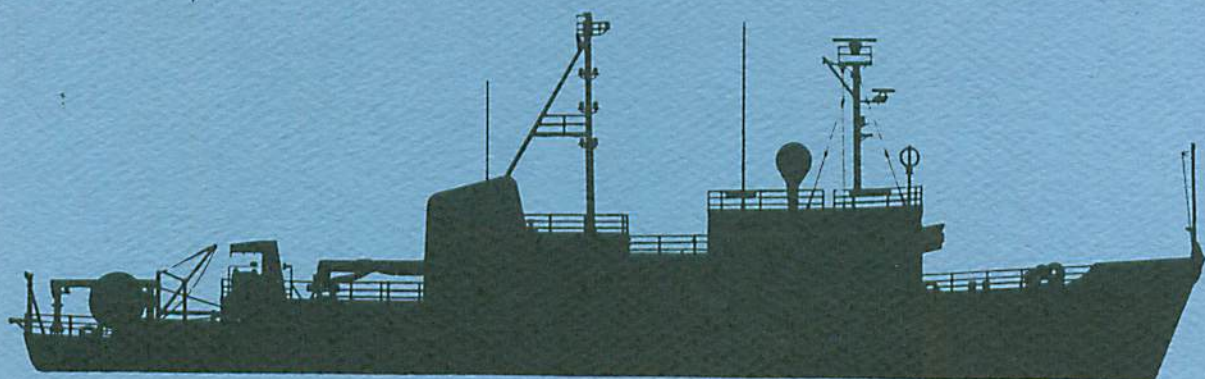


MCS



ROBERT D. CONRAD

LAMONT-DOHERTY GEOLOGICAL OBSERVATORY

COLUMBIA



UNIVERSITY

CRUISE C2902

LAMONT DATA REDUCTION CRUISE SUMMARY

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CRUISE: C2902

START: 14 February 88 (045) Punta Arenas, Chile

END: 29 February 88 (060) Punta Arenas, Chile

PURPOSE: Multichannel Seismic (MCS)

CHIEF SCIENTIST(S): Dr. John Mutter and Dr. Peter Buhl, both L-DGO

DATA REDUCTION: Tom Aitken and Robert Blaes Jr.

SPEED AND HEADING:

Instrument: Furuno CI-30 2-axis doppler speed log, Sperry MK-27 gyro

Logging: 3 second intervals

Checking: visual check of plot of data

Smoothing: mean value of all good values within the same minute

Notes:

day	time	comment
---	-----	-----
045	1457	starts
045	1457-2359	on bottom tracking
046	0000-2301	on bottom tracking
047	1341-1402	on bottom tracking
049	2051-2359	on bottom tracking
050	0000-0457	on bottom tracking
050	0223-0443	on and off during this period
050	1313-1315	on bottom tracking
050	2146-2206	on bottom tracking
051	0303-1307	on bottom tracking
051	2110-2145	gap
051	2220-2222	on bottom tracking
051	2243-2359	on bottom tracking
052	0000-0327	on bottom tracking
052	0345-2359	on bottom tracking
052	0328-0344	gap
053	0000-0745	on bottom tracking
059	0750-0958	on bottom tracking
059	1631-2359	on bottom tracking
060	0000-1907	on bottom tracking
060	1907	ends

Furuno is normally on water tracking, bottom tracking can only be used in shallow water.

TRANSIT SATELLITE FIXES:

Instrument: Magnavox MX-1107RS dual frequency Transit satellite receiver

Logging: all fixes

Checking: reject receiver flagged fixes, fixes with high drifts in navigation and fixes producing Eotvos correction errors in gravity

GPS SATELLITE FIXES:

Instrument: Magnavox T-Set Global Positioning System receiver

Logging: 30 second intervals

Checking:

minimum number of sats: 2

dilution of precision maximum: north = 8.0, east = 8.0

carrier signal-noise ratio minimum: 35.0

standard deviation maximum: north = 10.0, east = 10.0

time step maximum: 3

speed maximum: 15.0 knots

compared GPS speed and course with Furuno smooth speed and heading

compared positions with Transit-Furuno navigation

reject fixes with high drifts in navigation

reject fixes producing Eotvos correction errors in gravity

Interpolation: interpolated positions at 00, 30 seconds of each minute

Smoothing: smoothed interpolated positions with 9 point running average

NAVIGATION:

A "1 minute navigation" is produced from the above sources. Acceptable fixes are merged at 1 per minute with priority given to GPS, then to Transit. The smooth speed and heading data is used to fill any gaps of 2 minutes or longer between fixes by computing 1 minute DR'ed positions corrected for set and drift between fixes. The DR'ed positions are produced at 00 seconds of each minute.

Lamont database: 1 minute navigation.

Notes:

Navigation starts on 14 February (045) at 1512:48 transit sat fix,
and ends on 29 February (060) at 1815:36 transit sat fix.

BATHYMETRY:

Instrument: Raytheon LSR 3.5 kilohertz Precision Depth Recorder (PDR)

Logging: readings in meters from continuous PDR paper records

Checking: visual check of plot of data

Lamont database: PDR record depth values at 5 minute intervals.

Depth is stored in fathoms.

Notes:

day	time	comment
045	1515	starts
055	2300	ends, PDR turned off

MAGNETICS:

Instrument: Varian V75 magnetometer

Logging: 20 second intervals

Checking: visual check of plot of data

Reference field: International Geomagnetic Reference Field 1985 (IGRF 1985)

model of the main field at 1985.0 and a predictive model of the

secular variation for adjusting to dates between 1985.0 and 1990.0

Lamont database: interpolated total intensity value at 00 seconds of each minute.

Notes:

day	time	comment
045	2240	starts
047	2201-2359	magnetometer out of water
048	0000-2359	continues out of water
049	0000-0111	continues out of water
050	1804-2359	magnetometer out of water
051	0000-1638	continues out of water
052	1335-1346	gap
053	1241	ends, MCS eel lost, searching for it

GRAVITY:

Instrument: Bell Aerospace BGM-3 marine gravity meter
Logging: 1 minute intervals
Merge with navigation: calculate Eotvos correction and Free Air Anomaly.
Checking: visual check of plot of data to determine satisfactory Eotvos
corrections, reject spikes of data at turns.
Velocity smoothing: 5 point running average for all days (045-060)
Drift rate: .0328 mgals per day
Dc shift: 2.8 mgals
Lamont database: Free Air Anomaly value at 00 seconds of each minute.
1930 International gravity formula.

Notes:

The drift rate is the same as for c2811, c2901, and c2902.
This drift rate is based on a tie in Miami on 7 December 1987,
in which the meter was .57 mgals high and the 13 February 1988
tie, when the meter was 2.8 mgals high. This gives an increase
of 2.23 mgals in 68 days, or +.0328 mgals per day.

PRE-CRUISE GRAVITY TIE-IN:

Port: Punta Arenas, Chile
Date: 12-13 February 1988
Operator: Joe Stennett
Gravity Meter: LaCoste-Romberg model G #70
Reference Station: Two ties were made: The Filtration Plant (12 Feb)
and the Port Administration Building (13 Feb).
Pier/Ship's position: The Conrad BGM was 100 meters from the end of the
Port Administration pier and 5 meters below the pier.

The Filtration Plant:

Ref. value	= 981315.9 mgals*
Pier to Ref tie	= -19.4 mgals
Pier value	= 981335.3 mgals
Pier + height corr	= 981335.3 + 1.5 = 981336.8 mgals
BGM Reading	= 981326.2 mgals

BGM READ 10.6 MGALS LOW

* (note: ACIC 0216-2 shows this as 981313.95 mgals)

The Port Administration Building:

Ref. value	= 981336.3 mgals
Ref to Pier tie	= -0.7 mgals
Pier value	= 981335.6 mgals
Pier + height corr	= 981335.6 + 1.5 = 981337.1 mgals
BGM Reading	= 981326.2 mgals

BGM read 10.9 mgals low

Weighted (for the Port Admin Bdg) average = BGM 10.8 mgals low.
It was considered that the reference values lacked the Potsdam
correction, in which case they would be high by 13.6 mgals.

Adjusting for this, the BGM would be 2.8 mgals on 13 February 88.

POST-CRUISE GRAVITY TIE-IN:

Port: Buenos Aires, Argentina

Date: 22 March 1988

Operator: Joe Stennett

Gravity Meter: LaCoste-Romberg model G #70

Reference Station: Instituto Geografico Militar building in San Martin

This is ACIC 0031-0 ref value of 979703.57 mgals

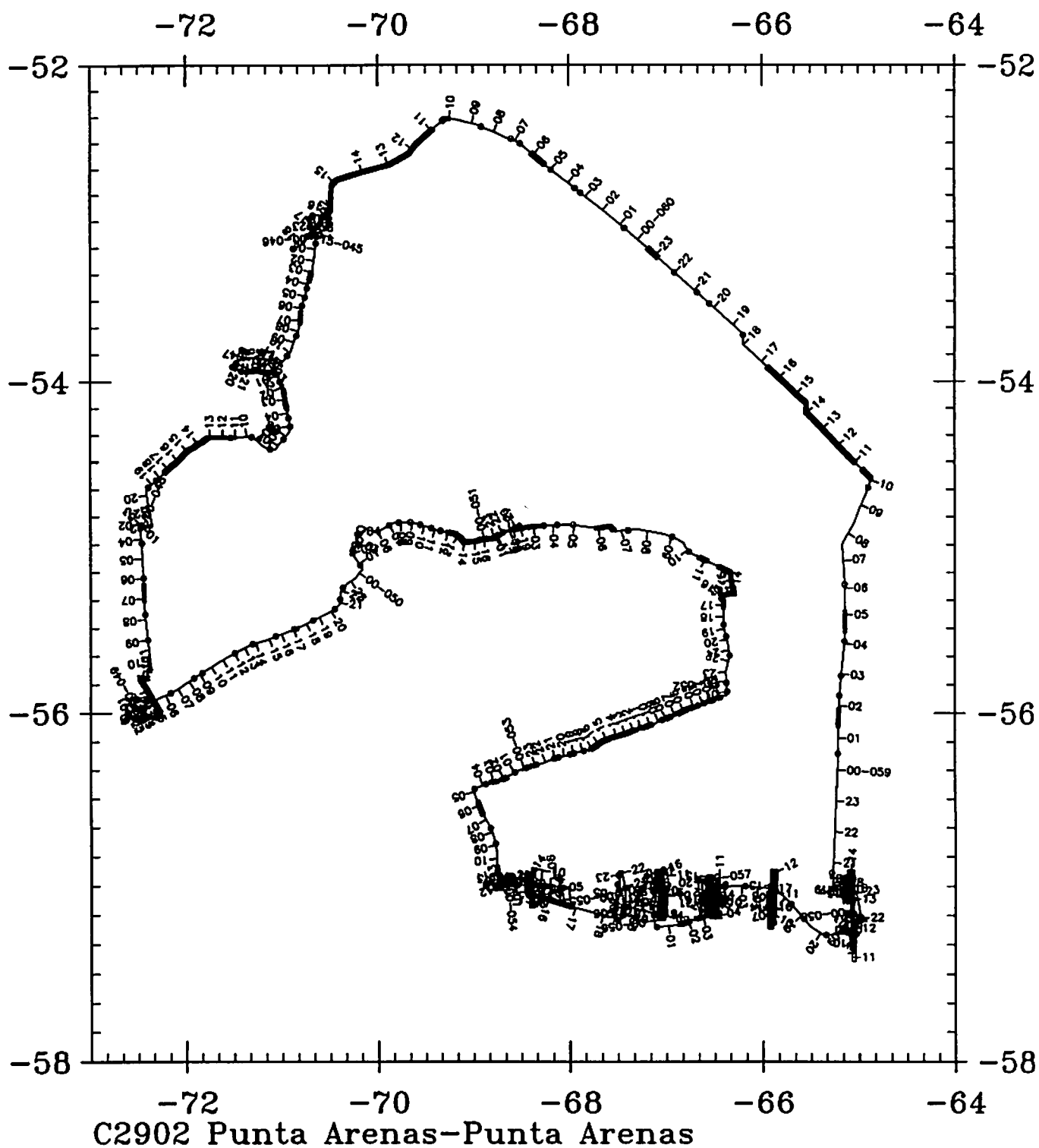
Pier/Ship's position: The ship was in dry dock

Notes:

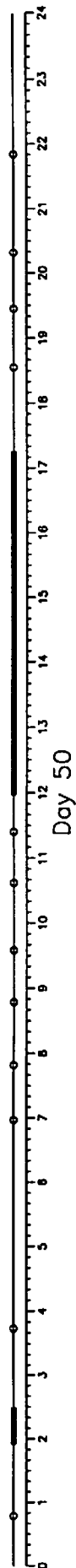
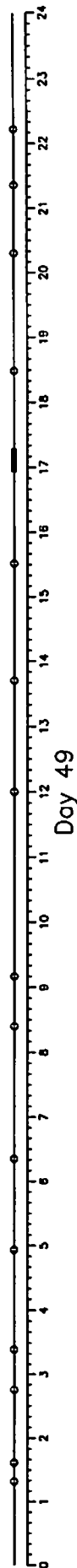
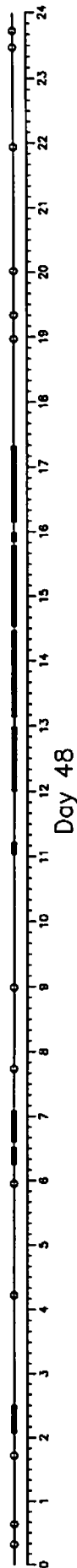
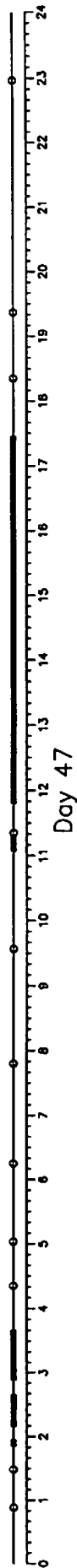
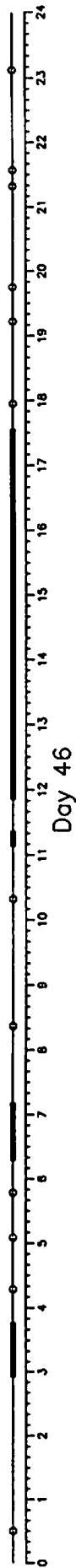
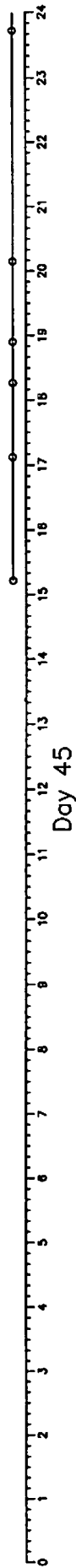
The post cruise tie-in was NOT used as the power had been turned off on the ship in dry-dock, which caused a "tear" in the recorded gravity. If this tie had been used, there would have been a negative drift rate. So, the drift rate of the meter from the good ties in Miami and Punta Arenas was used. The drift rate after the "tear" is also positive.

ADDITIONAL DATA SETS:

(1) BGM-3 gravity 10 second "counts"

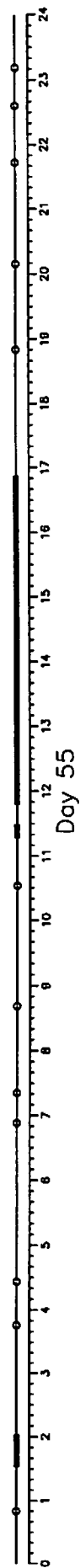
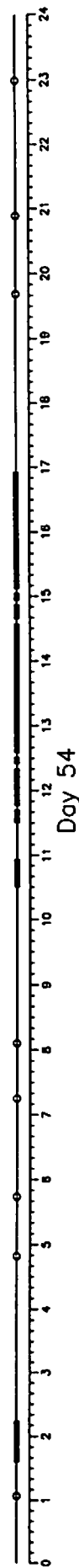
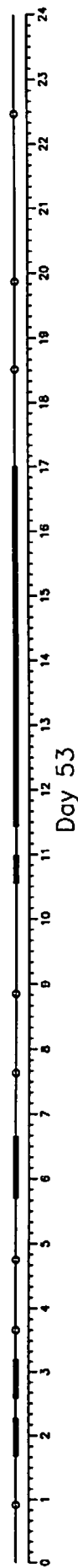
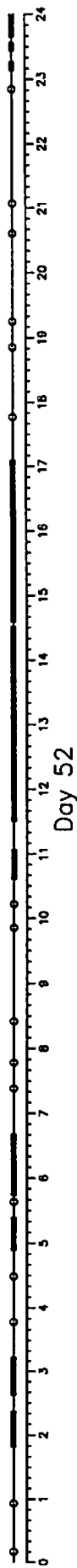
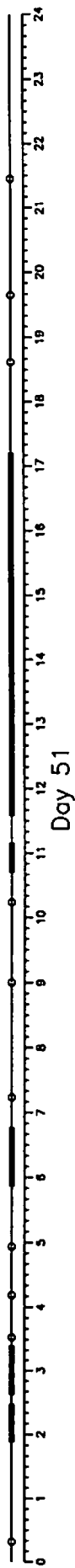


C2902 Punta Arenas—Punta Arenas
Lamont daily navigation line: x = GPS o = transit - = dr



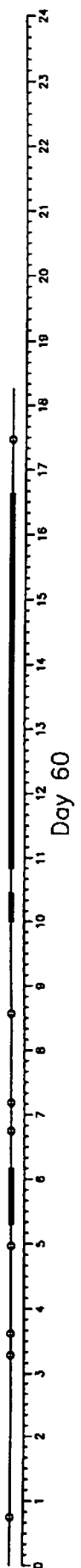
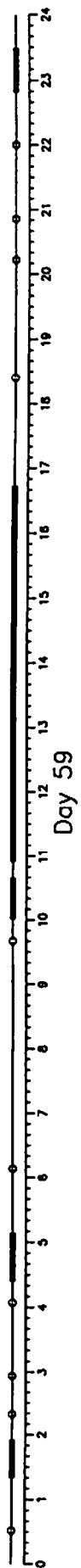
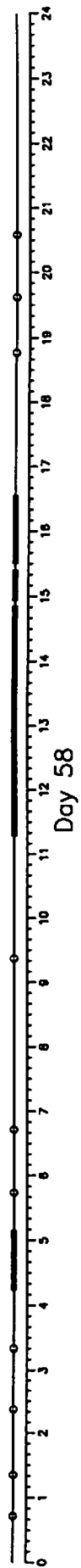
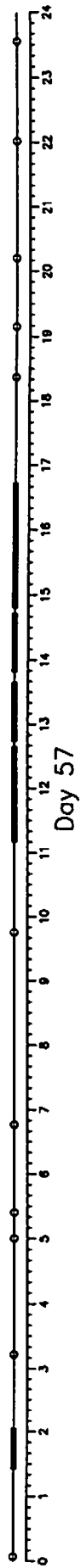
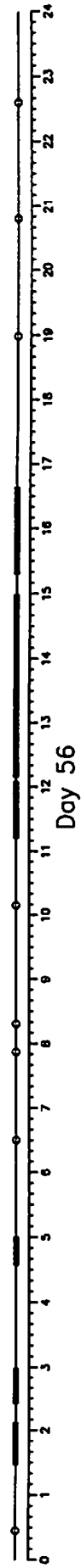
C2902 Punta Arenas--Punta Arenas

Lamont daily navigation line: x = GPS o = transit - = dr



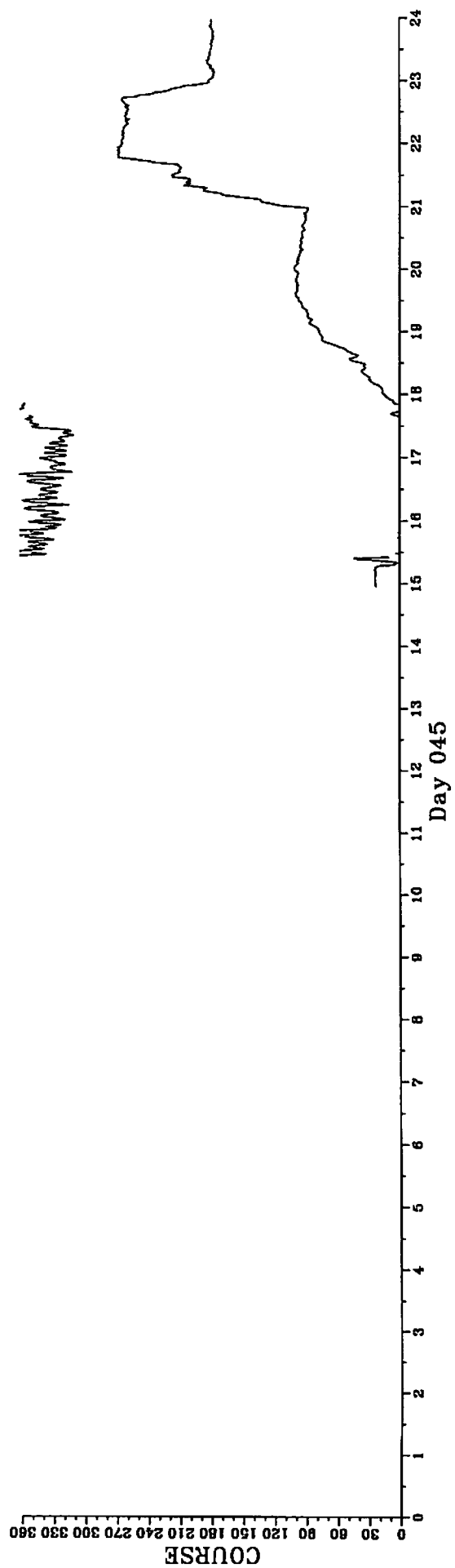
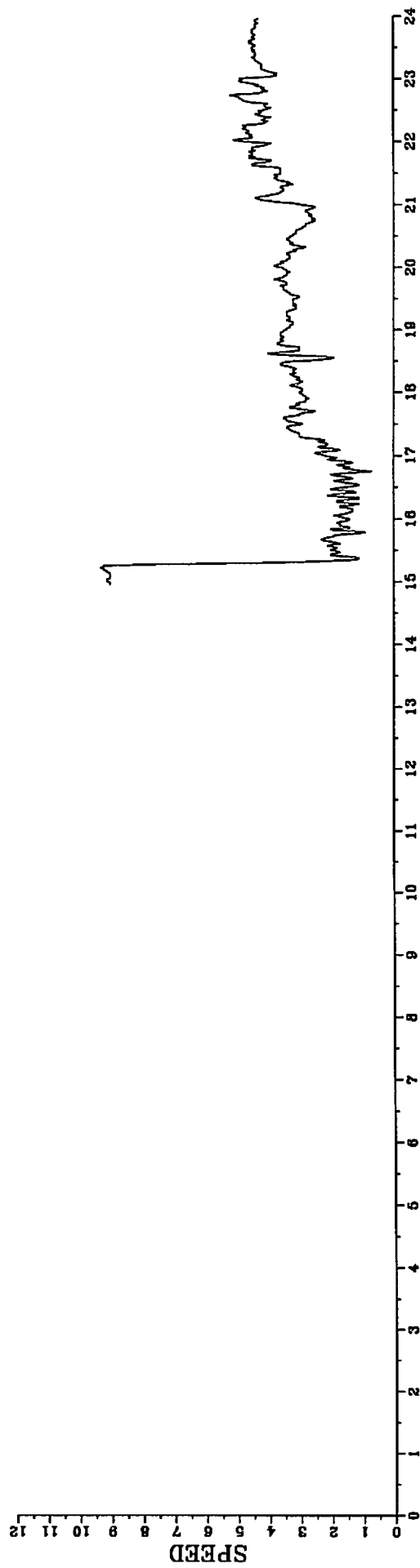
C2902 Punta Arenas--Punta Arenas

Lamont daily navigation line: x = GPS o = transit - = dr



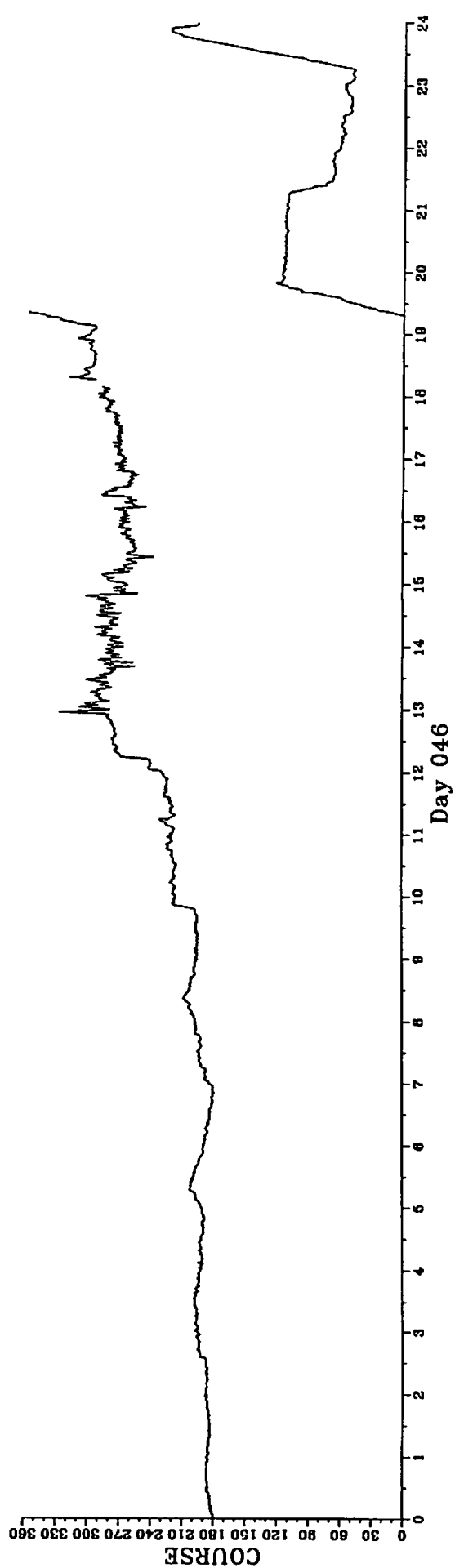
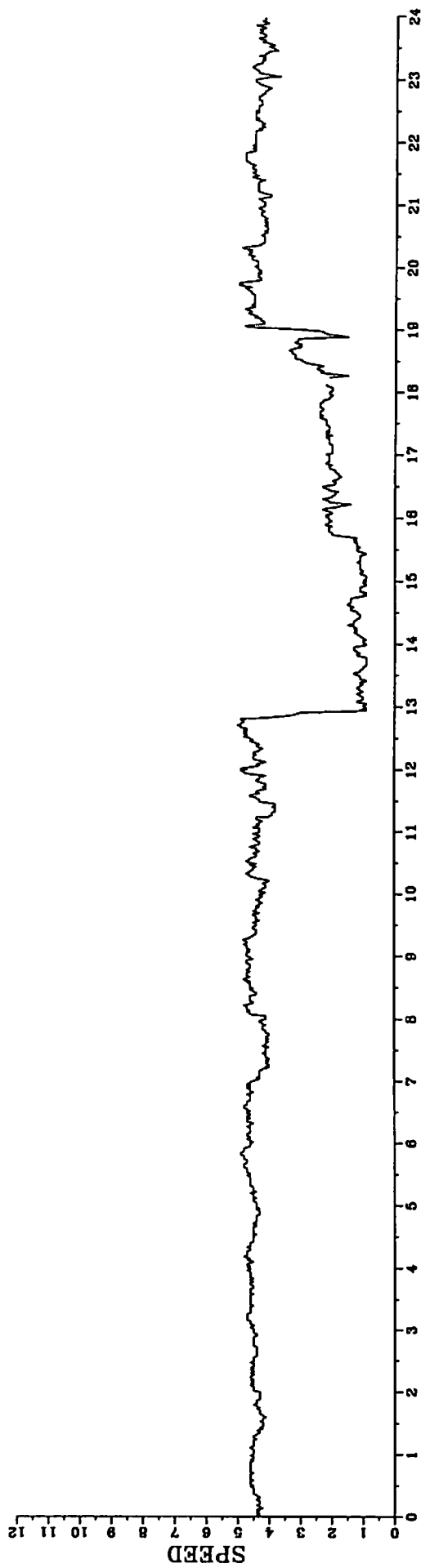
C2902 Punta Arenas-Punta Arenas Smooth Speed and Heading

Data file: 2902fu.s045



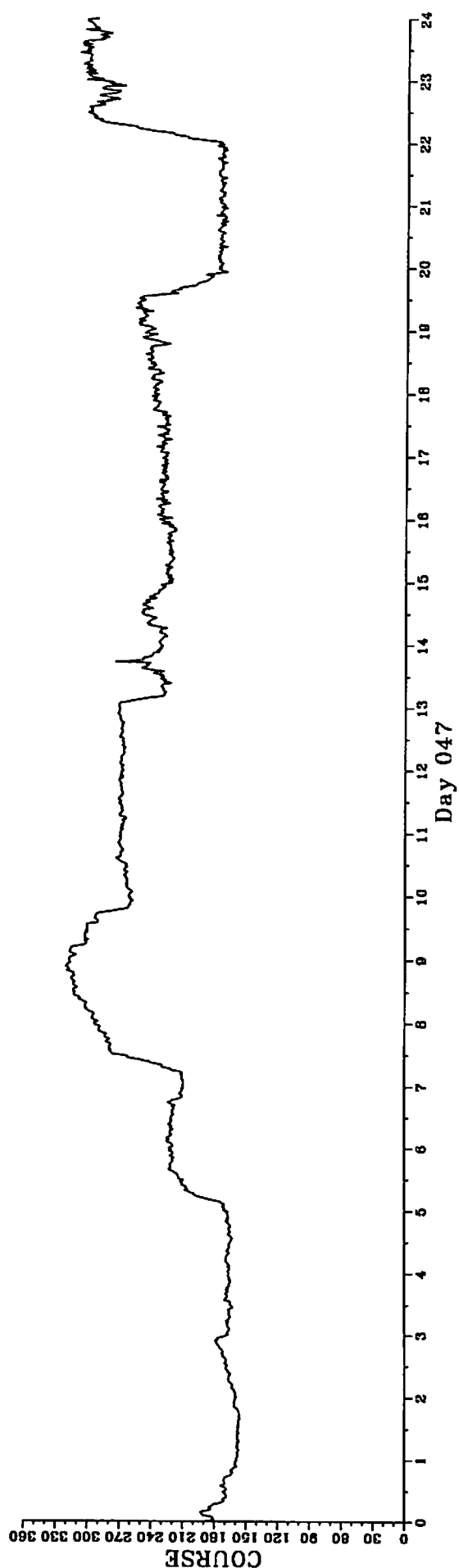
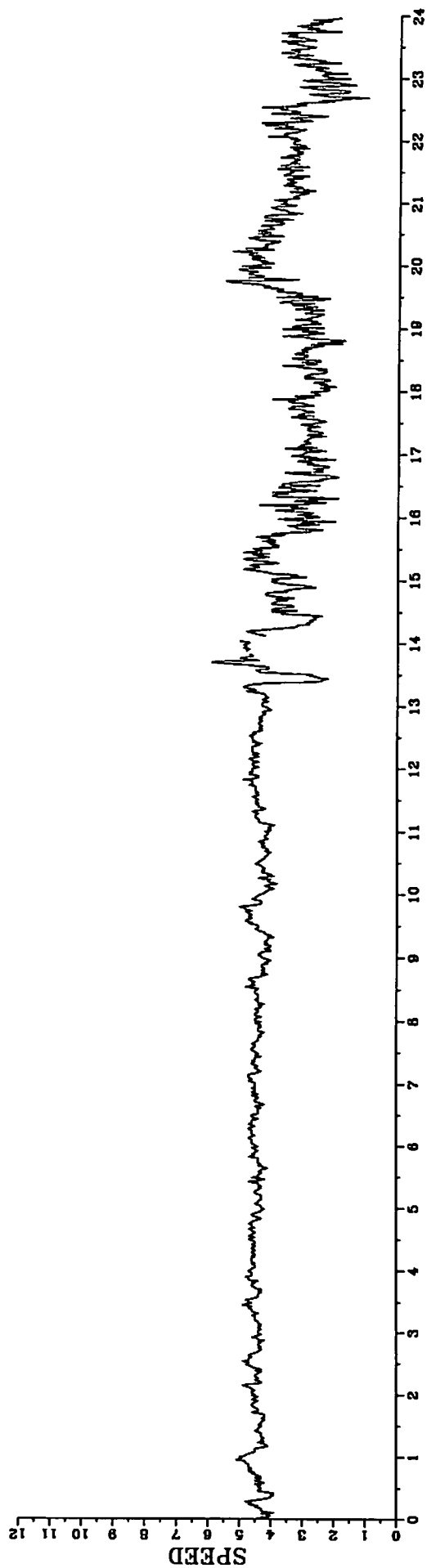
C2902 Punta Arenas-Punta Arenas Smooth Speed and Heading

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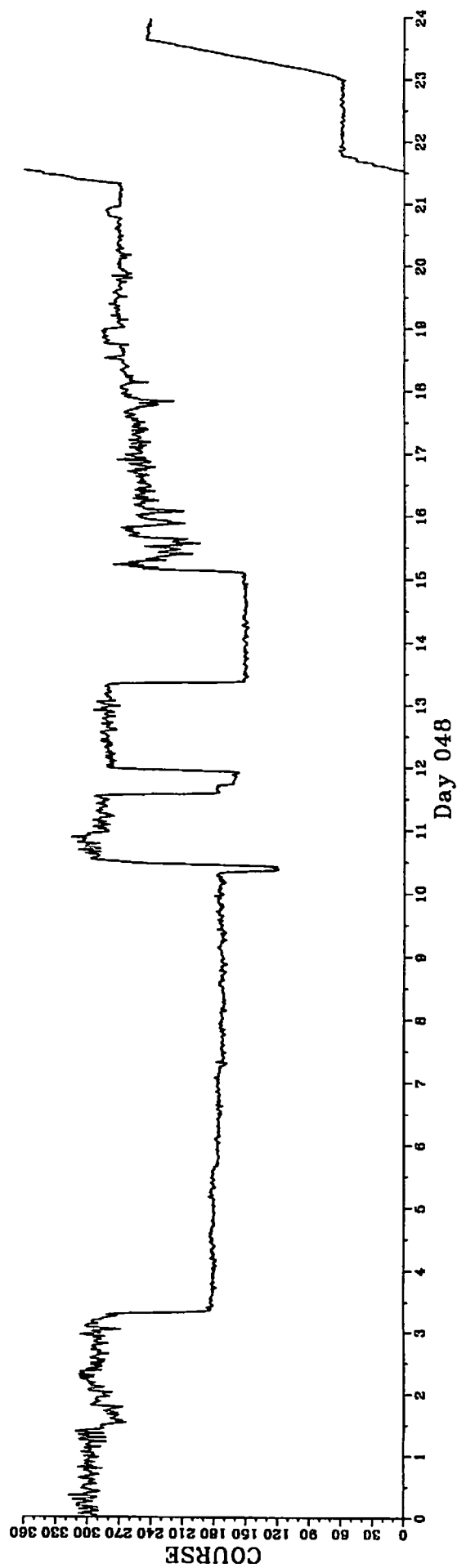
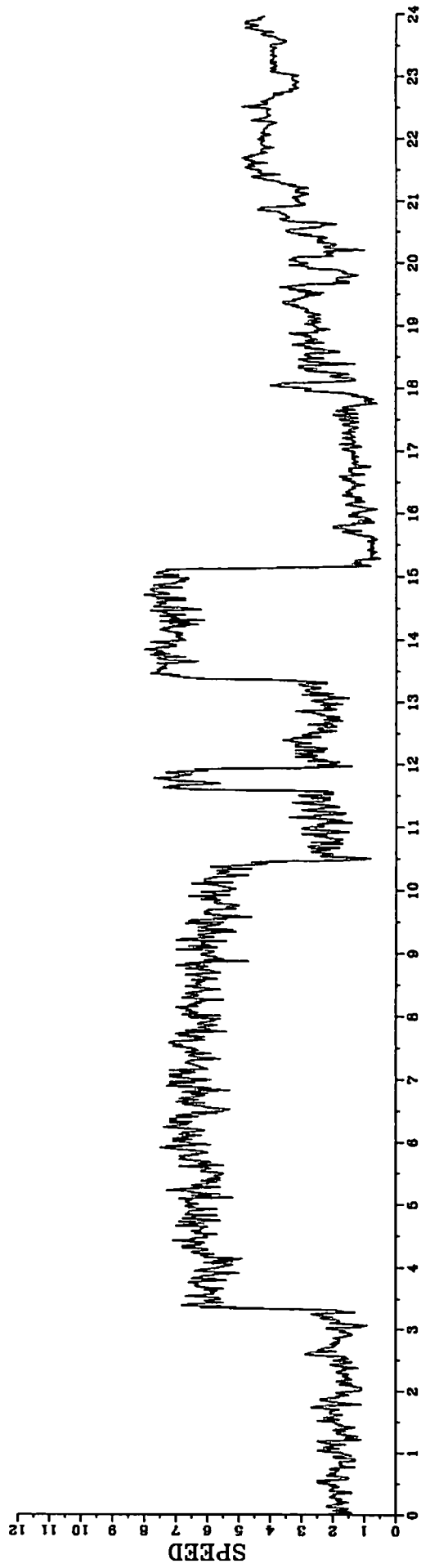
C2902 Punta Arenas-Punta Arenas Smooth Speed and Heading

Data file: 2902fu.s047



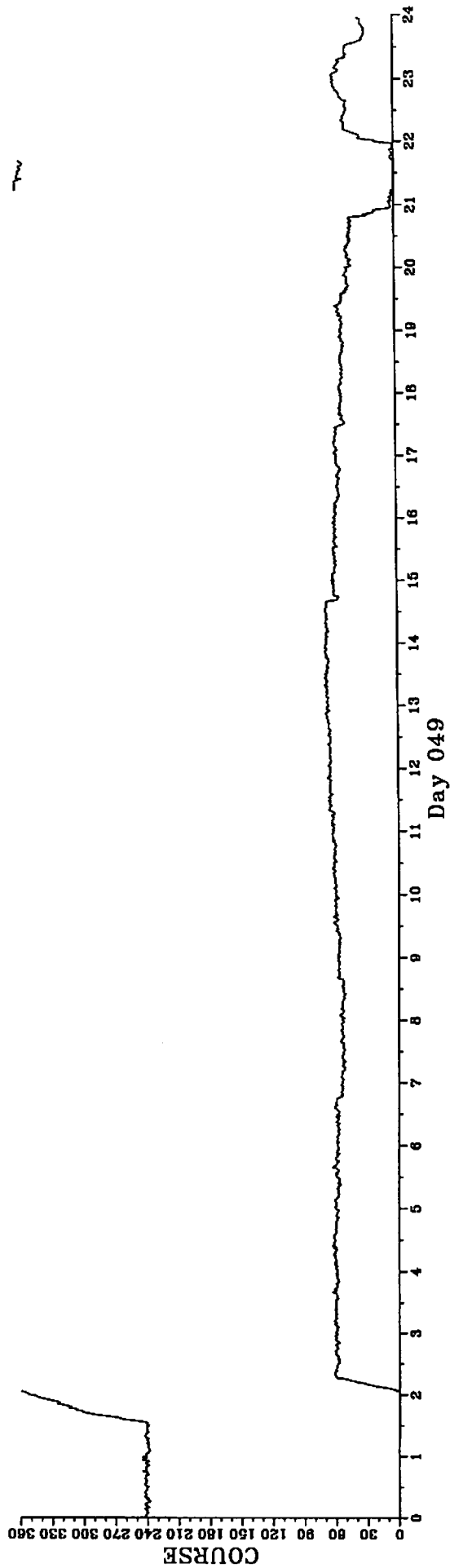
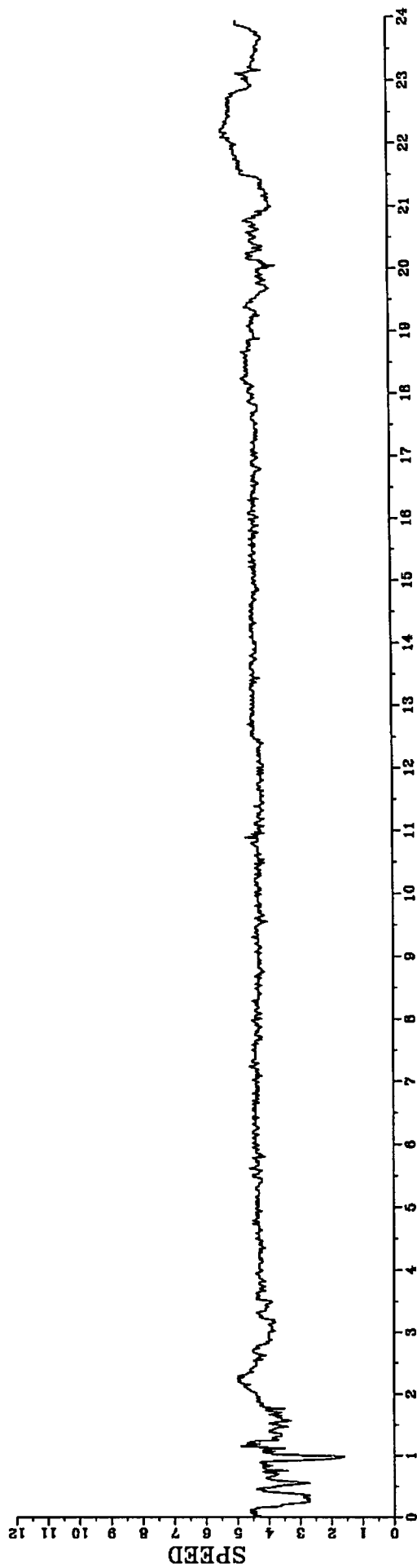
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Data file: 2902fu.s048



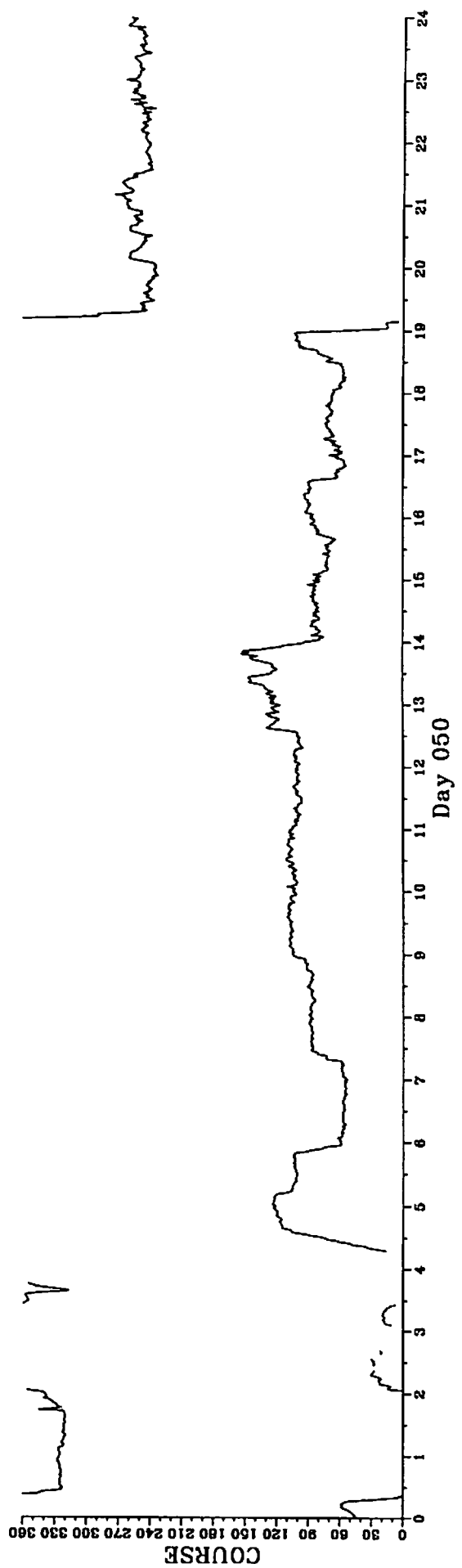
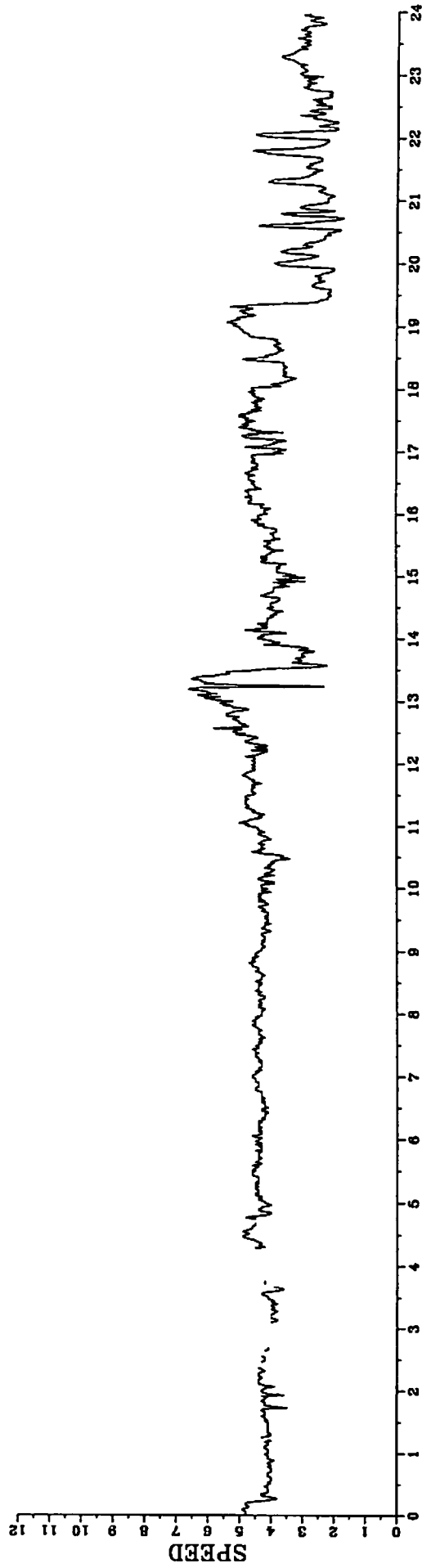
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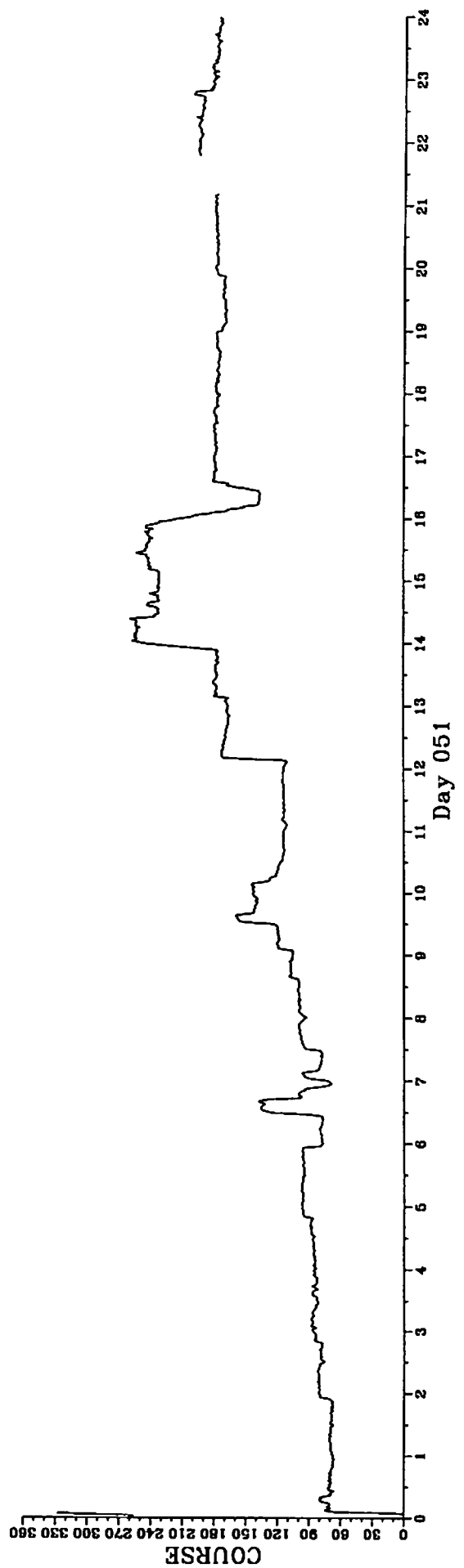
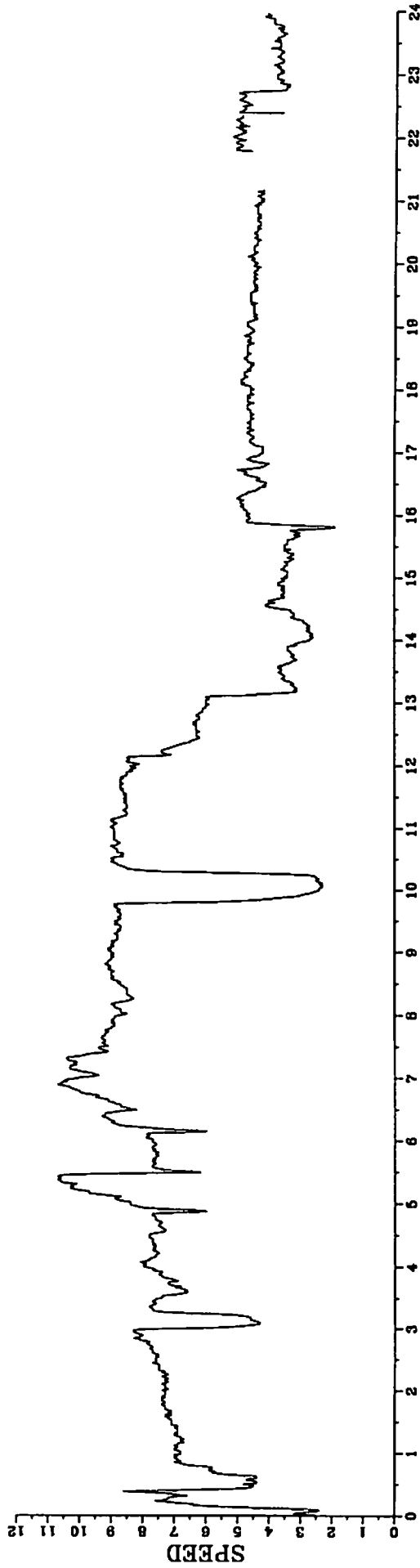
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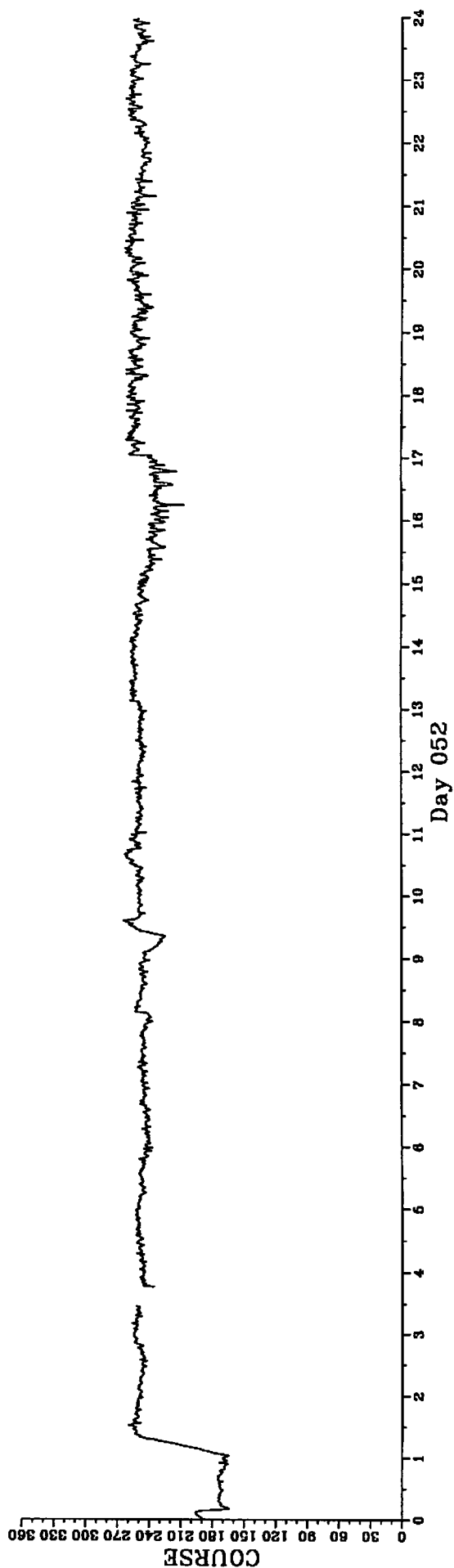
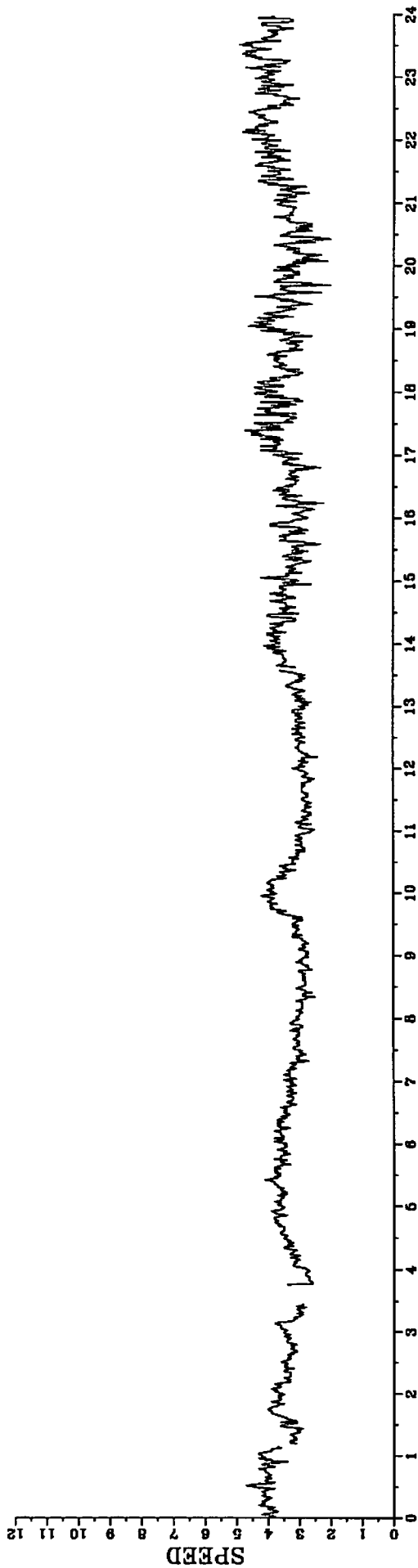
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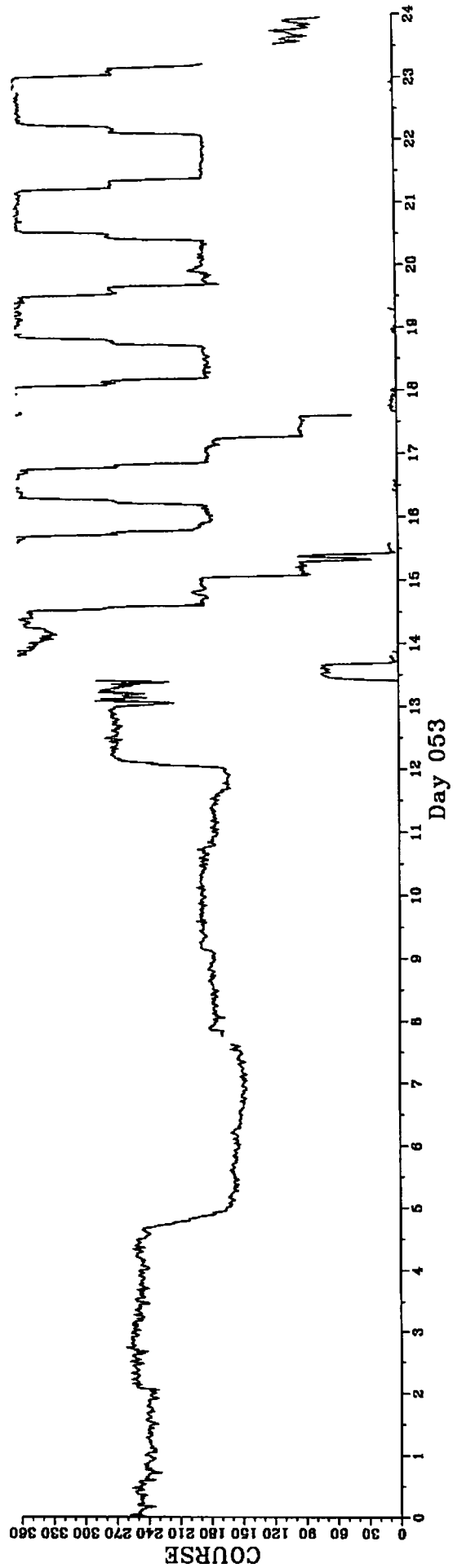
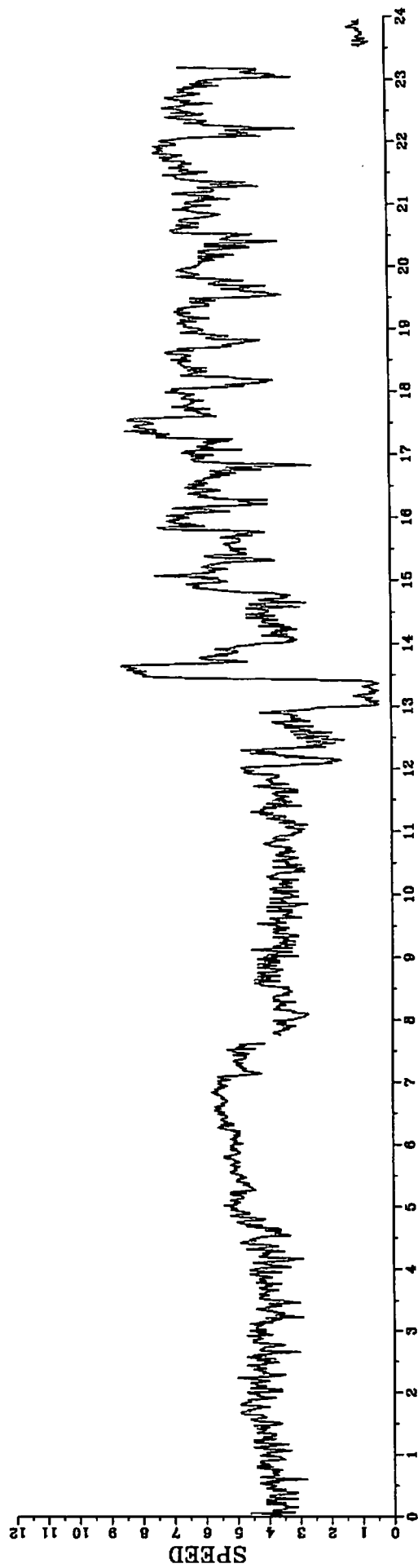
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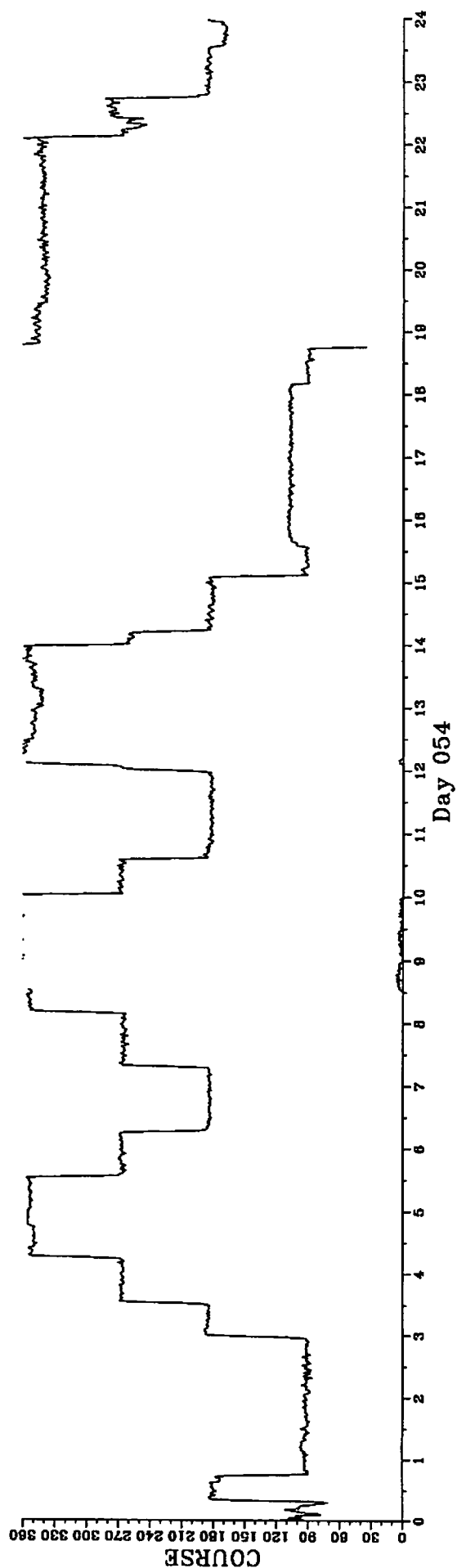
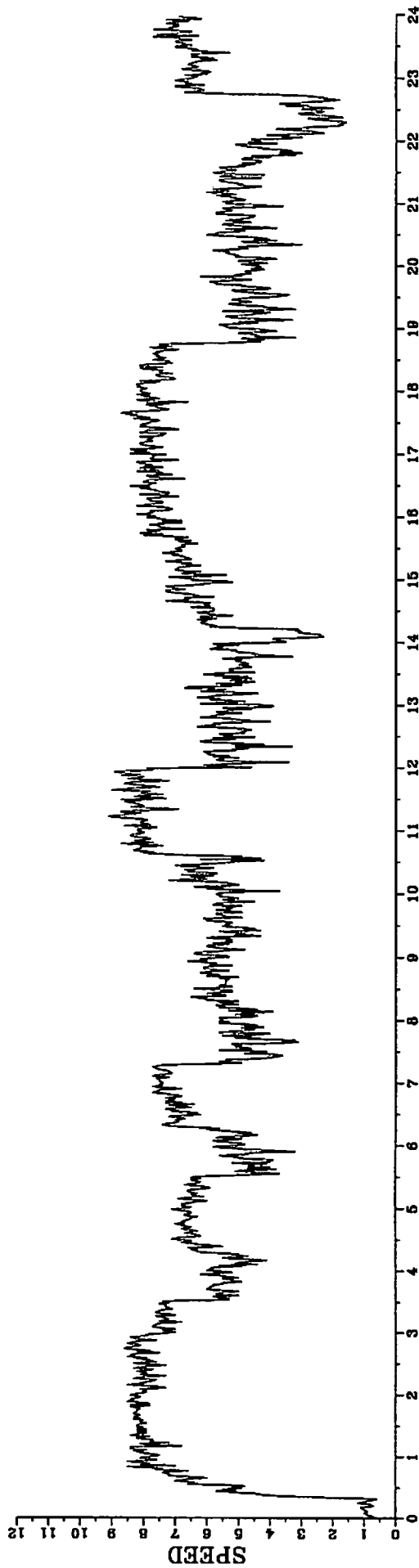
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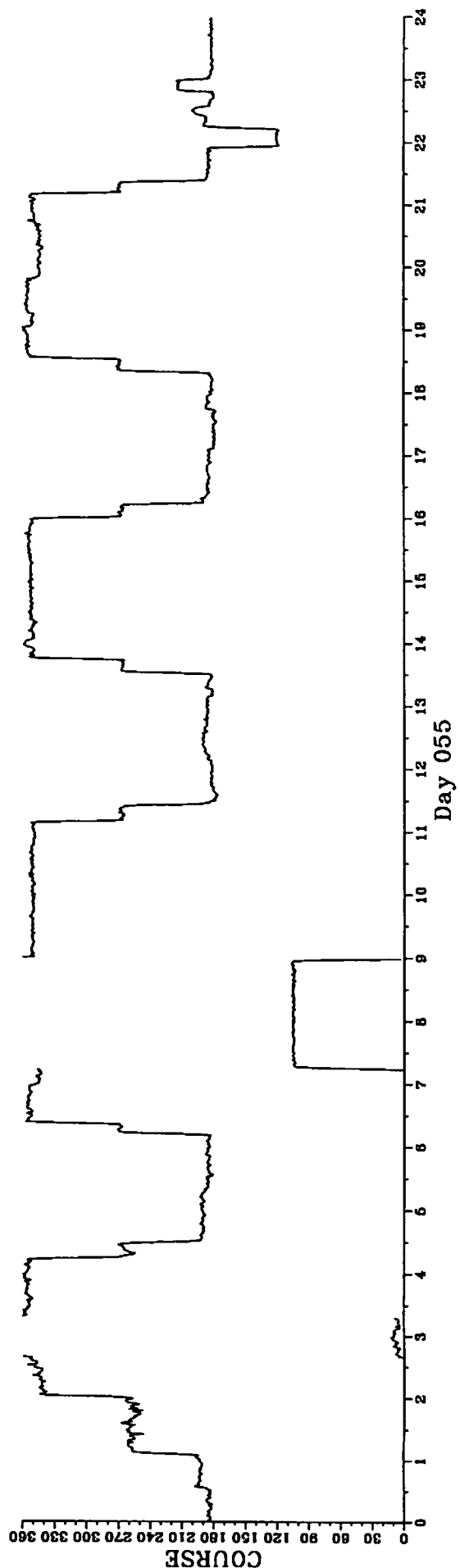
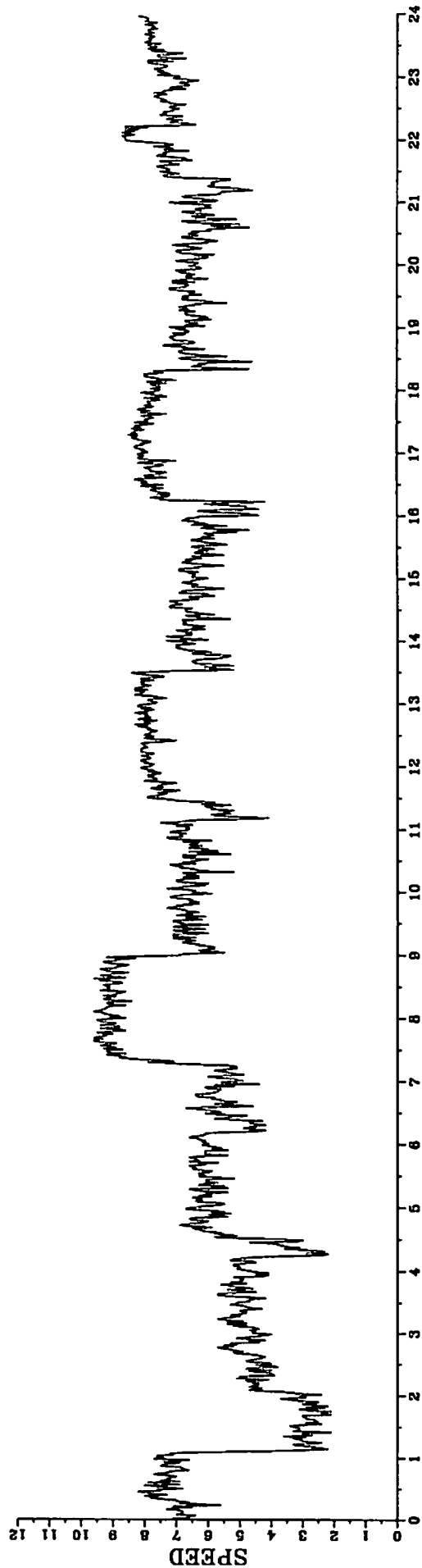
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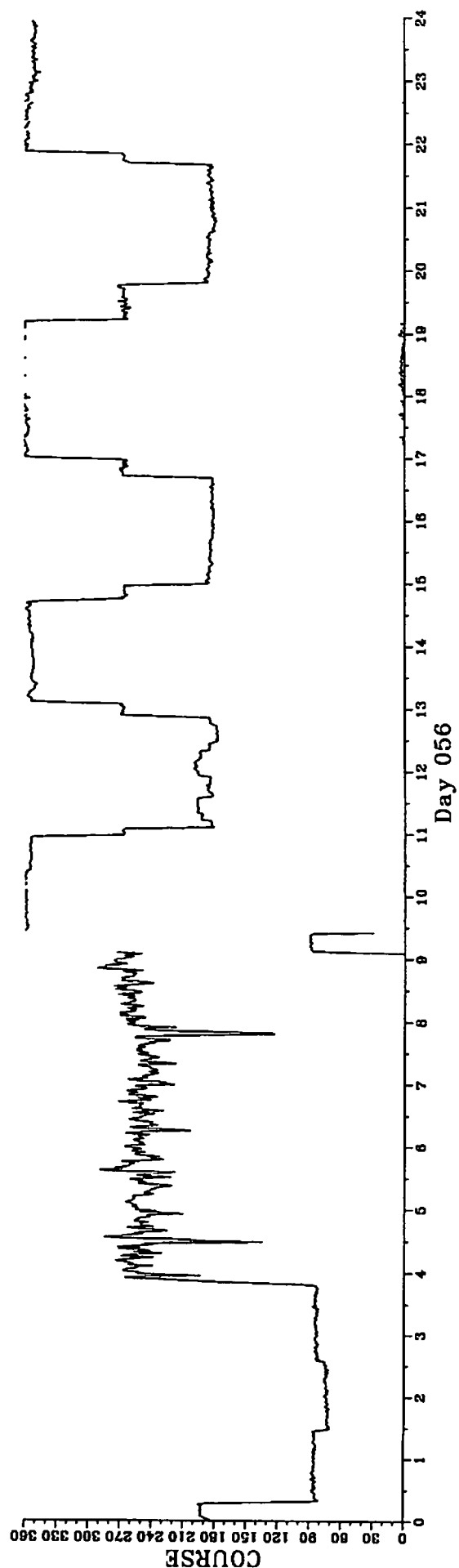
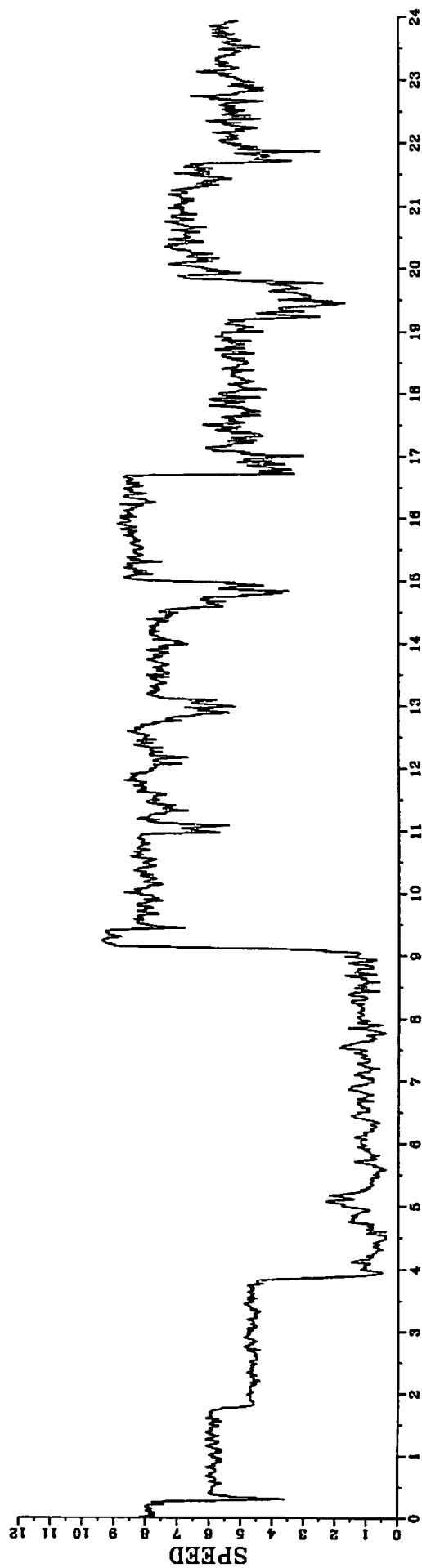
C2902 Punta Arenas-Punta Arenas Smooth Speed and Heading

Data file: 2902fu.s055



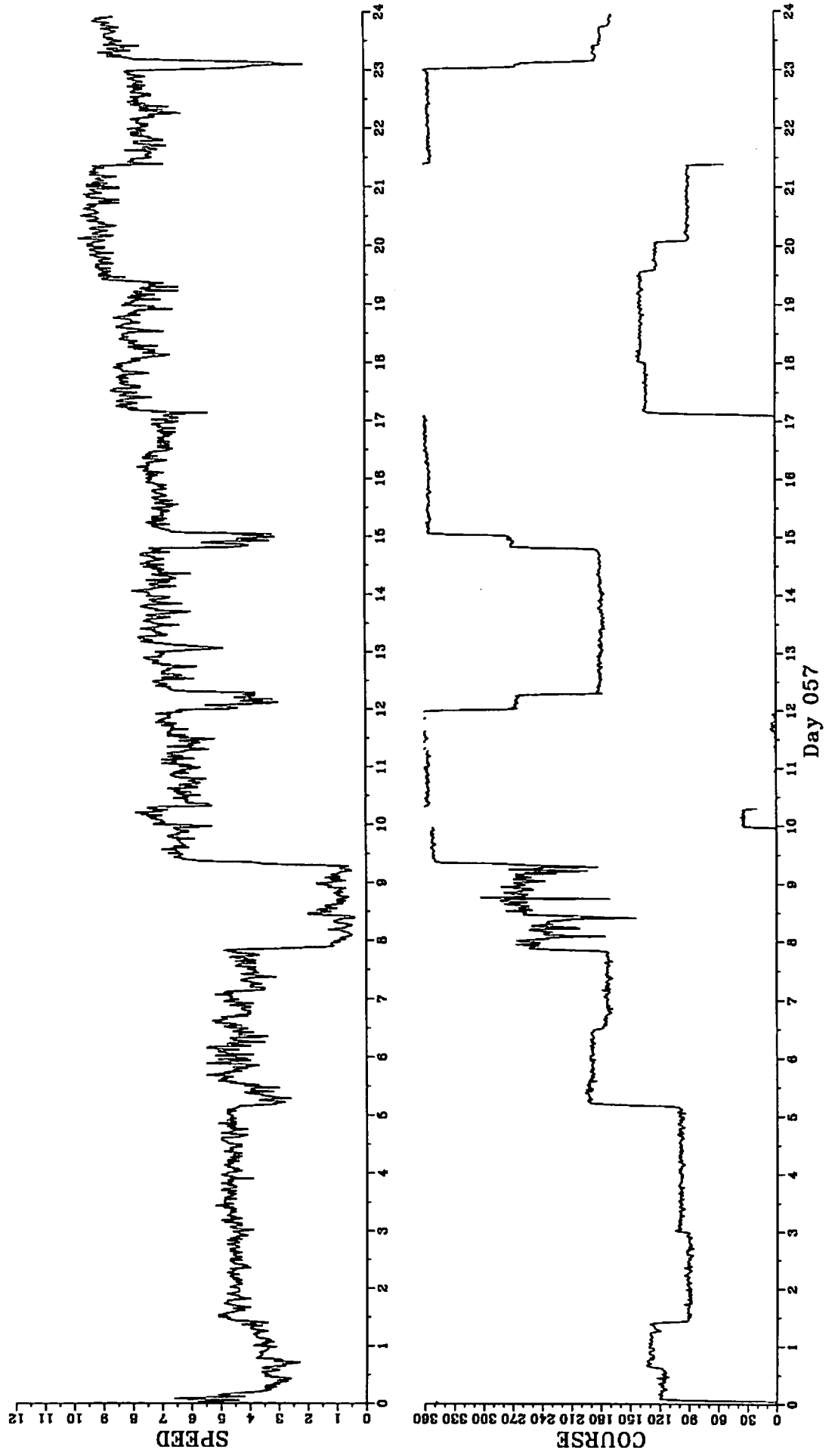
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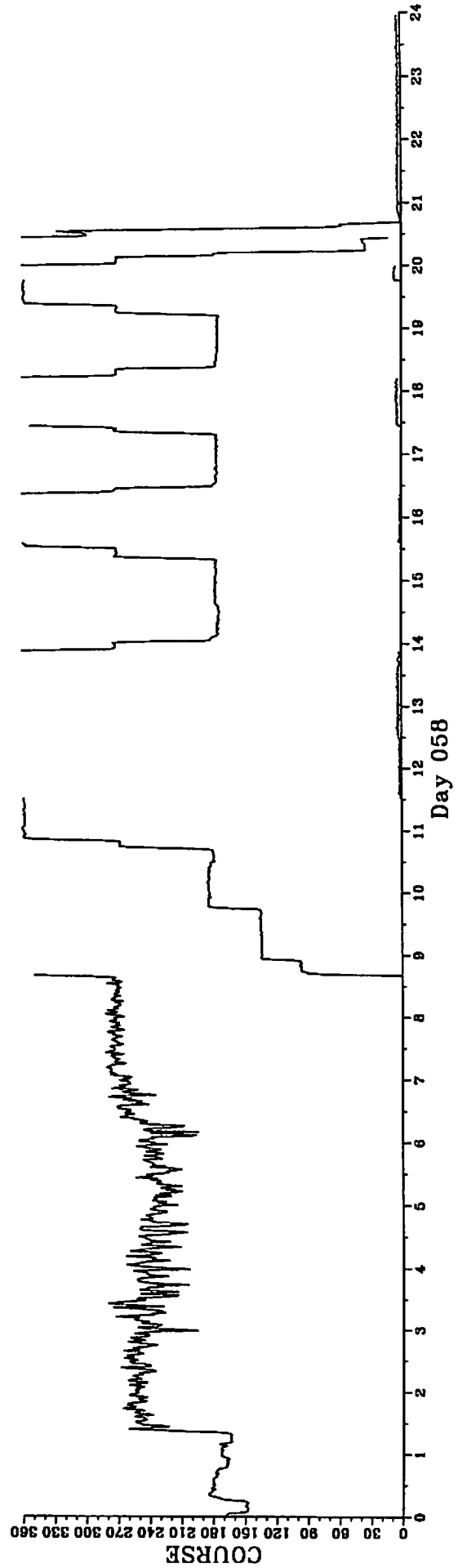
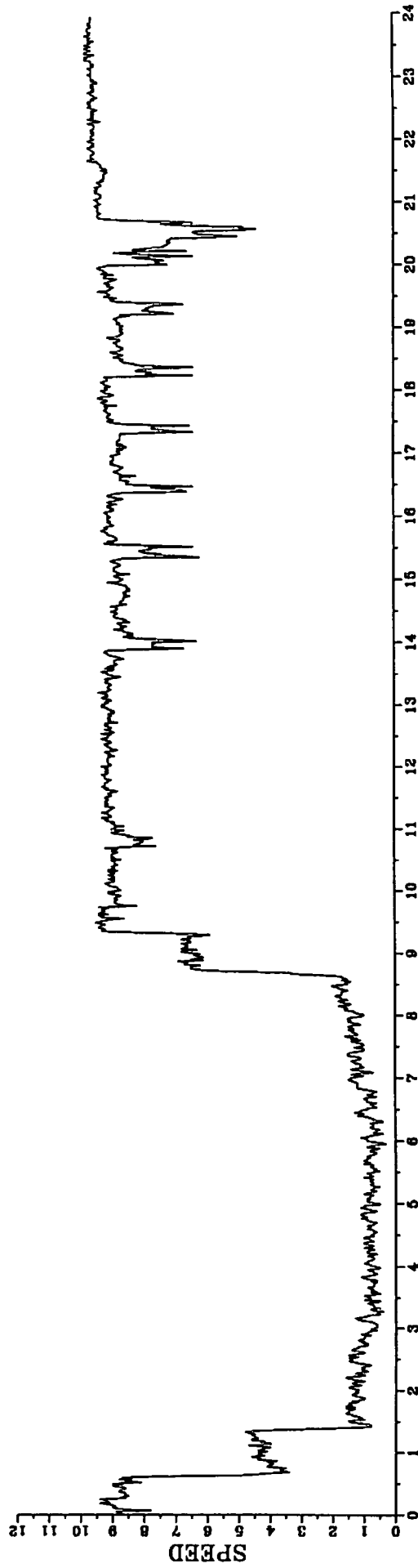
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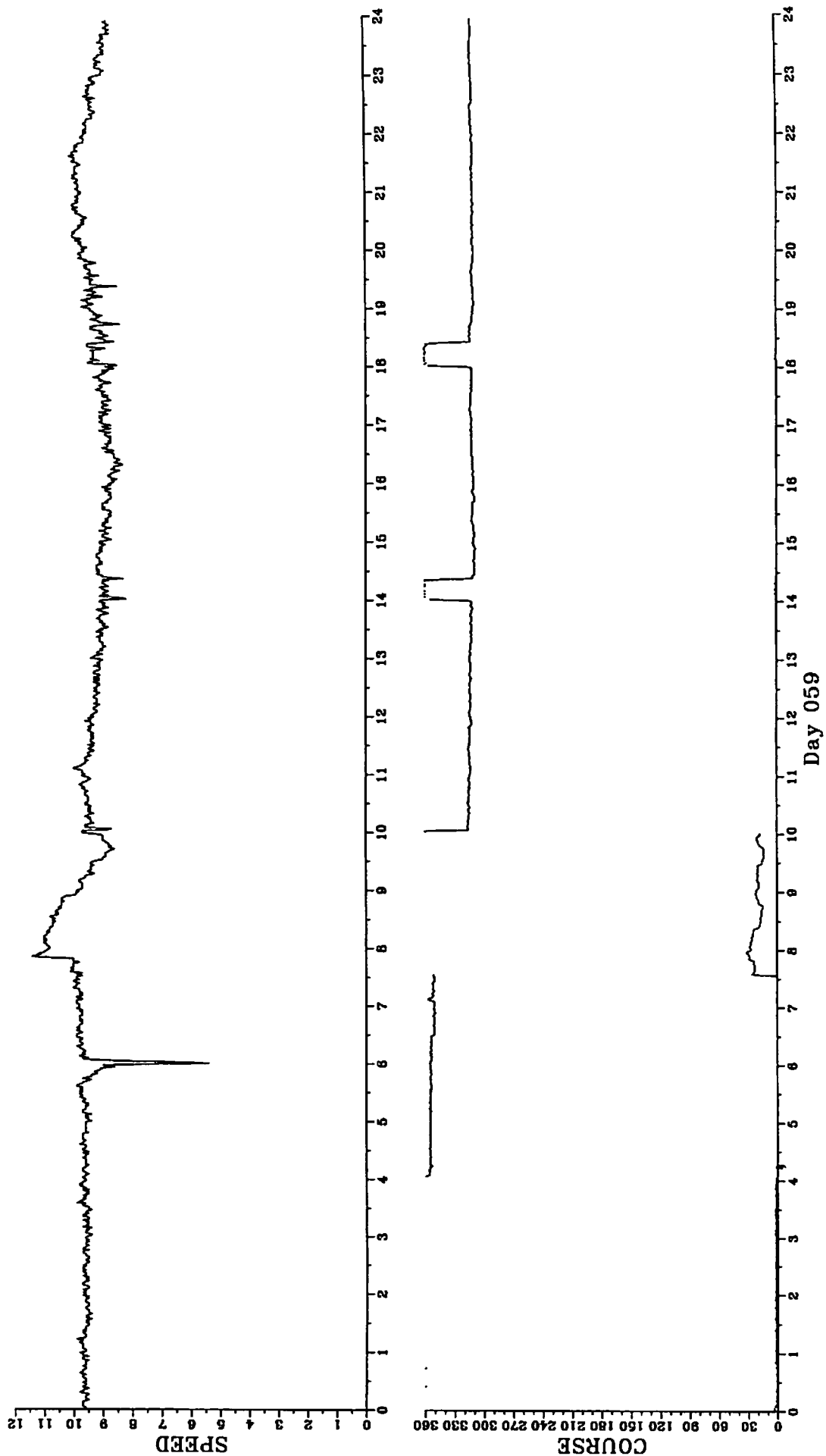
C2902 Punta Arenas-Punta Arenas Smooth Speed and Heading

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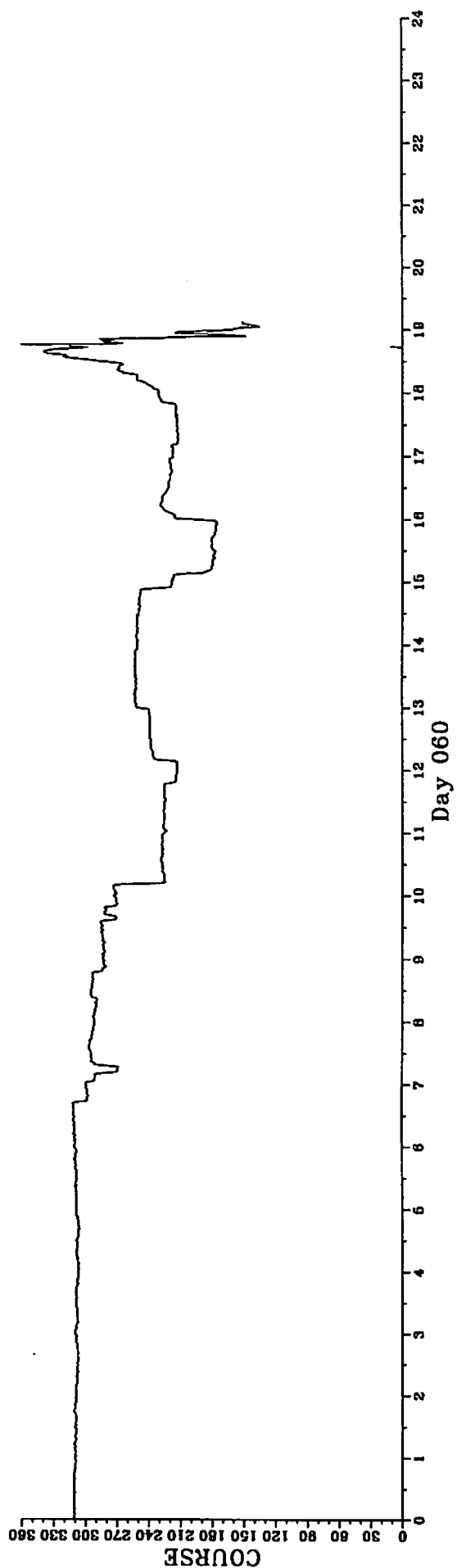
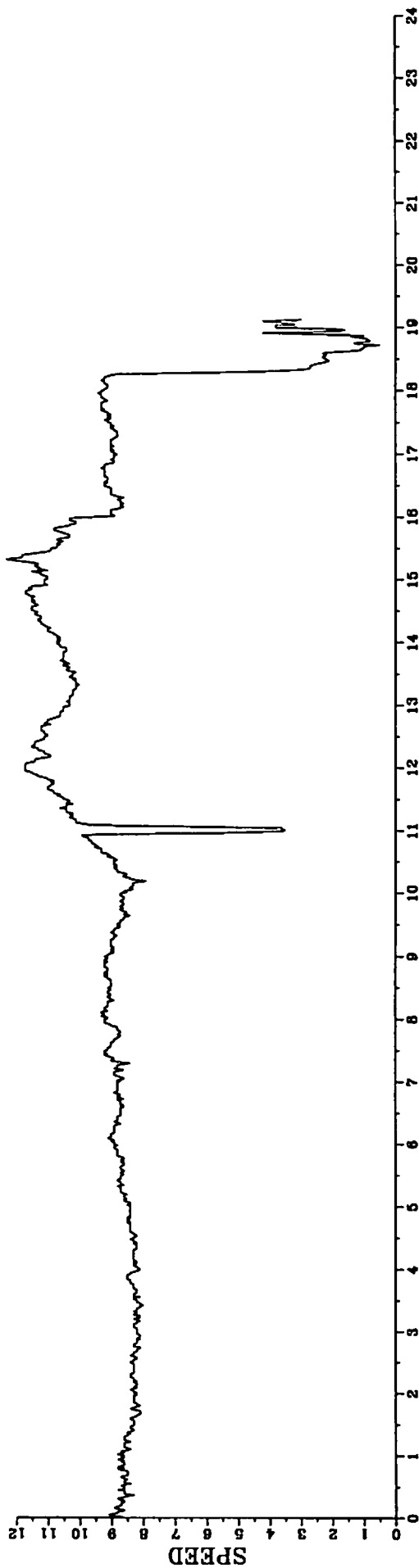
C2902 Punta Arenas-Punta Arenas Smooth Speed and Heading

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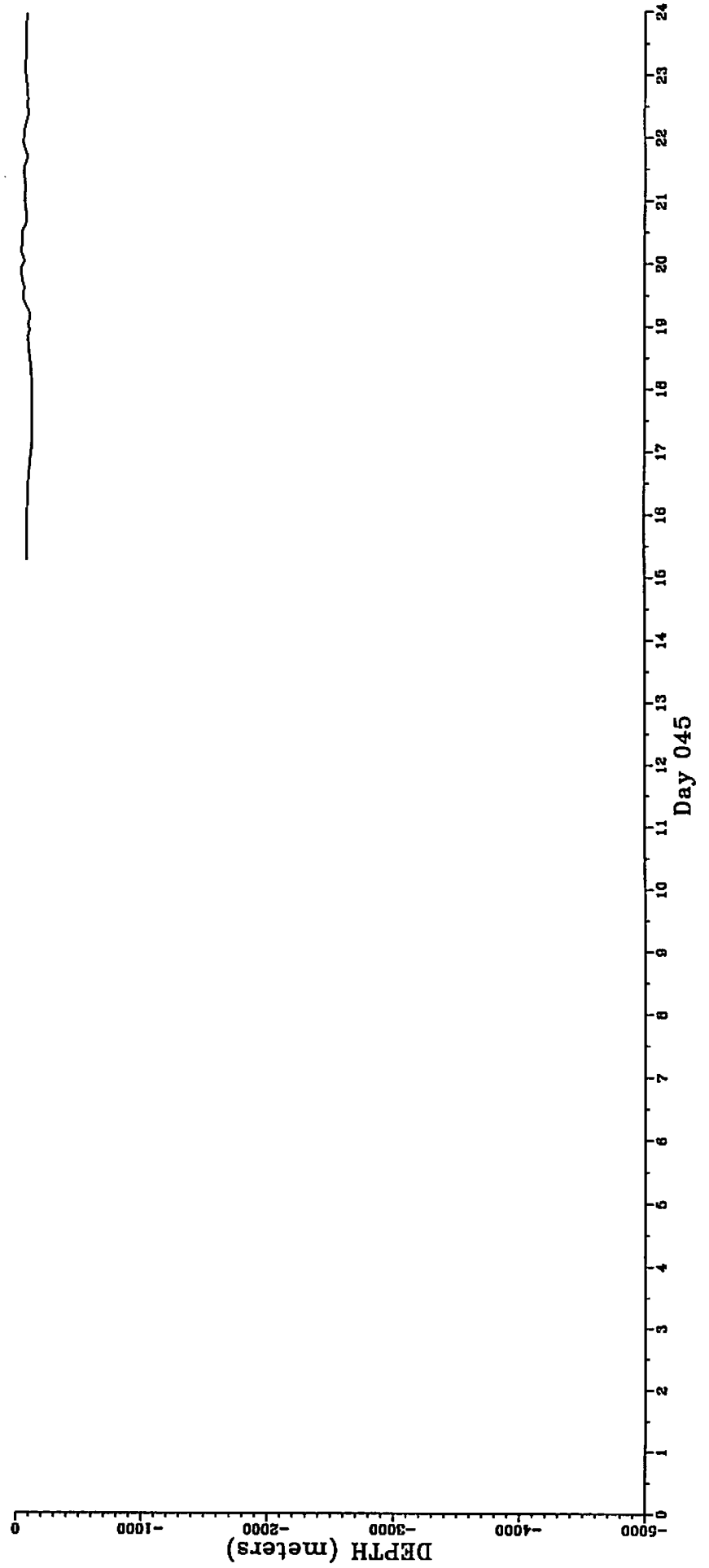
C2902 Punta Arenas-Punta Arenas Smooth Speed and Heading

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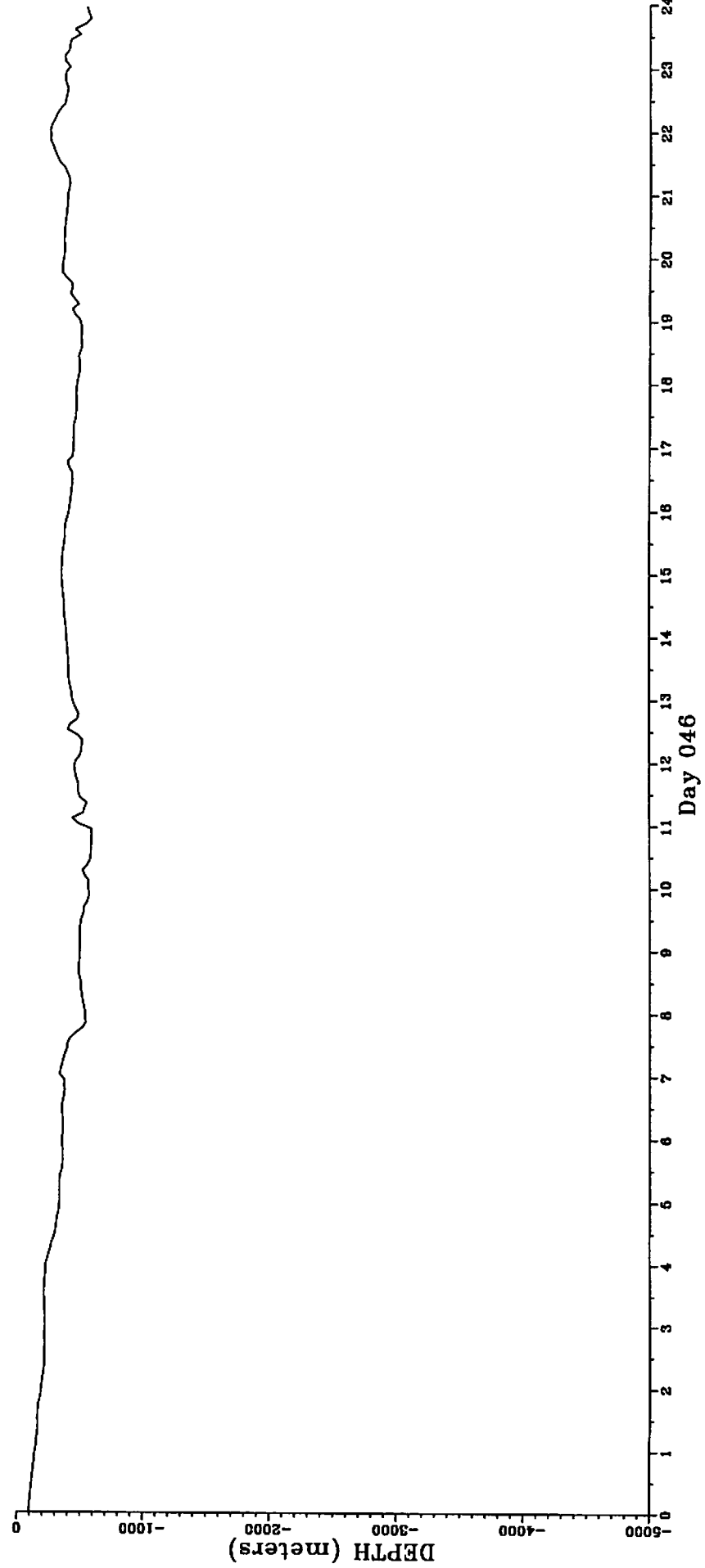


C2902 Punta Arenas-Punta Arenas PDR depths at 5 minute intervals

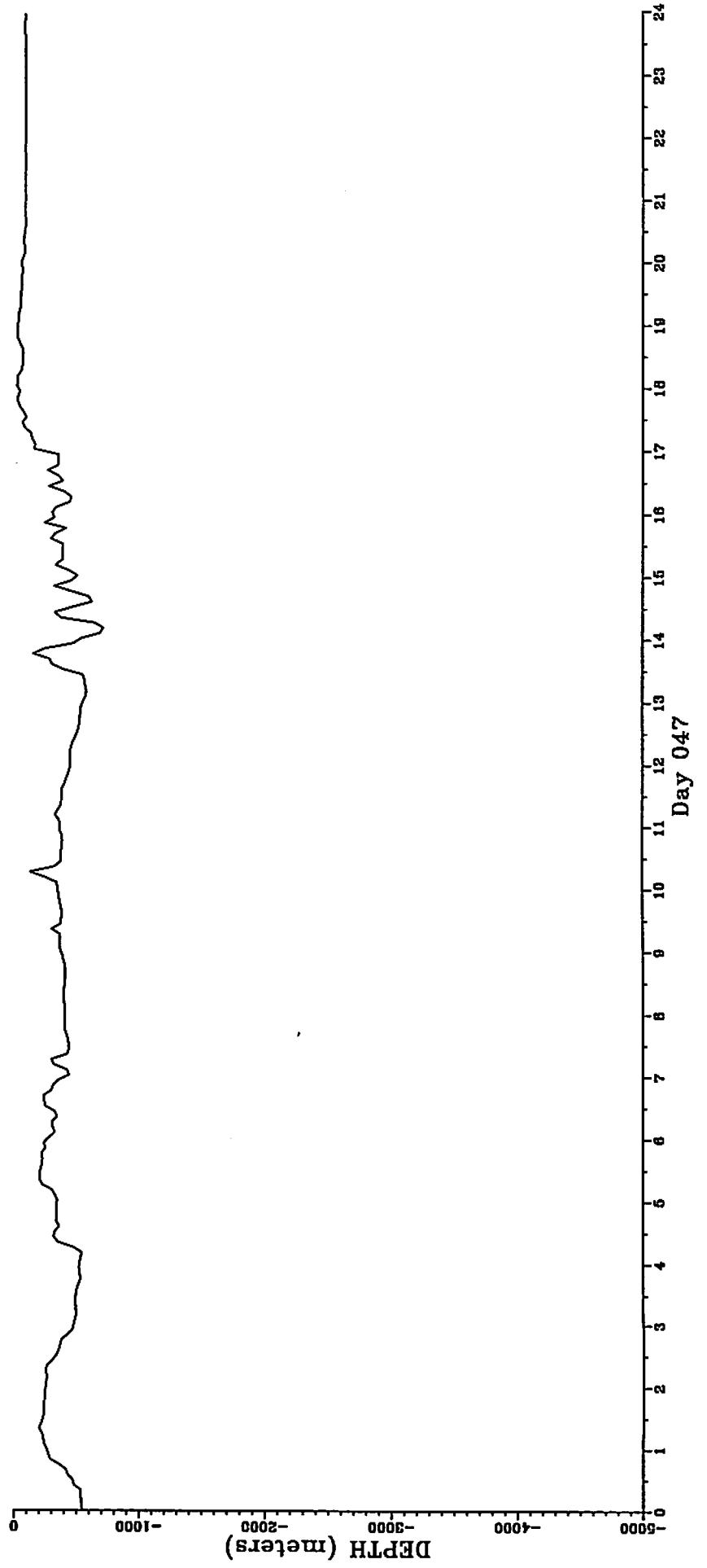
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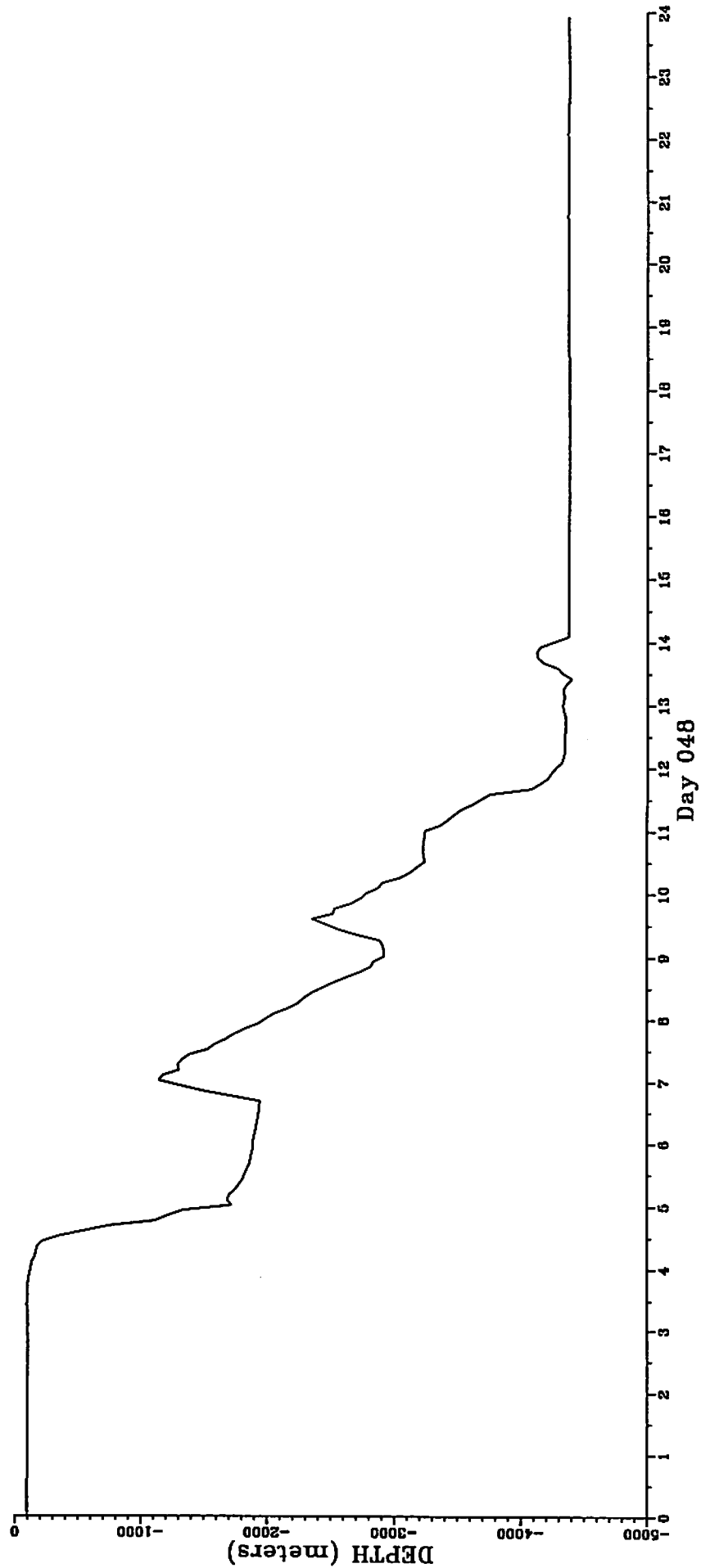
C2902 Punta Arenas-Punta Arenas PDR depths at 5 minute intervals
Data file: 2902bt.d046



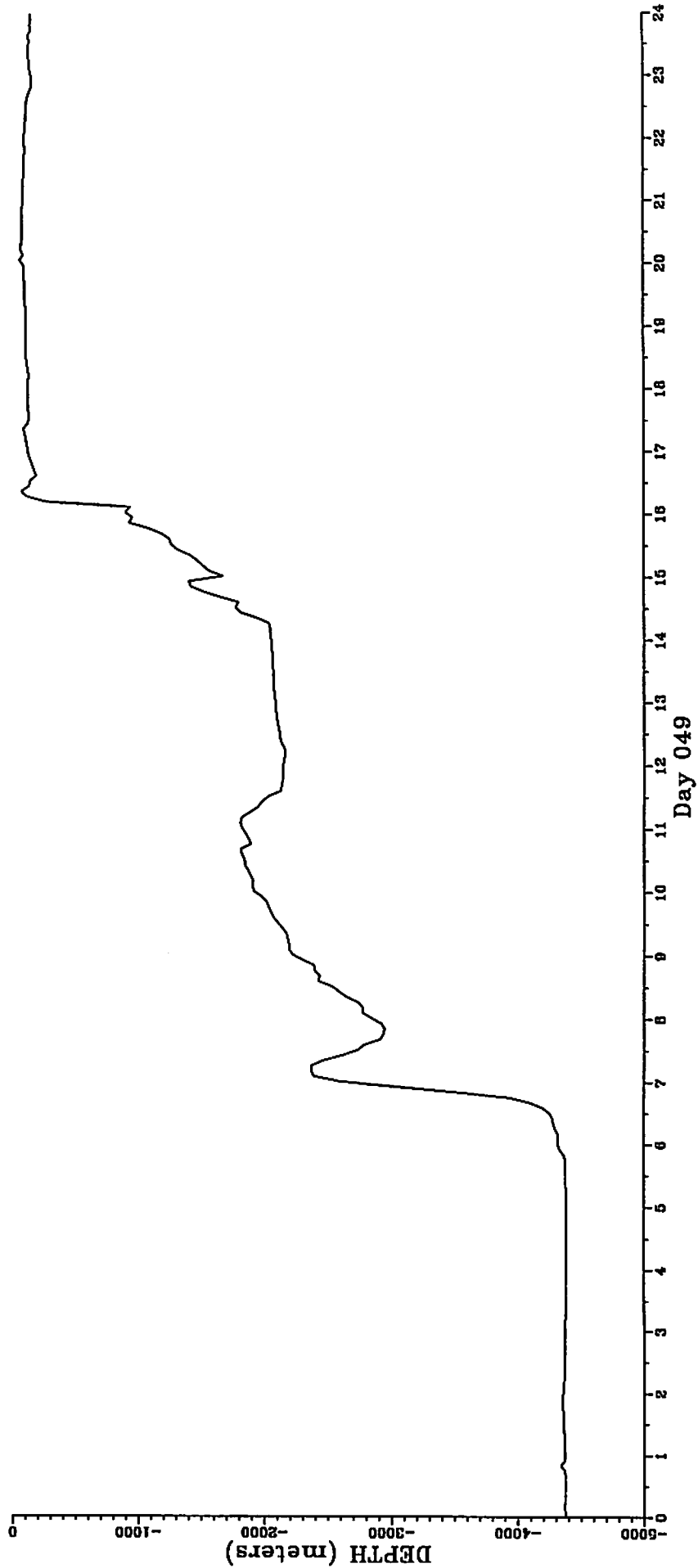
C2902 Punta Arenas-Punta Arenas PDR depths at 5 minute intervals
Data file: 2902bt.d047



C2902 Punta Arenas-Punta Arenas PDR depths at 5 minute intervals
Data file: 2902bt.d048

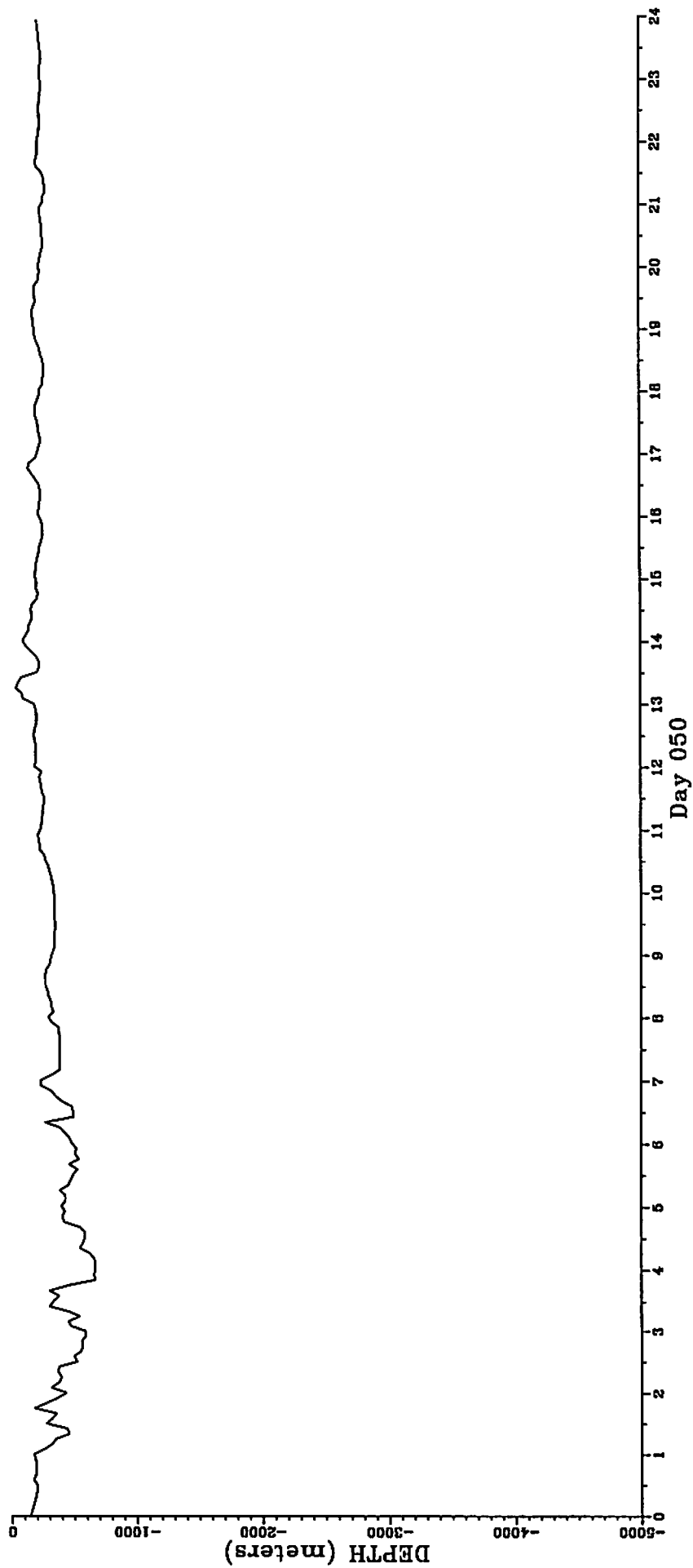


C2902 Punta Arenas-Punta Arenas PDR depths at 5 minute intervals
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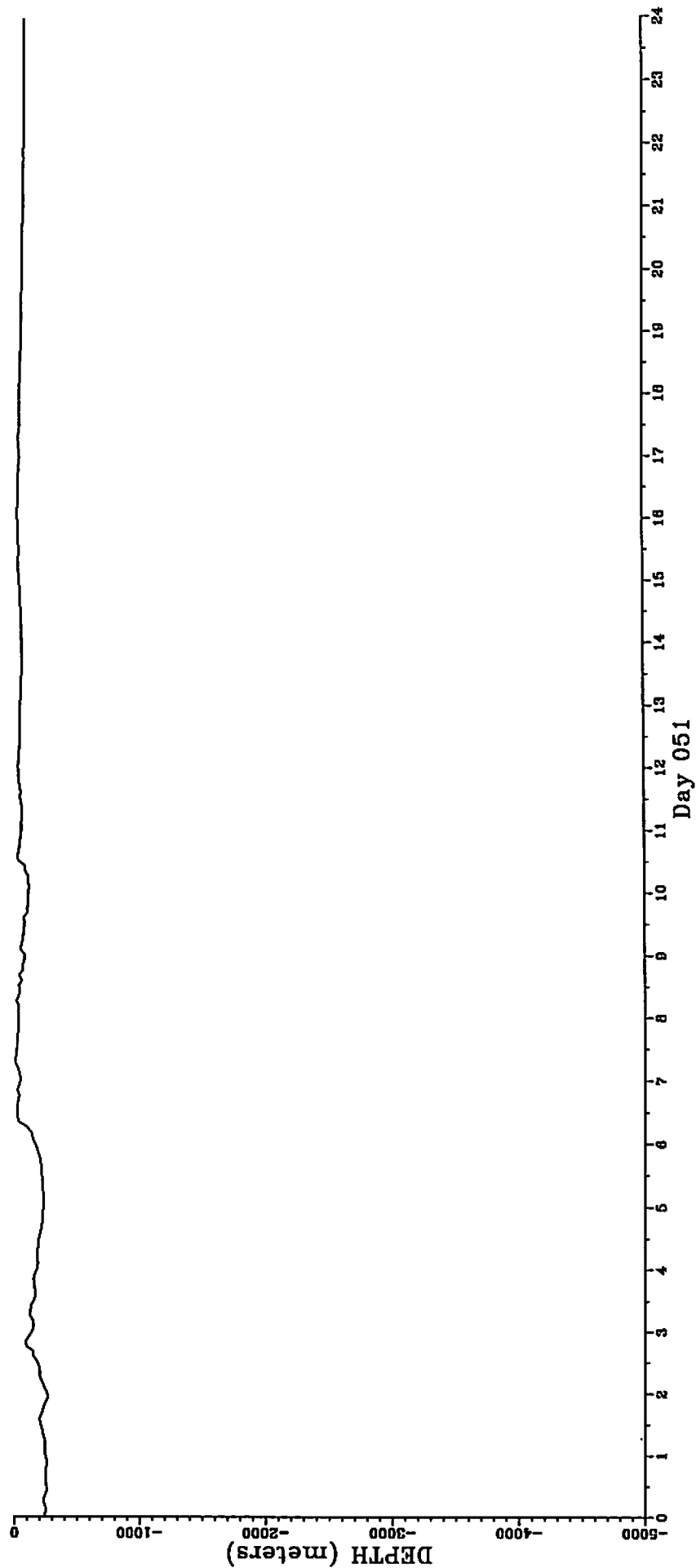


C2902 Punta Arenas--Punta Arenas PDR depths at 5 minute intervals

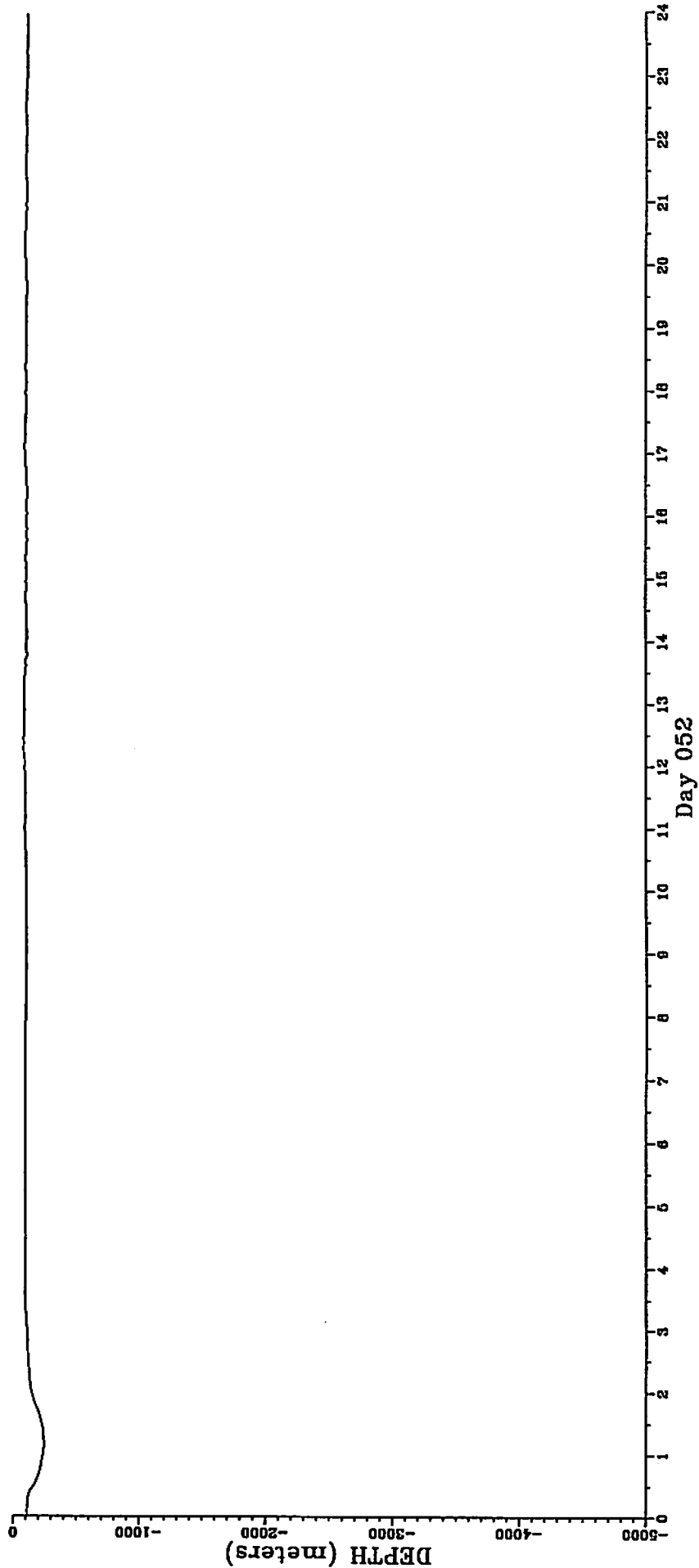
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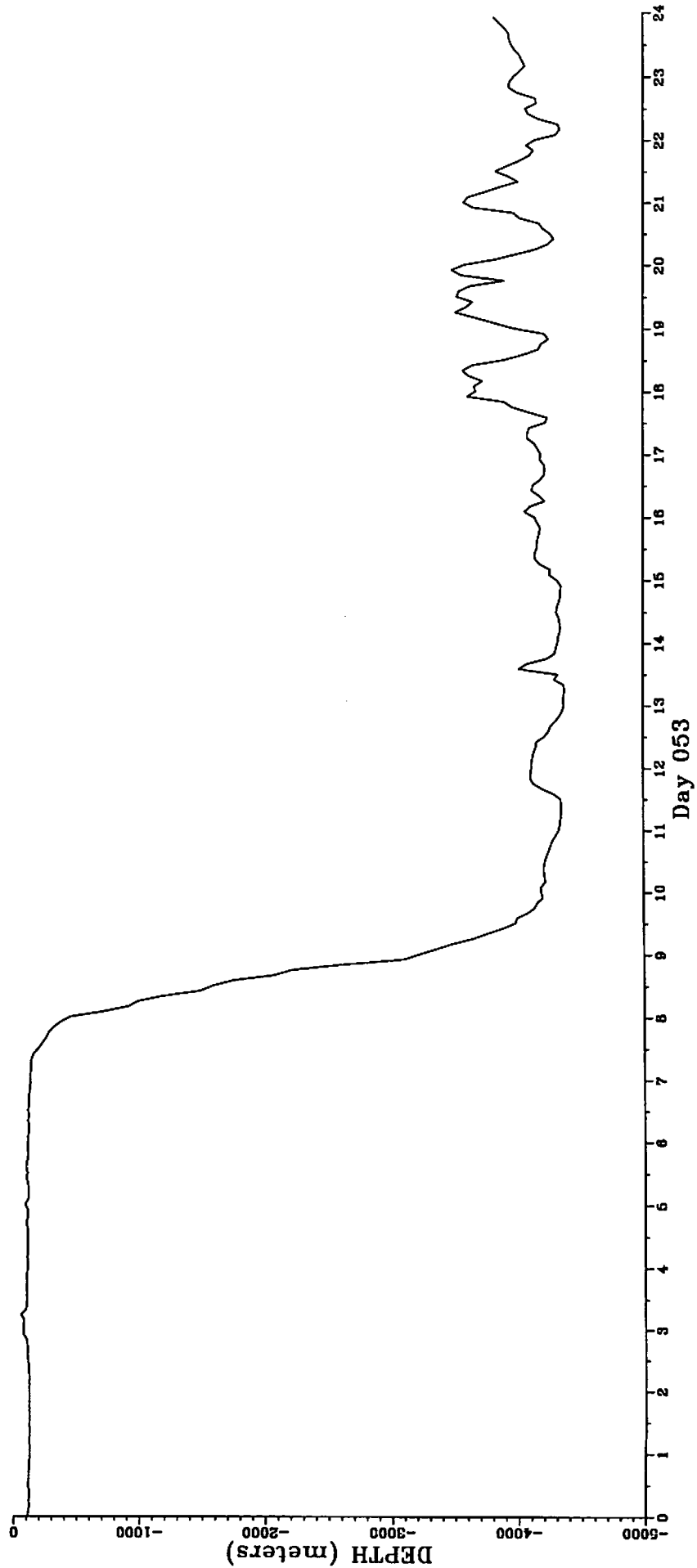
C2902 Punta Arenas--Punta Arenas PDR depths at 5 minute intervals
Data file: 2902bt.d051



C2902 Punta Arenas-Punta Arenas PDR depths at 5 minute intervals
Data file: 2902bt.d052

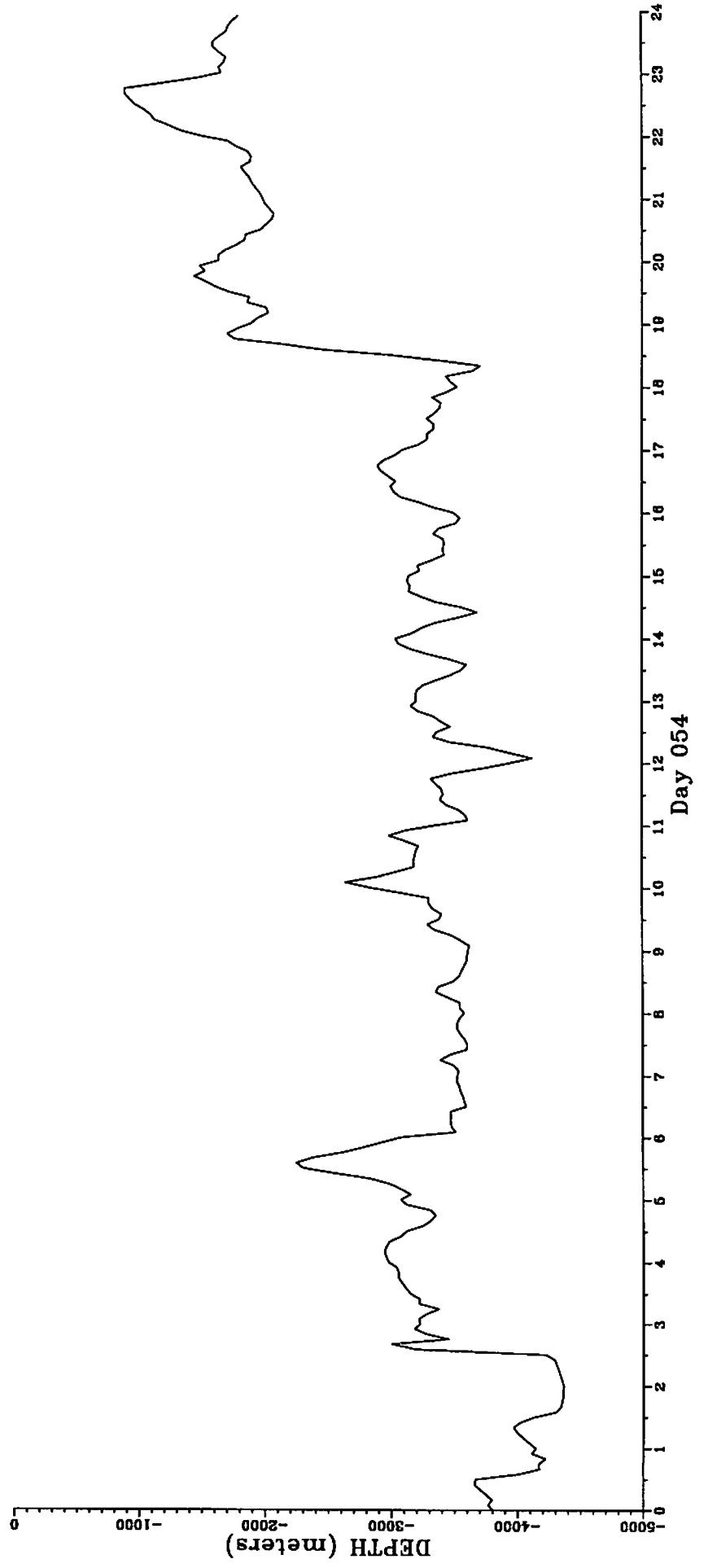


C2902 Punta Arenas--Punta Arenas PDR depths at 5 minute intervals
Data file: 2902bt.d053



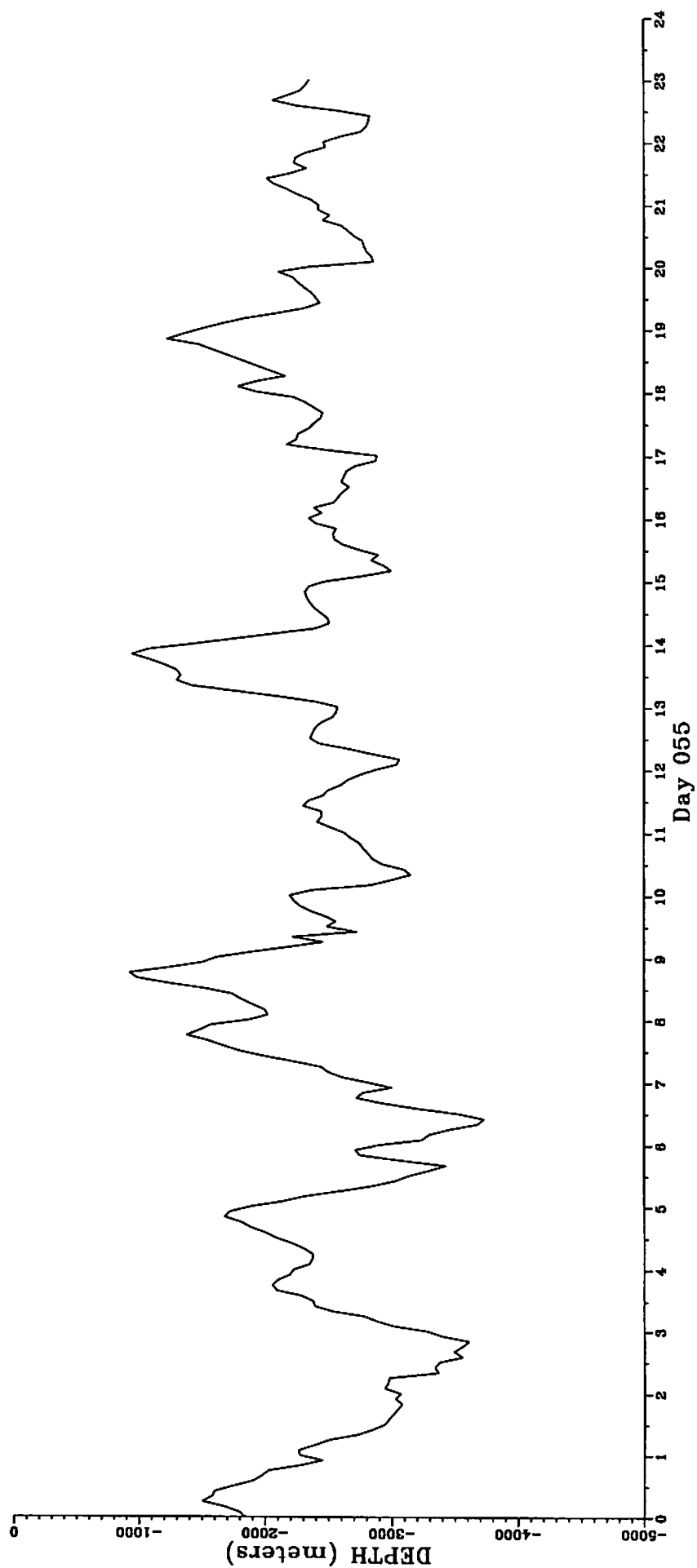
C2902 Punta Arenas-Punta Arenas PDR depths at 5 minute intervals

Data file: 2902bt.d054



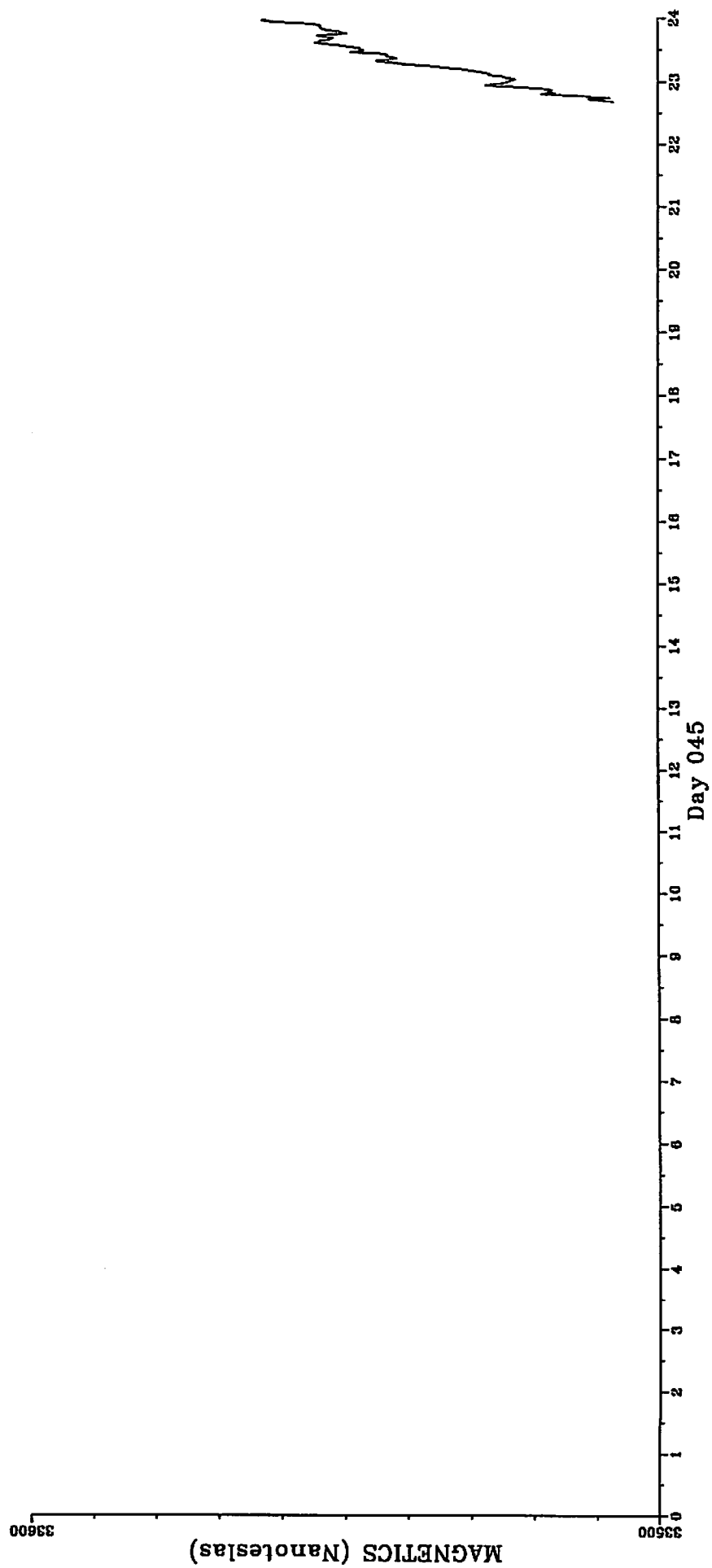
C2902 Punta Arenas-Punta Arenas PDR depths at 5 minute intervals

Data file: 2902bt.d055



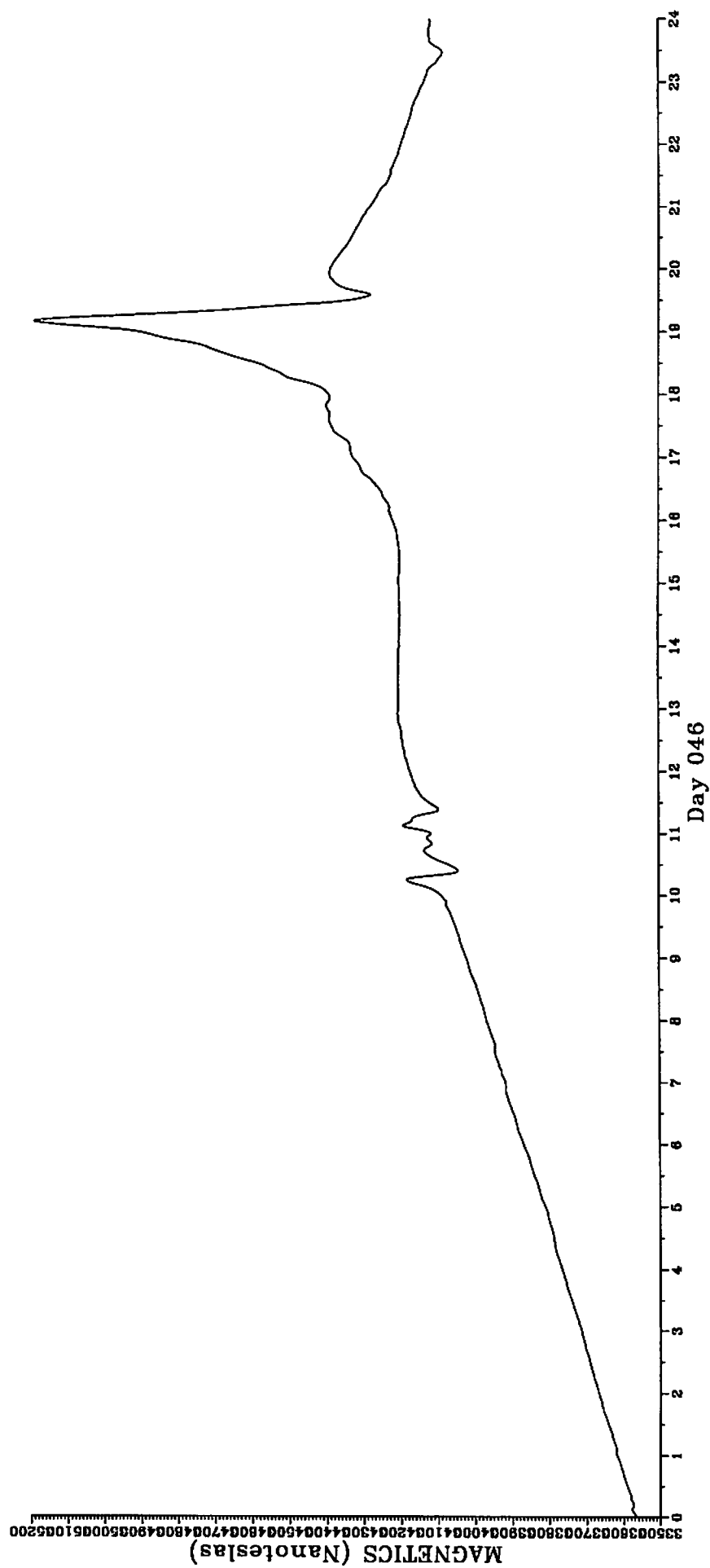
C2902 Total Intensity Magnetics interpolated value at 00 sec of each minute

Data file: 2902mg.n045



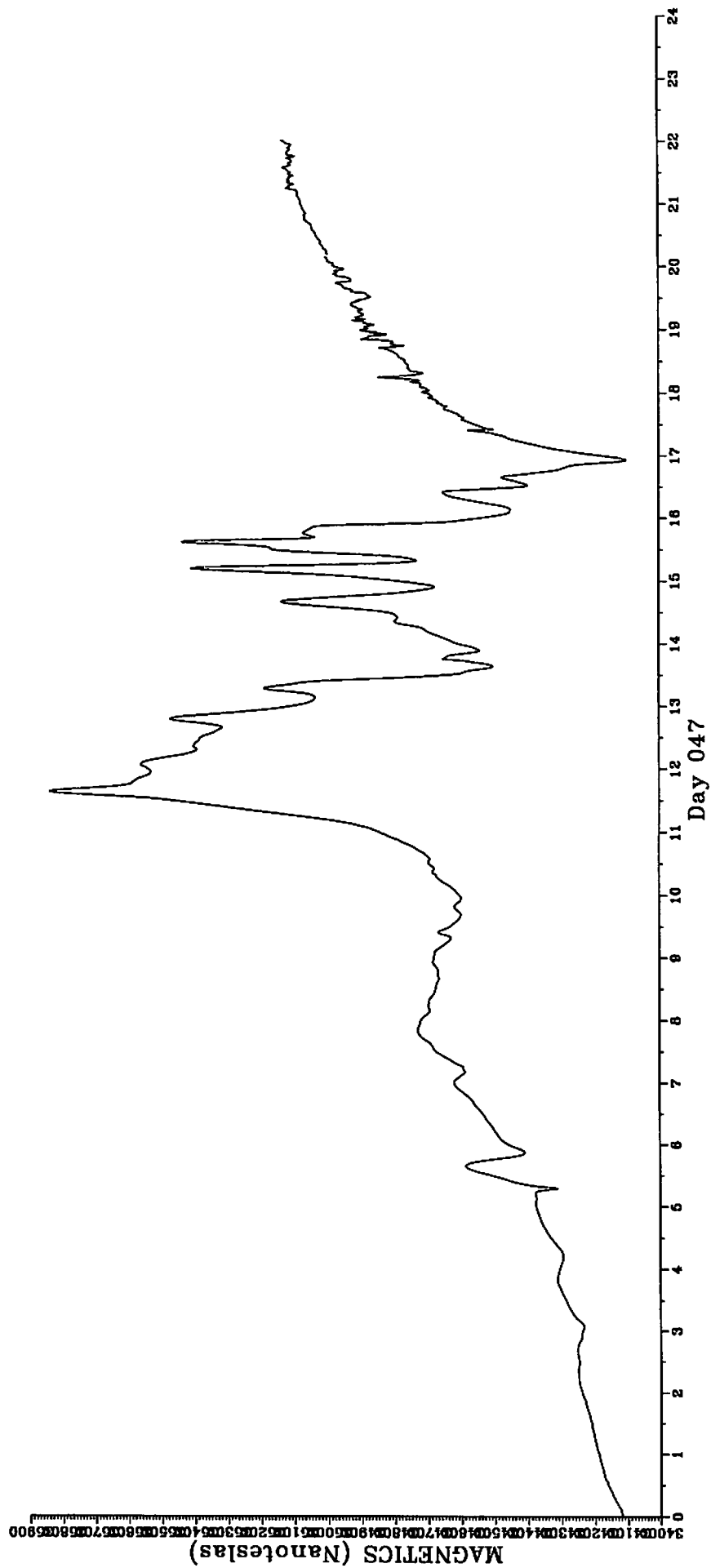
C2902 Total Intensity Magnetics interpolated value at 00 sec of each minute

Data file: 2902mg.n046

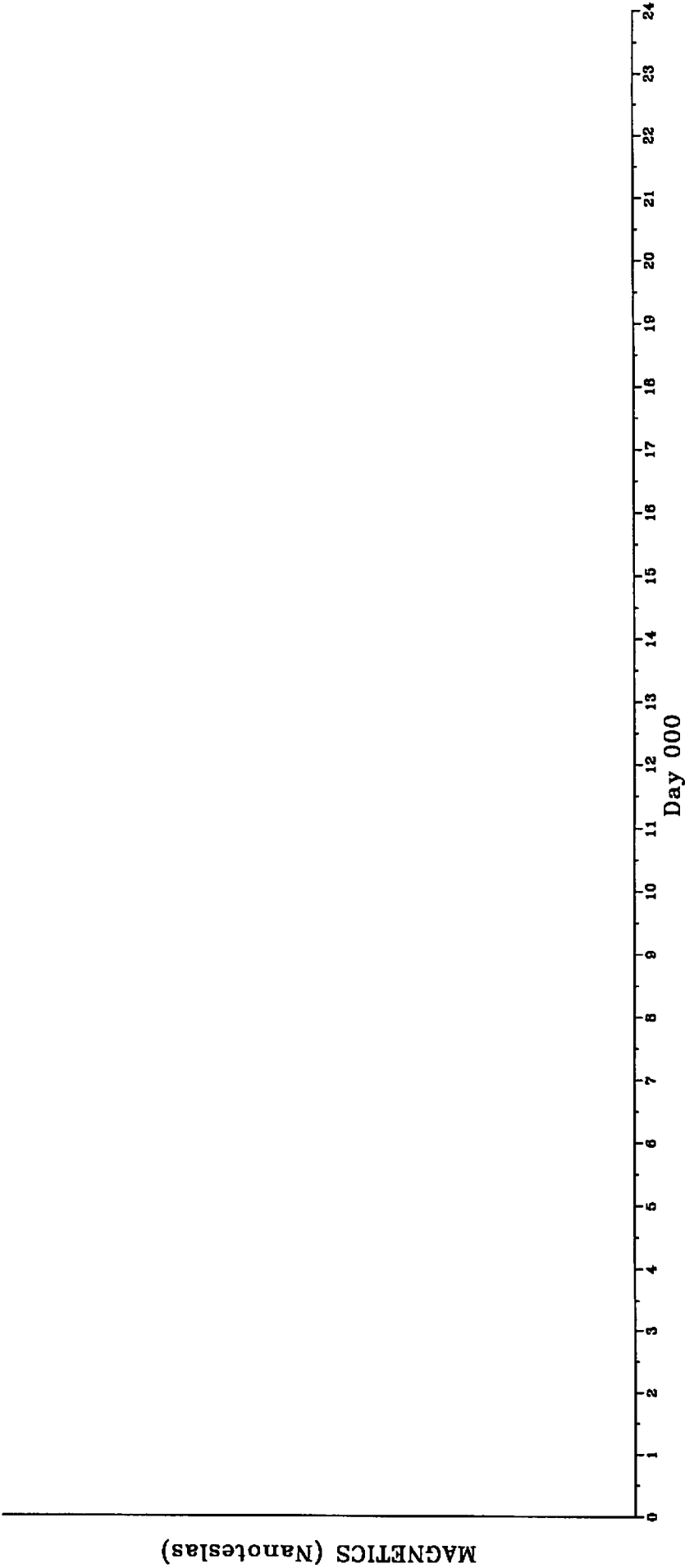


C2902 Total Intensity Magnetics interpolated value at 00 sec of each minute

Data file: 2902mg.n047

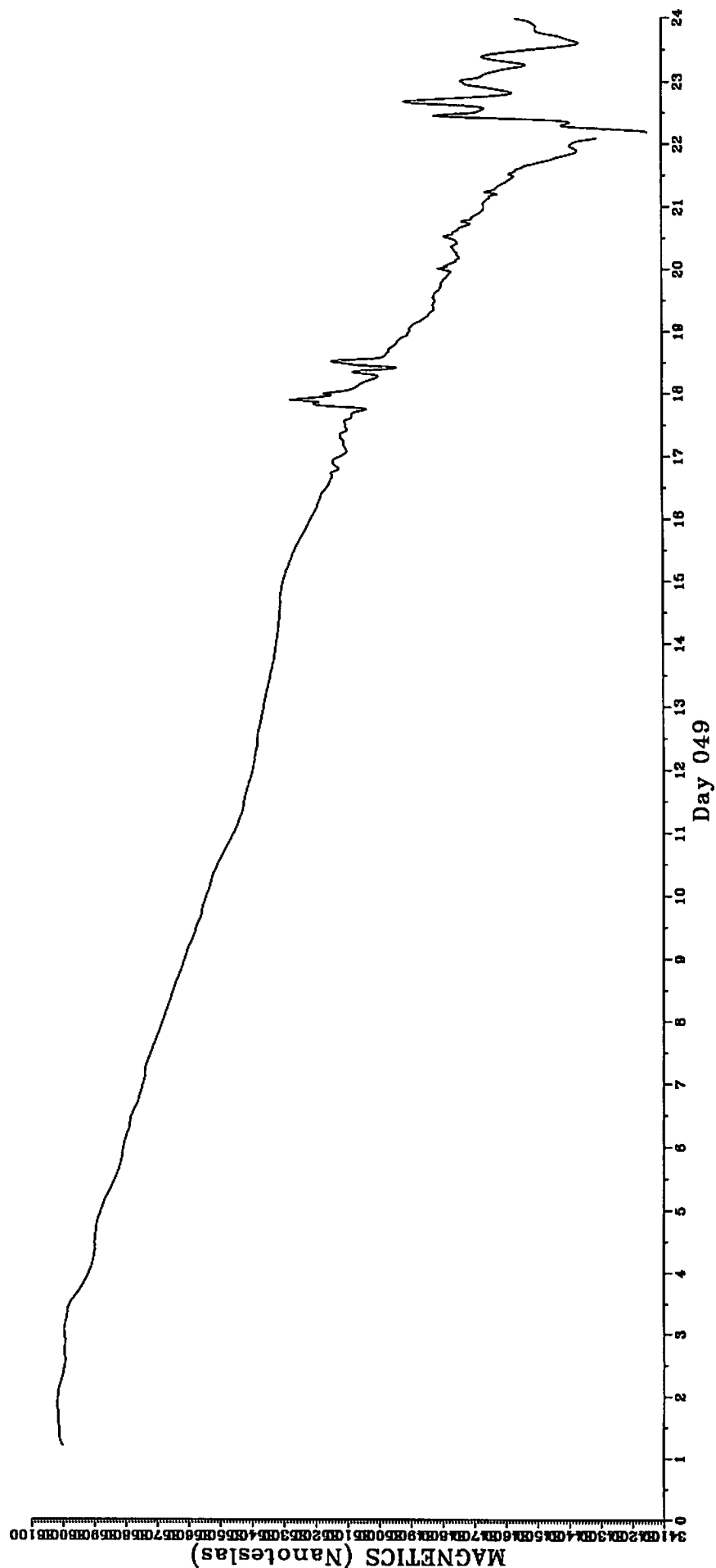


C2902 Total Intensity Magnetics interpolated value at 00 sec of each minute
Data file: 2902mg.n048



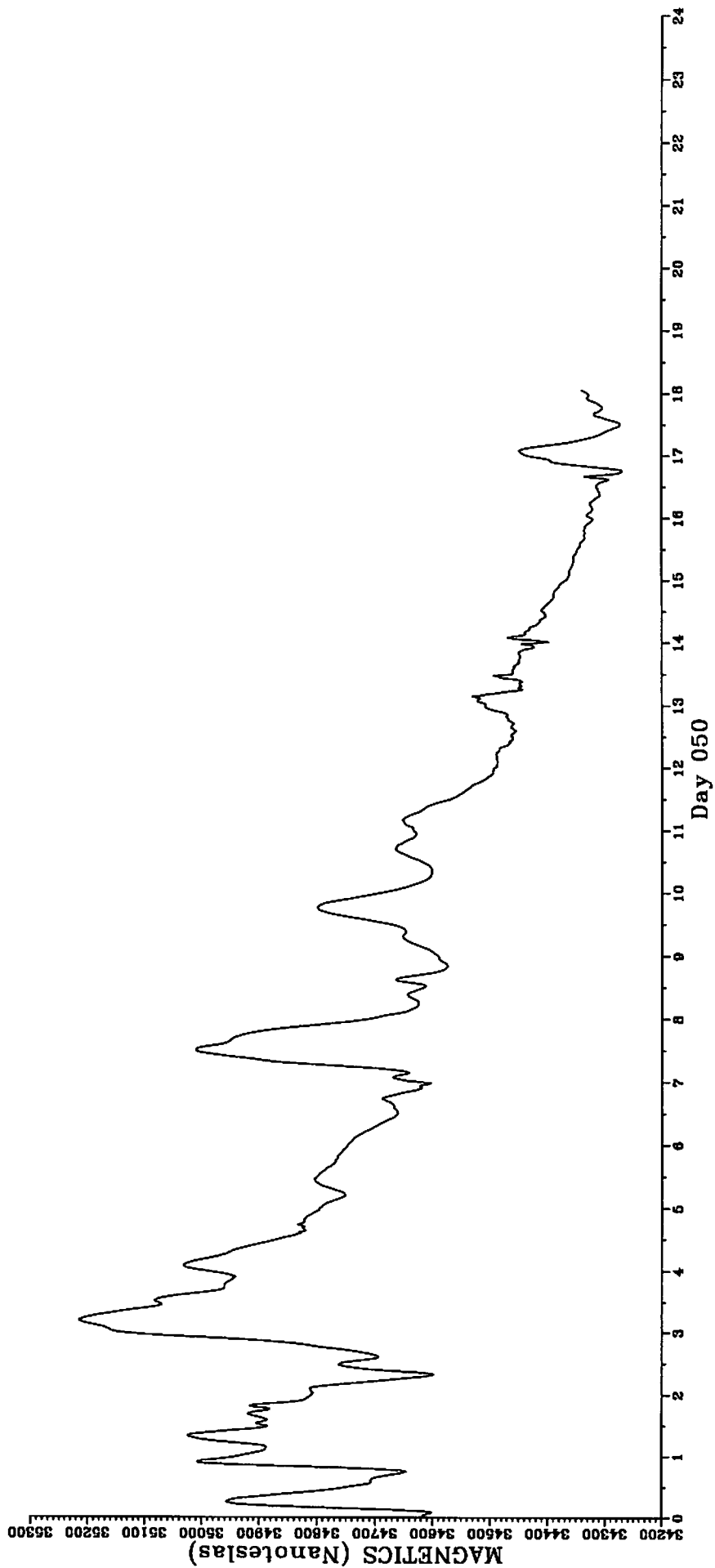
C2902 Total Intensity Magnetism interpolated value at 00 sec of each minute

Data file: 2902mg.n049



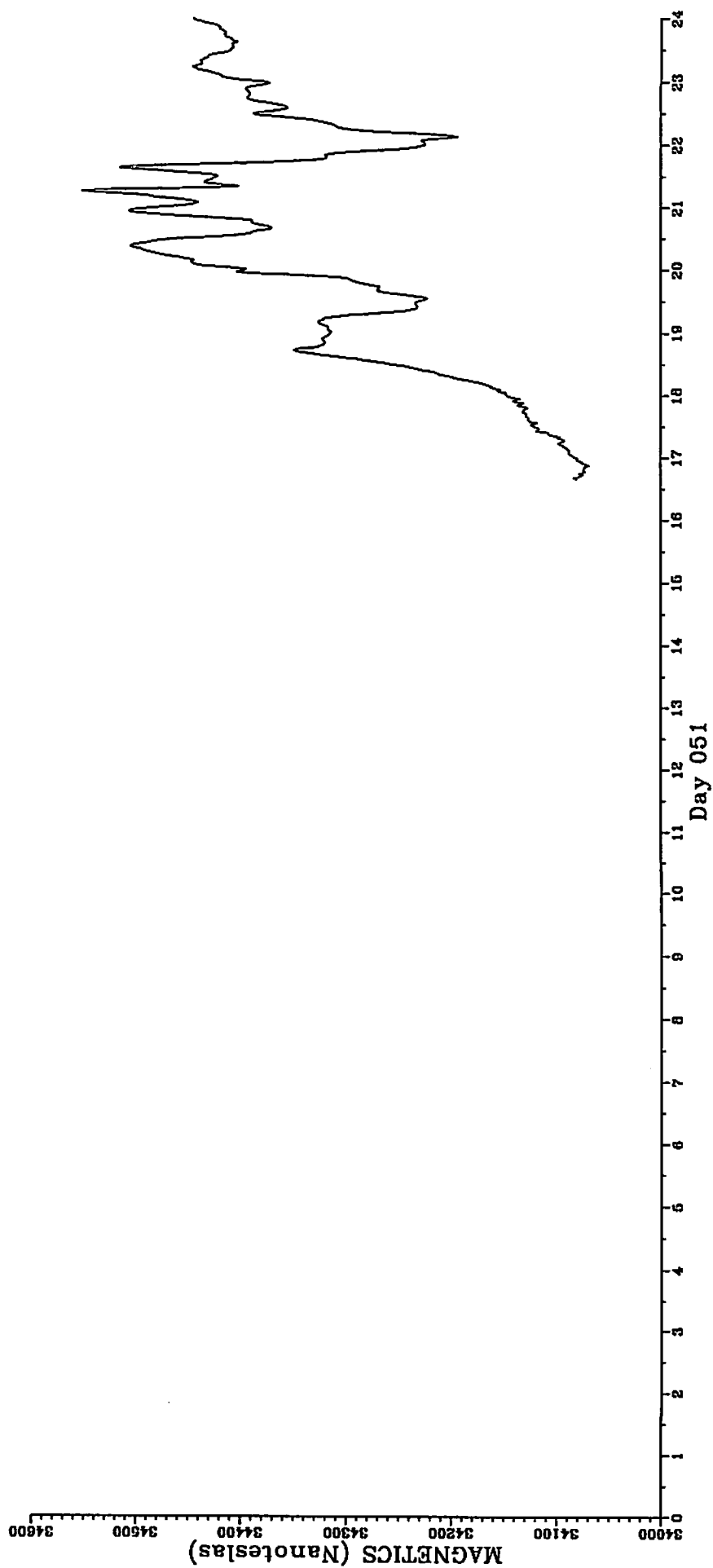
C2902 Total Intensity Magnetism interpolated value at 00 sec of each minute

Data file: 2902mg.n050



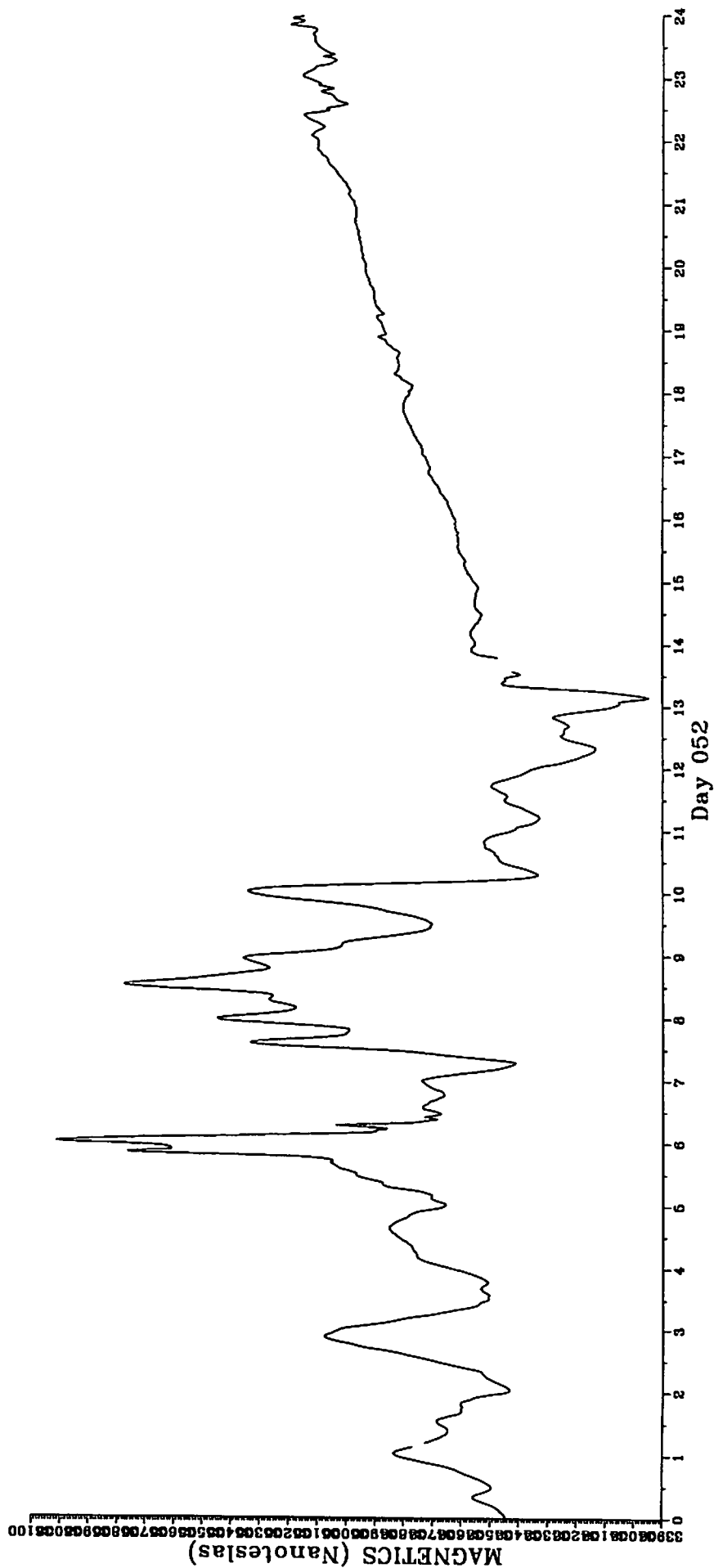
C2902 Total Intensity Magnetics interpolated value at 00 sec of each minute

Data file: 2902mg.n051



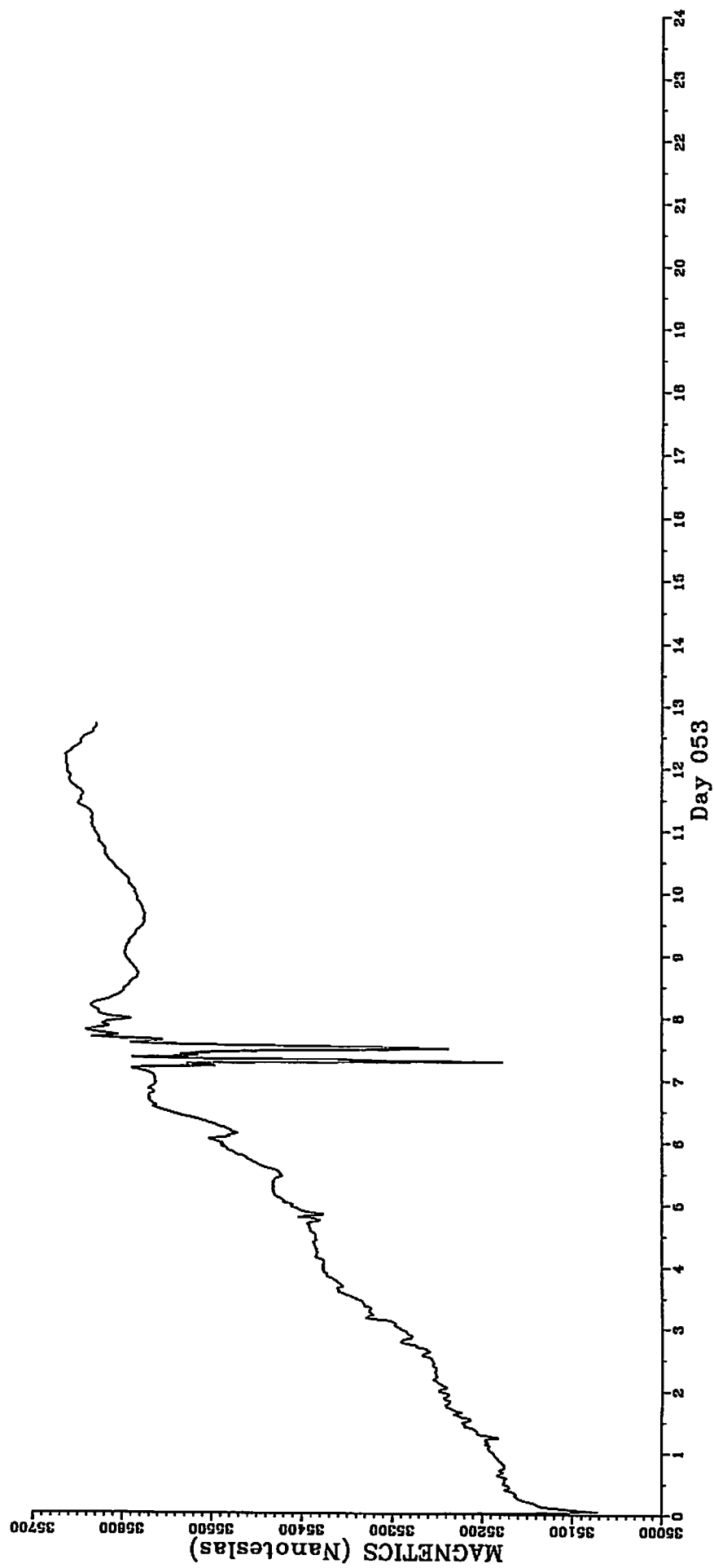
C2902 Total Intensity Magnetics interpolated value at 00 sec of each minute

Data file: 2902mg.n052

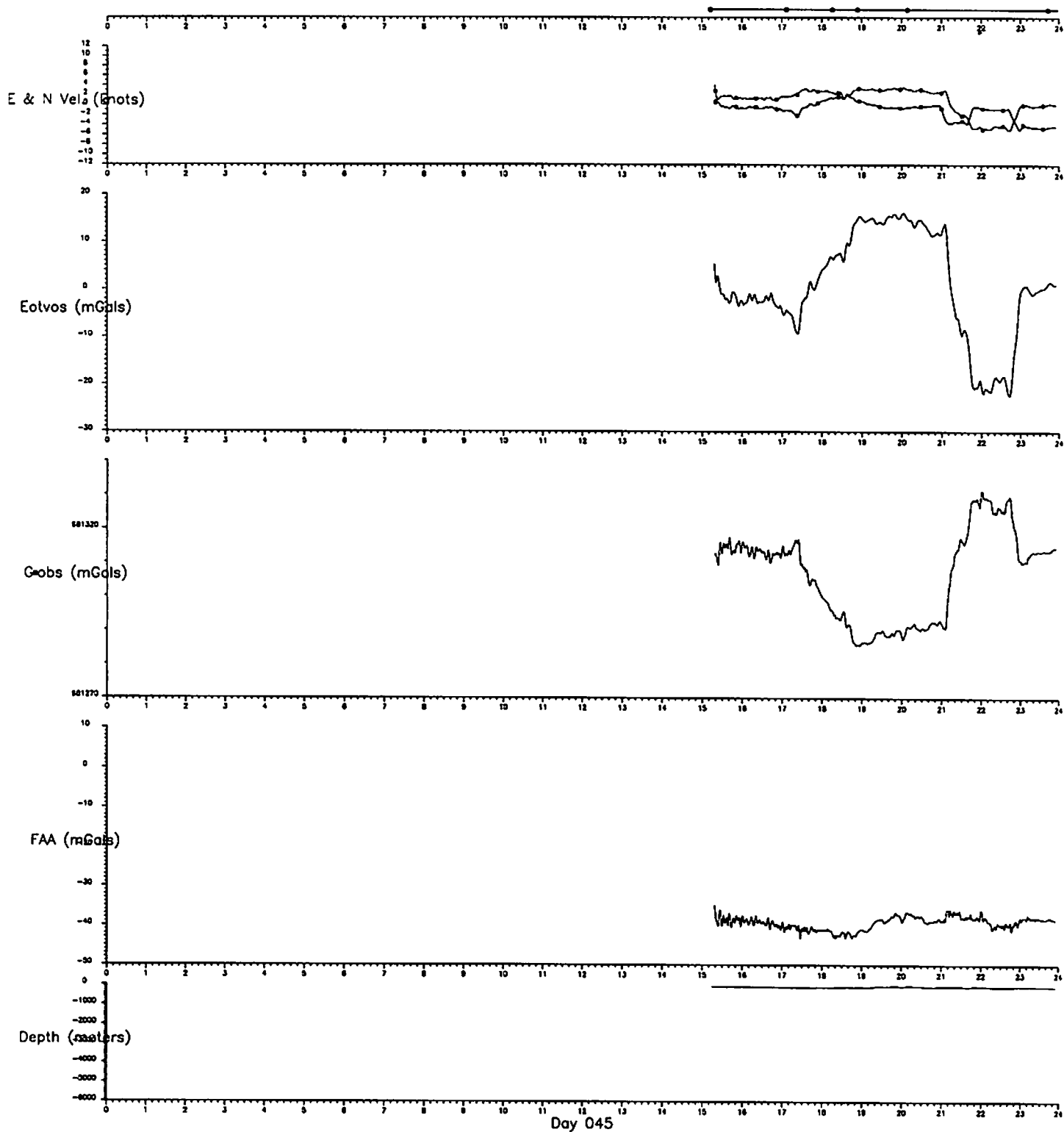


C2902 Total Intensity Magnetics interpolated value at 00 sec of each minute

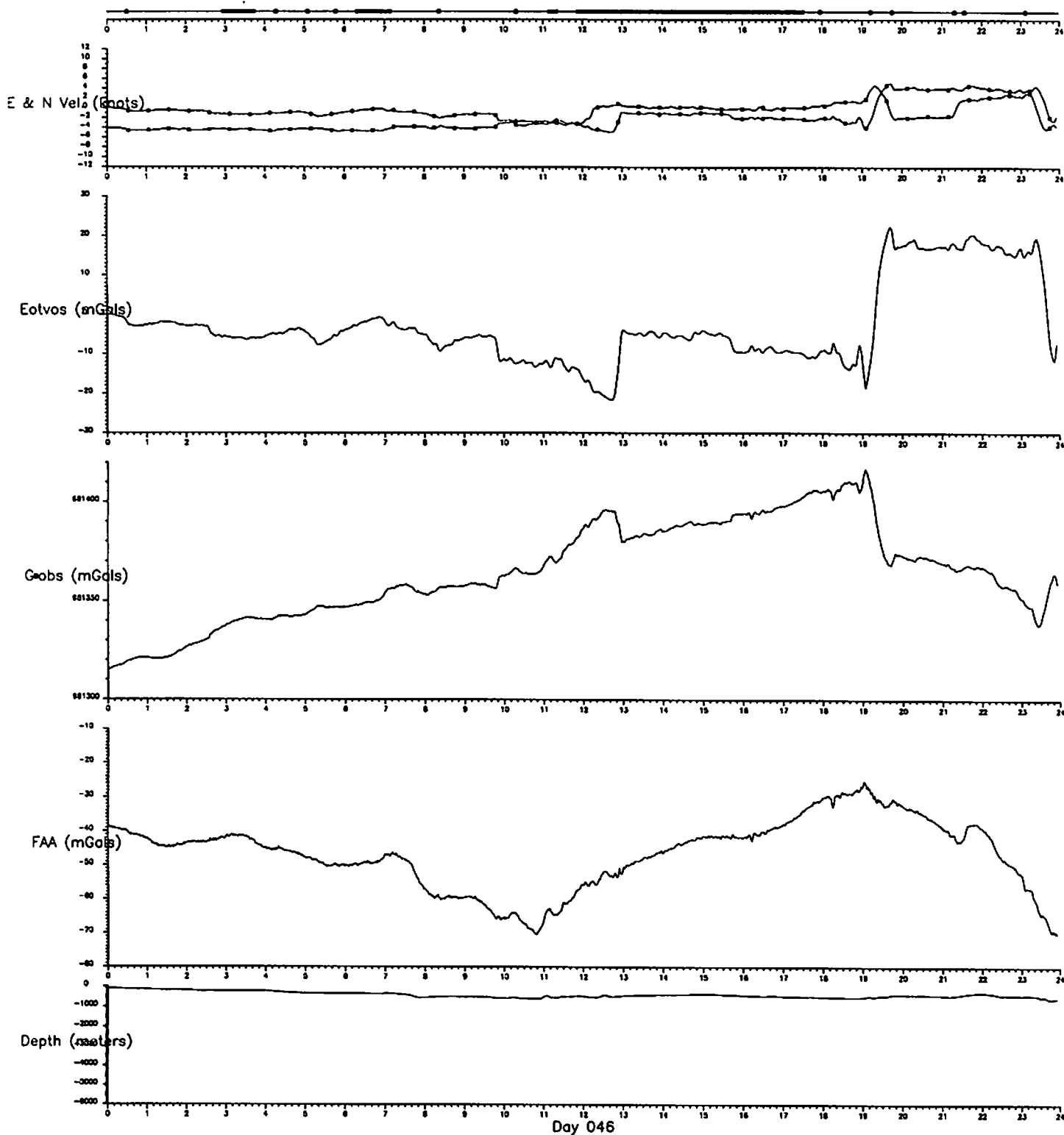
Data file: 2902mg.n053



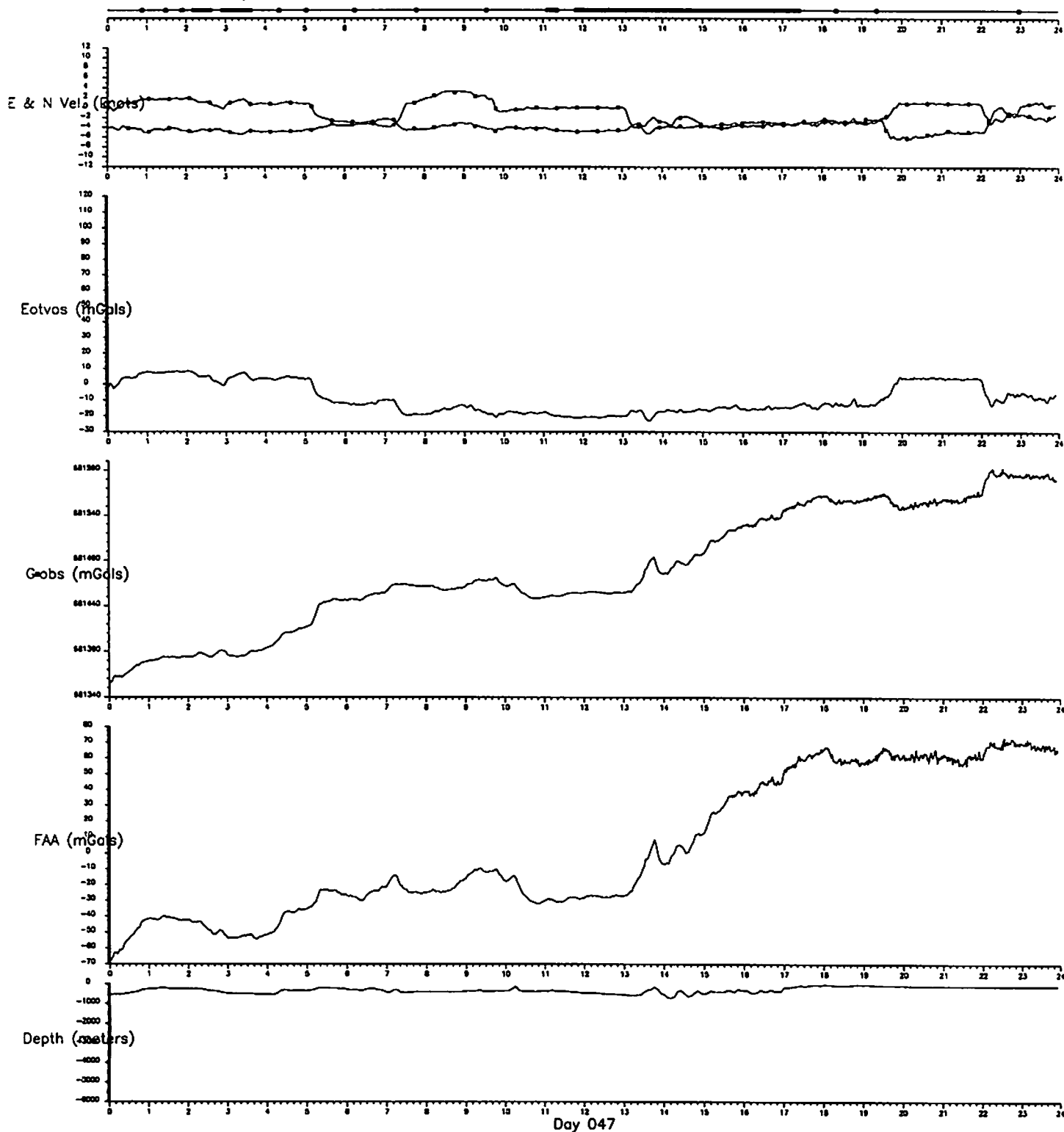
C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
 Gravity file: 2902vt.n045 Bathymetry file: 2902bt.d045 Navigation file: 2902n.045



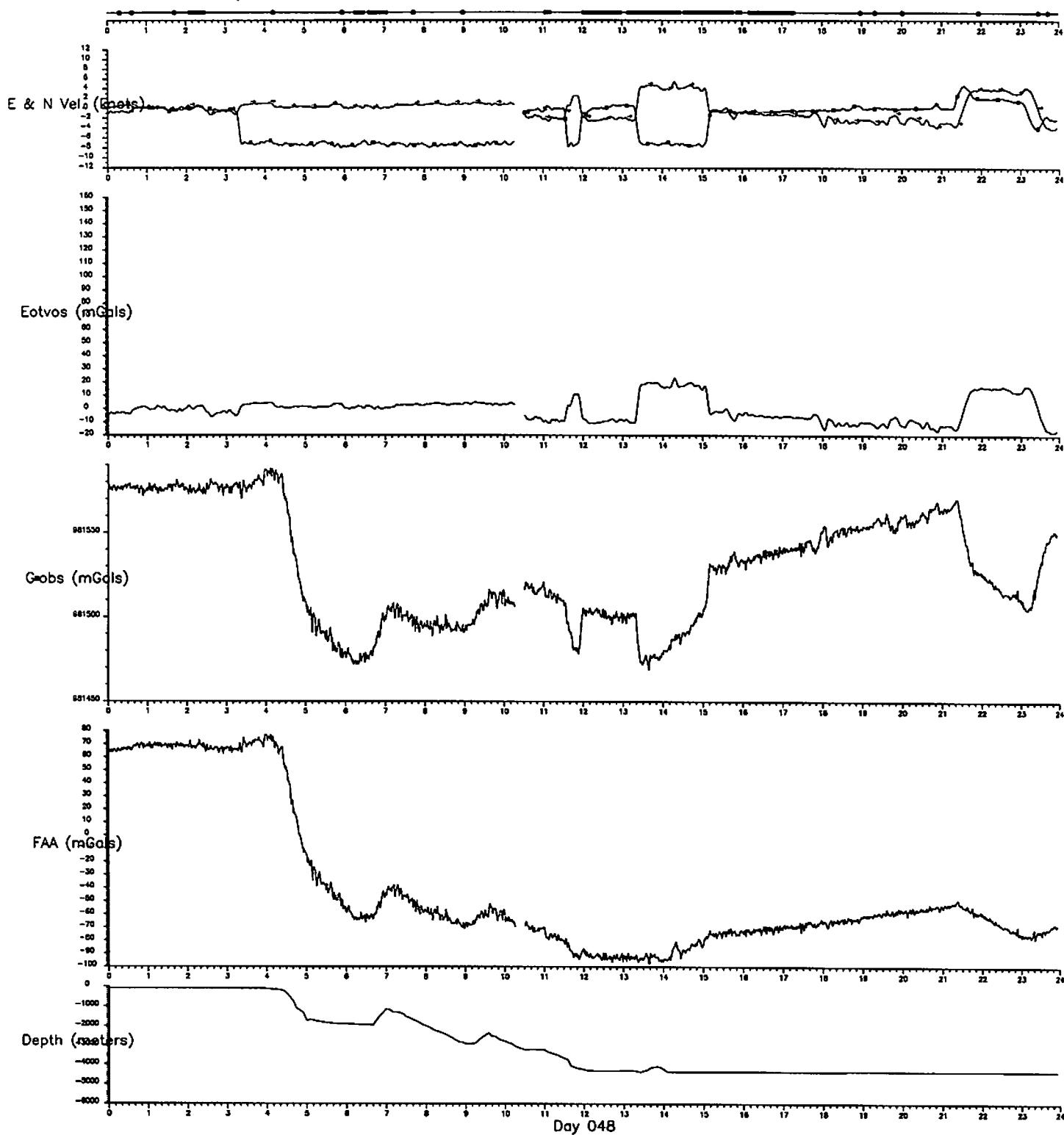
C2902 Punta Arenas—Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
Gravity file: 2902vt.n046 Bathymetry file: 2902bt.d046 Navigation file: 2902n.046



C2902 Punta Arenas—Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
 Gravity file: 2902vt.n047 Bathymetry file: 2902bt.d047 Navigation file: 2902n.047

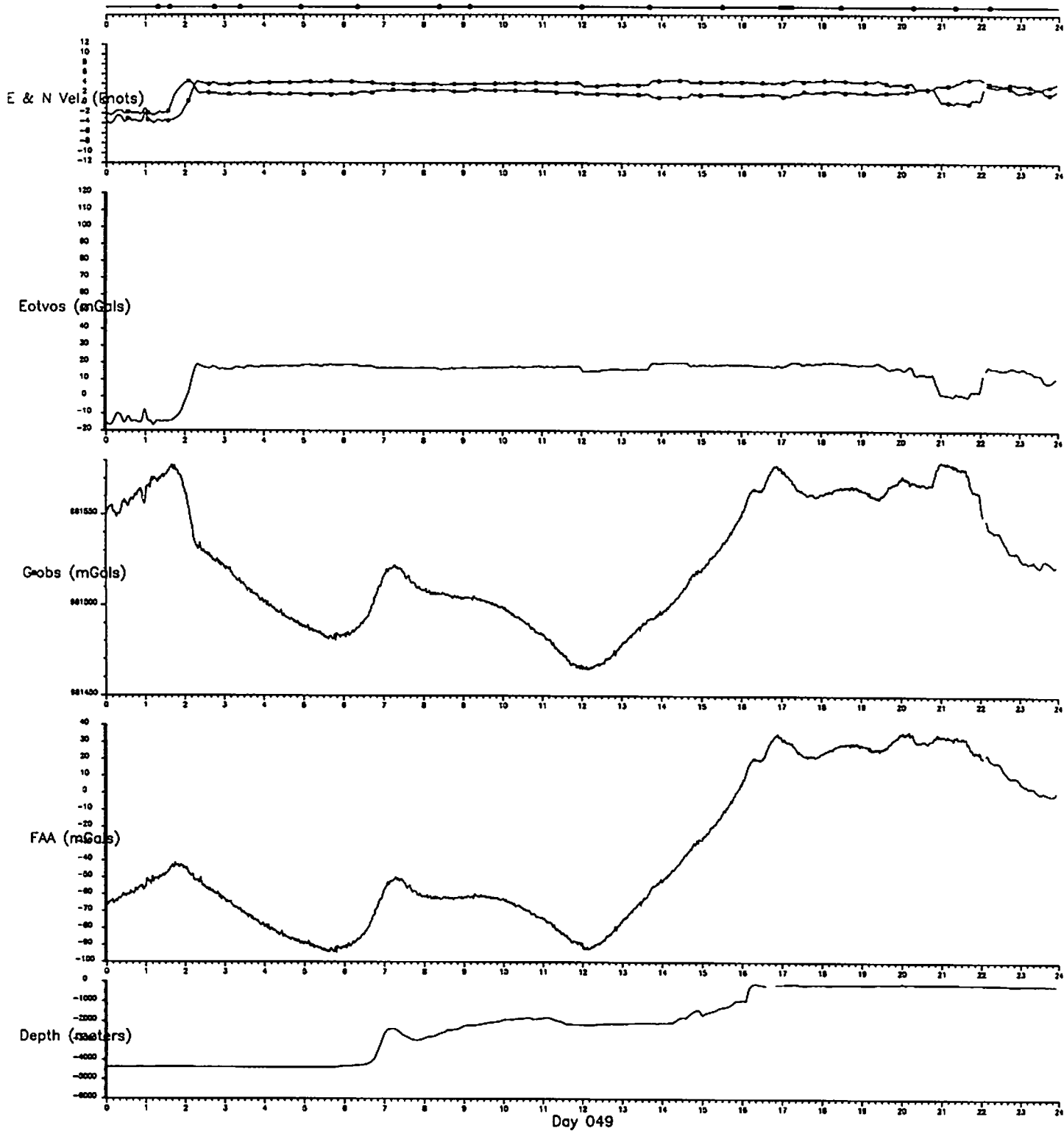


C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
 Gravity file: 2902vt.n048 Bathymetry file: 2902bt.d048 Navigation file: 2902n.048

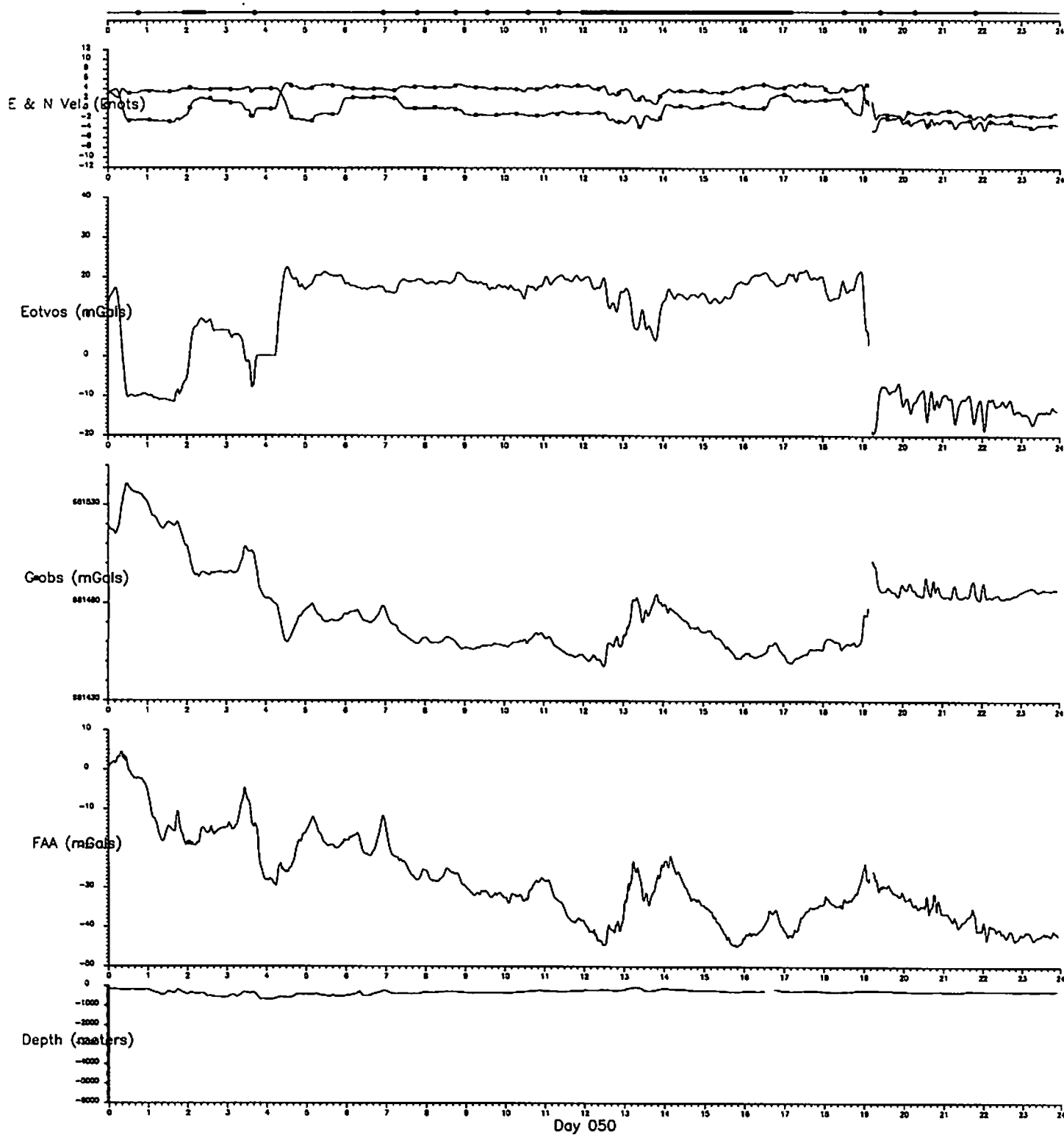


C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing

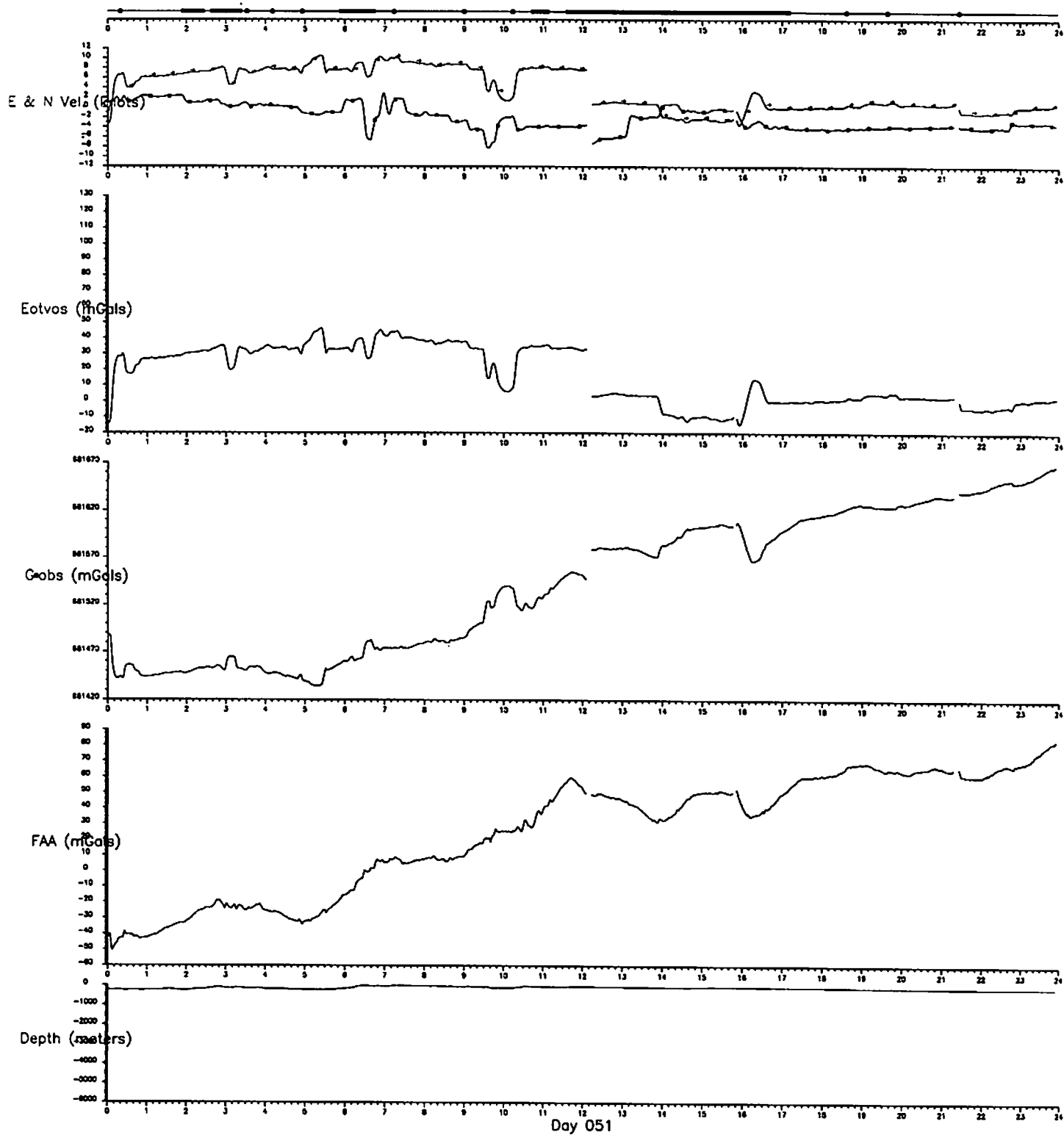
Gravity file: 2902vt.n049 Bathymetry file: 2902bt.d049 Navigation file: 2902n.049



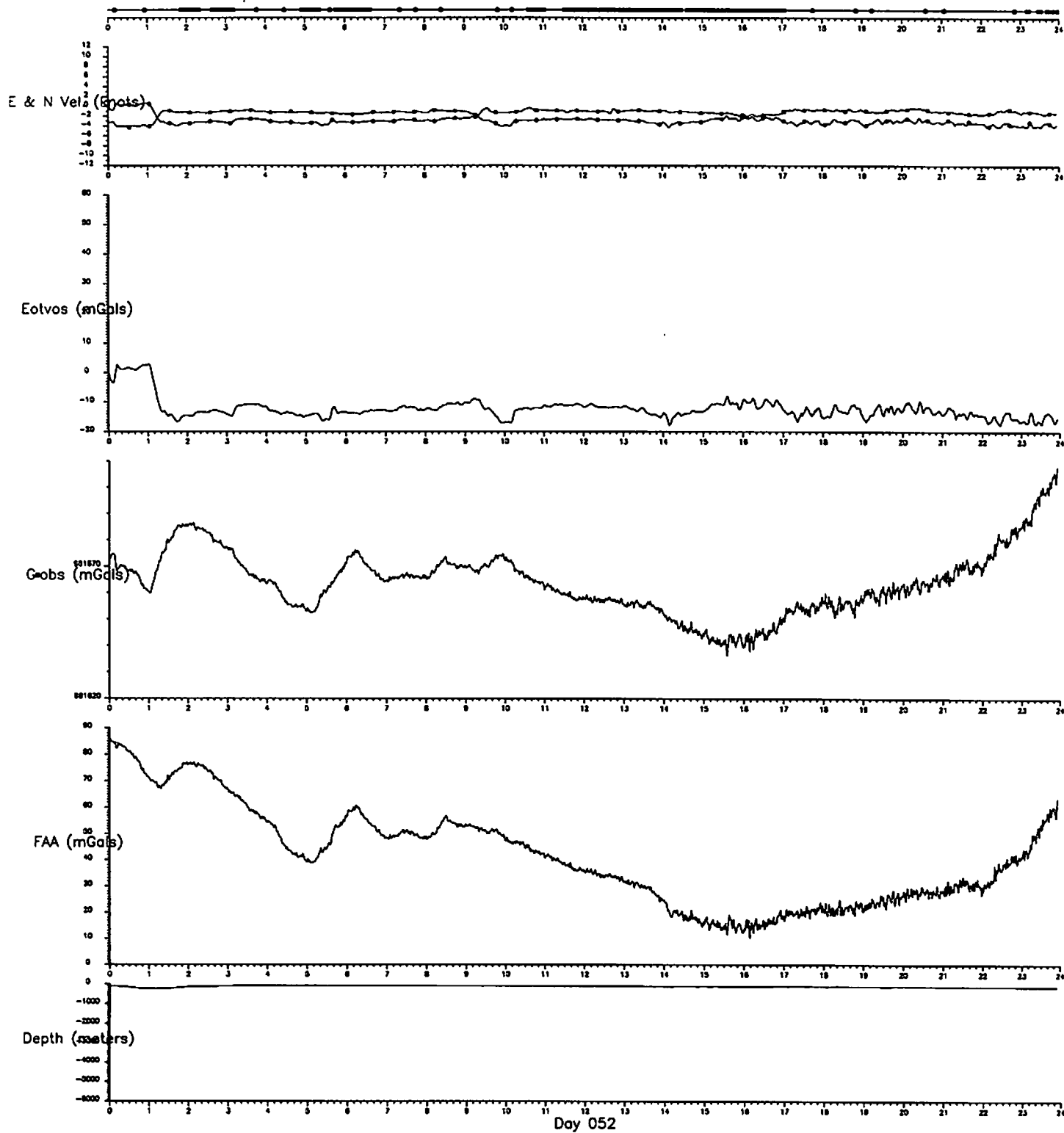
C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
Gravity file: 2902vt.n050 Bathymetry file: 2902bt.d050 Navigation file: 2902n.050



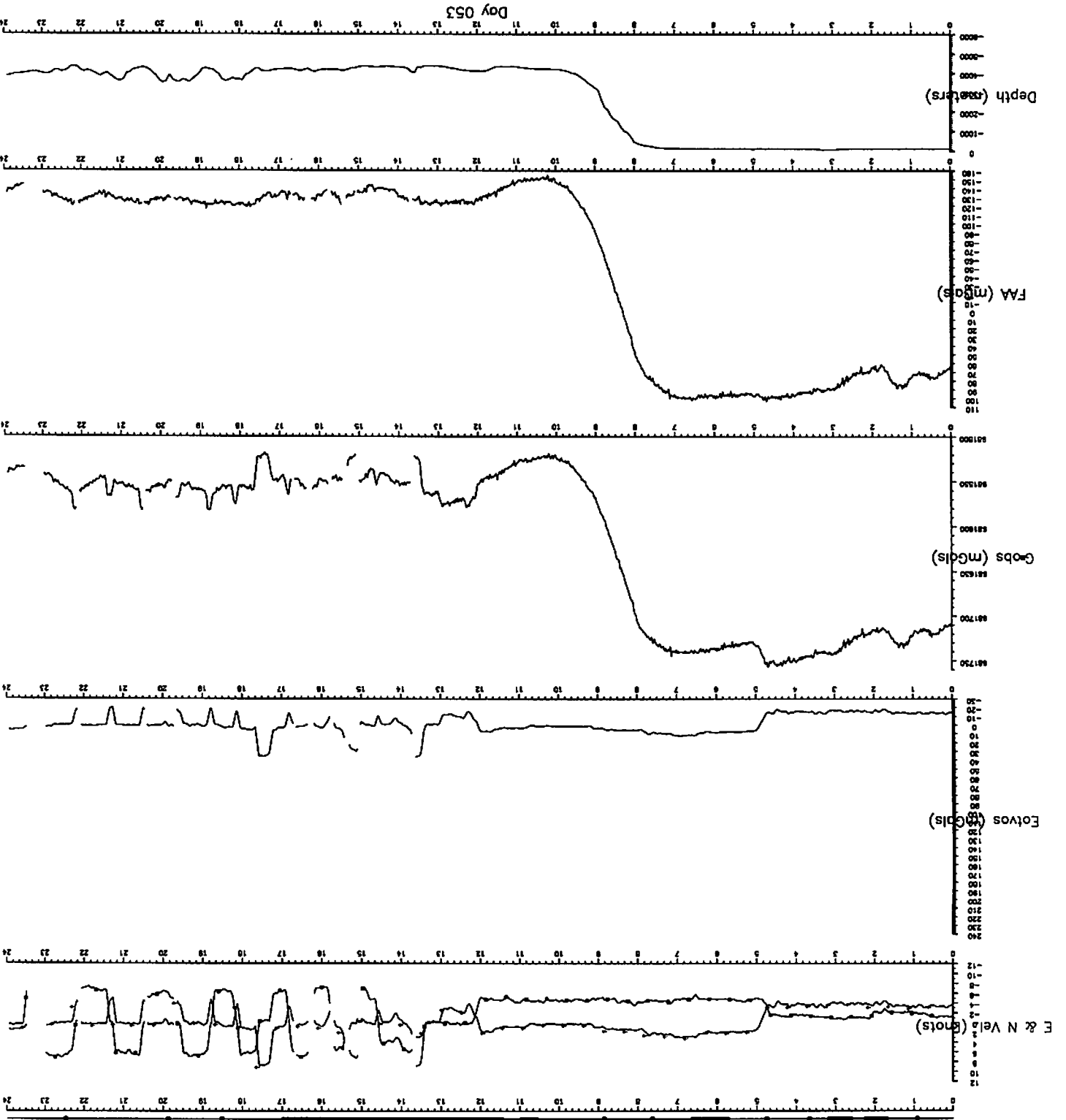
C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
 Gravity file: 2902vt.n051 Bathymetry file: 2902bt.d051 Navigation file: 2902n.051



C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
 Gravity file: 2902vt.n052 Bathymetry file: 2902bt.d052 Navigation file: 2902n.052



C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
 Gravity file: 2902vt.n053 Bathymetry file: 2902bt.d053 Navigation file: 2902n.053

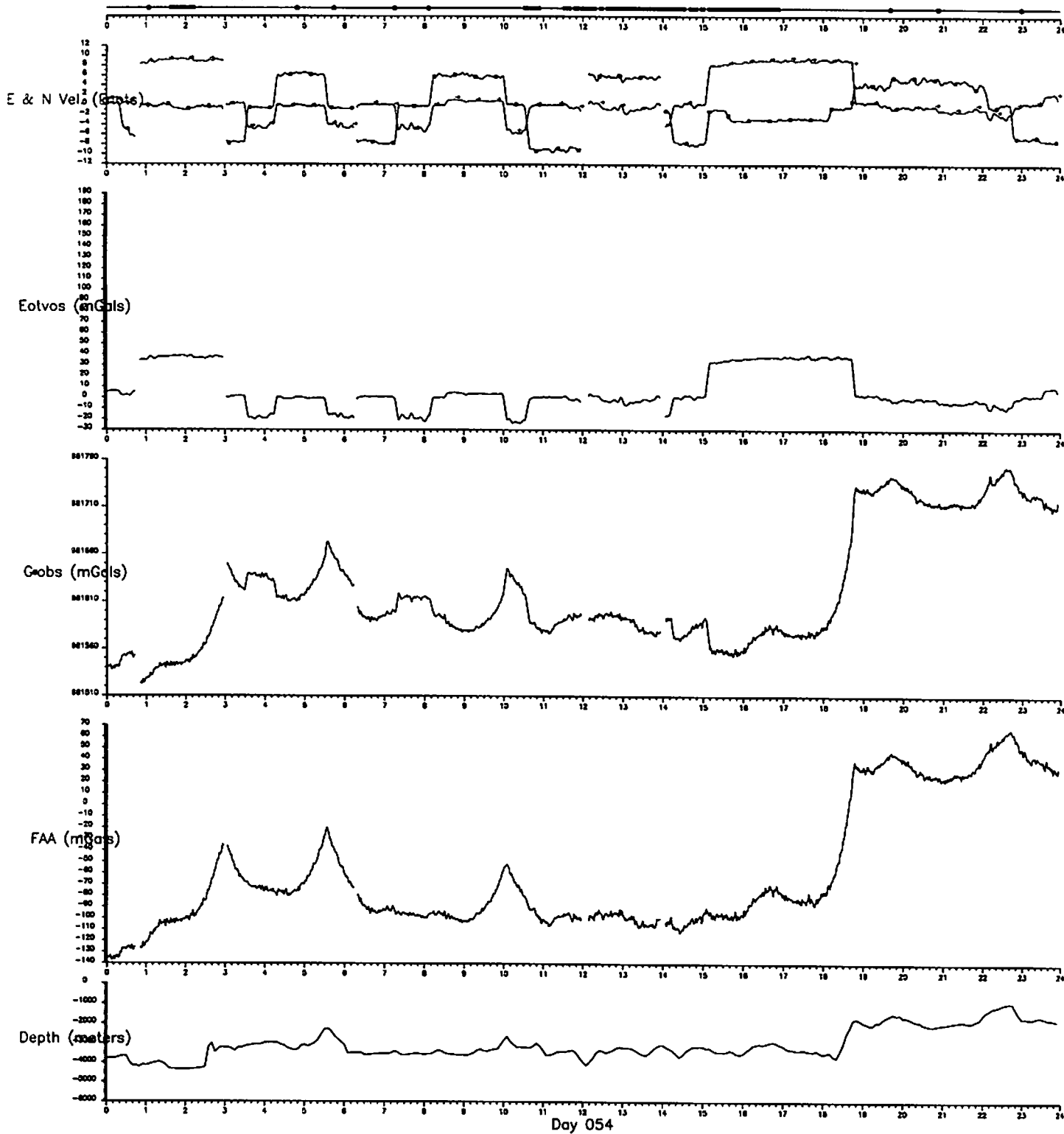


C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing

Gravity file: 2902vt.n054

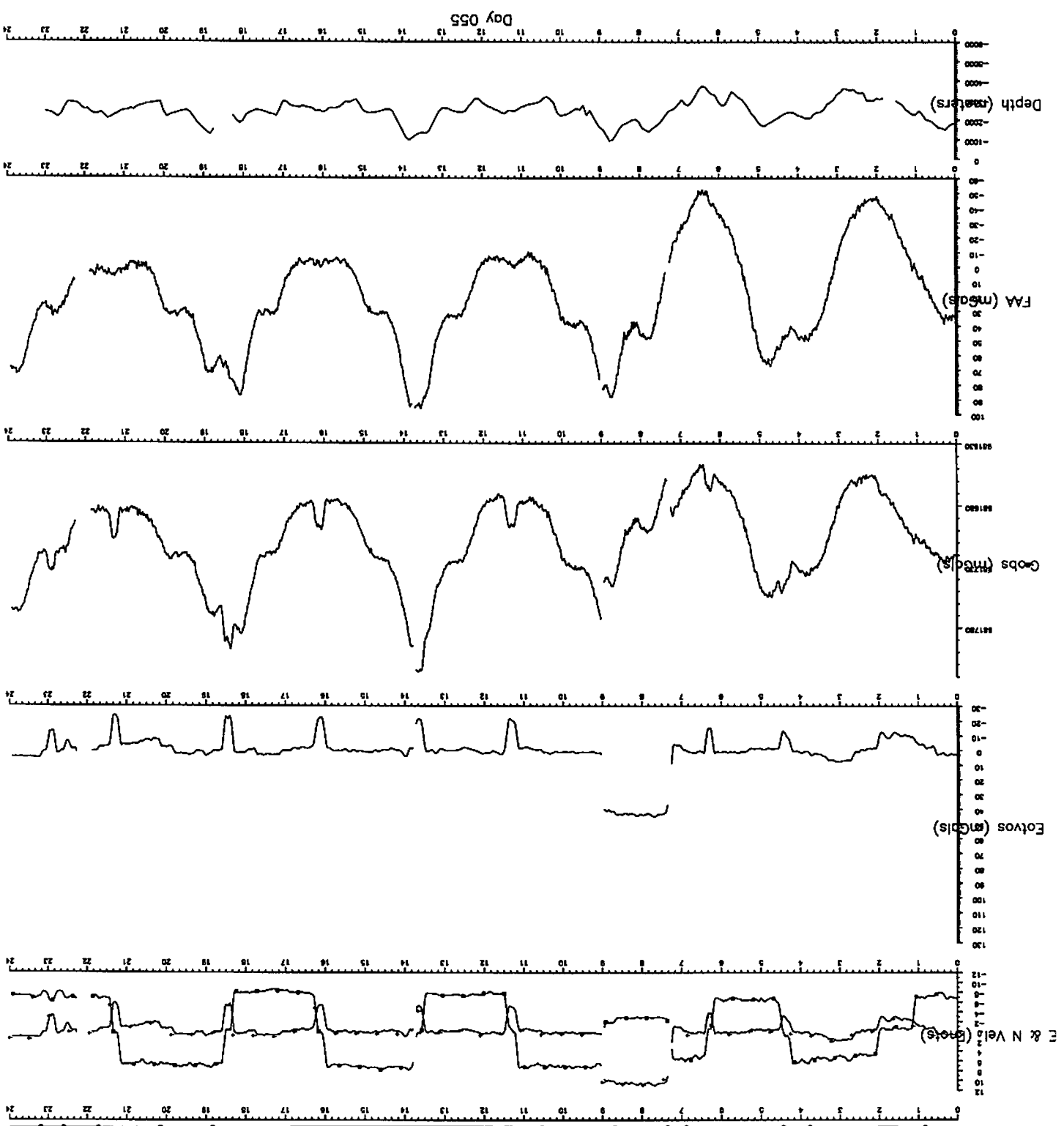
Bathymetry file: 2902bt.d054

Navigation file: 2902n.054

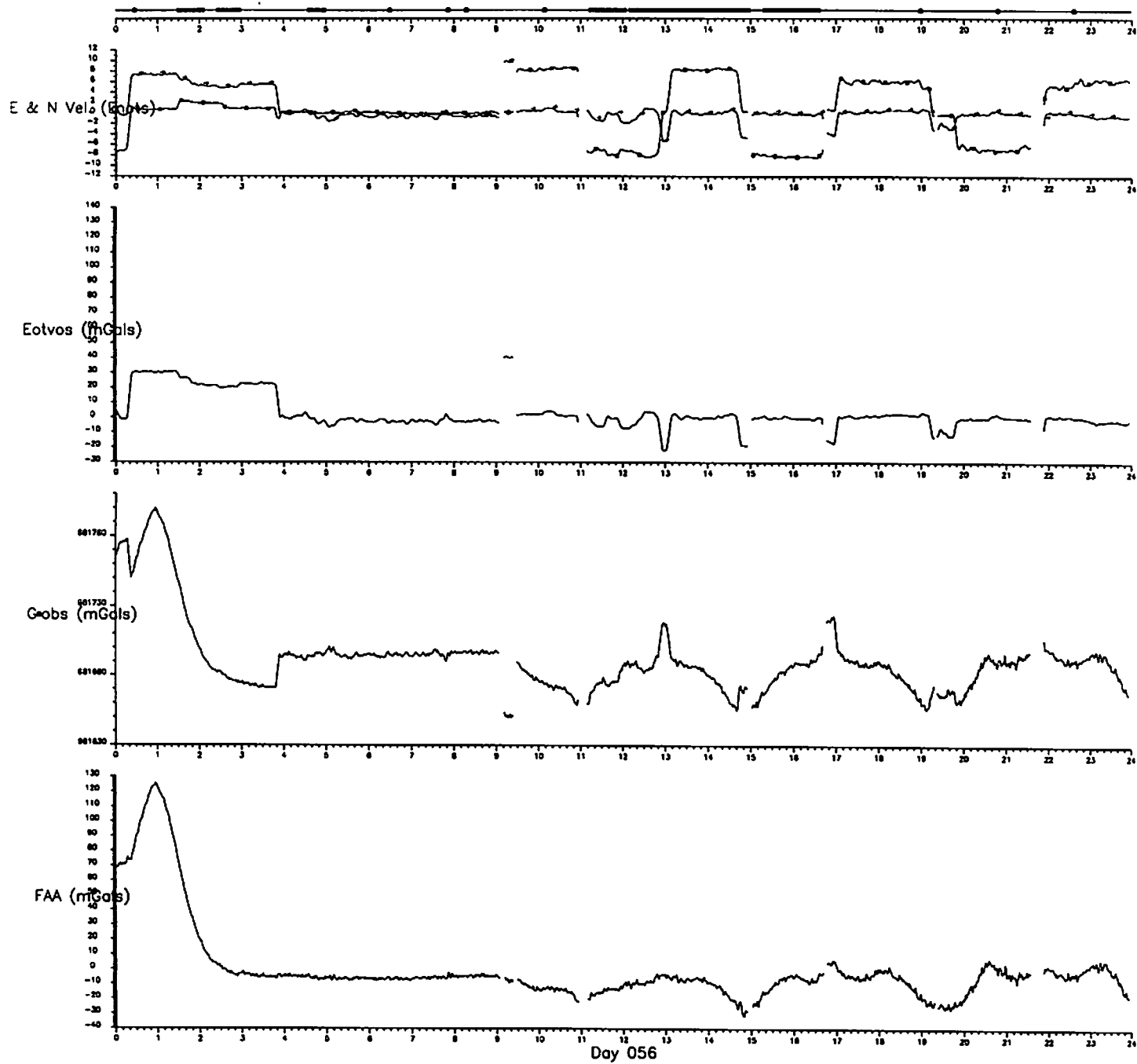


C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing

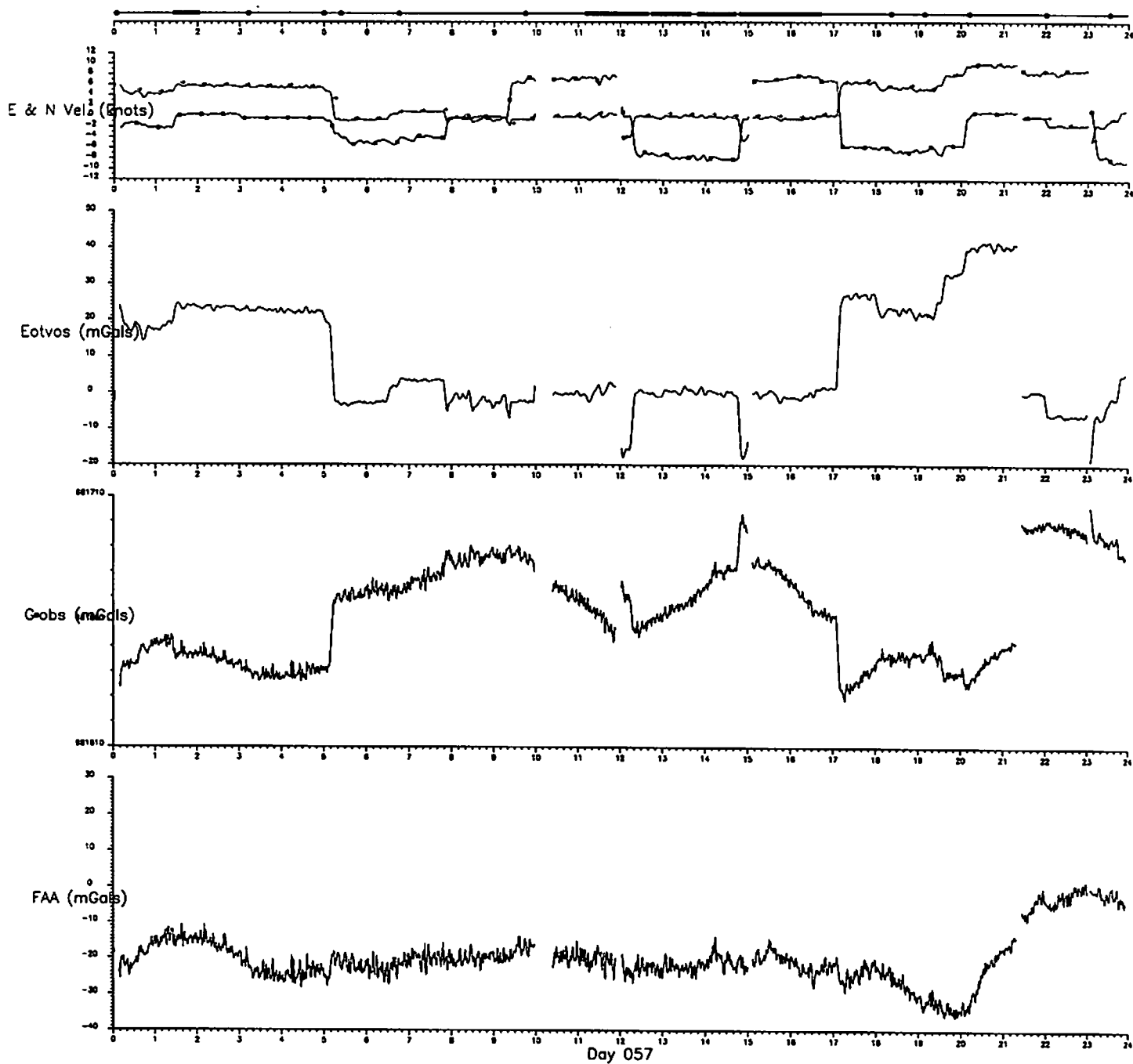
Gravity file: 2902vln055 Bathymetry file: 2902bt.d055 Navigation file: 2902n.055



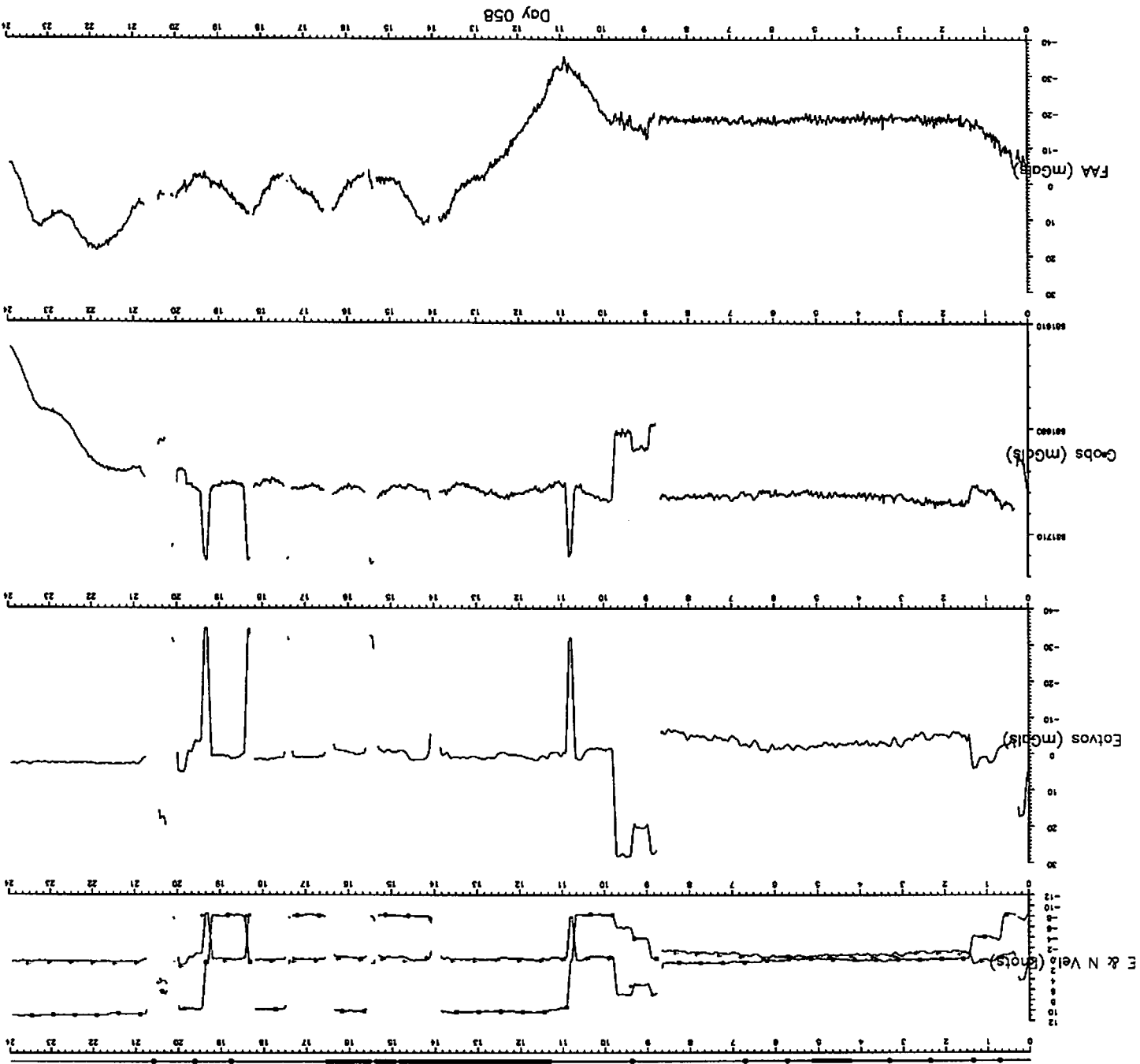
C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
Gravity file: 2902vt.n056 Navigation file: 2902n.056



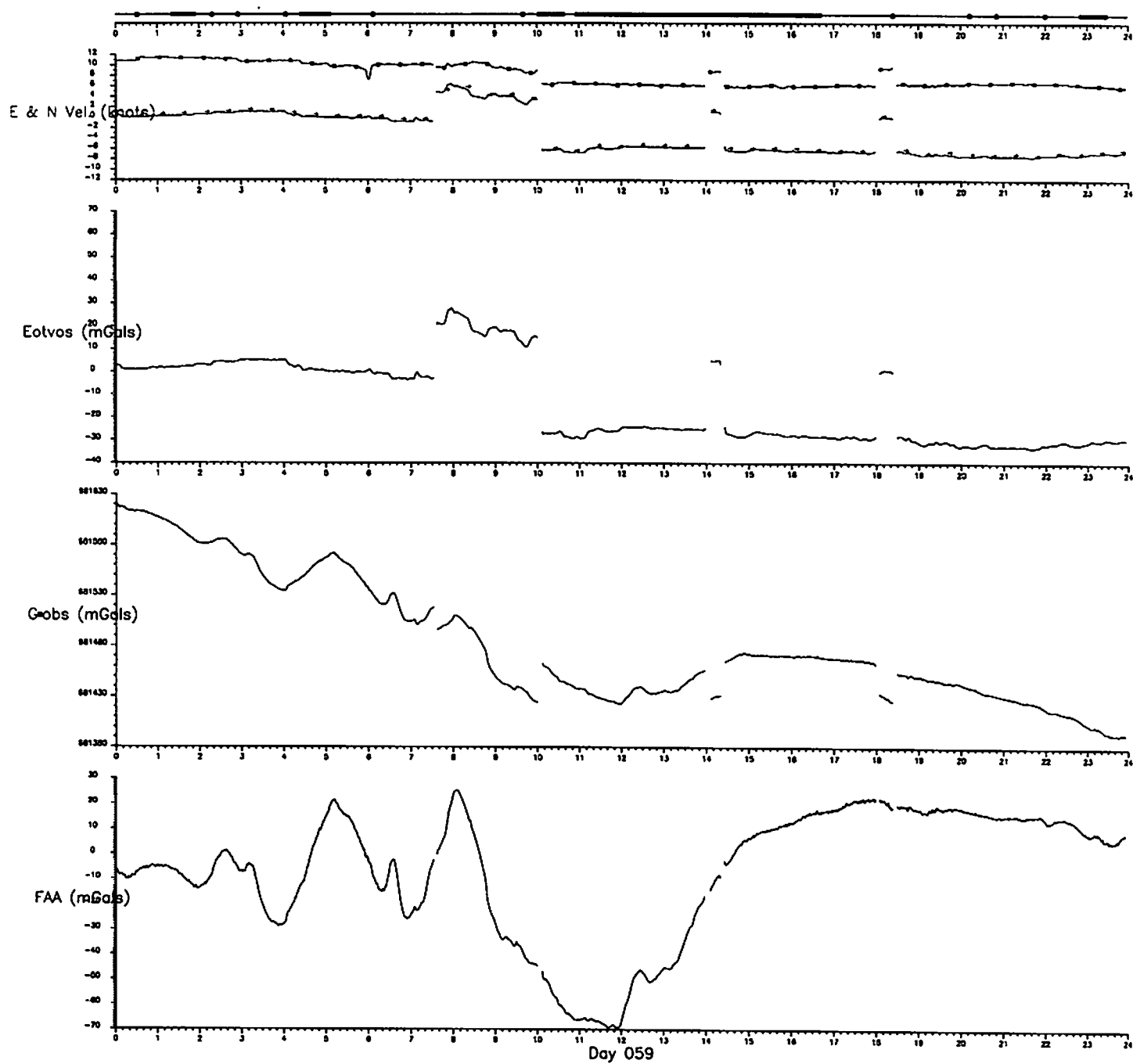
C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
Gravity file: 2902vt.n057 Navigation file: 2902n.057



C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical: 5 pt. velocity smoothing
 Gravity file: 2902vt.n058 Navigation file: 2902n.058



C2902 Punta Arenas-Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
Gravity file: 2902vt.n059 Navigation file: 2902n.059



C2902 Punta Arenas--Punta Arenas GRAVITY DATA: 1930 Theoretical; 5 pt. velocity smoothing
Gravity file: 2902vt.n060 Navigation file: 2902n.060

