NOAA Technical Memorandum NMFS

MARCH 2008

REPORT OF A HYDROGRAPHIC SURVEY OF CLIPPERTON RIDGE CONDUCTED ABOARD THE *DAVID STARR JORDAN* DURING THE *STENELLA* ABUNDANCE RESEARCH CRUISE 2006

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Keith W. Roberts
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NOAA-TM-NMFS-SWFSC-419

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Science Center

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Introduction and methods

The National Oceanic and Atmospheric Administration (NOAA) Research Vessel DAVID STARR JORDAN (hereafter, JORDAN) based in San Diego, CA, supports the research efforts of the NOAA Southwest Fisheries Science Center (SWFSC). General operational capabilities include fisheries stock assessment (trawl and long line operations), physical and biological oceanography, and marine mammal abundance research. Although hydrographic data acquisition is not a primary mission of the ship, the JORDAN is equipped with several acoustic echo sounding systems including the Simrad EK500 (200 kHz, 1200 kHz, and 38 kHz transducers), Simrad ES60 (50 kHz), Skipper GDS101 Navigational fathometer (200 kHz) and Knudsen 320B (12 kHz).

The JORDAN collected reconnaissance bathymetric data while operating near Clipperton Island from 9-11 November 2006. Sea floor depth data were collected along Clipperton Ridge using a Knudsen 12 kHz echo sounder. Position and ship track data were simultaneously monitored and saved using Nobeltec Navigation Suite version 7. Acoustic backscatter data to a depth of 500m were recorded using a Simrad EK500 echosounder and associated software. These hydrographic data were collected by the Oceanographer and Officers while underway on research cruise DS-06-05, STAR (Stenella Abundance Research); a triennial marine mammal and ecosystem survey (http://swfsc.noaa.gov/prd-star.aspx).

The JORDAN approached Clipperton Island from the east on an average course of 267° T and collected hydrographic data from 21:30 local mean time (LMT) on 9 November 2006 (+6 GMT) until 08:10 LMT on 10 November 2006. Additional data were collected north and west of Clipperton Island from 19:00 LMT on 10 November 2006 until 02:00 LMT on 11 November 2006. The Knudsen system was used for this survey because it is the only echosounder on board capable of detecting the sea floor at depths greater than 1200m. The JORDAN was not equipped to record the digital data of this trace, hence screen shots are provided. EK500 data was recorded during the entire survey and may be of particular interest for the period between 08:07 to 19:02 LMT on 10 November 2006. During this time frame the Knudsen echosounder was not recorded as the JORDAN was on standby, awaiting the completion of scientific activities on Clipperton Island.

Results

Ship positions and bathymetric data collected along Clipperton Ridge to the east of Clipperton Atoll are presented in Figures 1 – 11 and Table 1, and to the north-northeast of Clipperton Atoll in Figures 12 – 16 and Table 1.

The ship transited repeatedly along the north side of Clipperton Atoll between 08:07 and 19:02 LMT on 10 November 2006 (figure 17). During this time, bathymetric data were collected using a Simrad EK500 echosounder. These data are available by contacting Lisa.Ballance@noaa.gov.

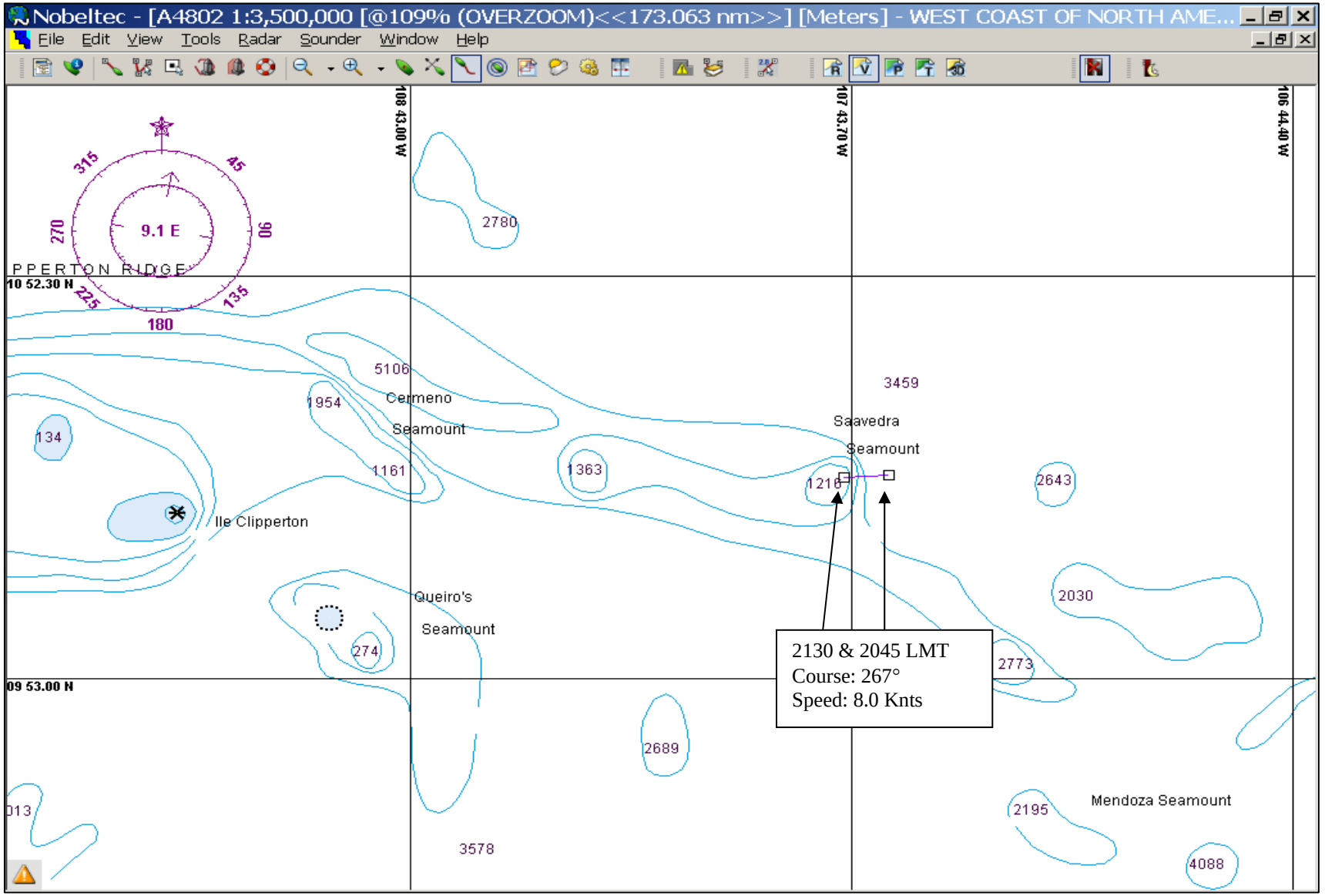

Figure 1a: Ship's position at 20:45 and 21:30 local mean time (LMT) on 9 November, 2006. Corresponding hydrographic data are given in Figure 1b. Depth contours are in meters.

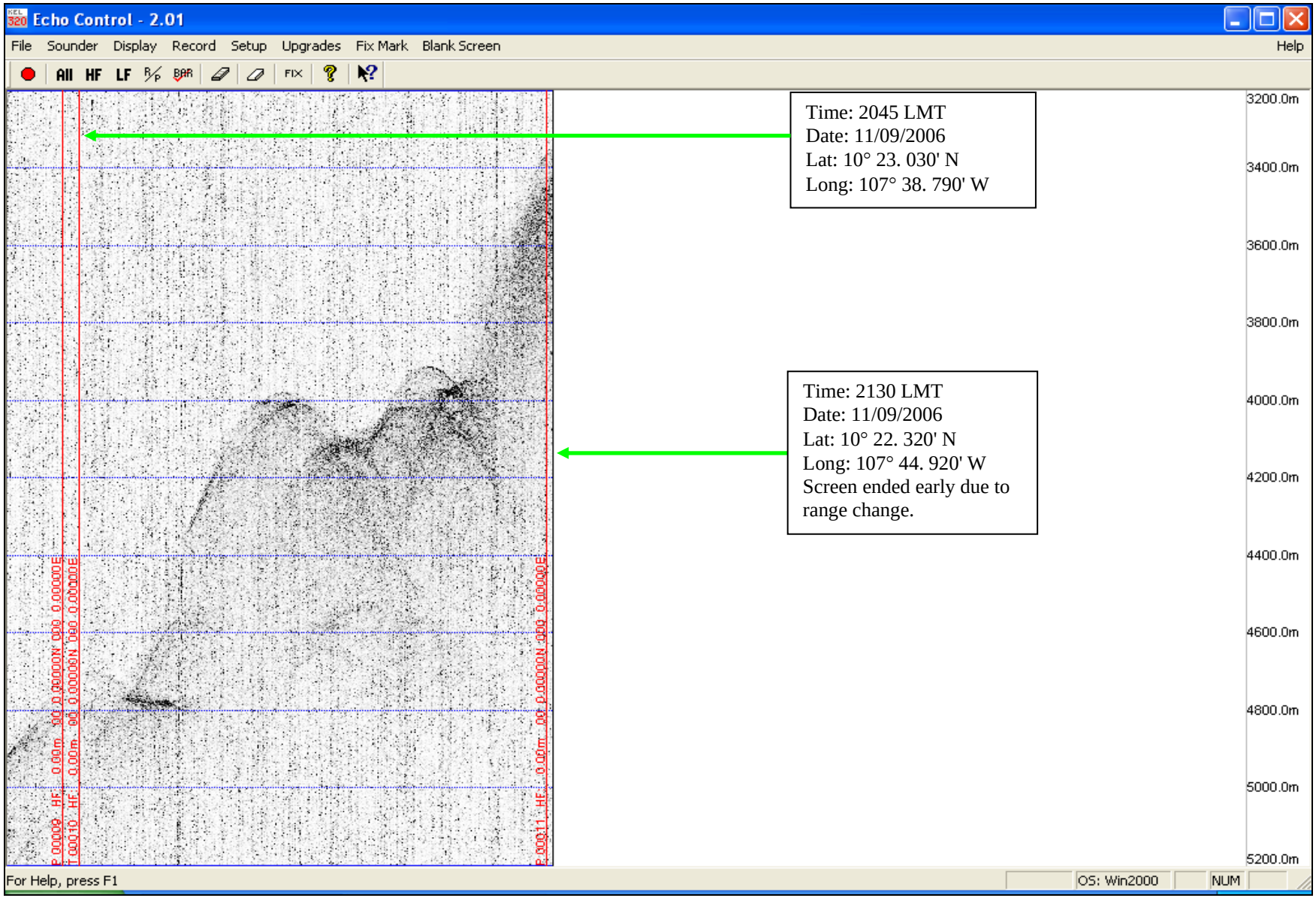

Figure 1b: Bathymetric profile corresponding to ship's location in Figure 1a.

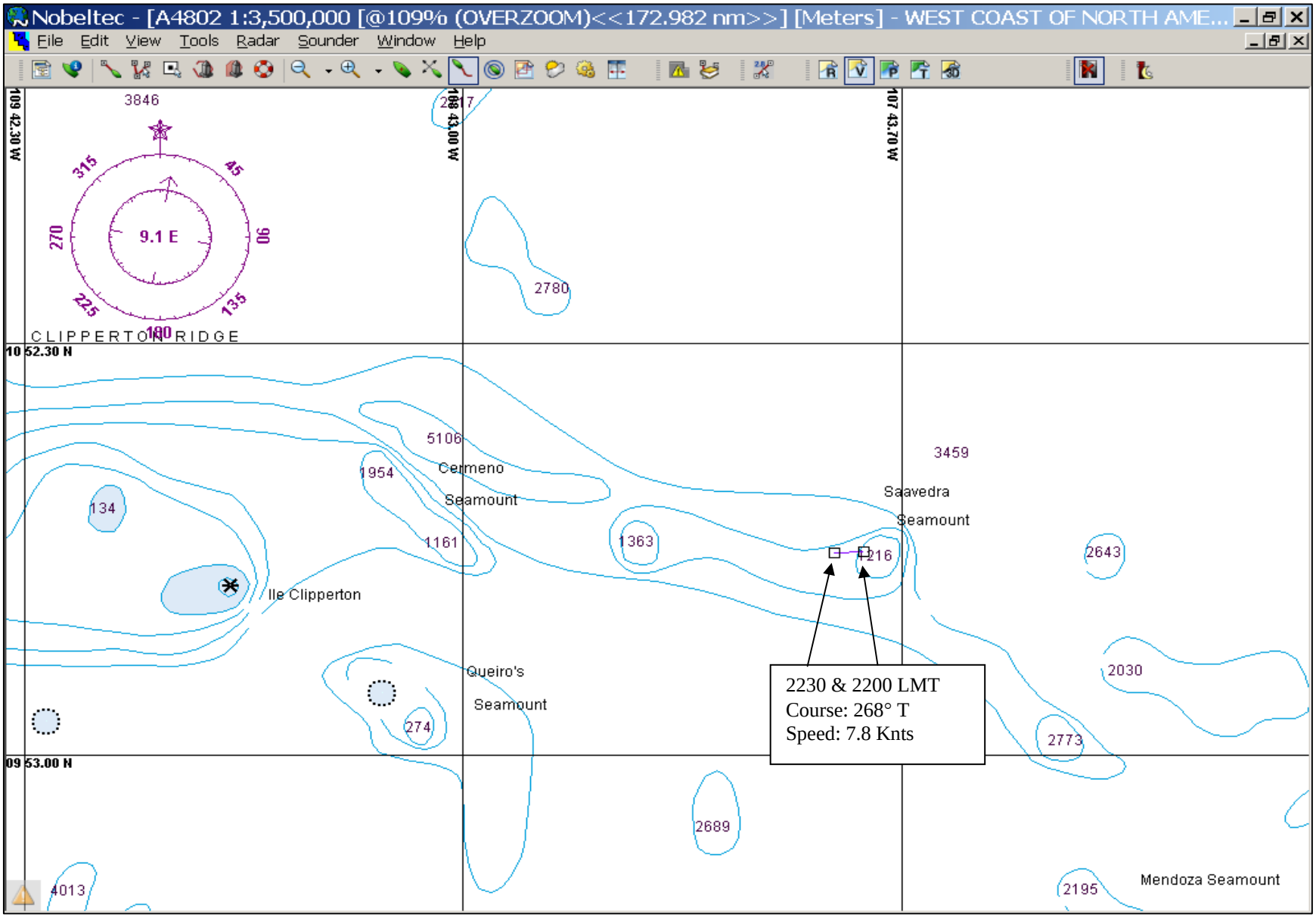

Figure 2a: Ship's position at 22:00 and 22:30 LMT on 9 November, 2006. Corresponding hydrographic data are given in Figure 2b. Depth contours are in meters.

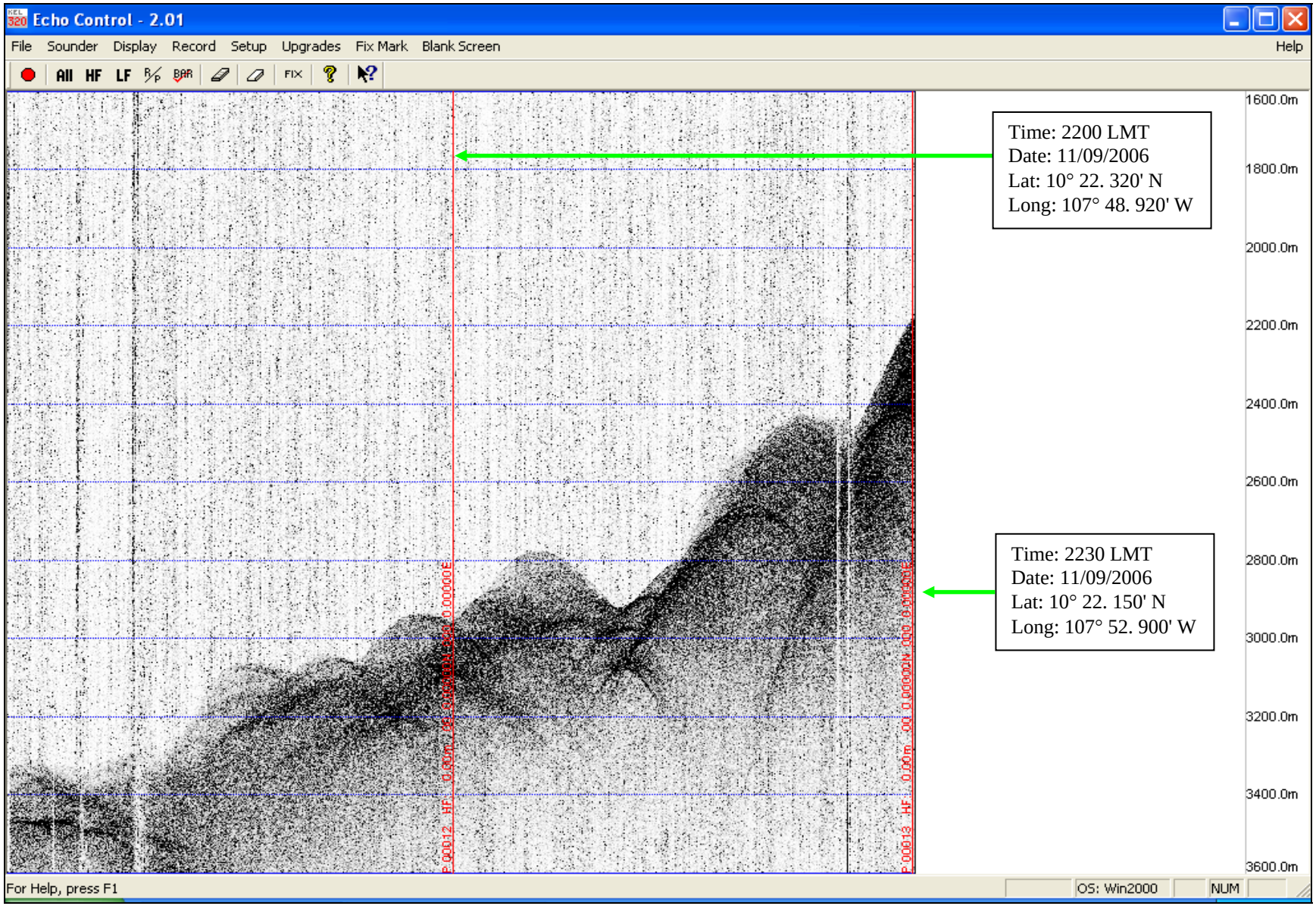

Figure 2b: Bathymetric profile corresponding to ship's location in Figure 2a.

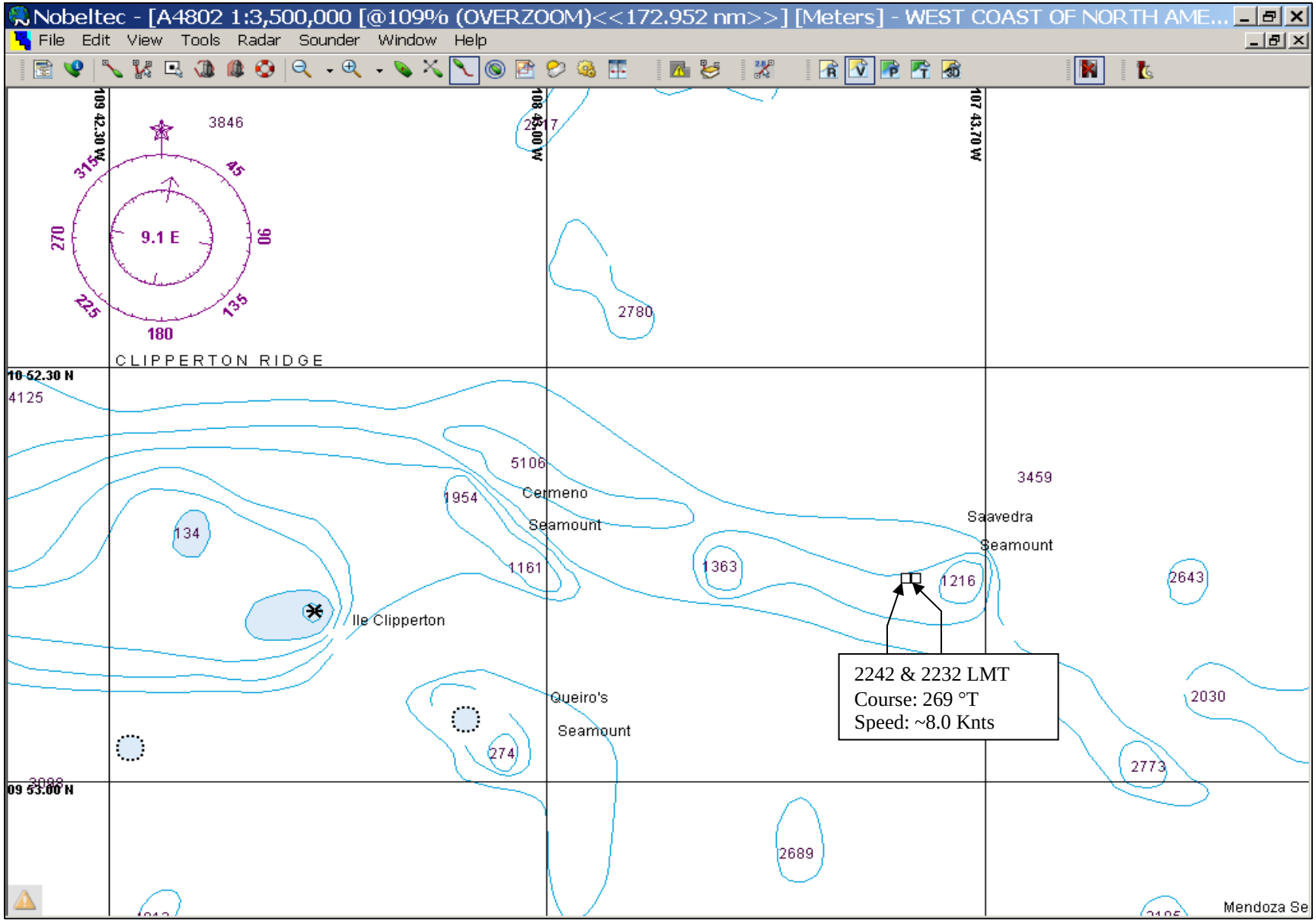

Figure 3a: Ship's position at 22:32 and 22:42 LMT on 9 November, 2006. Corresponding hydrographic data are given in Figure 3b. Depth contours are in meters.

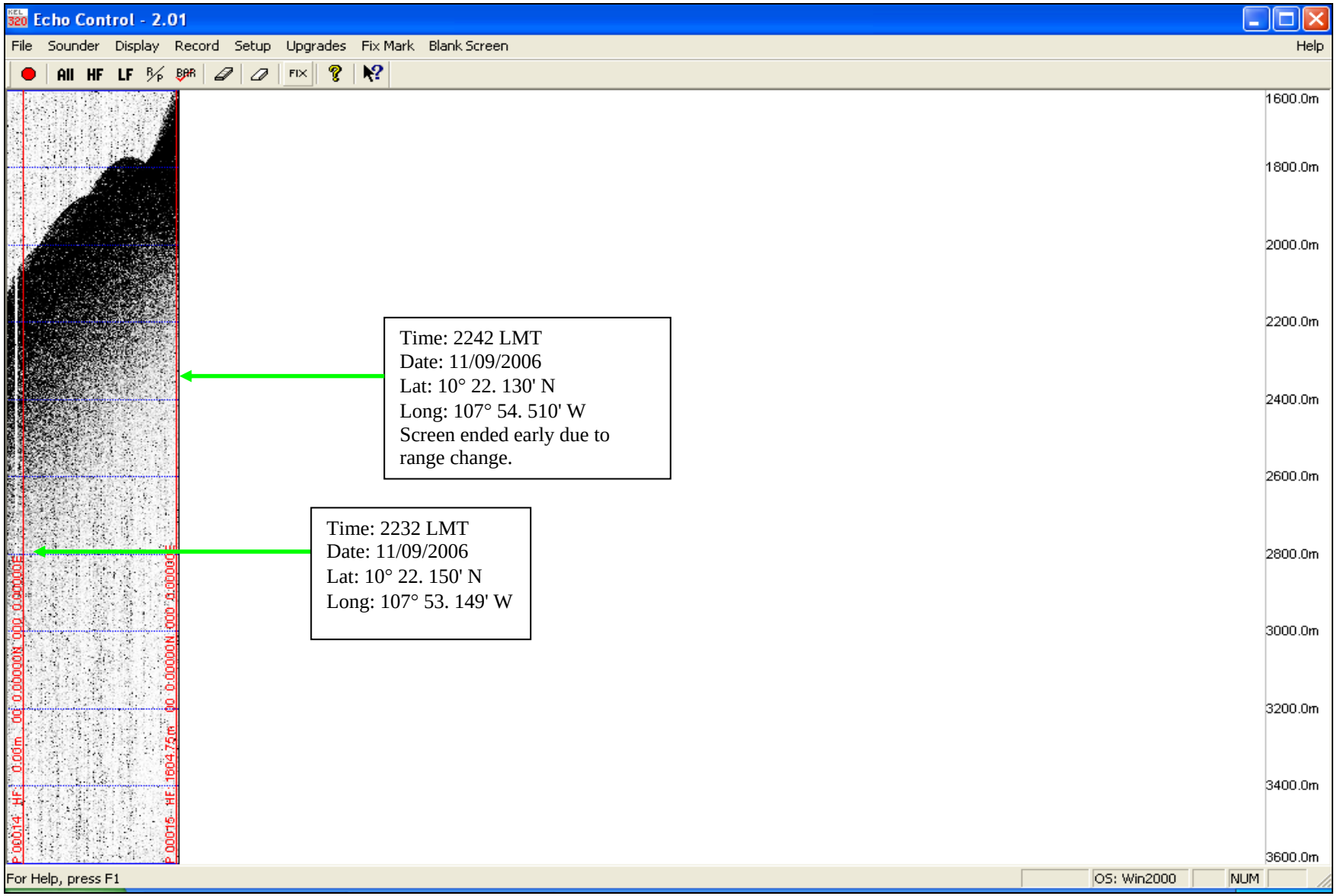

Figure 3b: Bathymetric profile corresponding to ship's location in Figure 3a.

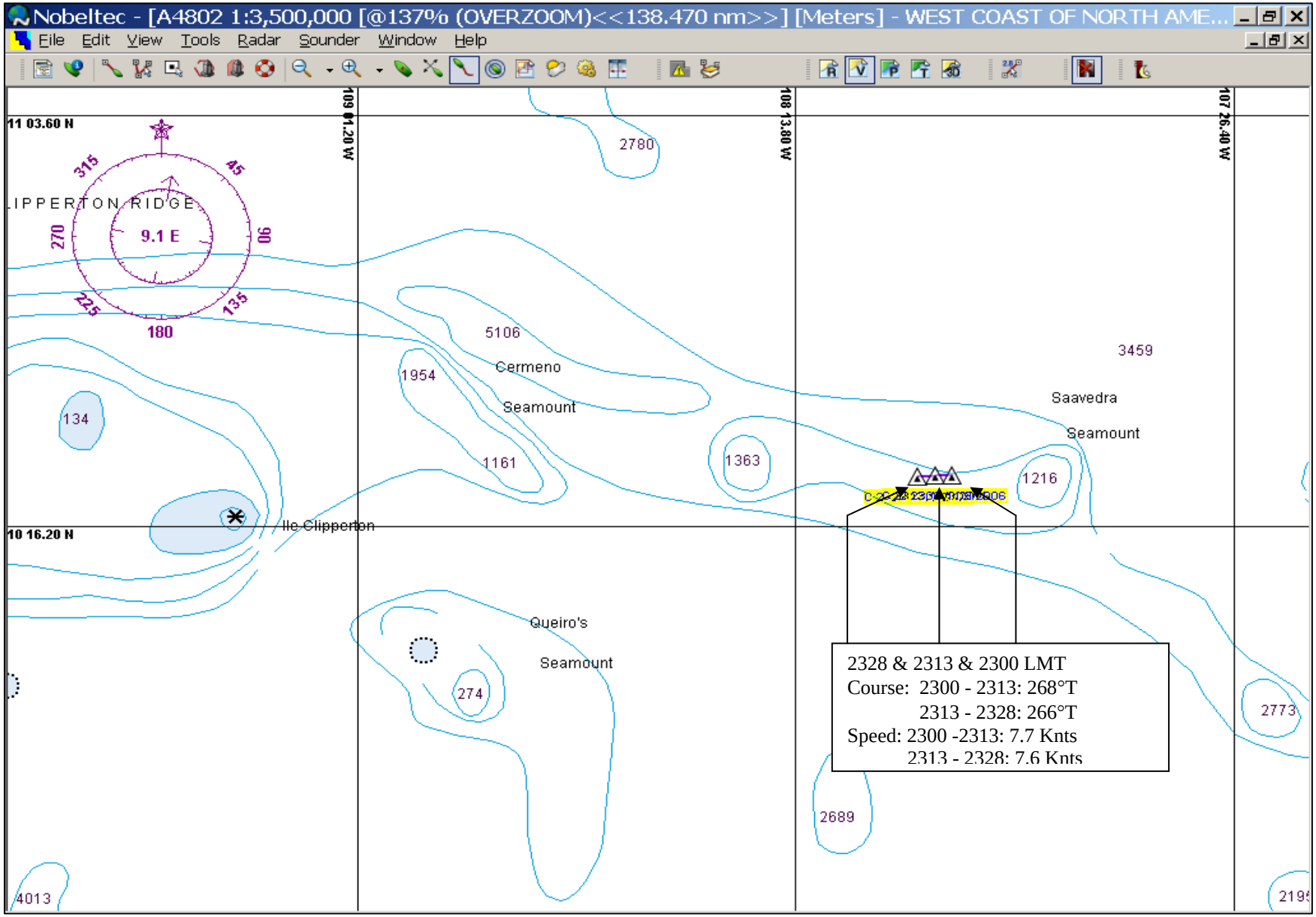

Figure 4a: Ship's position at 23:00, 23:13 and 23:28 LMT on 9 November, 2006. Corresponding hydrographic data are given in Figure 4b. Depth contours are in meters.

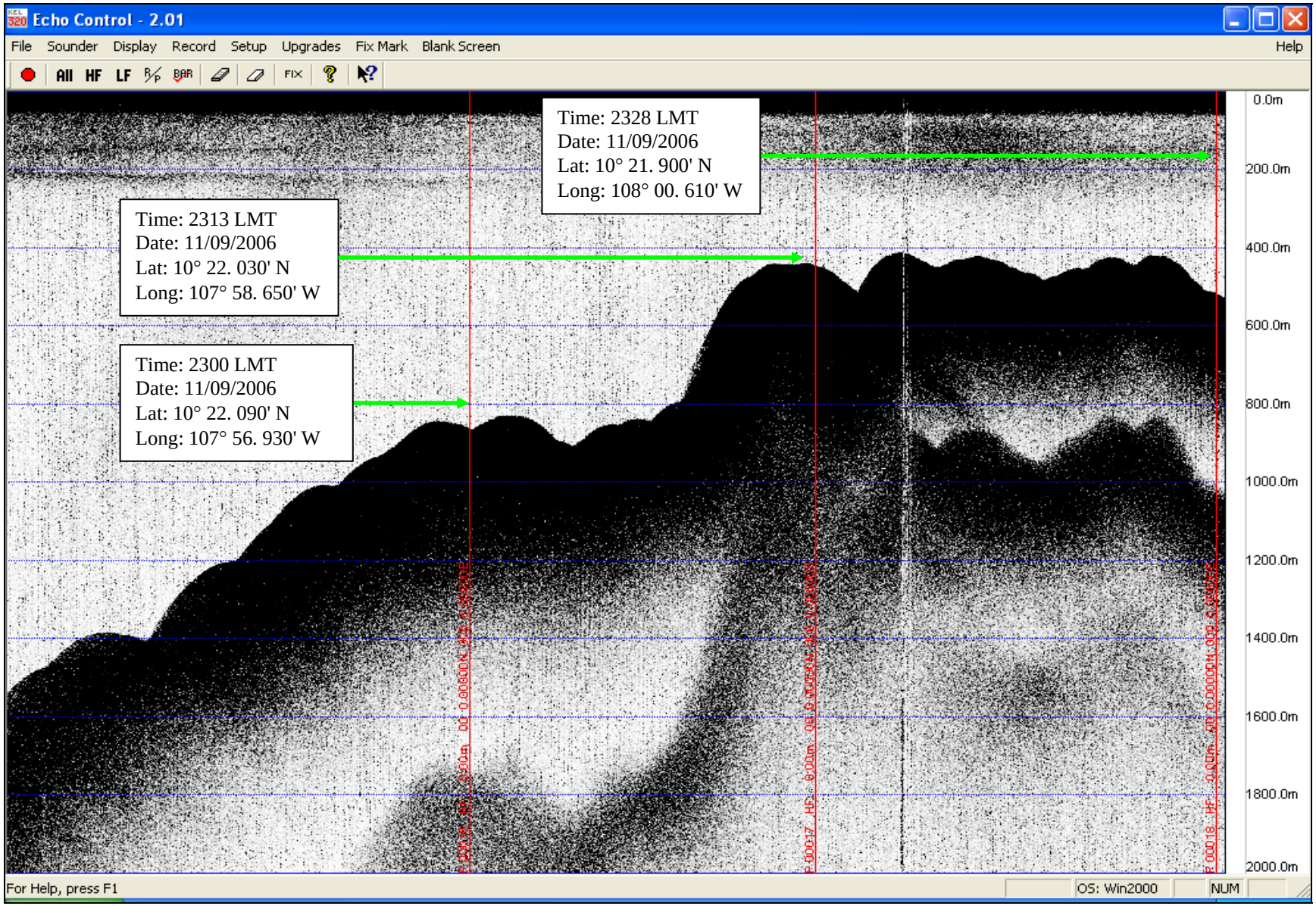

Figure 4b: Bathymetric profile corresponding to ship's location in Figure 4a.

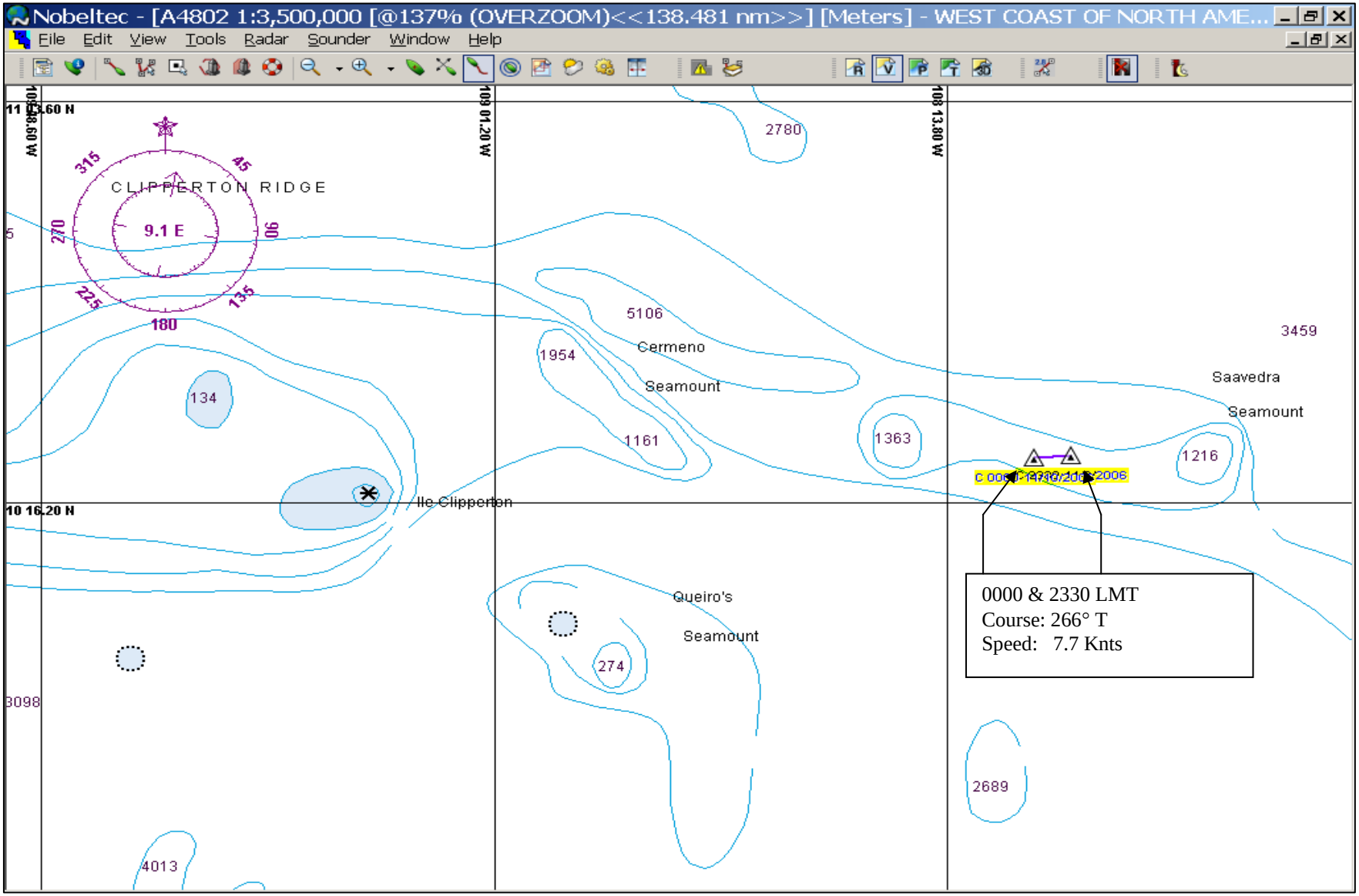

Figure 5a: Ship's position at 23:30 and 00:00 LMT on 9 and 10 November, 2006. Corresponding hydrographic data are given in Figure 5b. Depth contours are in meters.

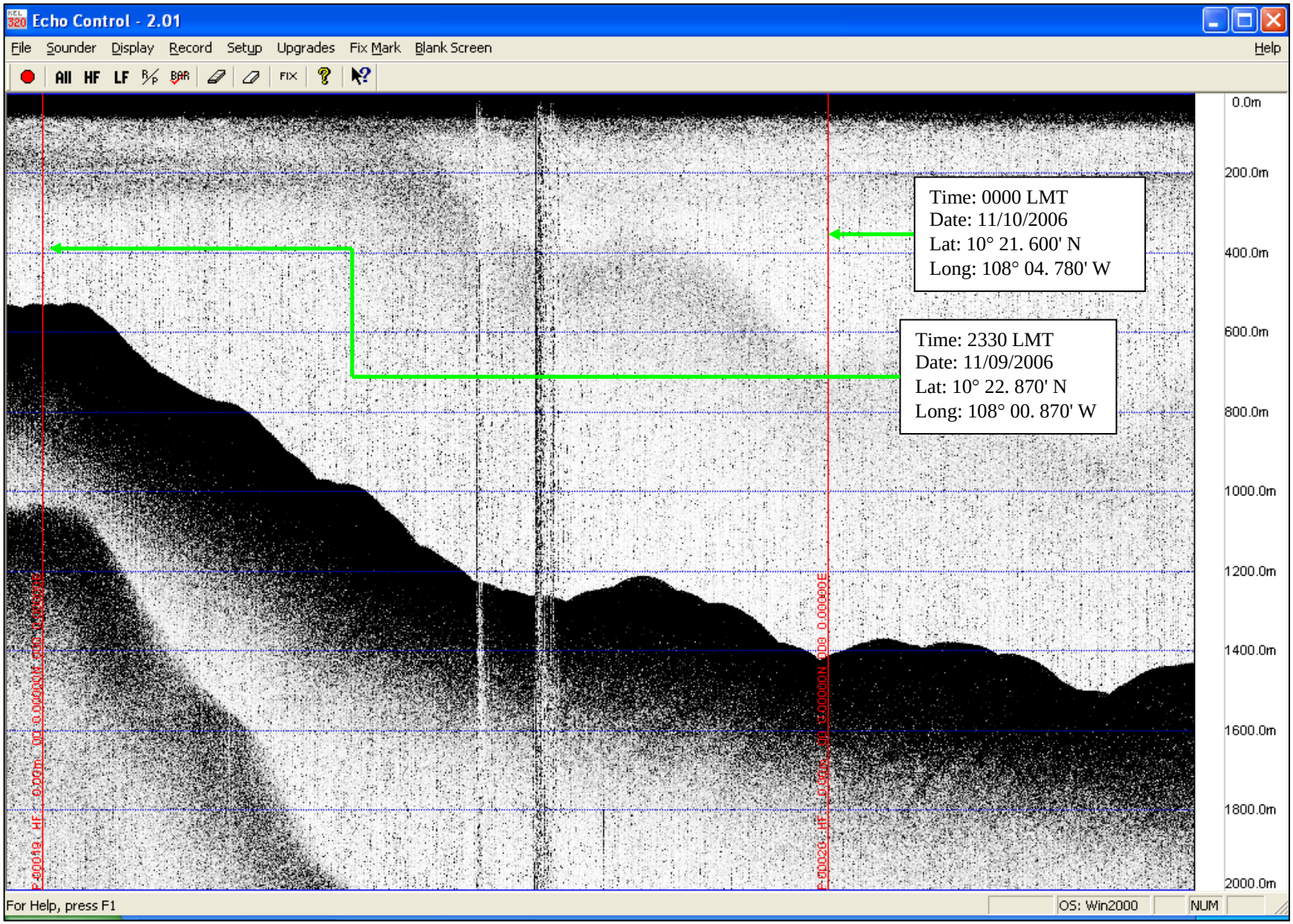

Figure 5b: Bathymetric profile corresponding to ship's location in Figure 5a.

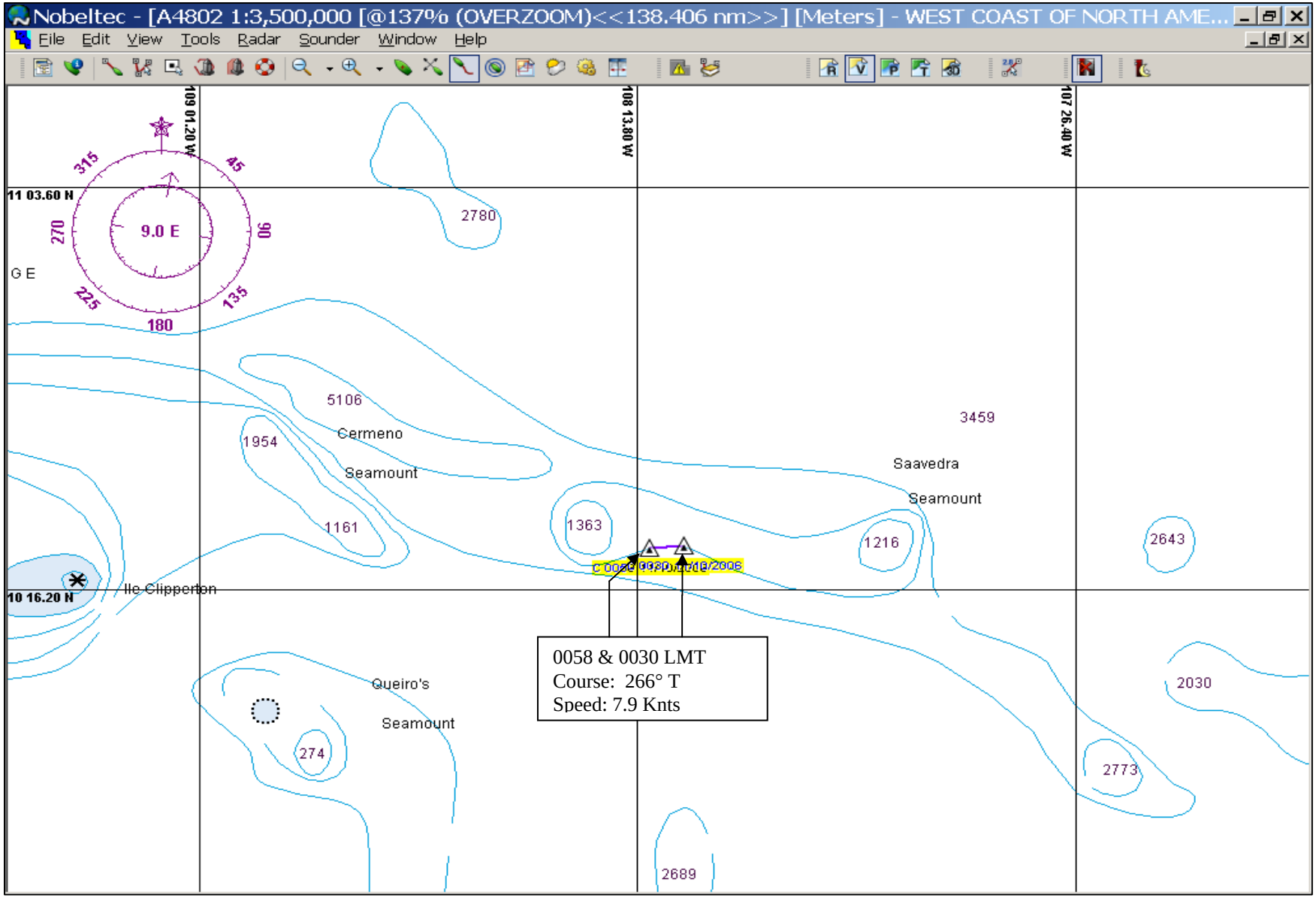

Figure 6a: Ship's position at 00:30 and 00:58 LMT on 10 November, 2006. Corresponding hydrographic data are given in Figure 6b. Depth contours are in meters.

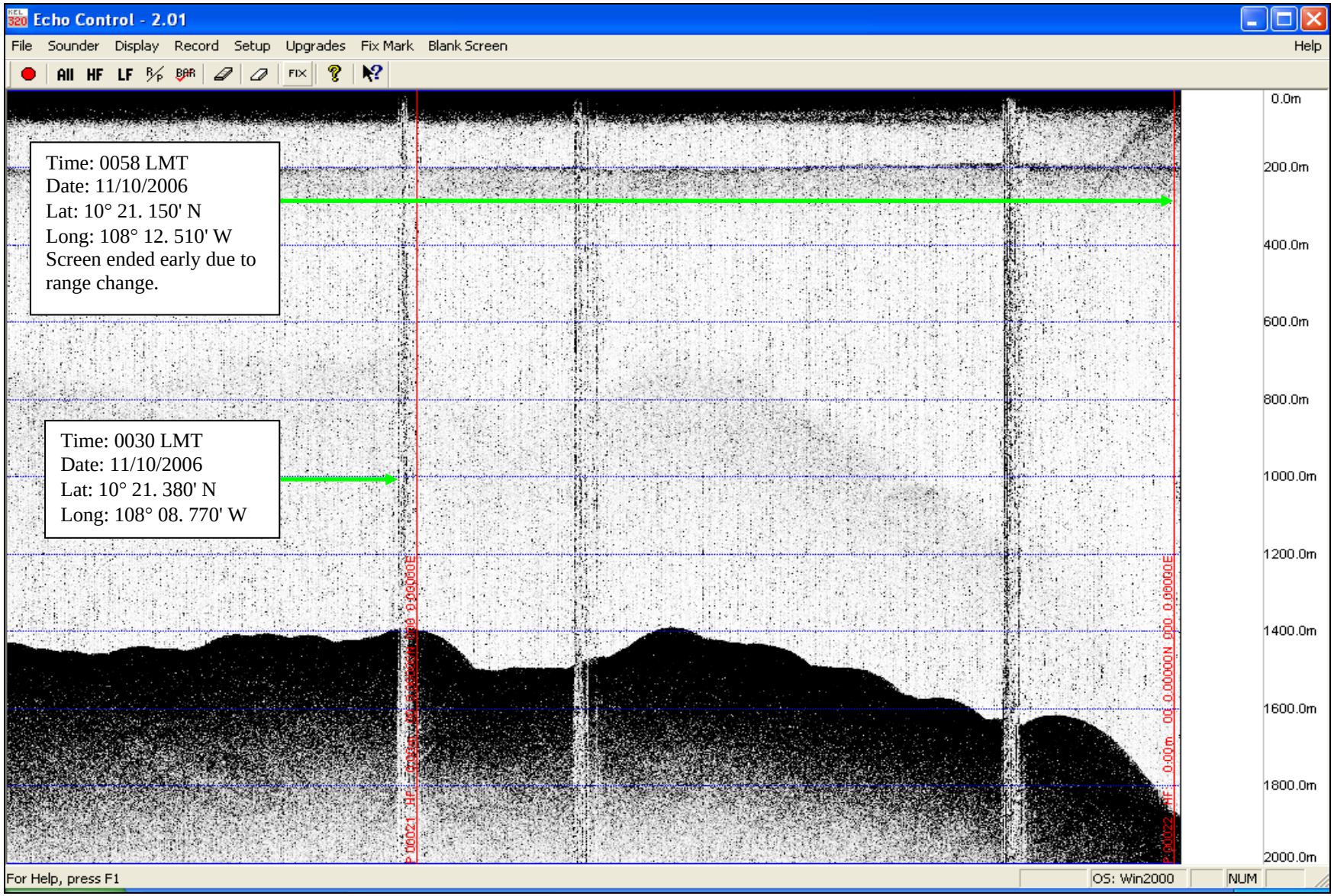

Figure 6b: Bathymetric profile corresponding to ship's location in Figure 6a.

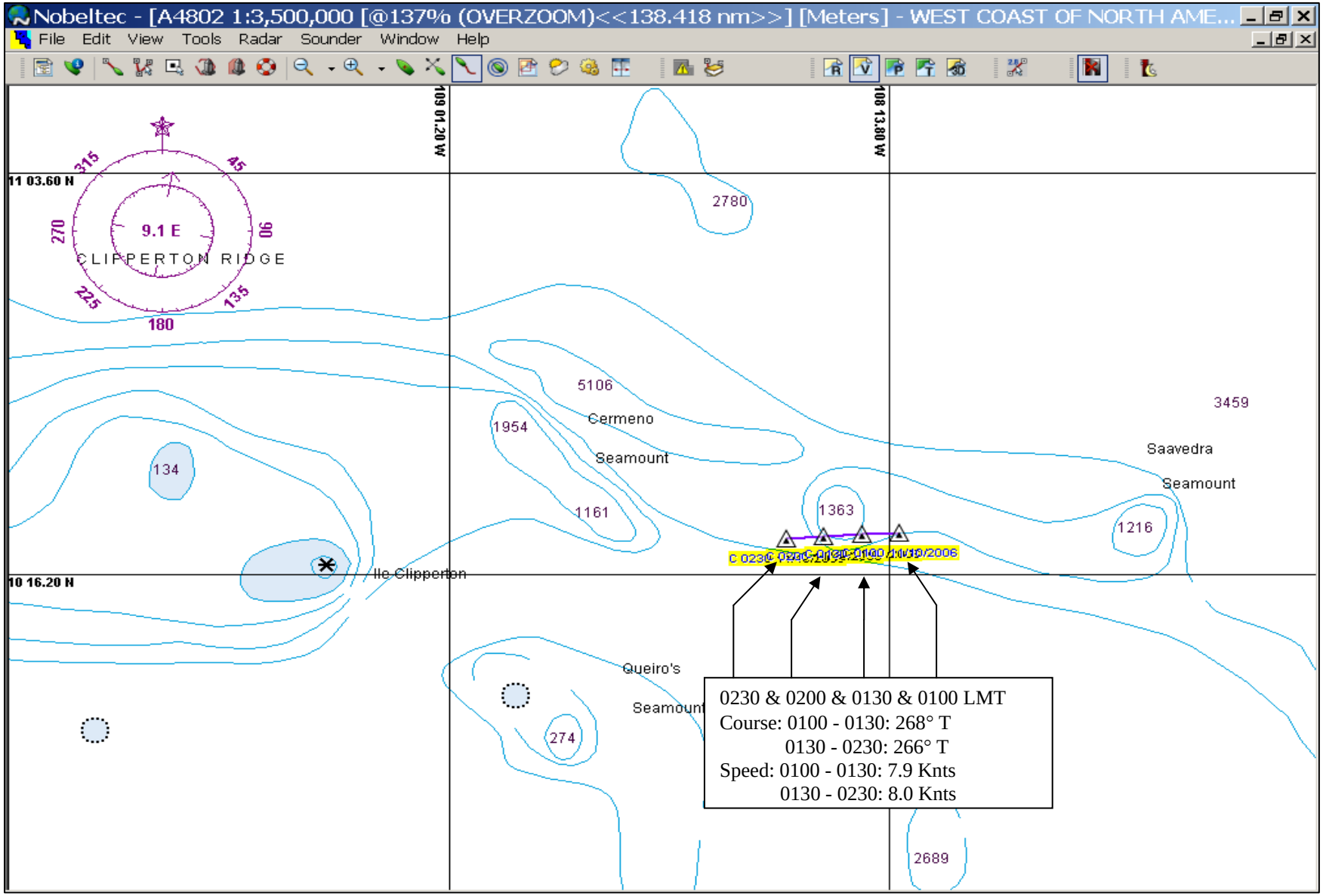

Figure 7a: Ship's position at 01:00, 01:30, 02:00 and 02:30 LMT on 10 November, 2006. Corresponding hydrographic data are given in Figure 7b. Depth contours are in meters.

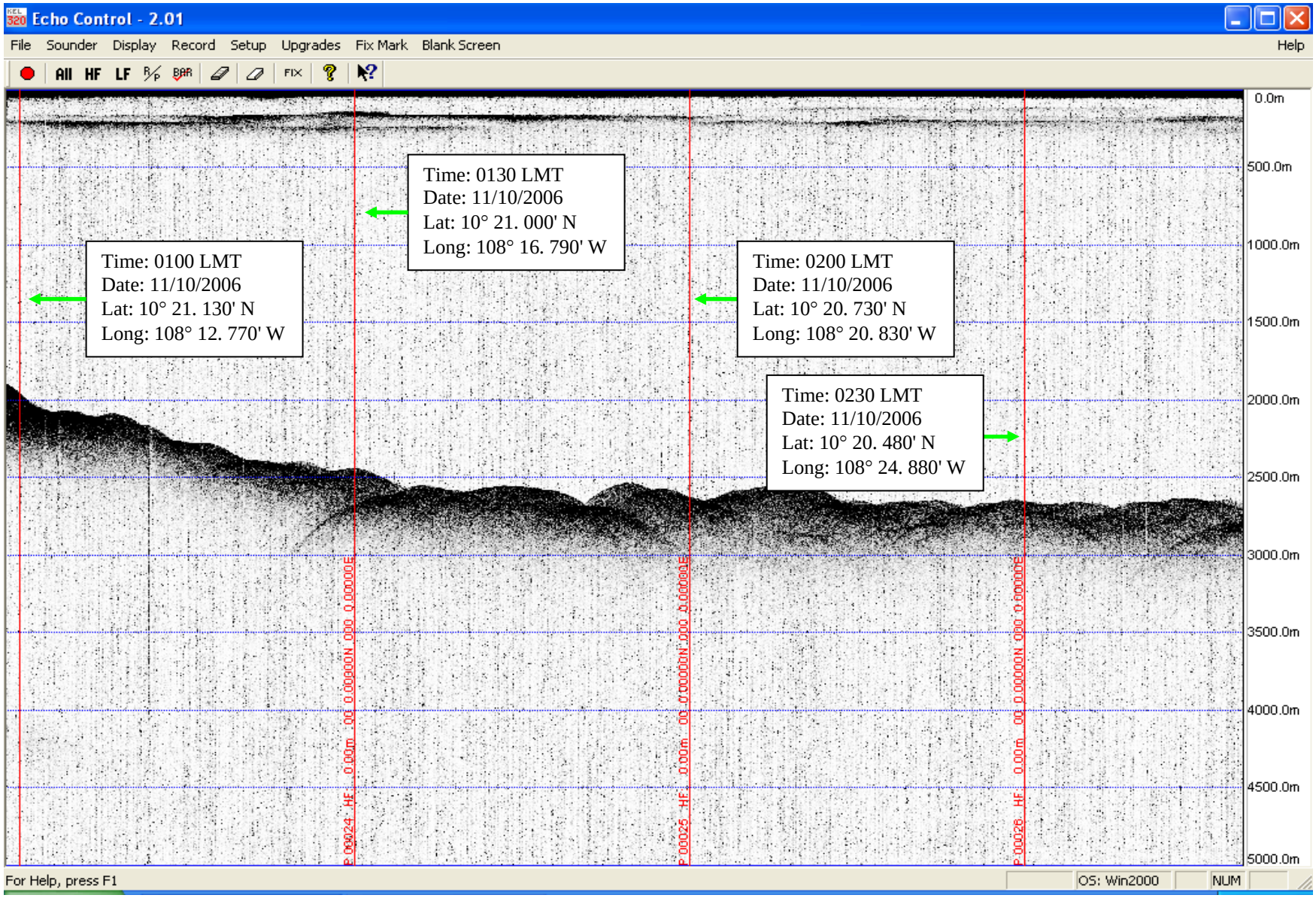

Figure 7b: Bathymetric profile corresponding to ship's location in Figure 7a.

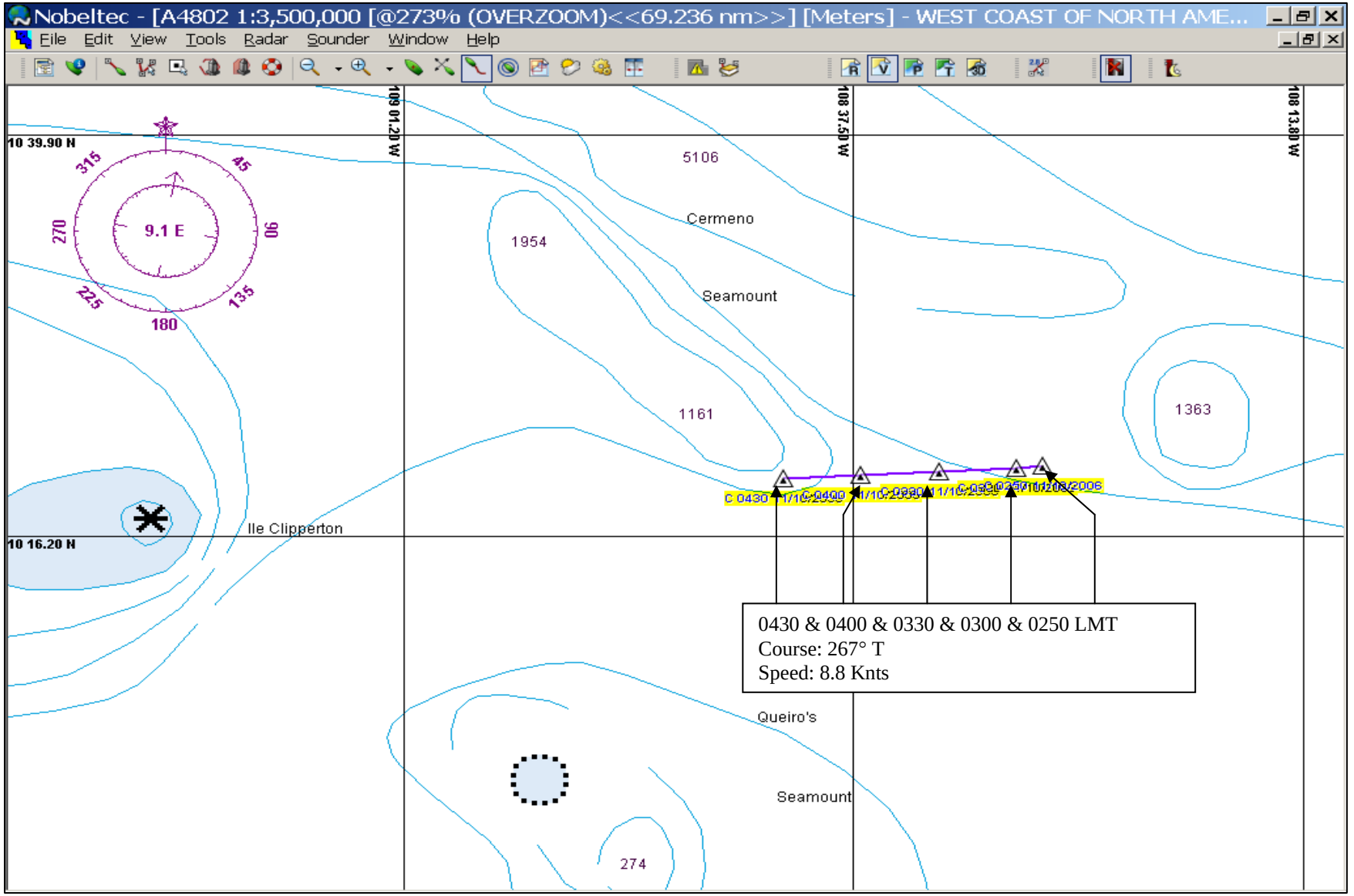

Figure 8a: Ship's position at 02:50, 03:00, 03:30, 04:00 and 04:30 LMT on 10 November, 2006. Corresponding hydrographic data are given in Figure 8b. Depth contours are in meters.

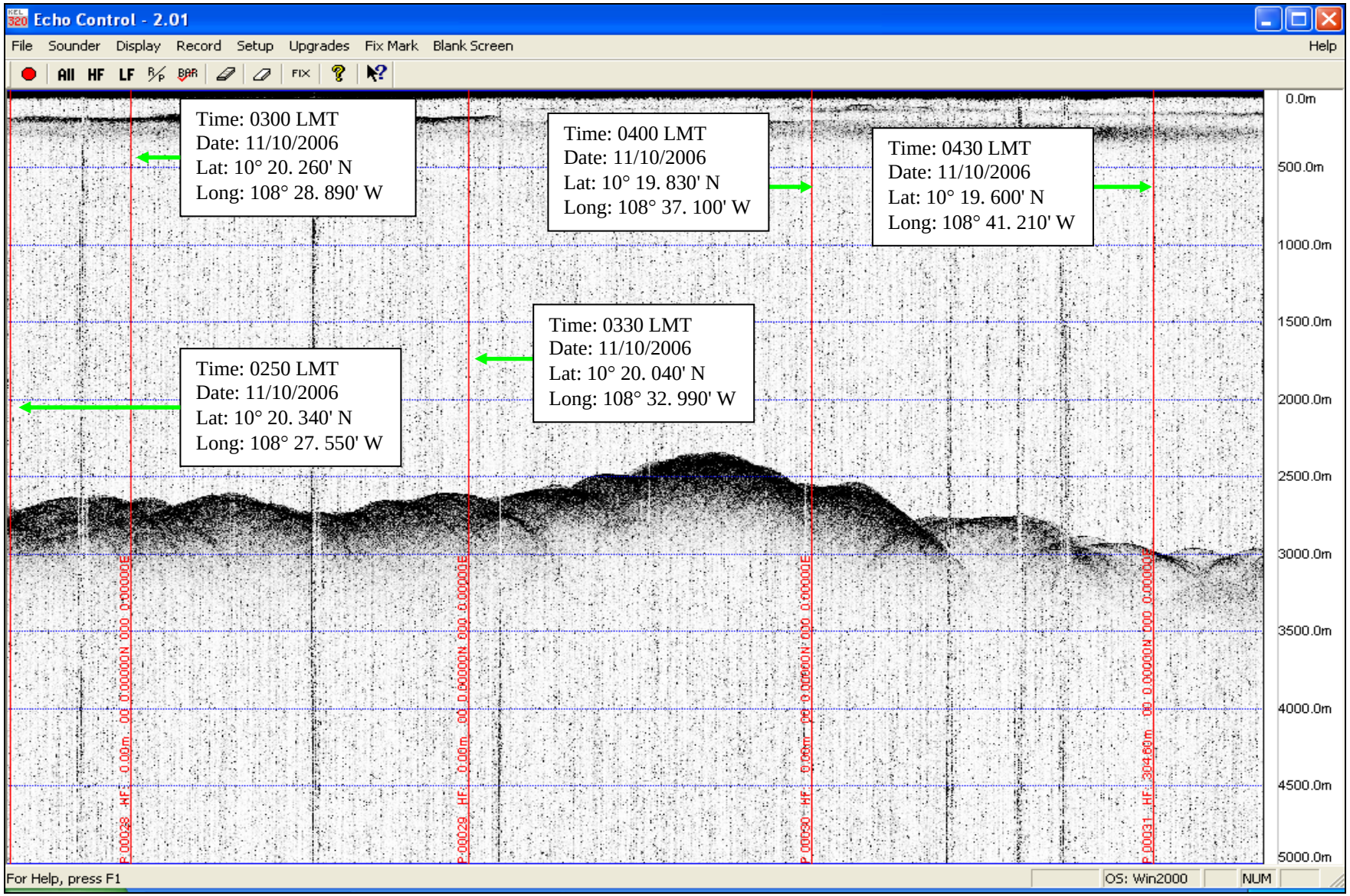

Figure 8b: Bathymetric profile corresponding to ship's location in Figure 8a.

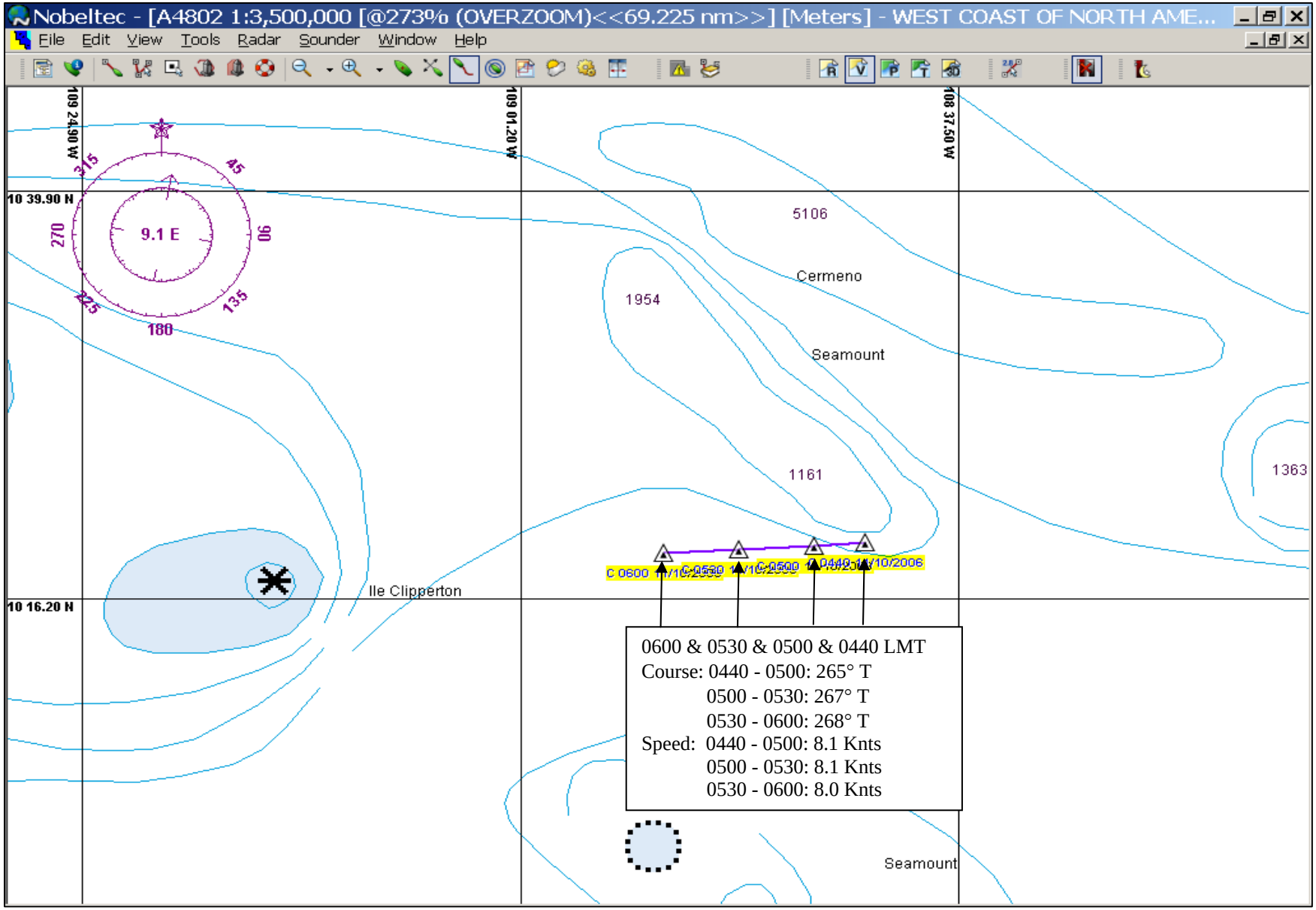

Figure 9a: Ship's position at 04:40, 05:00, 05:30 and 06:00 LMT on 10 November, 2006. Corresponding hydrographic data are given in Figure 9b. Depth contours are in meters.

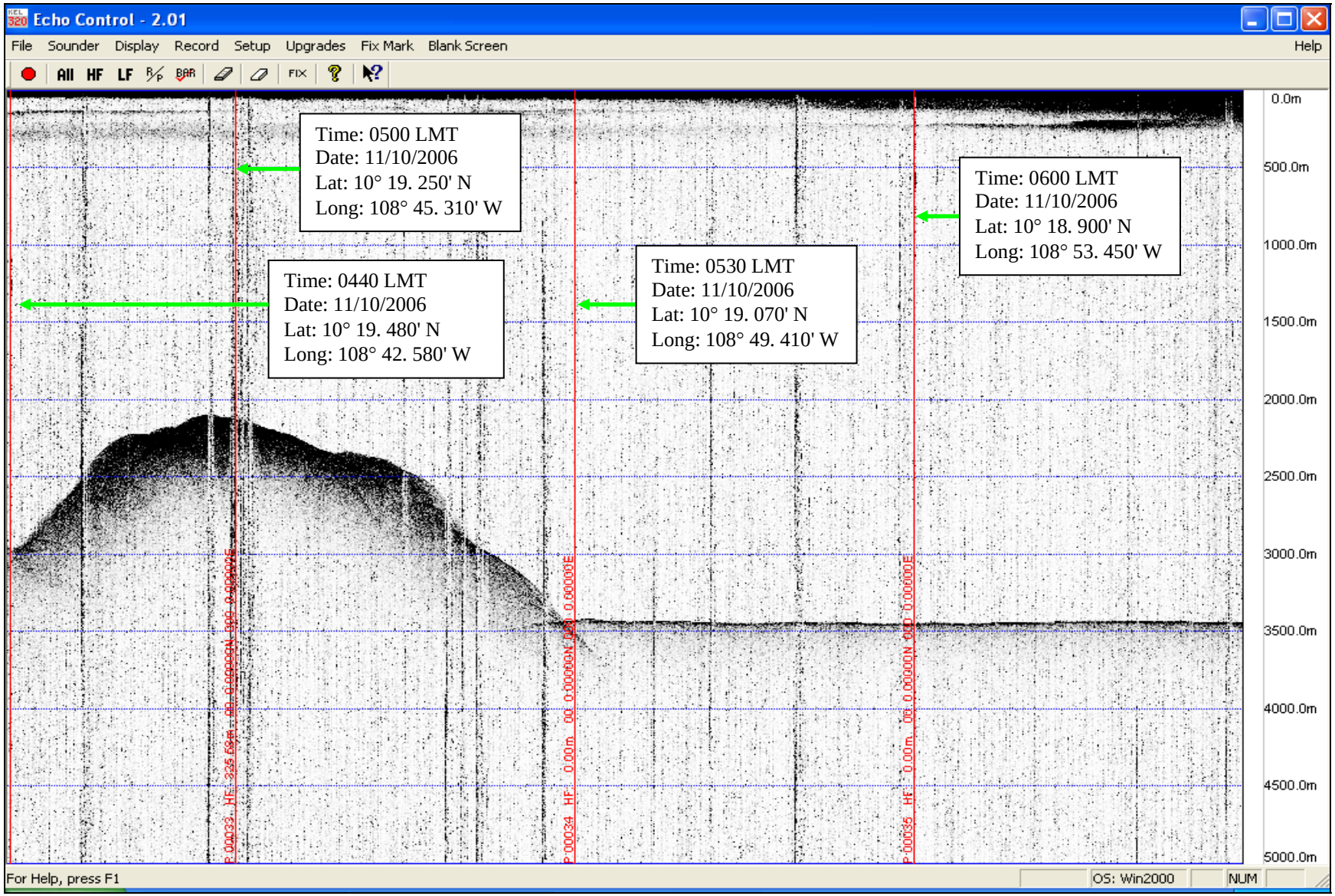

Figure 9b: Bathymetric profile corresponding to ship's location in Figure 9a.

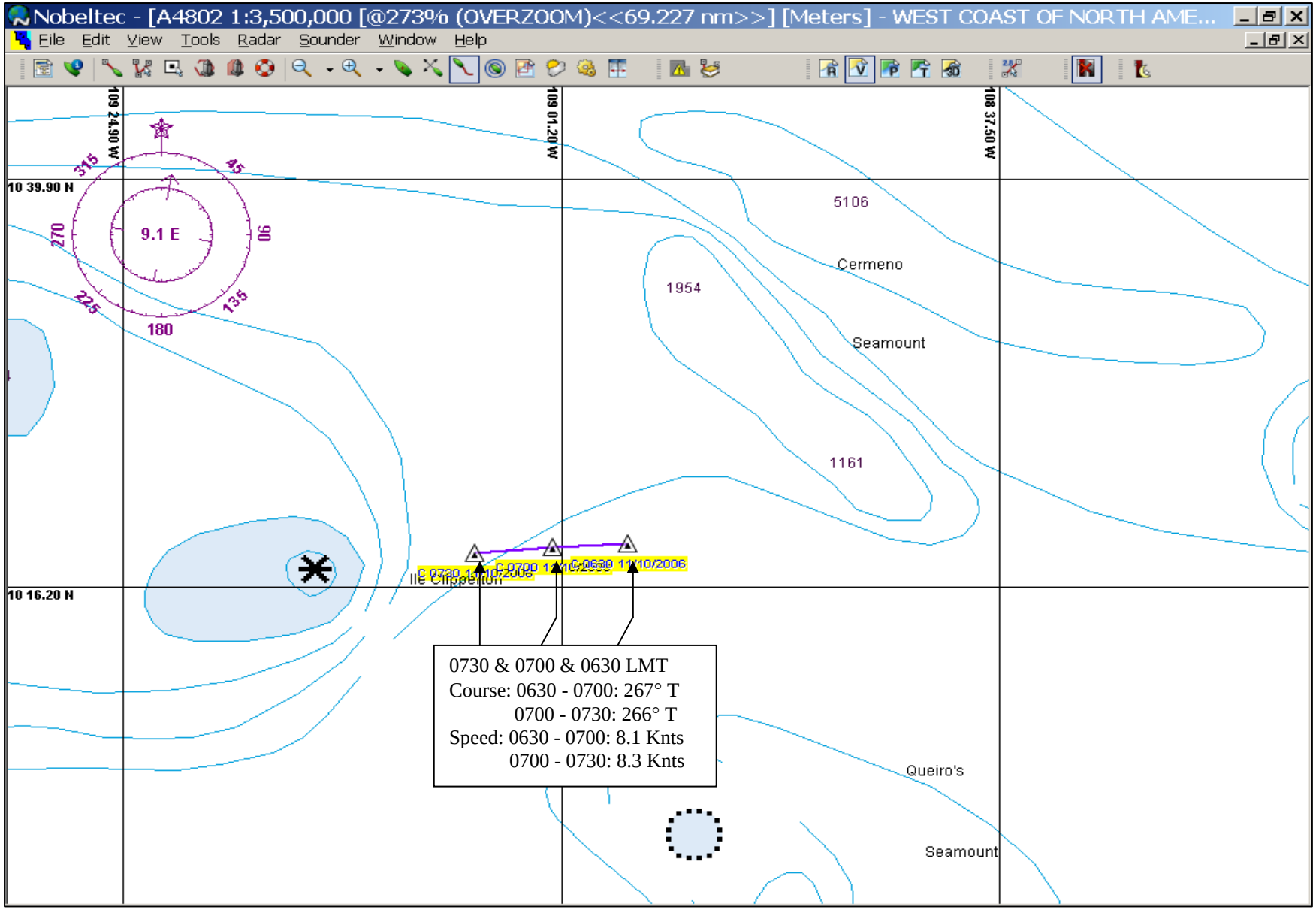

Figure 10a: Ship's position at 06:30, 07:00 and 07:30 LMT on 10 November, 2006. Corresponding hydrographic data are given in Figure 10b. Depth contours are in meters.

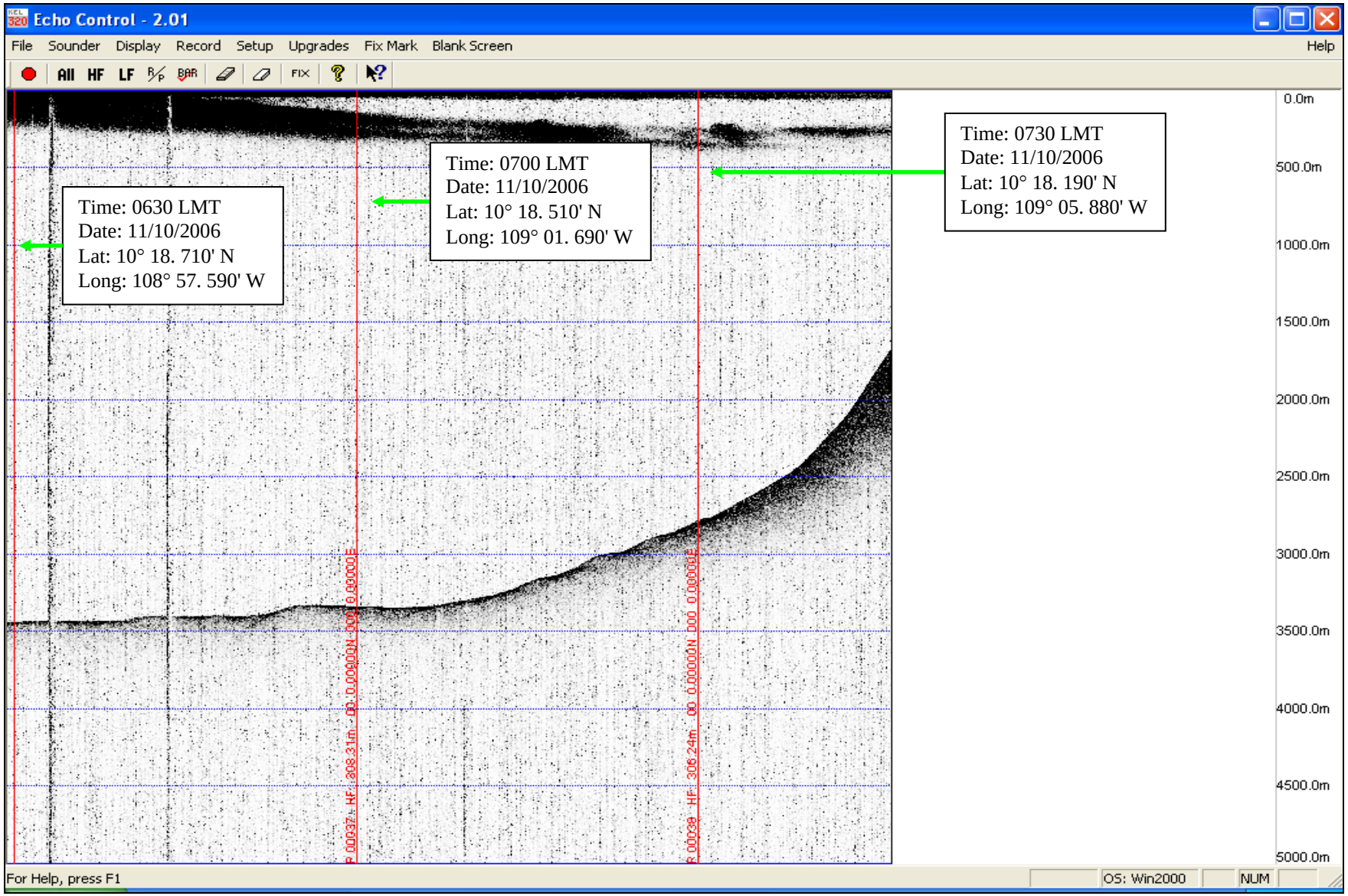

Figure 10b: Bathymetric profile corresponding to ship's location in Figure 10a.

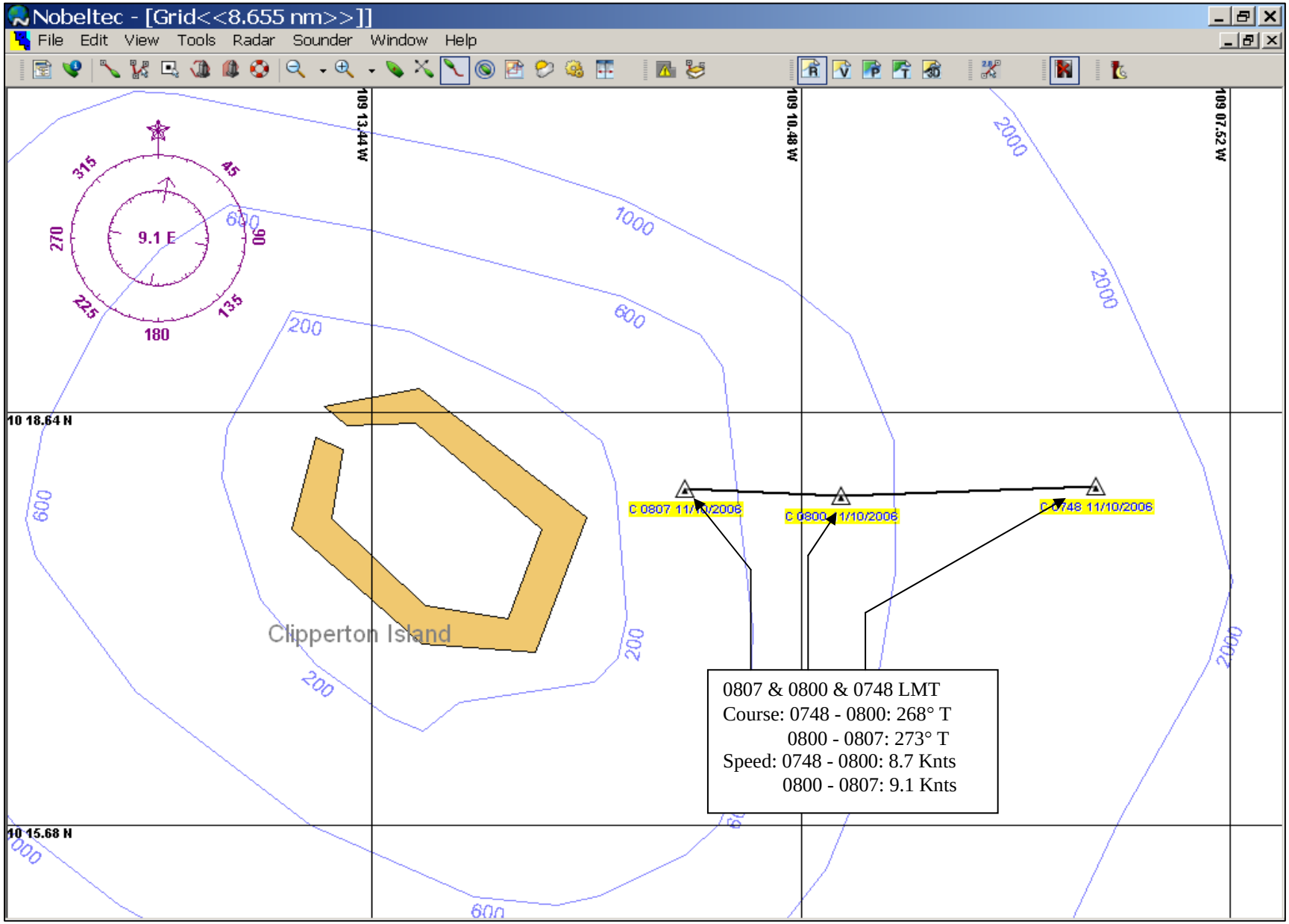

Figure 11a: Ship's position at 07:48, 08:00 and 08:07 LMT on 10 November, 2006. Corresponding hydrographic data are given in Figure 11b. Depth contours are in meters.

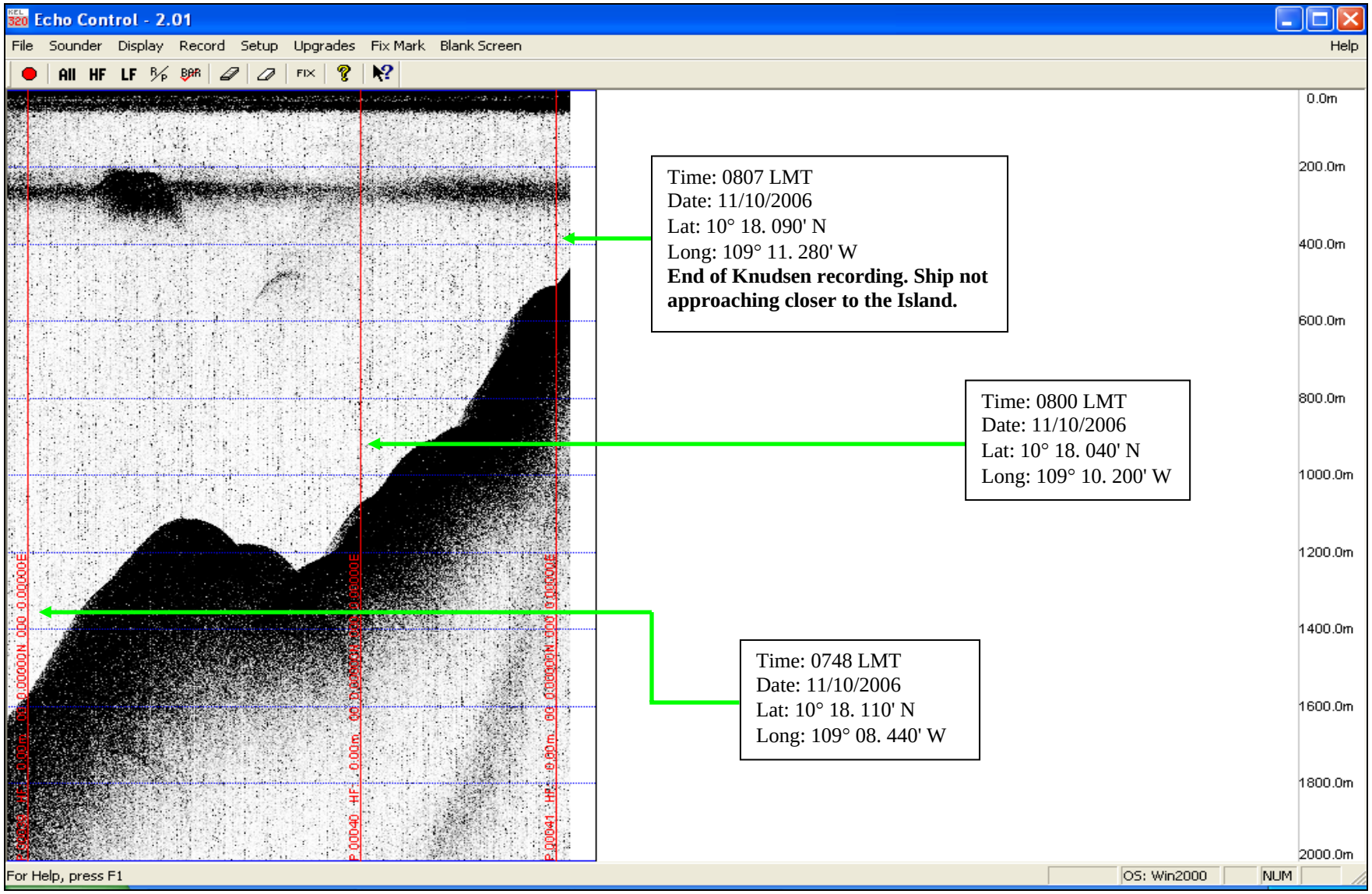

Figure 11b: Bathymetric profile corresponding to ship's location in Figure 11a.

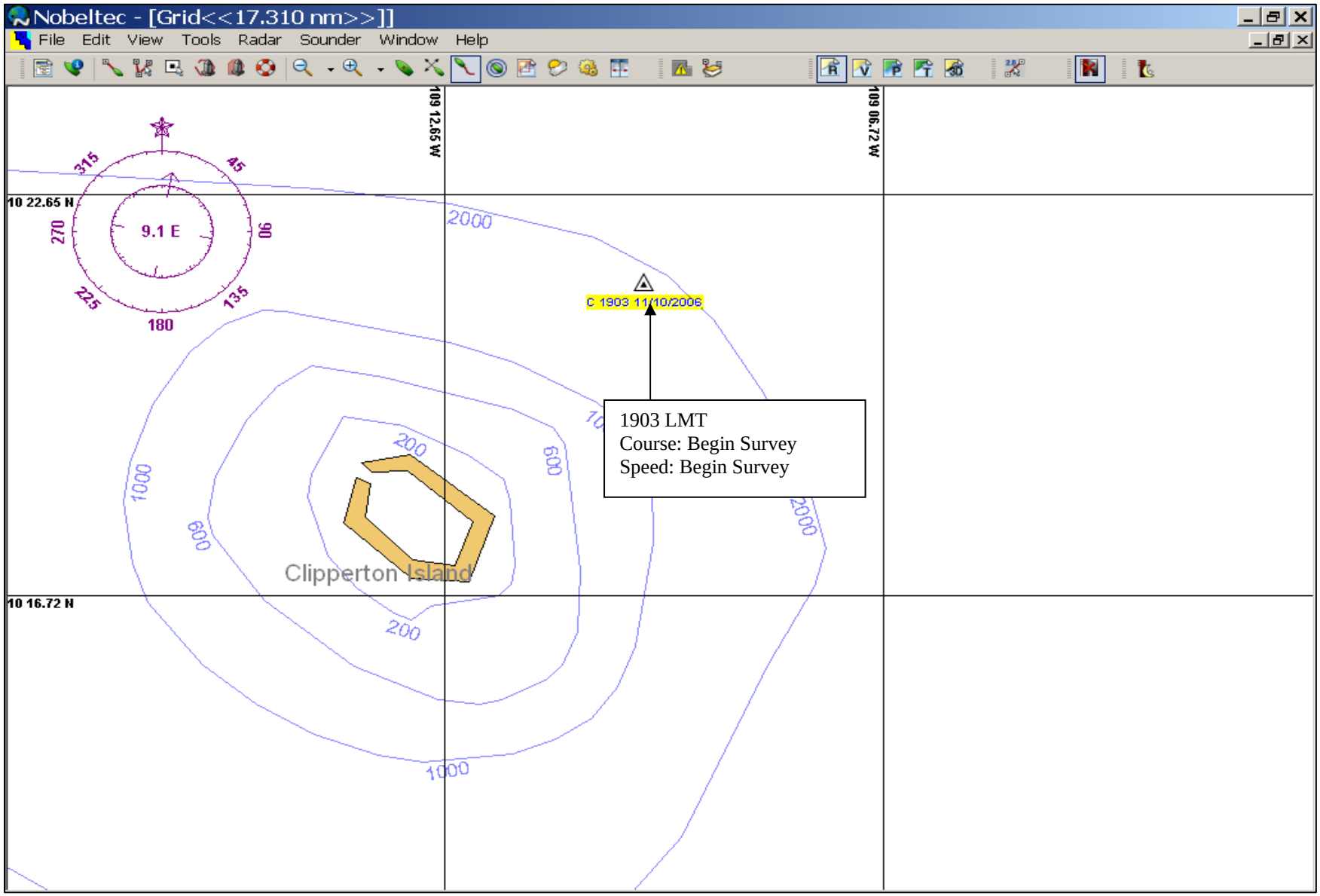

Figure 12a: Ship's position at 19:03 LMT on 10 November, 2006. Corresponding hydrographic data are given in Figure 12b. Depth contours are in meters.

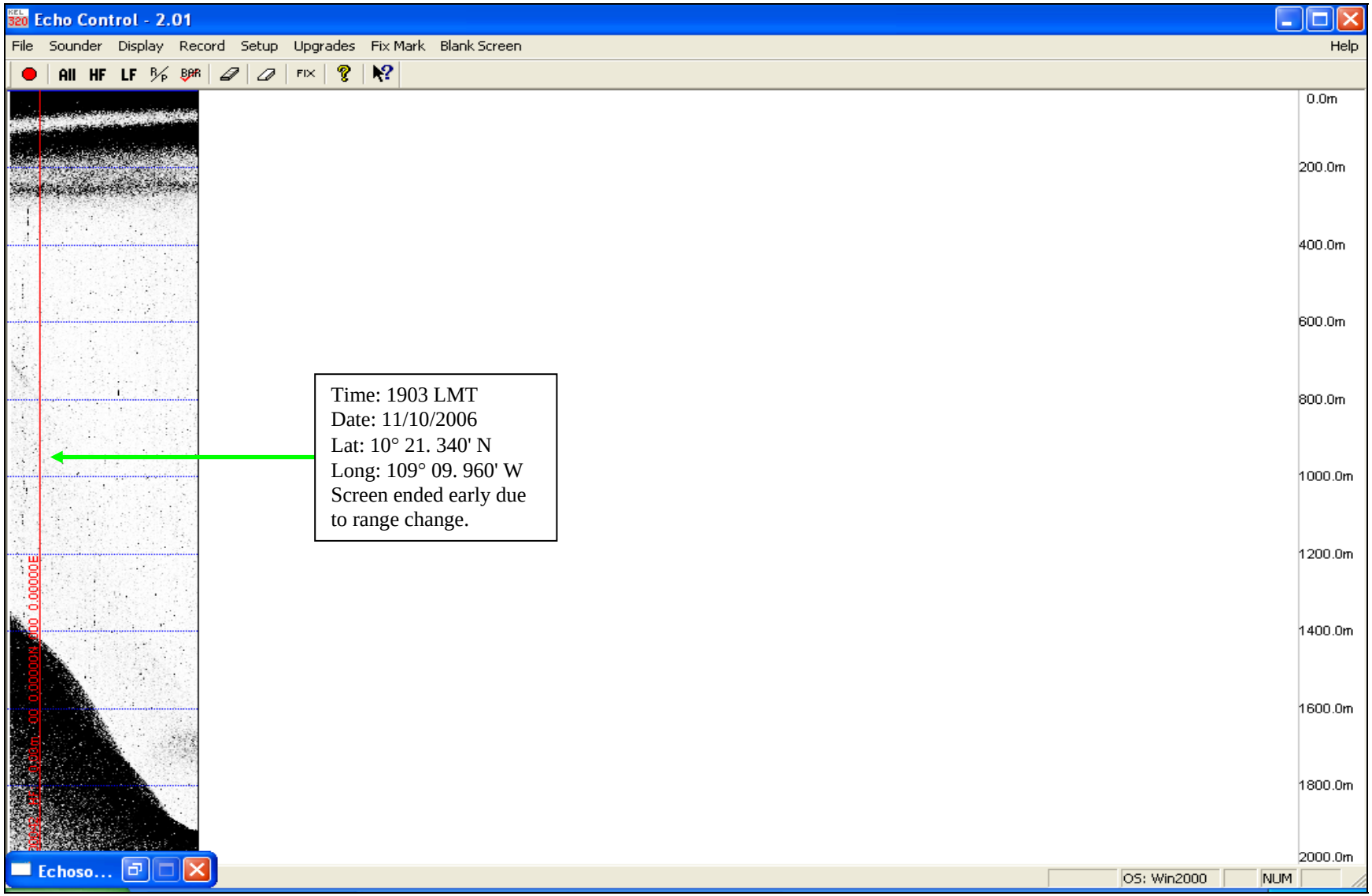

Figure 12b: Bathymetric profile corresponding to ship's location in Figure 12a.

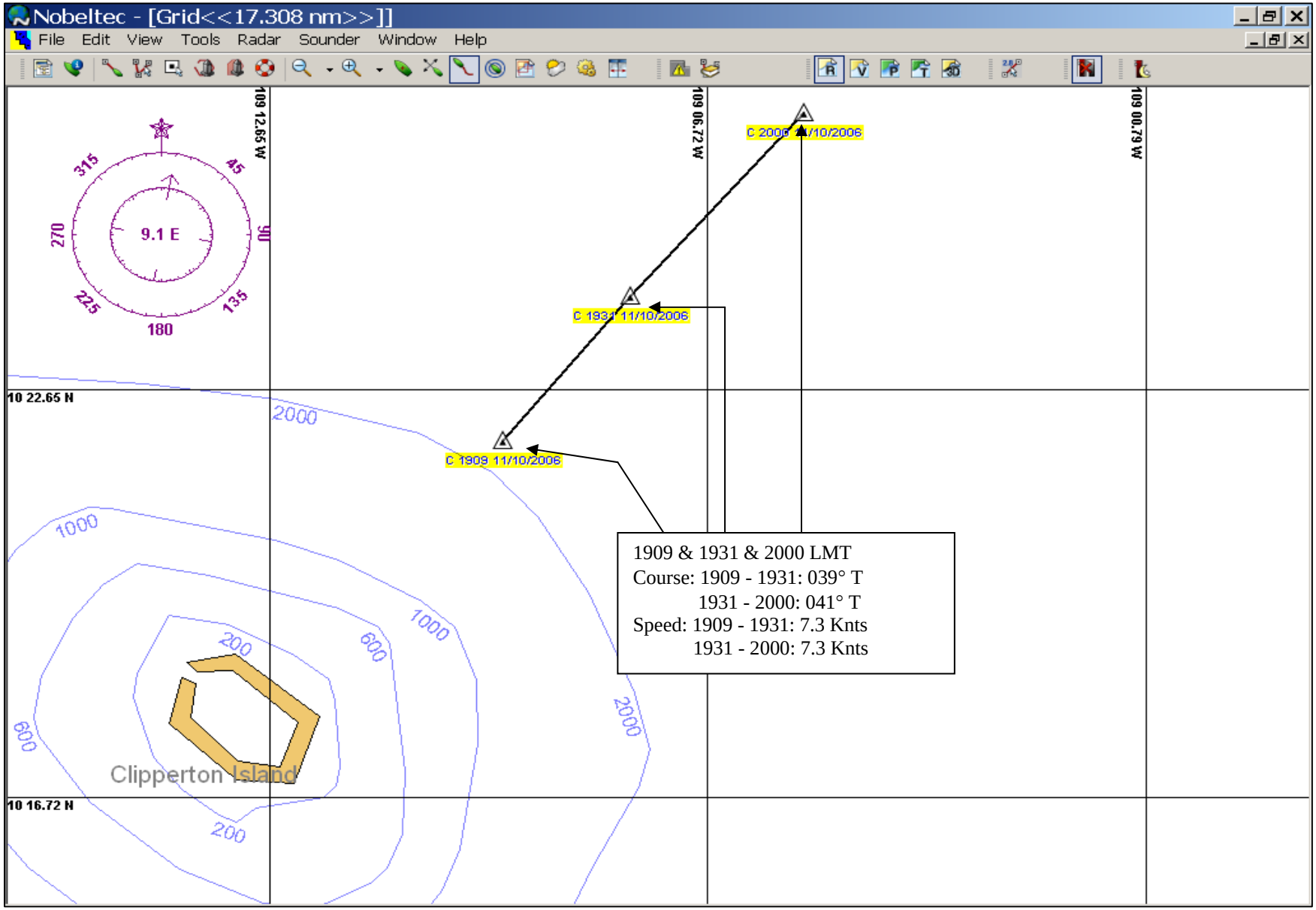

Figure 13a: Ship's position at 19:09, 19:31 and 20:00 LMT on 10 November, 2006. Corresponding hydrographic data are given in Figure 13b. Depth contours are in meters.

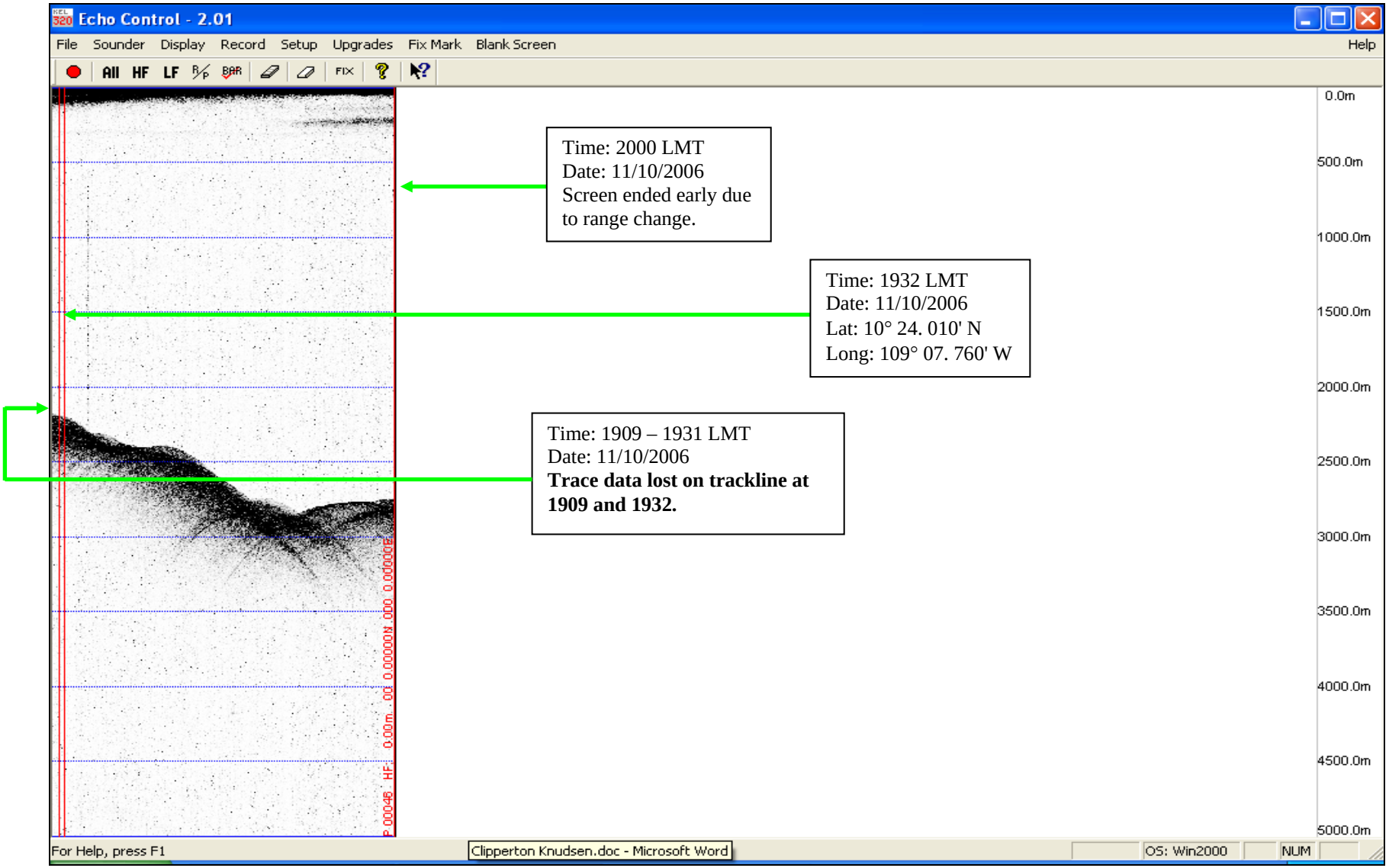

Figure 13b: Bathymetric profile corresponding to ship's location in Figure 13a.

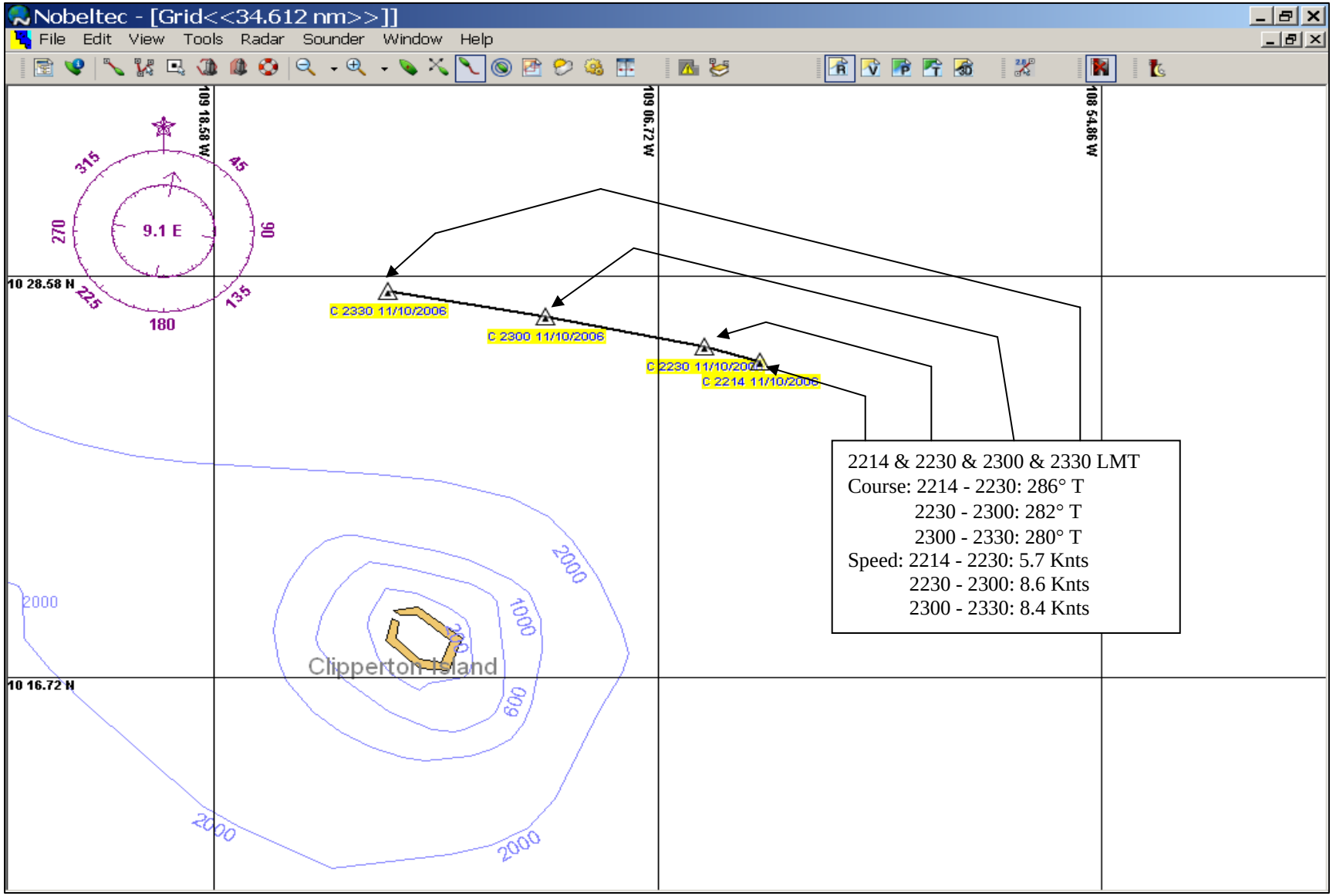

Figure 14a: Ship's position at 22:14, 22:30, 23:00 and 23:30 LMT on 10 November, 2006. Corresponding hydrographic data are given in Figure 14b. Depth contours are in meters.

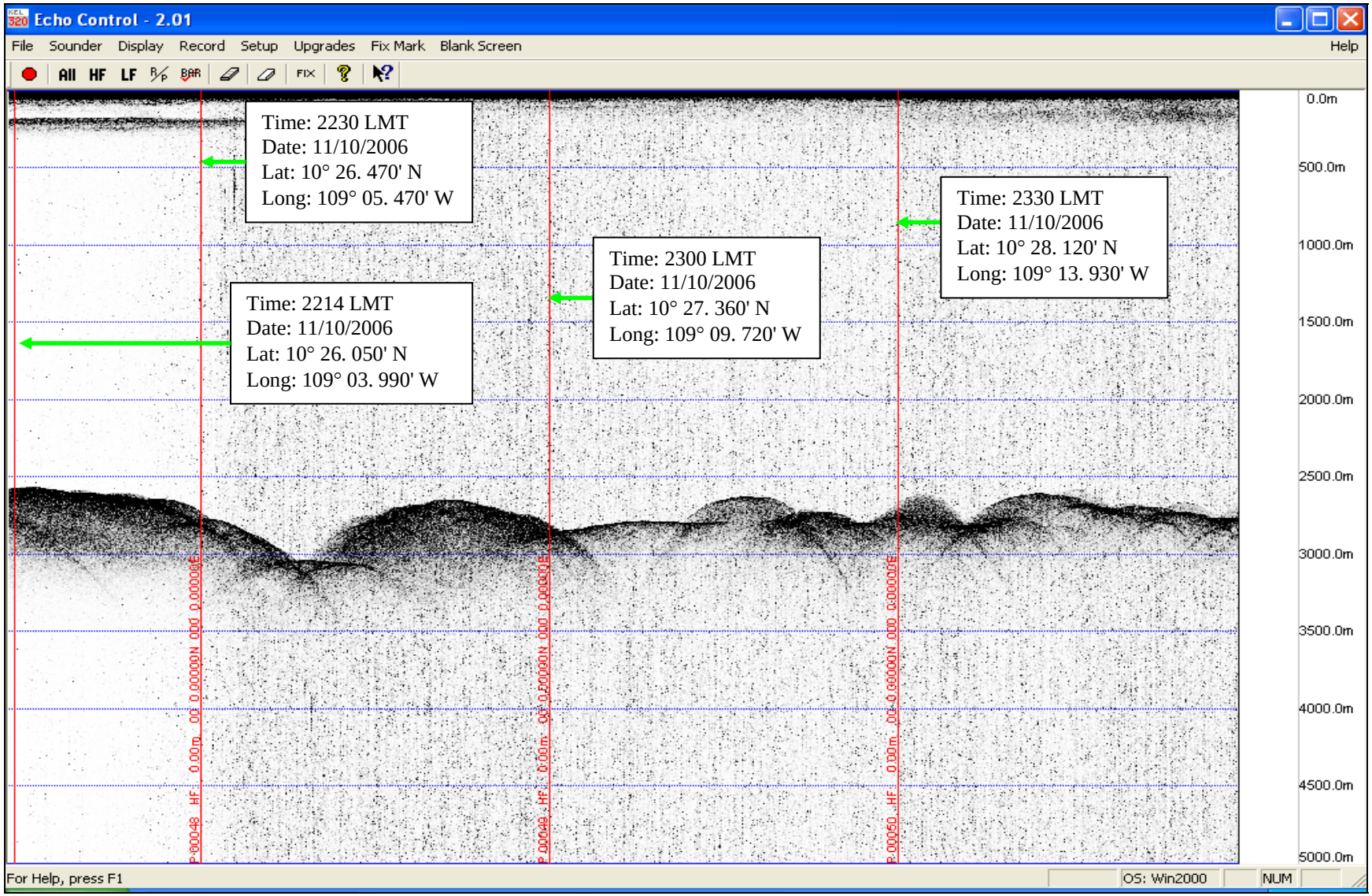

Figure 14b: Bathymetric profile corresponding to ship's location in Figure 14a.

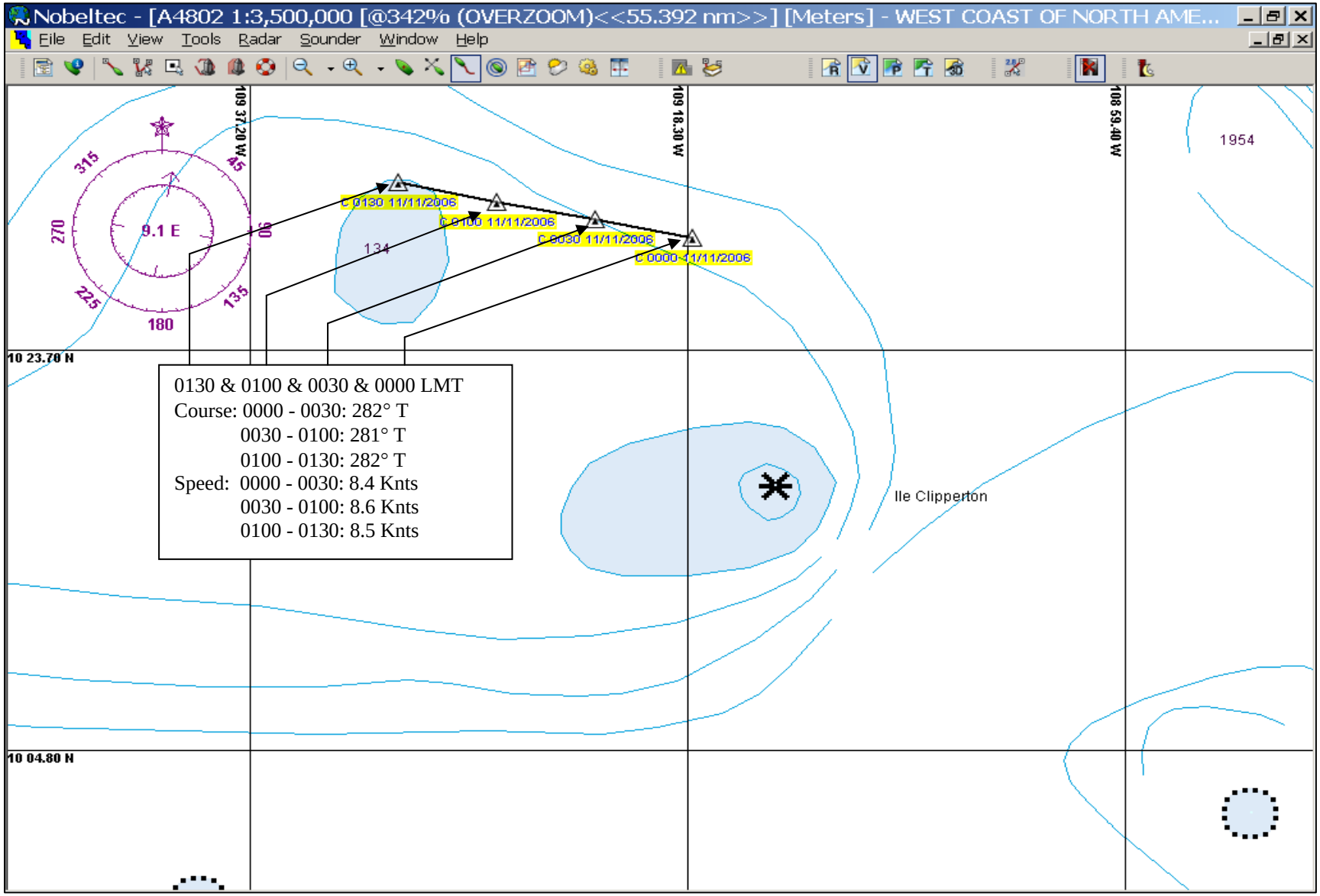

Figure 15a: Ship's position at 00:00, 00:30, 01:00 and 01:30 LMT on 11 November, 2006. Corresponding hydrographic data are given in Figure 15b. Depth contours are in meters.

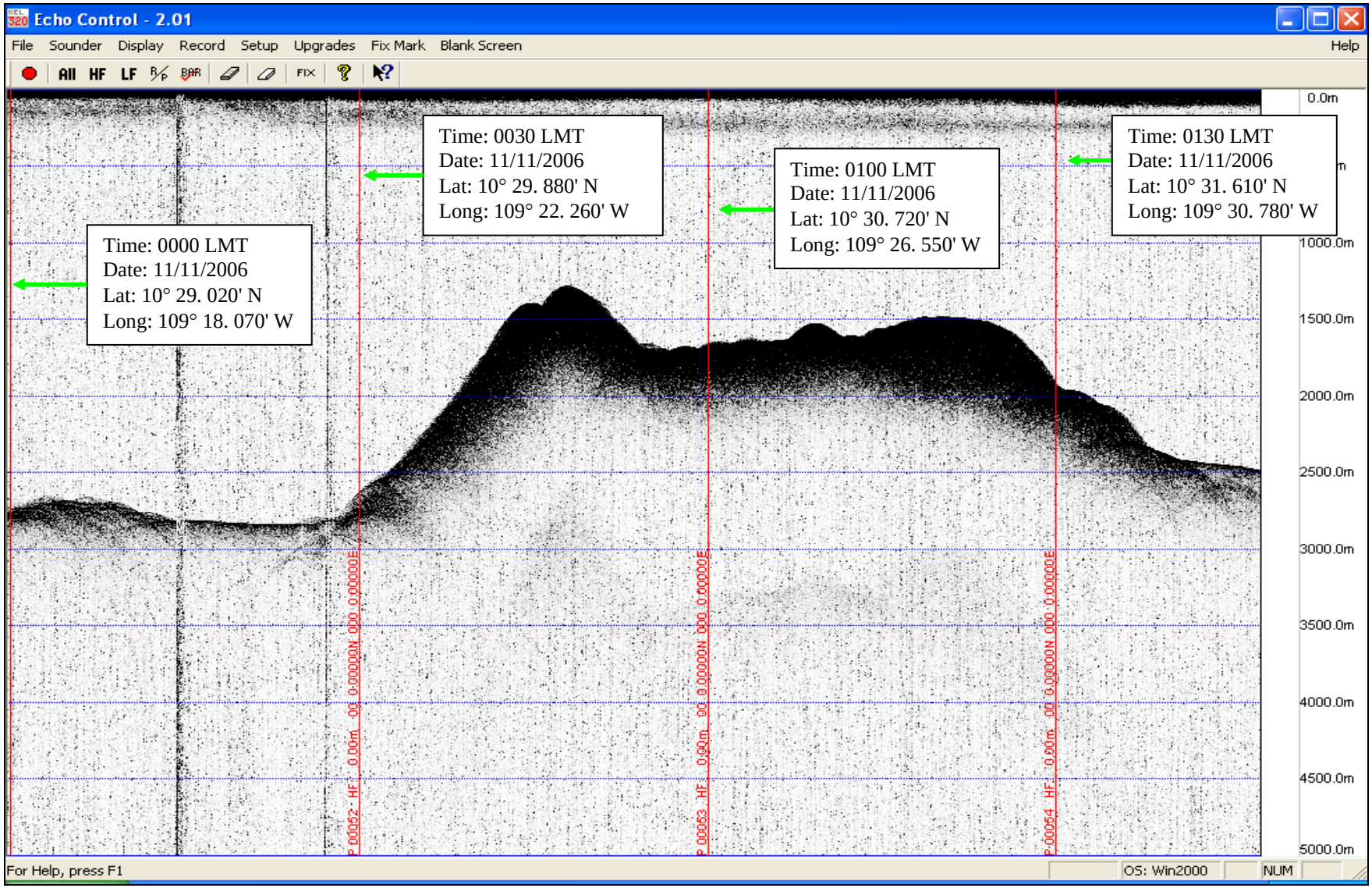

Figure 15b: Bathymetric profile corresponding to ship's location in Figure 15a.

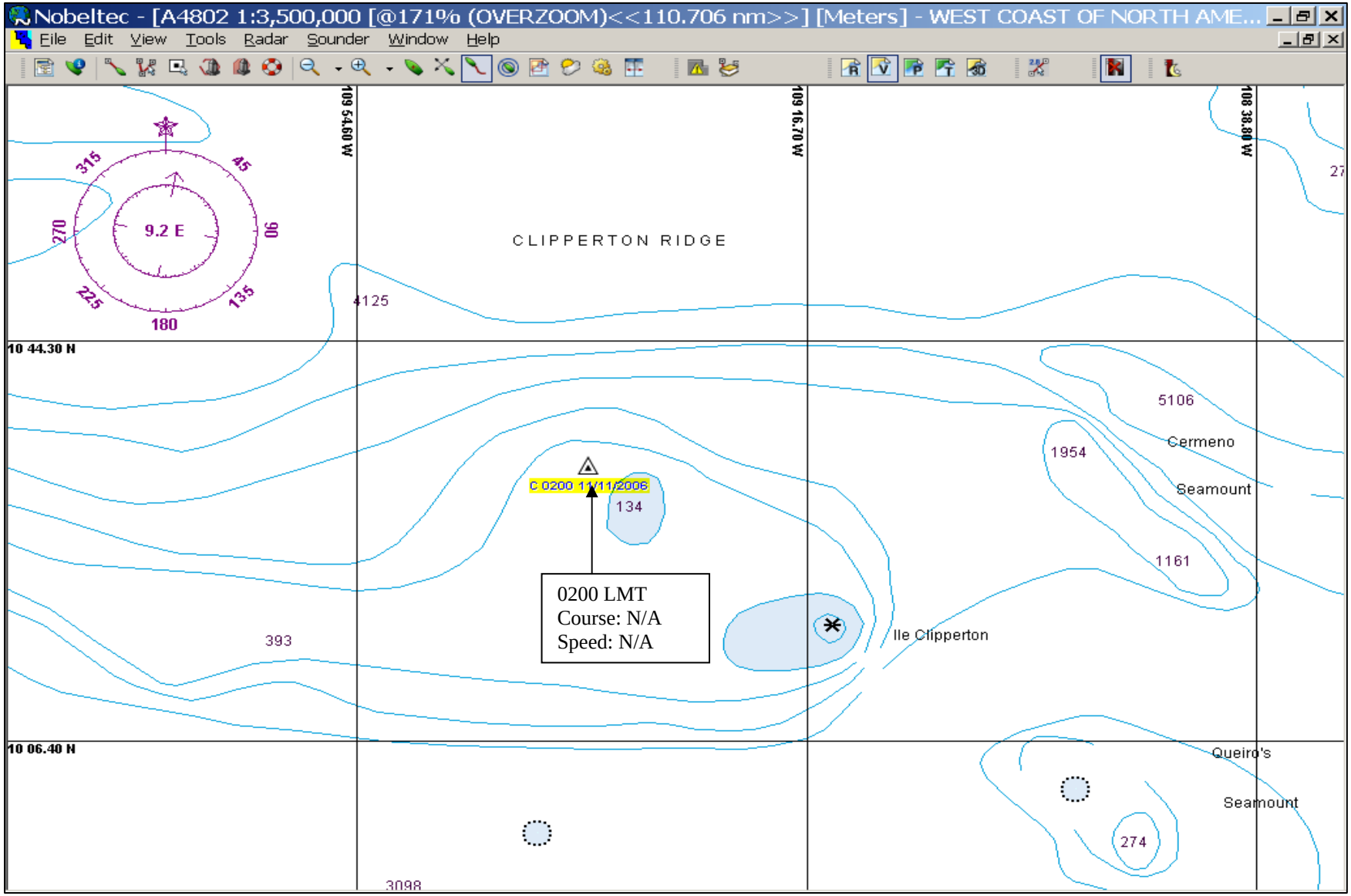

Figure 16a: Ship's position at 02:00 LMT on 11 November, 2006. Survey ended at 02:02 LMT on 11 November, 2006. Corresponding hydrographic data are given in Figure 16b. Depth contours are in meters.

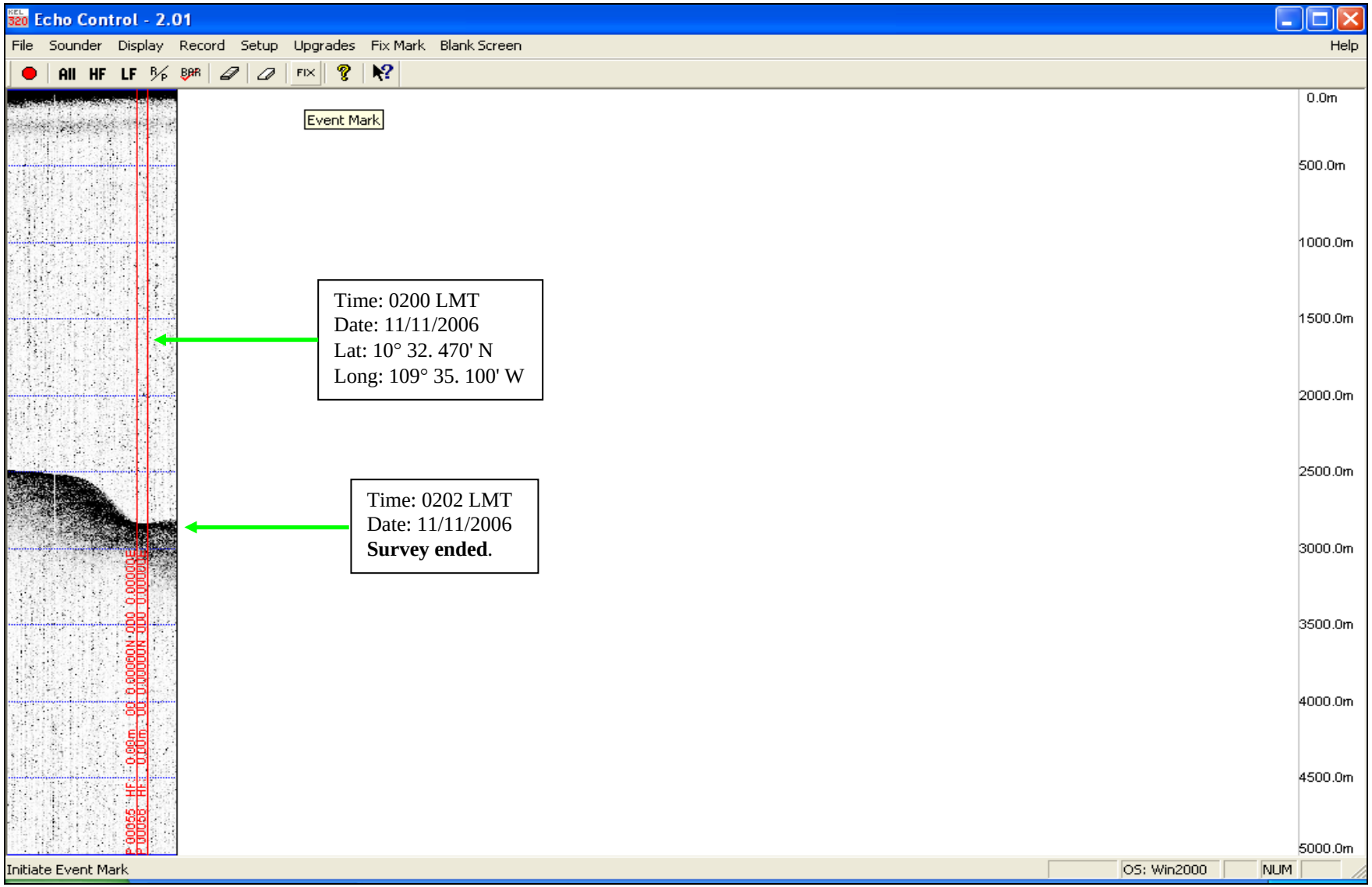

Figure 16b: Bathymetric profile corresponding to ship's location in Figure 16a.

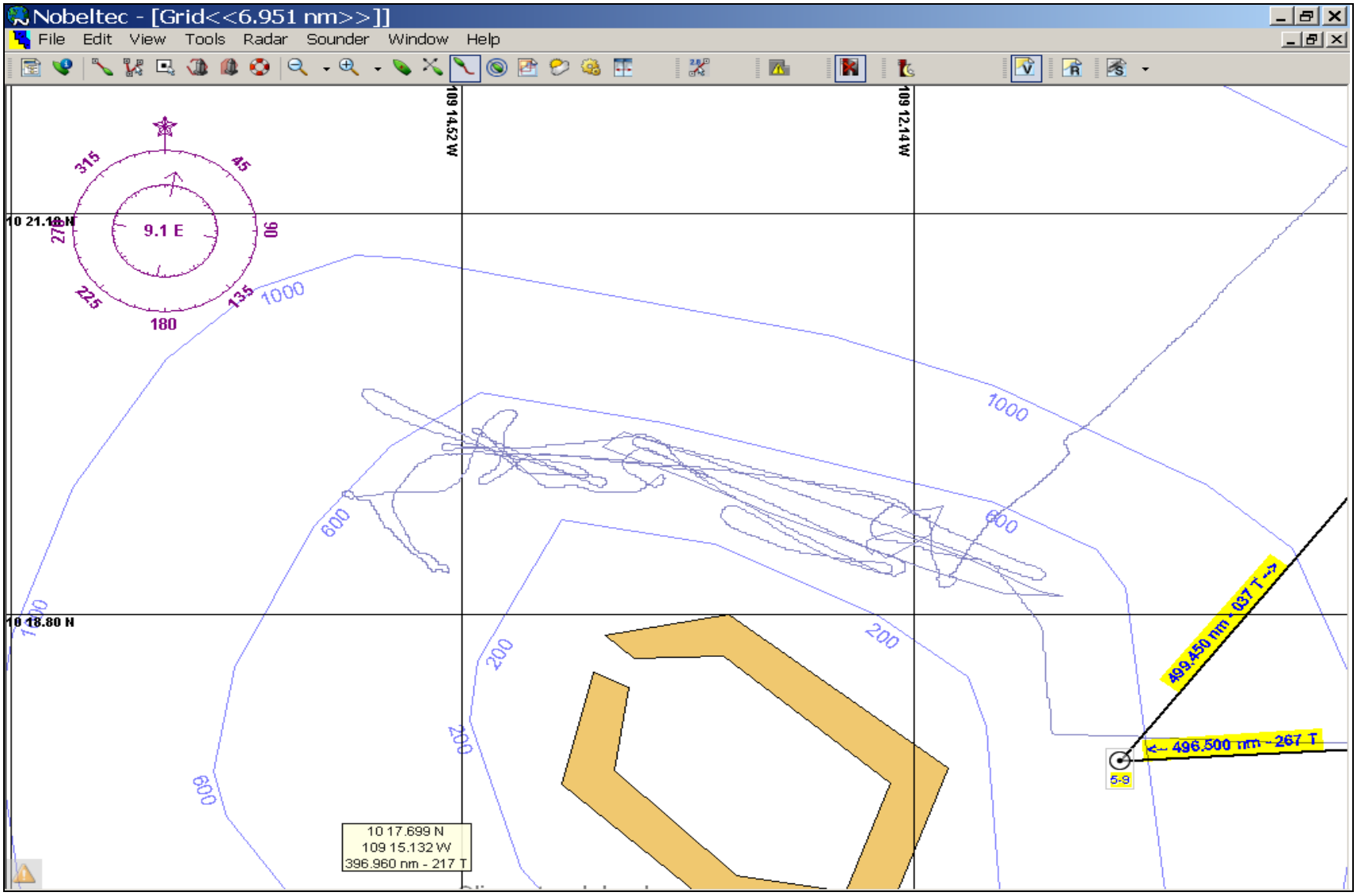

Figure 17: Trackline of NOAA Research Vessel David Starr Jordan (in blue) while transiting along the north side of Clipperton Atoll. Data are only available in EK500 Echoview format for this time period.

Table 1: Position of the NOAA Research Vessel DAVID STARR JORDAN during the transit along the Clipperton Ridge. Time is Local Mean Time; Latitude and Longitude are degrees and decimal minutes north and west, respectively.

Date	Time (z=L+6)	Lat	Long
9-Nov	2045	10 23.030	107 38.790
9-Nov	2130	10 22.670	107 44.840
9-Nov	2200	10 22.320	107 48.920
9-Nov	2230	10 22.150	107 52.900
9-Nov	2242	10 22.130	107 54.510
9-Nov	2300	10 22.090	107 56.930
9-Nov	2313	10 22.030	107 58.650
9-Nov	2328	10 21.900	108 00.610
9-Nov	2330	10 21.870	108 00.870
10-Nov	0000	10 21.600	108 04.780
10-Nov	0030	10 21.380	108 08.770
10-Nov	0058	10 21.150	108 12.510
10-Nov	0100	10 21.130	108 12.770
10-Nov	0130	10 21.000	108 16.790
10-Nov	0200	10 20.730	108 20.830
10-Nov	0230	10 20.480	108 24.880
10-Nov	0250	10 20.340	108 27.550
10-Nov	0300	10 20.260	108 28.890
10-Nov	0330	10 20.040	108 32.990
10-Nov	0400	10 19.600	108 41.210
10-Nov	0440	10 19.480	108 42.580
10-Nov	0500	10 19.250	108 45.310
10-Nov	0530	10 19.070	108 49.410
10-Nov	0600	10 18.900	108 53.450
10-Nov	0630	10 18.710	108 57.590
10-Nov	0700	10 18.510	109 01.690
10-Nov	0730	10 18.190	109 05.880
10-Nov	0748	10 18.110	109 08.440
10-Nov	0800	10 18.040	109 10.200
10-Nov	0807	10 18.090	109 11.280
10-Nov	1903	10 21.340	109 09.960
10-Nov	1909	10 21.910	109 09.480
10-Nov	1931	10 24.010	109 07.760
10-Nov	2000	10 26.670	109 05.420
10-Nov	2214	10 26.050	109 03.990
10-Nov	2230	10 26.470	109 05.470
10-Nov	2300	10 27.360	109 09.720
10-Nov	2330	10 28.120	109 13.930
11-Nov	0000	10 29.020	109 18.070
11-Nov	0030	10 29.880	109 22.260
11-Nov	0100	10 30.720	109 26.550
11-Nov	0130	10 31.610	109 30.780
11-Nov	0200	10 32.470	109 35.100

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