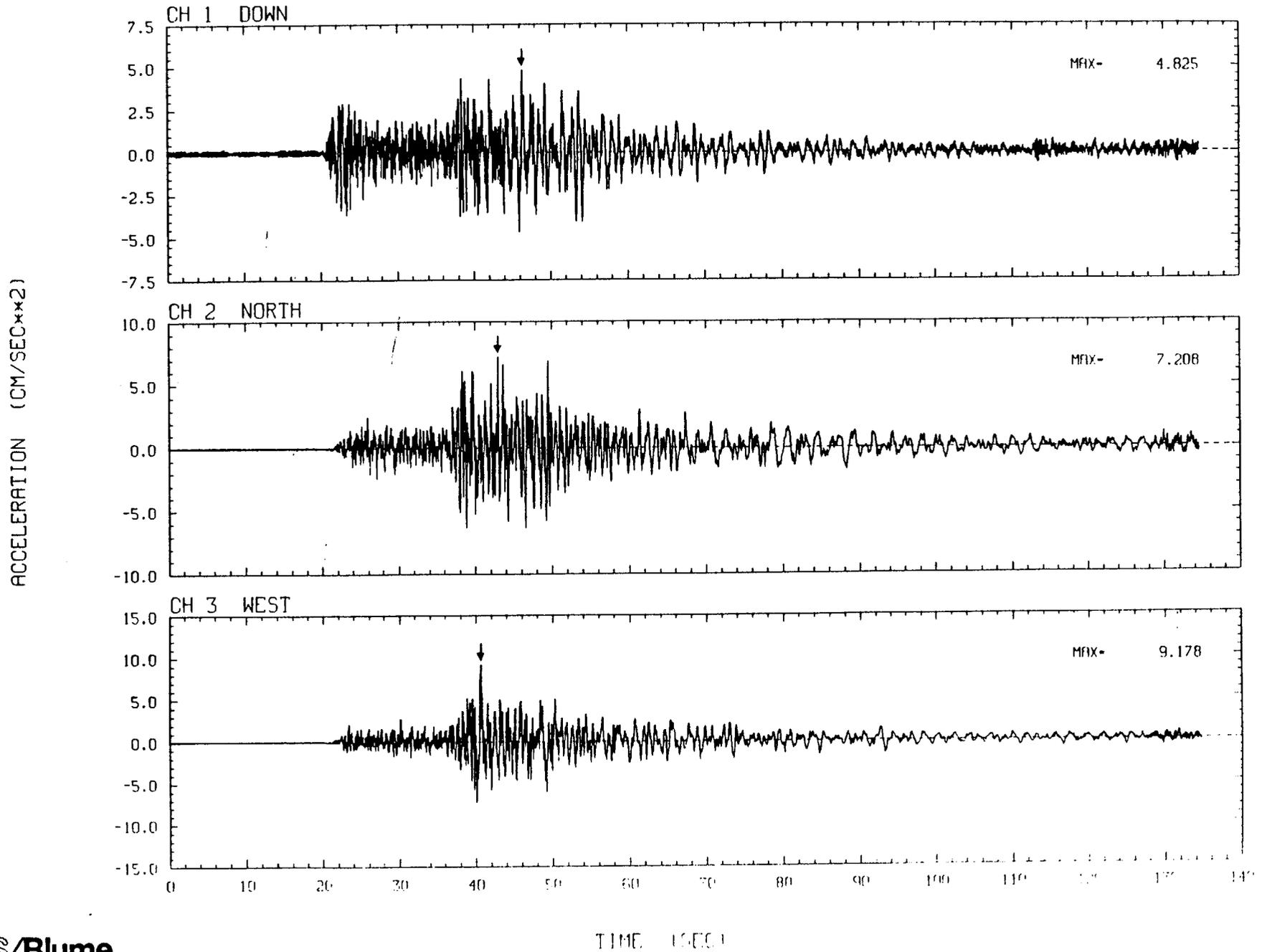
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 15 SYSTEM B

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

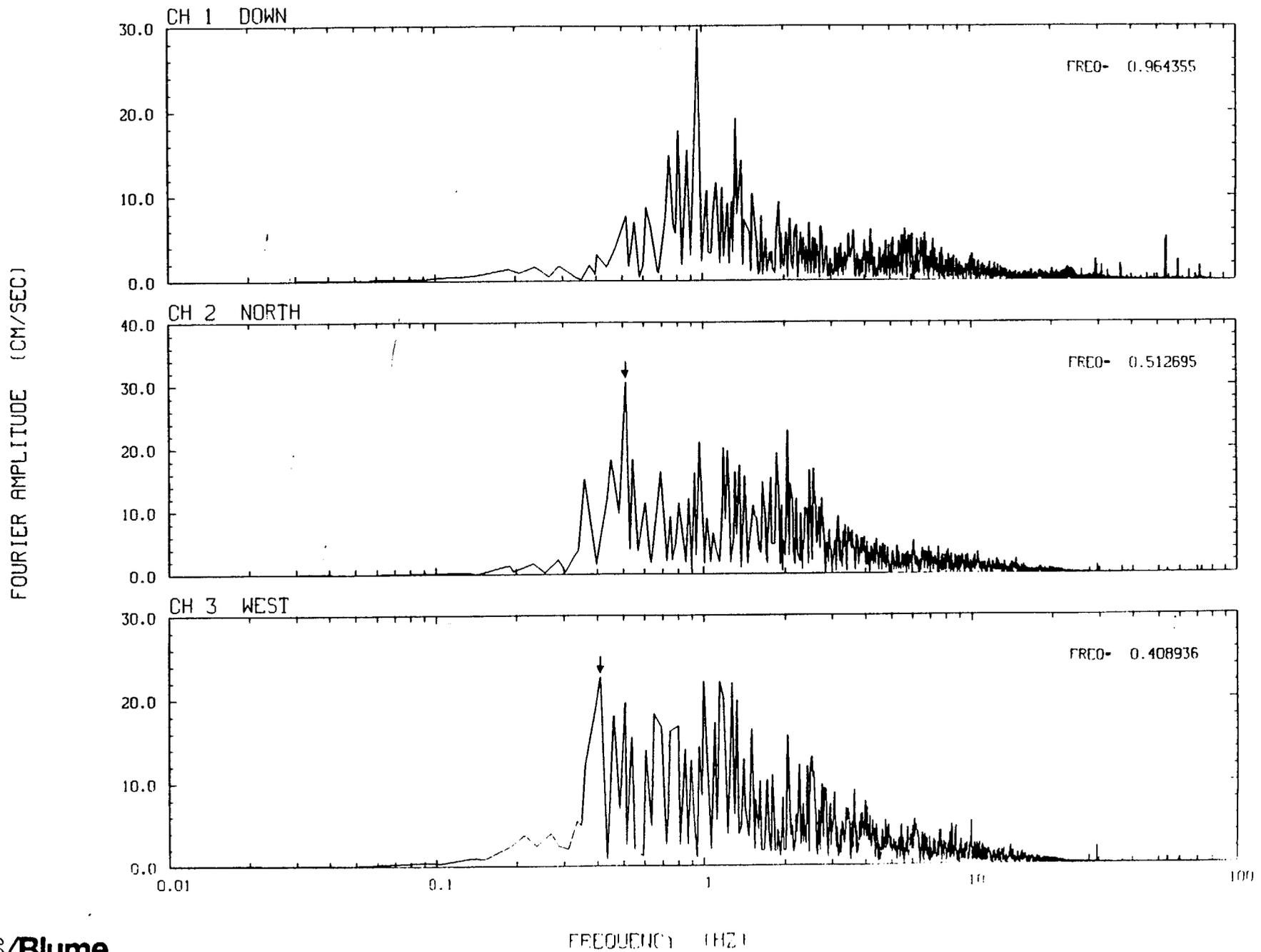


STATION NO. 16

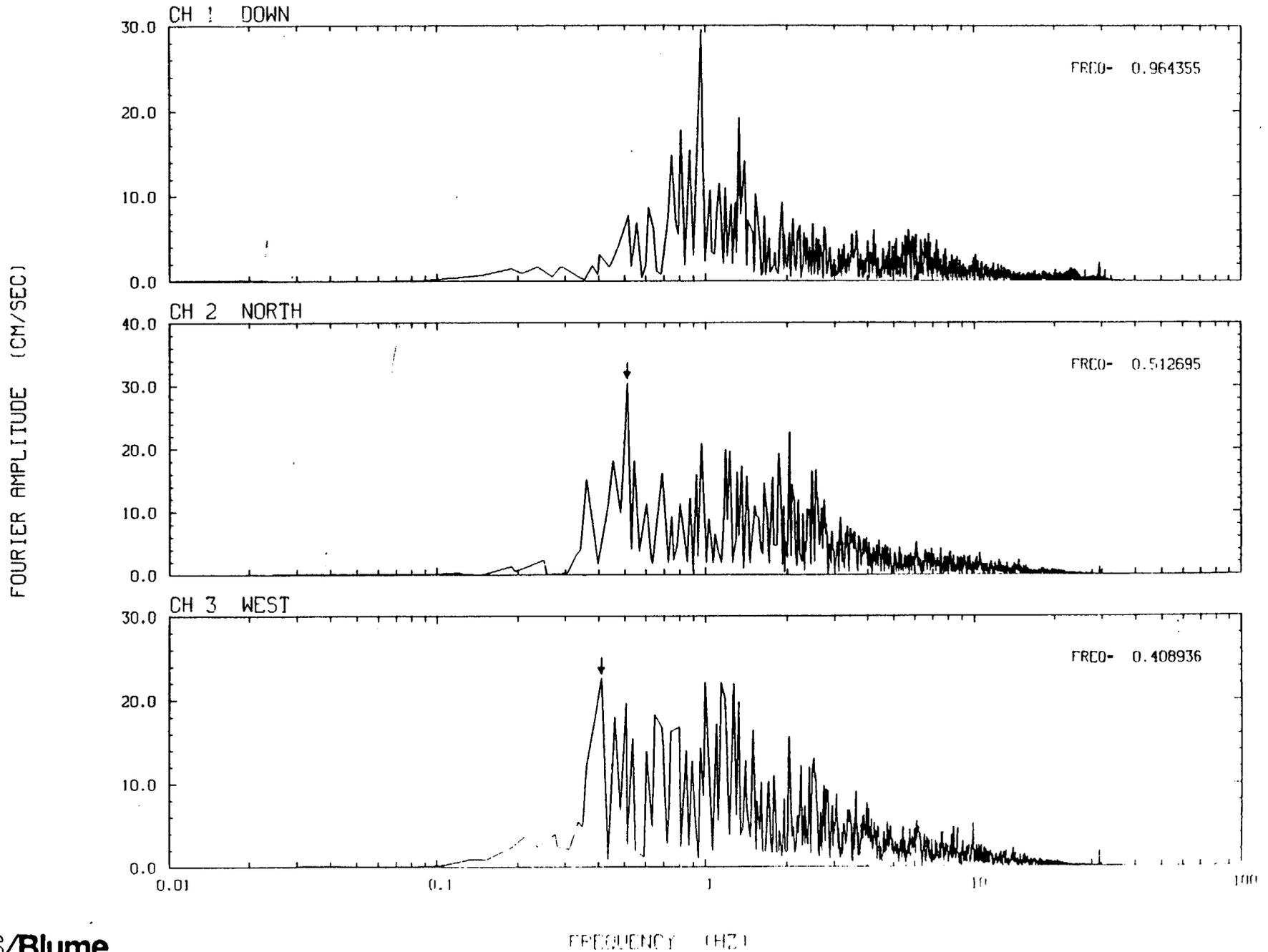
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 16
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 16
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

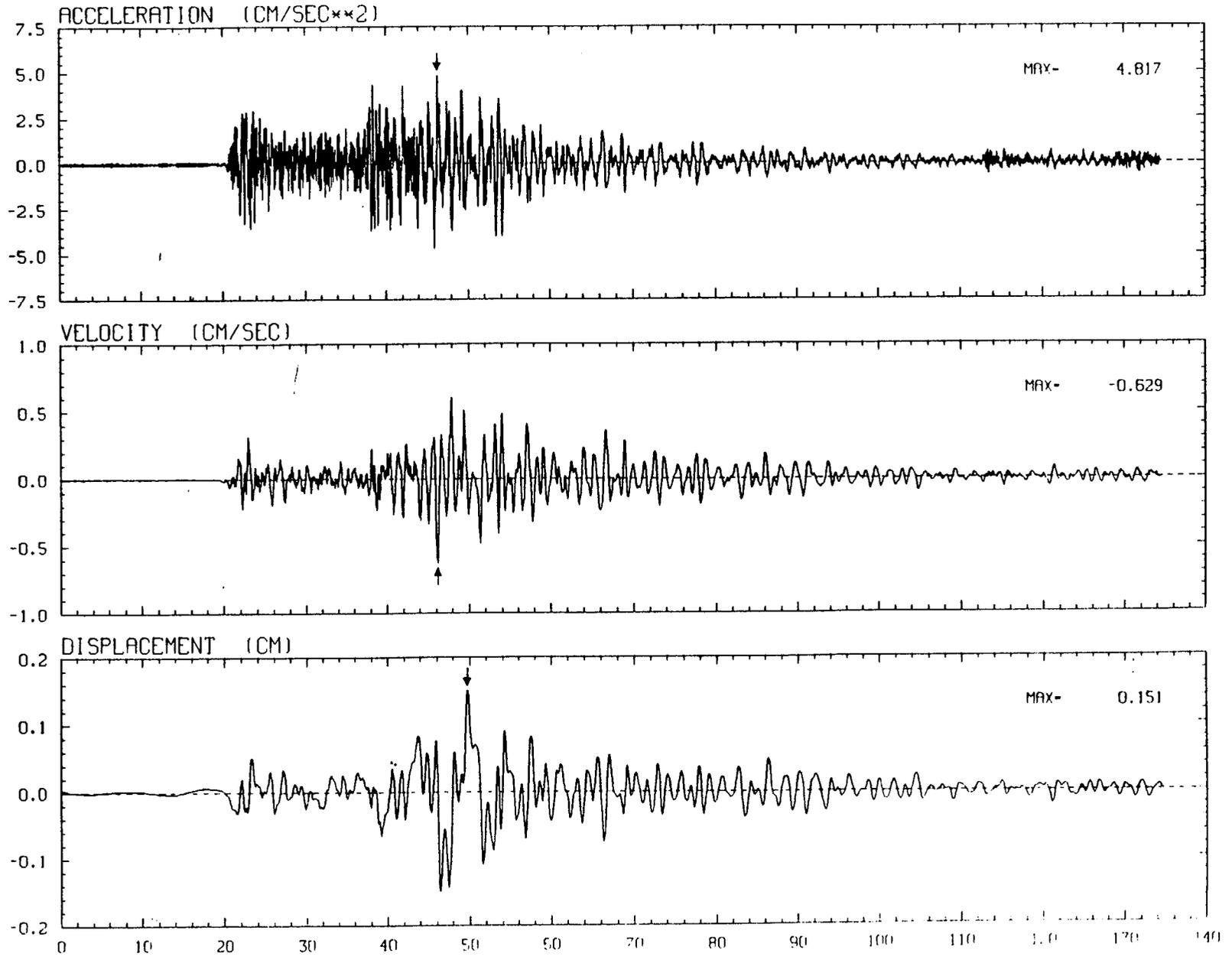


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 16
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



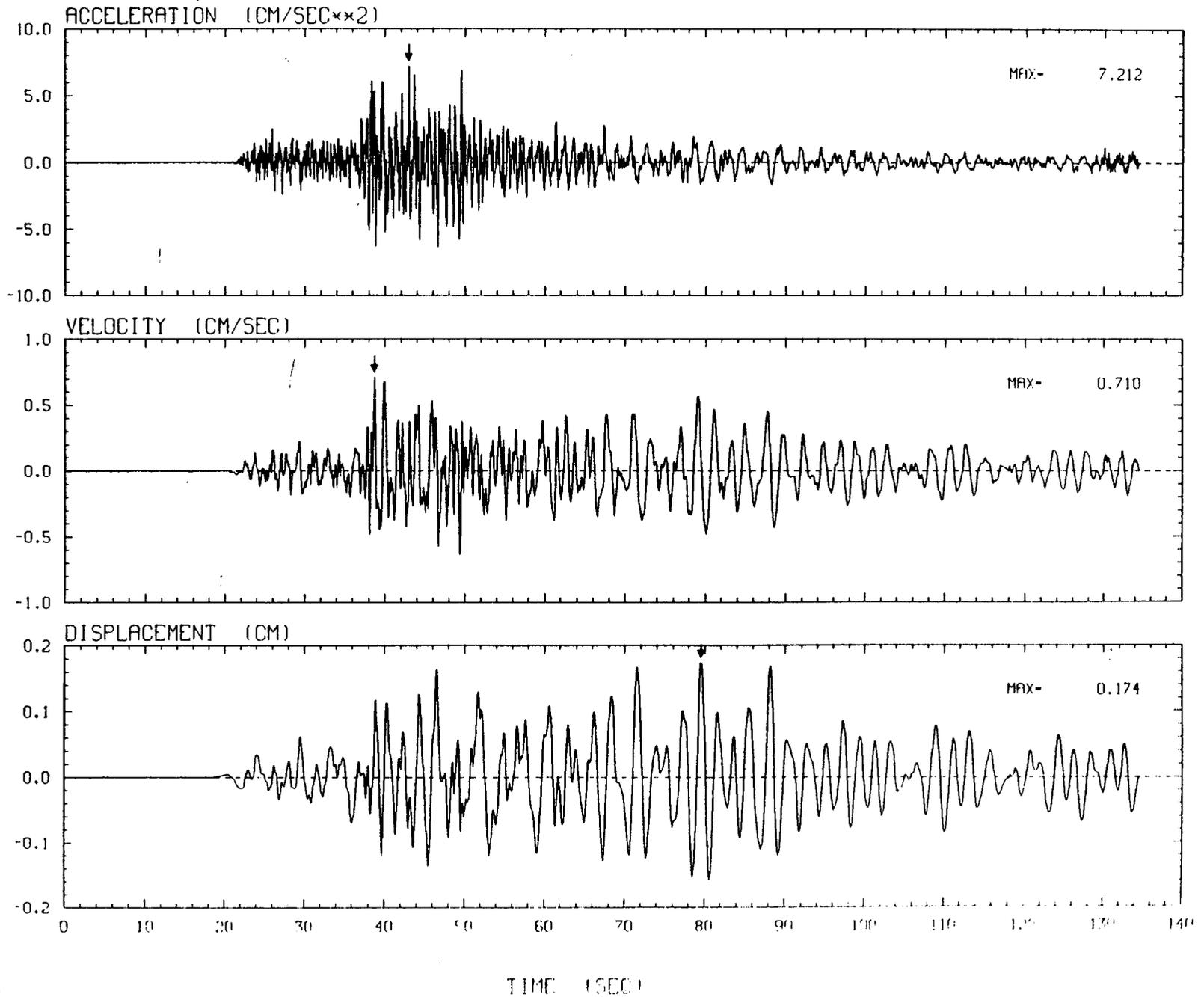
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 16 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



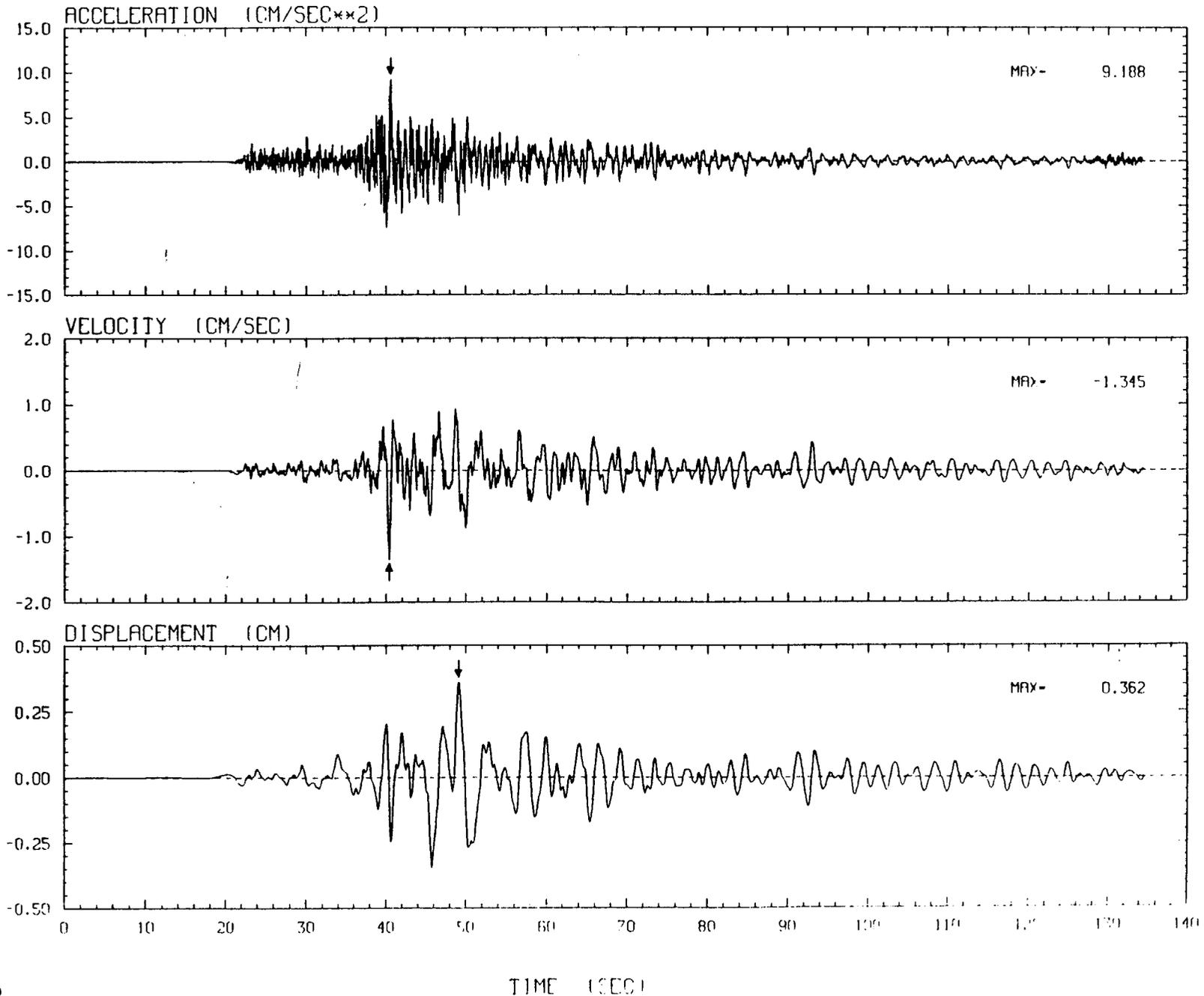
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 16 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



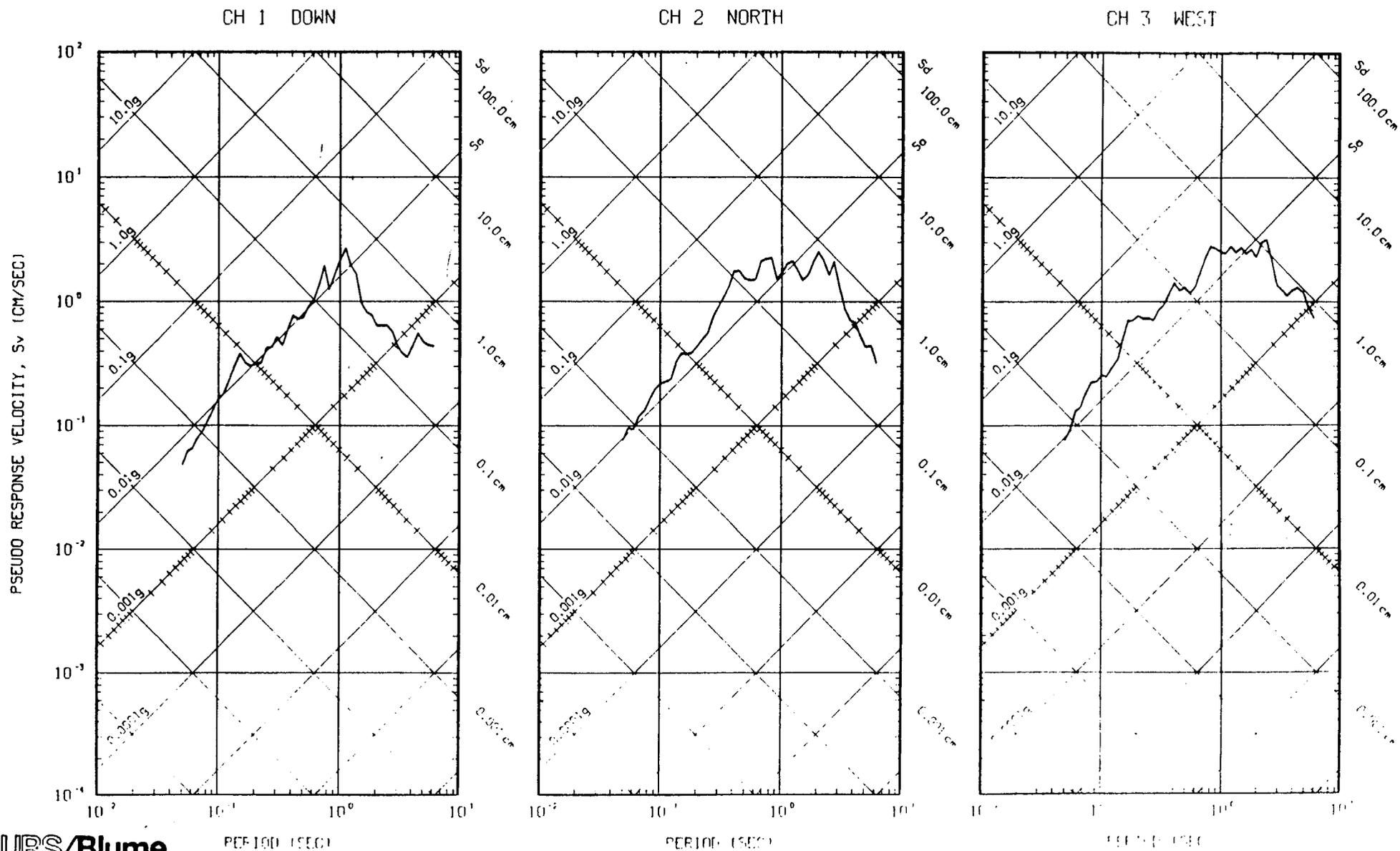
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 16 CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



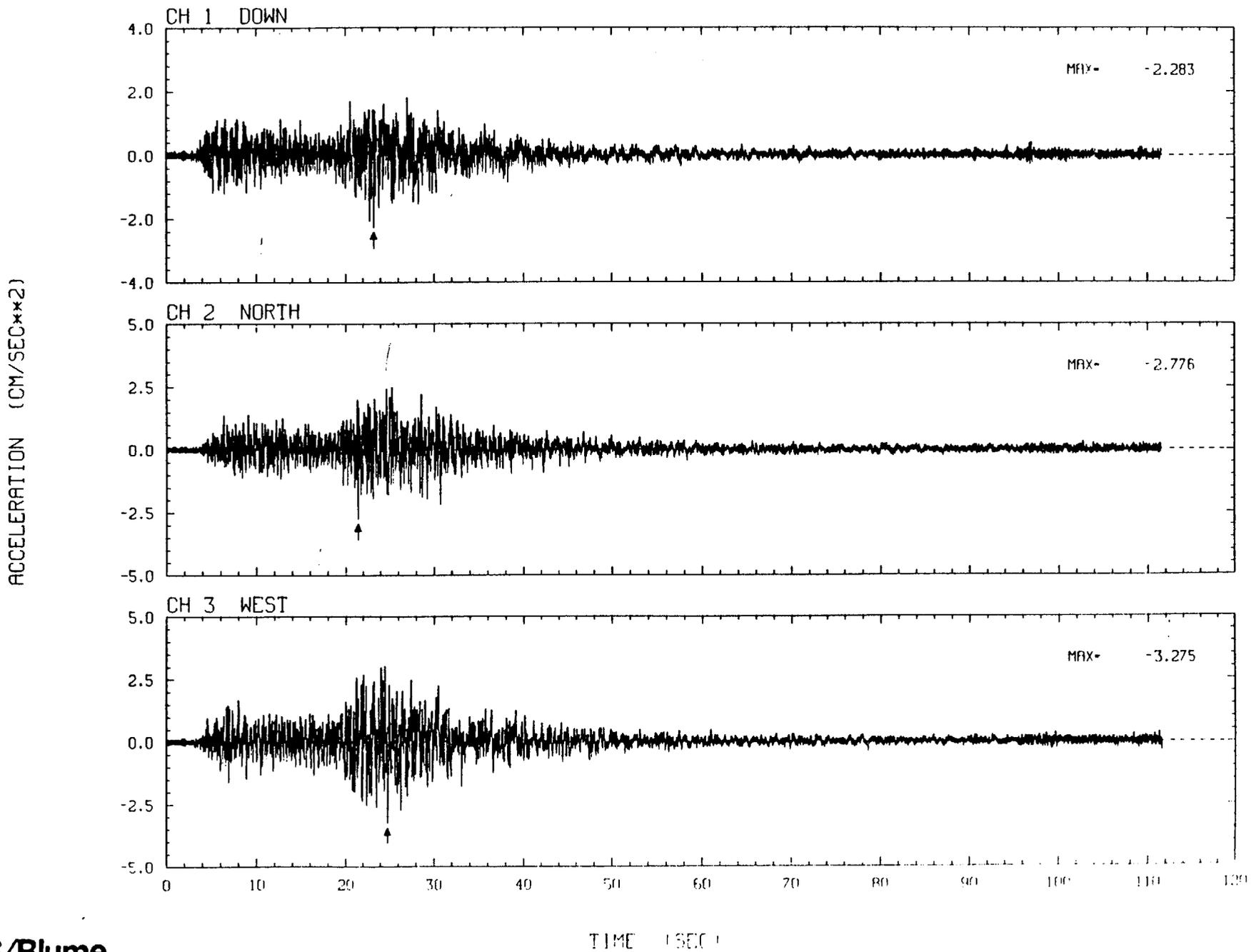
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 16

5 PCT DAMPED PESUDO VELOCITY RESPONSE SPECTRA



STATION NO. 17

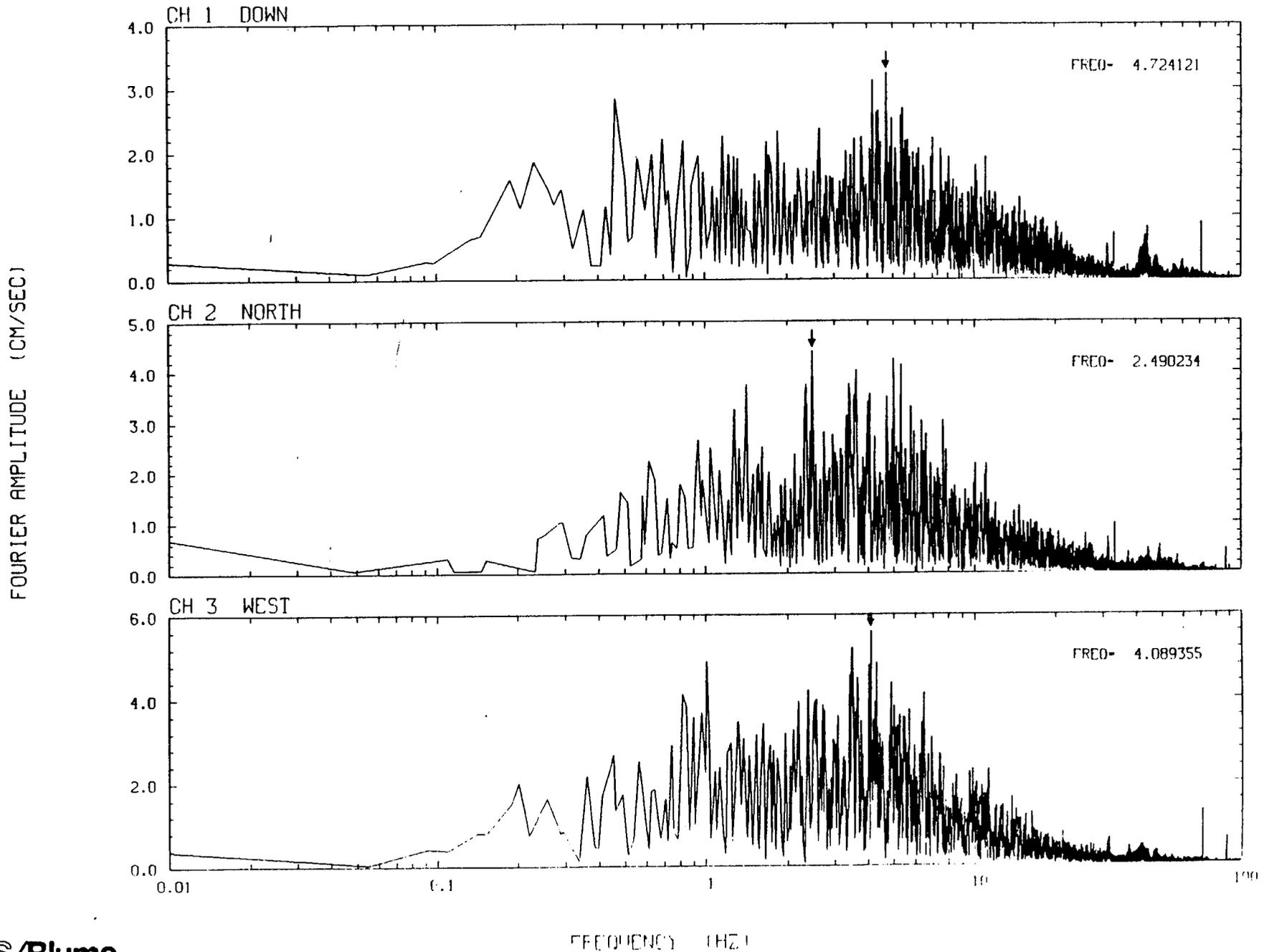
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 17
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 17

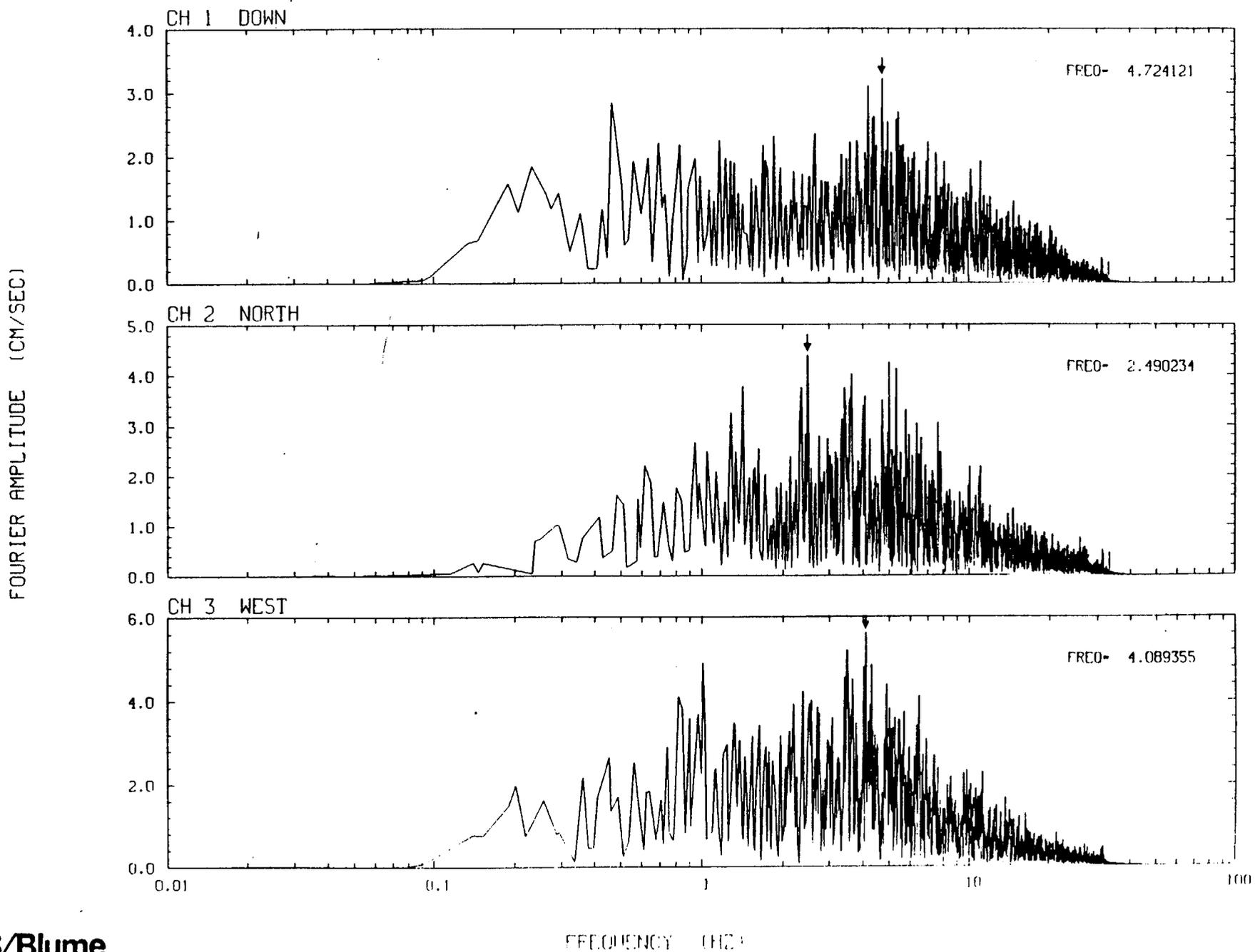
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

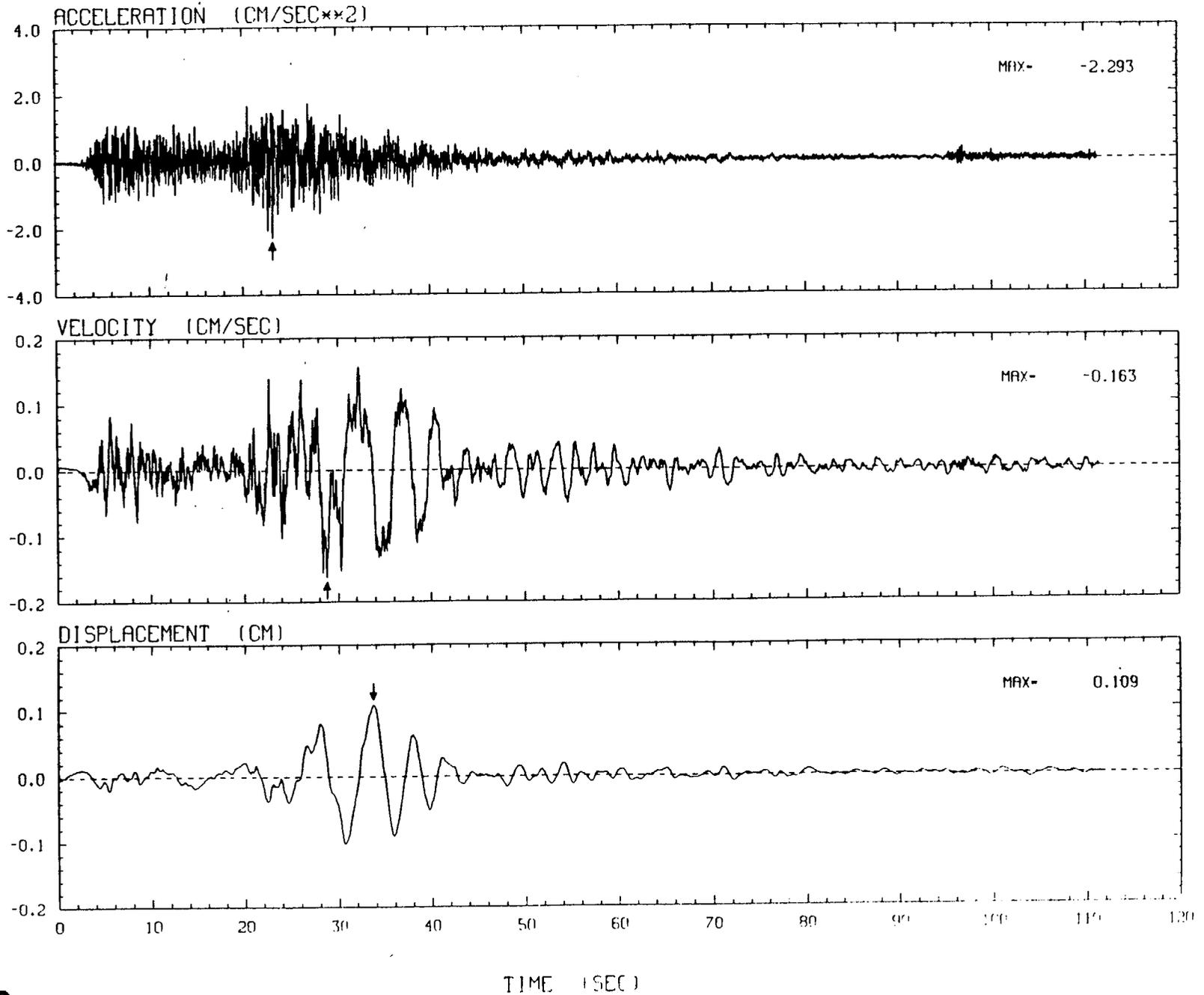
STATION NO. 17

CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 17 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



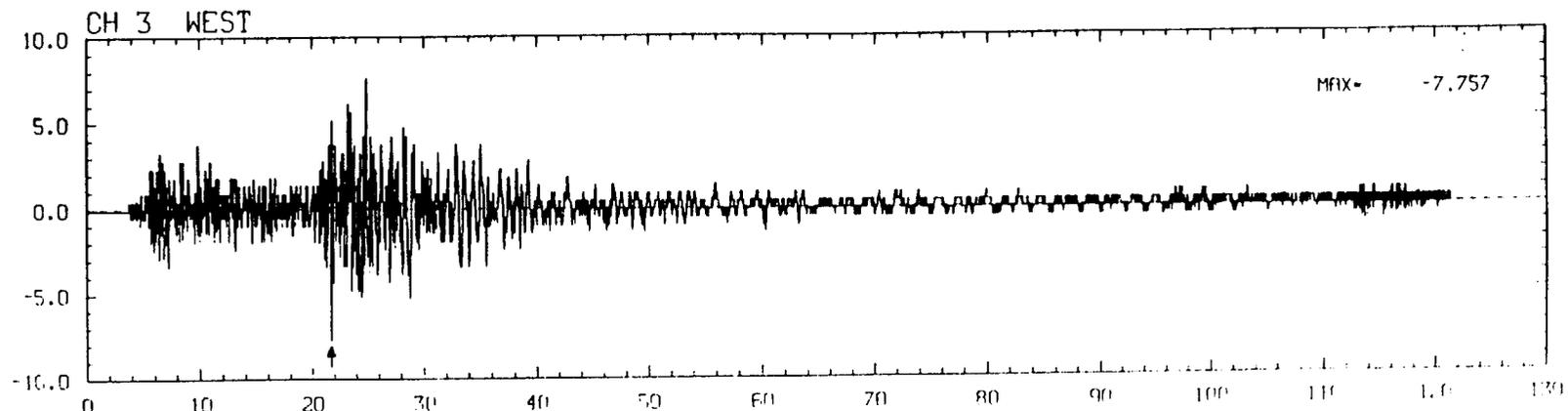
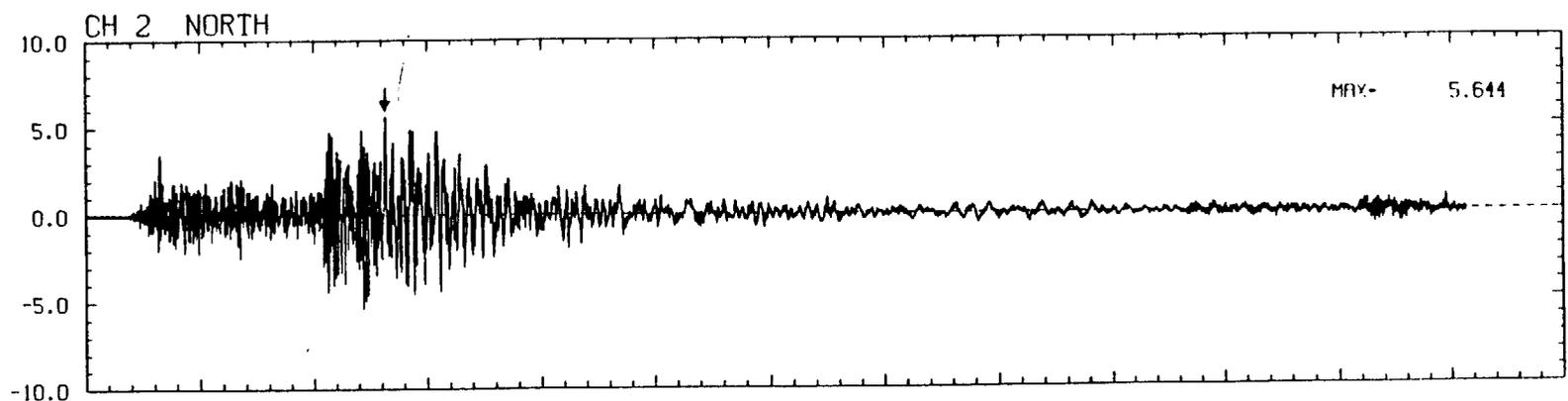
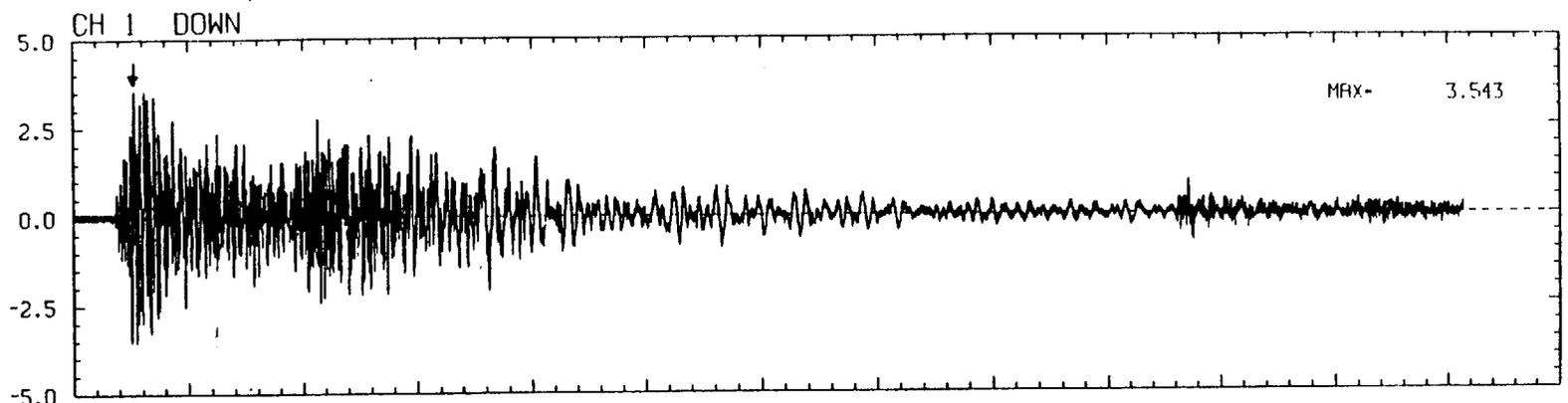
STATION NO. 18

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 18

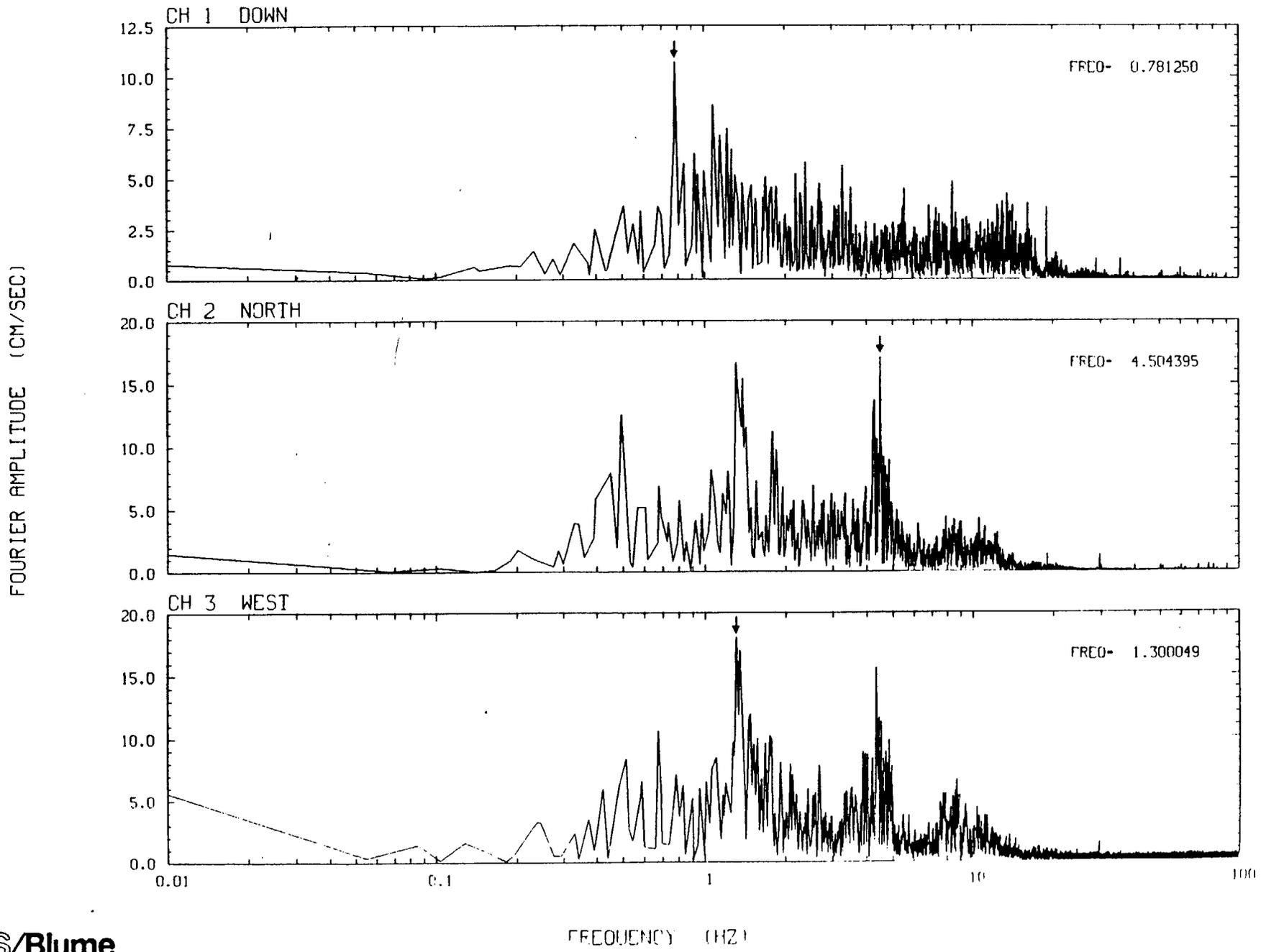
UNCORRECTED ACCELERATION TIME HISTORIES

ACCELERATION (CM/SEC**2)

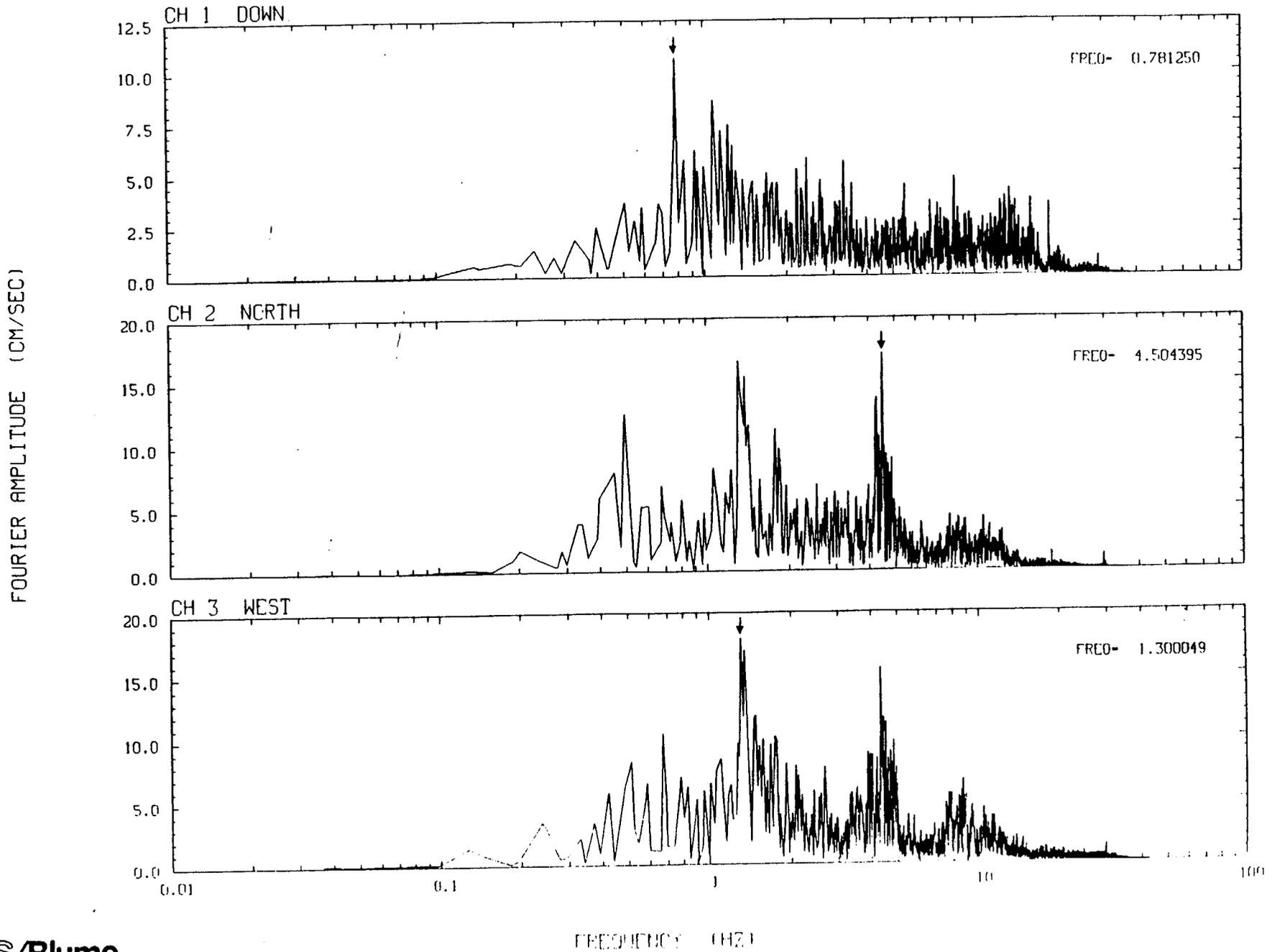


TIME (SEC)

LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 18
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

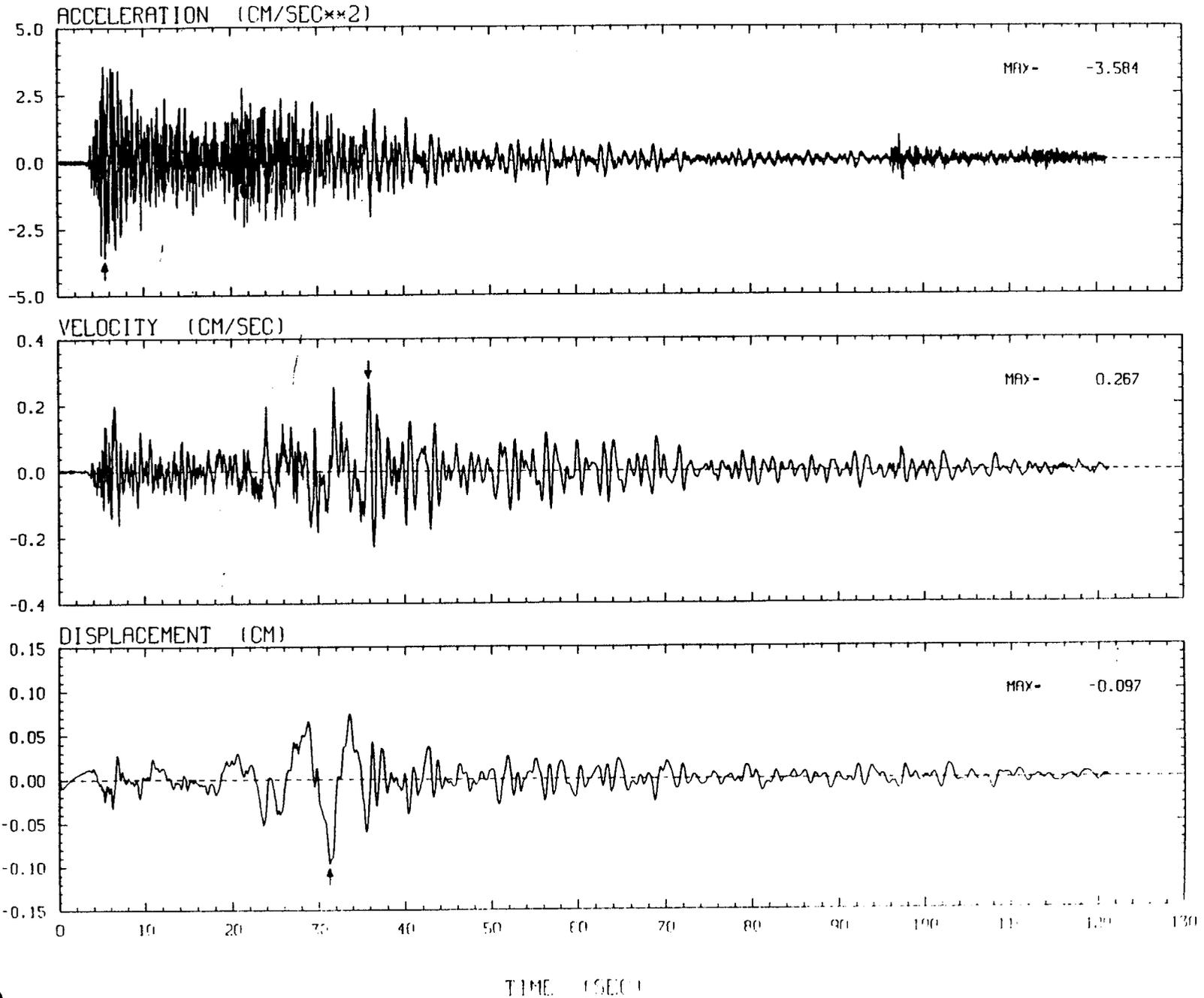


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 18
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



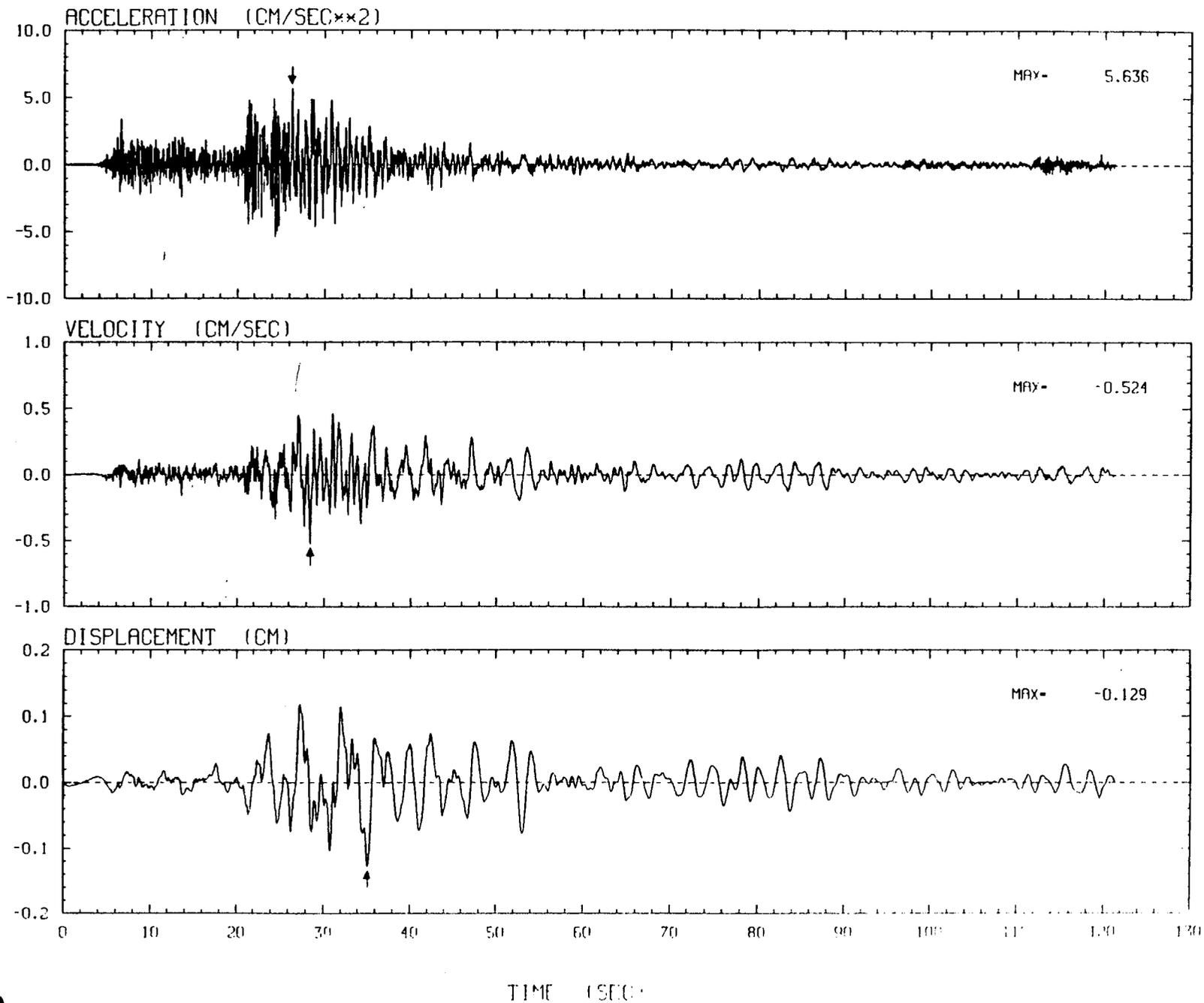
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 18 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



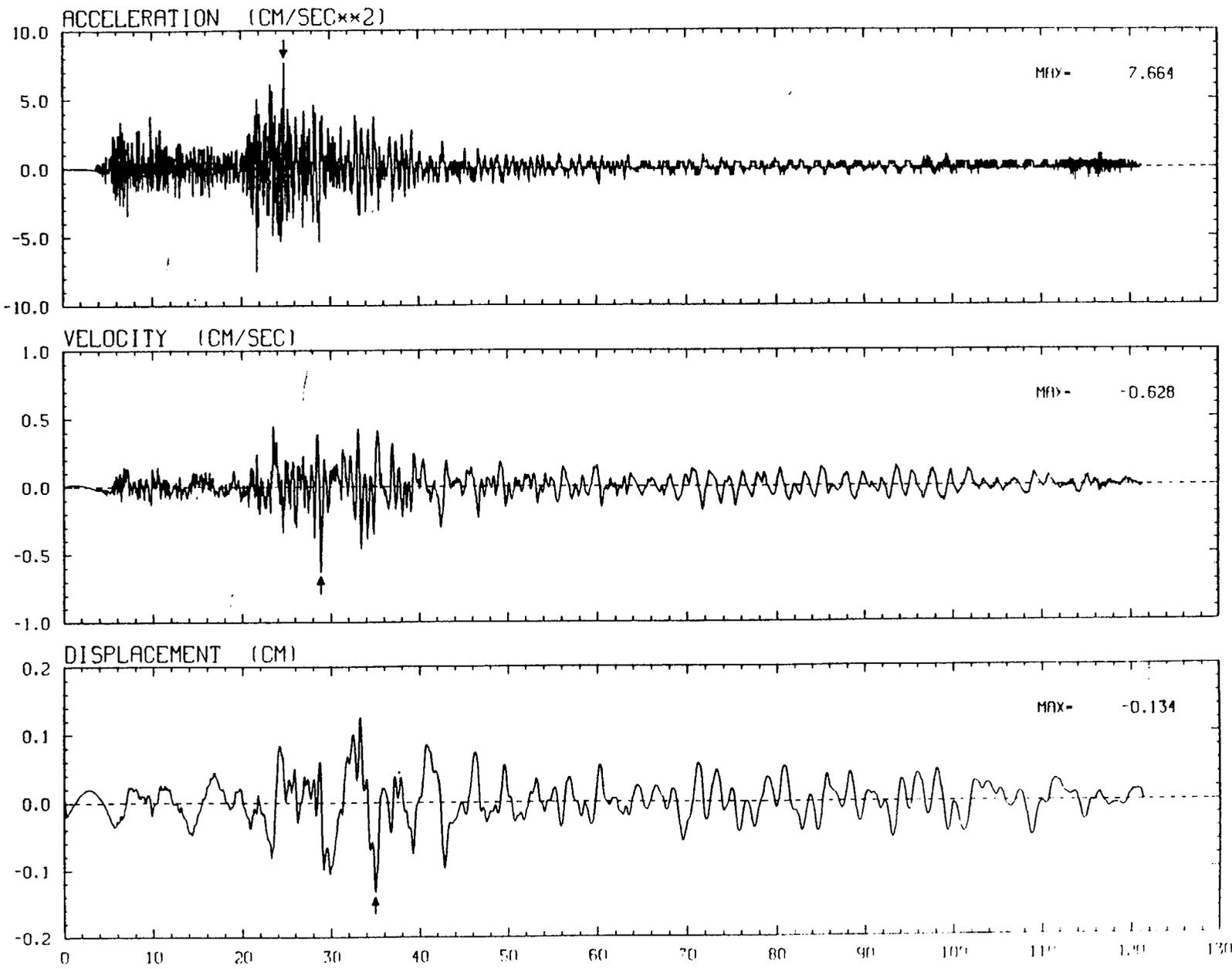
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 18 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



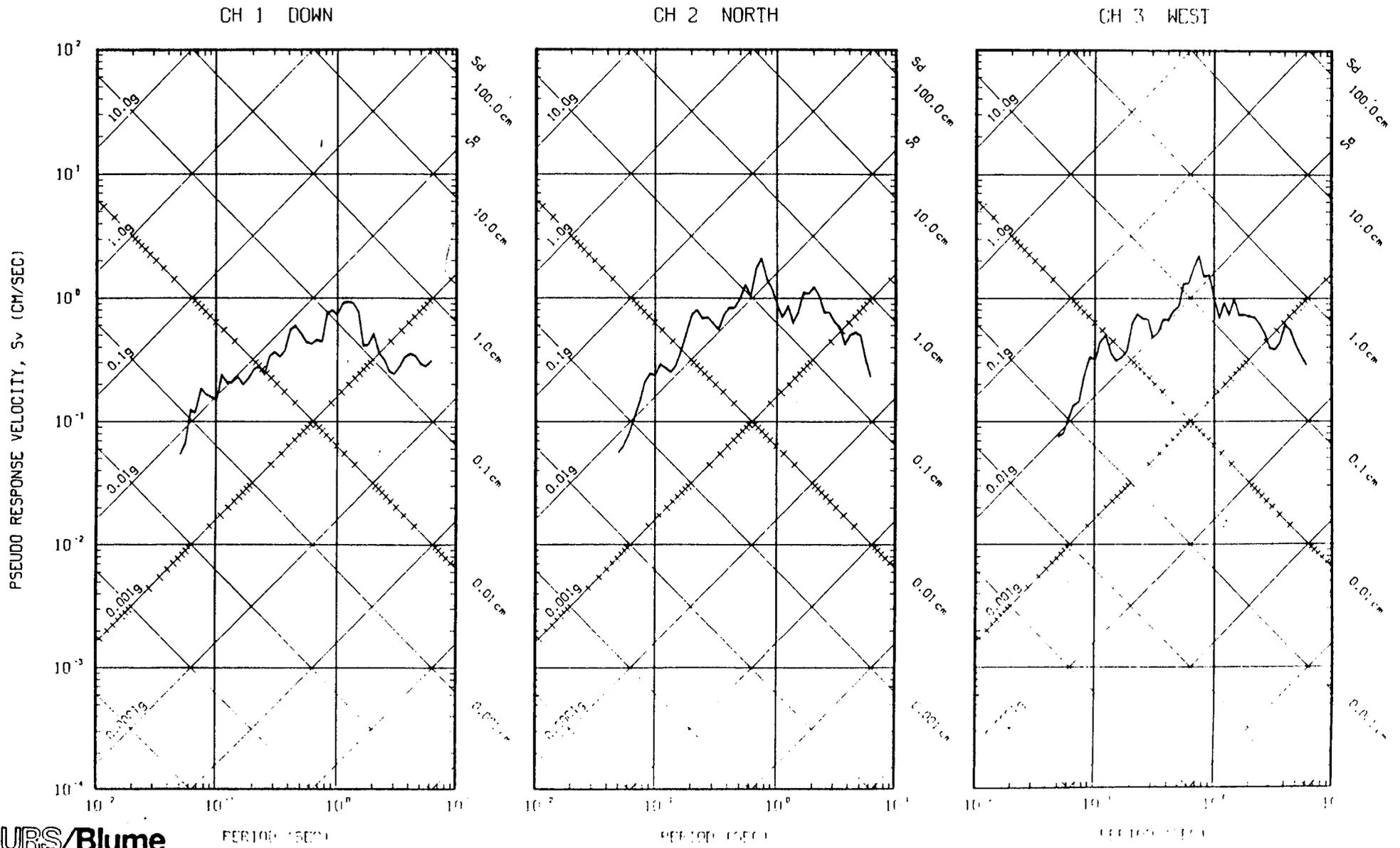
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 18 CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 18

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

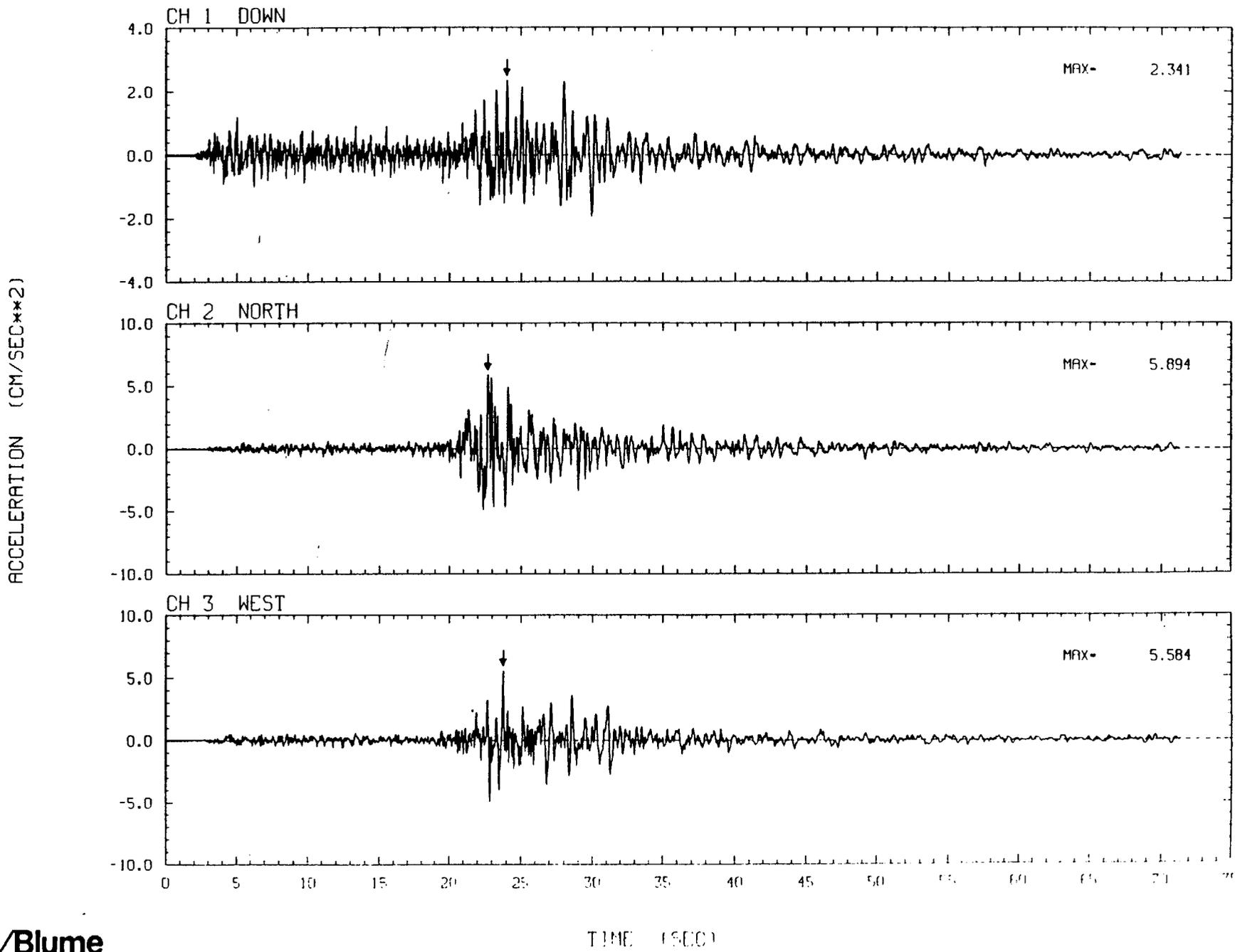


STATION NO. 19

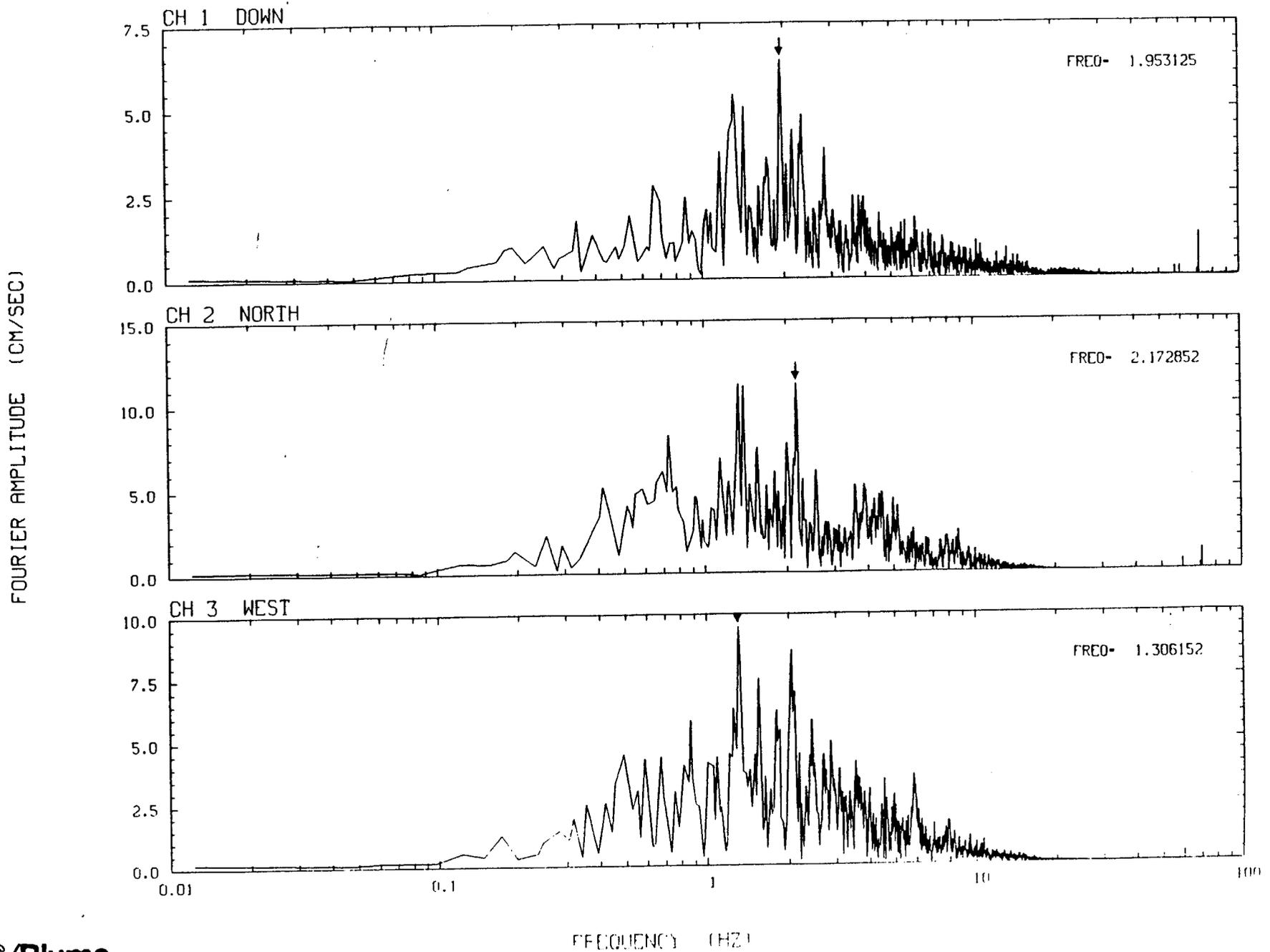
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 19

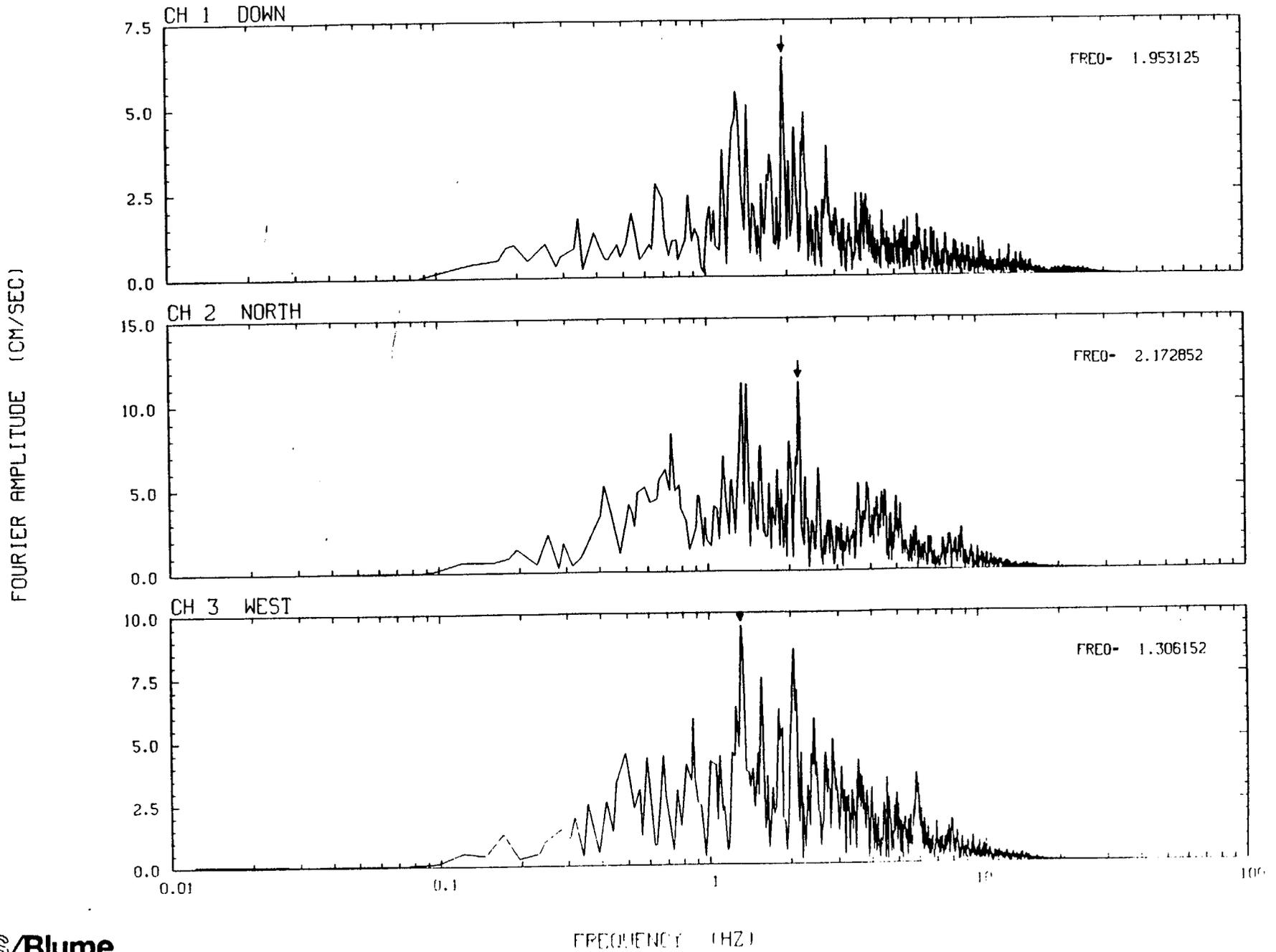
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 19
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

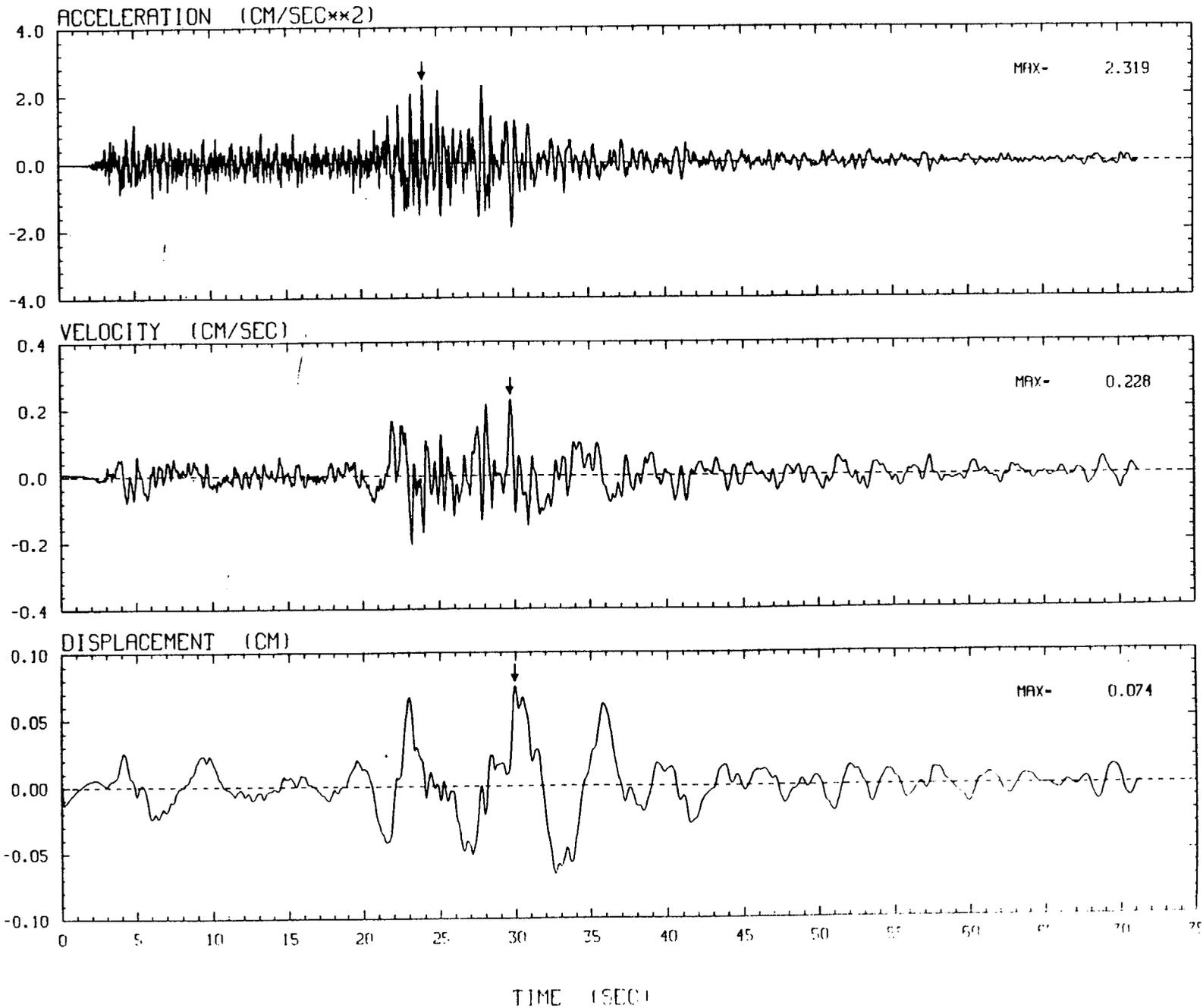


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 19
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



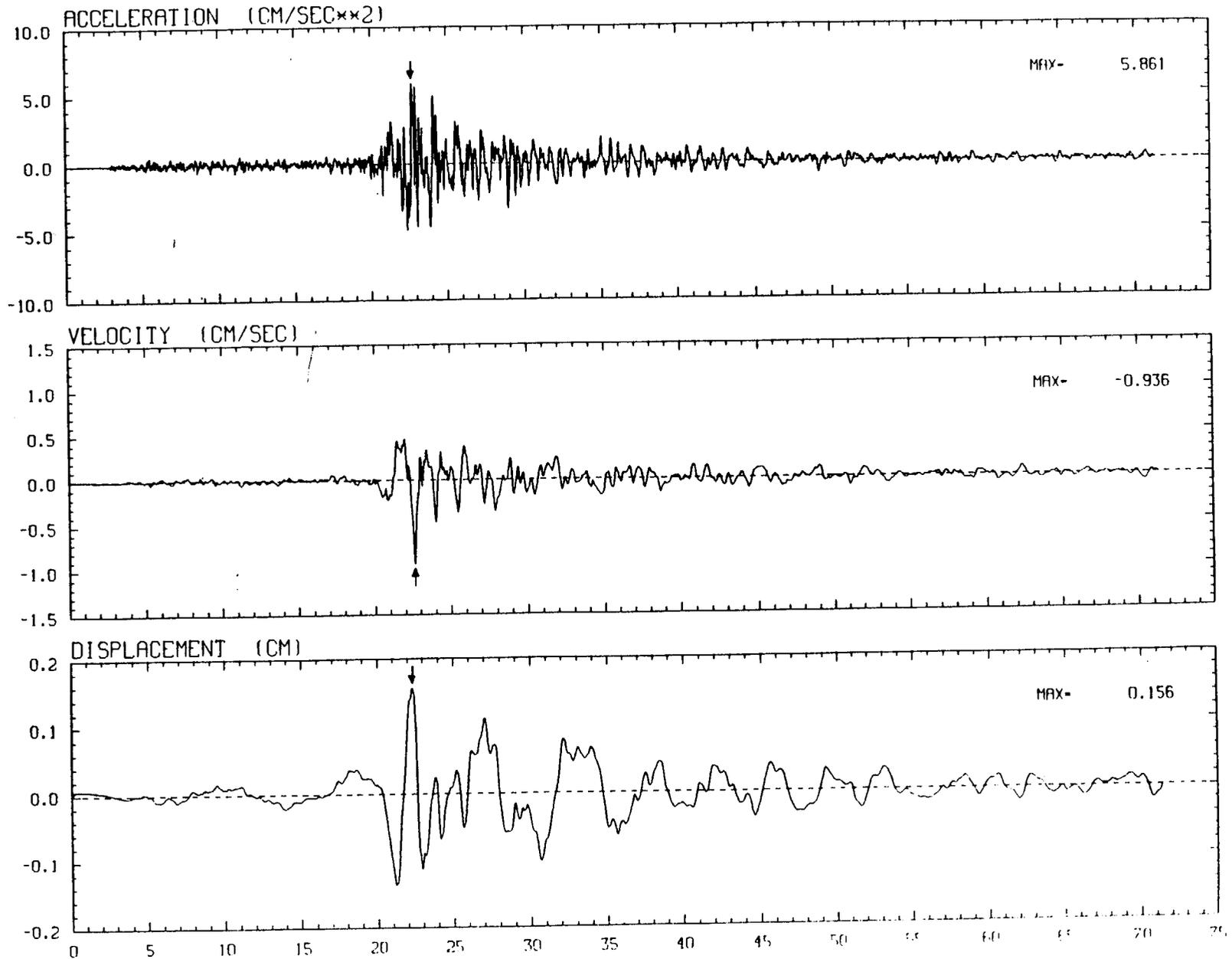
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 19 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



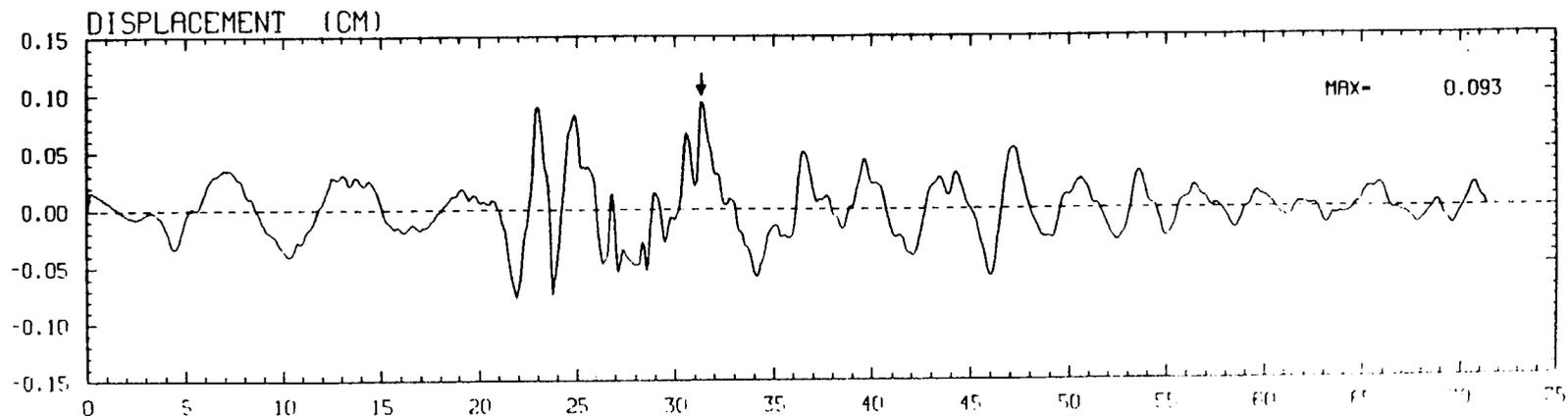
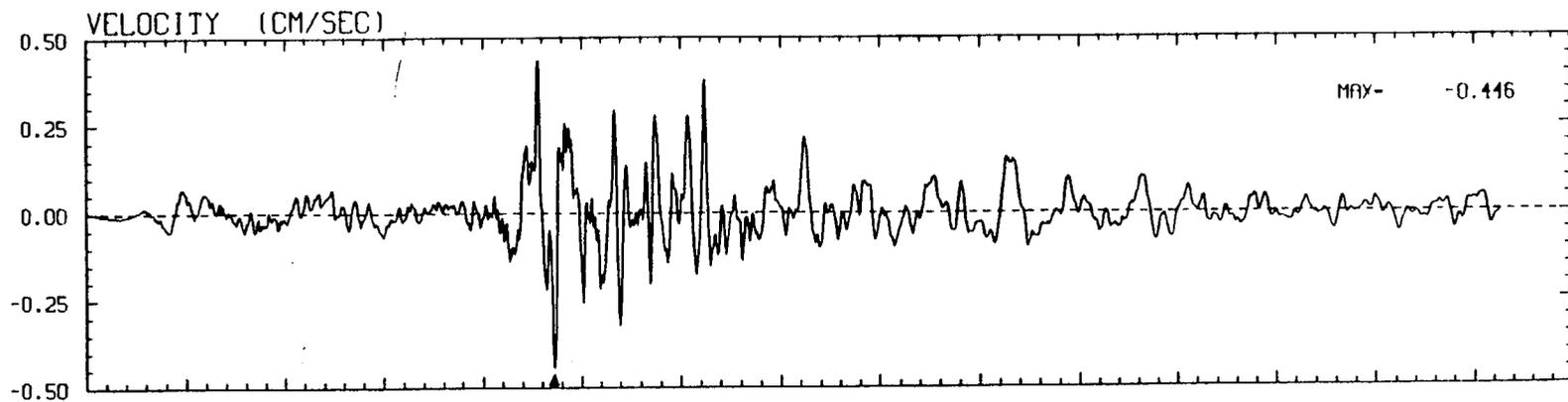
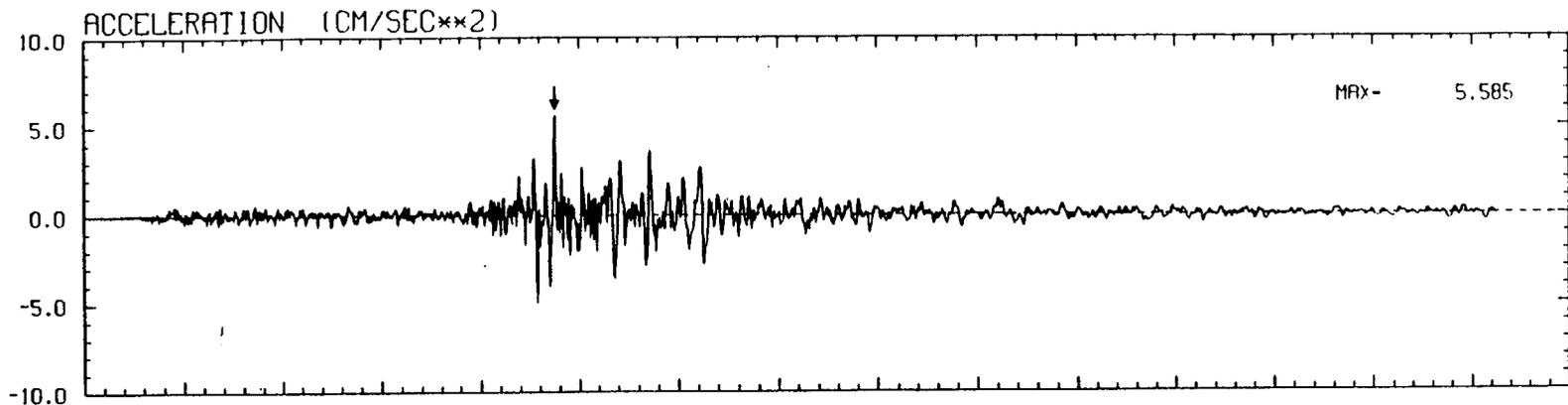
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 19 CH 2 NORTH
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 19 CH 3 WEST
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

AMPLITUDE



TIME (SEC)

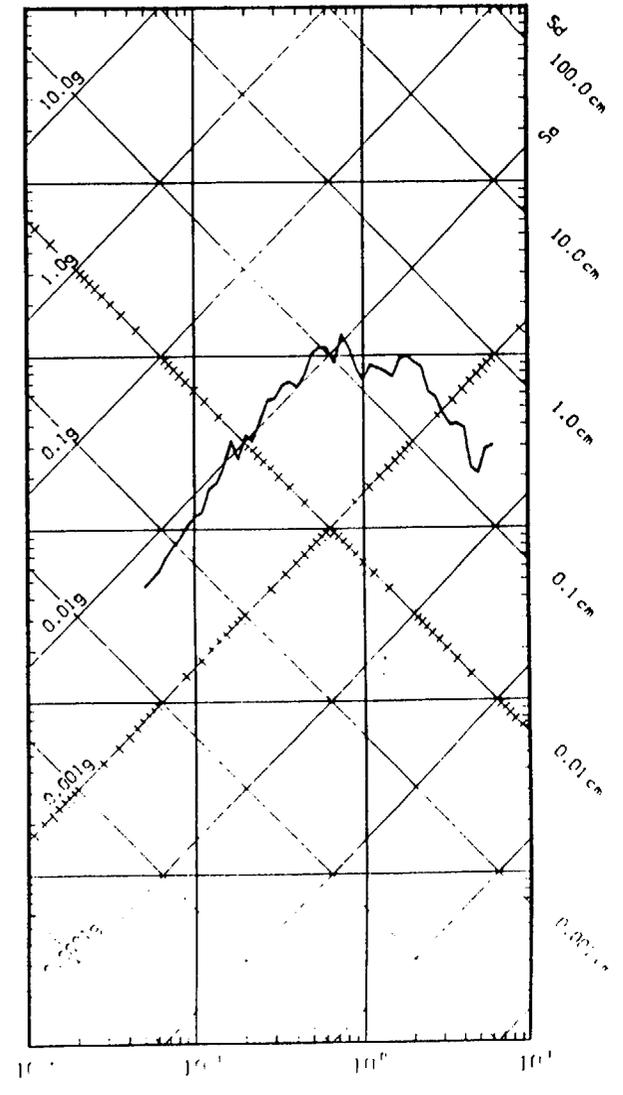
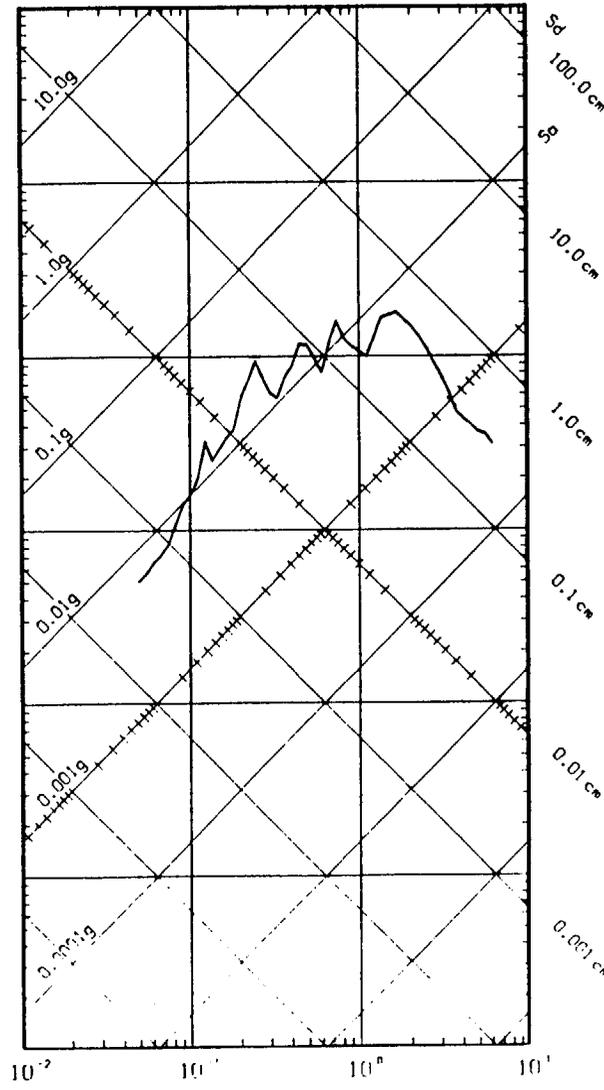
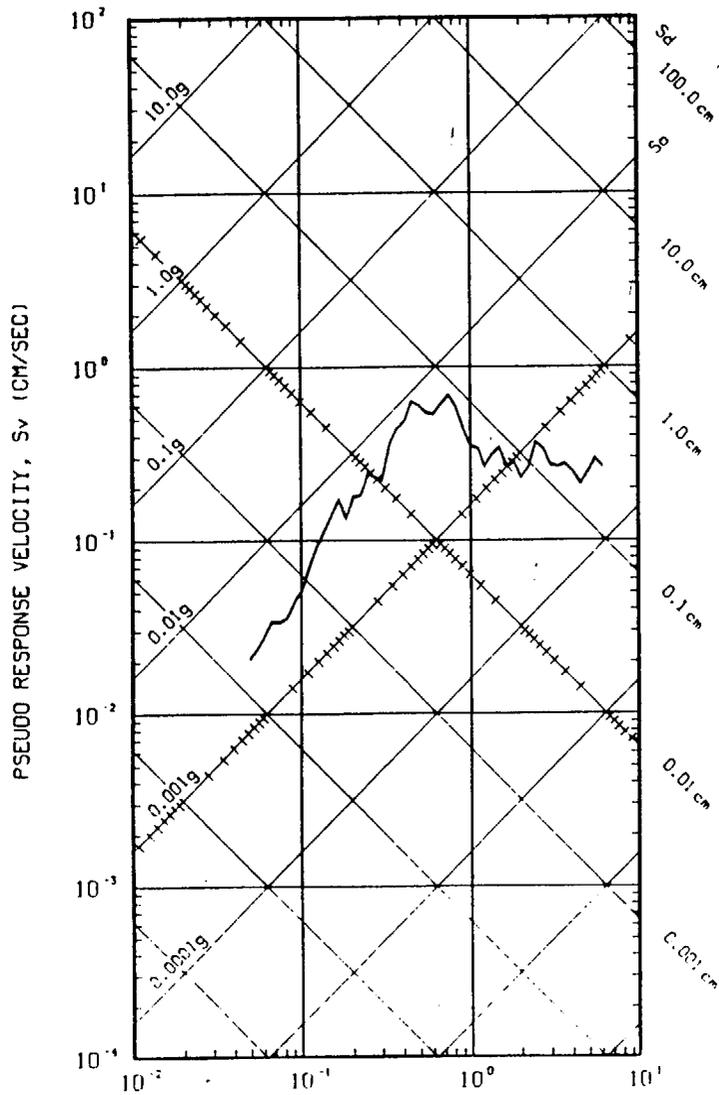
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 19

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA

CH 1 DOWN

CH 2 NORTH

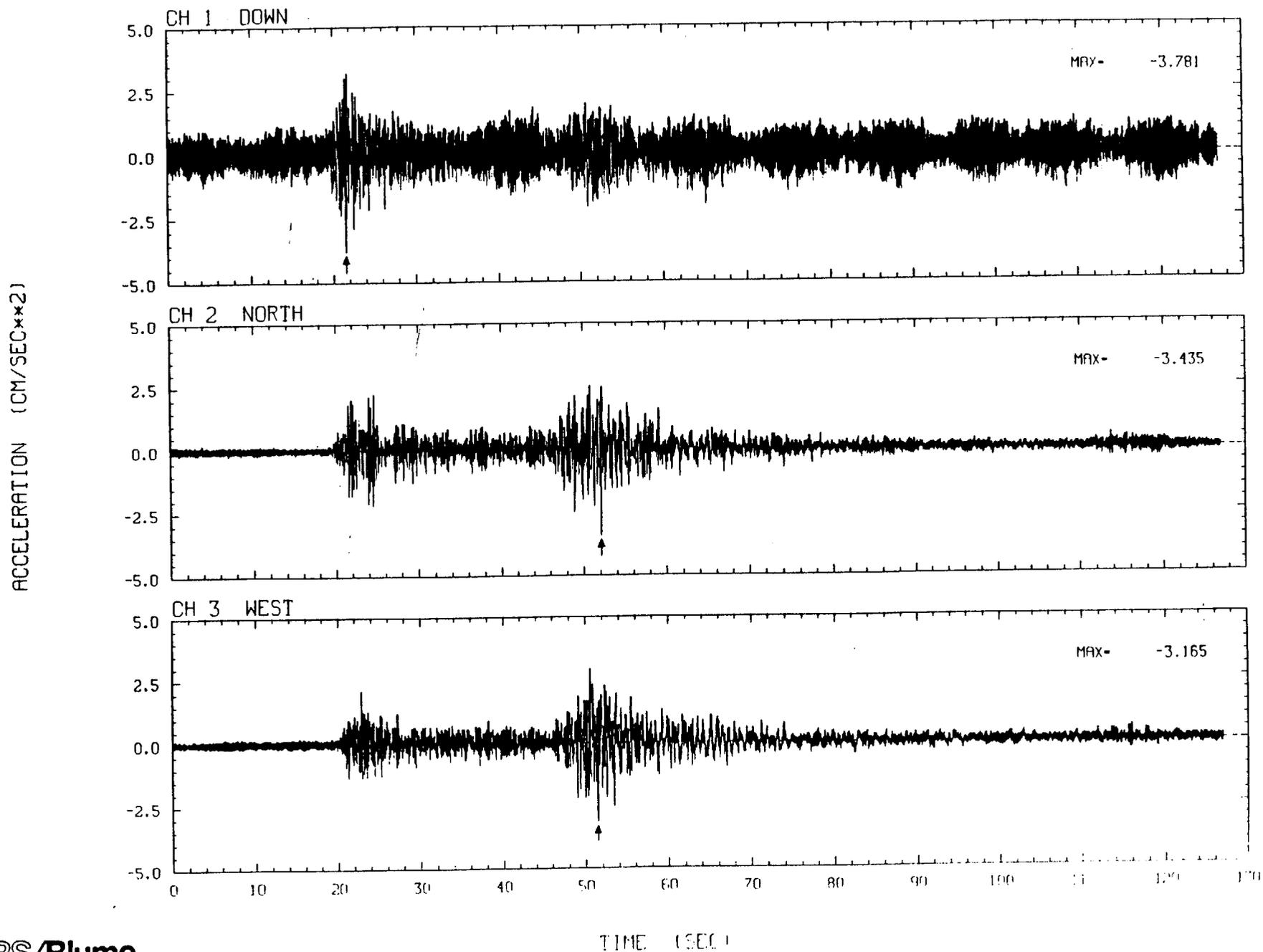
CH 3 WEST



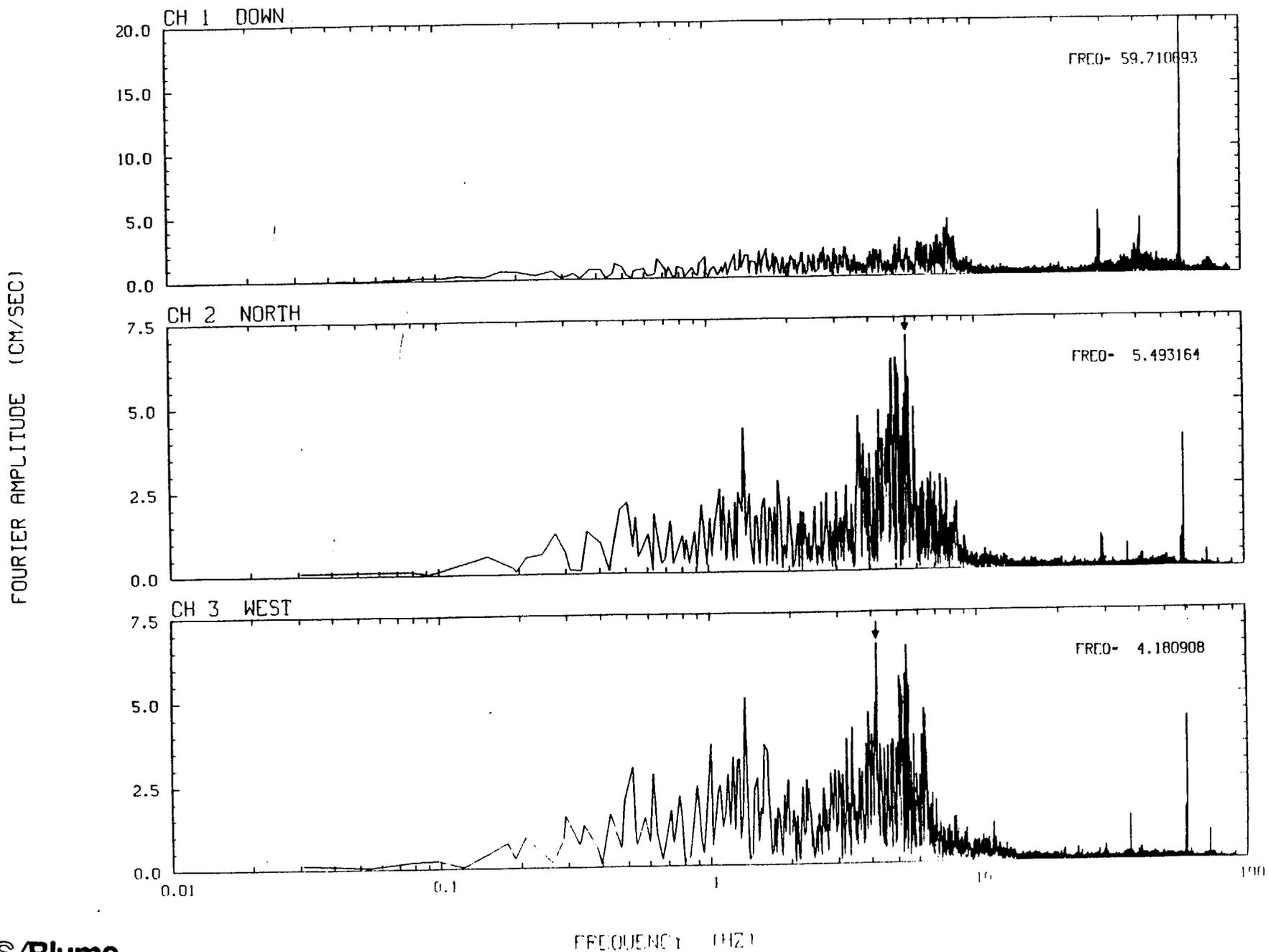
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 20

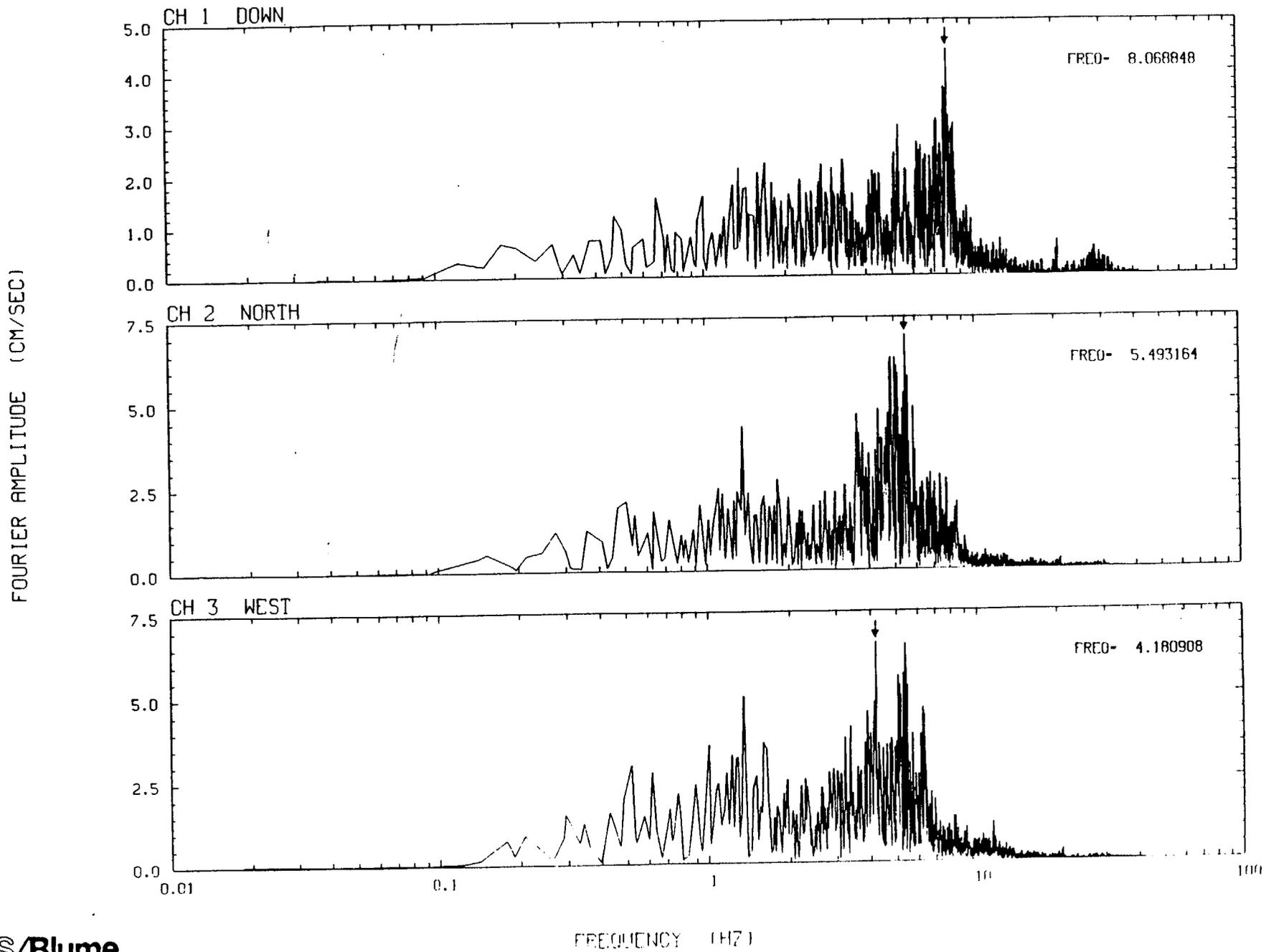
UNCORRECTED ACCELERATION TIME HISTORIES



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 20
UNCORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION

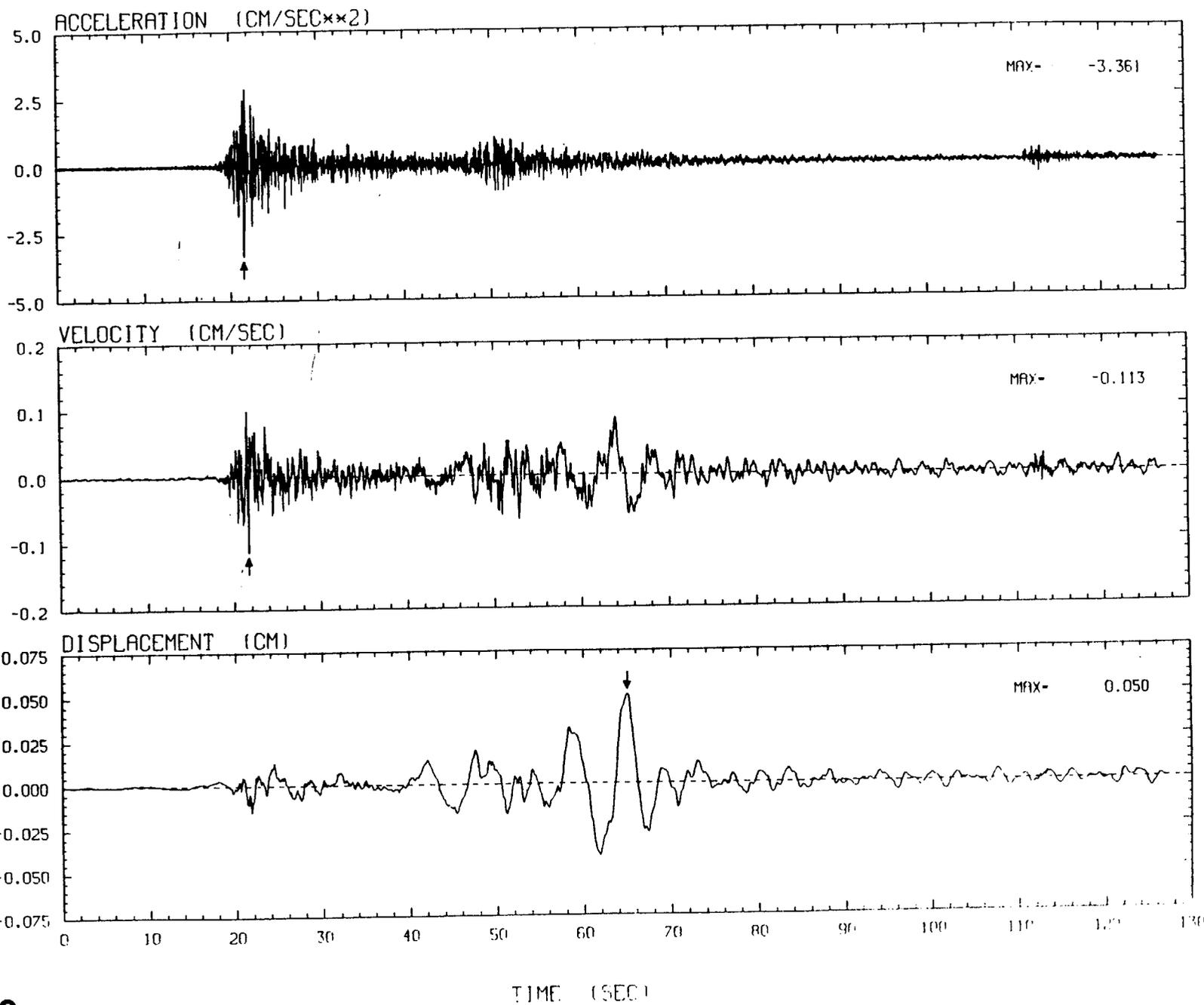


LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 20
CORRECTED FOURIER AMPLITUDE SPECTRA OF ACCELERATION



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 20 CH 1 DOWN
CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT
NOTCH FILTER (29.51-29.57, 29.60-29.67HZ)

AMPLITUDE



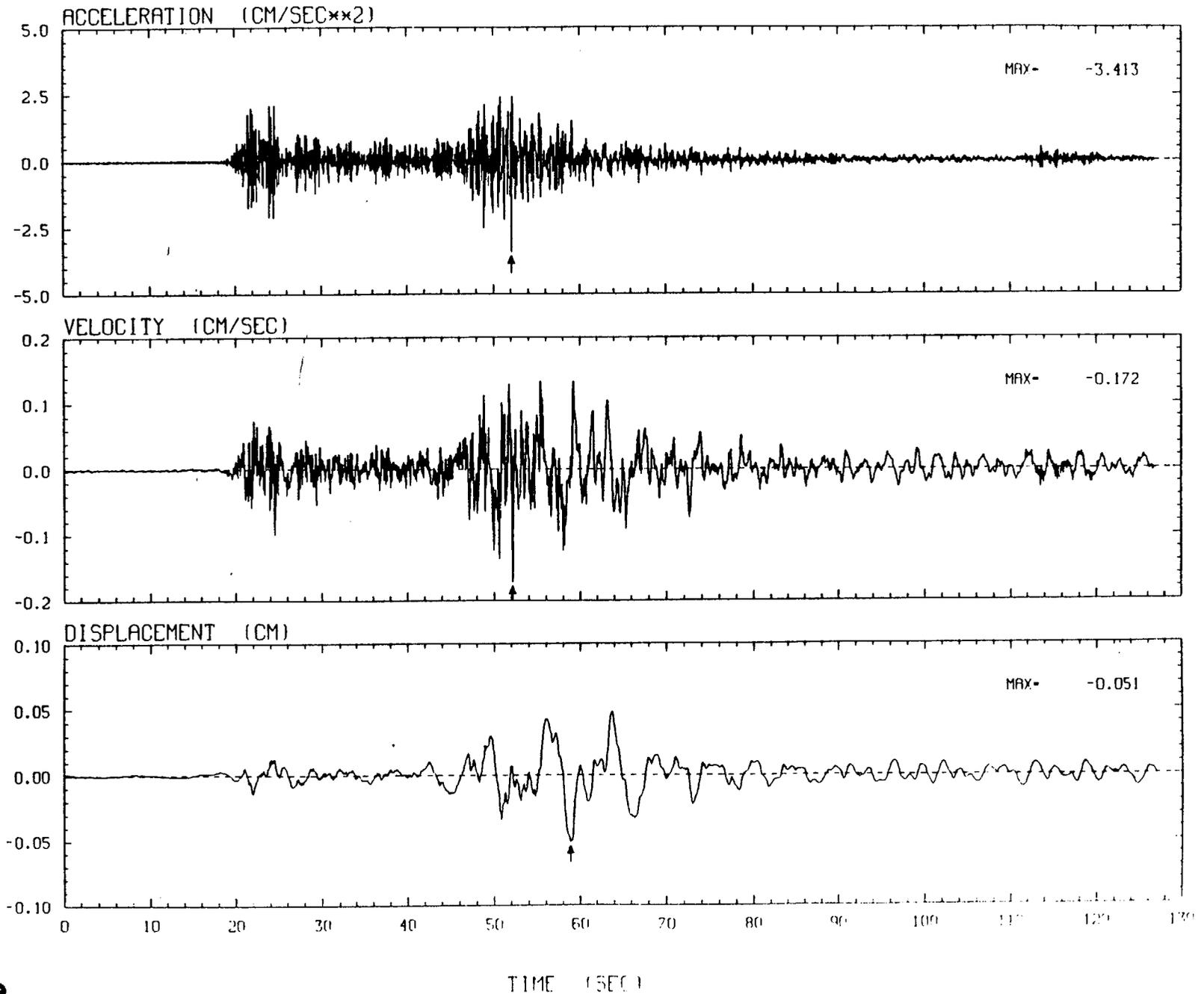
LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92

STATION NO. 20 CH 2 NORTH

CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

NOTCH FILTER (29.51-29.57, 29.60-29.67HZ)

AMPLITUDE



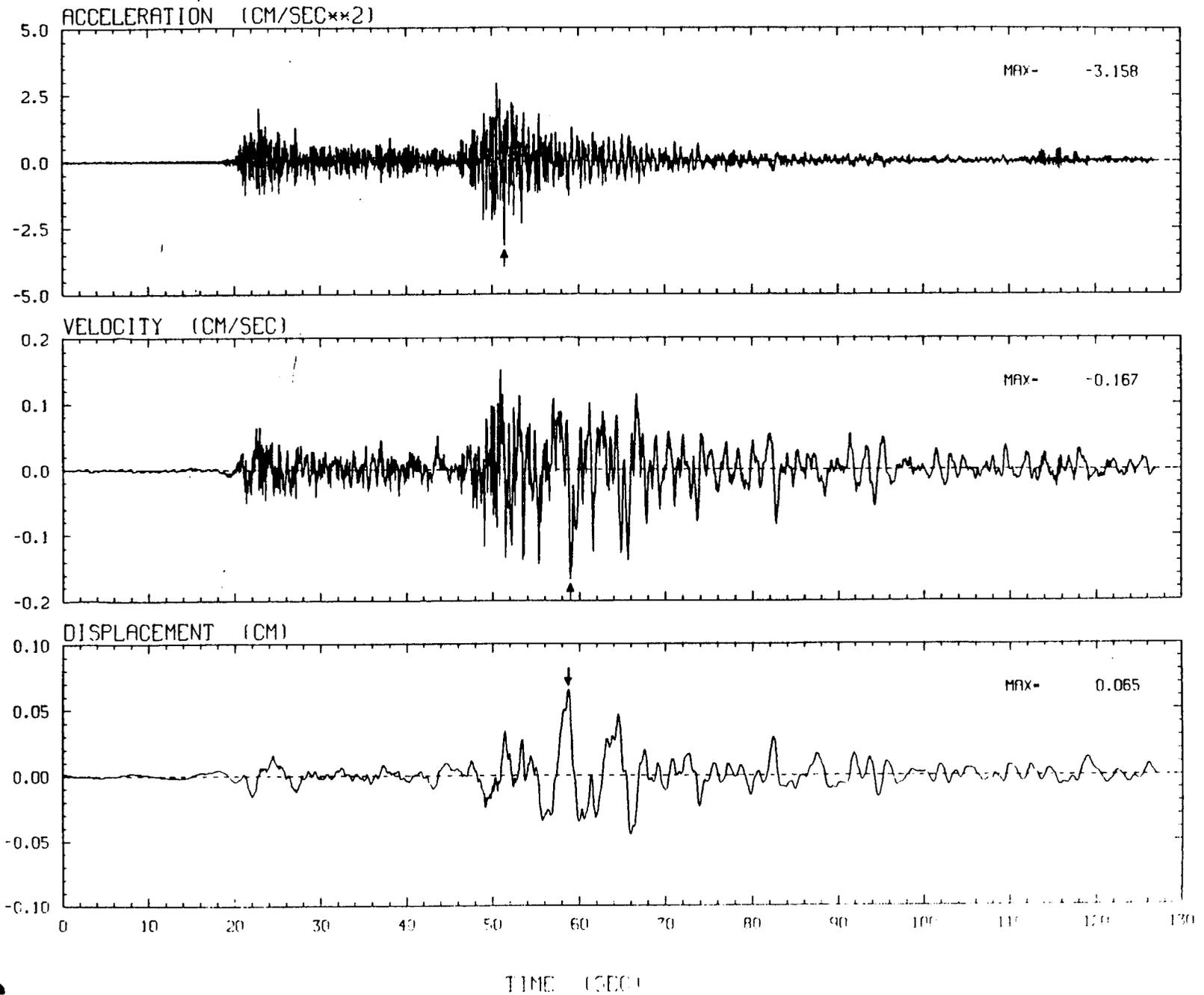
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STATION NO. 20 CH 3 WEST

CORRECTED ACCELERATION, VELOCITY & DISPLACEMENT

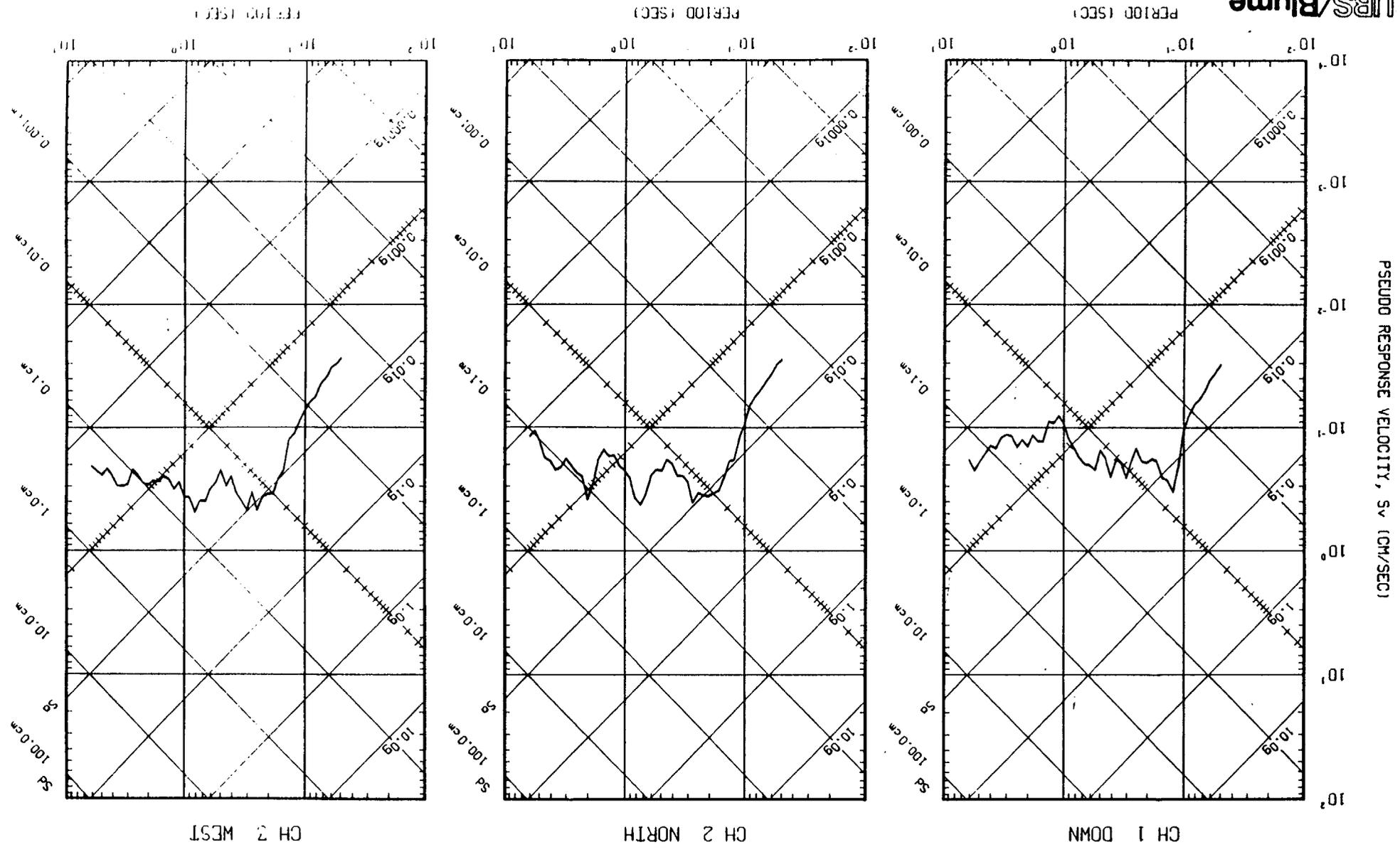
NOTCH FILTER (29.51-29.57, 29.60-29.67HZ)

AMPLITUDE



LITTLE SKULL MOUNTAIN EARTHQUAKE 6/29/92
STATION NO. 20

5 PCT DAMPED PSEUDO VELOCITY RESPONSE SPECTRA



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