Sentry Operations Report for the AT37-05 Gregg Cruise DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

R/V Atlantis — November 3, 2016 to December 3, 2016

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1 Summary

This document summarizes operations with the *Sentry* autonomous underwater vehicle (AUV) during the AT37-05 Gregg cruise. Included in this report is the vehicle configuration; basic vehicle and sensor performance; and post-dive reports (with summary statistics and narratives). This report does not attempt to describe the scientific results or conclusions. A detailed description of the data files resulting from this cruise is provided in a separate document. Individual dive summaries for Sentry dives 394 - 406 follow — each of these is a free-standing document summarizing the dive.

2 Cruise Log

This section provides a brief chronological summary of *Sentry* activities during the cruise. Additional information on specific dives is available in the dive reports.

3 Nov 2016 Departed Manzanilo Mexico on R/V Atlantis.

3 Nov 2016 - 5 Nov 2016 In transit to first dive station. Ship multibeam mapping of the first site began during the afternoon of 5 Nov.

6 Nov 2016 - 11 Nov 2016 Transit to Mexico for personel transfer due to an emergency Health issue.

12 Nov 2016 Sentry394 Engineering dive at Liona Seamount. Duration 24 Hours. Launch Early morning.

13 Nov 2016 Recovery of Sentry394 early morning. Launch Sentry395 at Ivy.

14 Nov 2016 Recover sentry395, launch sentry396 at Wayne seamount

15 Nov 2016 Recover sentry396. Deploy Sentry397 at Avery seamount.

16 Nov 2016 Recover sentry397. Deploy Sentry398 at Avery seamount.

17 Nov 2016 Recover sentry398. Deplay sentry399 at Avery seamount.

18 Nov 2016 Recover Sentry399. No Sentry Operations during the night.

19 Nov 2016 Deploy sentry400 at Beryl Seamount.

20 Nov 2016 Recover sentry400 at Beryl. Deploy Sentry401 at Near EPR seamount.

21 Nov 2016 Recovered sentry401. No Sentry night ops

22 Nov 2016 No sentry ops

23 Nov 2016 No sentry ops

24 Nov 2016 Deployed sentry402.

25 Nov 2016 Recovered sentry402. Deployed sentry403.

26 Nov 2016 Recovered Sentry403. Deployed sentry404.

27 Nov 2016 Recovered sentry404. No Sentry night ops.

28 Nov 2016 Deployed sentry405 at Coral Seamount.

29 Nov 2016 Recovered Sentry405 at Coral Seamount

30 Nov 2016 No Sentry Ops

1 Dec 2016 Transit

2 Dec 2016 Transit

3 Dec 2016 Arive Manzanillo

3 Vehicle Configuration

Table 1 lists the science sensors installed on *Sentry* on this cruise.

Table 1: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz Sub-Bottom Profiler (SBP)
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 Conductivity-Temperature-Depth (CTD)
Seapoint optical backscatter sensor (OBS)
Anderaa optode model 4330
300kHz RDI Doppler Velocity Log (DVL)
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

4 Navigation

All dives were navigated using real time DVL velocity inertial measurement unit (IMU) attitude measurements. External aiding during descent was performed with Ultra-Short Baseline (USBL) throughout the cruise. Dive specific notes on navigation are included in the dive reports. All final navigation consists of a track where the DVL/IMU track was fused with the USBL fixes in post-processing.

4.1 Coordinate origins

The vehicle's control system uses simple equidistant coordinates. This system uses an origin, defined in terms of latitude and longitude with the World Geodetic System 1984 (WGS84) datum, and a fixed scaling between meters displacement from the origin. We use the identical routines that have been used by the National Deep Submergence Facility (NDSF) assets Alvin and Jason for decades. Likewise we always used the same origin for Sentry and Alvin at each site. These simple coordinates have several advantages for realtime control of a vehicle. Unlike Universal Transverse Mercator (UTM) grid coordinates, the x and y axes intersect at right angles and align with true east and north respectively at the origin. These coordinates distort quickly as one moves away from the origin, but we solve that problem by putting the origin close to the operating area. We almost always report our results in latitude/longitude, so most users need not be aware of these details.

4.2 USBL Calibration and Performance Notes

A CASIUS calibration of the USBL system was conducted By the SSSG Group prior to this cruise. A copy of the USBL calibration report is included in this report.

5 Items of Note

This section summarized details which are worthy of note or mention for future reference but which do not constitute problems:

N.1: The first dive of the cruise was an engineering dive used to test various upgrades and installed equipment on Sentry.

N.2: Sentry Ops were conducted outside of Alvin ops, running at night when Alvin was not in the water.

N.3: Dredges were completed during Sentry dives. Typically only a single dredge was completed due to time constraints. Dredges were completed from 500m to 3km distance from the sentry surveys. The ranger USBL system would typically lose tracking of Sentry when the dredge was greater than 2km horizontal distance. Overall the simultaneous operations worked well.

6 Ship Specific Information

This section summarizes ship specific information factual, good, and bad and is meant primarily to facilitate more effective use of the same vessel in the future.

S.1: Atlantis is an ideal platform for Sentry operations. Atlantis crew are experienced in our operations and make launch,surveys, and recoveries effortless.

7 Technical Issues

This section summarizes technical issues encountered by the *Sentry* operations group on the cruise. Issues which affected primarily individual dives are listed in the individual dive reports.

T.1: Systematic issues throughout the cruise were not present. Individual issues are noted within the dive reports.

8 Sentry Operations Team

The *Sentry* team was comprised of 6 members on this cruise — Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll. Sean Kelley was the Expedition Leader and principal author of this report.

9 Sensor and Post Processing Configurations

9.1 Multibeam Parameters and processing

The Multibeam parameters used during the cruise can be seen in the following tables. MBsystems was used to process all multibeam data along with the sentry pipline and renav. the MBsystems version used during this cruise, V5.5.2263

Table 2: Multibeam Configuration and offsets

Setting	**value**
time Offset	0.125s
Roll Bias	-2.0
Pitch Bias	0.0
Heading Offset	1.81
VRUOffsety	-0.5
VRUOffsetz	-1.0
Reson Driver Mode	0
Range	160
Power	218
Pulse width	0.00066
Gain	25
Max Rate	5
Coverage Angle Degs	120
Min Range Gate	1
Max Range Gate	300
Min Depth Gate	1
Max Depth Gate	150

Table 3: Multibeam Processed Grid Spacing

Dive	**Grid**
Sentry394	1.0x1.0
Sentry395	1.0x1.0
Sentry396	1.0x1.0
Sentry397	1.0x1.0
Sentry398	1.0x1.0
Sentry399	1.0x1.0
Sentry400	1.0x1.0
Sentry401	No Data
Sentry402	1.0x1.0
Sentry403	1.0x1.0
Sentry404	1.0x1.0
Sentry405	1.0x1.0
Sentry406	1.0x1.0

9.2 Sub-bottom and sidescan parameters and processing

The 2016-gregg cruise used the Edgetech 2200N. Processing was completed using Sonarwiz processing software and a new Sentry mbsystems pipeline. The Sonarwiz software was the primary processing software used. The sentry mbsystems sidescan pipeline was not used for all of the dives and only used up to dive 400. Sonarwiz settings used for processing can be seen below, The Sonarwiz version used: V5.05.0012. High frequency sidescan was not processed. The vehicle altitude during the dives was not ideal for the high frequency sidescan to be effective.

A new sentry processing pipeline was used to create sub bottom SEGY files and postscript plots which are located in the dives folder 'sbp' under sss-sbp.

NOTE: fledermaus .sd sidescan drapes were not working properly for dive sentry402. There is no root cause yet for why these did not drape properly.

Table 4: Sub Bottom configuration used by Edgetech

Config	**value**
Ping Trigger	1
Trigger Mask	1
Trigger InInversion	1
Trigger Out Length	30000
PingRate	8000
Ping Range	150000

Table 5: Sidescan Configuration used by Edgetech

Config	**value**
Ping Trigger	2
200Khz Ping rate	2100
200Khz Ping Range	350000
400Khz Ping Trigger	2
400Khz Ping Rate	5000
400Khz Ping Range	150000

Table 6: Sonarwiz LF Sidescan Post Processing settings Per Dive

Dive	**Import**	**Gain**
Sentry394	G2,CH 1+2,100	AGC R30 I20
Sentry395	G4,CH 1+2,100	AGC R30 I20
Sentry396	G2,CH 1+2,100	AGC R30 I20
Sentry397	G2,CH 1+2,100	AGC R30 I20
Sentry398	G2,CH 1+2,100	AGC R30 I20
Sentry399	G2,CH 1+2,100	AGC R30 I20
Sentry400	G2,CH 1+2,100	AGC R30 I20
Sentry401	No dive data	No dive data
Sentry402	G2,CH 1+2,100	AGC R30 I20
Sentry403	G2,CH 1+2,100	AGC R30 I20
Sentry404	G2,CH 1+2,100	AGC R30 I20
Sentry405	G2,CH 1+2,100	AGC R30 I20
Sentry406	G2,CH 1+2,100	AGC R30 I20

Table 7: Sonarwiz Subottom Post Processing settings Per Dive

Dive	**Import**	**Gain**
Sentry394	G16	AGC R30 I20
Sentry395	G16	AGC R30 I20
Sentry396	G16	AGC R30 I20
Sentry397	G16	AGC R30 I20
Sentry398	G16	AGC R30 I20
Sentry399	G16	AGC R30 I20
Sentry400	G16	AGC R30 I20
Sentry401	—	No dive data
Sentry402	G16	AGC R30 I20
Sentry403	G16	AGC R30 I20
Sentry404	G16	AGC R30 I20
Sentry405	G16	AGC R30 I20
Sentry406	G16	AGC R30 I20

Table 8: mbsystems experimental subbottom processing settings

Dive	**norm**	**suGain**
Sentry394	rms	4 gagc
Sentry395	rms	4 gagc
Sentry396	rms	4 gagc
Sentry397	rms	4 gagc
Sentry398	rms	4 gagc
Sentry399	rms	4 gagc
Sentry400	rms	4 gagc
Sentry401	—	No dive data
Sentry402	rms	4 gagc
Sentry403	rms	4 gagc
Sentry404	rms	4 gagc
Sentry405	rms	4 gagc
Sentry406	rms	4 gagc

10 Acknowledgments

1. Thank you to the ship for excellent support in deck operations, integration support and feeding us so well!

2. Thank you to the National Science Foundation for funding this expedition.

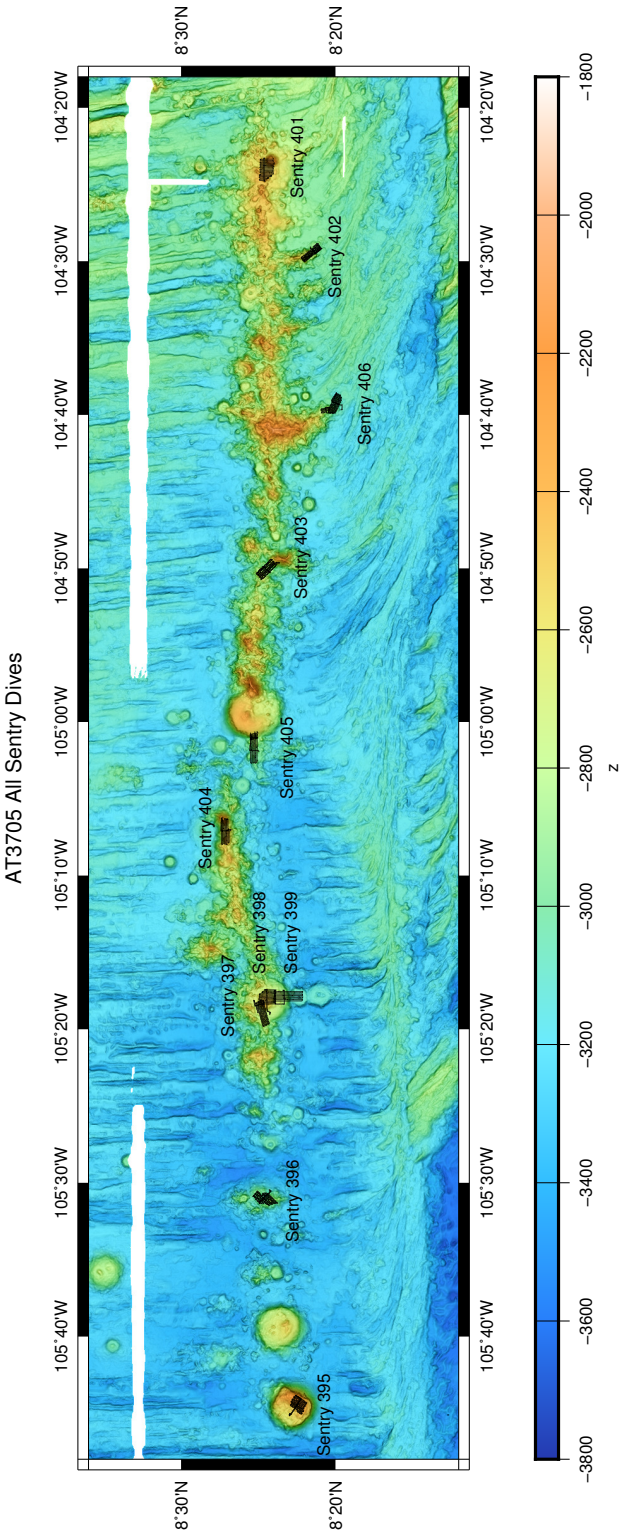


Figure 1: Sentry dives during AT37-05.

Sentry 394 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately 1-5 ft for both launch and recovery and were not a factor in operations. Wind was 5 to 10 knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 9: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -106 -20

Launch Position: sentry394 launch position: 08 35.022'N 106 10.807'W

Narrative

This was an engineering dive testing various systems and upgrades. Additional science multibeam surveys were added to the end of the mission covering areas of interest. The first 30 minutes of the survey did not have tracking or acoustic communications with the vehicle. This was due to a setting in the ranger software that limits the tracking depth of the ranger system. The setting was at 2000meters, while sentry was operating at 2500meters. After this was corrected, vehicle tracking and acoustic messaging worked well. Overall the dive went well.

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.1 sentry394 Summary

sentry394 Summary
Origin: 8.333333 -106.333333
Origin: 08 20.000'N 106 20.000'W
Launch: 2016/11/12 13:01:45
Survey start: 2016/11/12 14:17:17
Survey start: Lat:8.583306 Lon:-106.177322
Survey start: Lat:08 34.998'N Lon:106 10.639'W
Survey end: 2016/11/13 11:23:00
Survey end: Lat:8.576059 Lon:-106.173562
Survey end: Lat:08 34.564'N Lon:106 10.414'W
Ascent begins: 2016/11/13 11:23:00
On the surface: 2016/11/13 12:23:06
On deck: 2016/11/13 12:34:32
descent rate: 32.4 m/min
ascent rate: 36.9 m/min
survey time: 21.1 hours
deck-to-deck time 23.5 hours
Mean survey depth: 2329m
Mean survey height: 64m
distance travelled: 60.08km
average speed; 0.79m/s
average speed during photo runs: 0.56 m/s over 4.83 km
average speed during multibeam runs: 0.85 m/s over 55.41 km
total vertical during survey: 16404m
Battery energy at launch: 19.9 kwhr
Battery energy at survey end: 2.7 kwhr
Battery energy on deck: 2.6 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.2 sentry394 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161112_1026.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161112_1027.cfg
CTD	SBE 49	222		sbe49_20161112_1028.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161112_1027.cfg tim_20161112_1032.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

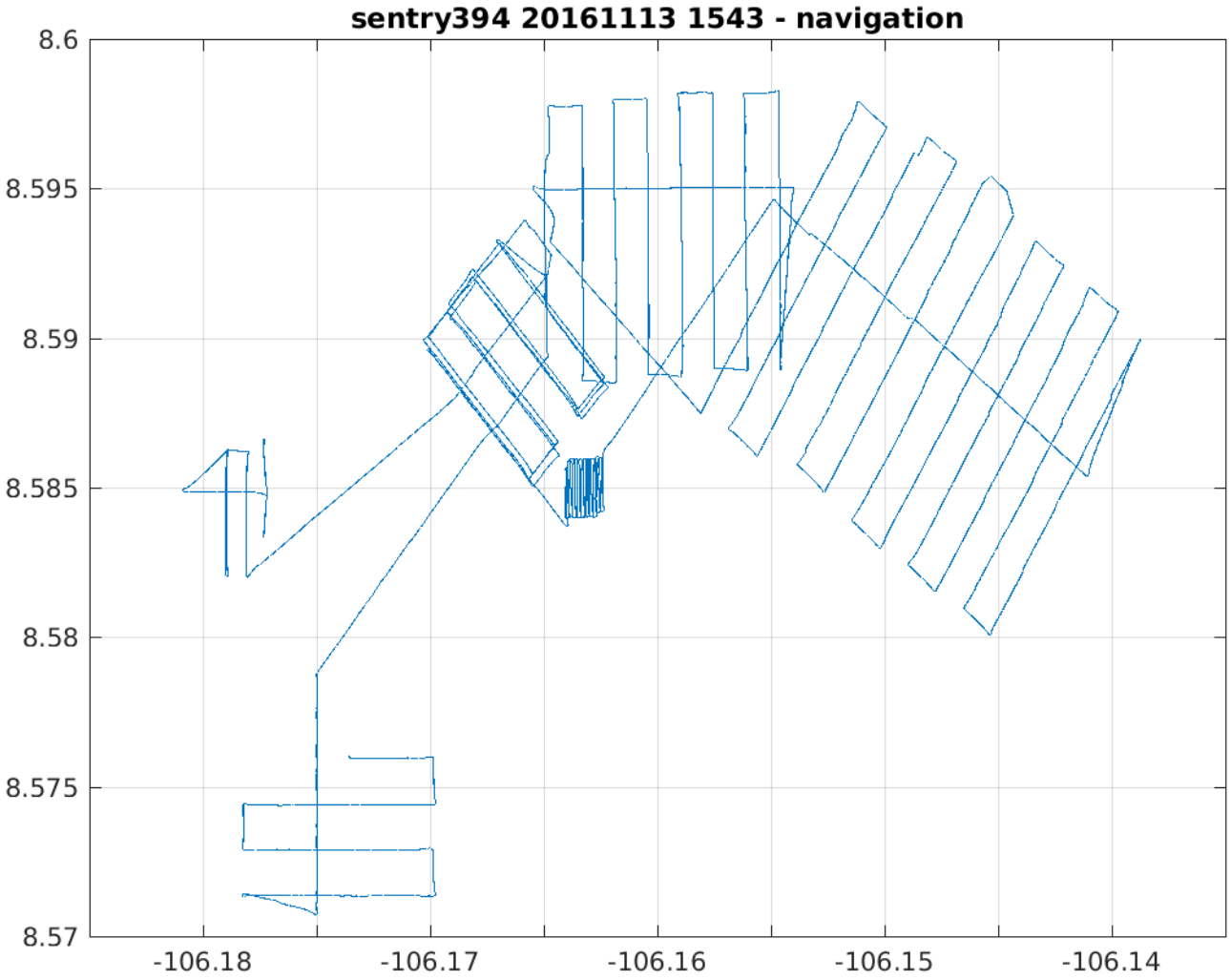


Figure 2: Latitude/Longitude plot of Sentry dive 394 based on post-processed navigation.

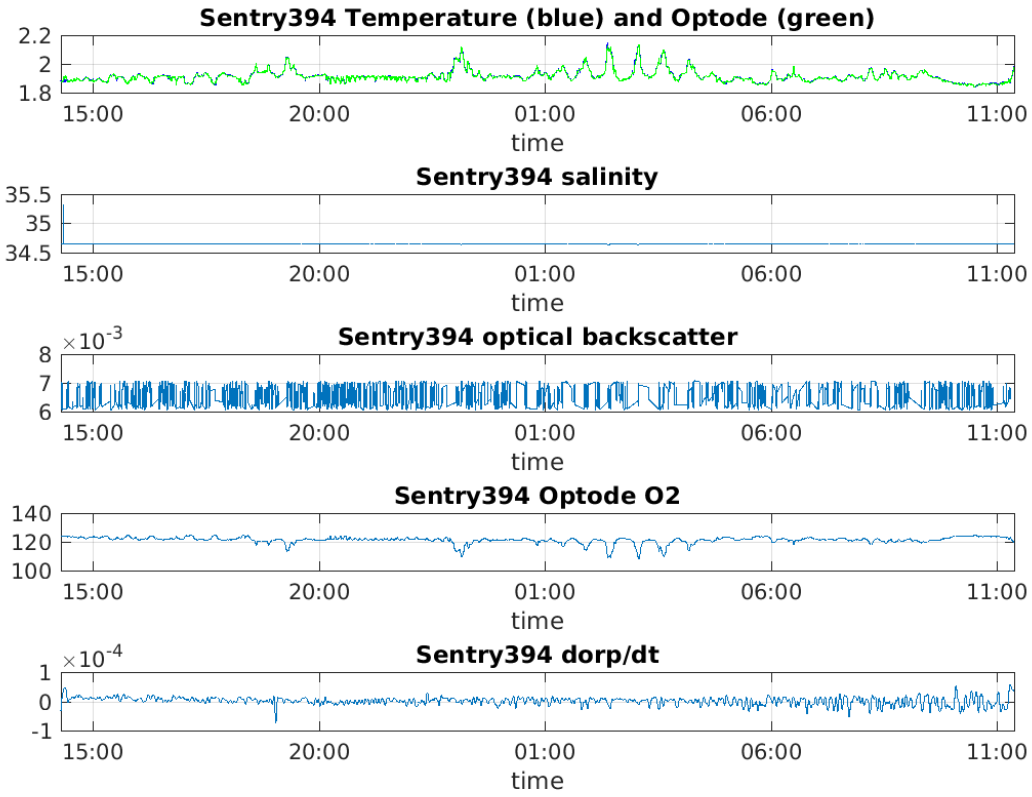


Figure 3: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

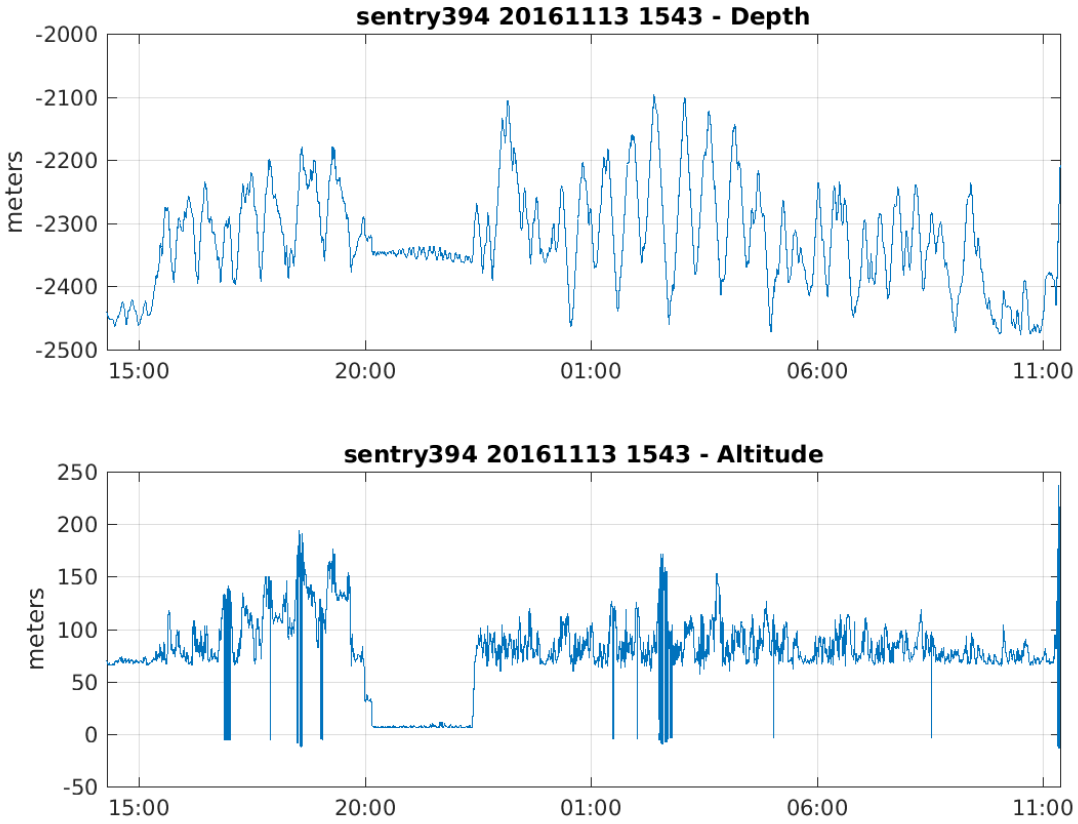


Figure 4: Depth and Altitude of Sentry during dive 394.

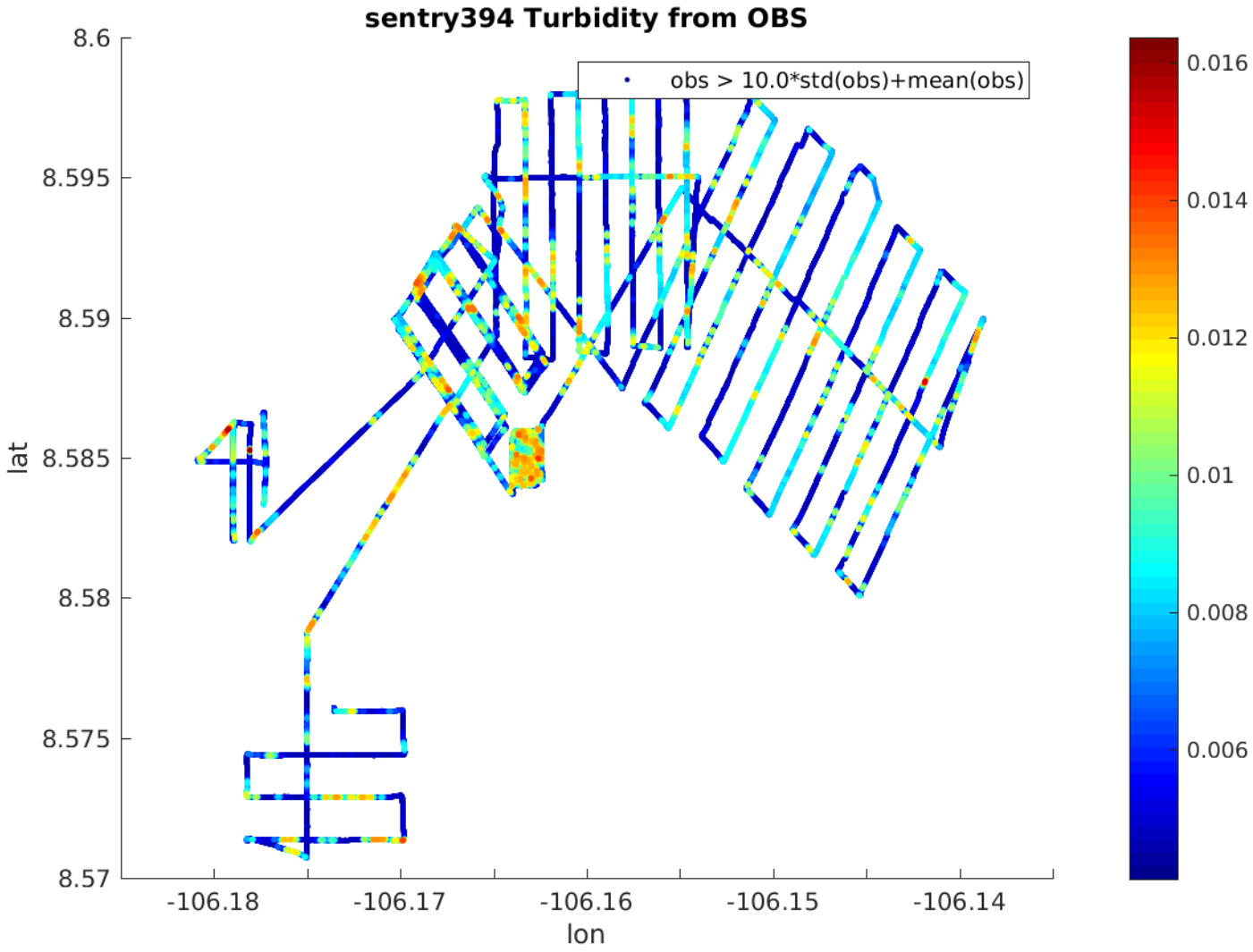


Figure 5: Optical backscatter on dive 394.

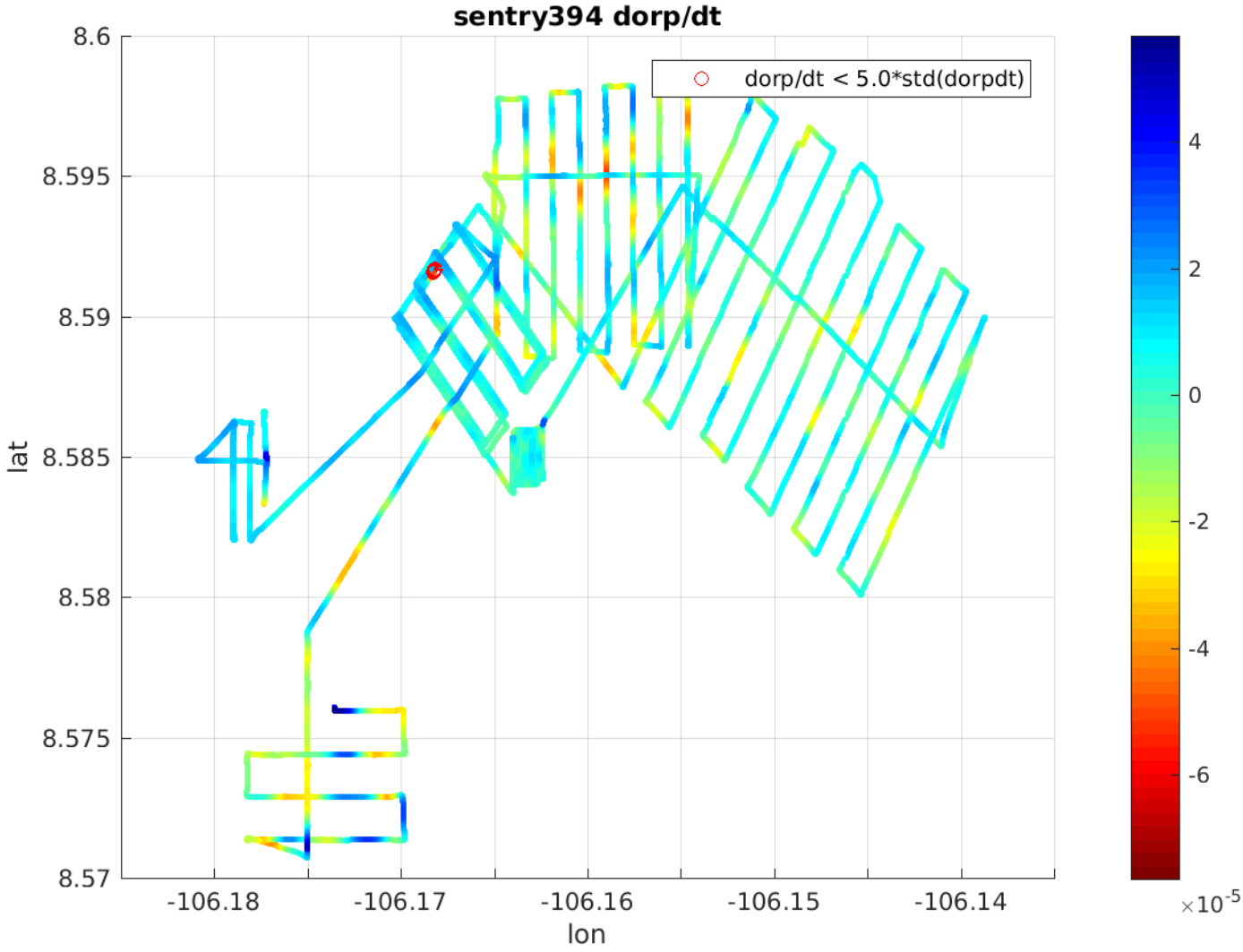


Figure 6: ORP sensor data during dive 394.

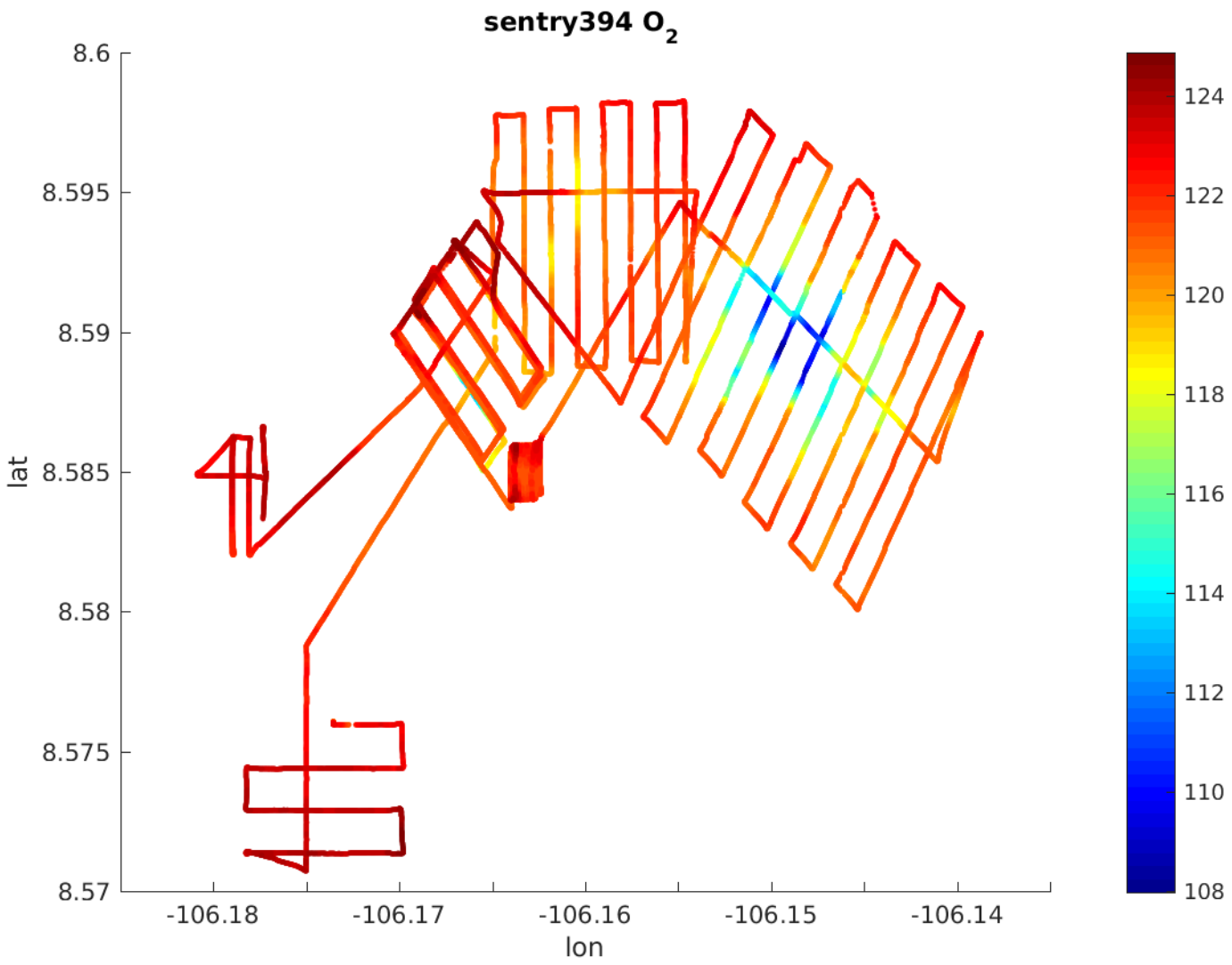


Figure 7: O2 sensor data during dive 394.

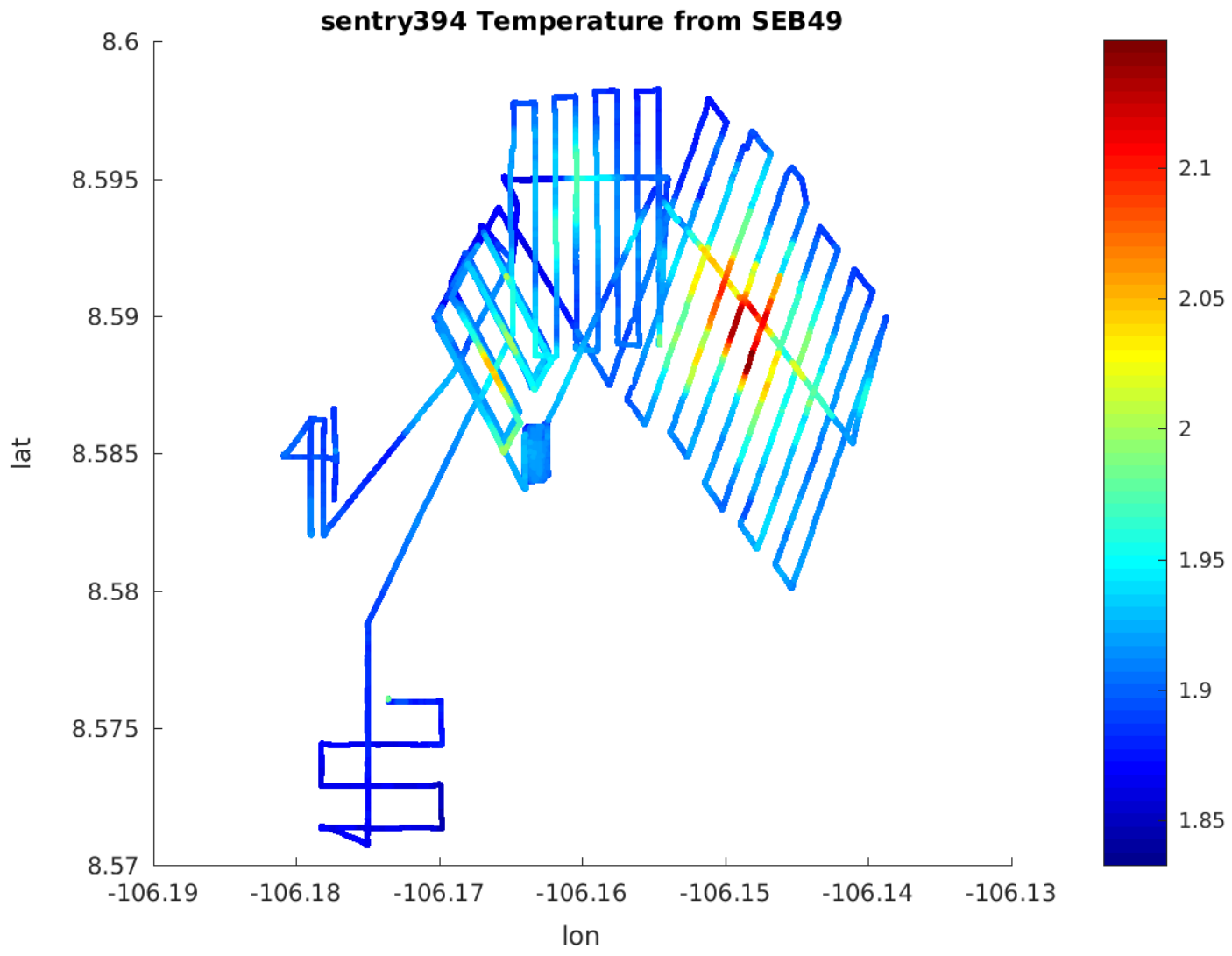


Figure 8: Temperature sensor data during dive 394.

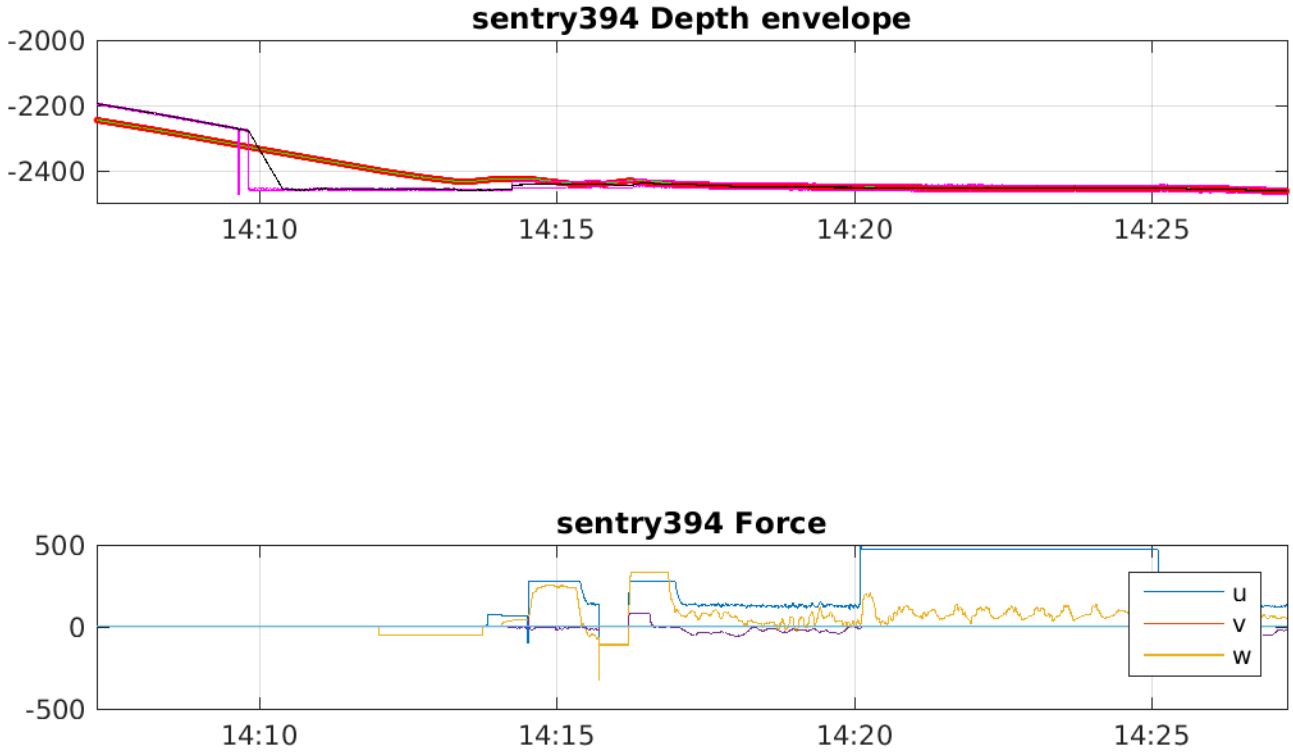


Figure 9: Bottom Approach for during dive 394.

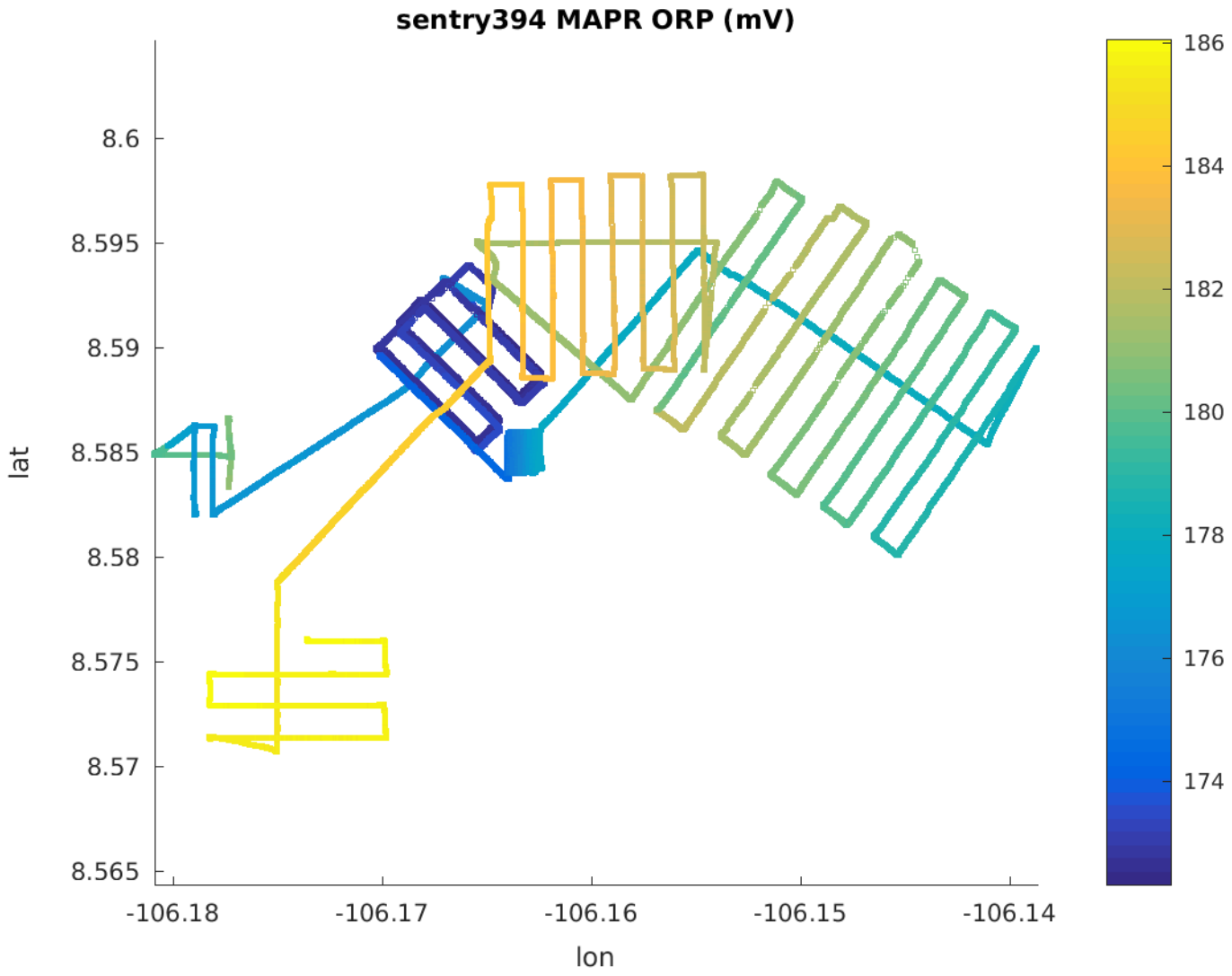


Figure 10: MAPR orp data during dive 394.

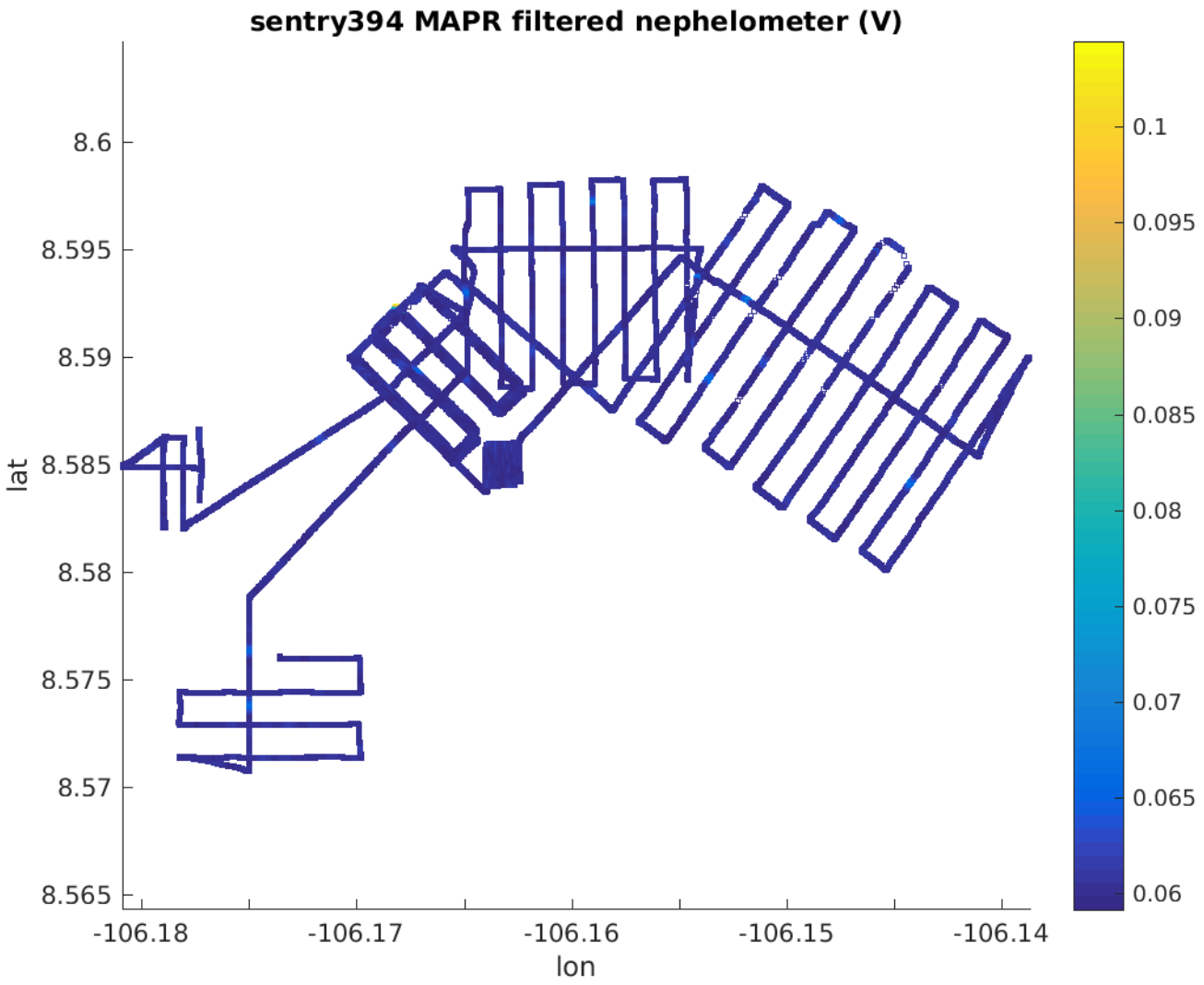


Figure 11: MAPR neph data during dive 394.

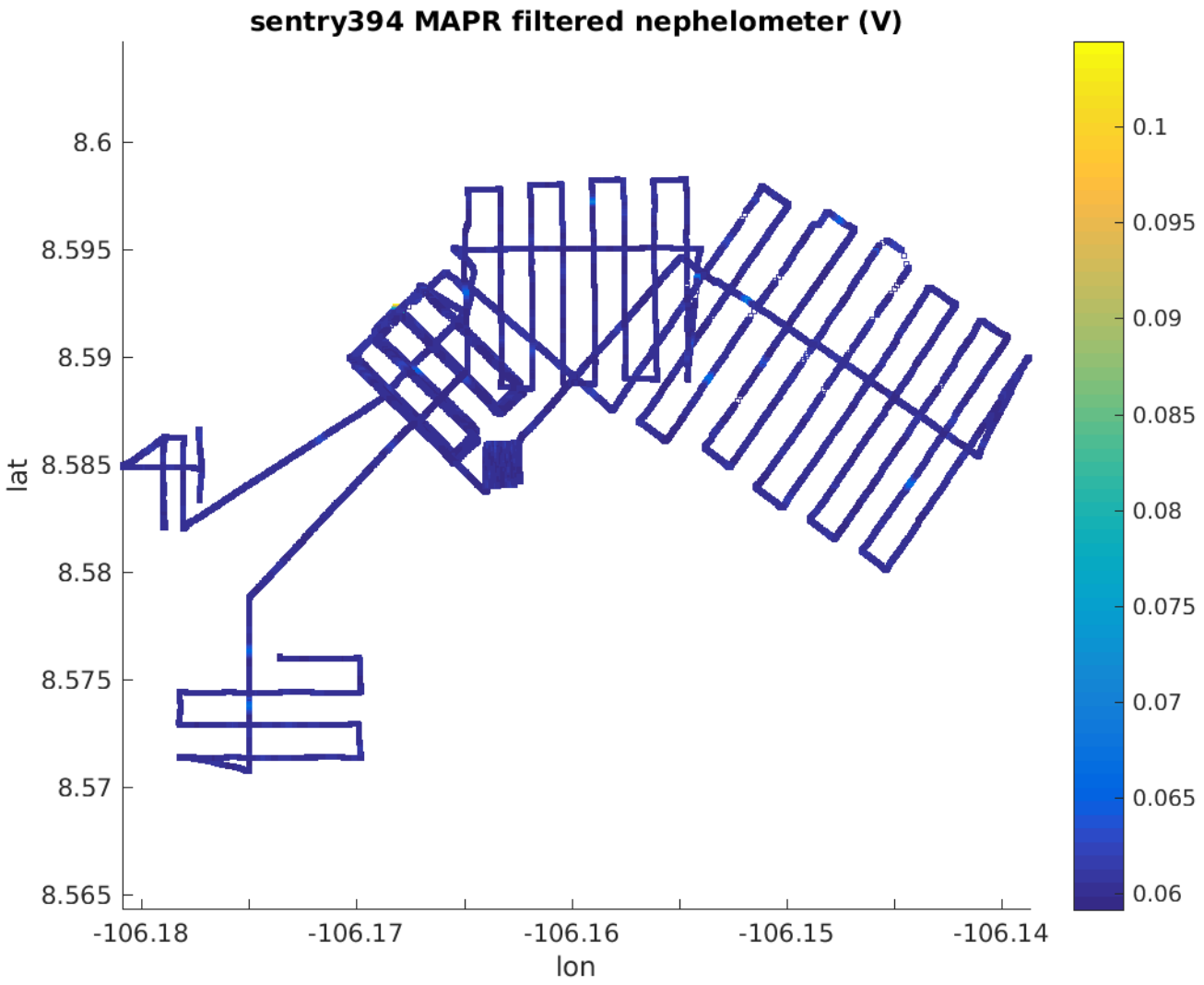


Figure 12: MAPR neph data during dive 394.

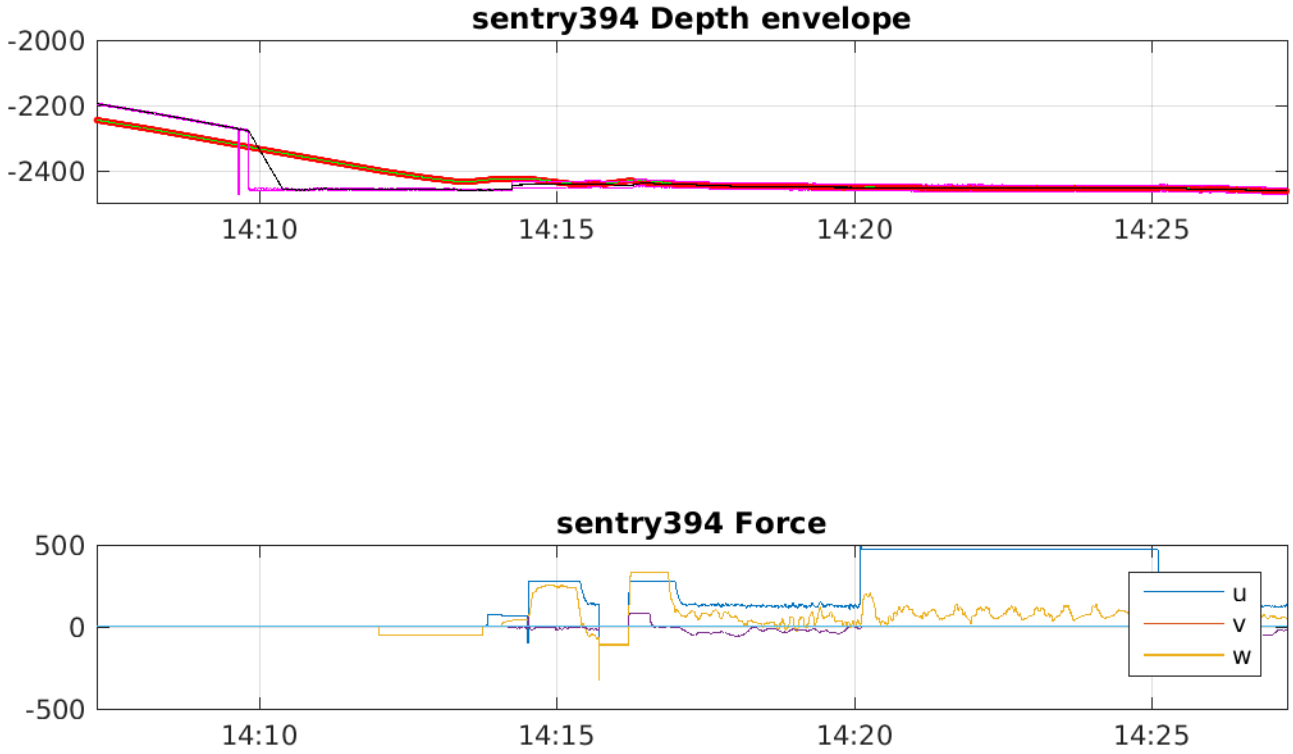


Figure 13: Bottom Approach for during dive 394.

Sentry 395 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately 1-2 ft for both launch and recovery and were not a factor in operations. Wind was 5 to 7 knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 10: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -106 -20

Launch Position: sentry395 launch position: 08 22.993'N 105 45.172'W

Narrative

Multibeam survey at Ivy seamount covering the south eastern side of the seamount. Launch and descent were normal without issues. Dive went well, completing most of the survey. Ascent and recovery were normal.

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Issues

- Rear servo did not move during the first run of the decktest. After troubleshooting we determined the communication bus was locked up on the device. Unplugging the servo power and sail connector corrected the problem.

Dive Statistics

0.3 sentry395 Summary

sentry395 Summary
Origin: 8.333333 -106.333333
Origin: 08 20.000'N 106 20.000'W
Launch: 2016/11/14 03:12:43
Survey start: 2016/11/14 04:25:54
Survey start: Lat:8.382855 Lon:-105.750897
Survey start: Lat:08 22.971'N Lon:105 45.054'W
Survey end: 2016/11/14 10:58:17
Survey end: Lat:8.375169 Lon:-105.747638
Survey end: Lat:08 22.510'N Lon:105 44.858'W
Ascent begins: 2016/11/14 10:58:17
On the surface: 2016/11/14 11:47:32
On deck: 2016/11/14 12:02:11
descent rate: 34.4 m/min
ascent rate: 49.8 m/min
survey time: 6.5 hours
deck-to-deck time 8.8 hours
Mean survey depth: 2287m
Mean survey height: 65m
distance travelled: 21.36km
average speed; 0.90m/s
average speed during photo runs: 0.76 m/s over 0.01 km
average speed during multibeam runs: 0.92 m/s over 21.35 km
total vertical during survey: 4507m
Battery energy at launch: 19.5 kwhr
Battery energy at survey end: 13.0 kwhr
Battery energy on deck: 12.7 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.4 sentry395 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161114_0211.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161114_0211.cfg
CTD	SBE 49	222		sbe49_20161114_0211.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161114_0211.cfg tim_20161114_0211.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

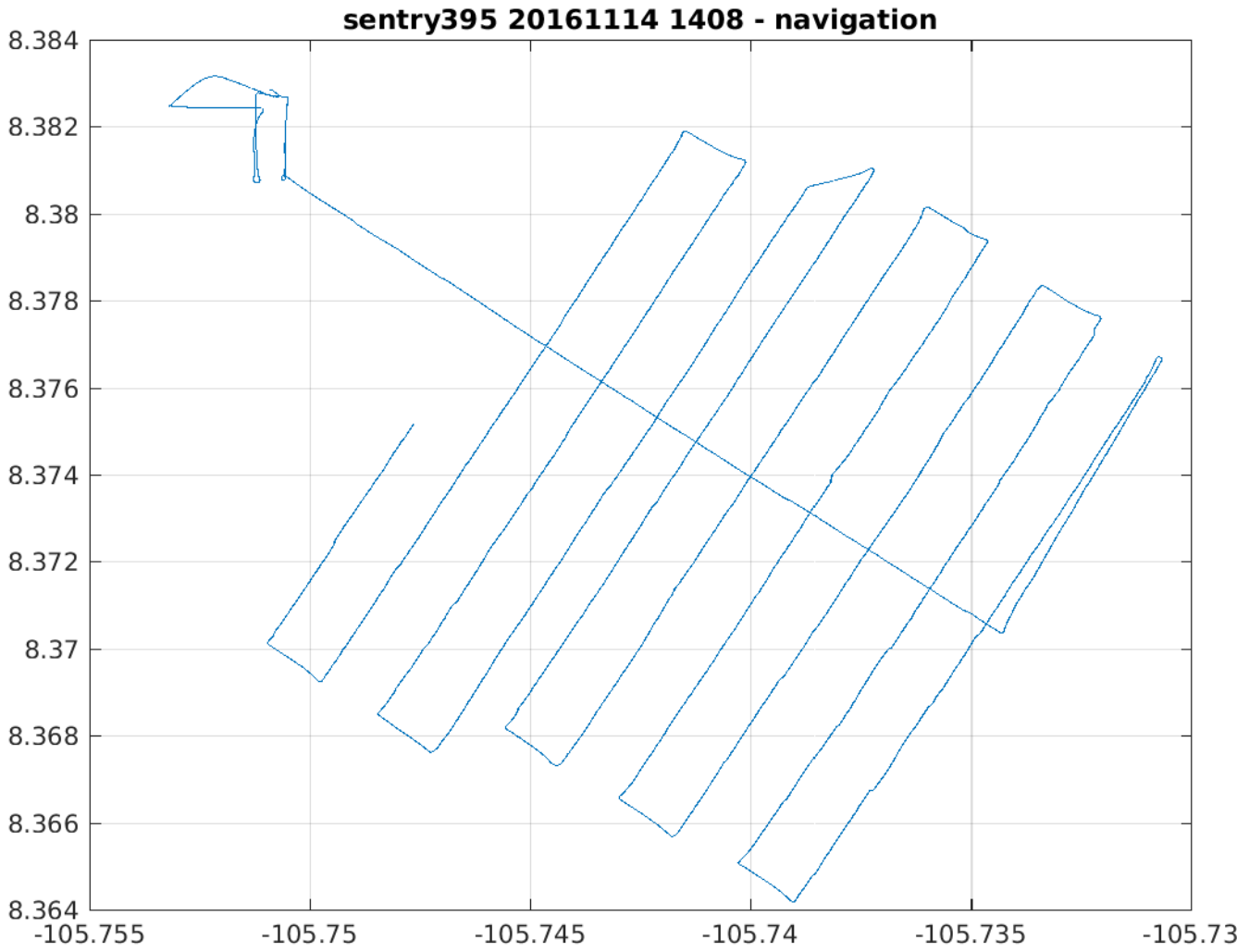


Figure 14: Latitude/Longitude plot of Sentry dive 395 based on post-processed navigation.

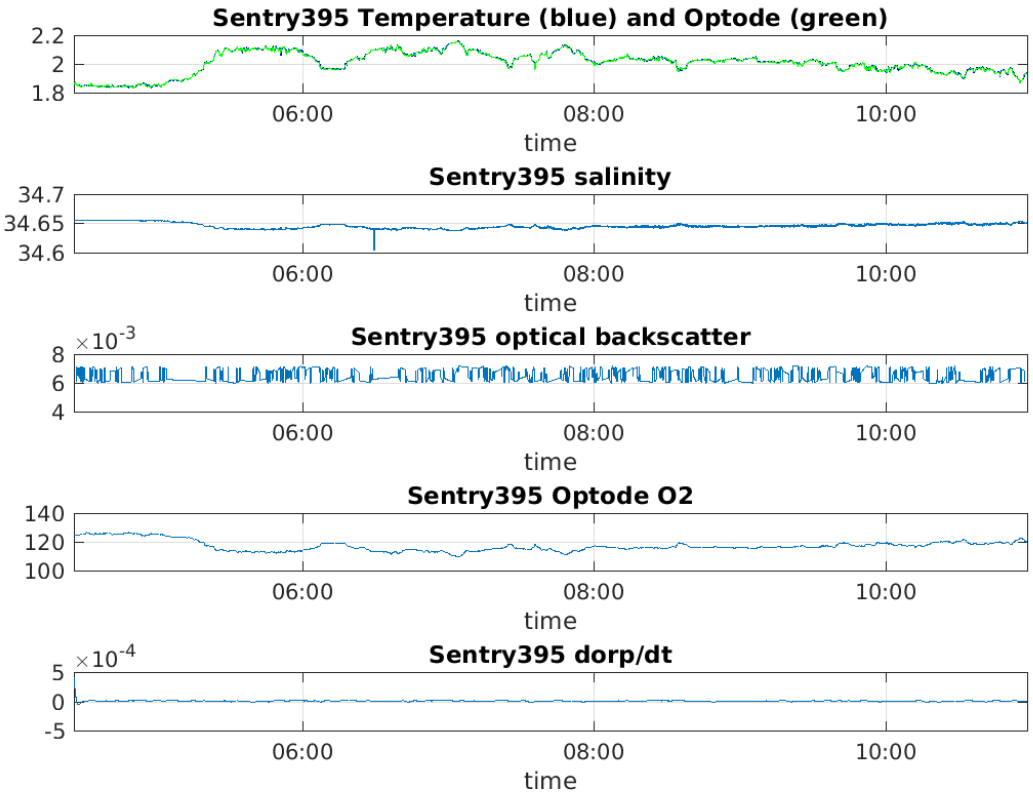


Figure 15: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

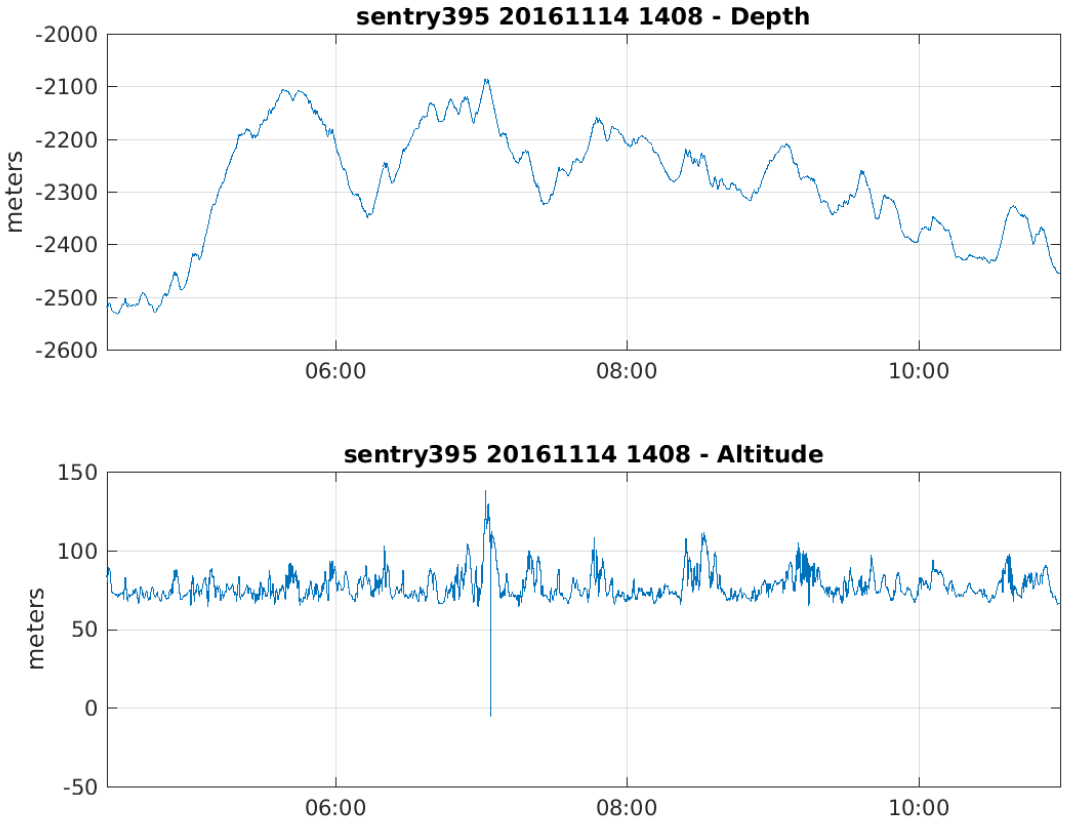


Figure 16: Depth and Altitude of Sentry during dive 395.

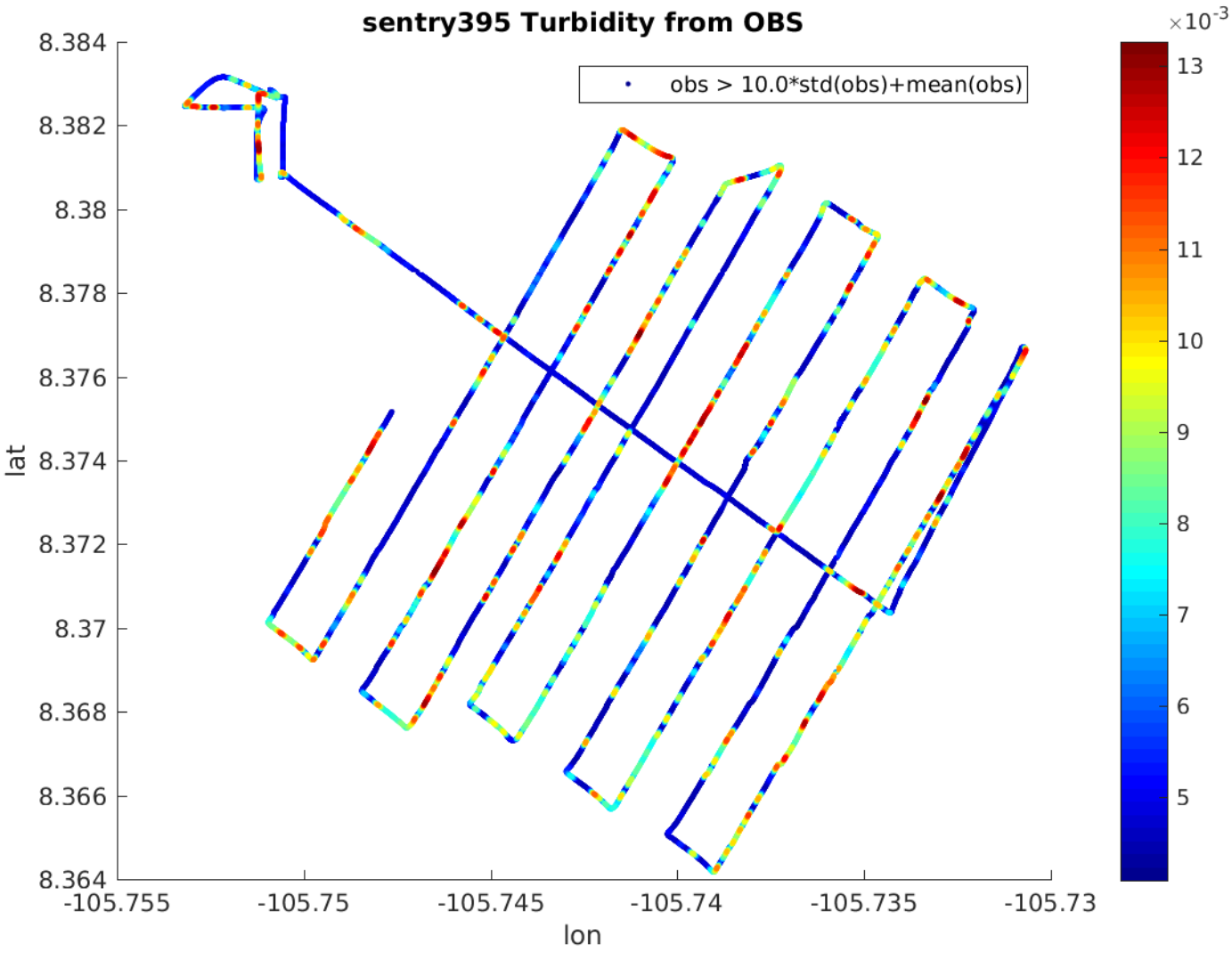


Figure 17: Optical backscatter on dive 395.

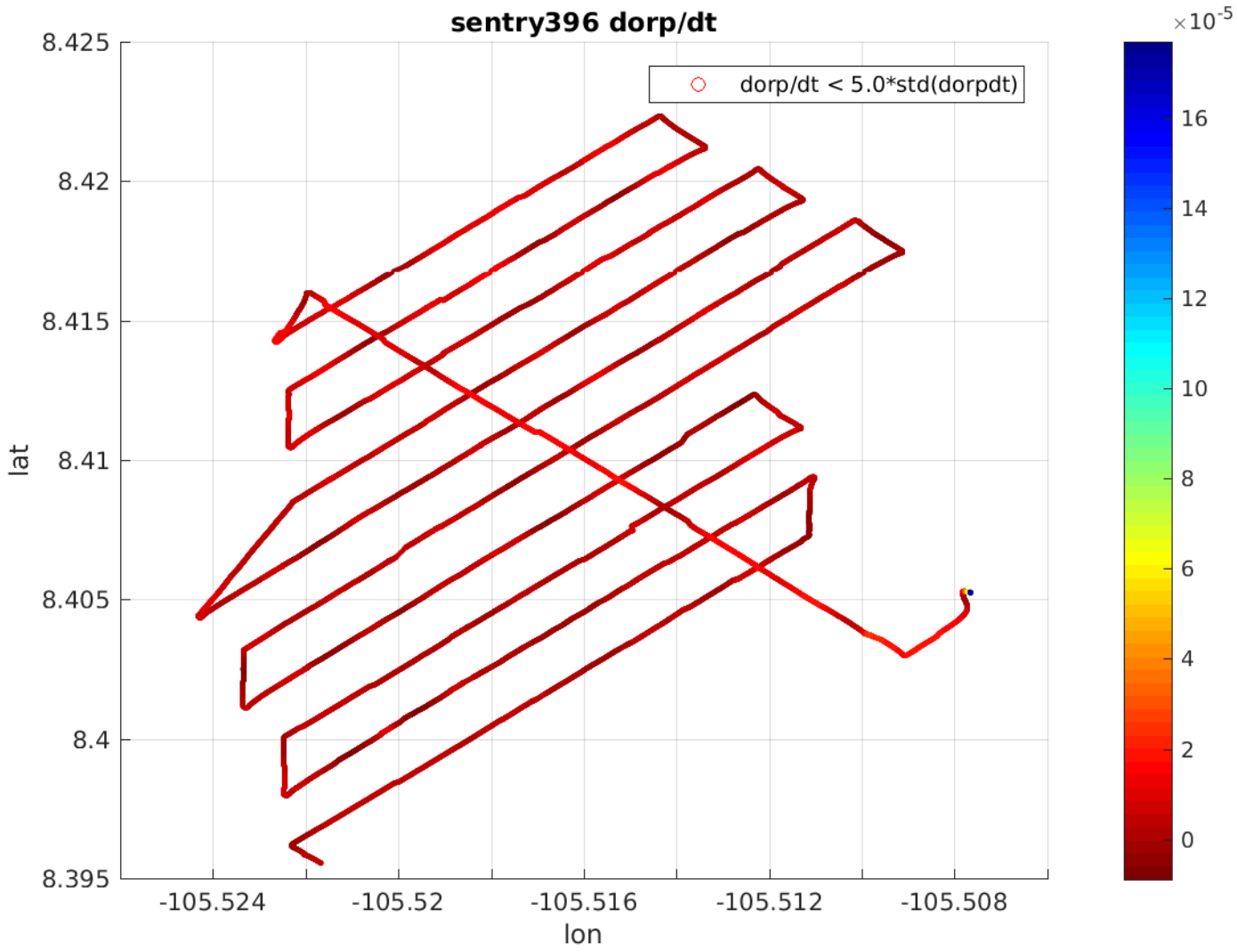


Figure 18: ORP sensor data during dive 395.

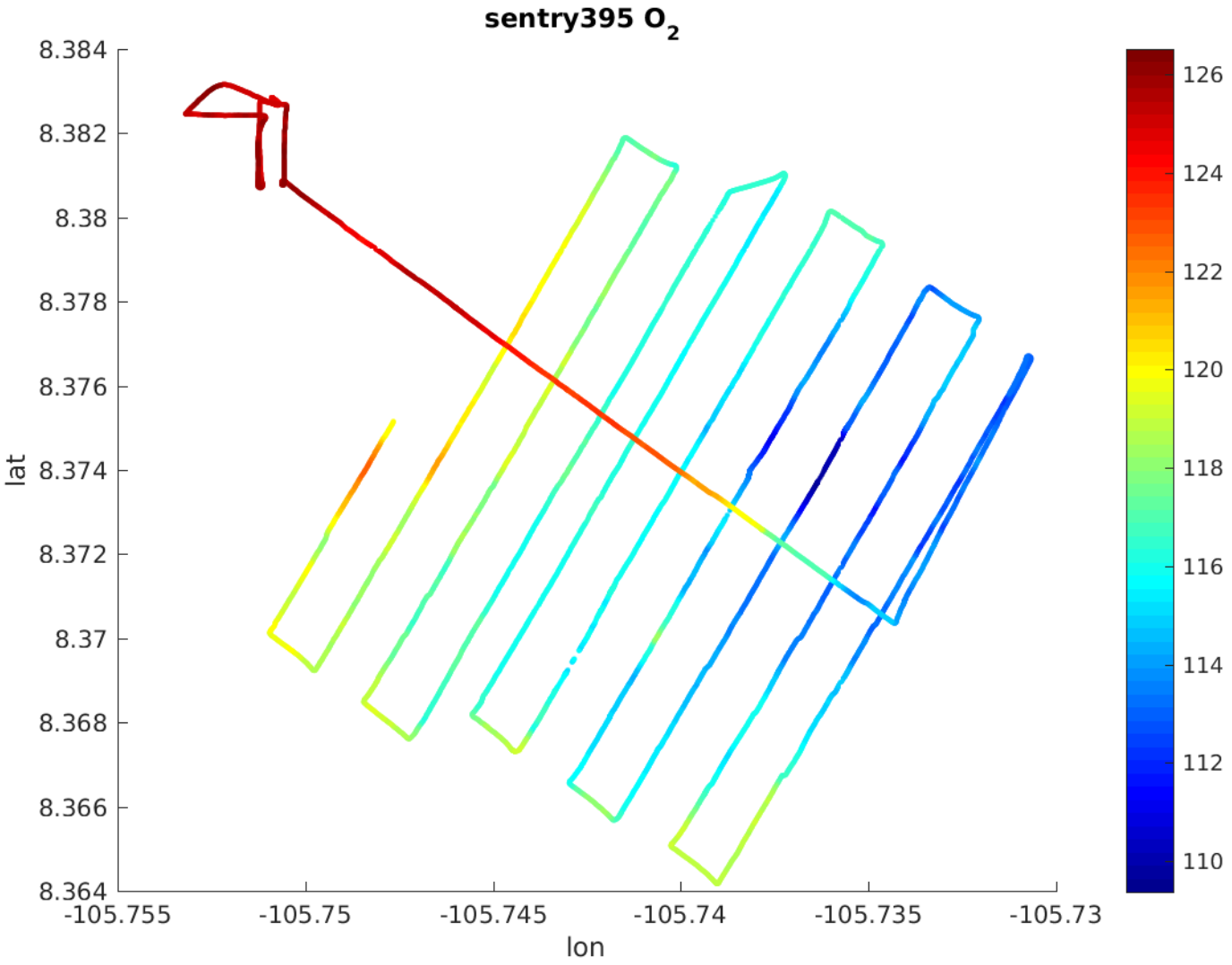


Figure 19: O2 sensor data during dive 395.

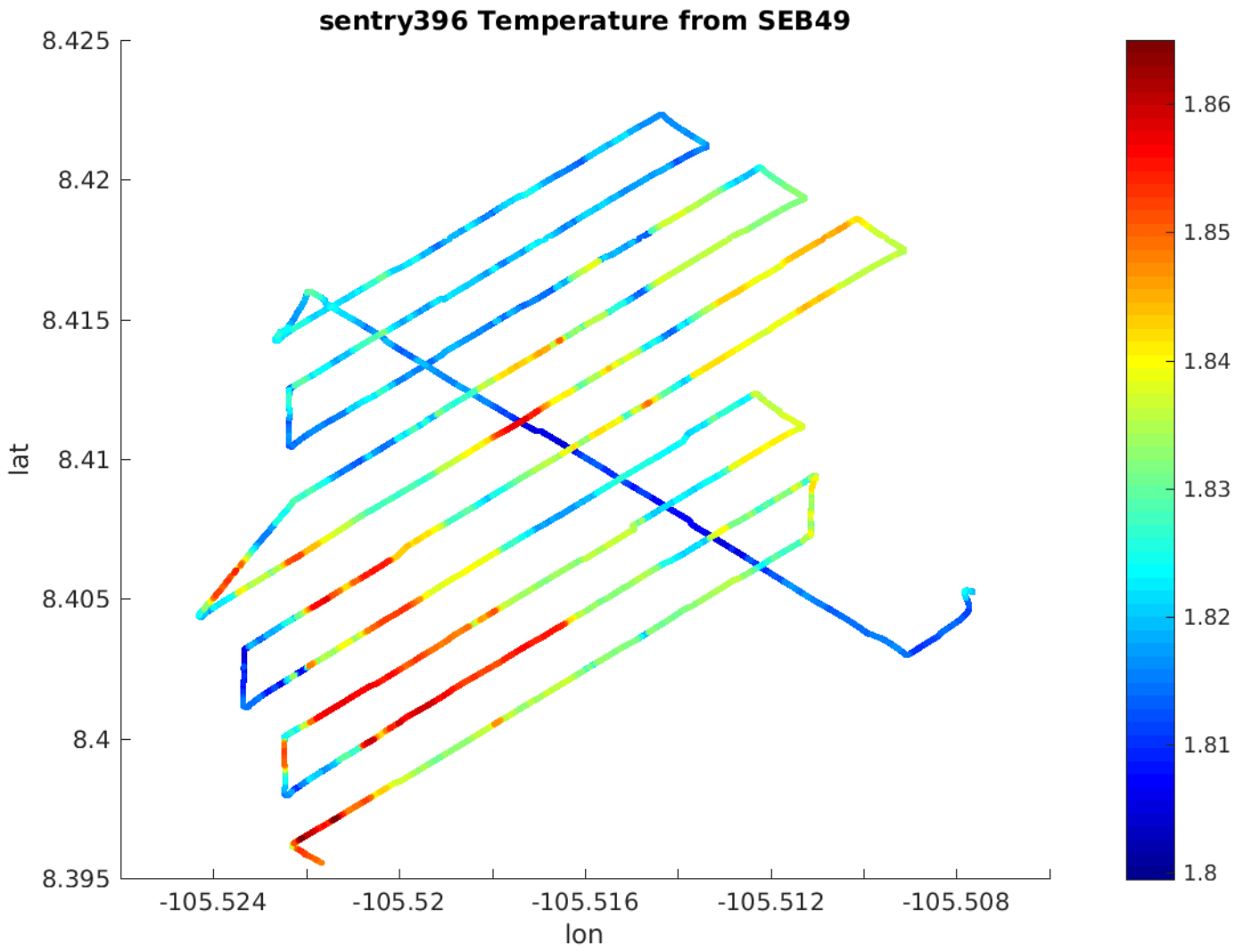


Figure 20: Temperature sensor data during dive 395.

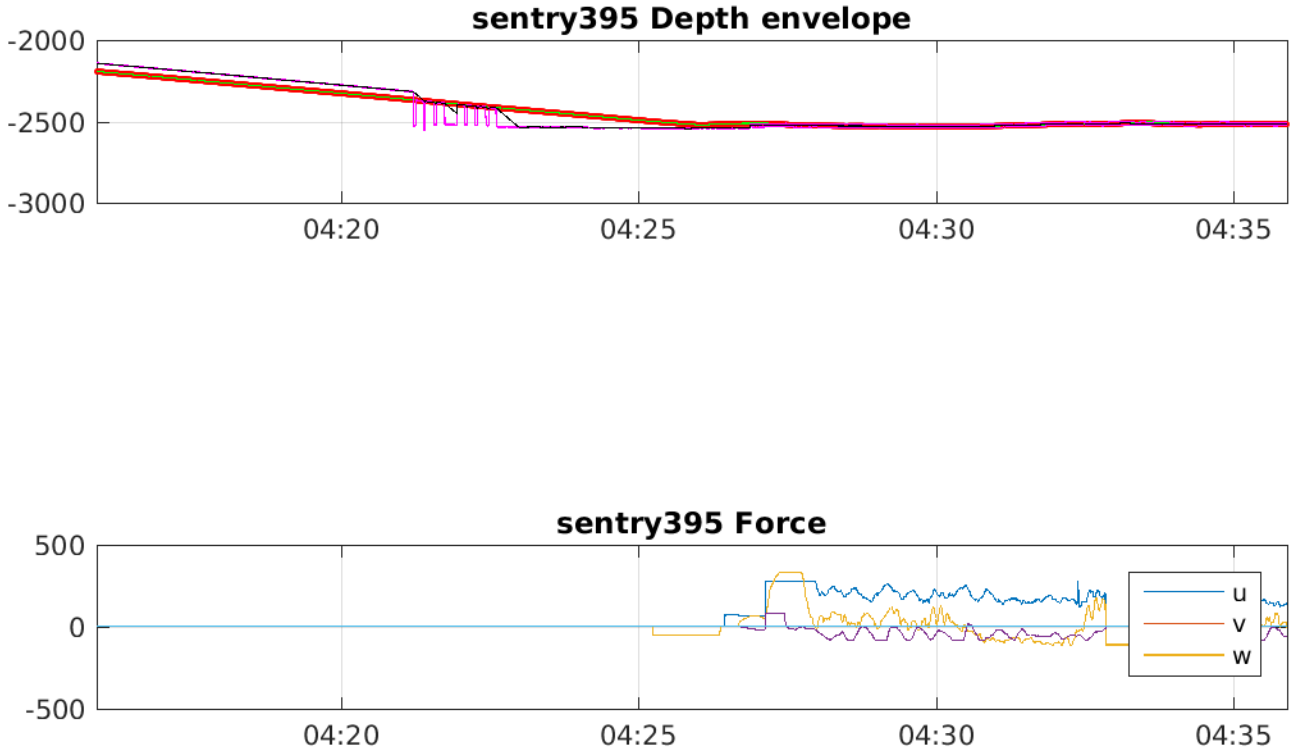


Figure 21: Bottom Approach for during dive 395.

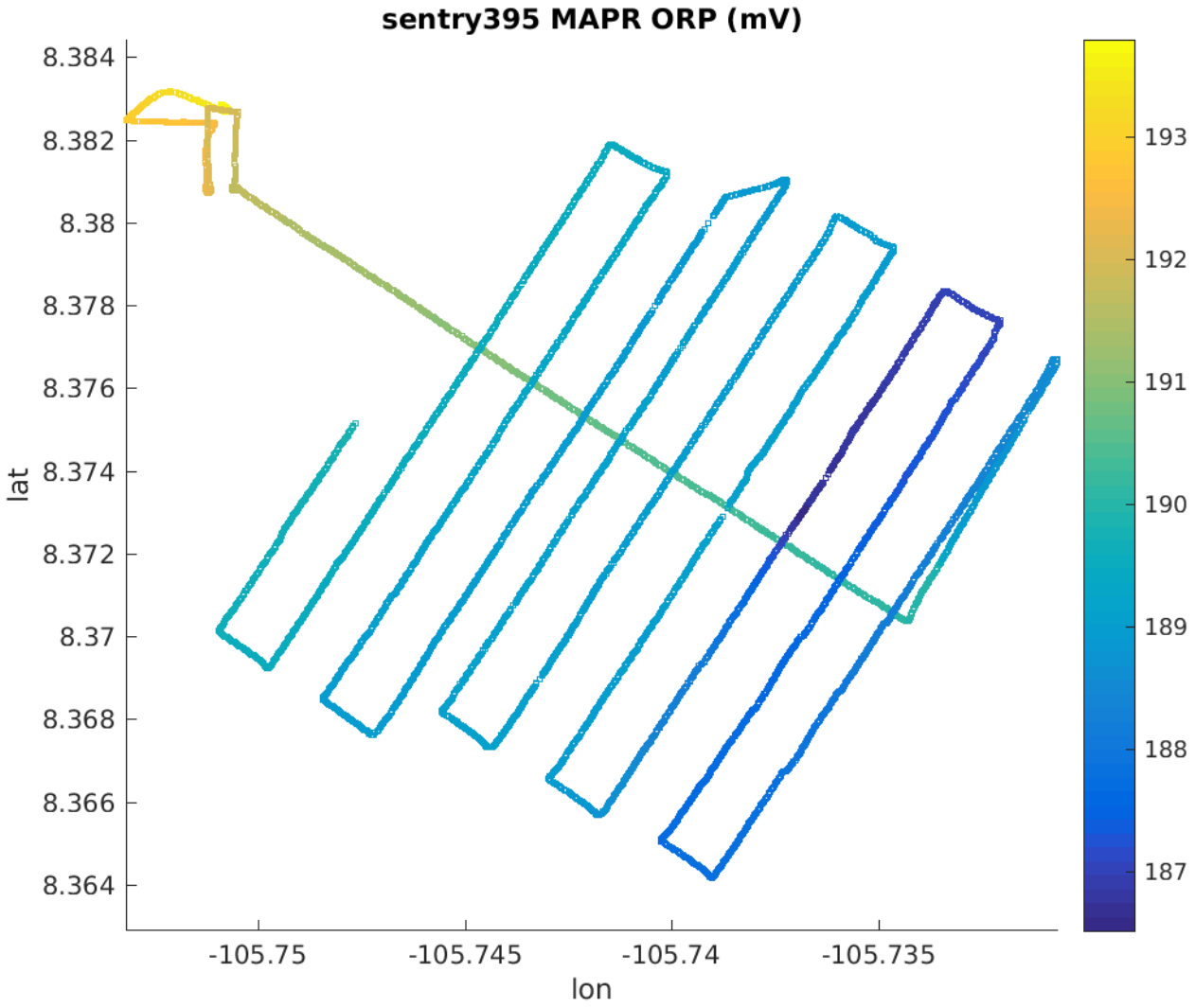


Figure 22: MAPR orp data during dive 395.

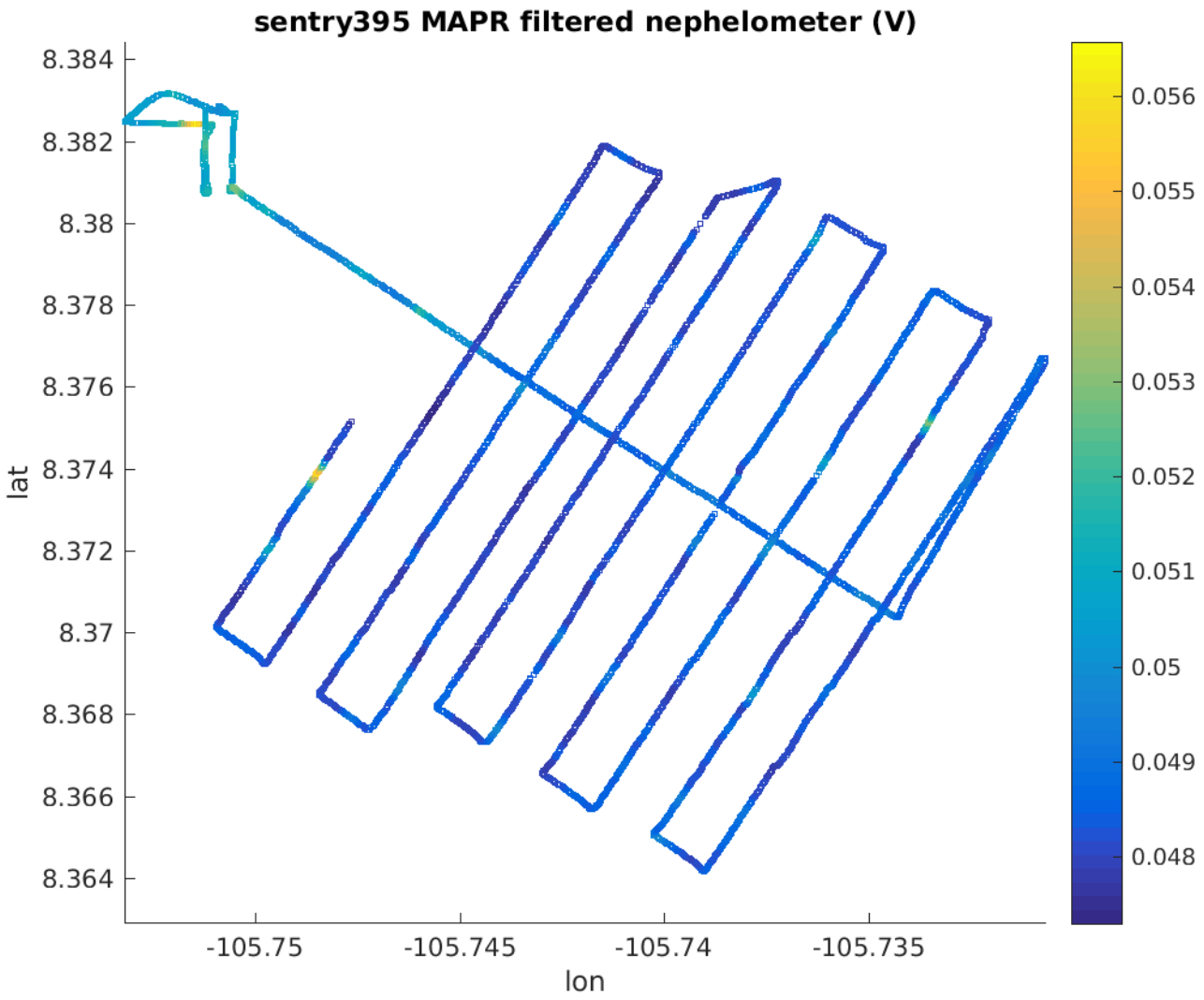


Figure 23: MAPR neph data during dive 395.

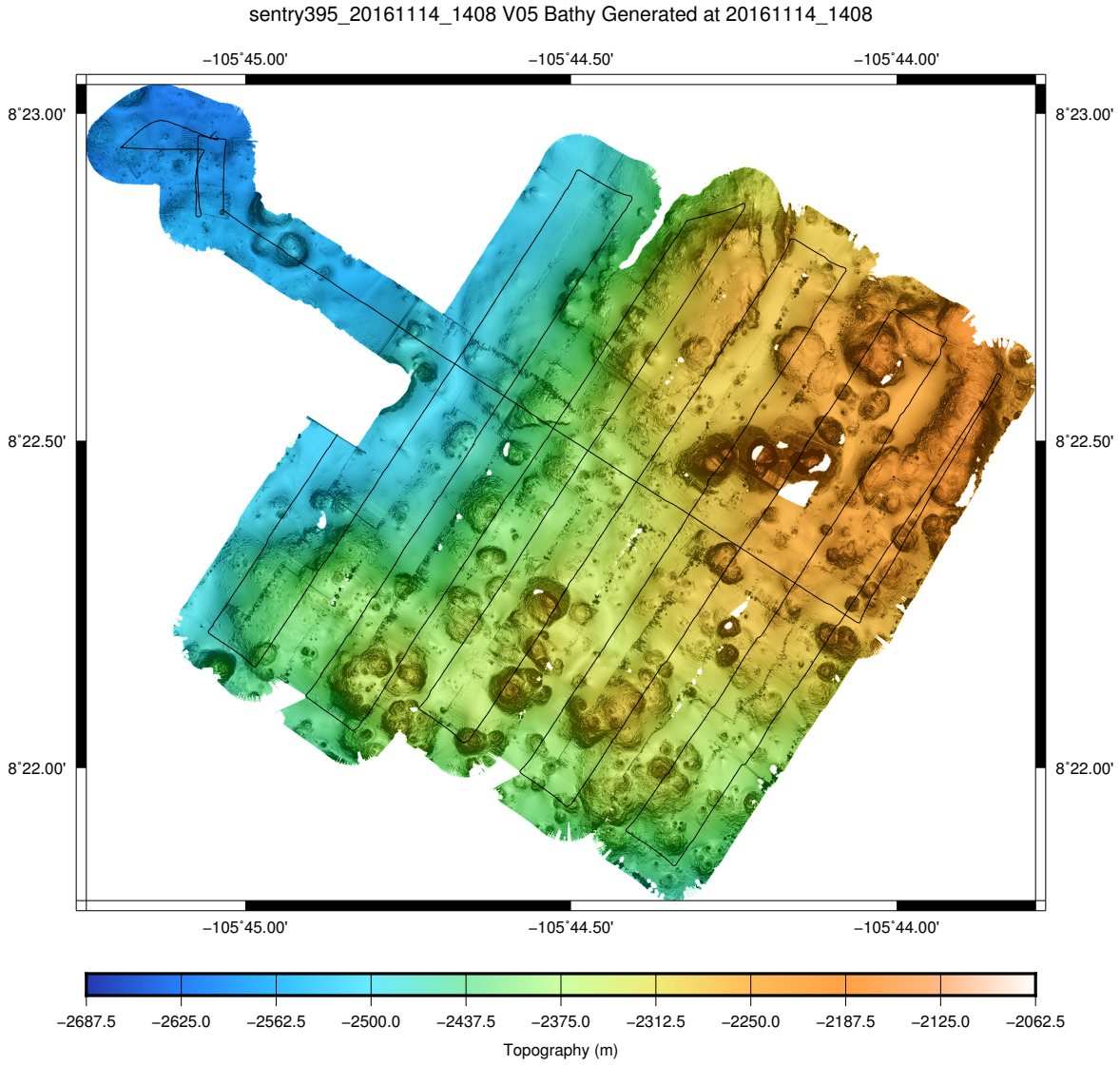


Figure 24: Processed multibeam data from dive 395 with navigation tracks.

Sentry 396 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately less than 1 ft for both launch and recovery and were not a factor in operations. Wind was nill knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 11: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -105 -35

Launch Position: sentry396 launch position: 08 24.298'N 105 30.425'W

Narrative

Multibeam survey at Wayne seamount. Covering the southern end of the seamount with a survey trimmed for specific targets. Launch and ascent were normal. A dredge was completed during the dive north of the survey. No issues were observed from the dredge tracking. Ascent was normal and Recovery was normal.

Issues

- Starboard DCAM did not fully open, leaving the starboard ascent weight in place. DCAM lever arm will be filed down to improve tolerance.

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.5 sentry396 Summary

sentry396 Summary
Origin: 8.333333 -105.583333
Origin: 08 20.000'N 105 35.000'W
Launch: 2016/11/15 00:54:47
Survey start: 2016/11/15 02:24:43
Survey start: Lat:8.405258 Lon:-105.507664
Survey start: Lat:08 24.316'N Lon:105 30.460'W
Survey end: 2016/11/15 09:48:10
Survey end: Lat:8.395543 Lon:-105.521664
Survey end: Lat:08 23.733'N Lon:105 31.300'W
Ascent begins: 2016/11/15 09:48:10
On the surface: 2016/11/15 10:59:28
On deck: 2016/11/15 11:11:51
descent rate: 33.5 m/min
ascent rate: 41.0 m/min
survey time: 7.4 hours
deck-to-deck time 10.3 hours
Mean survey depth: 2874m
Mean survey height: 67m
distance travelled: 21.98km
average speed; 0.82m/s
average speed during photo runs: NaN m/s over 0.00 km
average speed during multibeam runs: 0.83 m/s over 21.98 km
total vertical during survey: 6861m
Battery energy at launch: 19.8 kwhr
Battery energy at survey end: 12.6 kwhr
Battery energy on deck: 12.4 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.6 sentry396 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161115_0004.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161115_0004.cfg
CTD	SBE 49	222		sbe49_20161115_0005.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161115_0004.cfg tim_20161115_0009.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

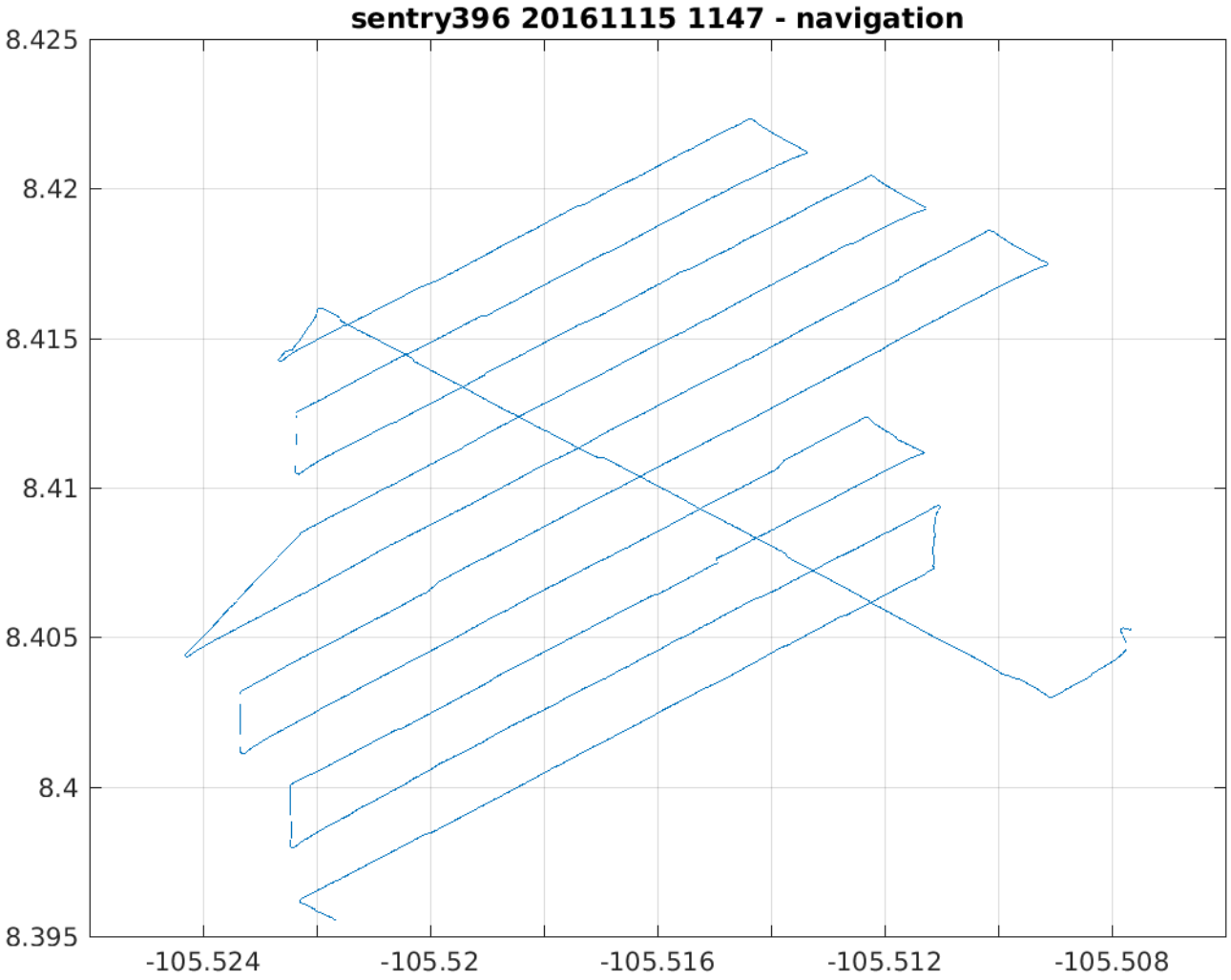


Figure 25: Latitude/Longitude plot of Sentry dive 396 based on post-processed navigation.

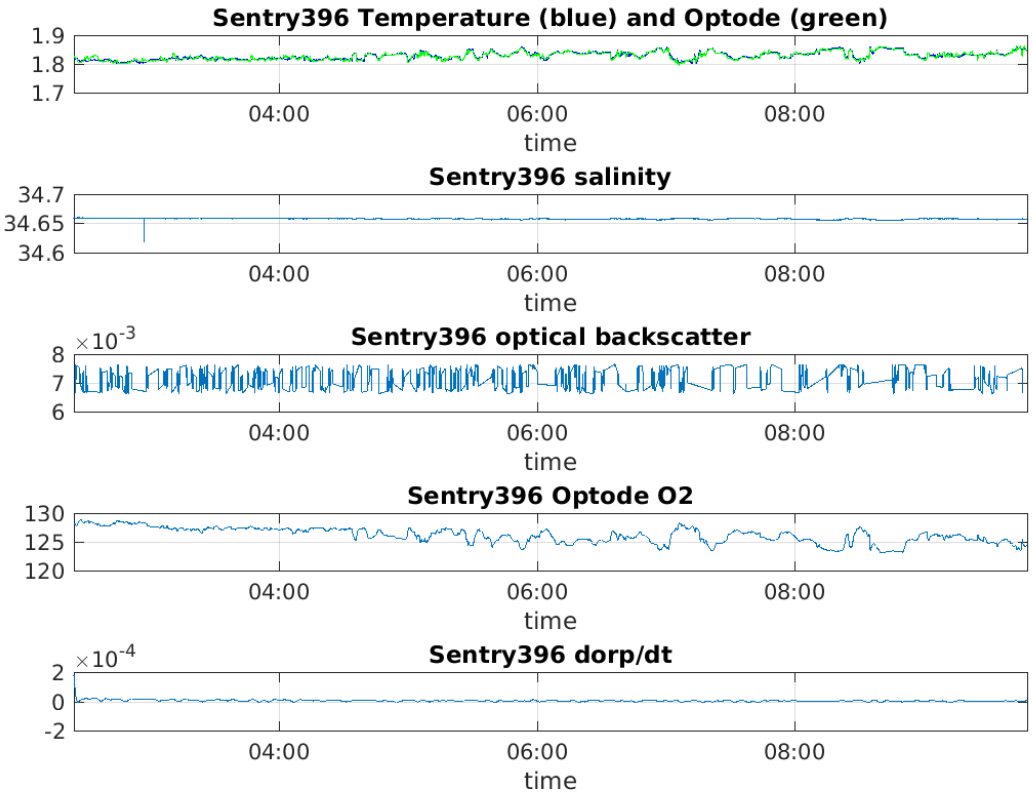


Figure 26: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

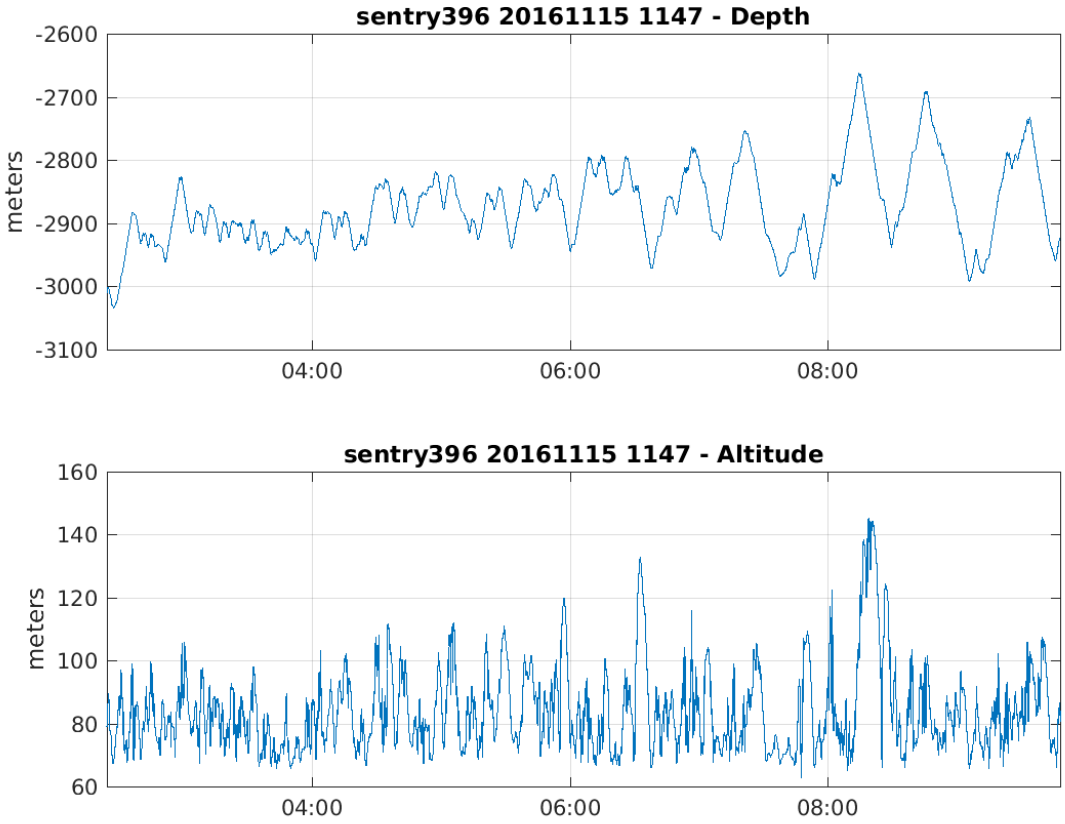


Figure 27: Depth and Altitude of Sentry during dive 396.

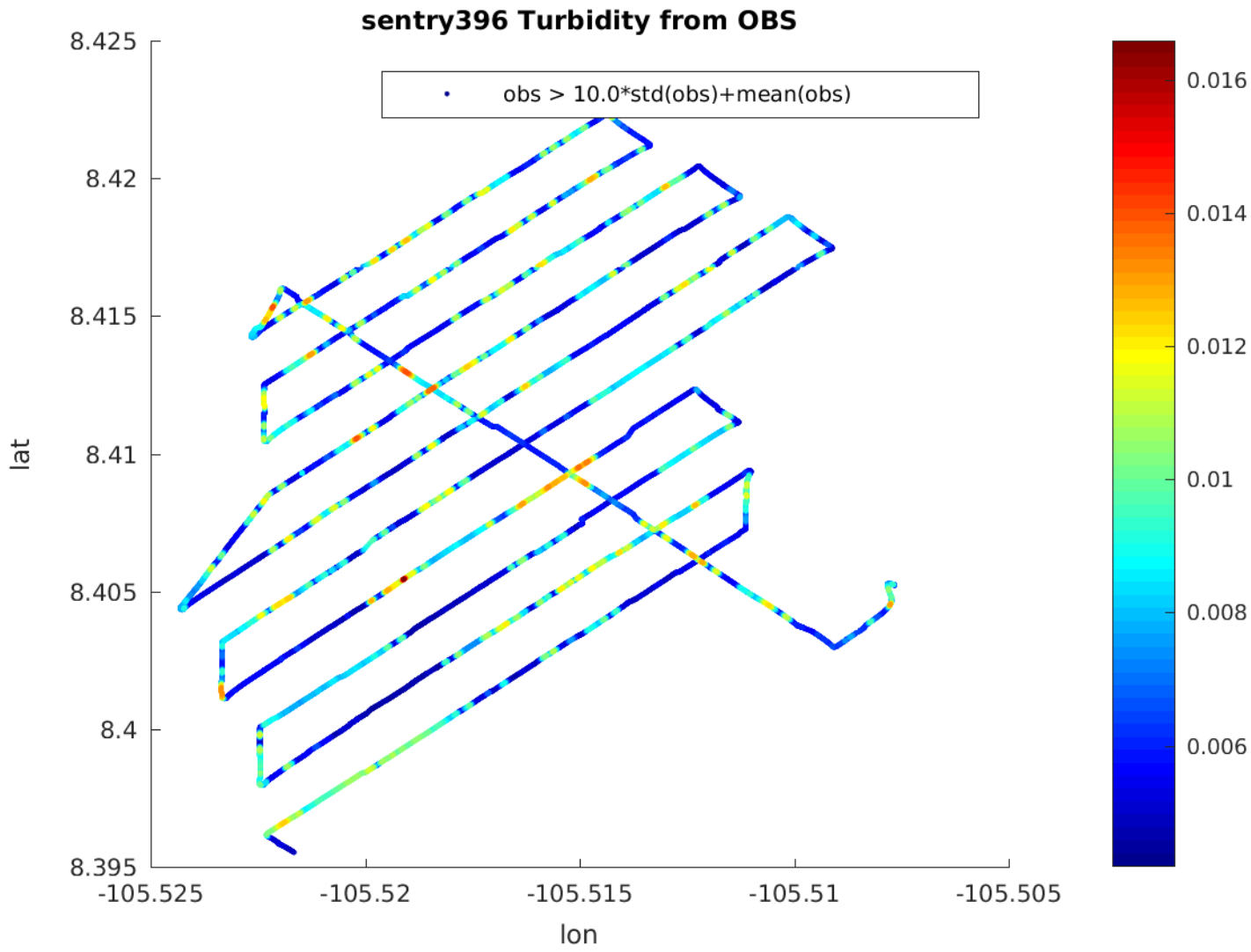


Figure 28: Optical backscatter on dive 396.

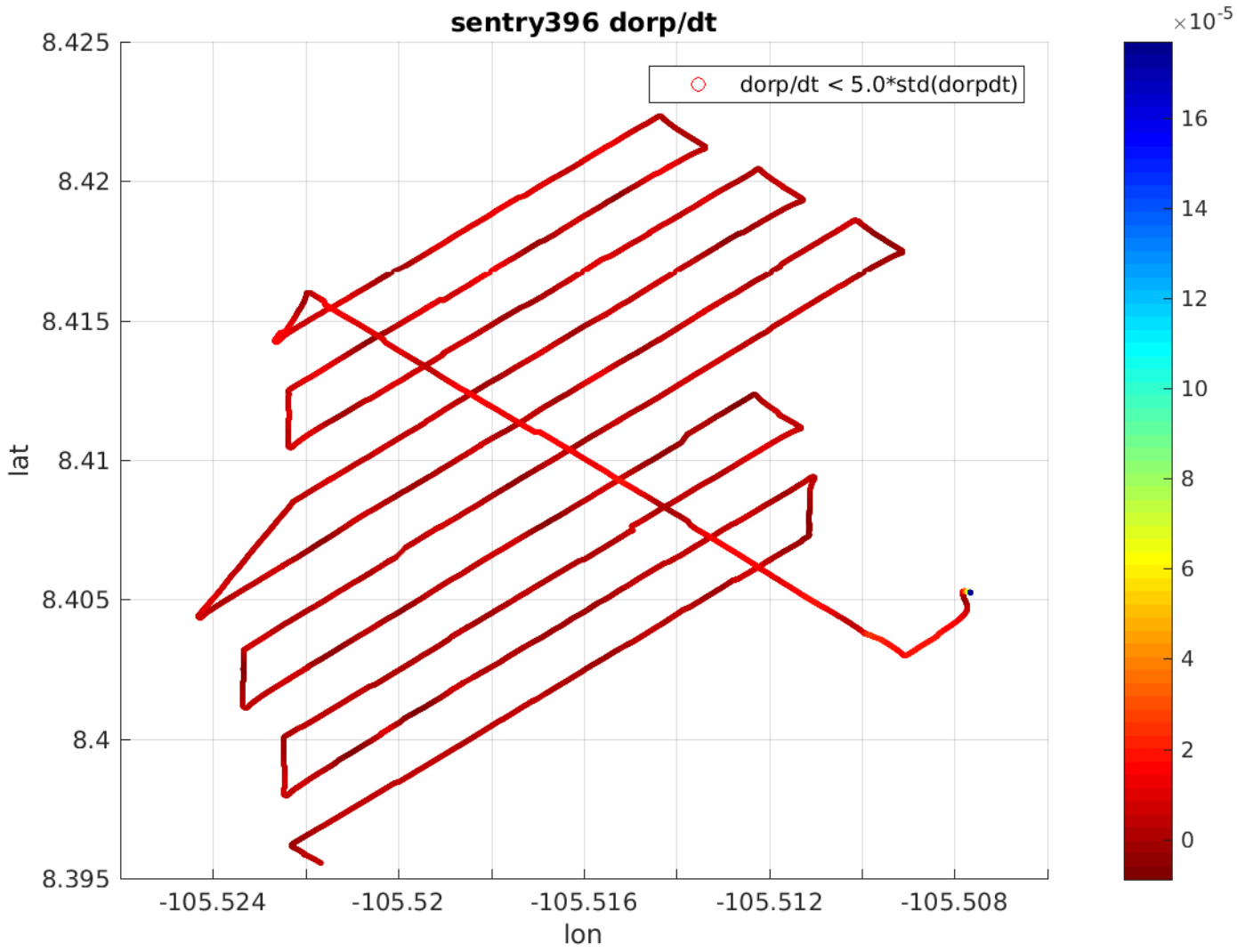


Figure 29: ORP sensor data during dive 396.

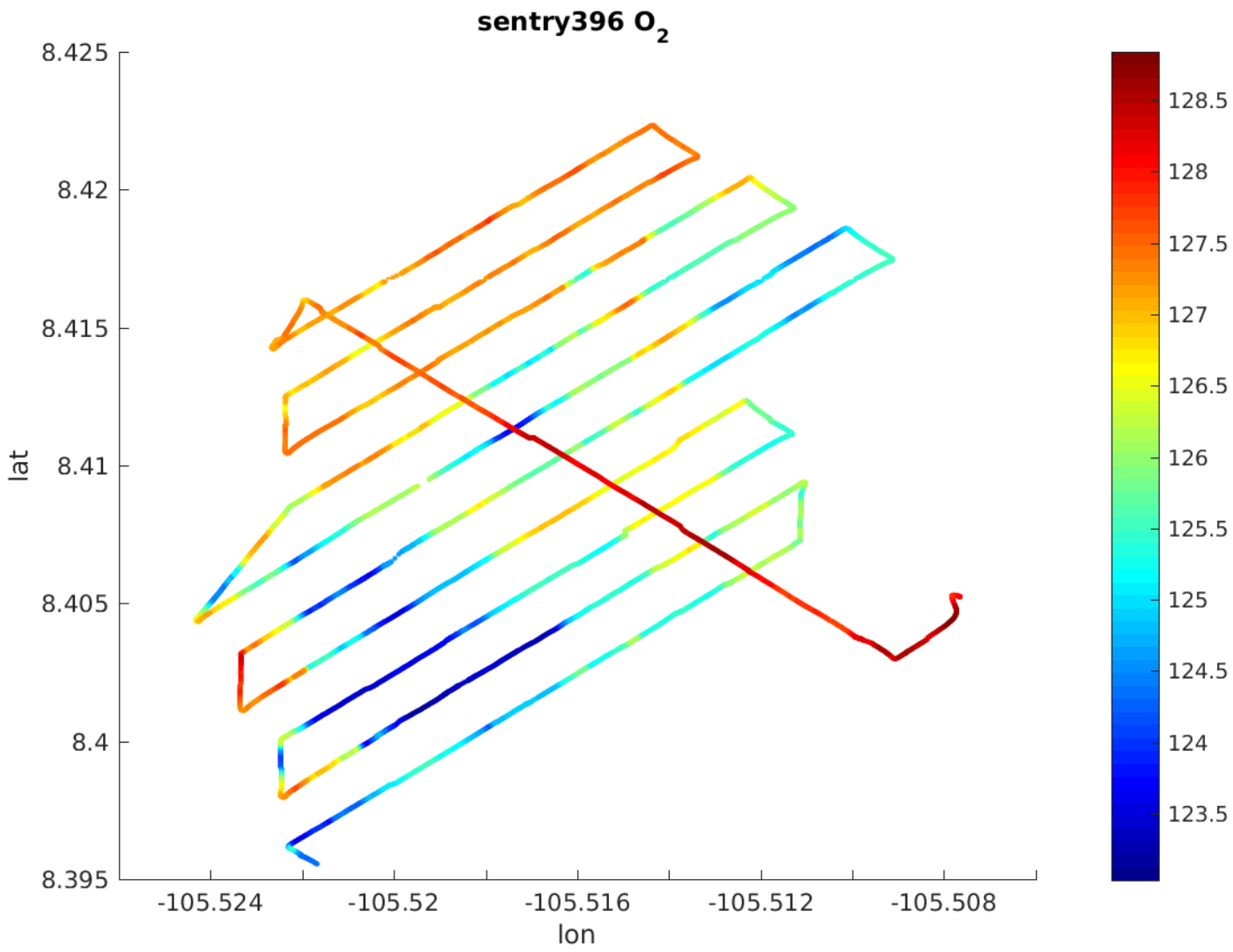


Figure 30: O2 sensor data during dive 396.

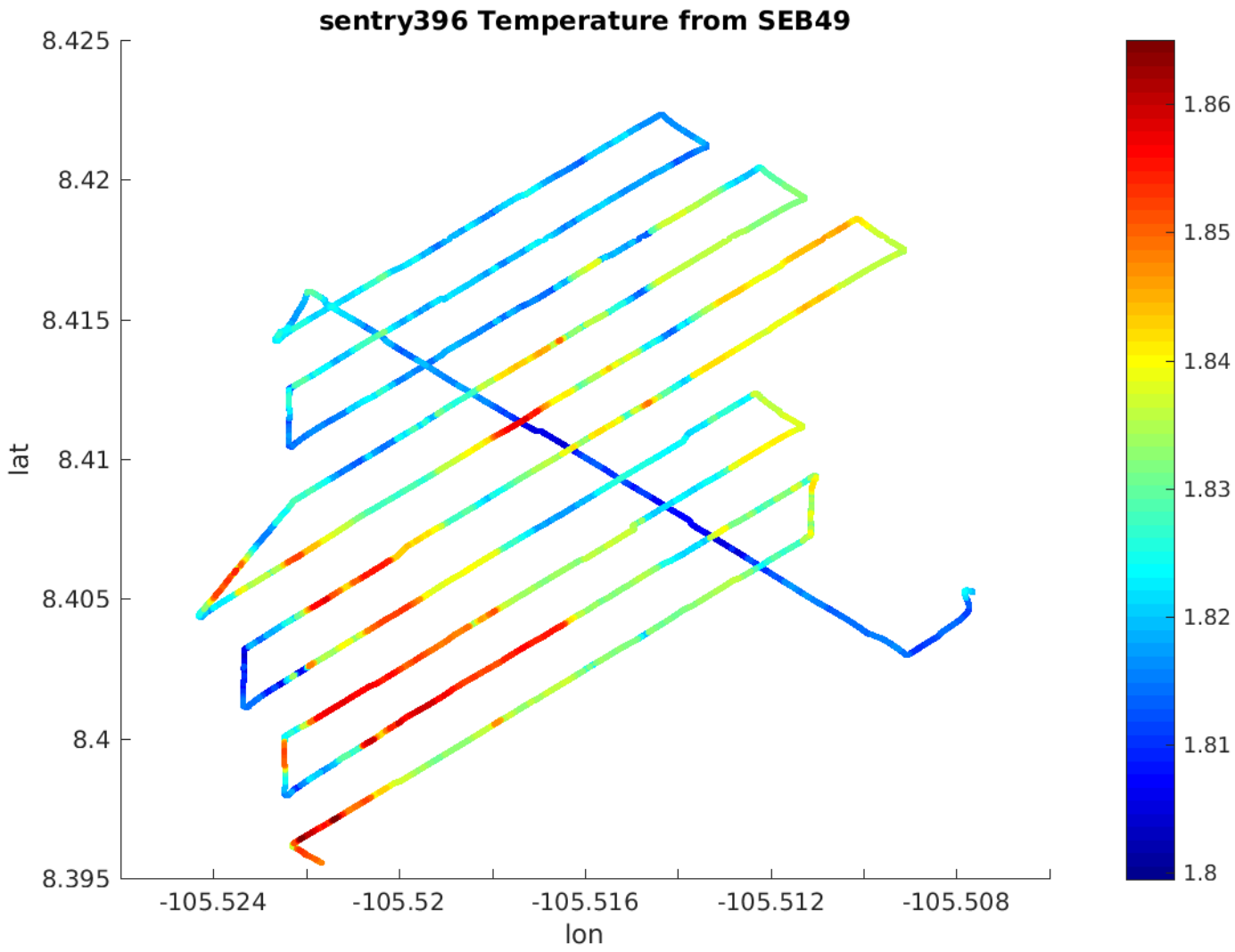


Figure 31: Temperature sensor data during dive 396.

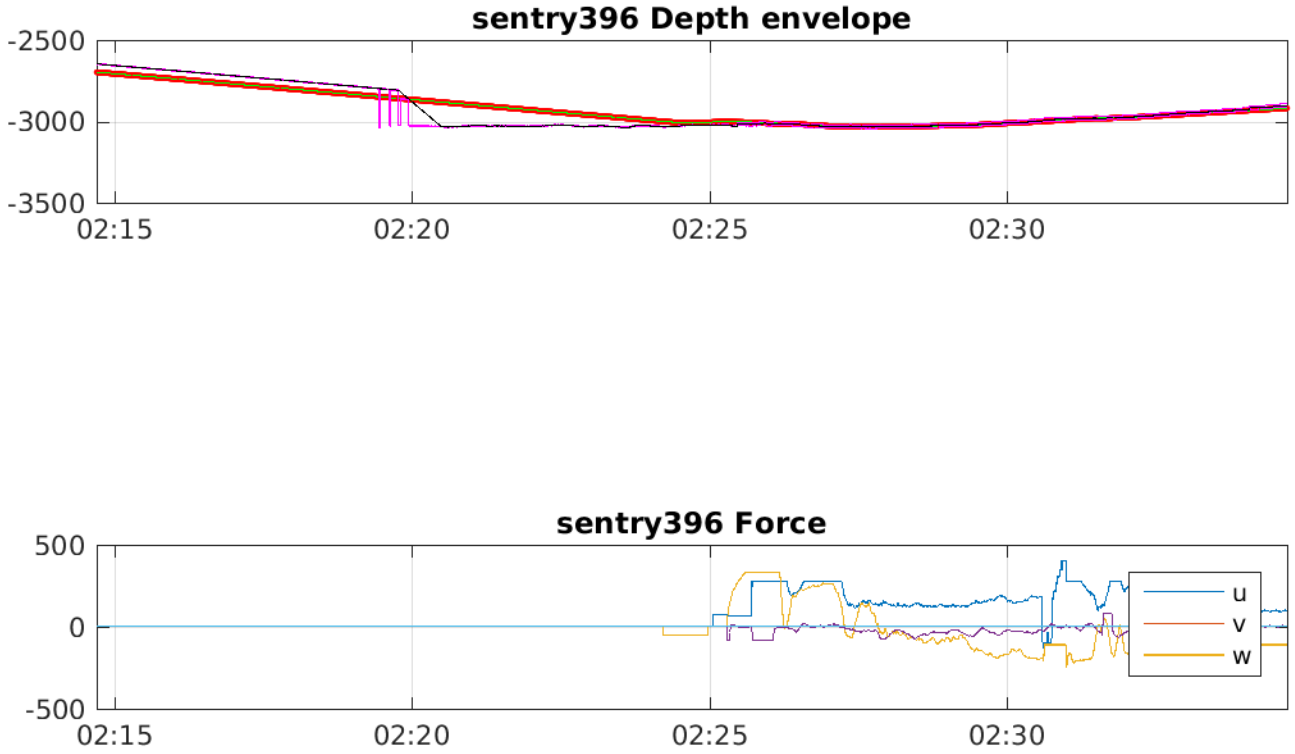


Figure 32: Bottom Approach for during dive 396.

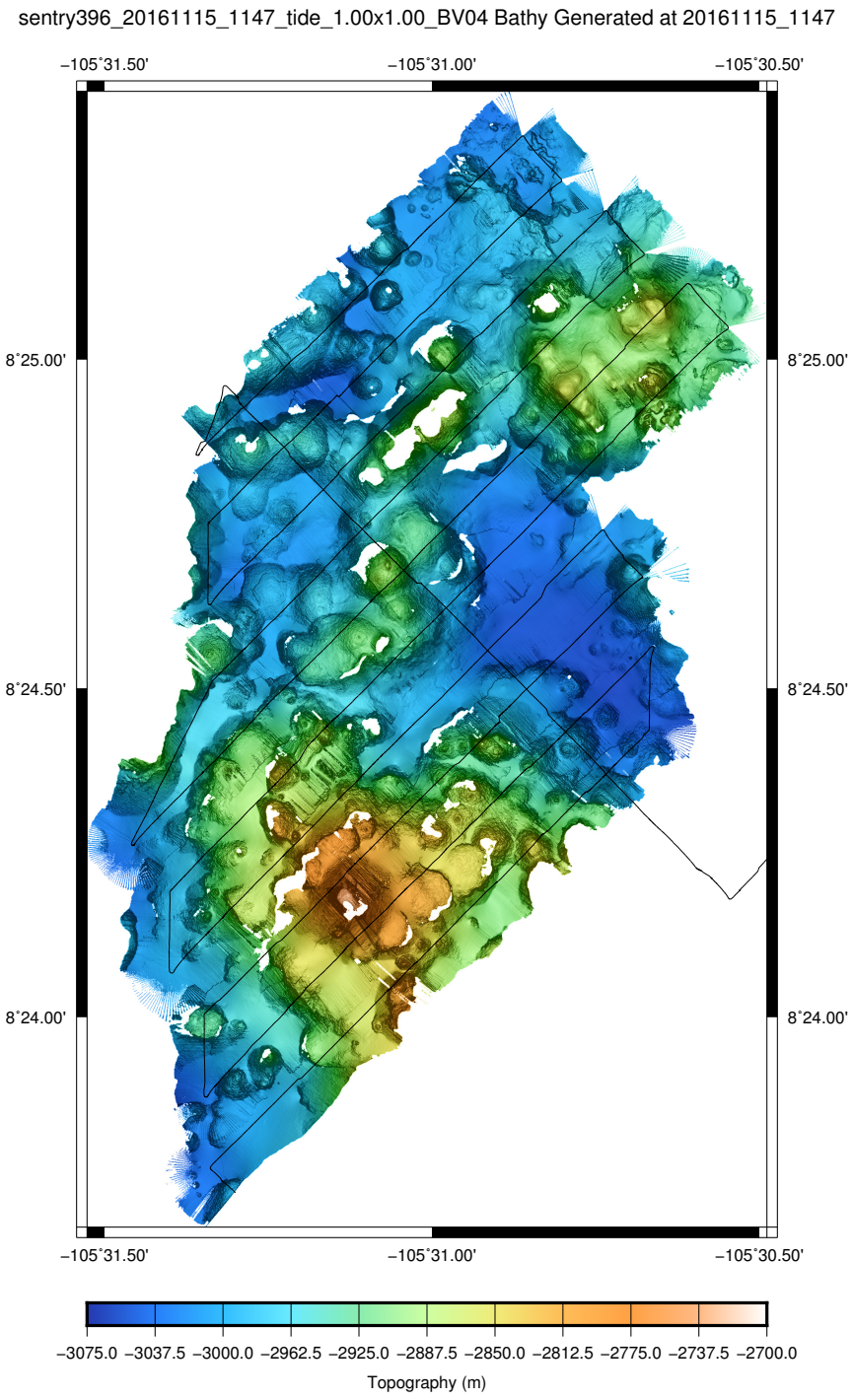


Figure 33: Processed multibeam data from dive 396 with navigation tracks.

Sentry 397 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately less than 2-3 ft for both launch and recovery and were not a factor in operations. Wind was 5-10 knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 12: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -105 -35

Launch Position: sentry397 launch position: 08 25.267'N 105 18.152'W

Narrative

Multibeam survey at Avery seamount. Surveying a north western slice of the seamount ahead of the scheduled Alvin dive. Survey went well, without issue. A dredge was completed during the survey.

Issues

- Mapr stopped logging data towards the end of the dive. It is not clear what caused this. The mapr has been swapped out for the spare mapr.

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.7 sentry397 Summary

sentry397 Summary
Origin: 8.333333 -105.583333
Origin: 08 20.000'N 105 35.000'W
Launch: 2016/11/16 02:11:25
Survey start: 2016/11/16 03:27:55
Survey start: Lat:8.422000 Lon:-105.302275
Survey start: Lat:08 25.320'N Lon:105 18.136'W
Survey end: 2016/11/16 10:45:19
Survey end: Lat:8.416623 Lon:-105.316052
Survey end: Lat:08 24.997'N Lon:105 18.963'W
Ascent begins: 2016/11/16 10:45:19
On the surface: 2016/11/16 11:37:56
On deck: 2016/11/16 11:52:20
descent rate: 34.2 m/min
ascent rate: 50.3 m/min
survey time: 7.3 hours
deck-to-deck time 9.7 hours
Mean survey depth: 2588m
Mean survey height: 66m
distance travelled: 22.05km
average speed; 0.83m/s
average speed during photo runs: 0.66 m/s over 0.05 km
average speed during multibeam runs: 0.86 m/s over 22.02 km
total vertical during survey: 5841m
Battery energy at launch: 19.7 kwhr
Battery energy at survey end: 12.6 kwhr
Battery energy on deck: 12.4 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.8 sentry397 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161116_0018.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161116_0018.cfg
CTD	SBE 49	222		sbe49_20161116_0019.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161116_0018.cfg tim_20161116_0023.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

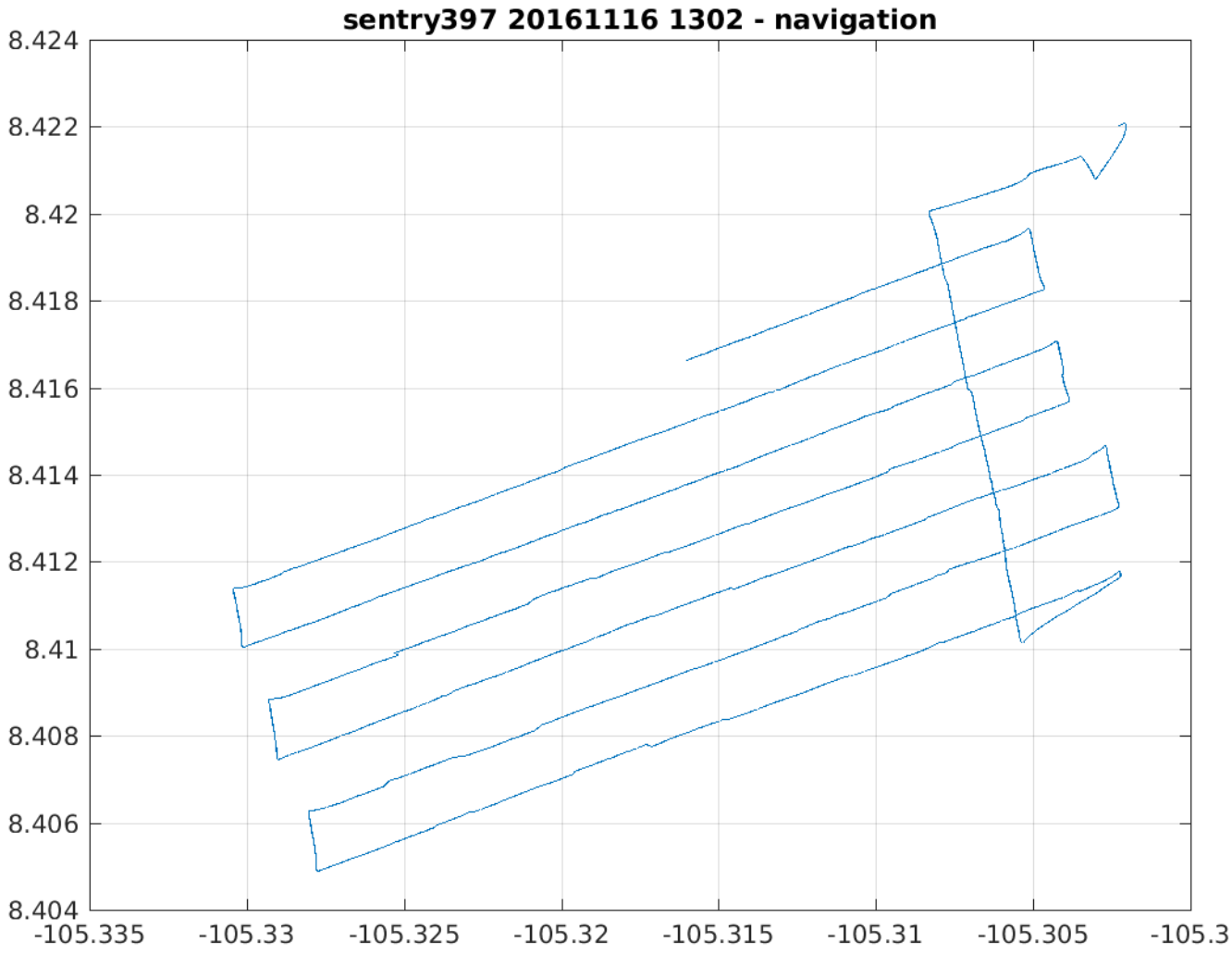


Figure 34: Latitude/Longitude plot of Sentry dive 397 based on post-processed navigation.

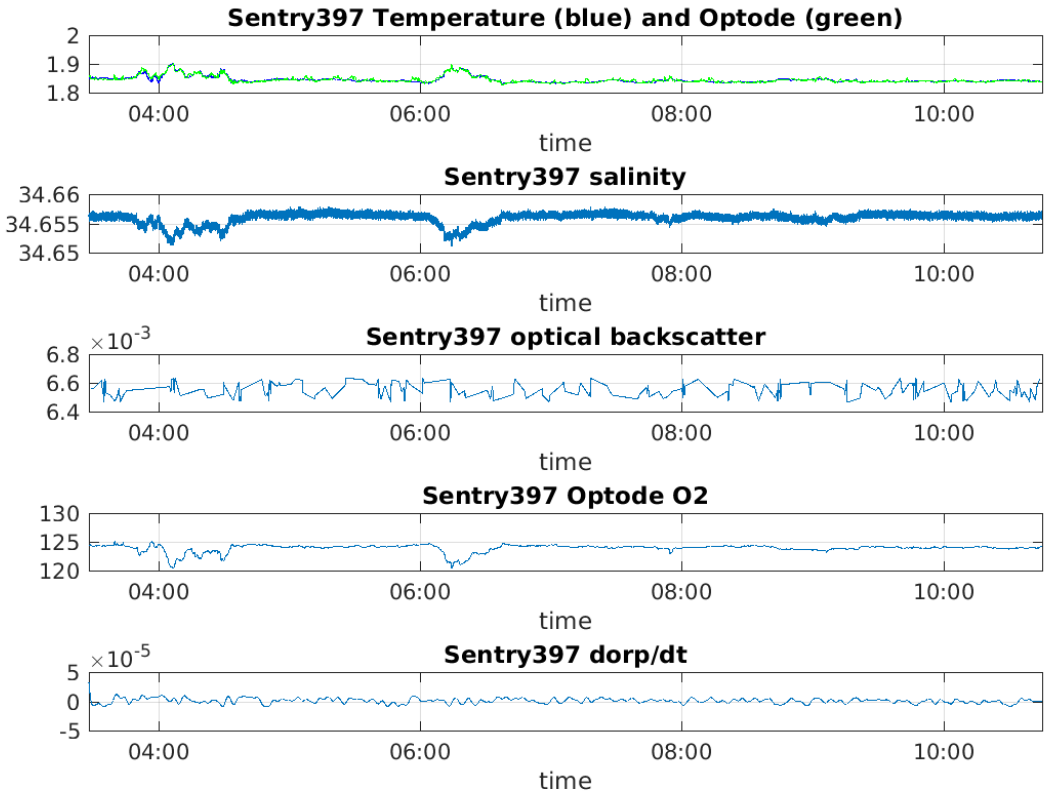


Figure 35: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

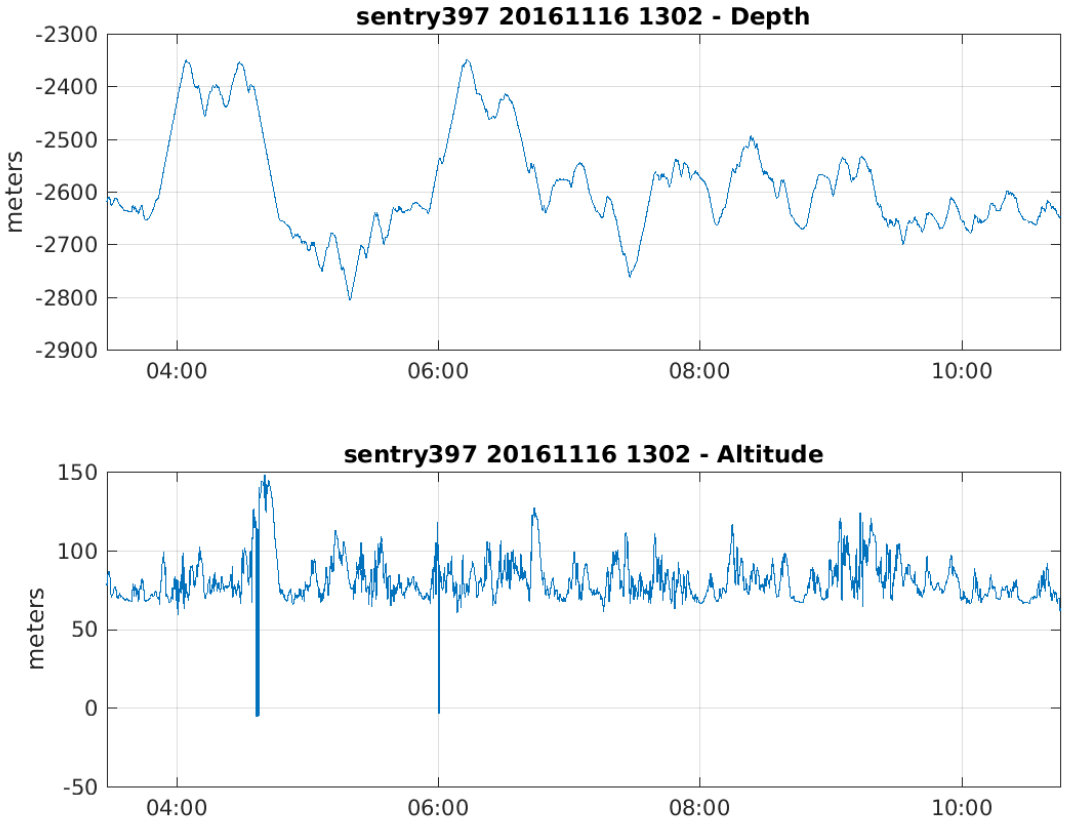


Figure 36: Depth and Altitude of Sentry during dive 397.

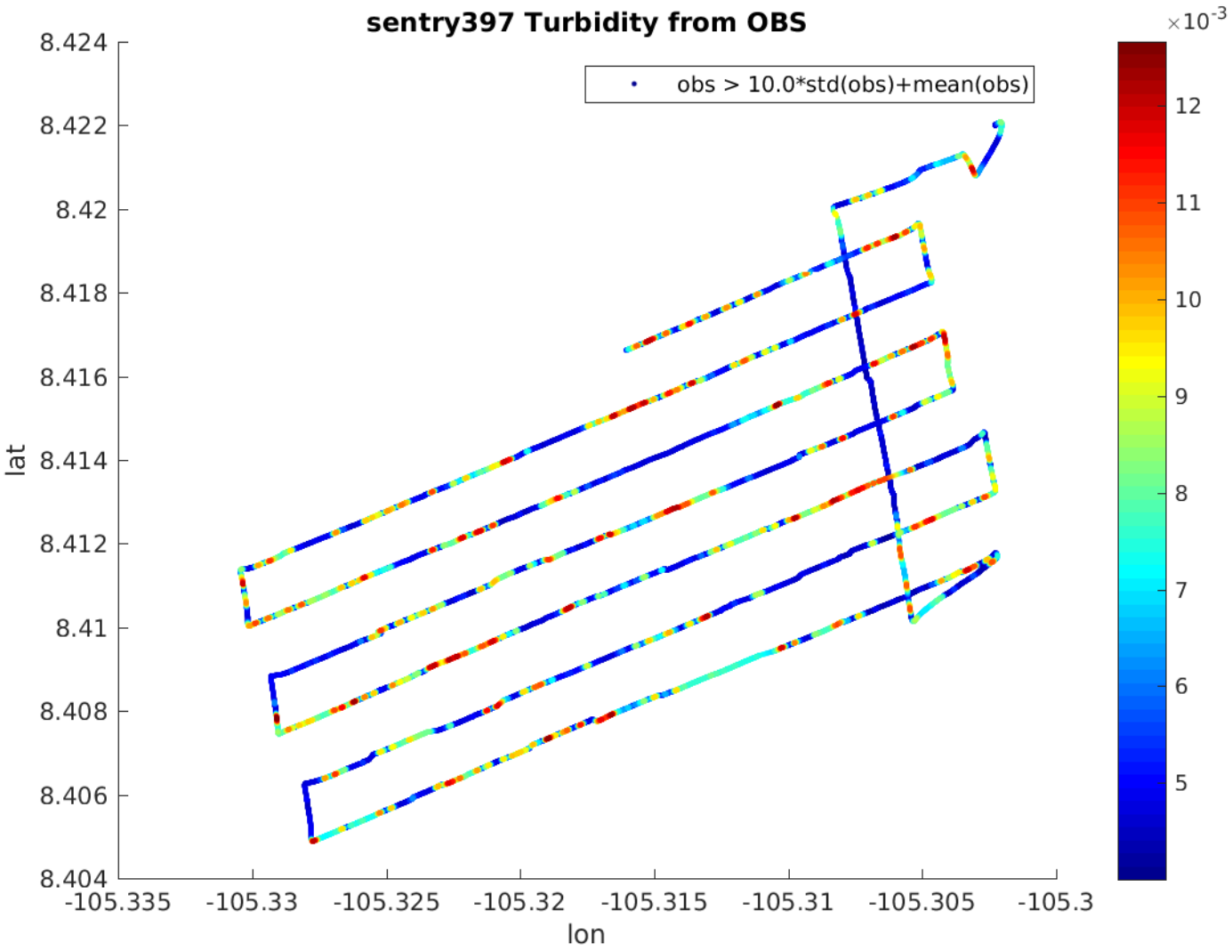


Figure 37: Optical backscatter on dive 397.

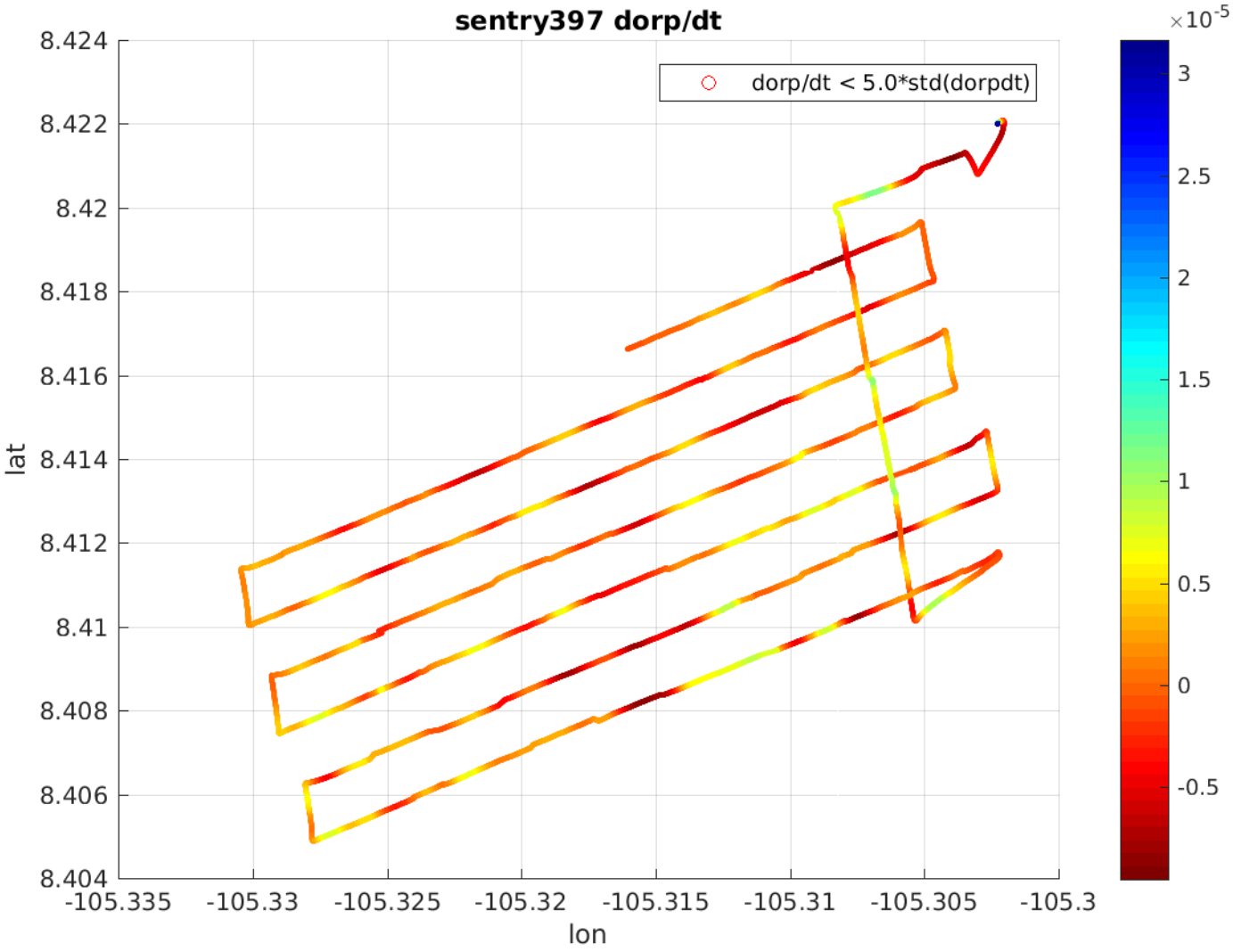


Figure 38: ORP sensor data during dive 397.

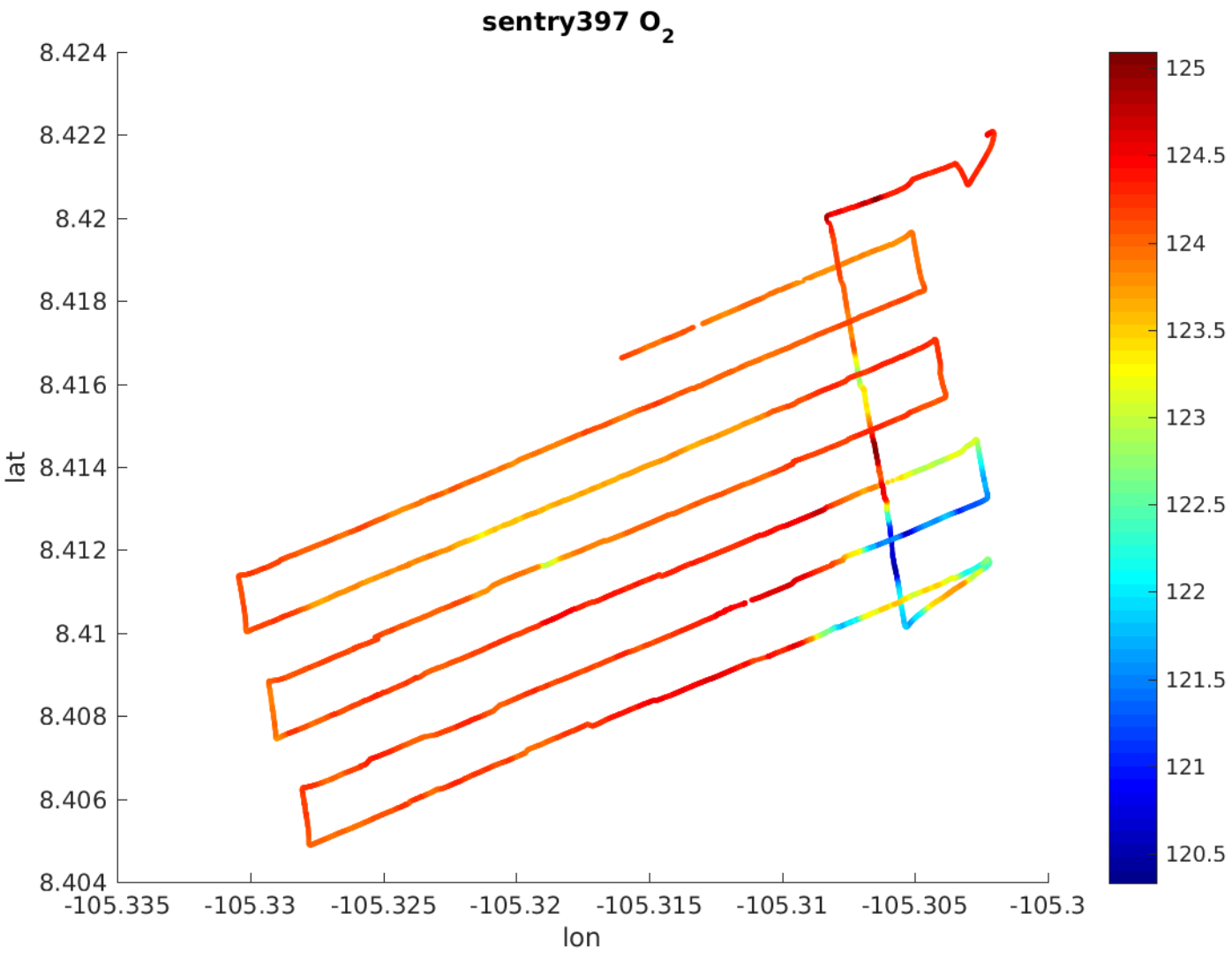


Figure 39: O2 sensor data during dive 397.

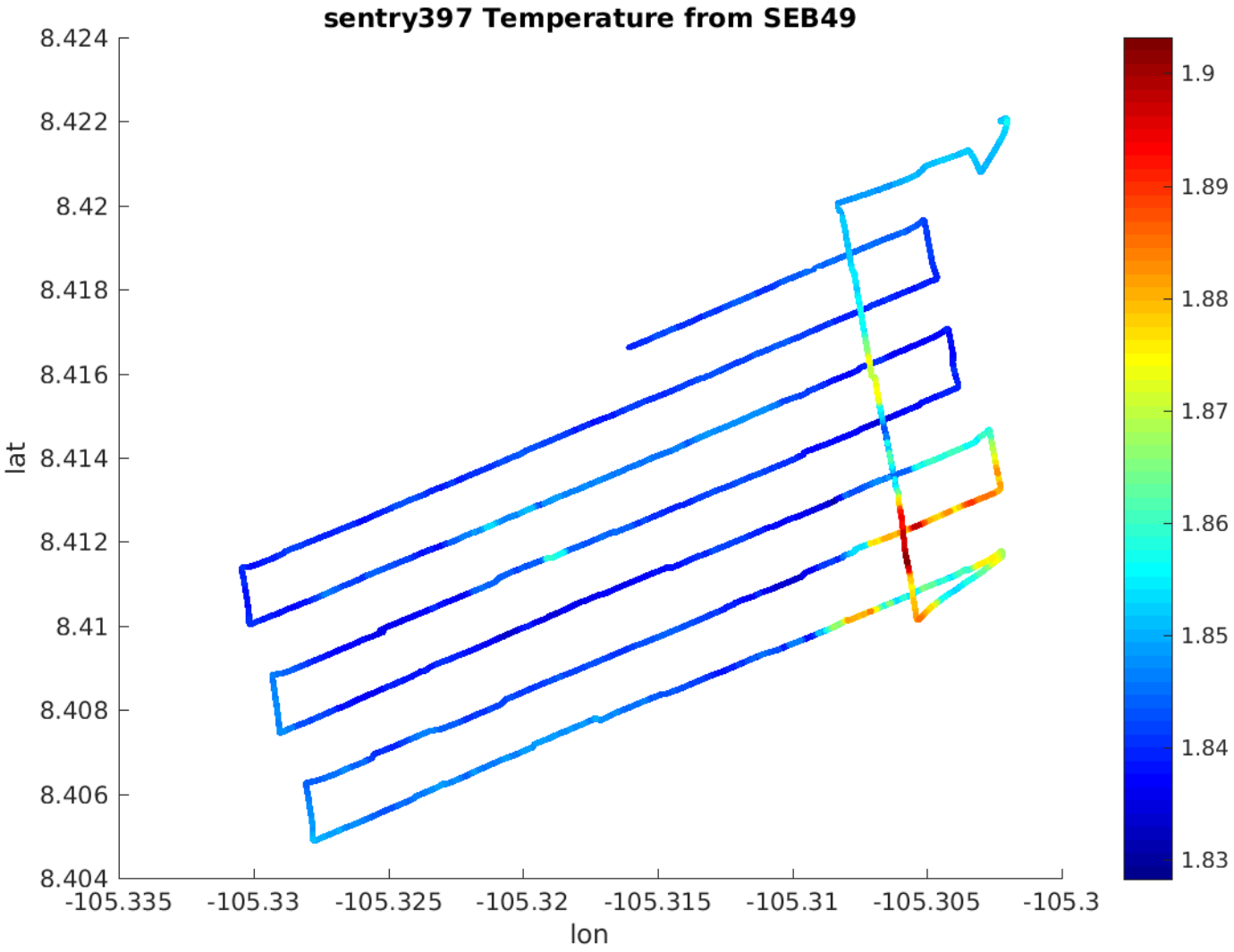


Figure 40: Temperature sensor data during dive 397.

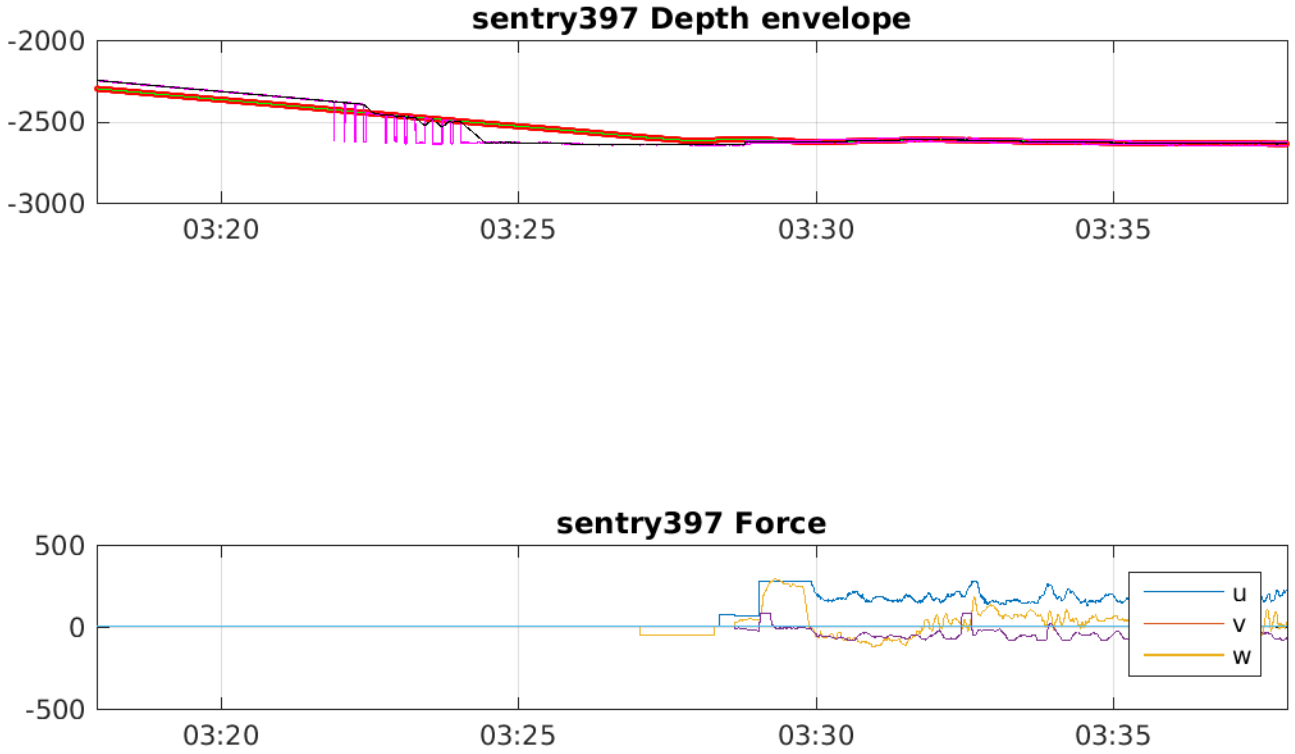


Figure 41: Bottom Approach for during dive 397.

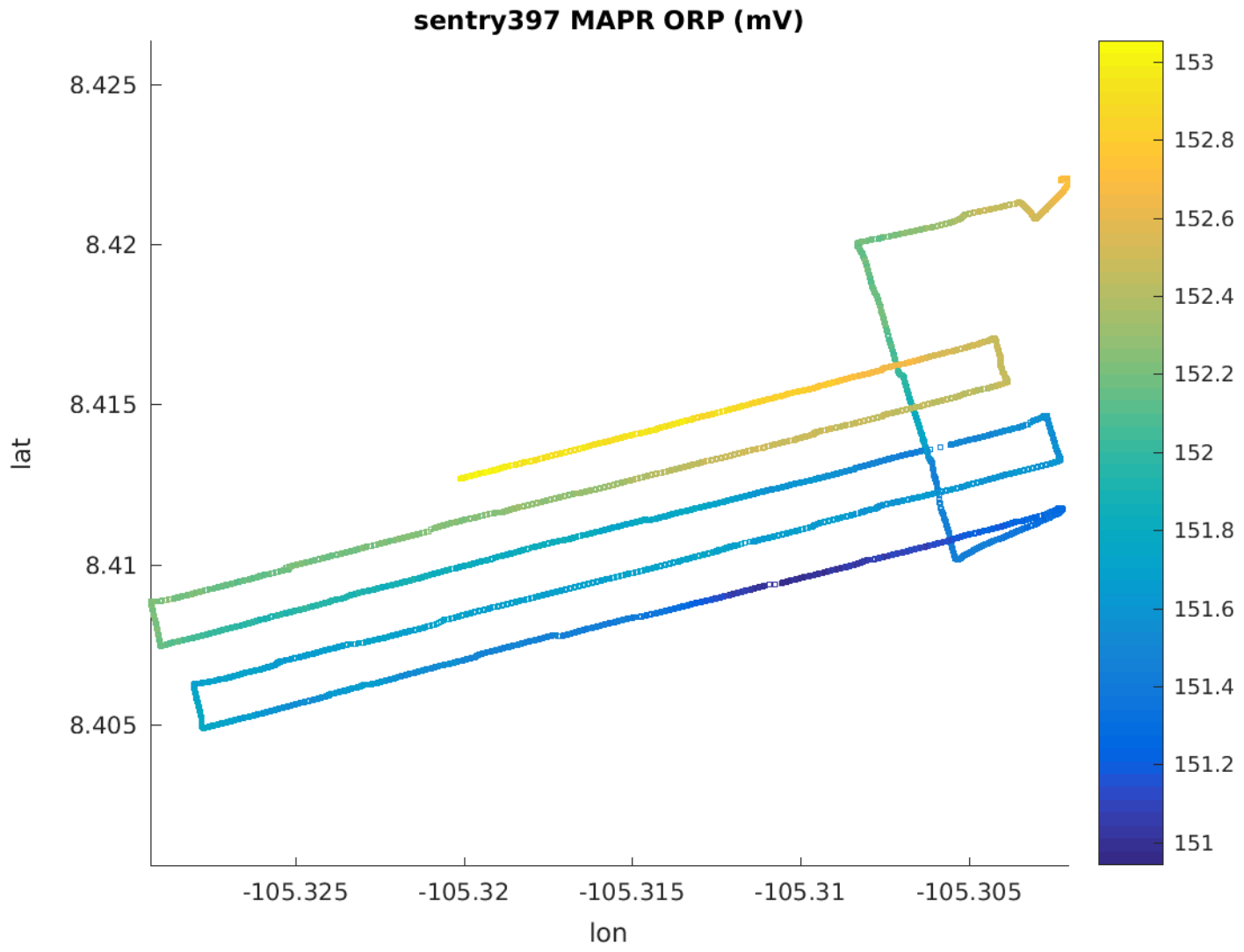


Figure 42: MAPR orp data during dive 397.

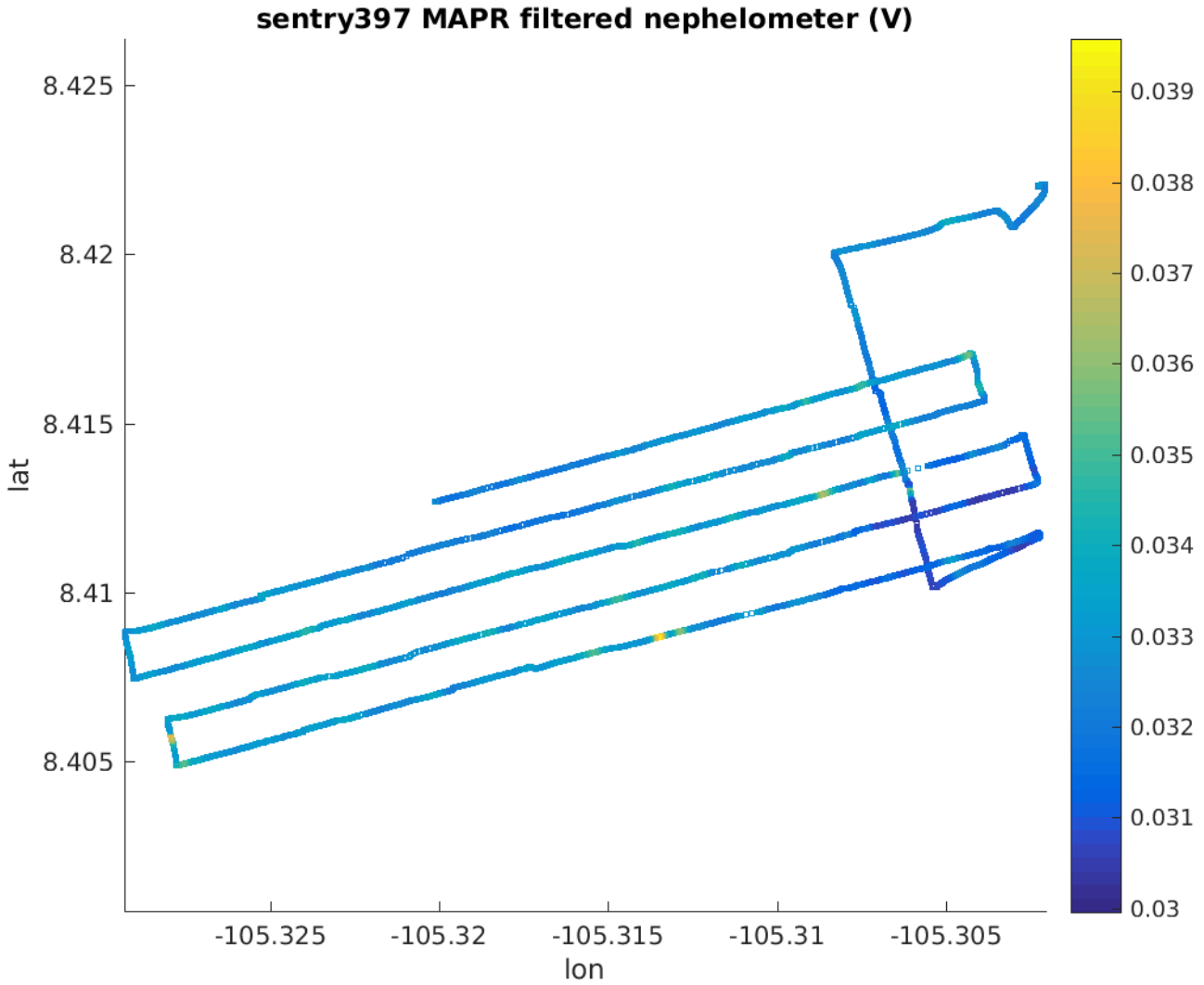


Figure 43: MAPR neph data during dive 397.

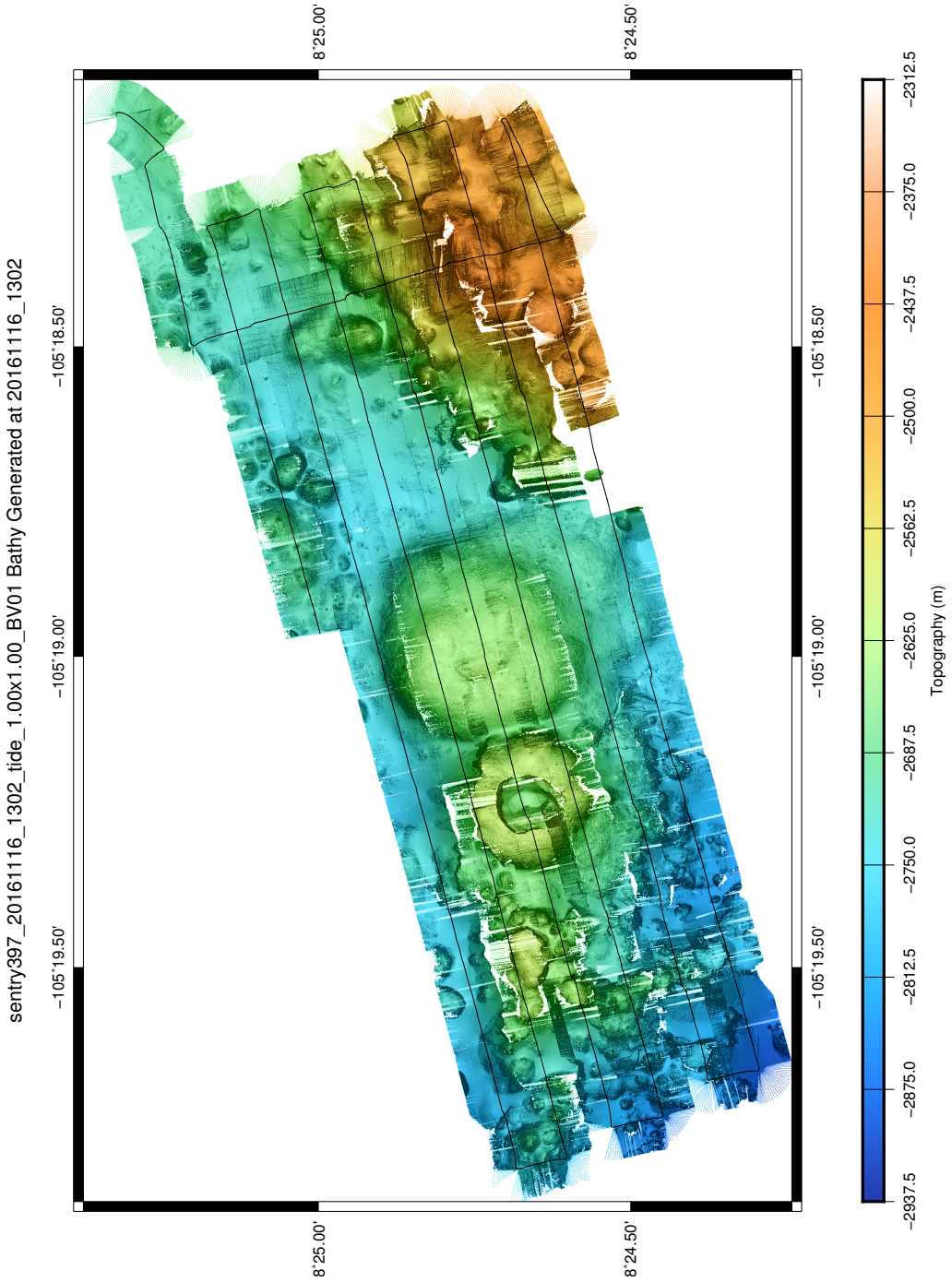


Figure 44: Processed multibeam data from dive 397 with navigation tracks.

Sentry 398 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately less than 1 ft for both launch and recovery and were not a factor in operations. Wind was nill knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 13: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -105 -35

Launch Position: sentry396 launch position: 08 24.298'N 105 30.425'W

Narrative

Continuation multibeam survey tying into sentry397's survey. This survey covered the peak of the seamount and ties into the eastern section of sentry397. Survey went well, and without issue.

Issues

- None

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.9 sentry398 Summary

sentry398 Summary
Origin: 8.333333 -105.583333
Origin: 08 20.000'N 105 35.000'W
Launch: 2016/11/17 00:28:58
Survey start: 2016/11/17 01:48:33
Survey start: Lat:8.404044 Lon:-105.317206
Survey start: Lat:08 24.243'N Lon:105 19.032'W
Survey end: 2016/11/17 10:47:09
Survey end: Lat:8.410137 Lon:-105.307356
Survey end: Lat:08 24.608'N Lon:105 18.441'W
Ascent begins: 2016/11/17 10:47:09
On the surface: 2016/11/17 11:33:45
On deck: 2016/11/17 11:47:30
descent rate: 33.8 m/min
ascent rate: 50.5 m/min
survey time: 9.0 hours
deck-to-deck time 11.3 hours
Mean survey depth: 2525m
Mean survey height: 66m
distance travelled: 27.52km
average speed; 0.85m/s
average speed during photo runs: NaN m/s over 0.00 km
average speed during multibeam runs: 0.86 m/s over 27.52 km
total vertical during survey: 7285m
Battery energy at launch: 20.1 kwhr
Battery energy at survey end: 11.7 kwhr
Battery energy on deck: 11.4 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.10 sentry398 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161116_2233.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161116_2234.cfg
CTD	SBE 49	222		sbe49_20161116_2234.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161116_2233.cfg tim_20161116_2238.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

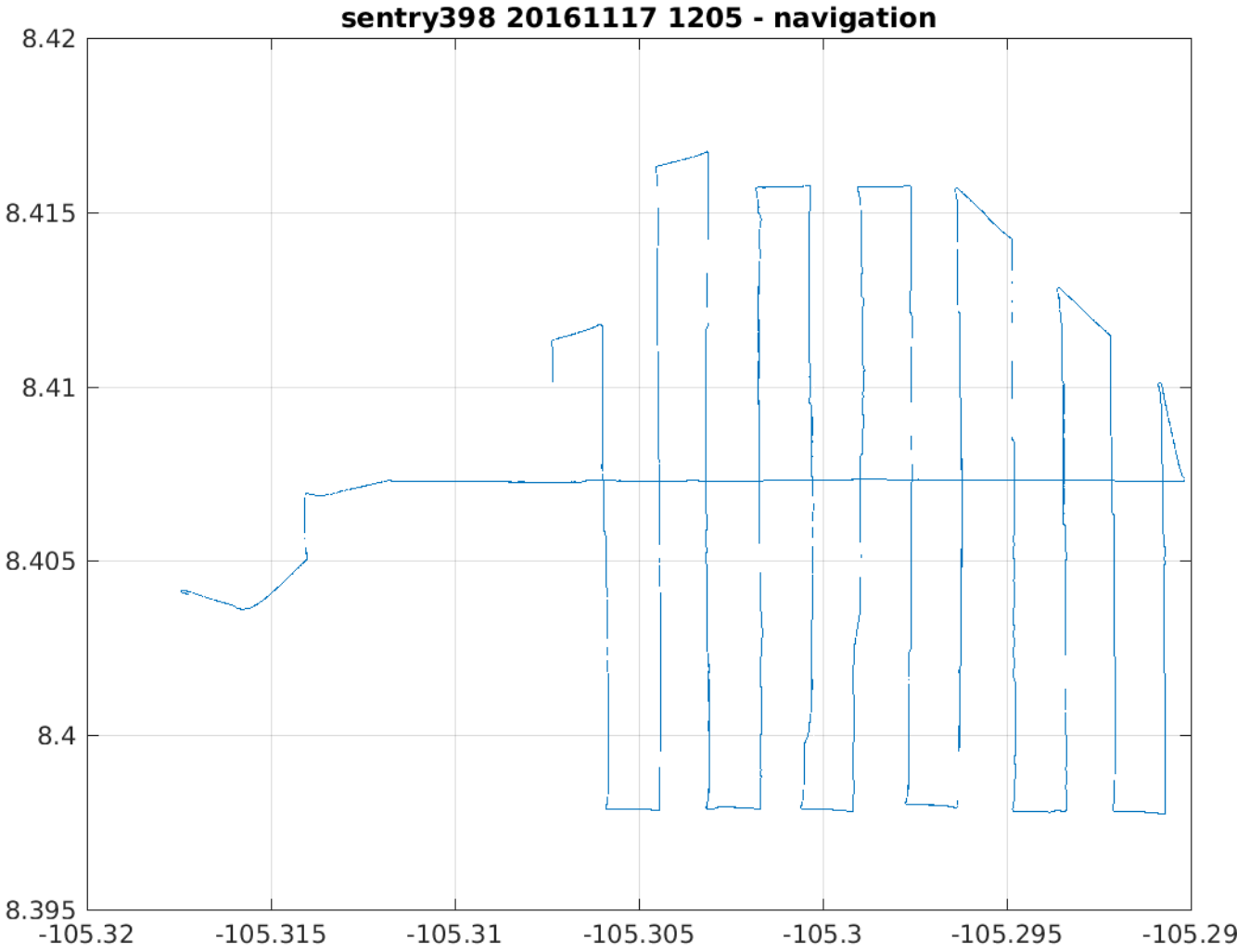


Figure 45: Latitude/Longitude plot of Sentry dive 398 based on post-processed navigation.

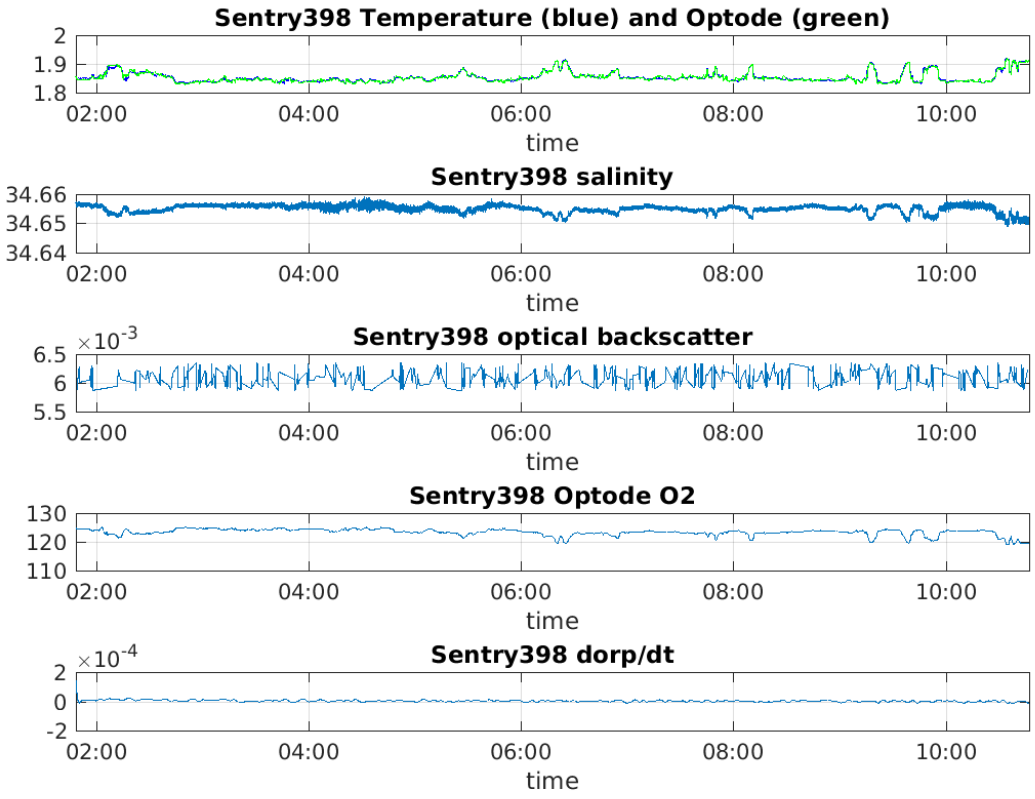


Figure 46: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

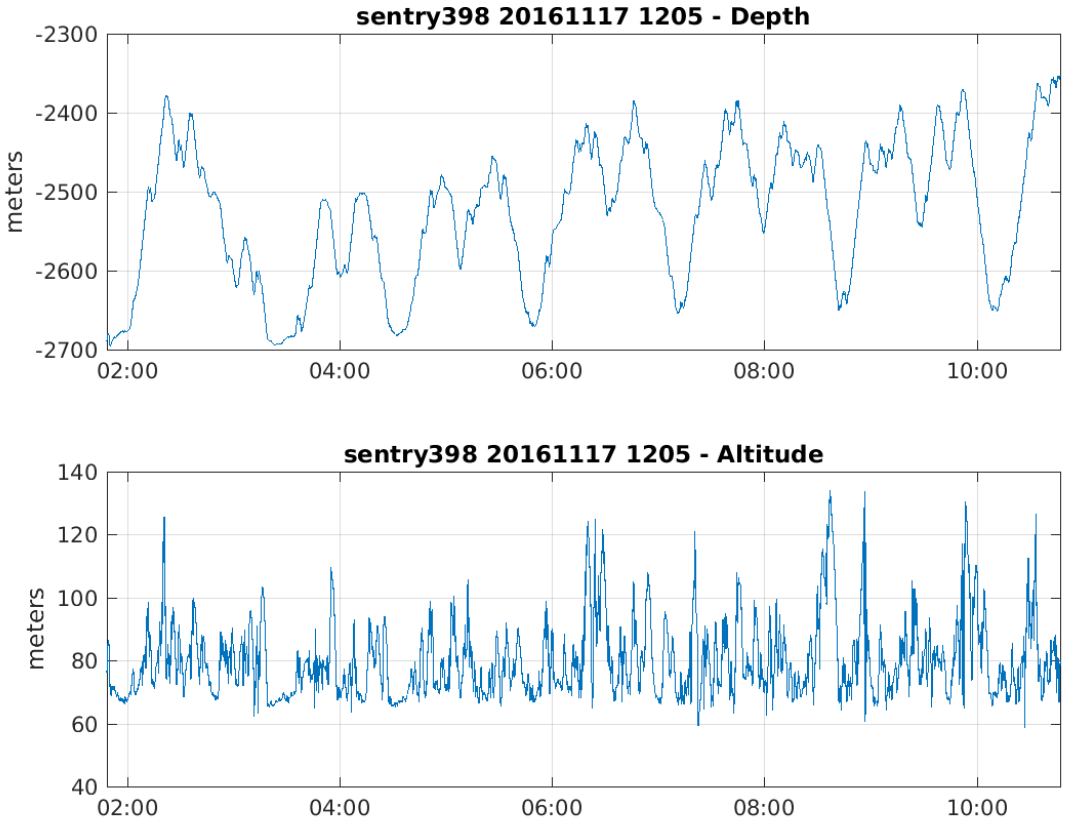


Figure 47: Depth and Altitude of Sentry during dive 398.

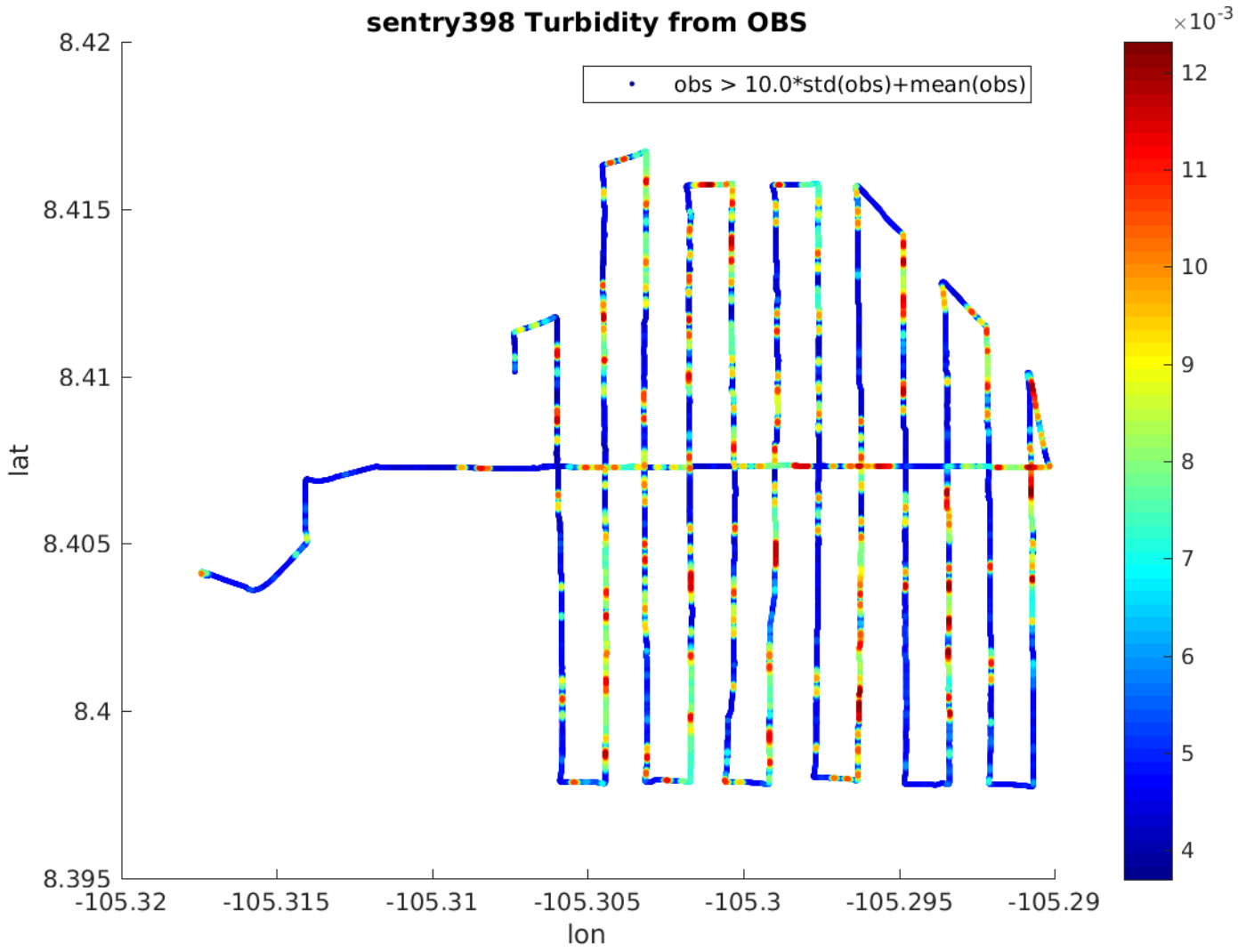


Figure 48: Optical backscatter on dive 398.

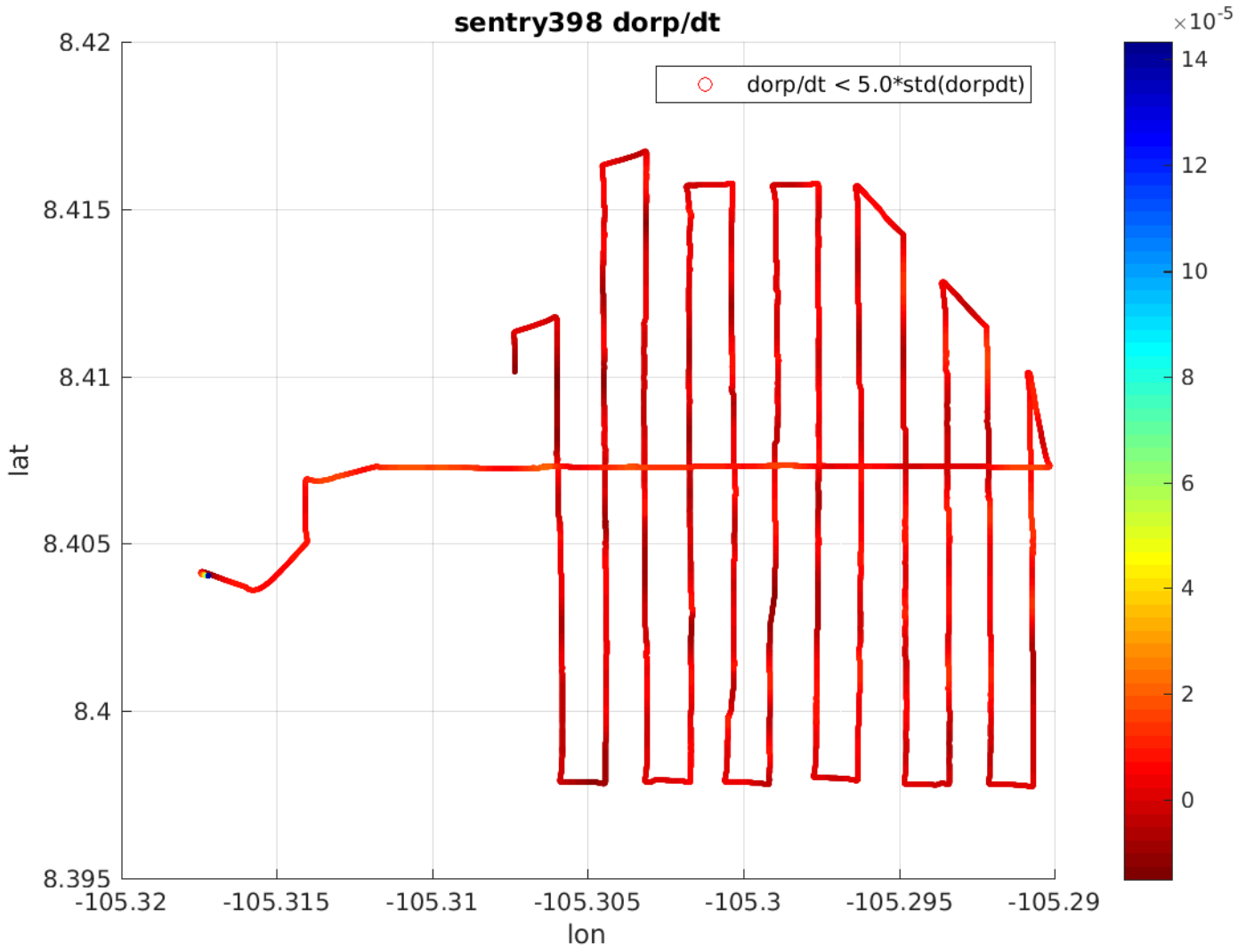


Figure 49: ORP sensor data during dive 398.

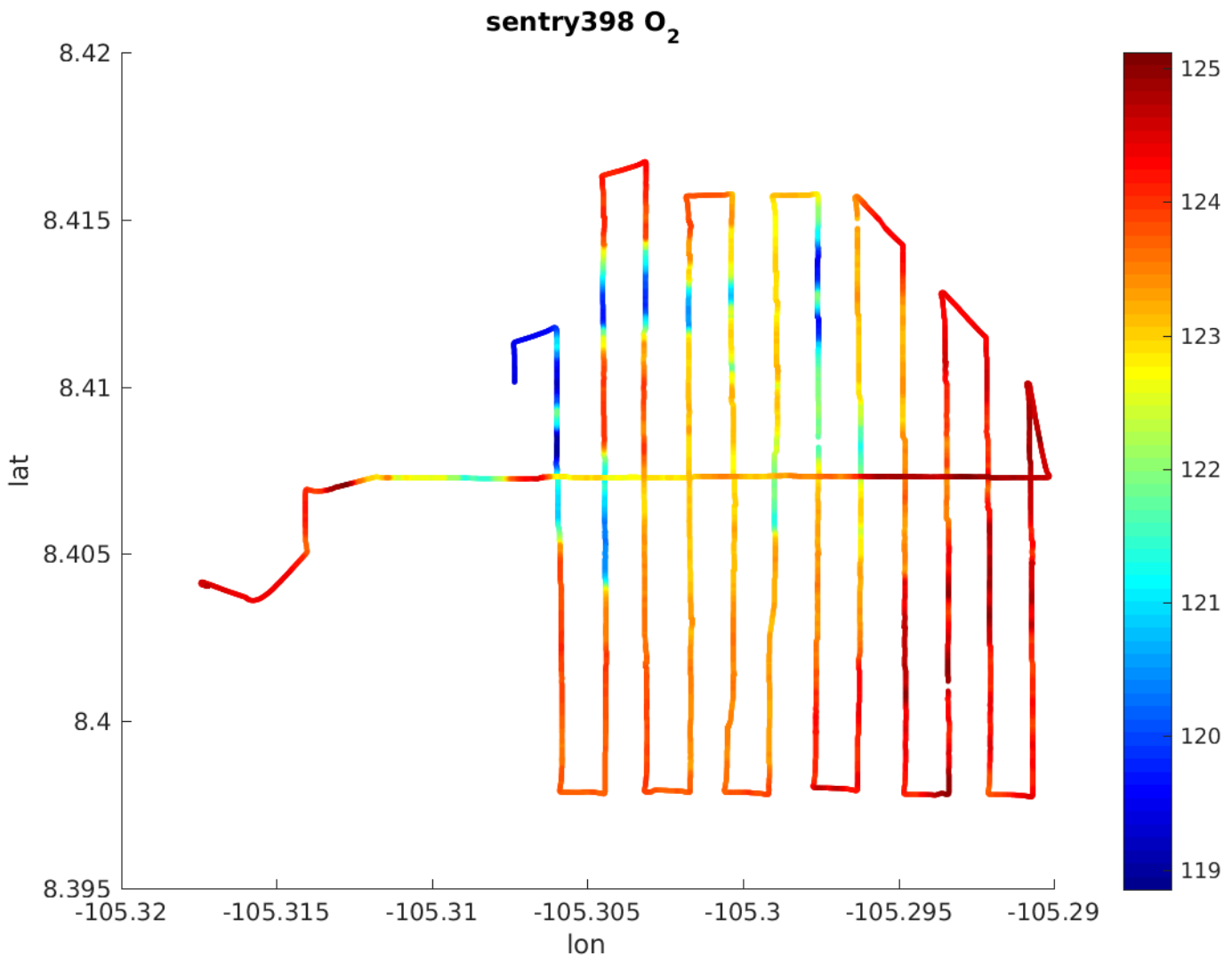


Figure 50: O2 sensor data during dive 398.

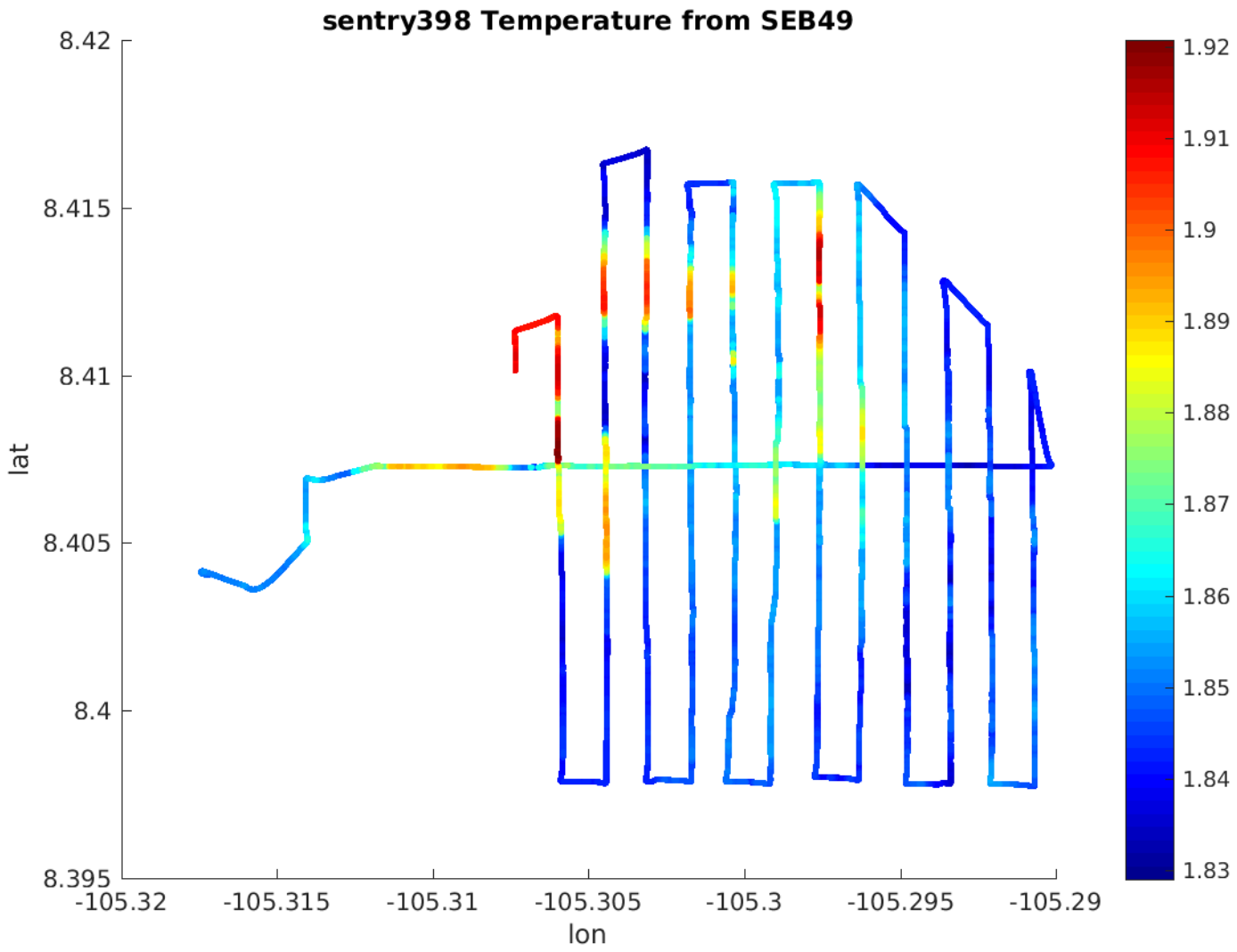


Figure 51: Temperature sensor data during dive 398.

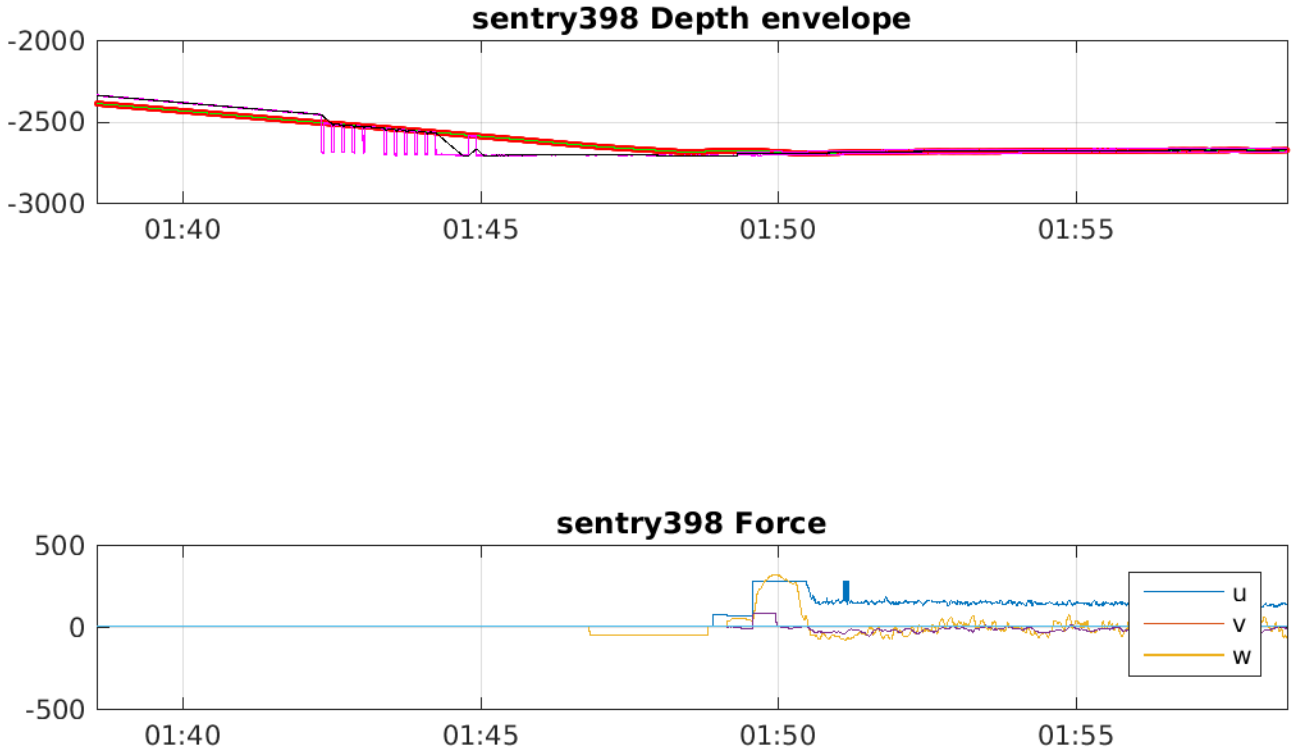


Figure 52: Bottom Approach for during dive 398.

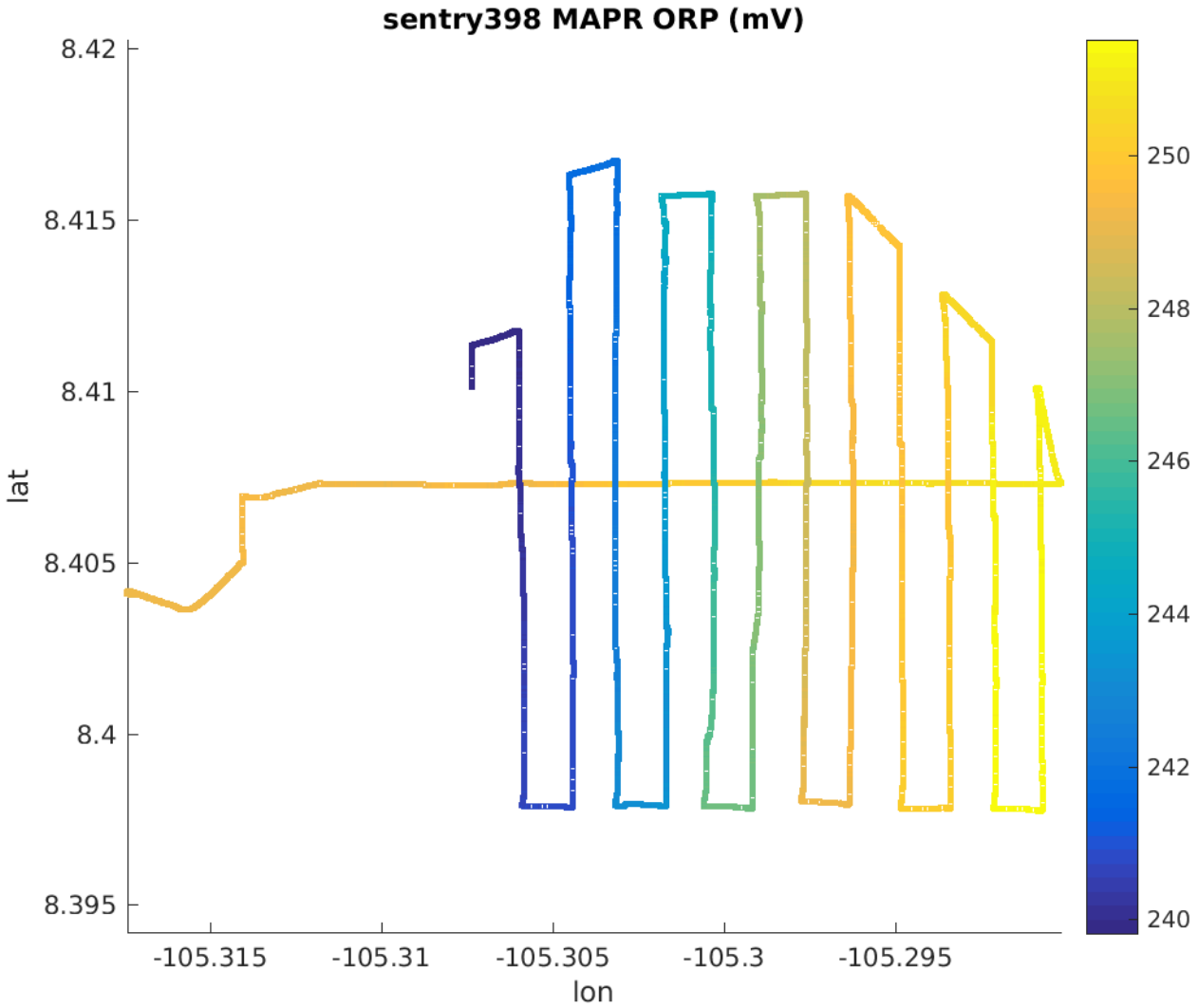


Figure 53: MAPR orp data during dive 398.

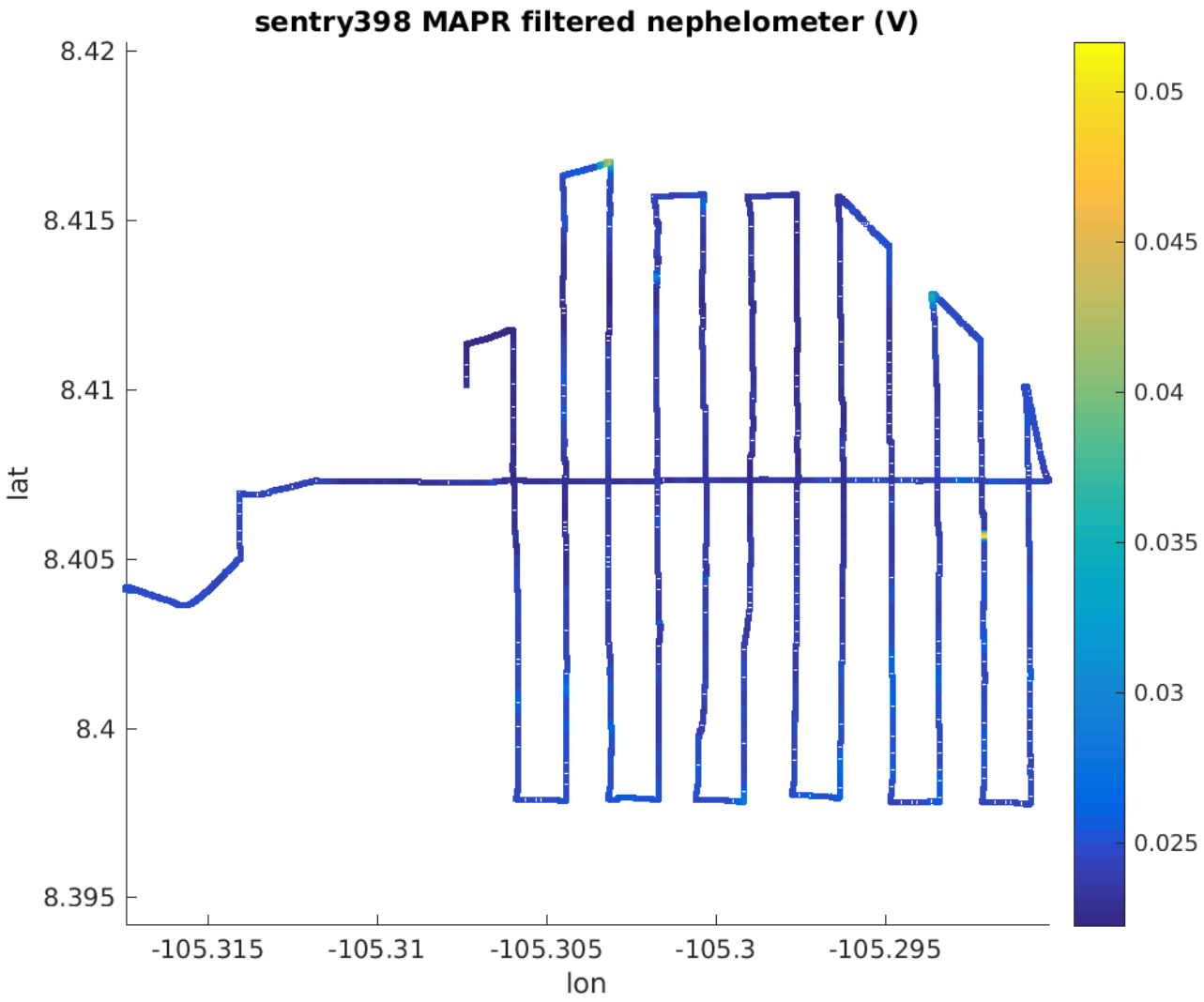


Figure 54: MAPR neph data during dive 398.

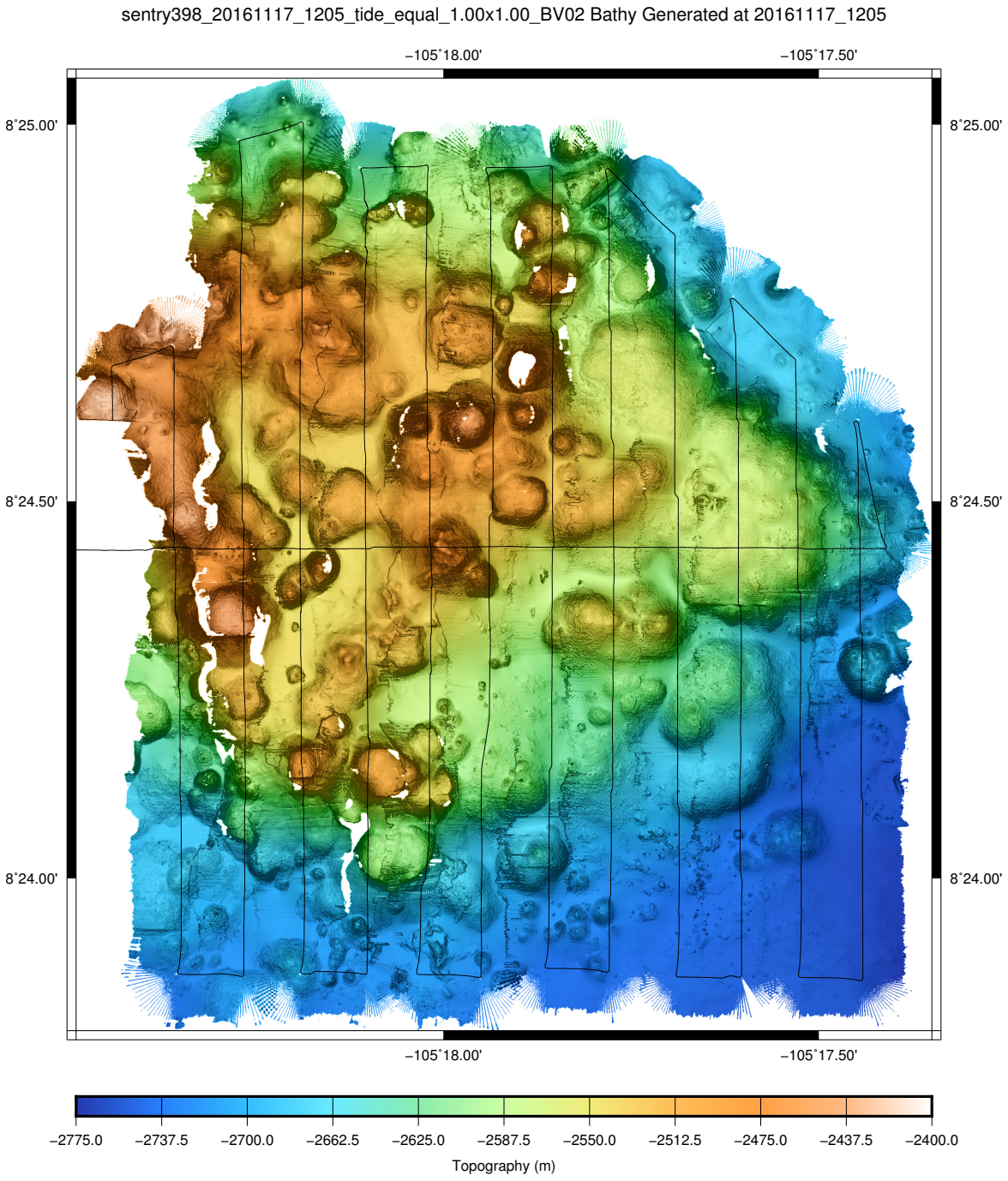


Figure 55: Processed multibeam data from dive 398 with navigation tracks.

Sentry 399 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately less than 1 ft for both launch and recovery and were not a factor in operations. Wind was nill knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 14: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -105 -35

Launch Position: sentry399 launch position: 08 23.418'N 105 17.425'W

Narrative

Third multibeam survey at Avery seamount, a continuation of sentry397 and sentry398. This survey covers the southern interface of the seamount with 3km long survey lines north to south. Dive went well, and without issue.

Issues

- None

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.11 sentry399 Summary

sentry399 Summary
Origin: 8.333333 -105.583333
Origin: 08 20.000'N 105 35.000'W
Launch: 2016/11/18 00:07:38
Survey start: 2016/11/18 01:29:43
Survey start: Lat:8.389134 Lon:-105.291863
Survey start: Lat:08 23.348'N Lon:105 17.512'W
Survey end: 2016/11/18 11:36:45
Survey end: Lat:8.398467 Lon:-105.304284
Survey end: Lat:08 23.908'N Lon:105 18.257'W
Ascent begins: 2016/11/18 11:36:45
On the surface: 2016/11/18 12:27:55
On deck: 2016/11/18 12:41:03
descent rate: 33.9 m/min
ascent rate: 51.6 m/min
survey time: 10.1 hours
deck-to-deck time 12.6 hours
Mean survey depth: 2839m
Mean survey height: 66m
distance travelled: 33.43km
average speed; 0.91m/s
average speed during photo runs: NaN m/s over 0.00 km
average speed during multibeam runs: 0.92 m/s over 33.43 km
total vertical during survey: 5846m
Battery energy at launch: 19.8 kwhr
Battery energy at survey end: 10.3 kwhr
Battery energy on deck: 10.0 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.12 sentry399 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161117_2159.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161117_2201.cfg
CTD	SBE 49	222		sbe49_20161117_2201.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161117_2200.cfg tim_20161117_2205.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

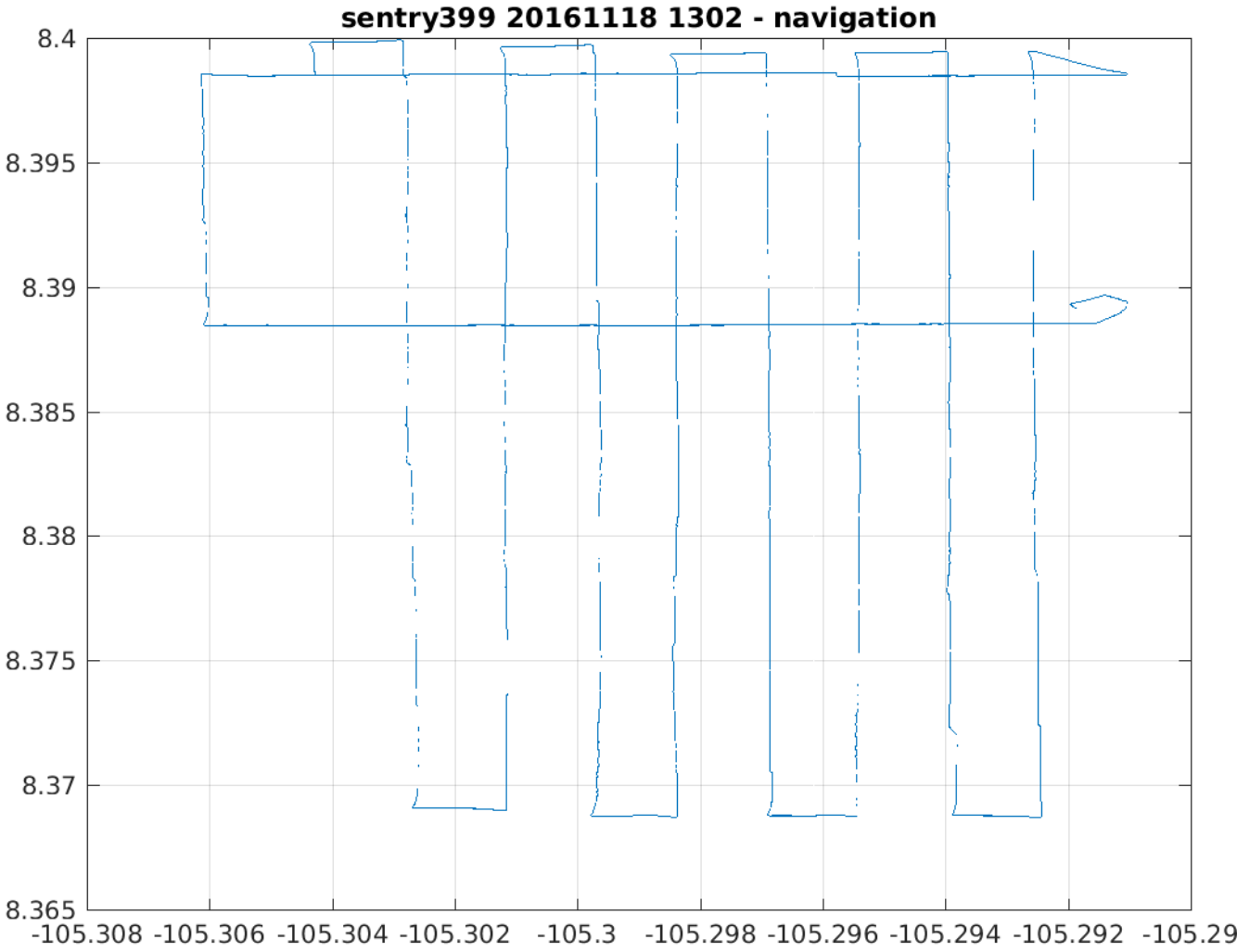


Figure 56: Latitude/Longitude plot of Sentry dive 399 based on post-processed navigation.

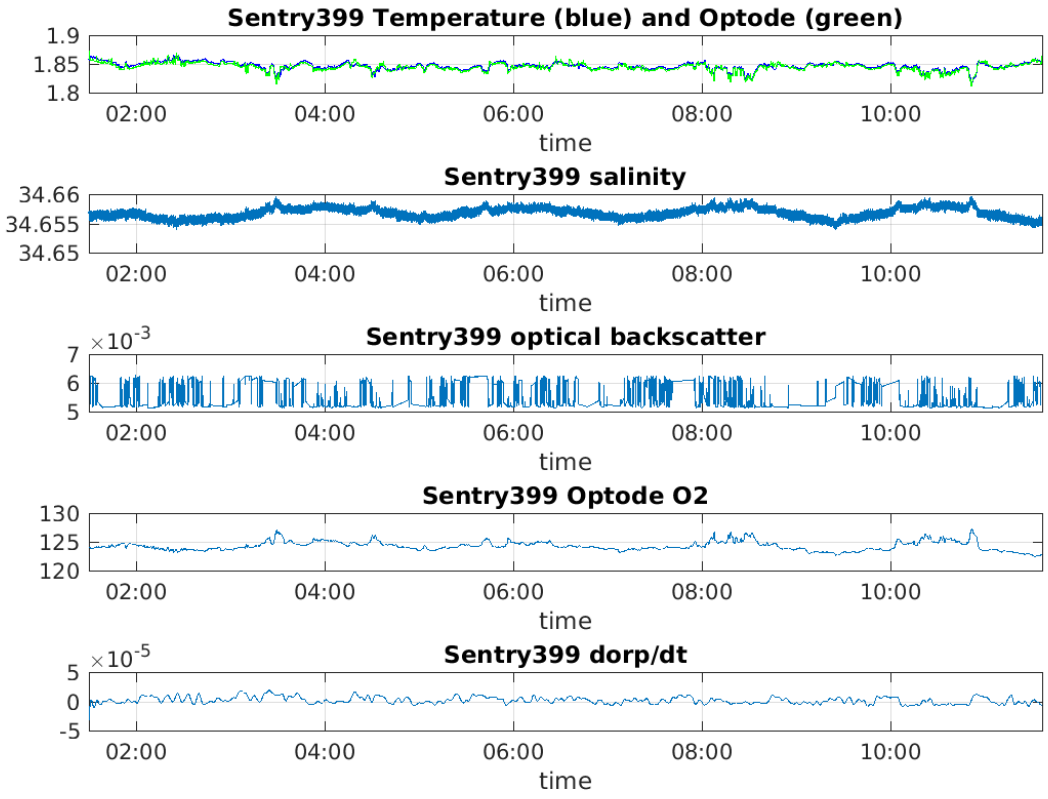


Figure 57: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

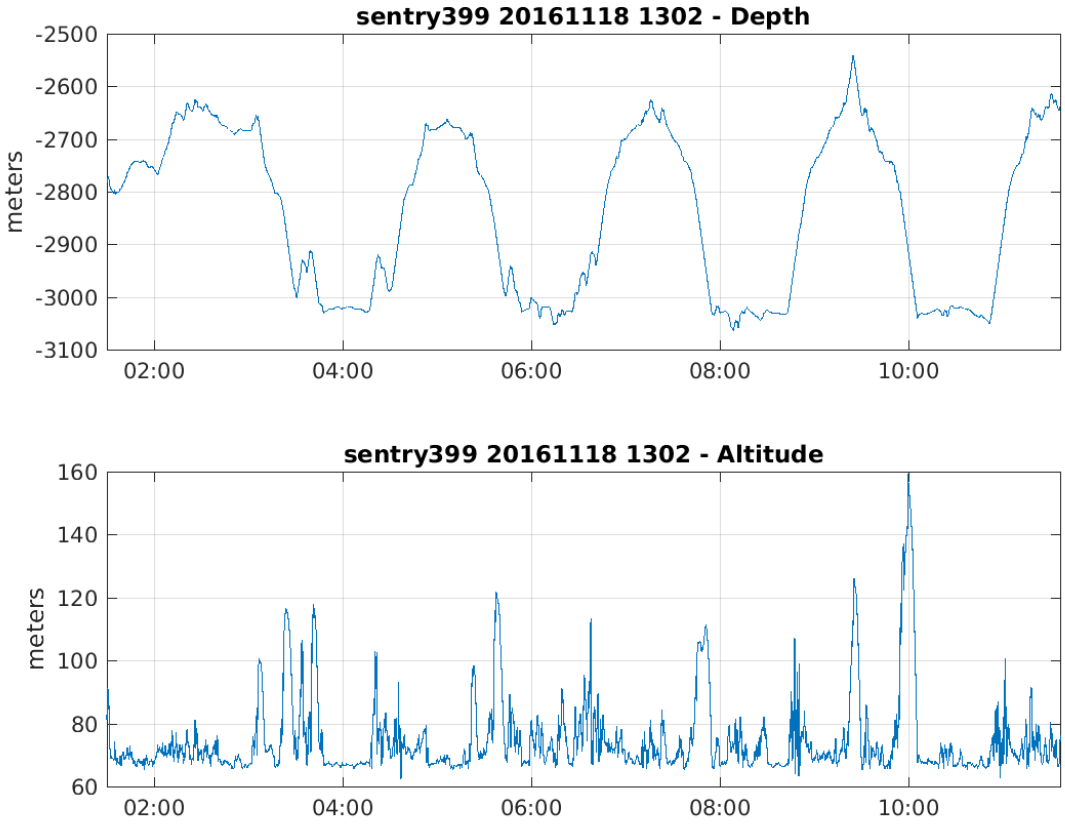


Figure 58: Depth and Altitude of Sentry during dive 399.

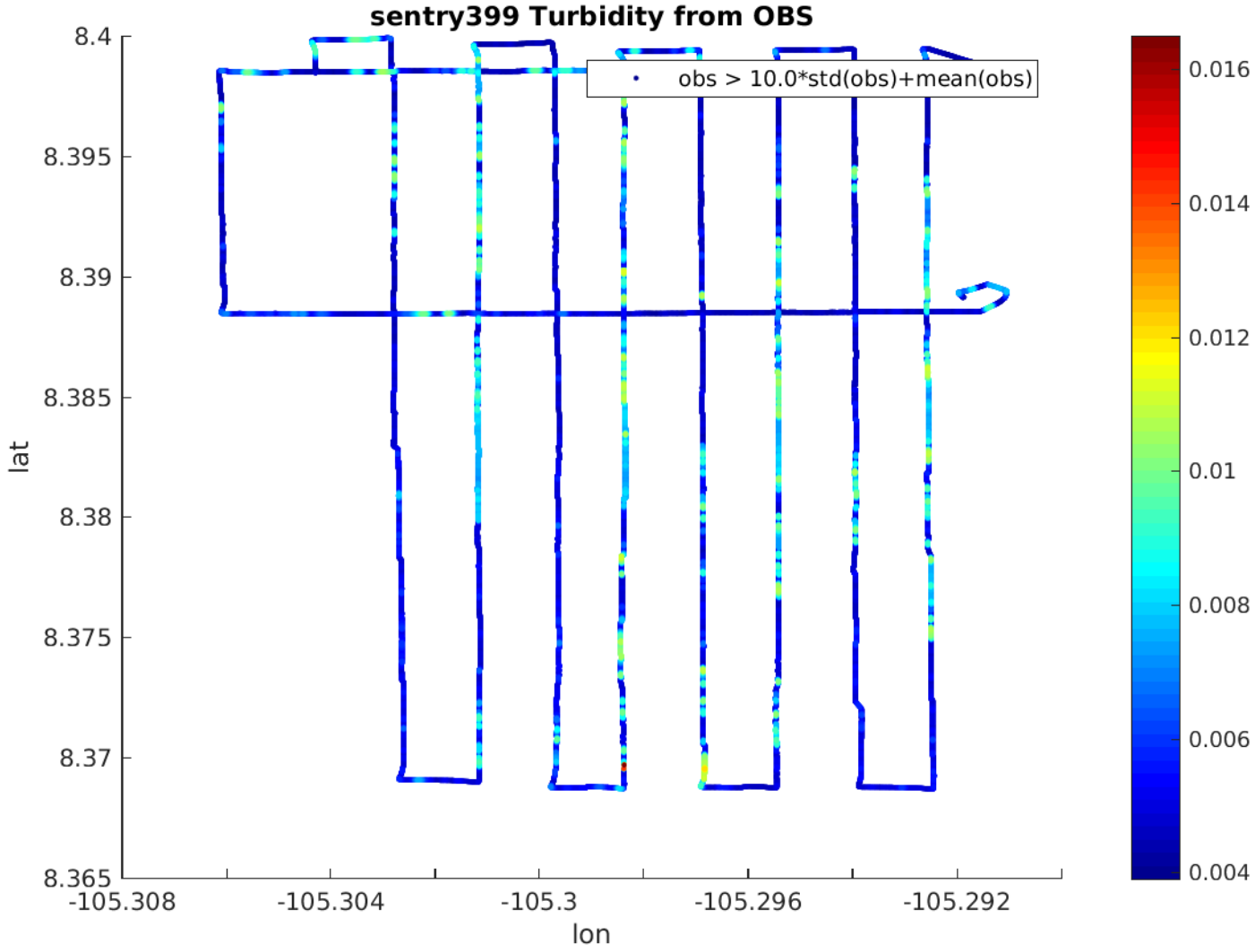


Figure 59: Optical backscatter on dive 399.

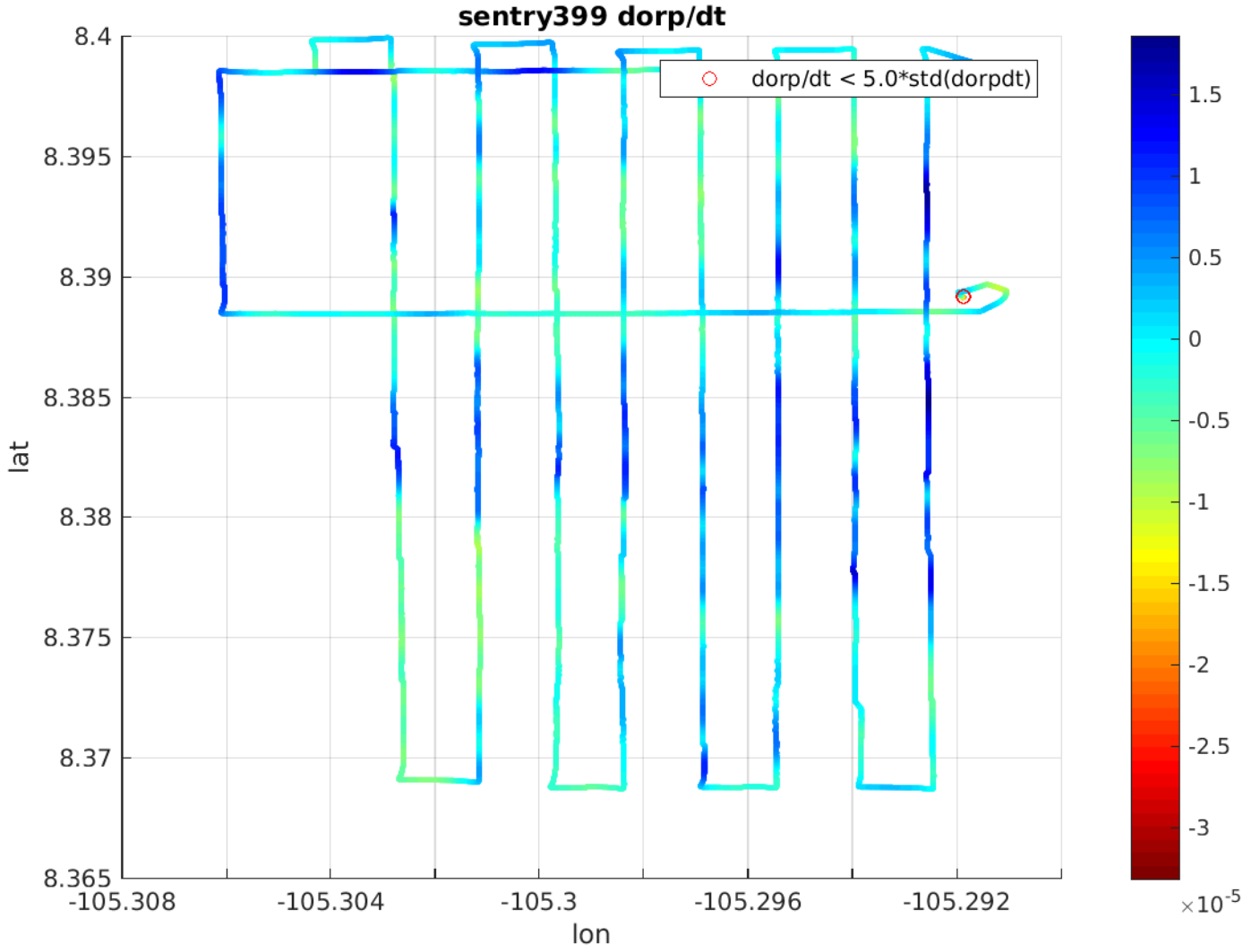


Figure 60: ORP sensor data during dive 399.

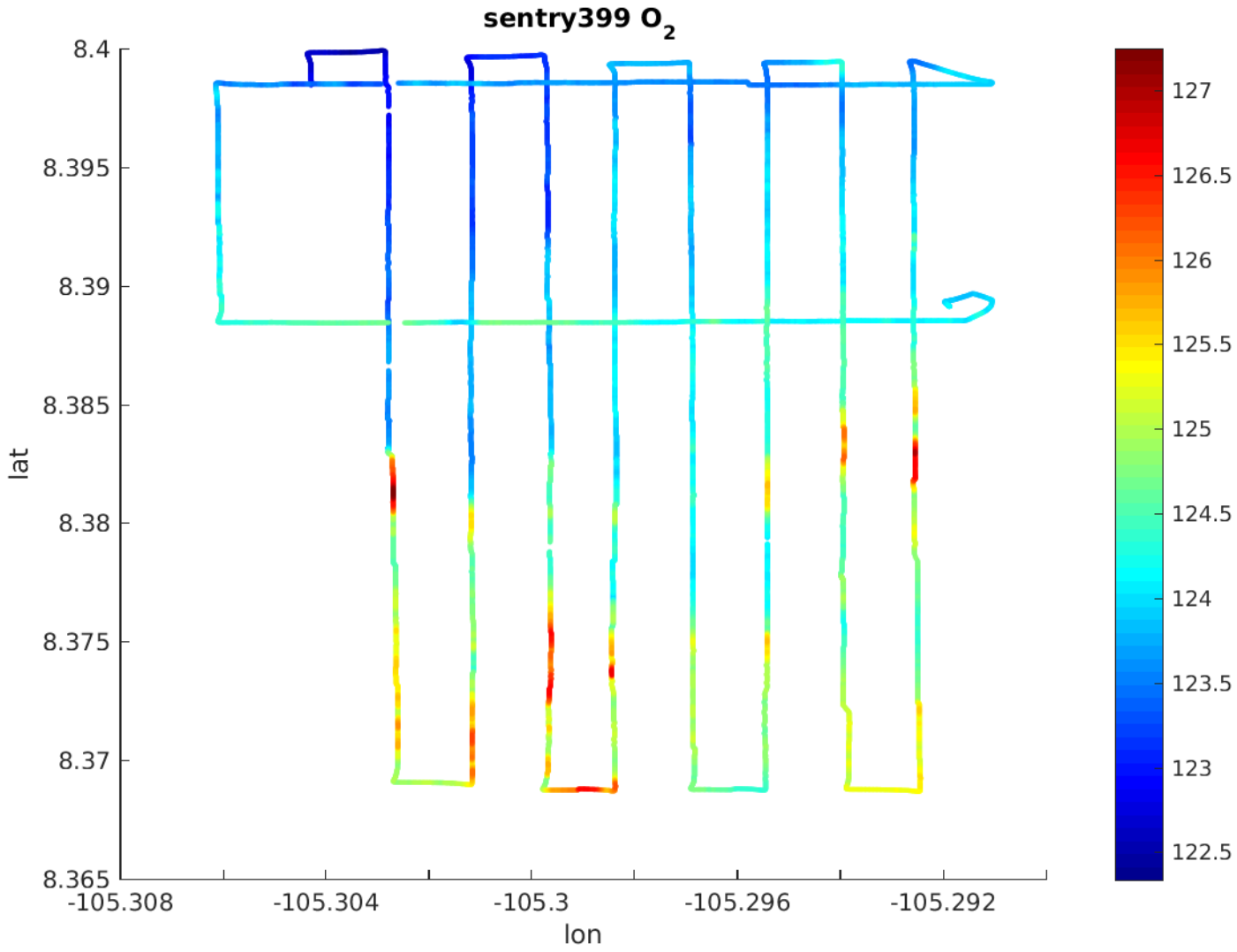


Figure 61: O2 sensor data during dive 399.

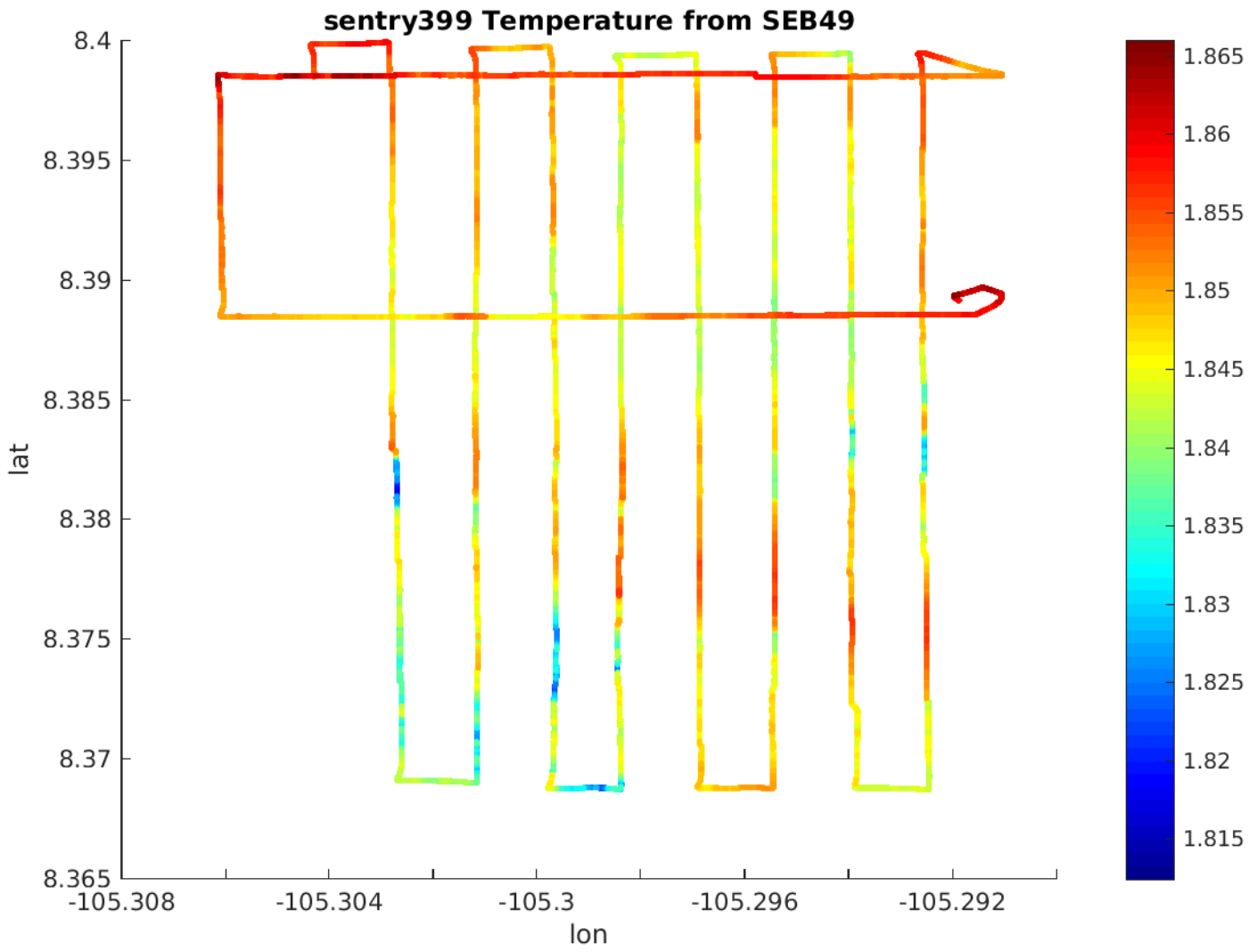


Figure 62: Temperature sensor data during dive 399.

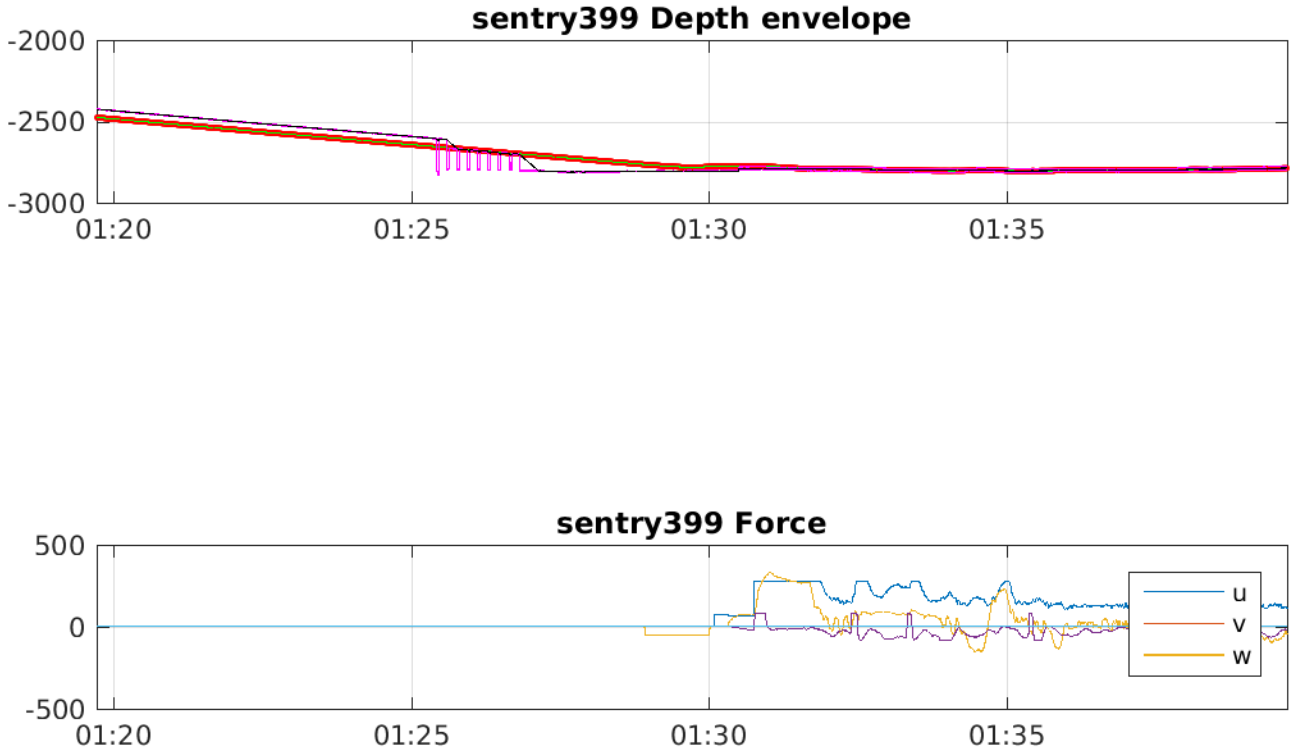


Figure 63: Bottom Approach for during dive 399.

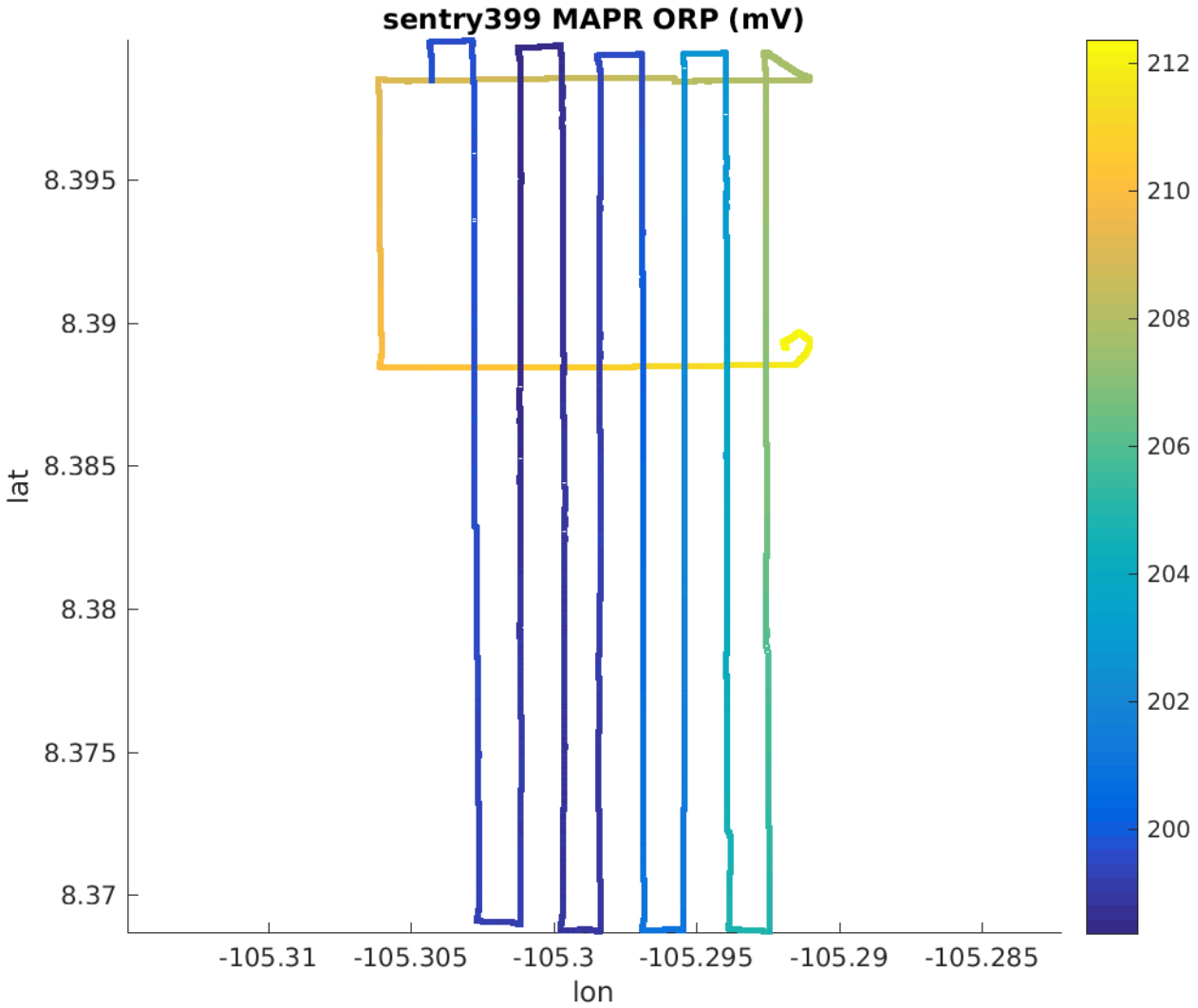


Figure 64: MAPR orp data during dive 399.

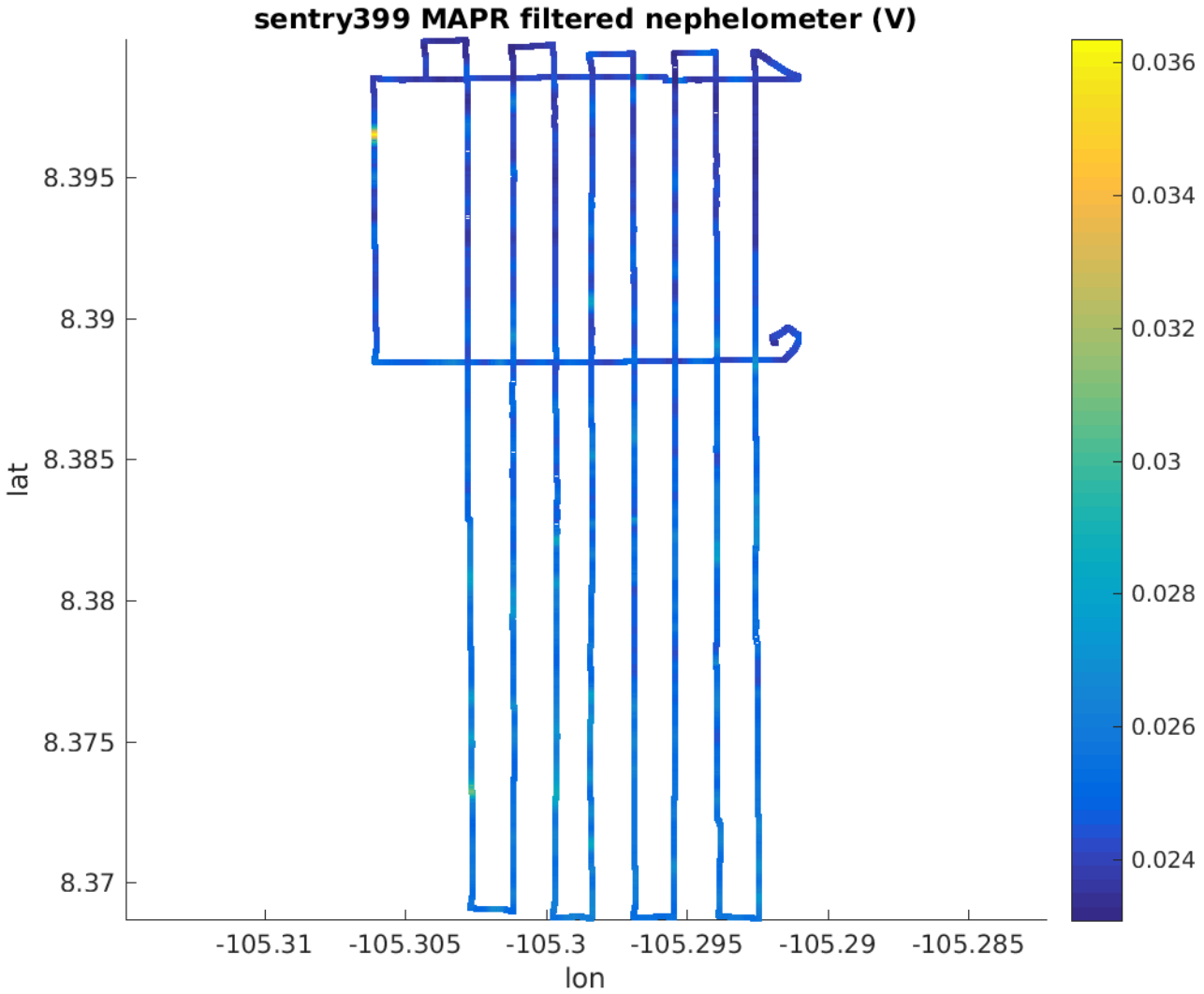


Figure 65: MAPR neph data during dive 399.

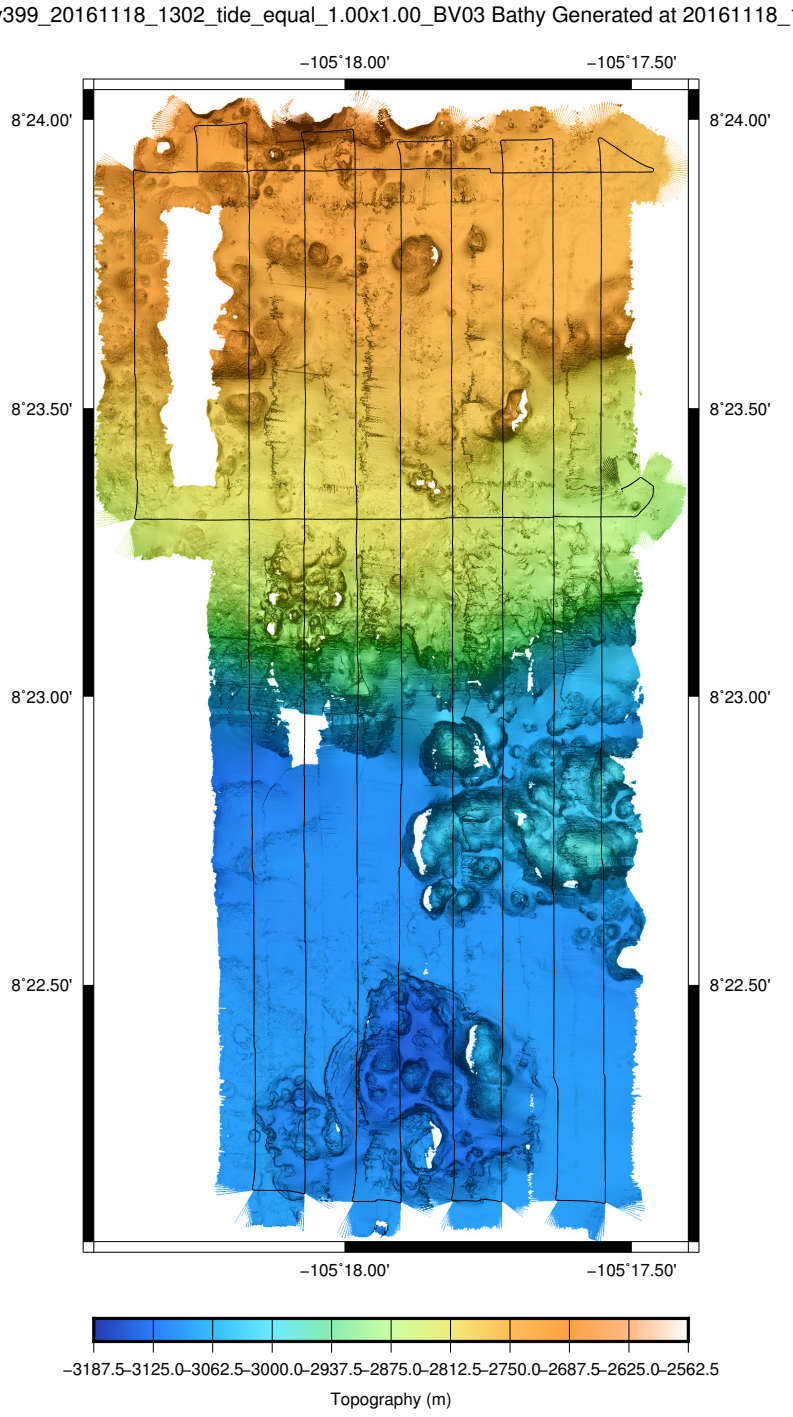


Figure 66: Processed multibeam data from dive 399 with navigation tracks.

Sentry 400 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were less than 1 ft for both launch and recovery and were not a factor in operations. Wind was nill.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 15: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -104 -43

Launch Position: sentry400 launch position: 08 24.470'N 104 41.070'W

Narrative

Multibeam survey at Beryl seamount. Overall the vehicle ran well with the exception of the multibeam which did not receive the command to start recording by the reson driver. The sonardyne SDQ message which allows us to monitor the reson's status during the dive was reporting an empty message. This message along with a slightly lower battery percentage usage rate lead us to believe the reson may not be operating correctly. The decision was made by science to continue the mission with this information and take the chance the multibeam was working. Once on deck, it was clear the reson multibeam did not run and had an issue that caused it to fail.

Issues

- Reson Multibeam – The root cause of this issue was determined once back on deck. The UDP port that connects the ROV code to the reson driver did not bind after a restart of ROV code during the decktest. Since this UDP port did not bind, the configuration messages that are sent by ROV to the

reson driver were never received by the driver. This issue was confirmed in the ROV log file when it failed to send the message with this error

```
RESON_DRIVER_NIO_THREAD (238): ERROR sending 8 byte WAS to
127.0.0.1 port 54567,-1 bytes sent, data is:CONFIG 0
```

Corrective action taken by the sentry group to prevent future issues. The Reson will now begin the dive recording on launch. Additionally, once ROV code has started during the decktest, the error logged in the SDE file will be checked.

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.13 sentry400 Summary

sentry400 Summary
Origin: 8.333333 -104.716667
Origin: 08 20.000'N 104 43.000'W
Launch: 2016/11/20 01:16:20
Survey start: 2016/11/20 02:18:54
Survey start: Lat:8.407294 Lon:-104.686118
Survey start: Lat:08 24.438'N Lon:104 41.167'W
Survey end: 2016/11/20 11:45:32
Survey end: Lat:8.397941 Lon:-104.680567
Survey end: Lat:08 23.876'N Lon:104 40.834'W
Ascent begins: 2016/11/20 11:45:32
On the surface: 2016/11/20 12:27:17
On deck: 2016/11/20 12:46:27
descent rate: 34.5 m/min
ascent rate: 49.4 m/min
survey time: 9.4 hours
deck-to-deck time 11.5 hours
Mean survey depth: 2326m
Mean survey height: 66m
distance travelled: 27.36km
average speed; 0.80m/s
average speed during photo runs: 0.51 m/s over 0.15 km
average speed during multibeam runs: 0.82 m/s over 27.31 km
total vertical during survey: 8549m
Battery energy at launch: 20.7 kwhr
Battery energy at survey end: 12.0 kwhr
Battery energy on deck: 12.0 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.14 sentry400 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161119_2224.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161119_2225.cfg
CTD	SBE 49	222		sbe49_20161119_2225.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161119_2225.cfg tim_20161119_2229.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

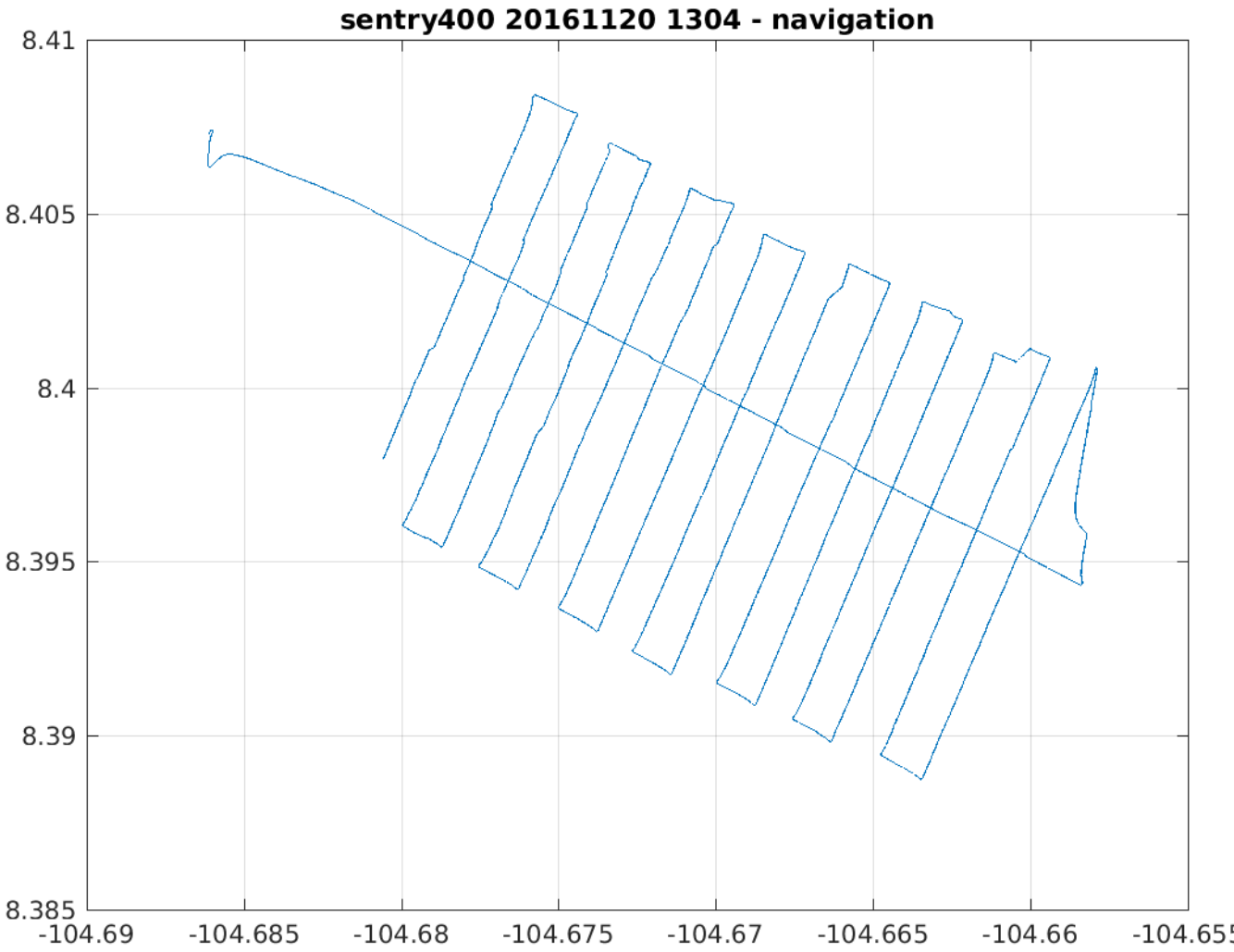


Figure 67: Latitude/Longitude plot of Sentry dive 400 based on post-processed navigation.

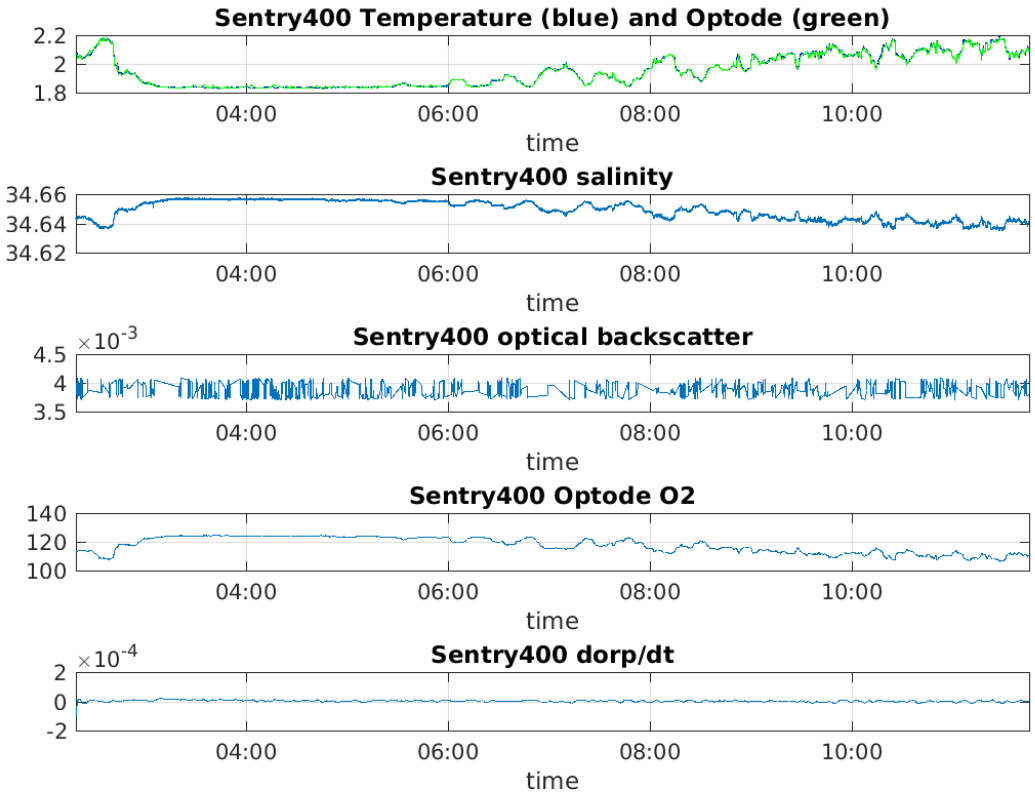


Figure 68: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

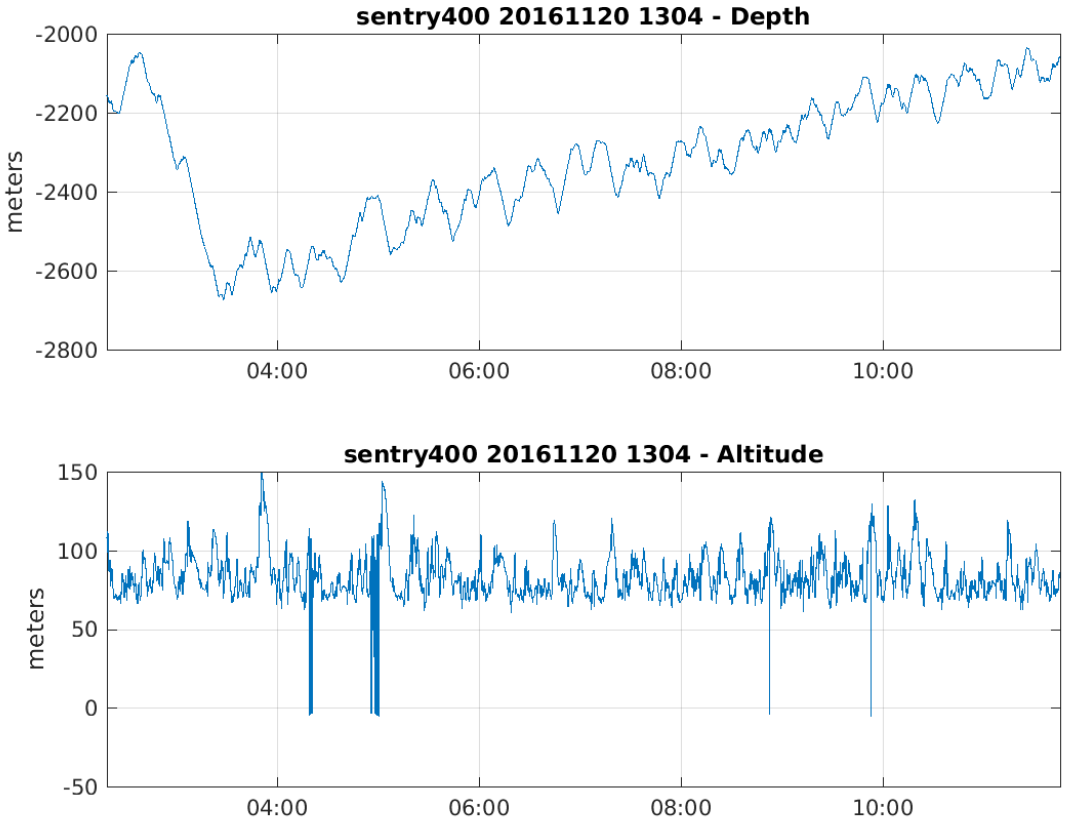


Figure 69: Depth and Altitude of Sentry during dive 400.

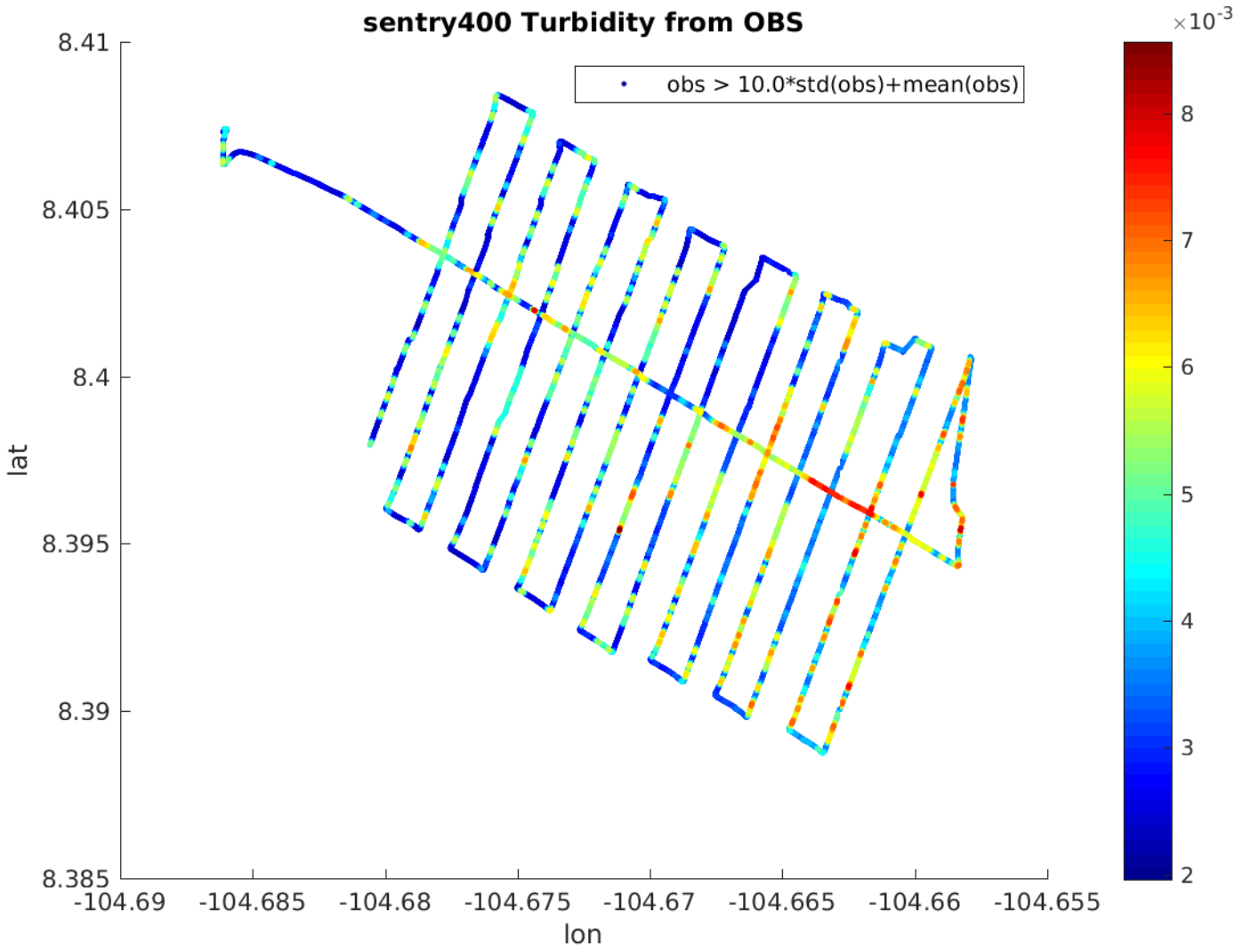


Figure 70: Optical backscatter on dive 400.

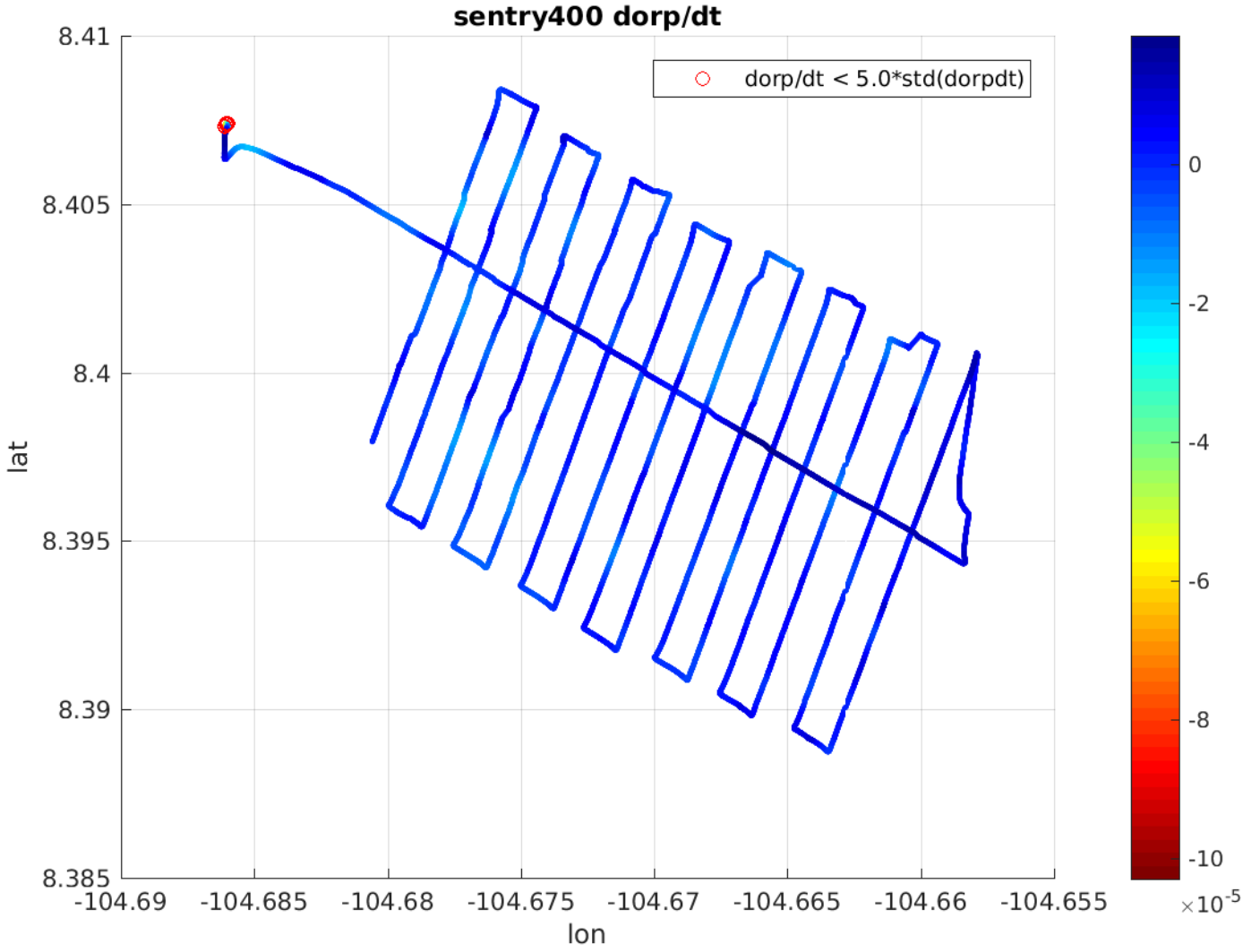


Figure 71: ORP sensor data during dive 400.

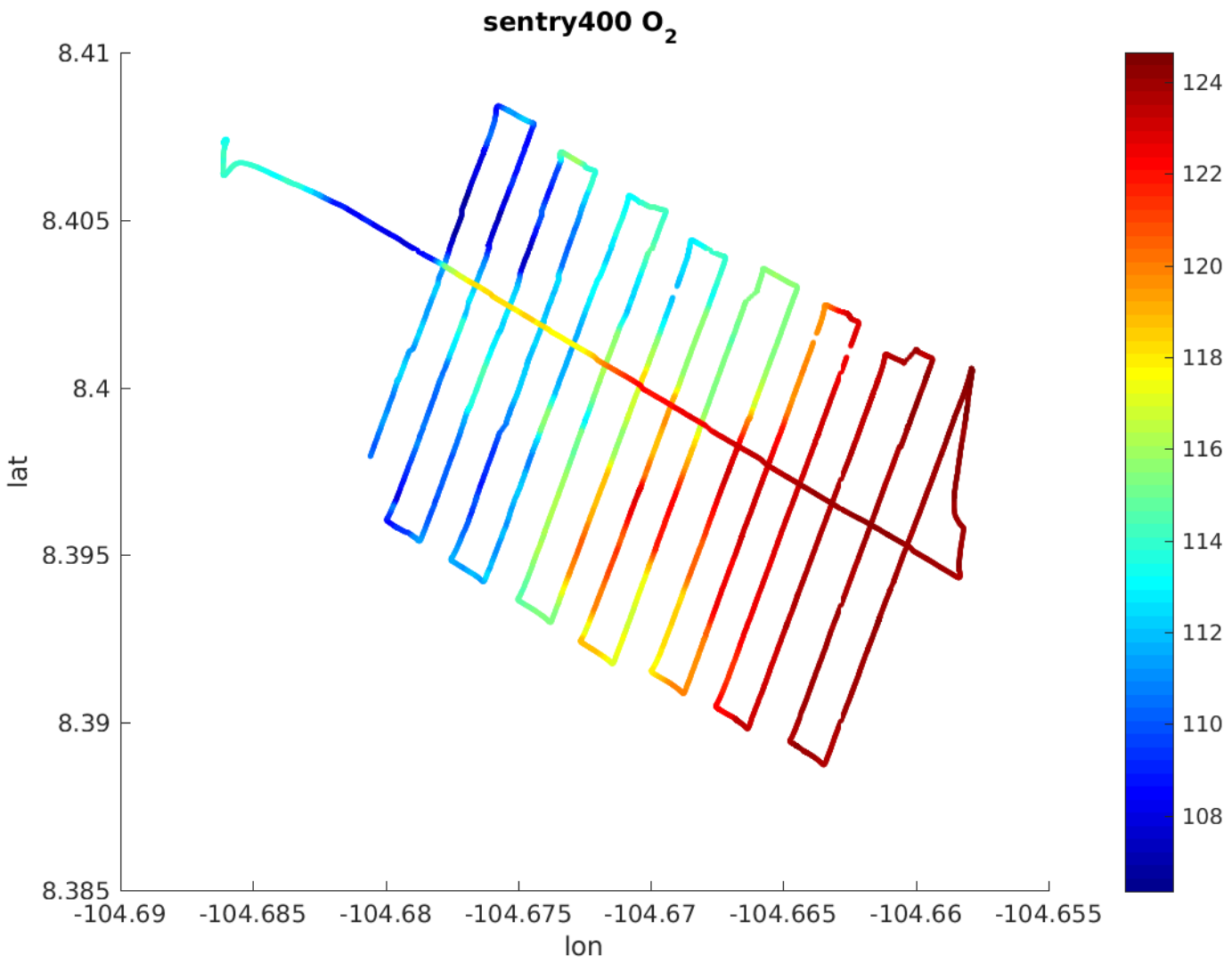


Figure 72: O2 sensor data during dive 400.

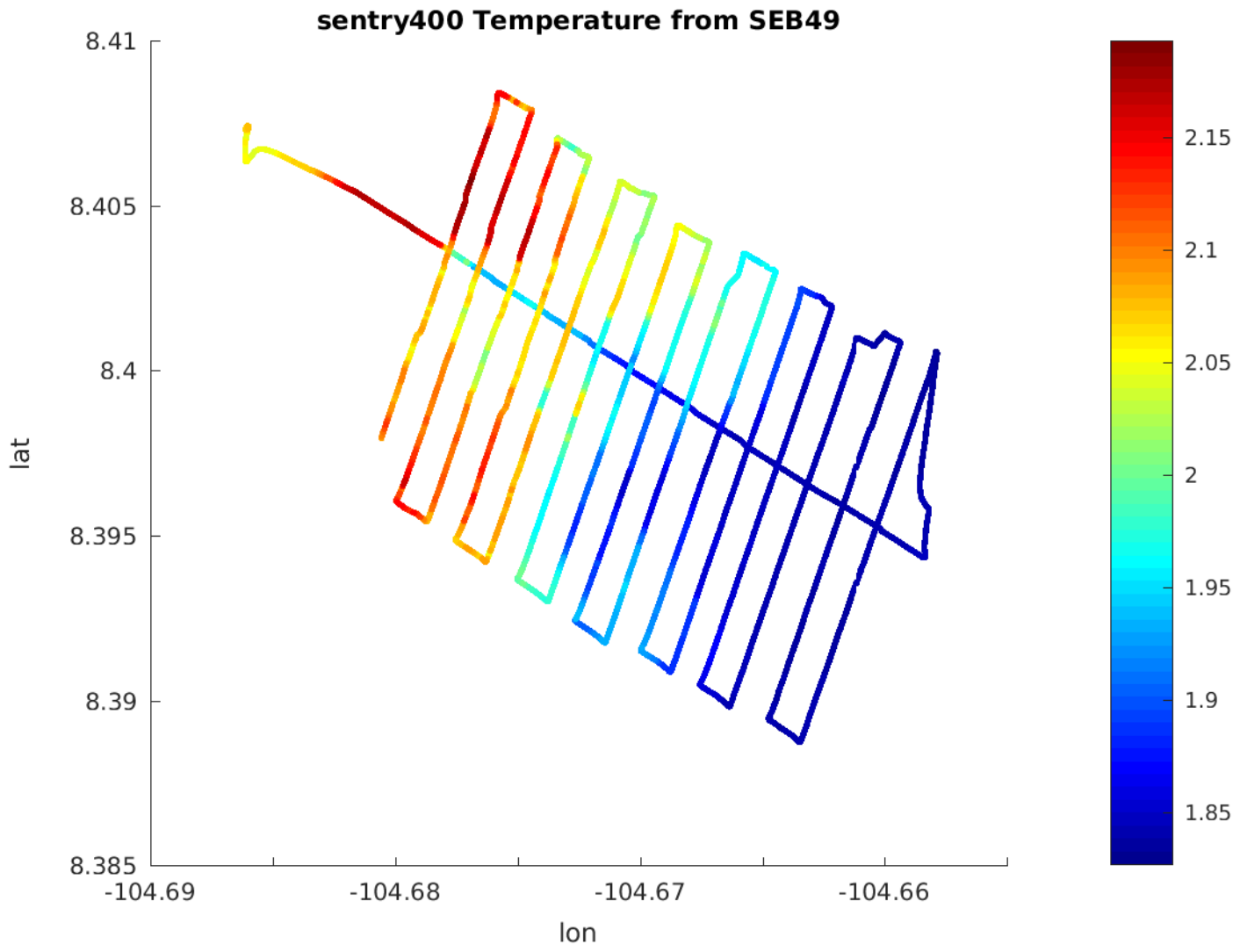


Figure 73: Temperature sensor data during dive 400.

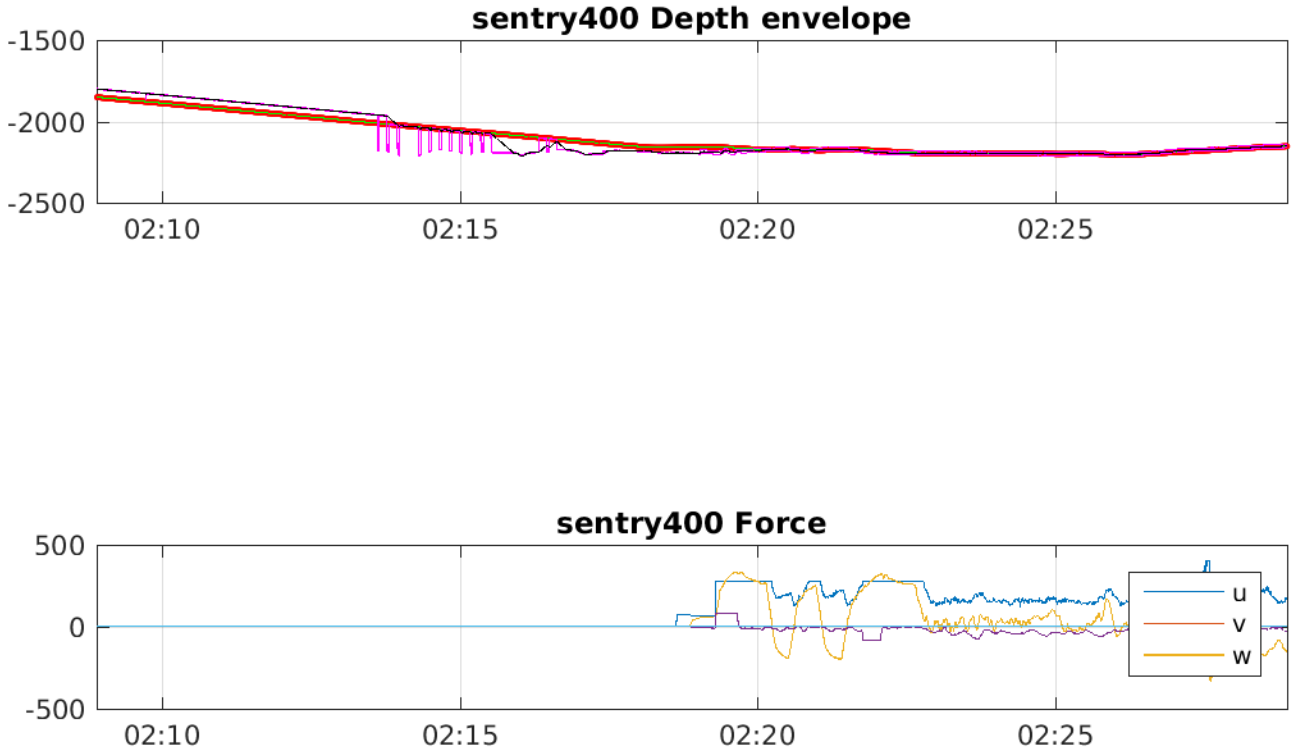


Figure 74: Bottom Approach for during dive 400.

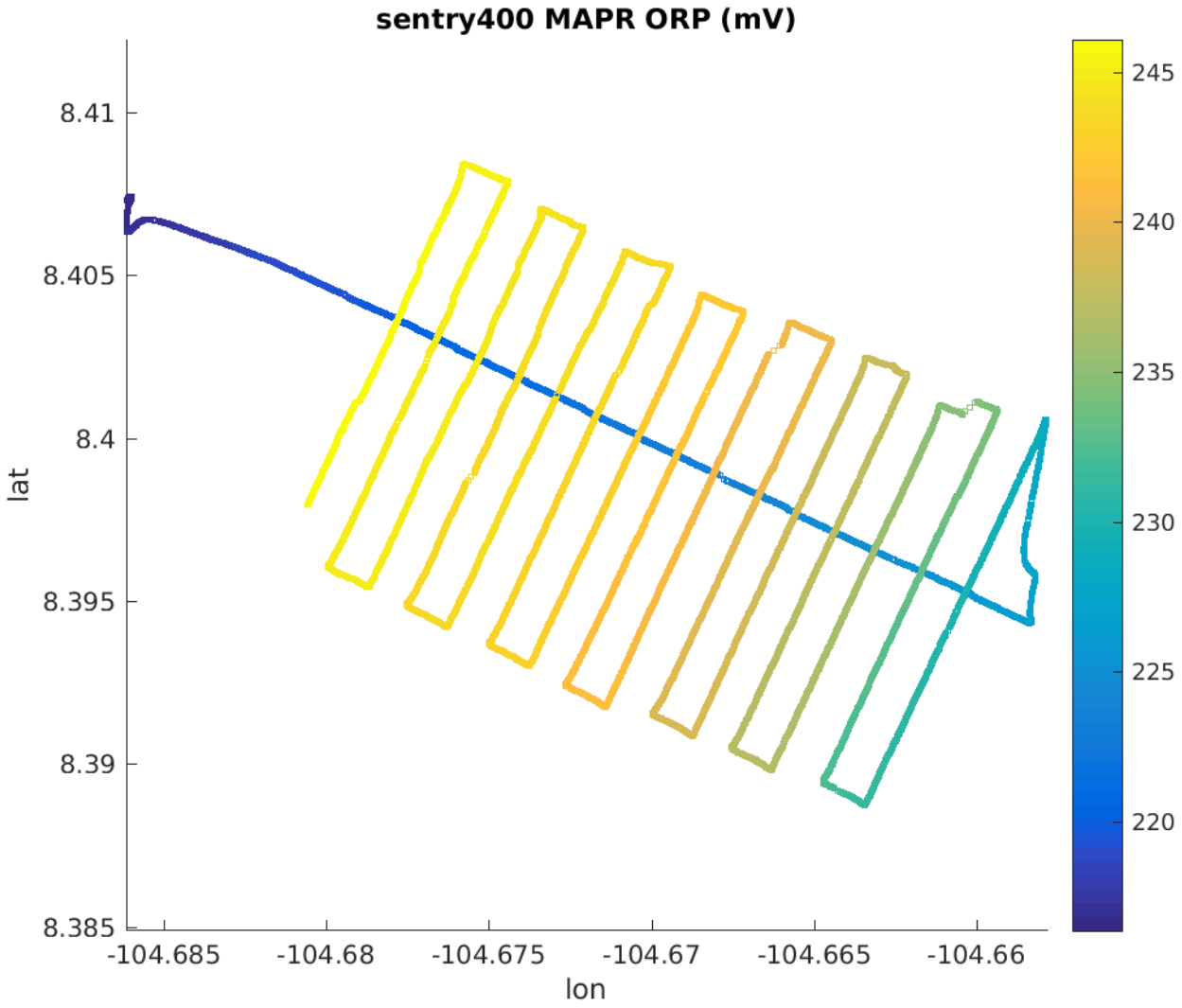


Figure 75: MAPR orp data during dive 400.

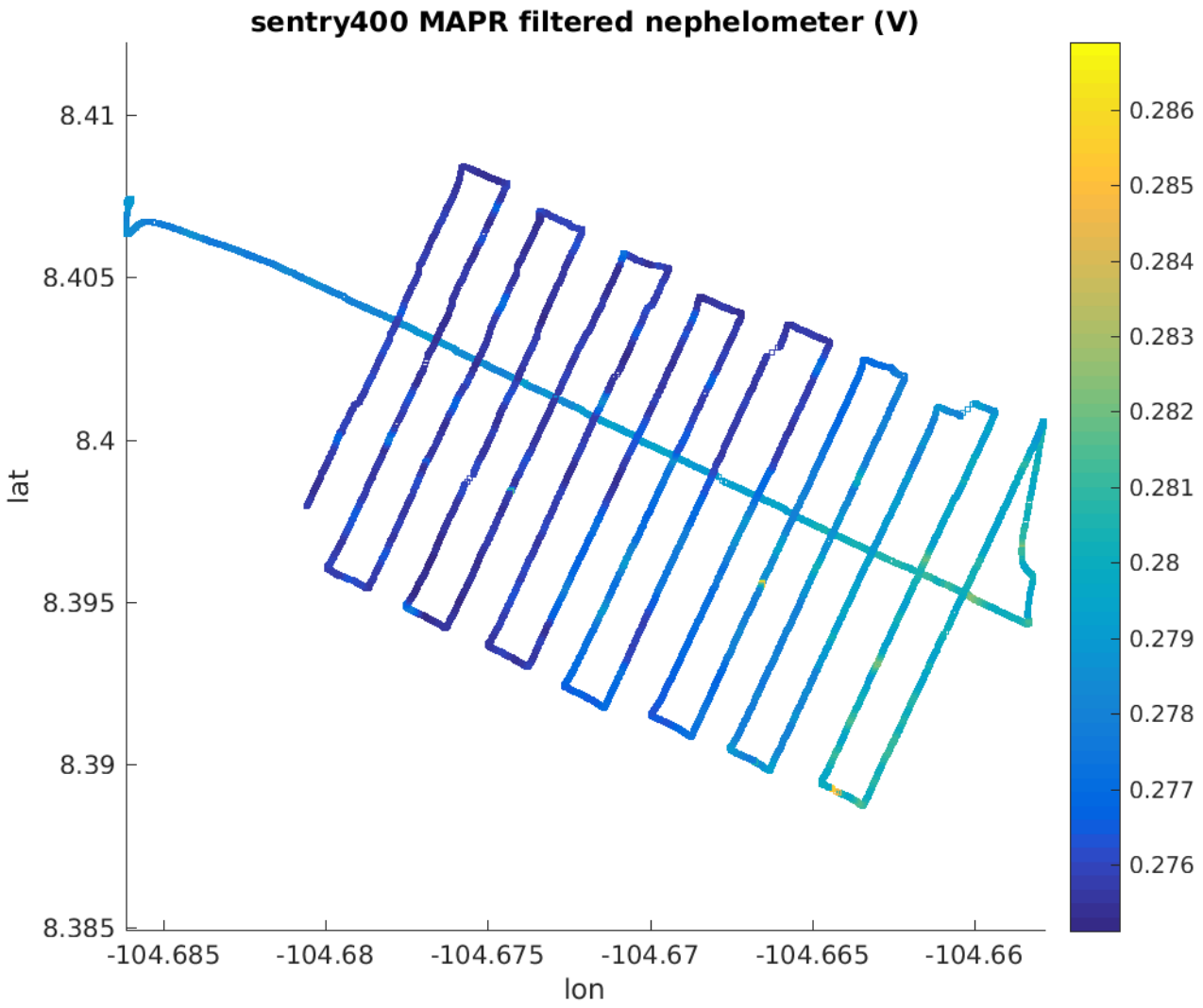


Figure 76: MAPR neph data during dive 400.

Sentry 401 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately 1 to 3 ft for both launch and recovery and were not a factor in operations. Wind was 5 to 10 knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 16: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -104 -43

Launch Position: sentry401 launch position: 08 24.660'N 104 23.251'W

Narrative

Multibeam survey at NearEPR seamount. This survey is the first survey at this site and is the closest site to the axis. Overall the survey went well and completed the mission.

Issues

- Optode did not work for the entire mission. Failure of the optode has not been determined. Optode tested OK on deck after mission and will not be swapped out.

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.15 sentry401 Summary

sentry401 Summary
Origin: 8.333333 -104.716667
Origin: 08 20.000'N 104 43.000'W
Launch: 2016/11/21 00:06:51
Survey start: 2016/11/21 01:18:15
Survey start: Lat:8.410231 Lon:-104.388180
Survey start: Lat:08 24.614'N Lon:104 23.291'W
Survey end: 2016/11/21 11:28:00
Survey end: Lat:8.400449 Lon:-104.389232
Survey end: Lat:08 24.027'N Lon:104 23.354'W
Ascent begins: 2016/11/21 11:28:00
On the surface: 2016/11/21 12:11:39
On deck: 2016/11/21 12:28:18
descent rate: 34.7 m/min
ascent rate: 50.9 m/min
survey time: 10.2 hours
deck-to-deck time 12.4 hours
Mean survey depth: 2391m
Mean survey height: 66m
distance travelled: 31.66km
average speed; 0.86m/s
average speed during photo runs: NaN m/s over 0.00 km
average speed during multibeam runs: 0.88 m/s over 31.66 km
total vertical during survey: 8083m
Battery energy at launch: 19.4 kwhr
Battery energy at survey end: 10.0 kwhr
Battery energy on deck: 9.8 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.16 sentry401 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161120_2140.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161120_2140.cfg
CTD	SBE 49	222		sbe49_20161120_2141.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161120_2140.cfg tim_20161120_2145.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

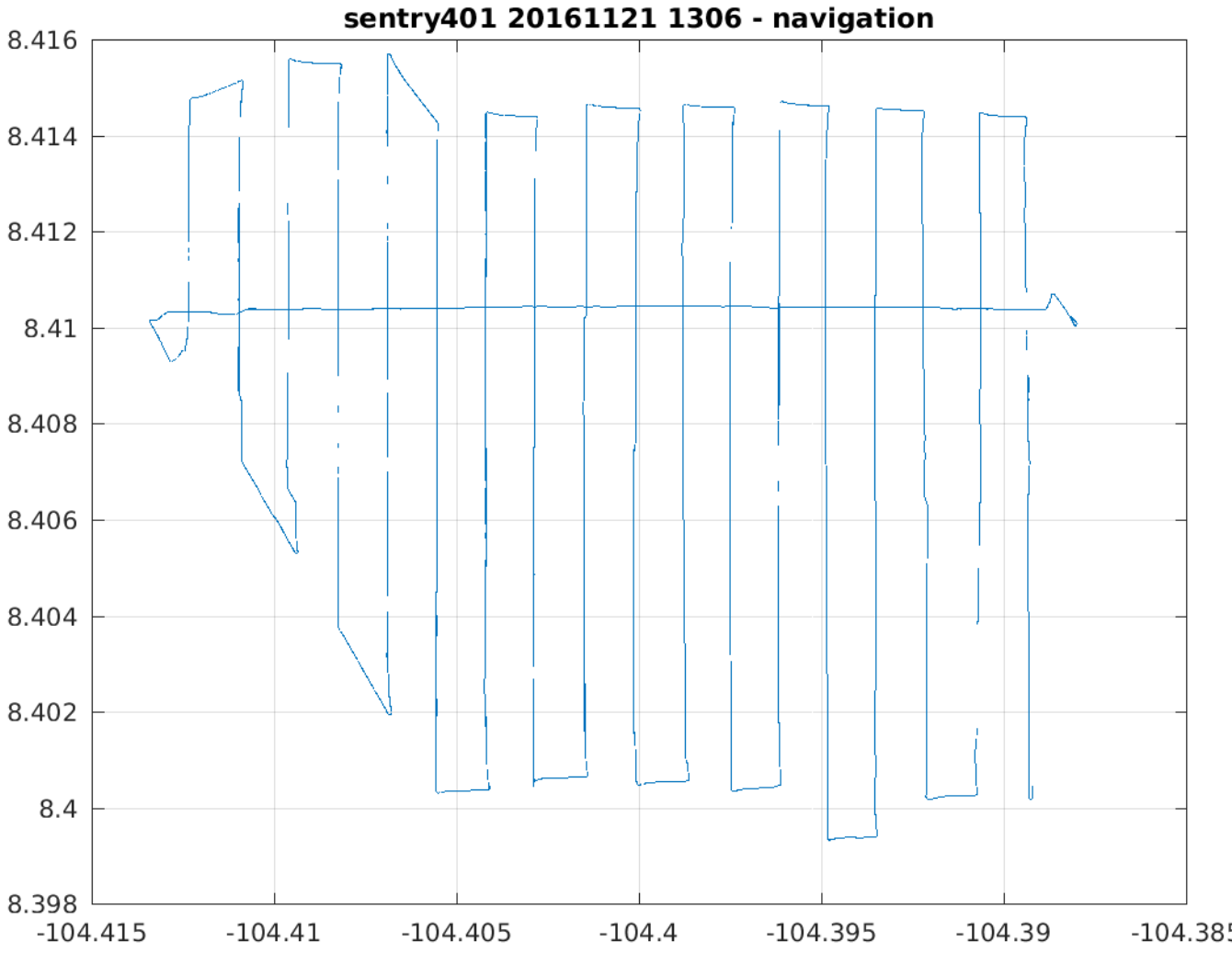


Figure 77: Latitude/Longitude plot of Sentry dive 401 based on post-processed navigation.

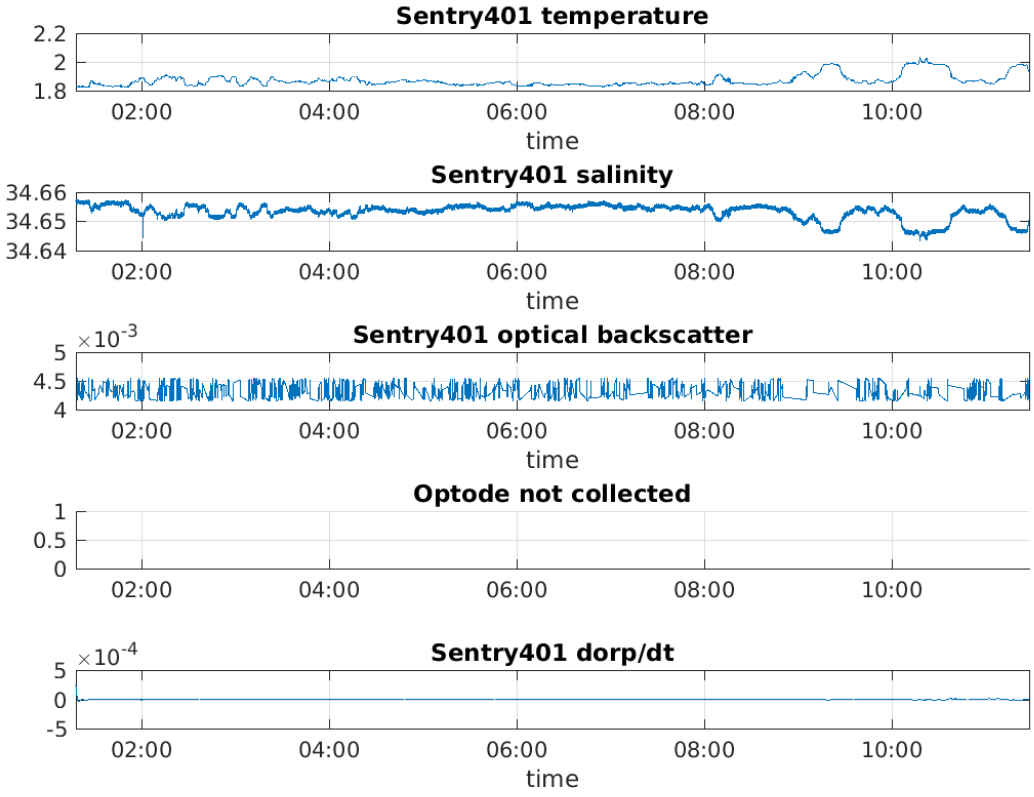


Figure 78: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

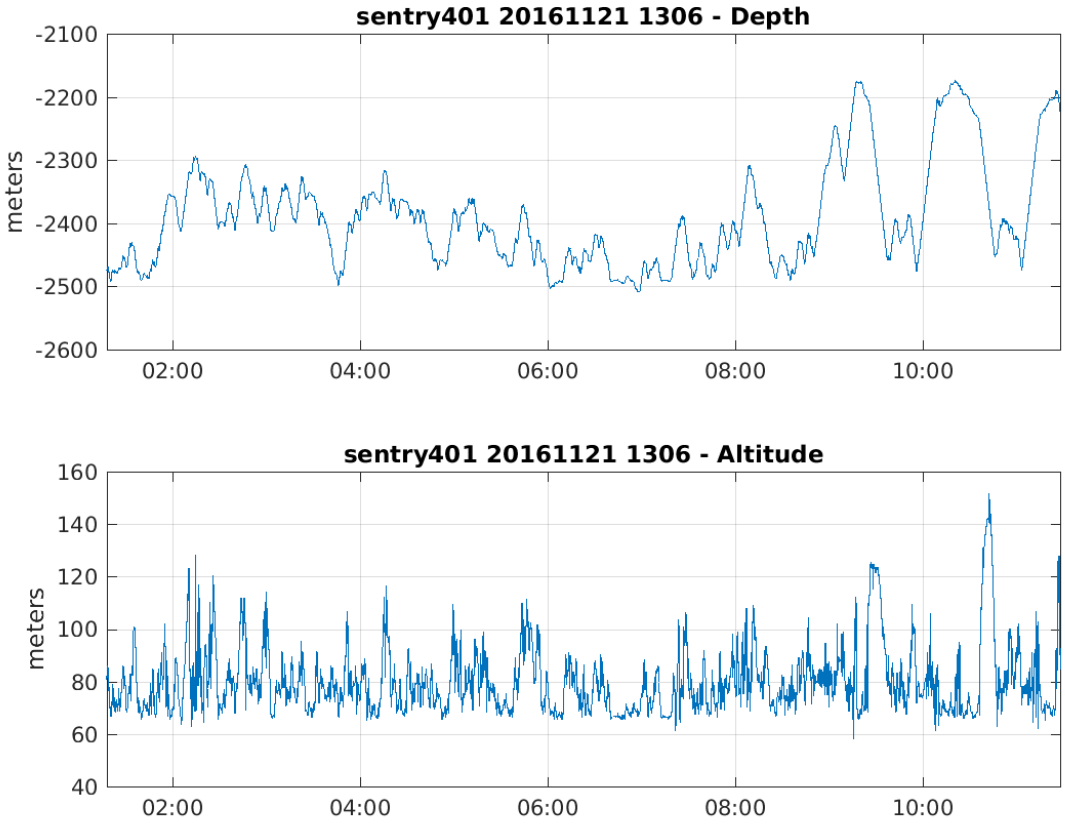


Figure 79: Depth and Altitude of Sentry during dive 401.

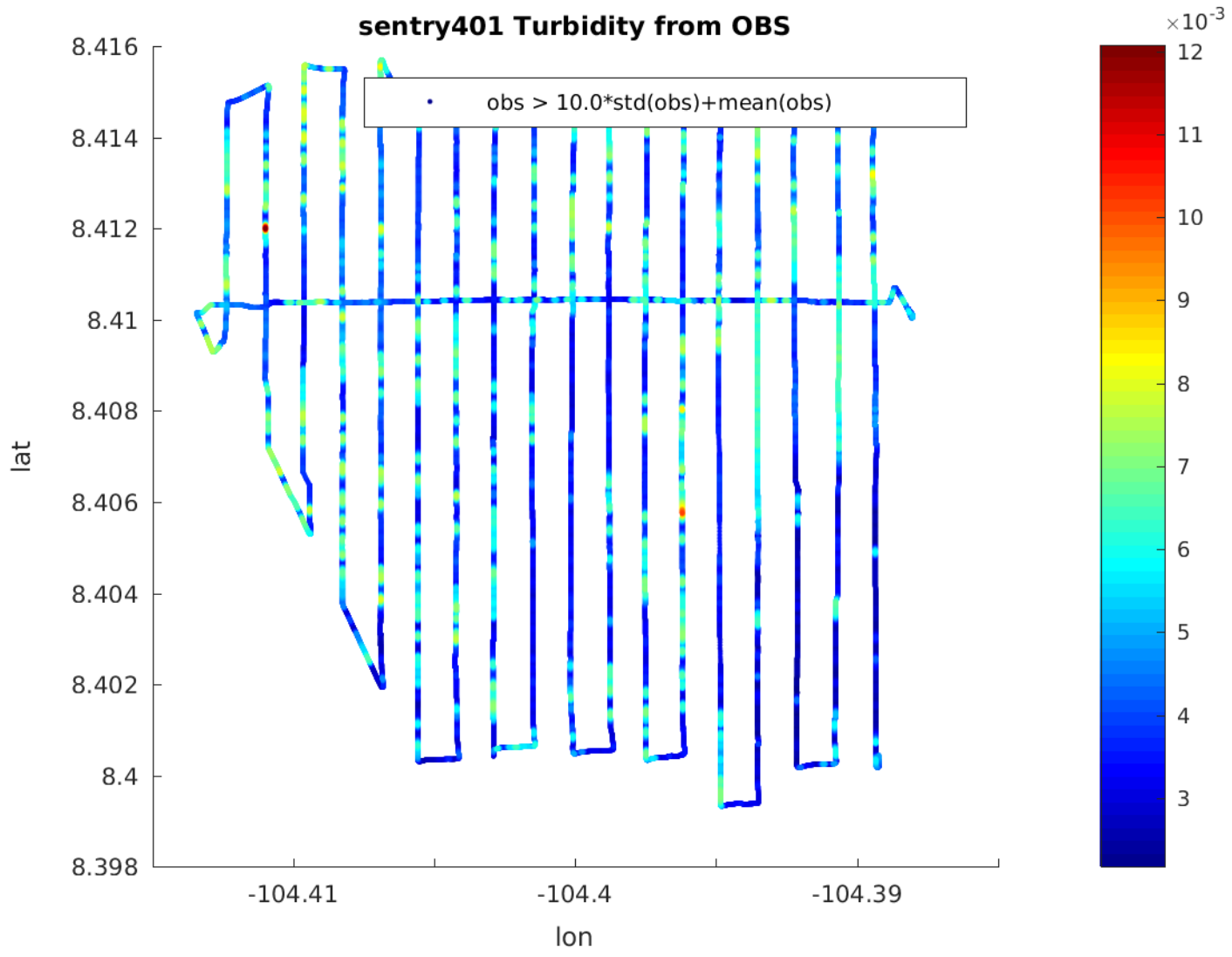


Figure 80: Optical backscatter on dive 401.

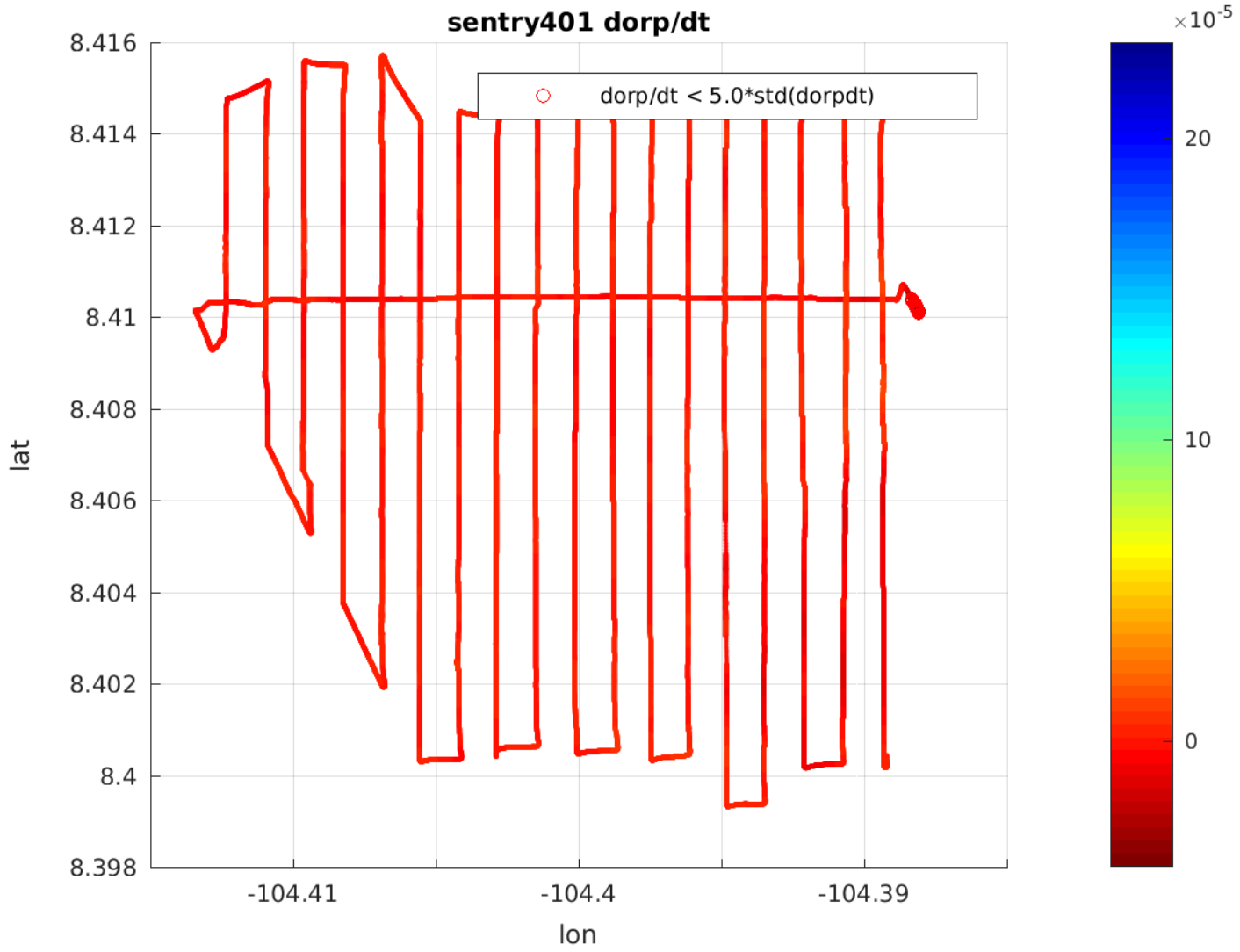


Figure 81: ORP sensor data during dive 401.

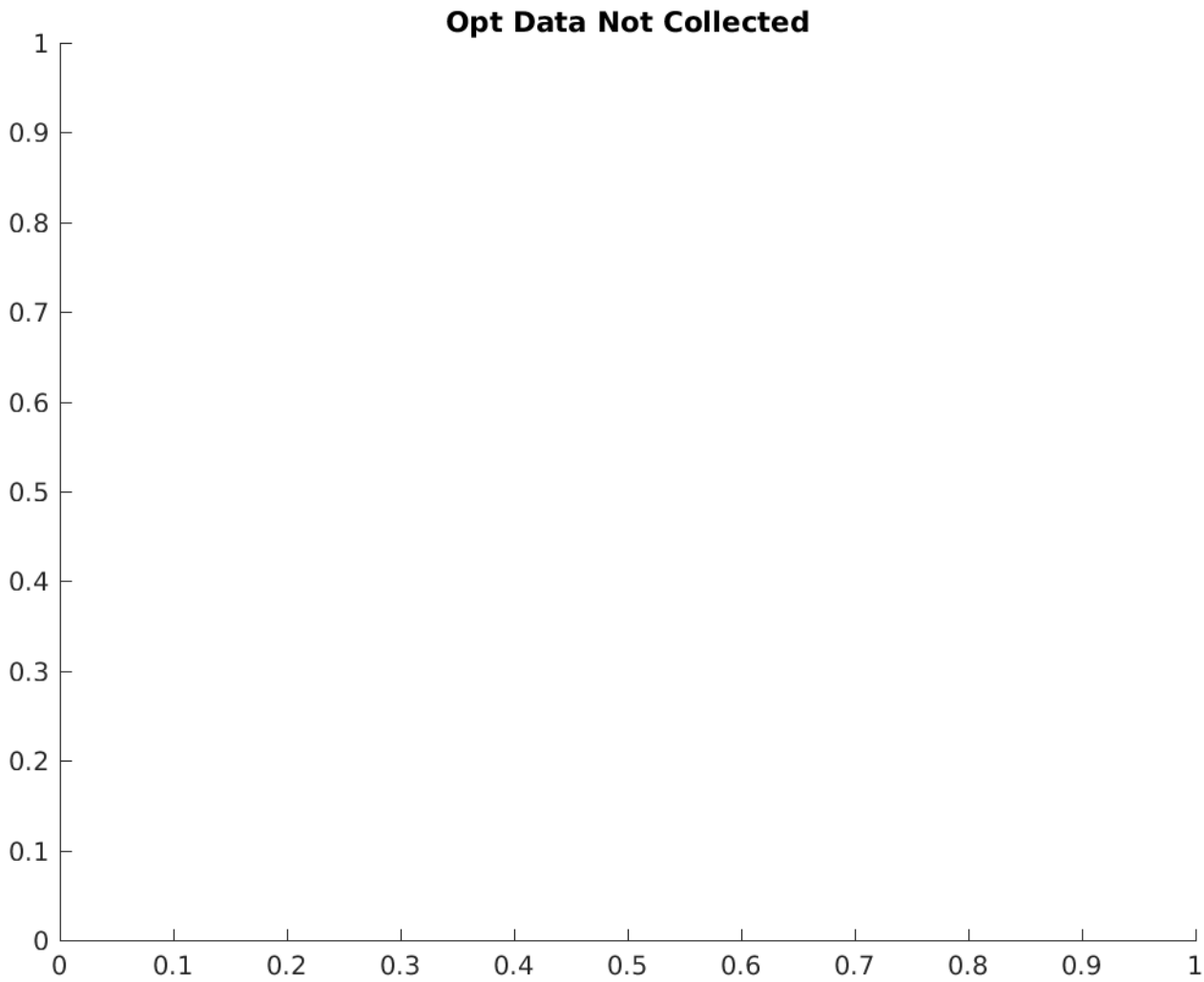


Figure 82: O2 sensor data during dive 401.

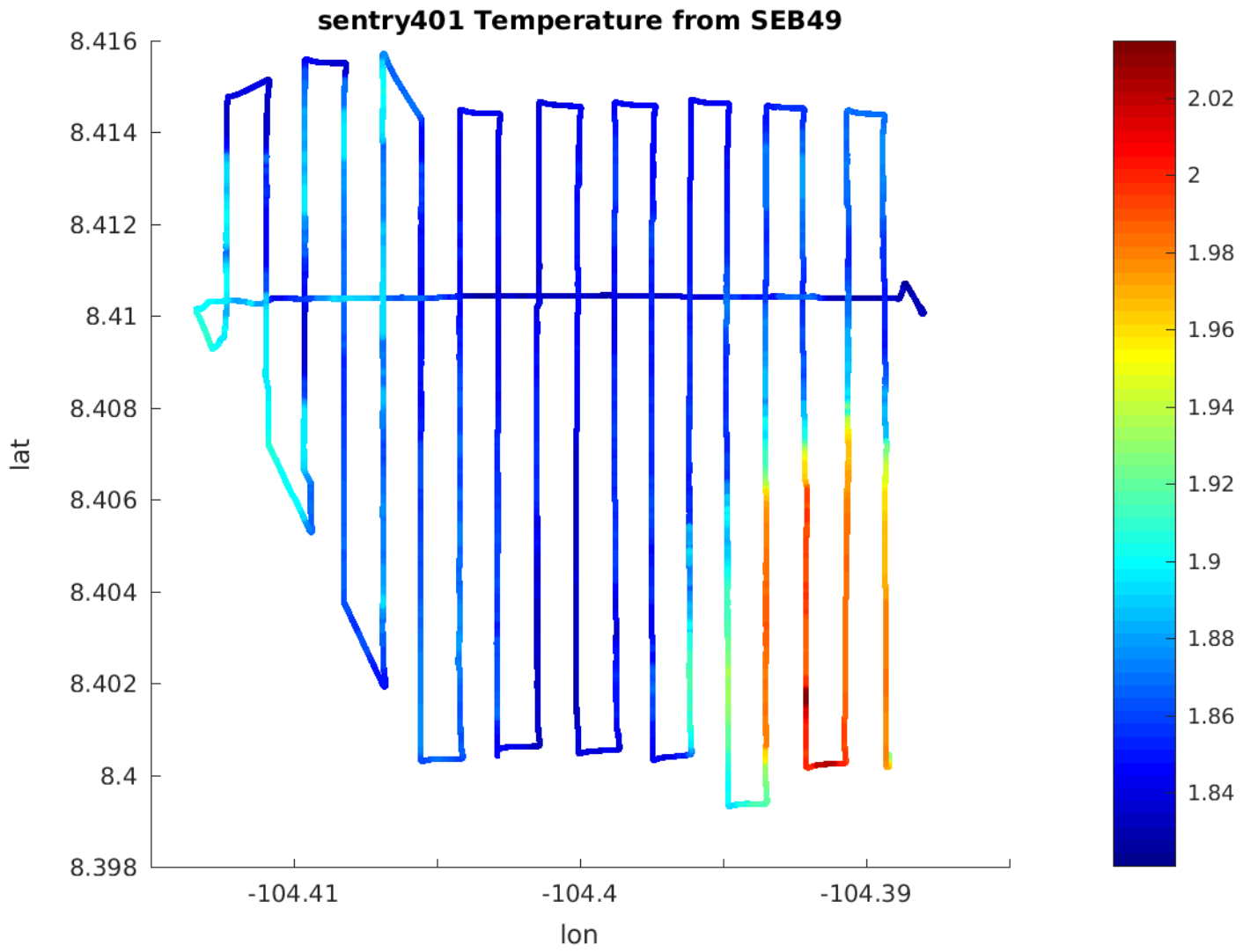


Figure 83: Temperature sensor data during dive 401.

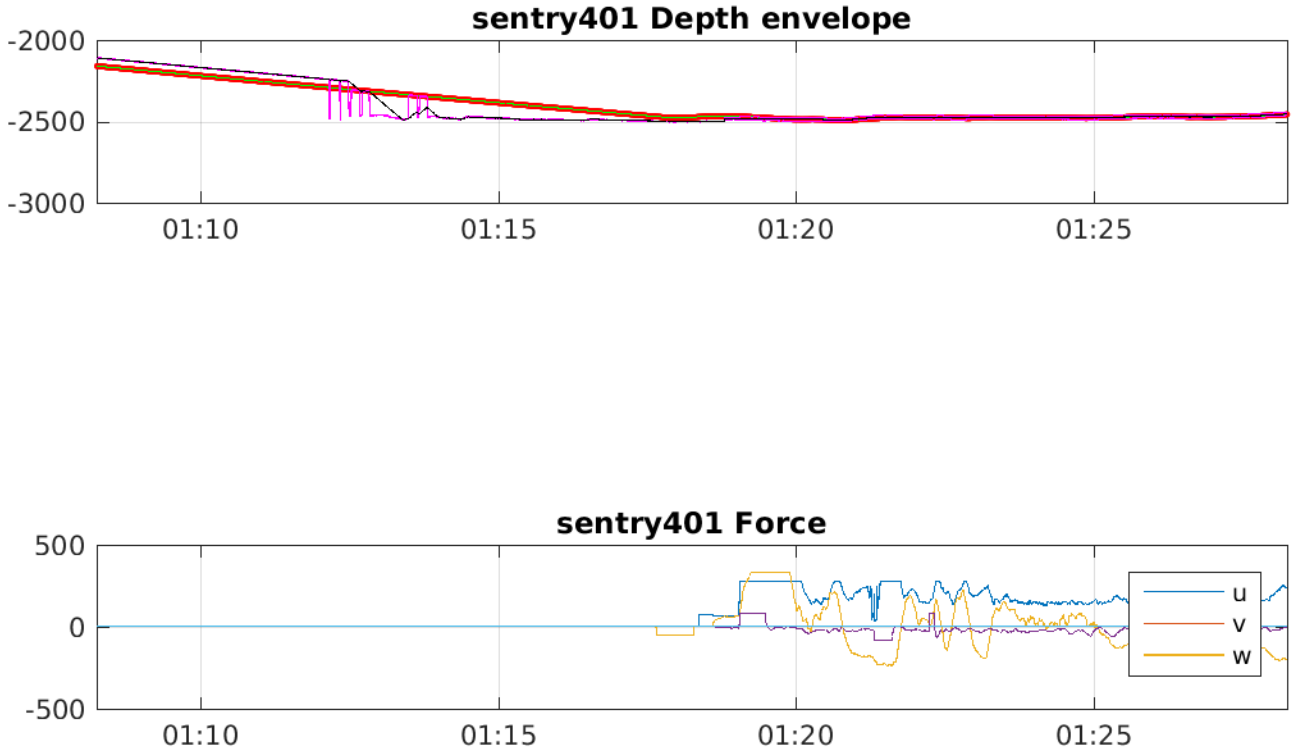


Figure 84: Bottom Approach for during dive 401.

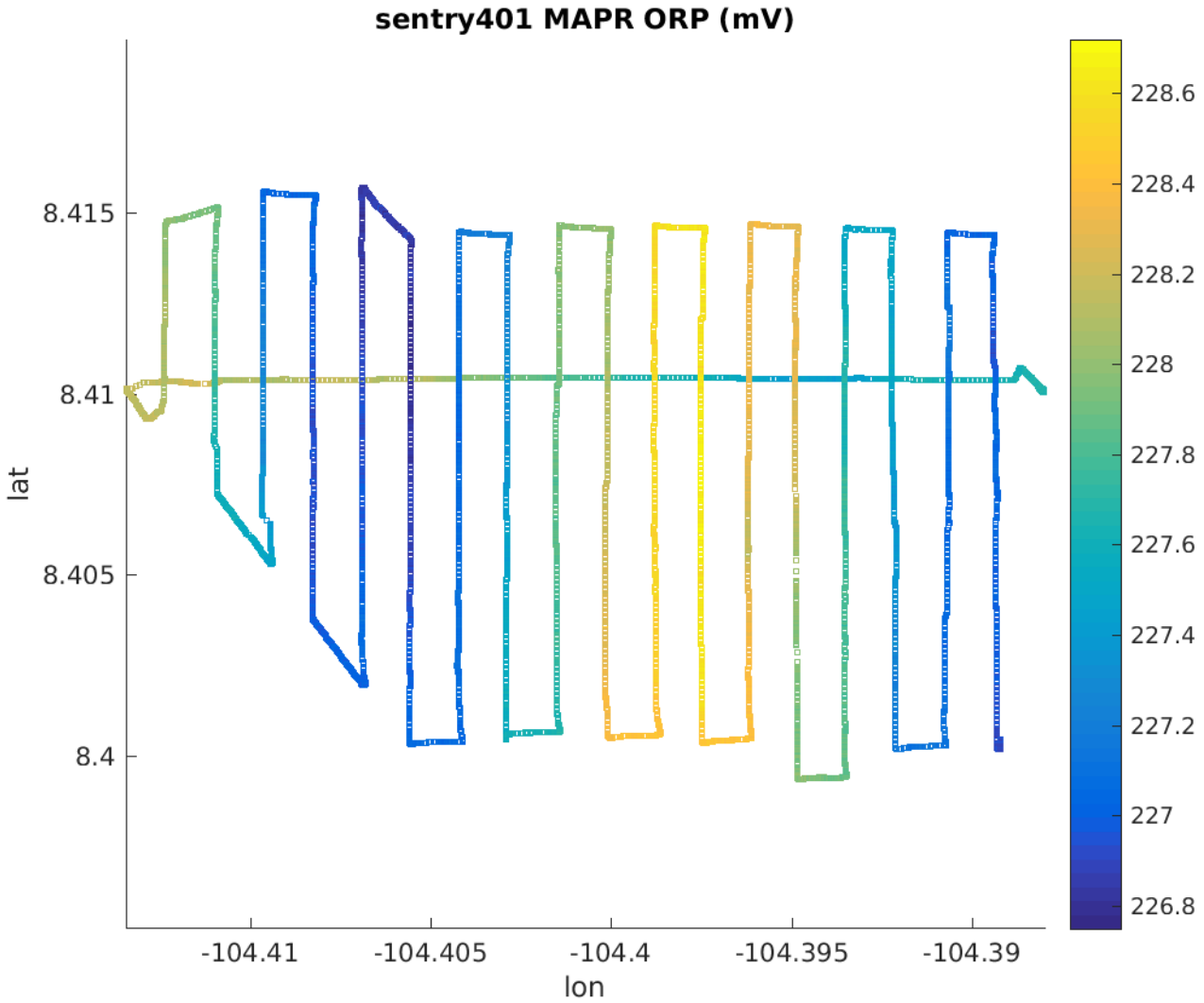


Figure 85: MAPR orp data during dive 401.

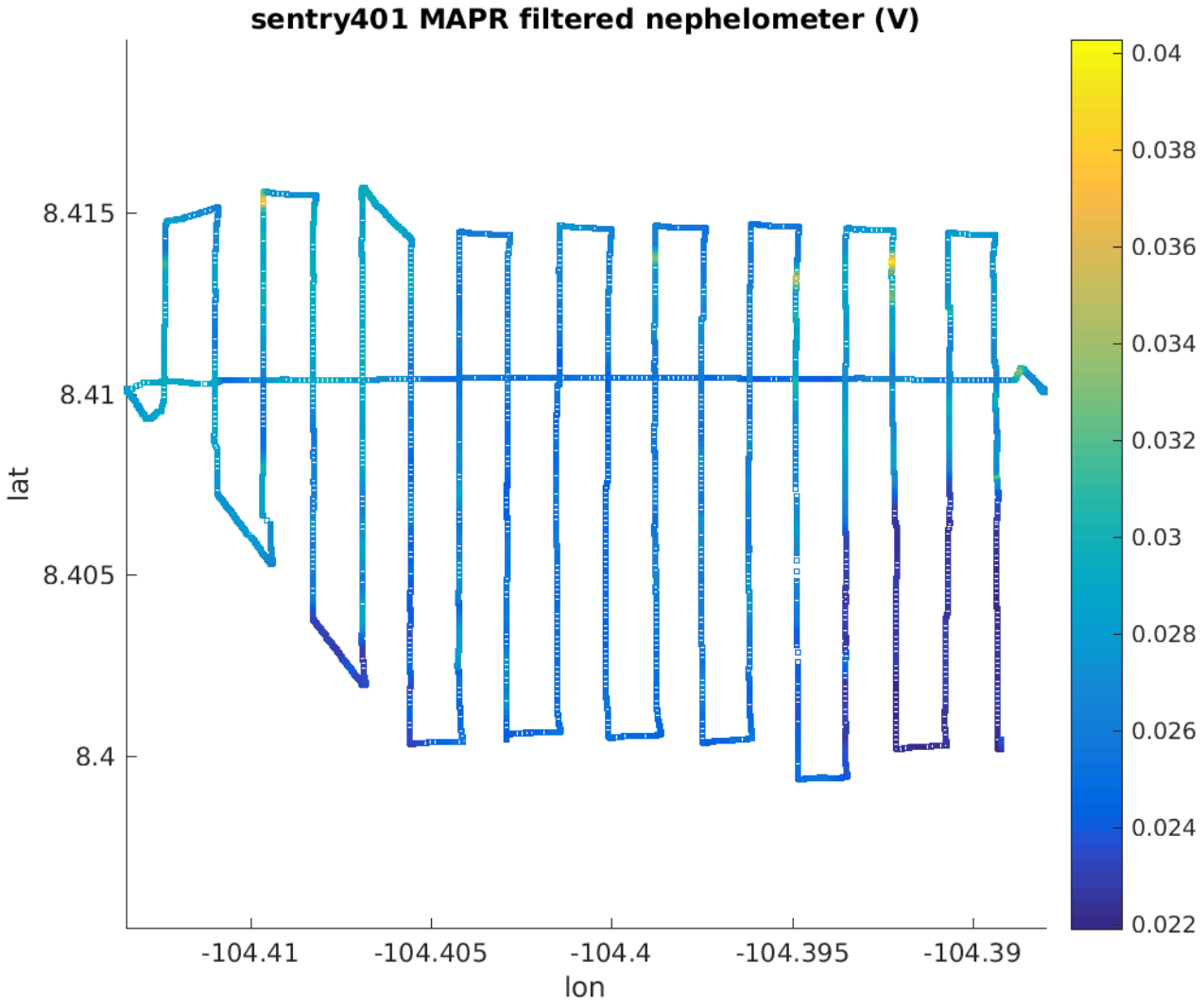


Figure 86: MAPR neph data during dive 401.

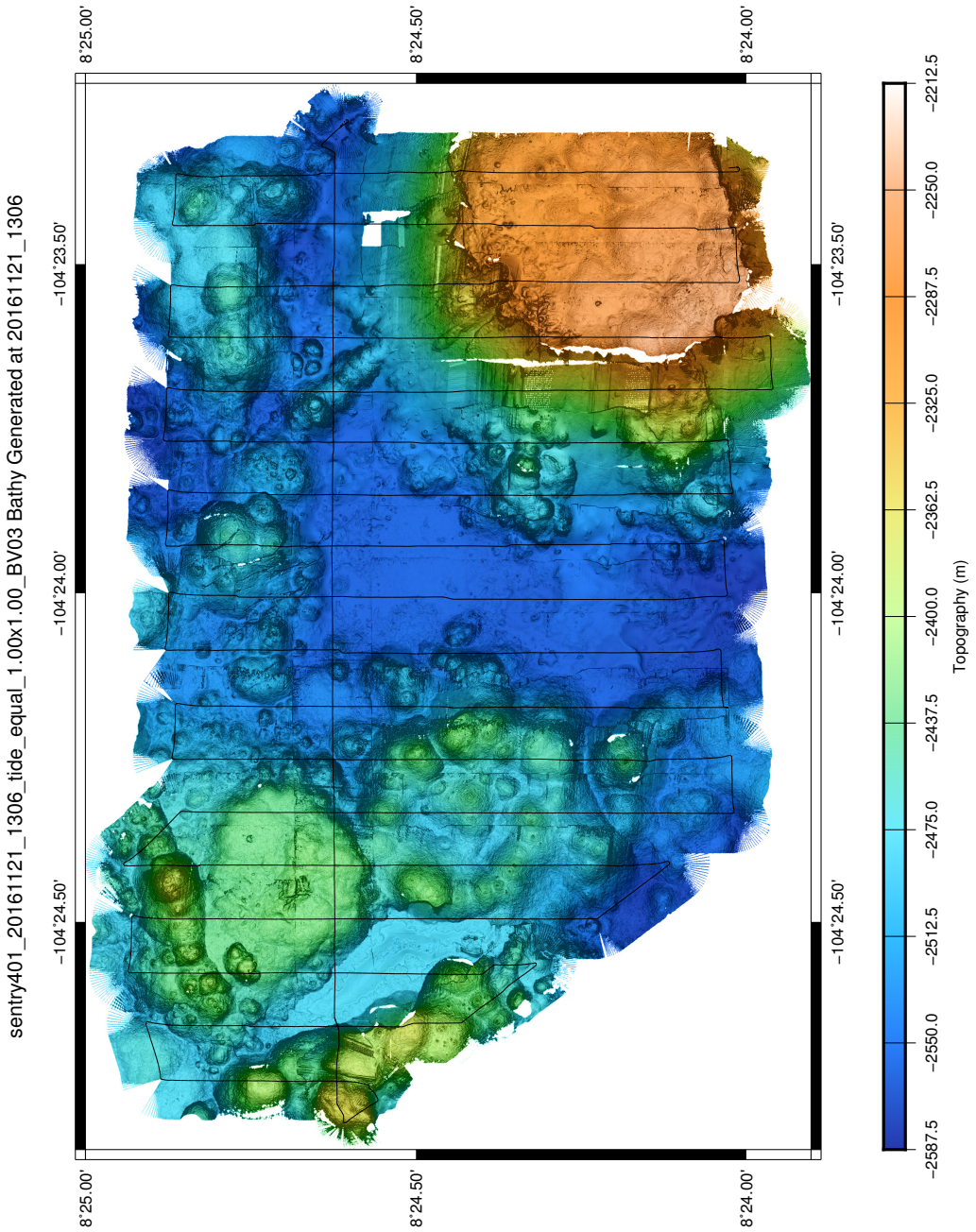


Figure 87: Processed multibeam data from dive 401 with navigation tracks.

Sentry 402 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately 1 to 3 ft for both launch and recovery and were not a factor in operations. Wind was 5 to 10 knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 17: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -104 -43

Launch Position: sentry402 launch position: 08 21.668'N 104 28.947'W

Narrative

Multibeam survey off axis running south east to north west survey lines capturing the seamount interface. Systems worked well. The second dredge of the night got stuck and delayed off bottom time by 10 minutes.

Issues

- None

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.17 sentry402 Summary

sentry402 Summary
Origin: 8.333333 -104.716667
Origin: 08 20.000'N 104 43.000'W
Launch: 2016/11/25 03:46:51
Survey start: 2016/11/25 05:08:29
Survey start: Lat:8.360663 Lon:-104.484680
Survey start: Lat:08 21.640'N Lon:104 29.081'W
Survey end: 2016/11/25 11:40:10
Survey end: Lat:8.357277 Lon:-104.484603
Survey end: Lat:08 21.437'N Lon:104 29.076'W
Ascent begins: 2016/11/25 11:40:10
On the surface: 2016/11/25 12:36:41
On deck: 2016/11/25 12:54:13
descent rate: 34.3 m/min
ascent rate: 49.6 m/min
survey time: 6.5 hours
deck-to-deck time 9.1 hours
Mean survey depth: 2718m
Mean survey height: 66m
distance travelled: 19.44km
average speed; 0.81m/s
average speed during photo runs: 0.25 m/s over 0.11 km
average speed during multibeam runs: 0.85 m/s over 19.40 km
total vertical during survey: 5198m
Battery energy at launch: 18.9 kwhr
Battery energy at survey end: 12.6 kwhr
Battery energy on deck: 12.3 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.18 sentry402 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161124_2332.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161124_2333.cfg
CTD	SBE 49	222		sbe49_20161124_2333.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161124_2332.cfg tim_20161124_2337.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

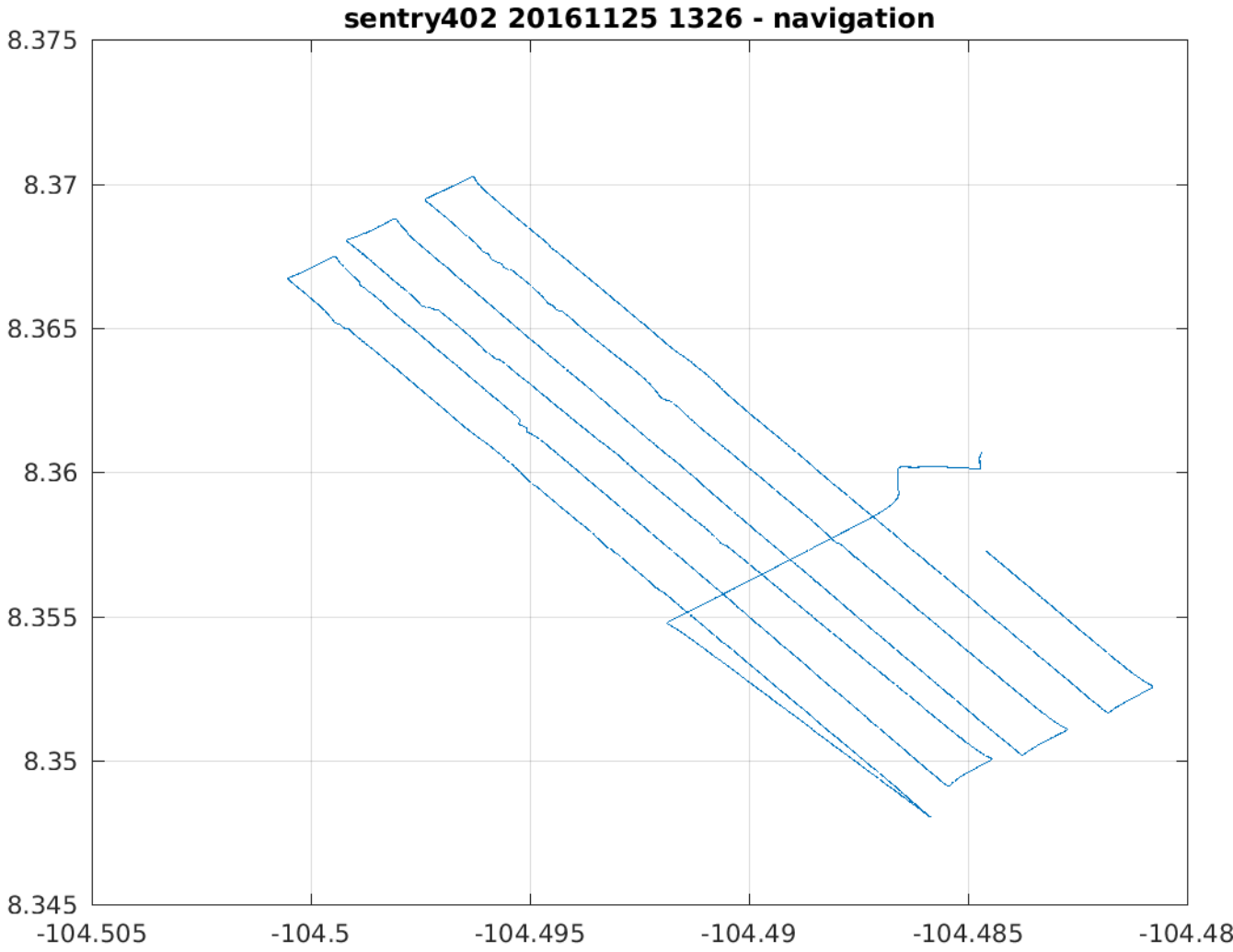


Figure 88: Latitude/Longitude plot of Sentry dive 402 based on post-processed navigation.

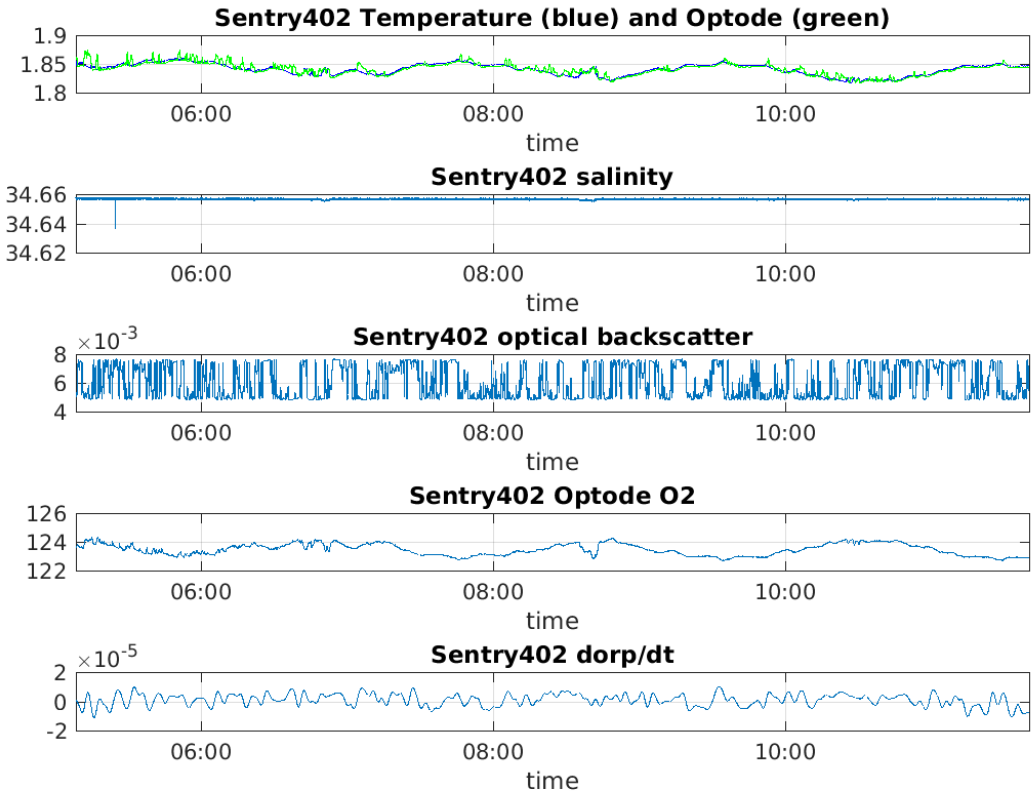


Figure 89: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

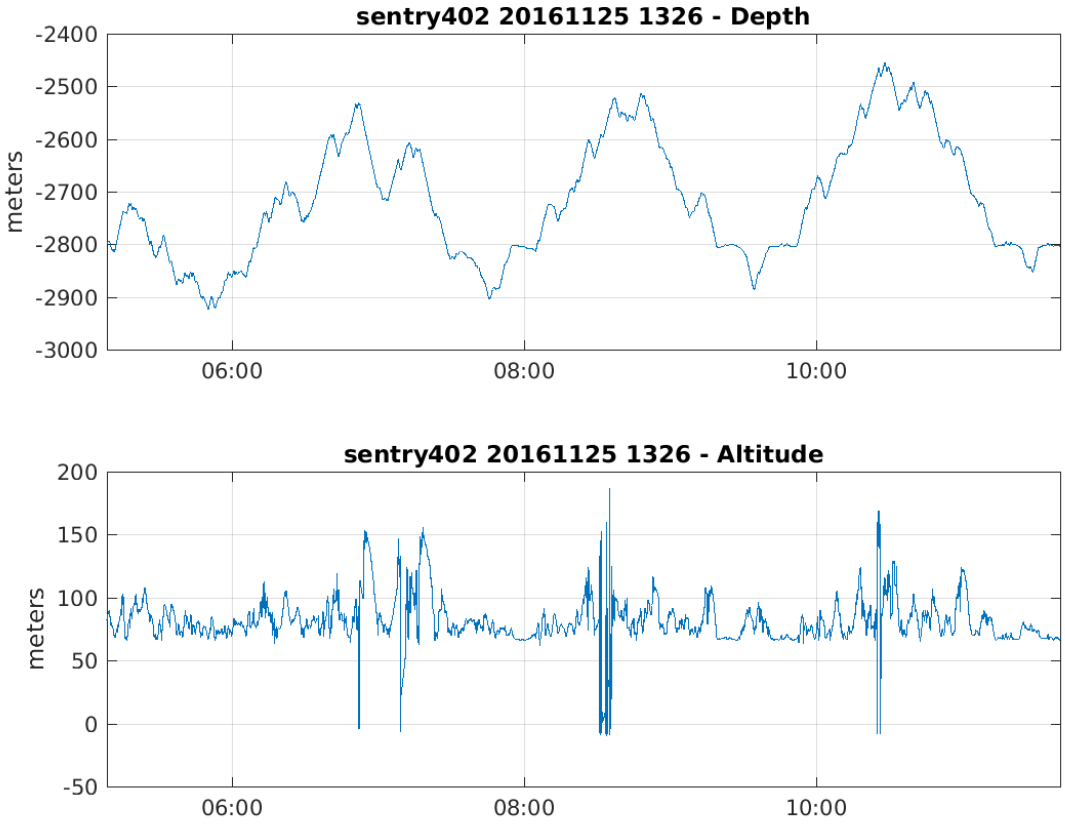


Figure 90: Depth and Altitude of Sentry during dive 402.

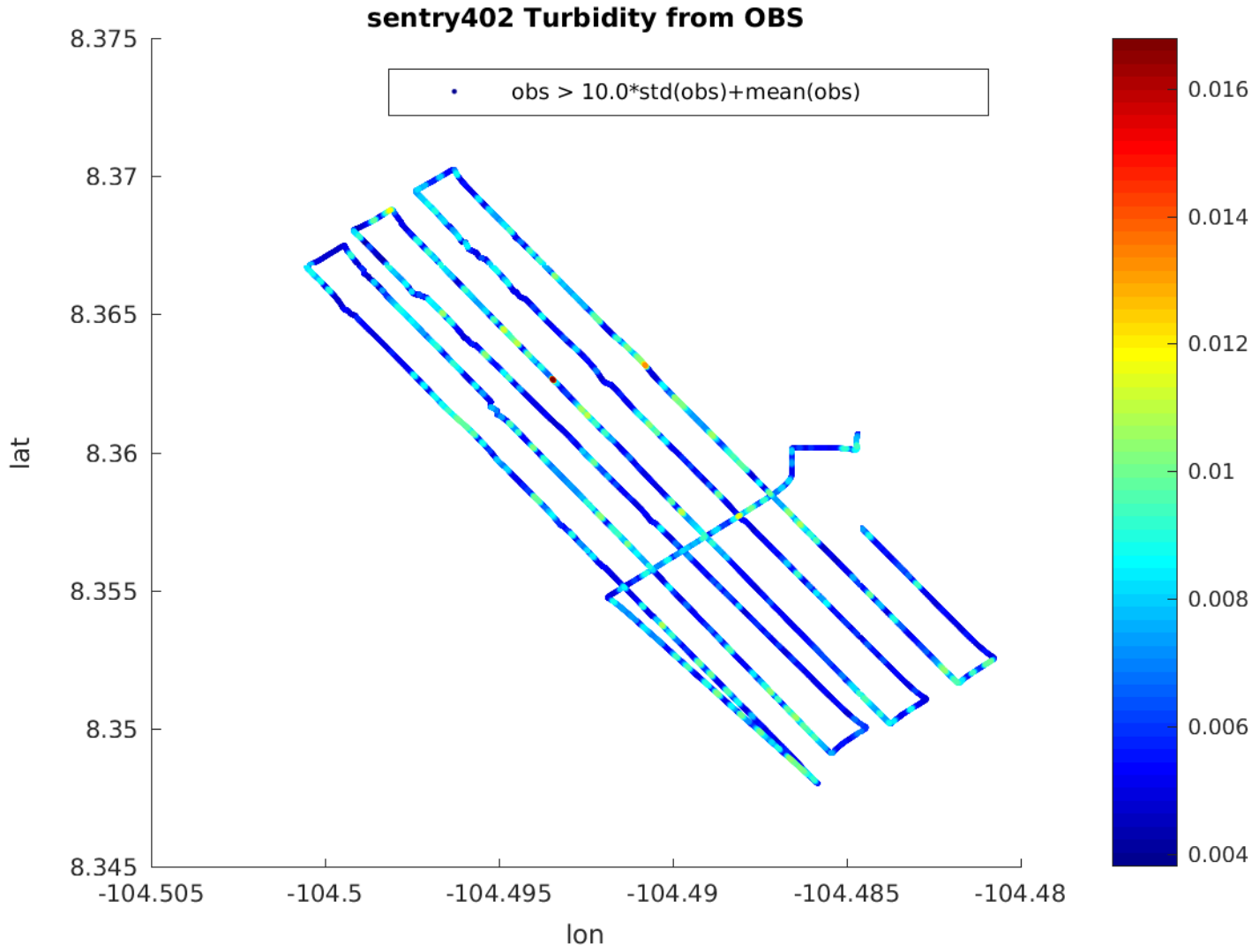


Figure 91: Optical backscatter on dive 402.

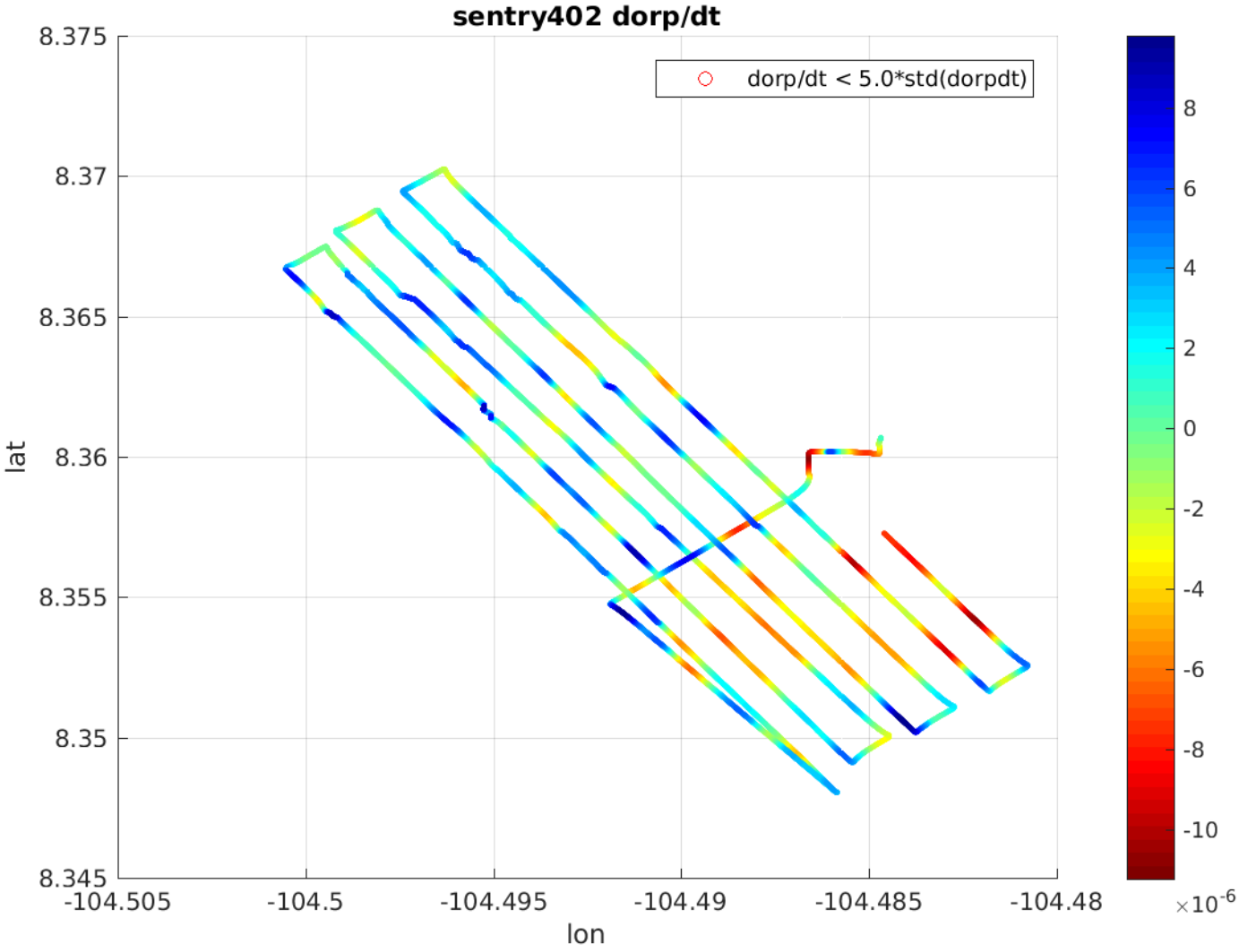


Figure 92: ORP sensor data during dive 402.

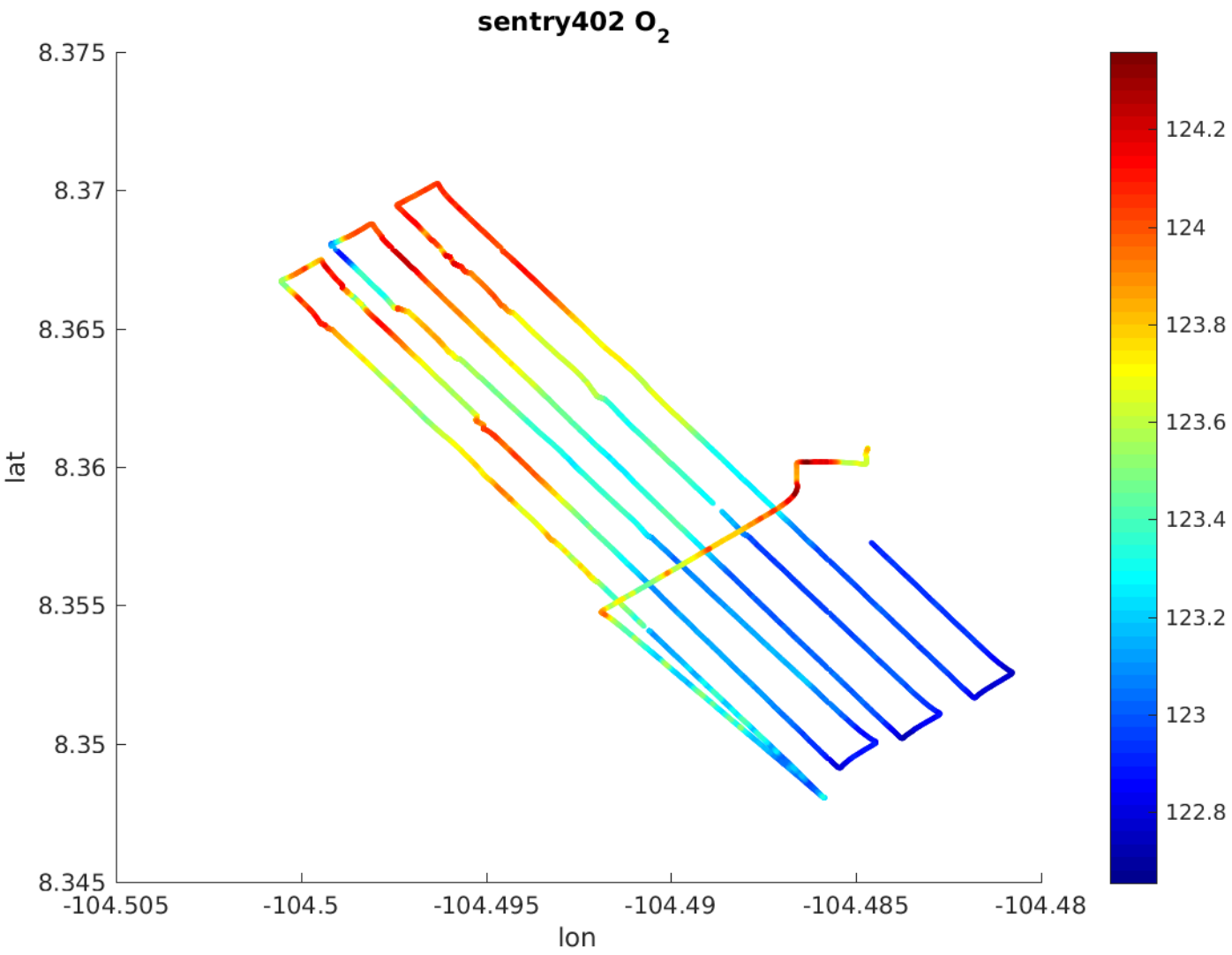


Figure 93: O2 sensor data during dive 402.

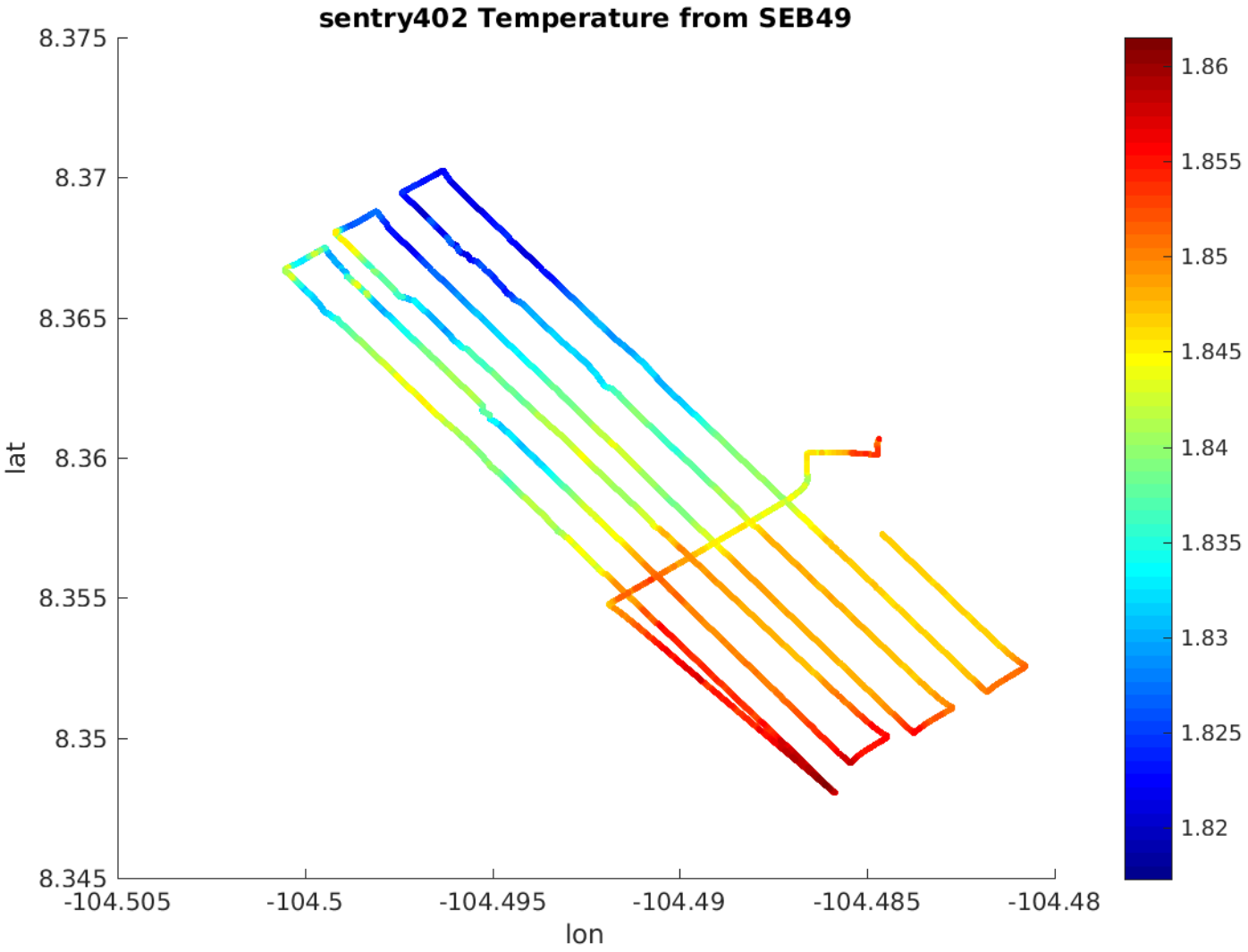


Figure 94: Temperature sensor data during dive 402.

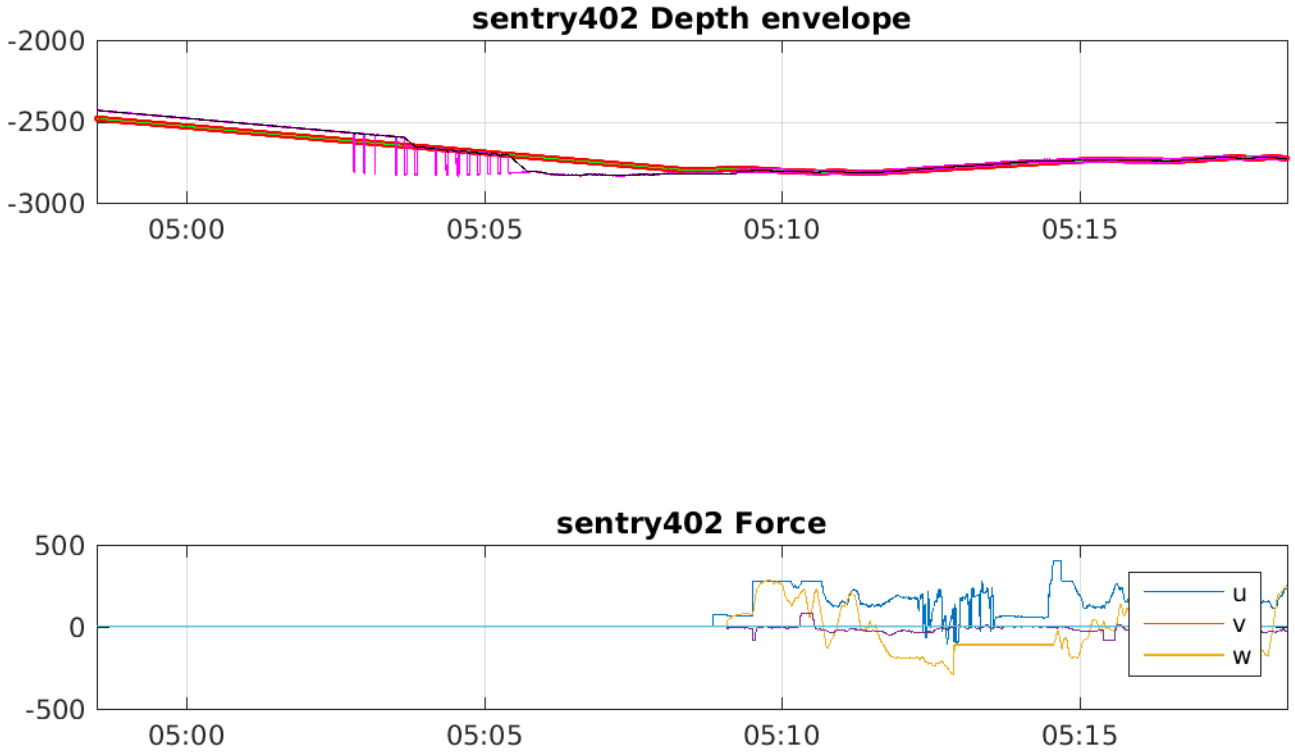


Figure 95: Bottom Approach for during dive 402.

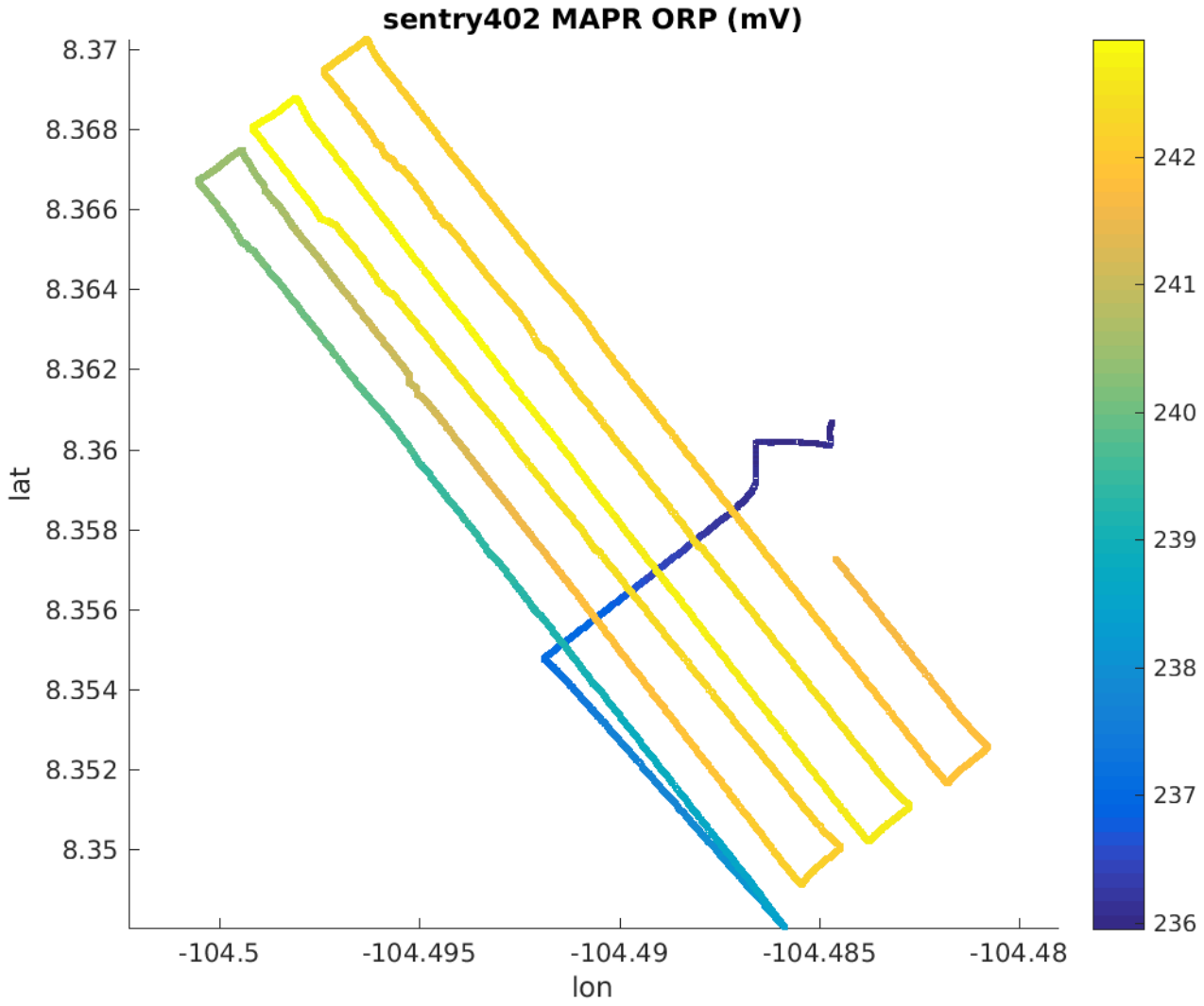


Figure 96: MAPR orp data during dive 402.

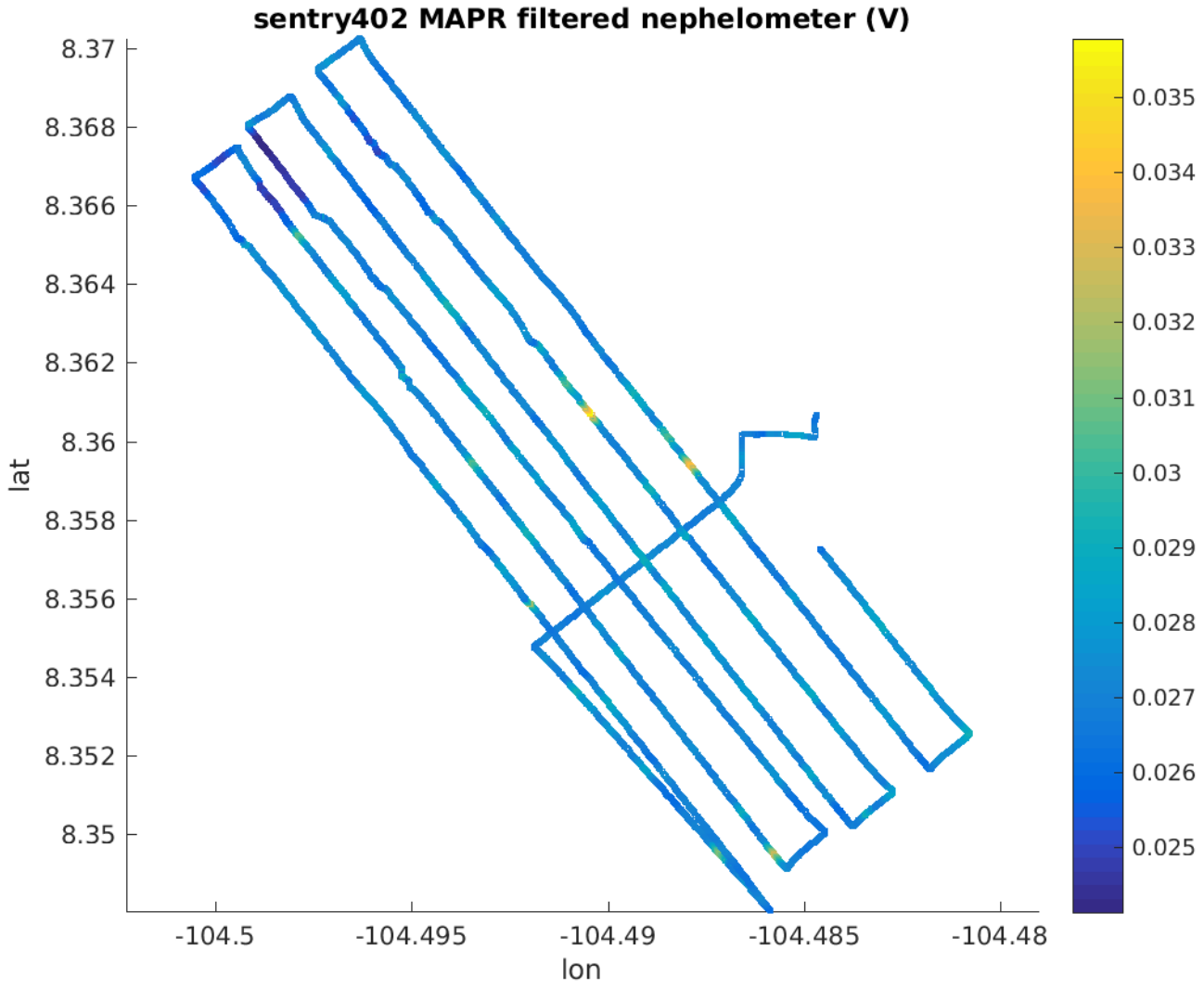


Figure 97: MAPR neph data during dive 402.

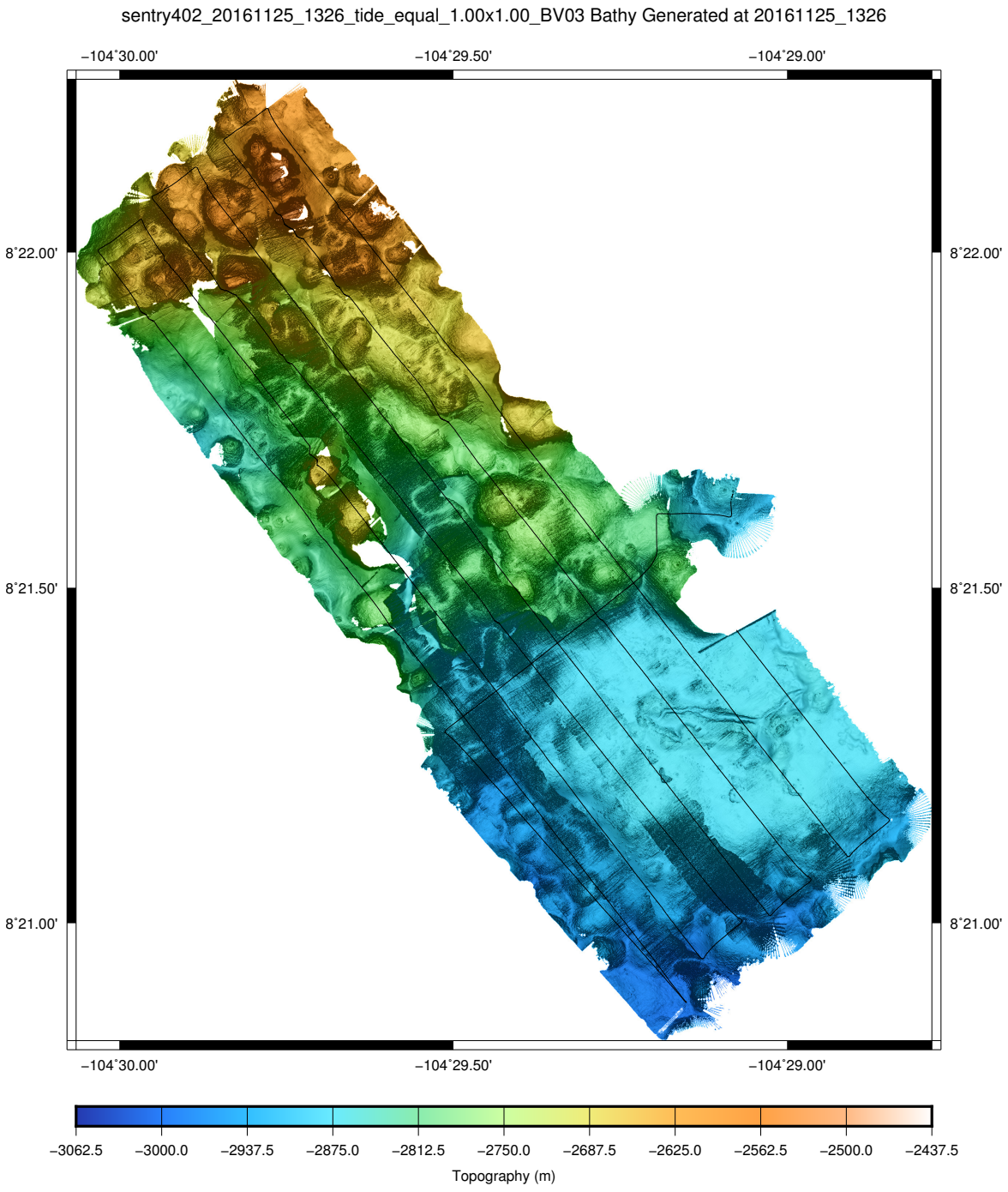


Figure 98: Processed multibeam data from dive 402 with navigation tracks.

Sentry 403 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately 1 to 3 ft for both launch and recovery and were not a factor in operations. Wind was 5 to 10 knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 18: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -105 -05

Launch Position: sentry403 launch position: 08 24.201'N 104 50.196'W

Narrative

Multibeam survey off axis on seamount. Two survey's were planned into this mission, the first completing most of the desired area, and the second covering the top of the seamount. The second survey did not complete due to time. Recovery was especially difficult due to the location of the sun with respect to the vehicle. Due to the reflection of the sun during the recovery, it was difficult to maintain visual contact. Overall the recovery took close to 45 minutes to complete. Additional help from science and crew in locating the vehicle was critical to successfully finding the vehicle in the sun.

Issues

- None

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.19 sentry403 Summary

sentry403 Summary
Origin: 8.333333 -105.083333
Origin: 08 20.000'N 105 5.000'W
Launch: 2016/11/26 03:48:17
Survey start: 2016/11/26 05:10:06
Survey start: Lat:8.403209 Lon:-104.838310
Survey start: Lat:08 24.193'N Lon:104 50.299'W
Survey end: 2016/11/26 13:23:03
Survey end: Lat:8.400259 Lon:-104.827378
Survey end: Lat:08 24.016'N Lon:104 49.643'W
Ascent begins: 2016/11/26 13:23:03
On the surface: 2016/11/26 14:12:02
On deck: 2016/11/26 15:13:03
descent rate: 34.1 m/min
ascent rate: 51.0 m/min
survey time: 8.2 hours
deck-to-deck time 11.4 hours
Mean survey depth: 2678m
Mean survey height: 67m
distance travelled: 22.55km
average speed; 0.76m/s
average speed during photo runs: NaN m/s over 0.00 km
average speed during multibeam runs: 0.77 m/s over 22.55 km
total vertical during survey: 8137m
Battery energy at launch: 19.8 kwhr
Battery energy at survey end: 12.3 kwhr
Battery energy on deck: 11.7 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.20 sentry403 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161125_2310.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161125_2310.cfg
CTD	SBE 49	222		sbe49_20161125_2311.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161125_2310.cfg tim_20161125_2315.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

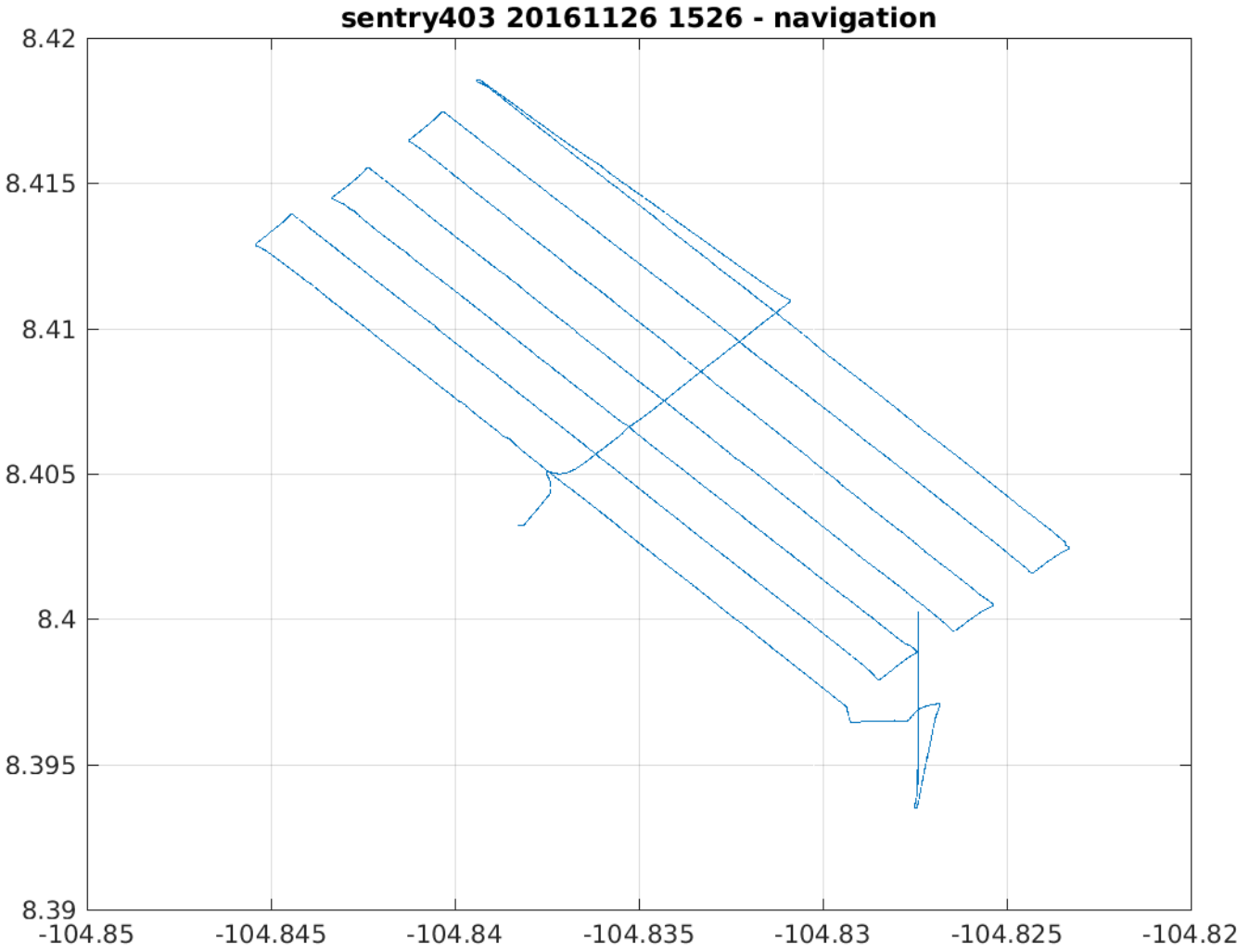


Figure 99: Latitude/Longitude plot of Sentry dive 403 based on post-processed navigation.

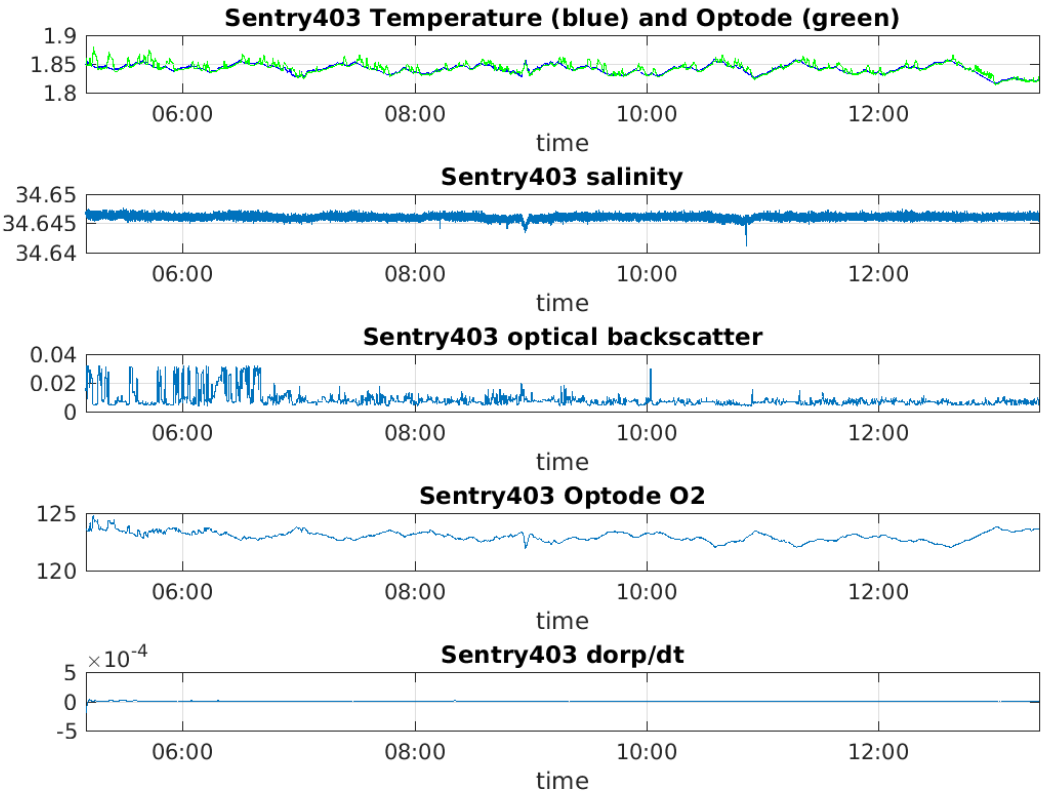


Figure 100: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

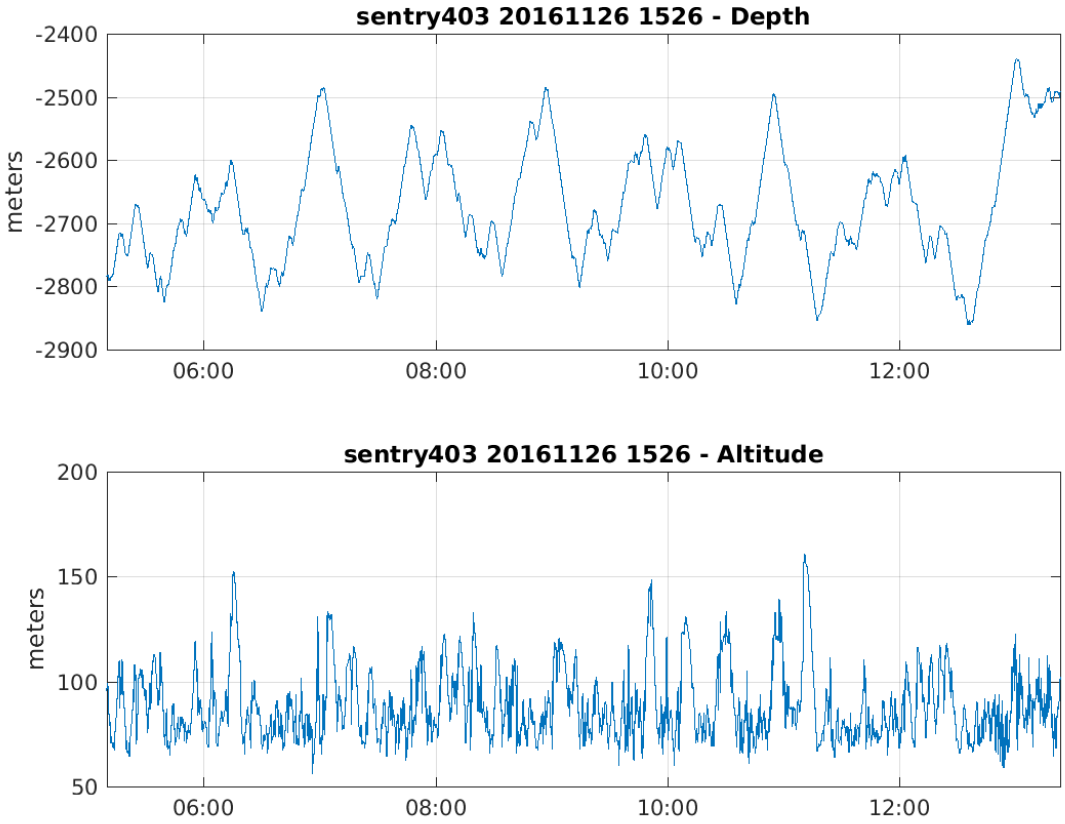


Figure 101: Depth and Altitude of Sentry during dive 403.

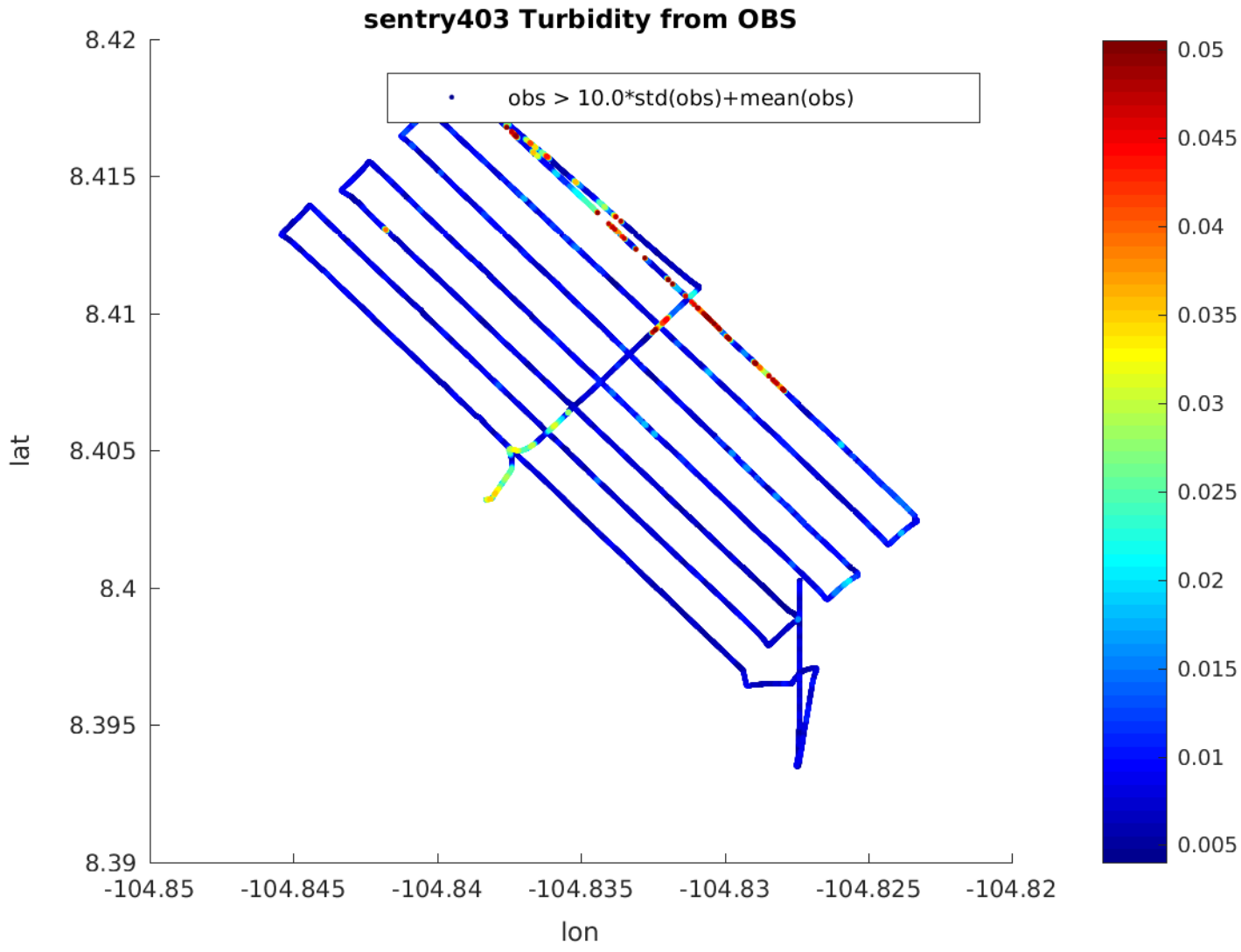


Figure 102: Optical backscatter on dive 403.

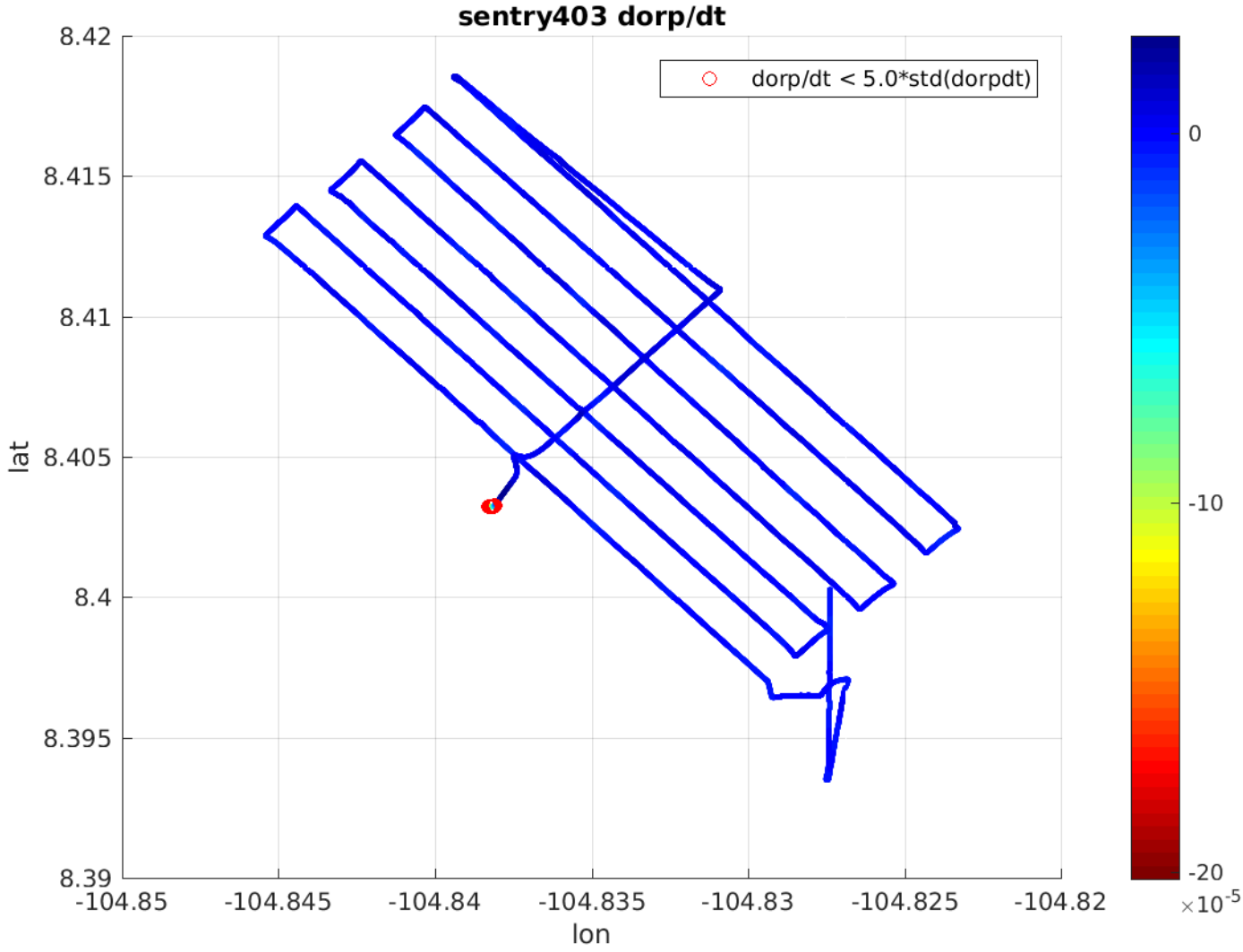


Figure 103: ORP sensor data during dive 403.

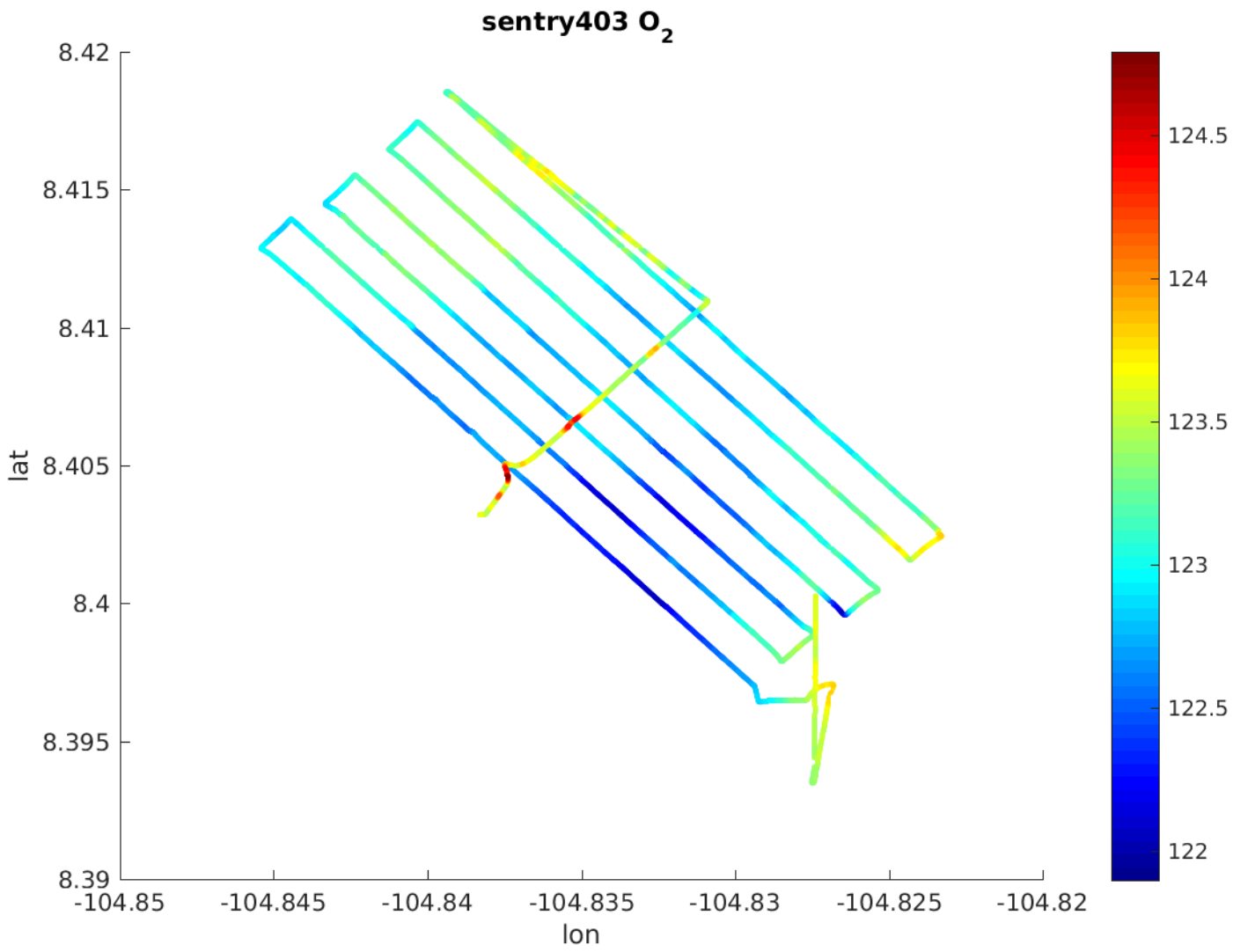


Figure 104: O2 sensor data during dive 403.

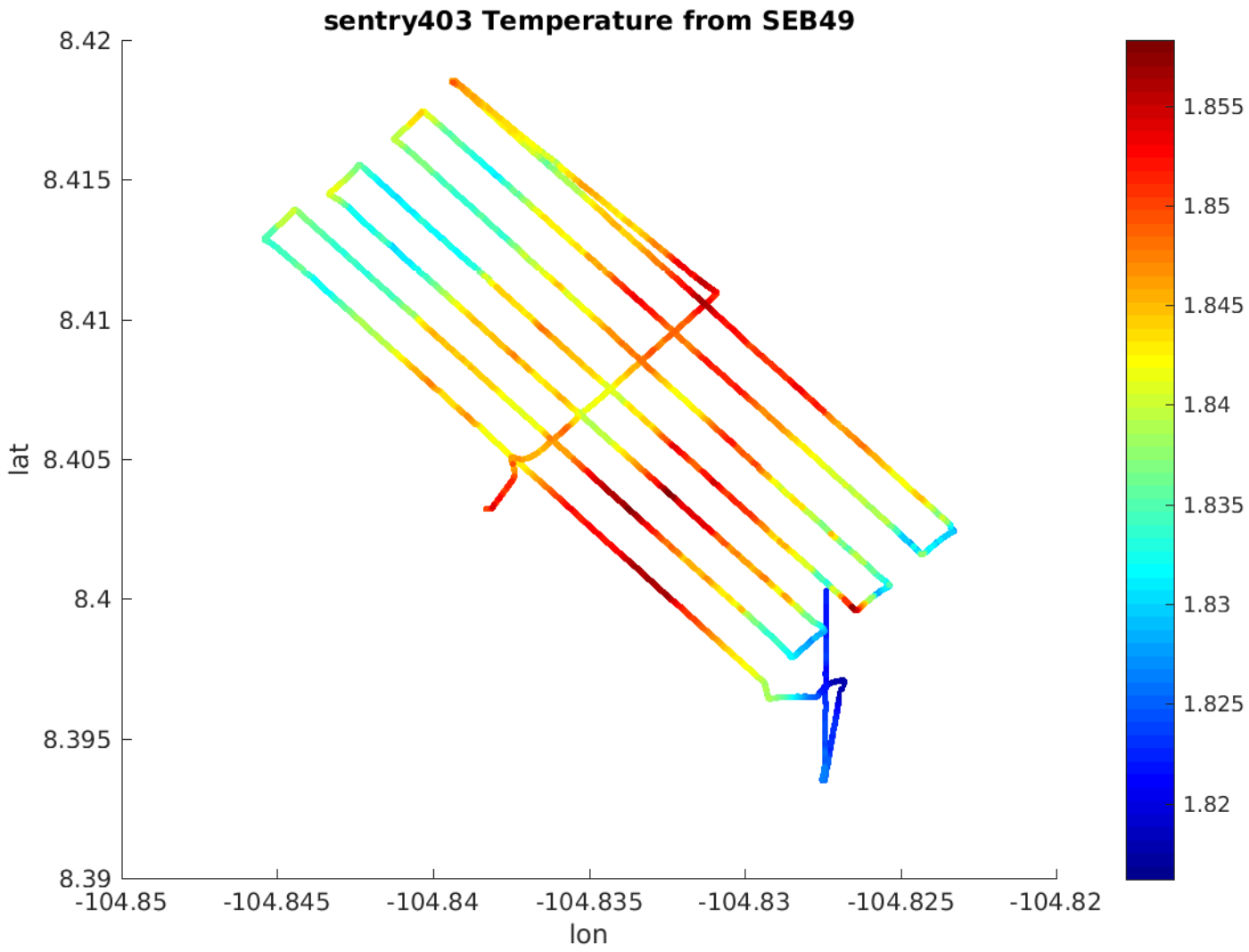


Figure 105: Temperature sensor data during dive 403.

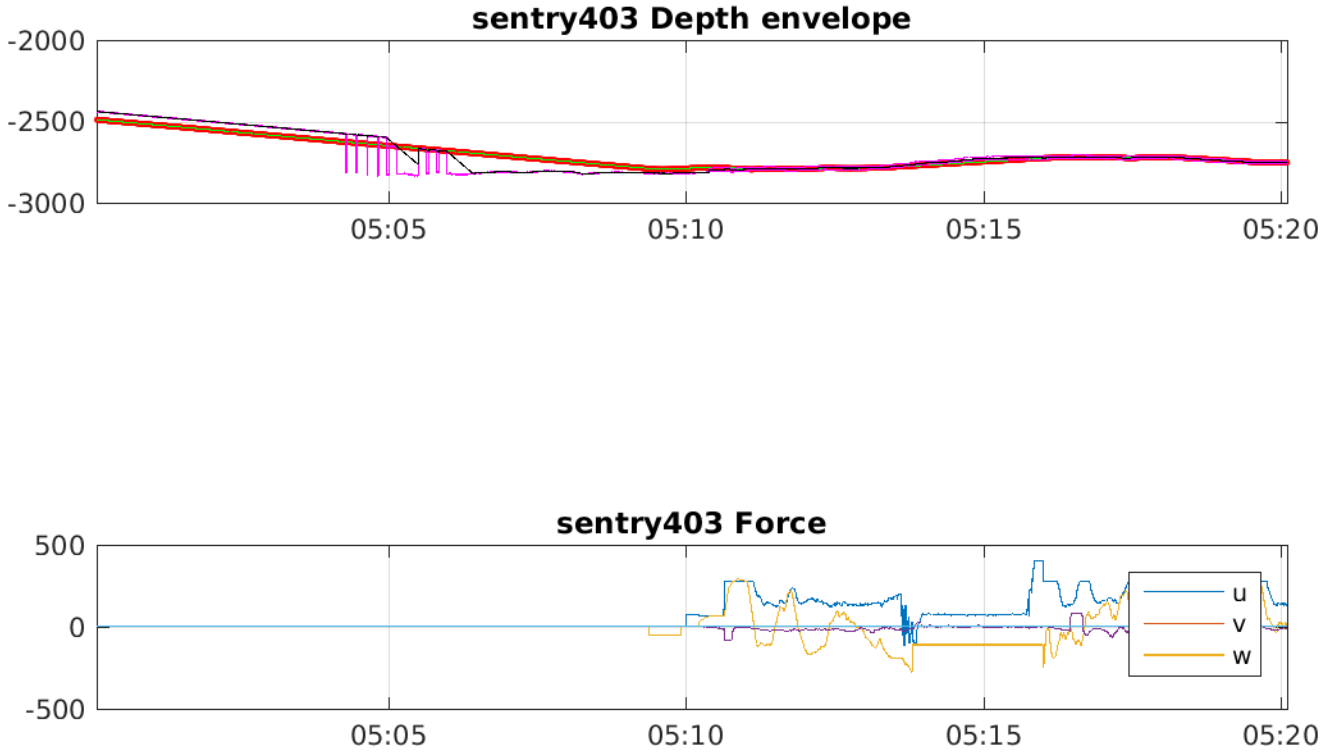


Figure 106: Bottom Approach for during dive 403.

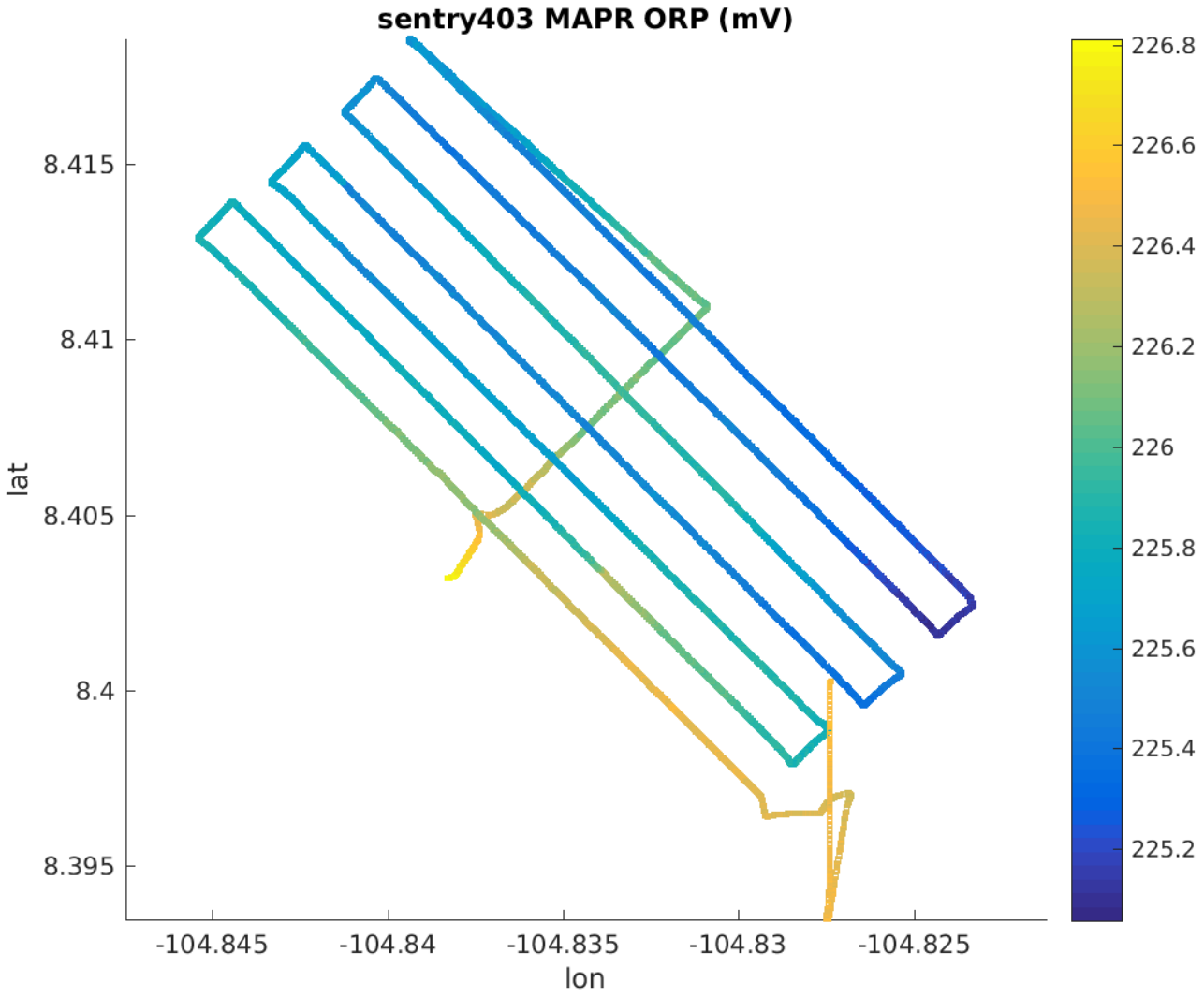


Figure 107: MAPR orp data during dive 403.

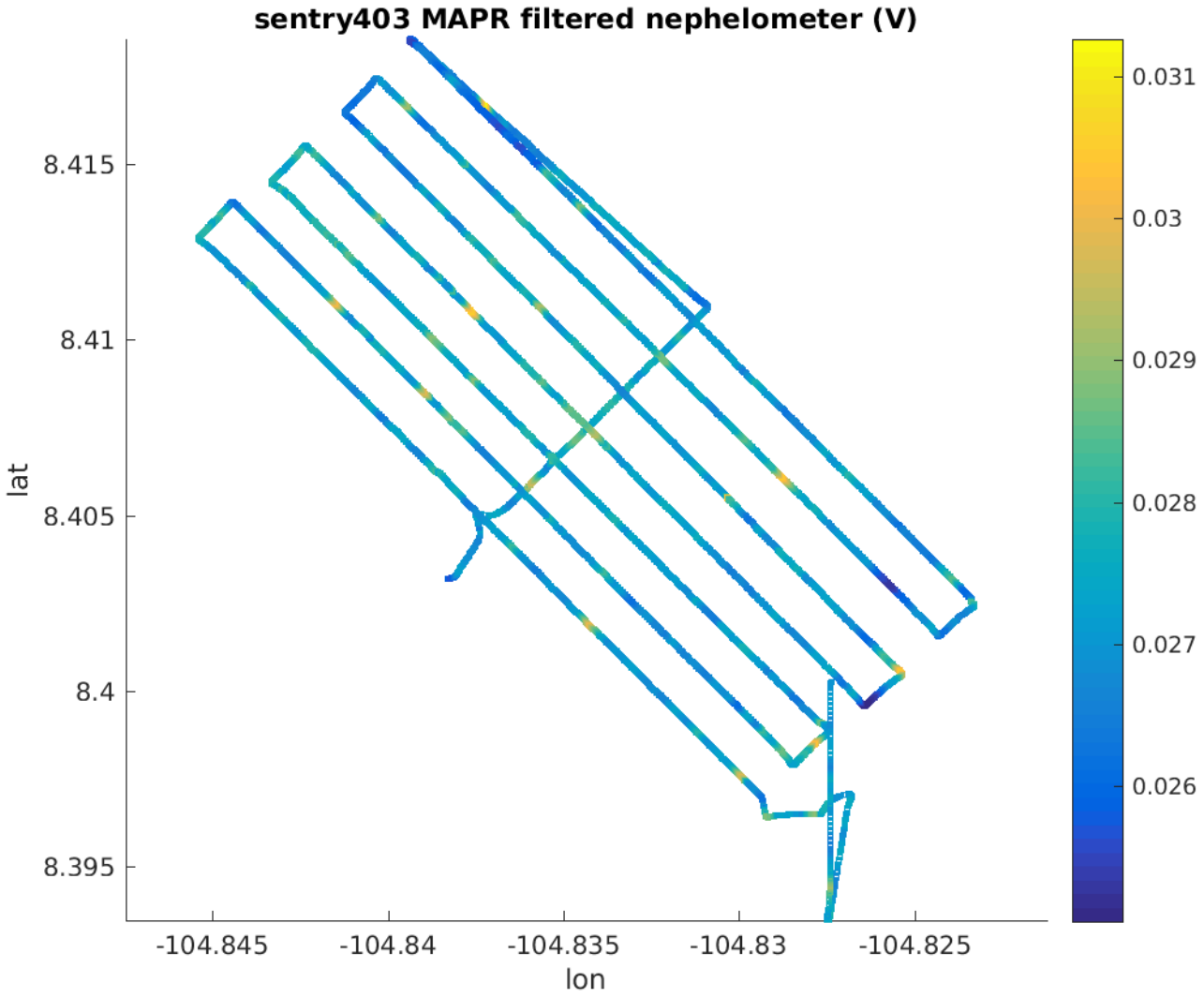


Figure 108: MAPR neph data during dive 403.

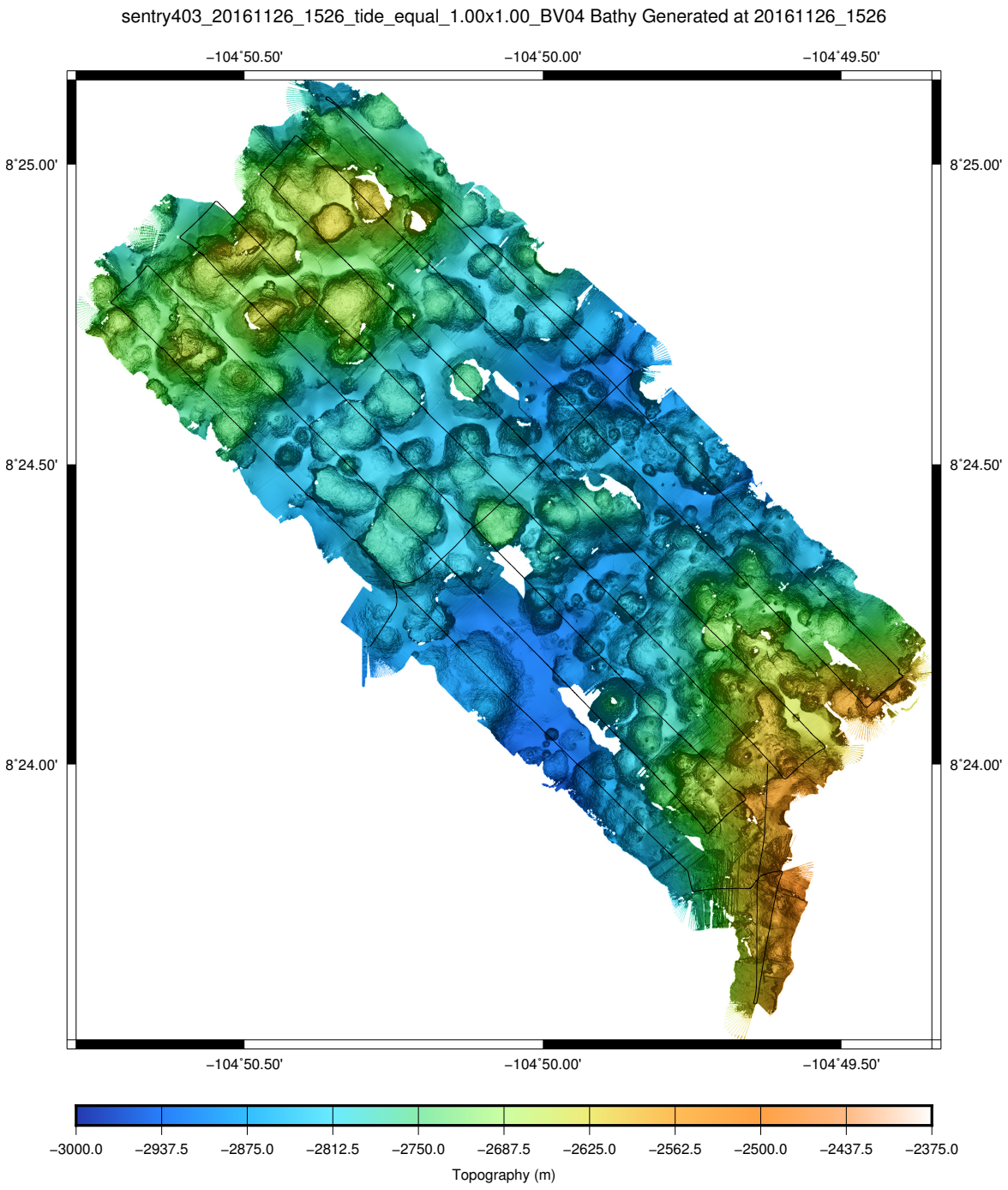


Figure 109: Processed multibeam data from dive 403 with navigation tracks.

Sentry 404 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately 1 to 3 ft for both launch and recovery and were not a factor in operations. Wind was 1 to 5 knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 19: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -105 -35

Launch Position: sentry404 launch position: 08 27.004'N 105 6.907'W

Narrative

Multibeam survey at Otto ridge, running east to west survey lines, capturing the top of the ridge and just west of the summit. Overall the dive went well, Sentry was out of USBL tracking on the north western area of the survey due to the dredge location.

Issues

- None

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.21 sentry404 Summary

sentry404 Summary
Origin: 8.333333 -105.583333
Origin: 08 20.000'N 105 35.000'W
Launch: 2016/11/27 00:51:24
Survey start: 2016/11/27 02:02:23
Survey start: Lat:8.450889 Lon:-105.117063
Survey start: Lat:08 27.053'N Lon:105 7.024'W
Survey end: 2016/11/27 11:32:19
Survey end: Lat:8.448117 Lon:-105.117839
Survey end: Lat:08 26.887'N Lon:105 7.070'W
Ascent begins: 2016/11/27 11:32:19
On the surface: 2016/11/27 12:20:22
On deck: 2016/11/27 12:33:17
descent rate: 34.5 m/min
ascent rate: 50.8 m/min
survey time: 9.5 hours
deck-to-deck time 11.7 hours
Mean survey depth: 2464m
Mean survey height: 67m
distance travelled: 26.36km
average speed; 0.76m/s
average speed during photo runs: 0.64 m/s over 1.31 km
average speed during multibeam runs: 0.80 m/s over 26.27 km
total vertical during survey: 9318m
Battery energy at launch: 19.0 kwhr
Battery energy at survey end: 10.3 kwhr
Battery energy on deck: 10.1 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.22 sentry404 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161126_2243.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161126_2243.cfg
CTD	SBE 49	222		sbe49_20161126_2243.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161126_2243.cfg tim_20161126_2248.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

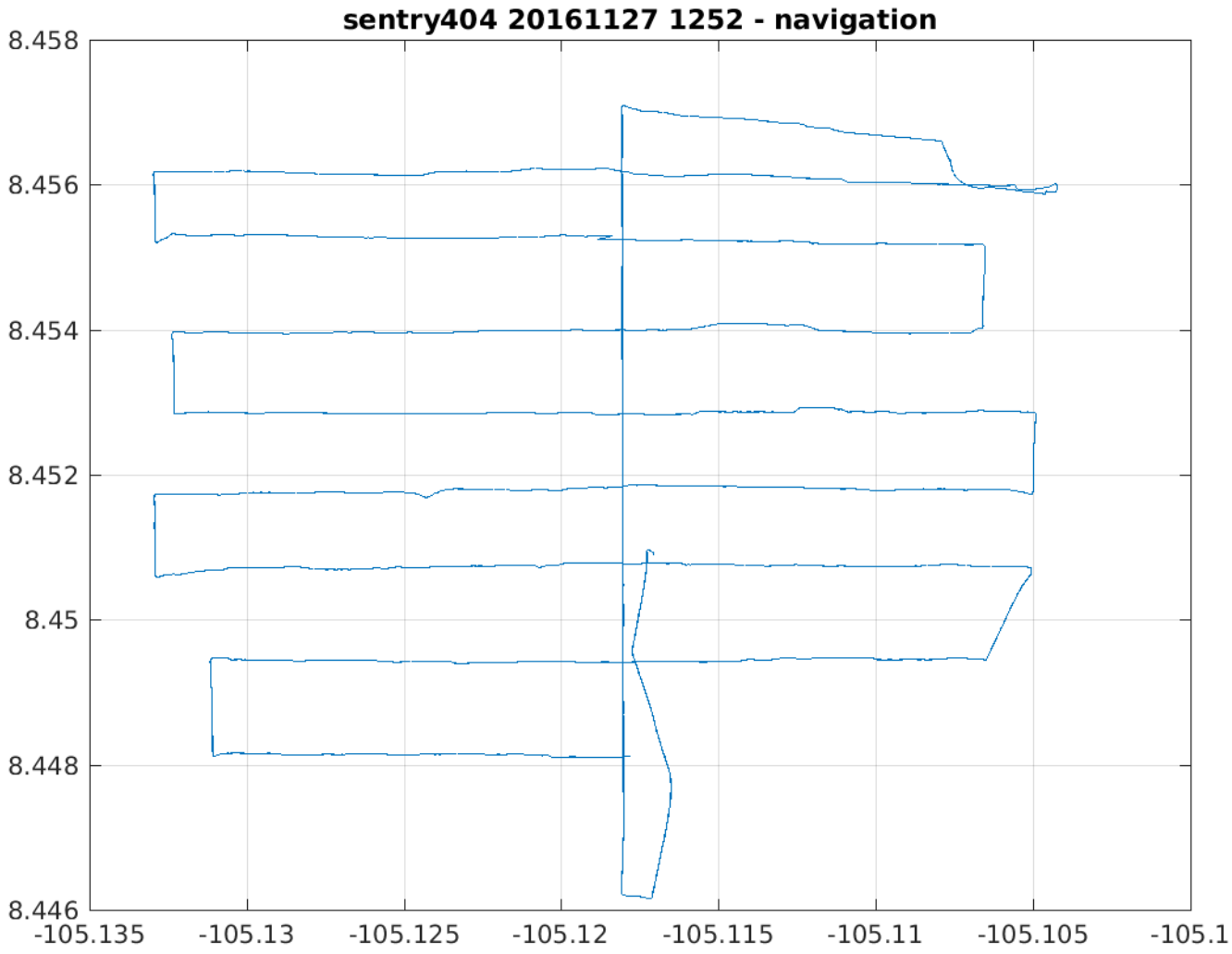


Figure 110: Latitude/Longitude plot of Sentry dive 404 based on post-processed navigation.

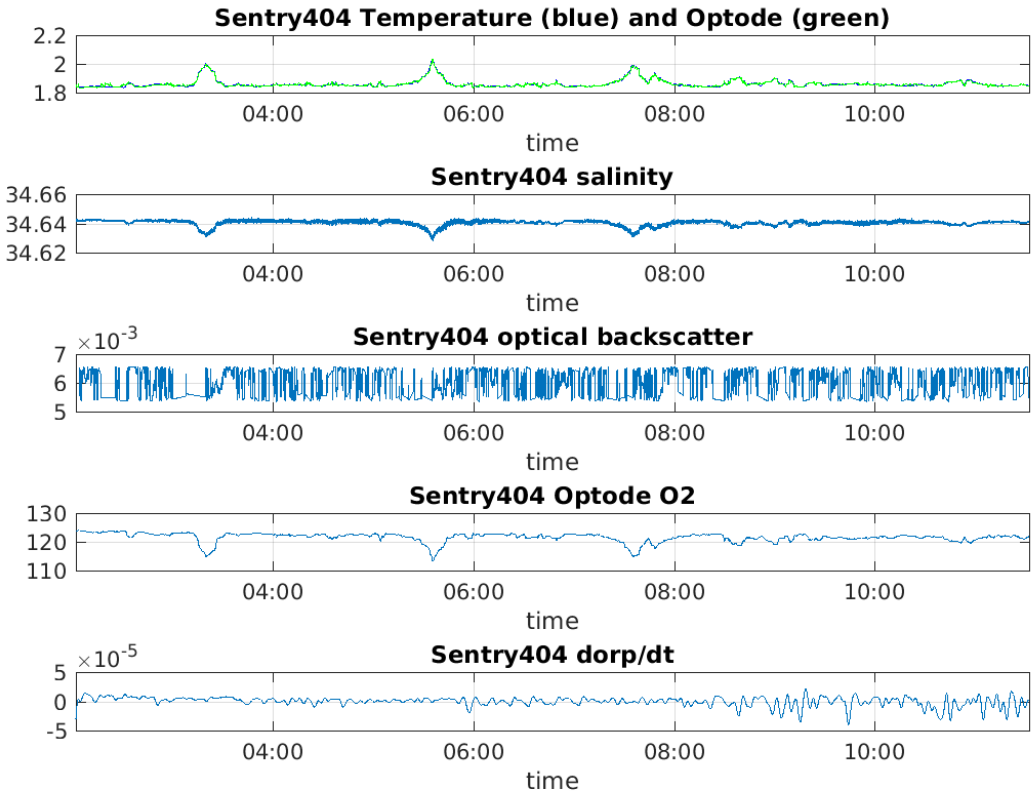


Figure 111: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

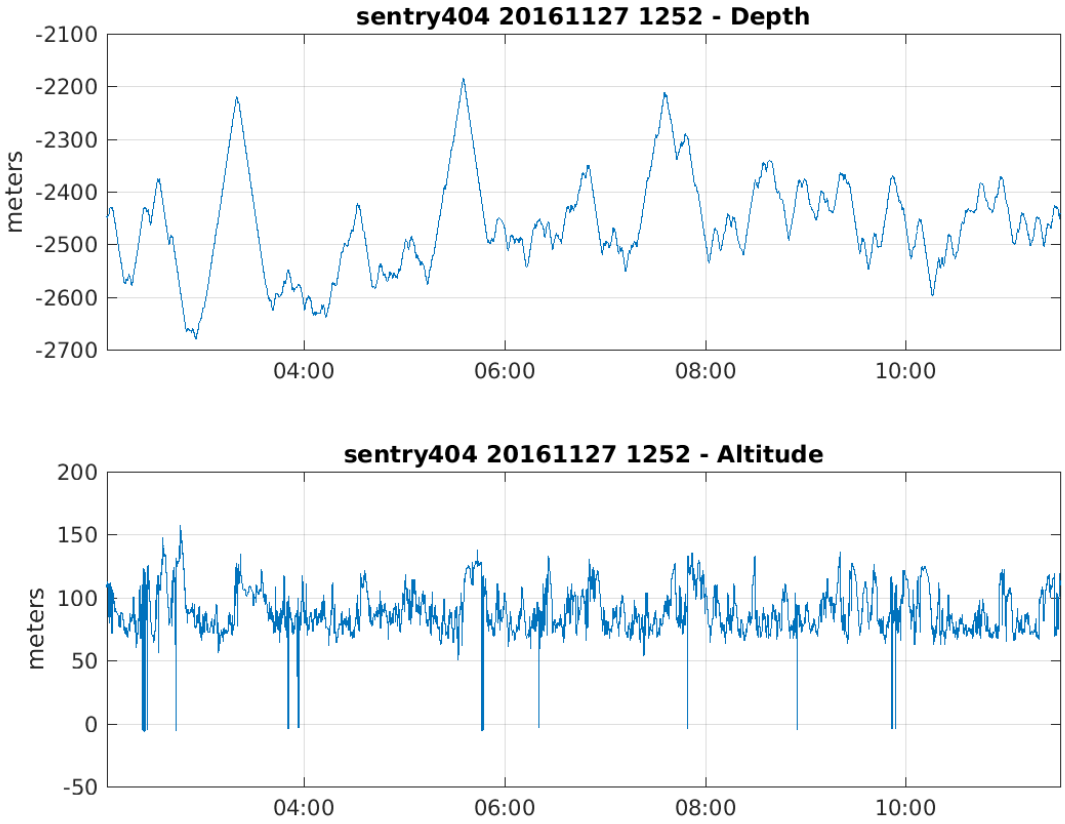


Figure 112: Depth and Altitude of Sentry during dive 404.

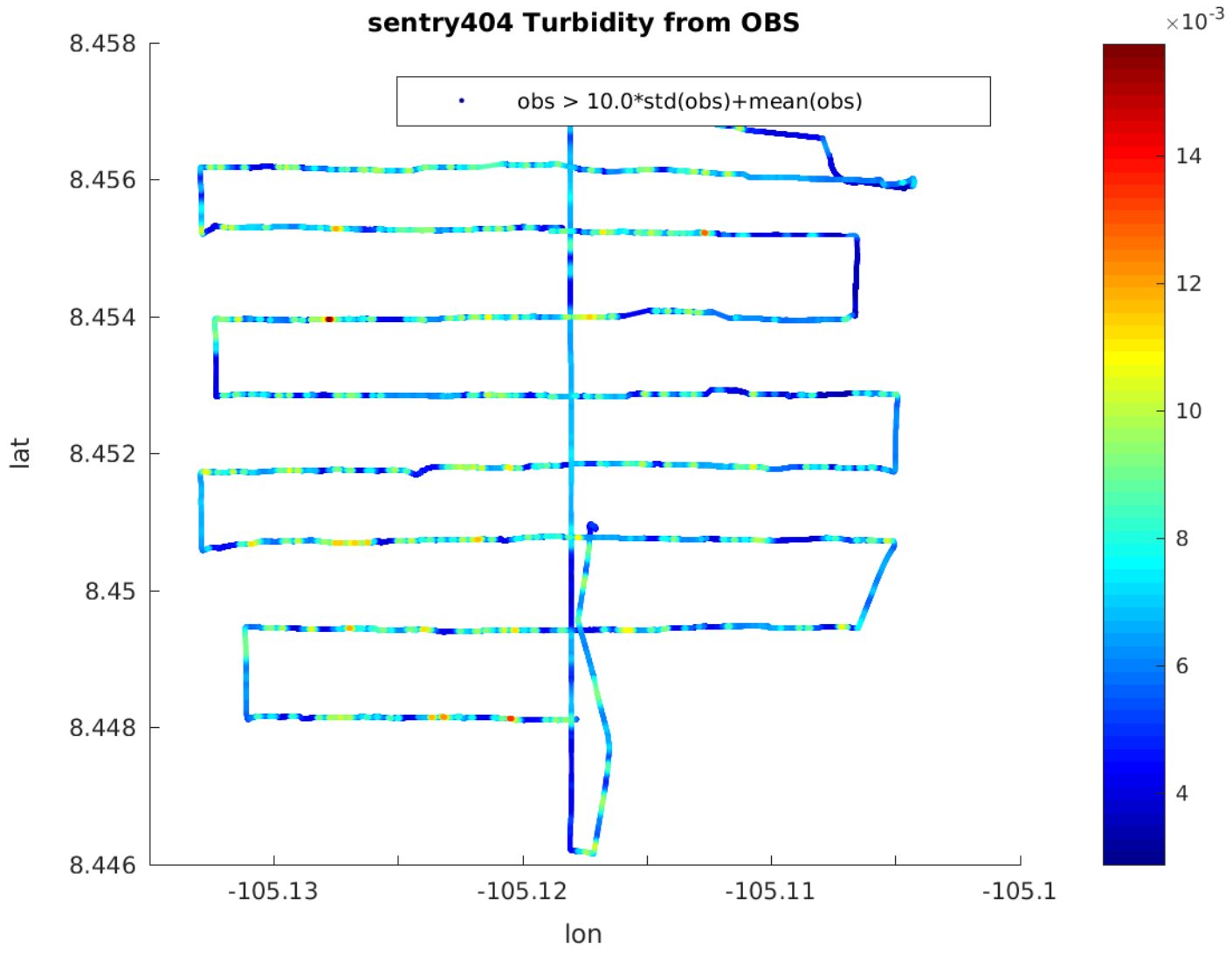


Figure 113: Optical backscatter on dive 404.

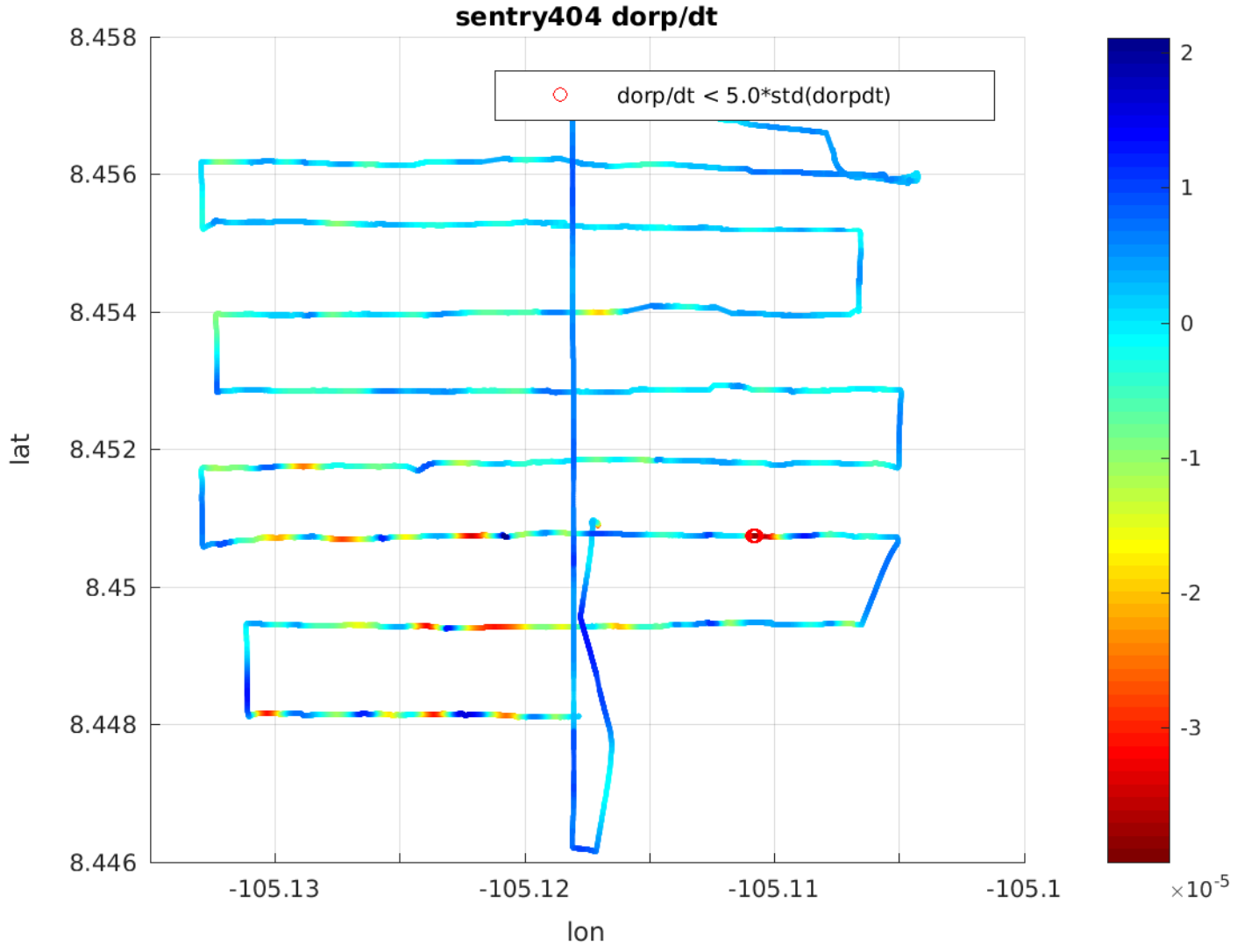


Figure 114: ORP sensor data during dive 404.

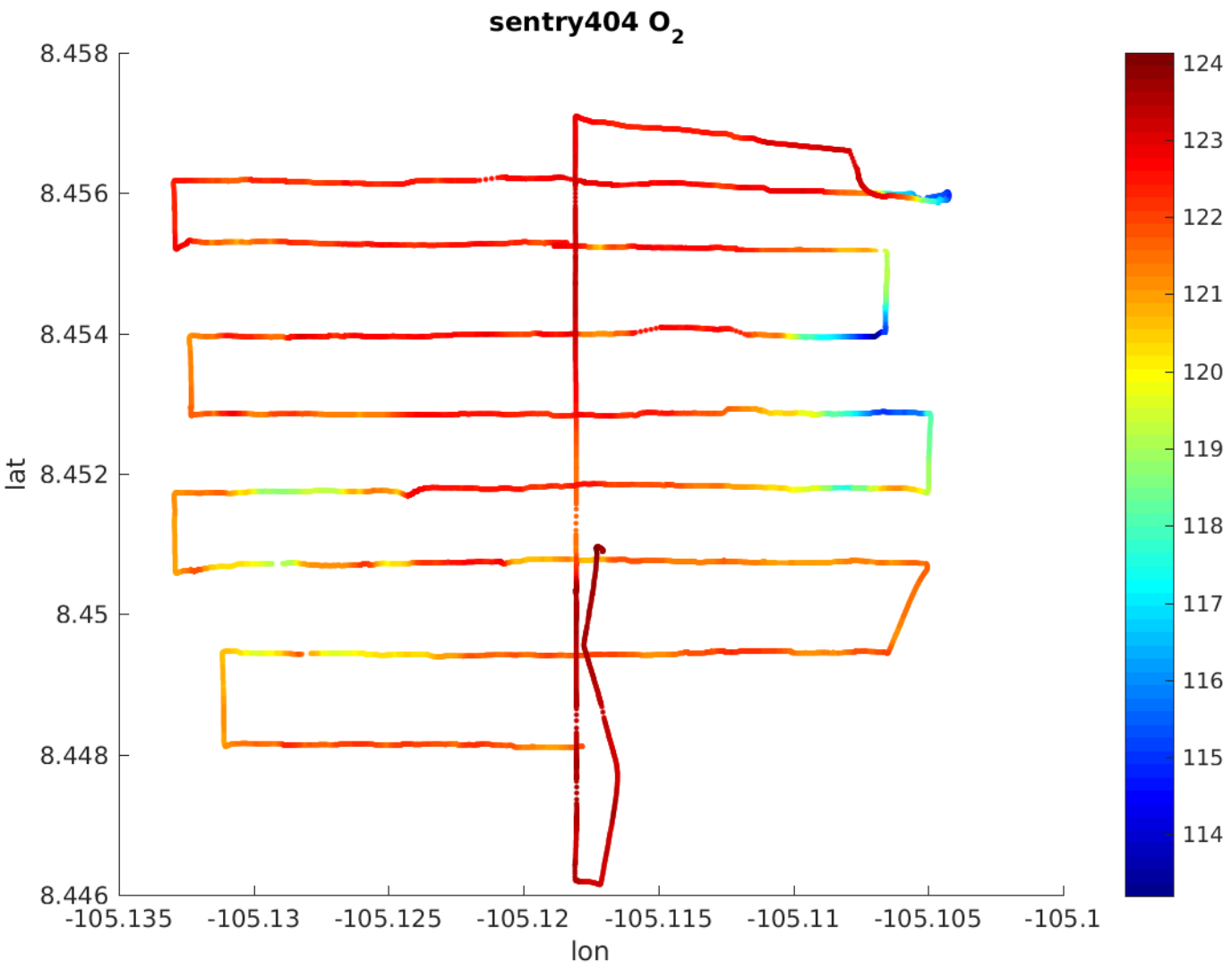


Figure 115: O2 sensor data during dive 404.

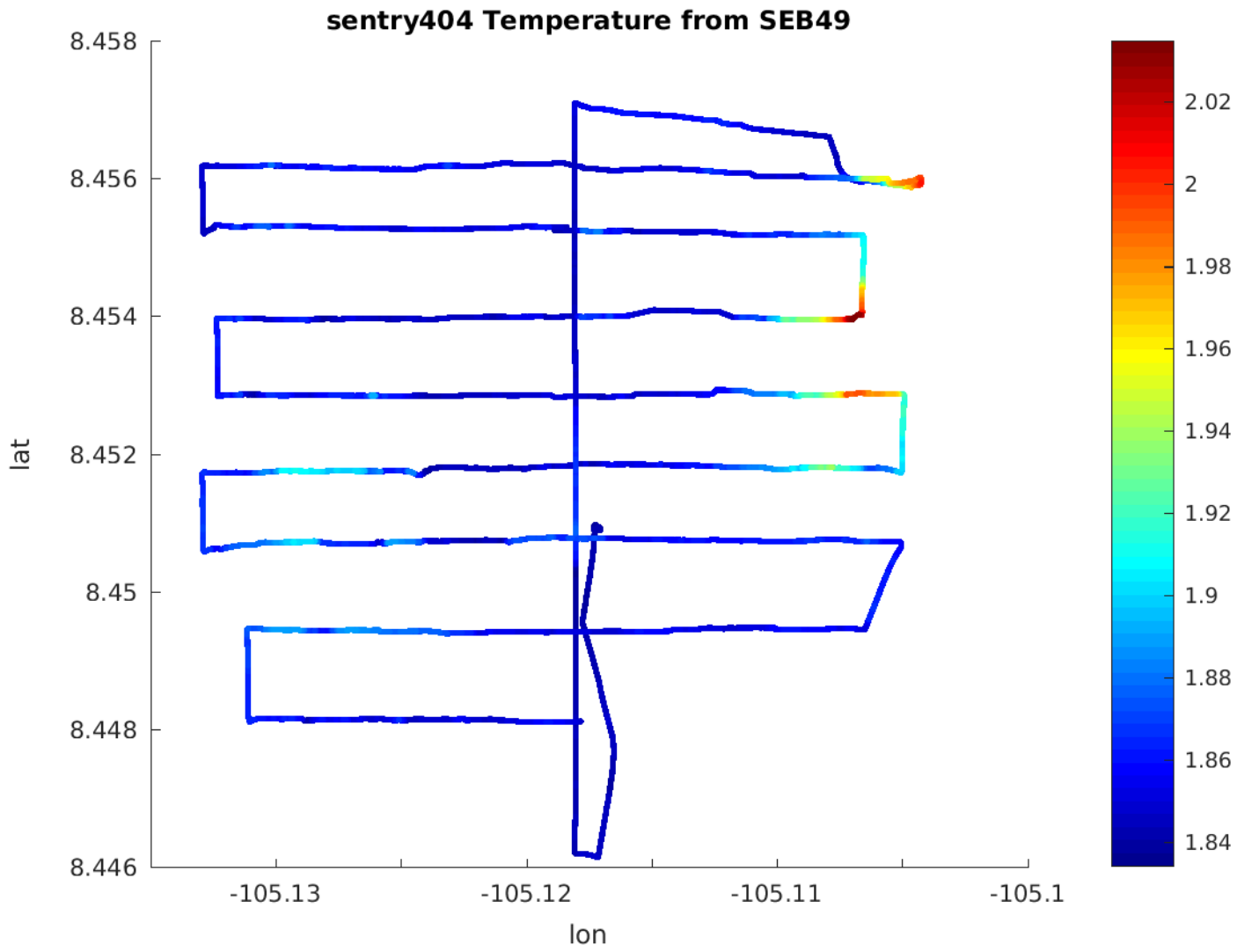


Figure 116: Temperature sensor data during dive 404.

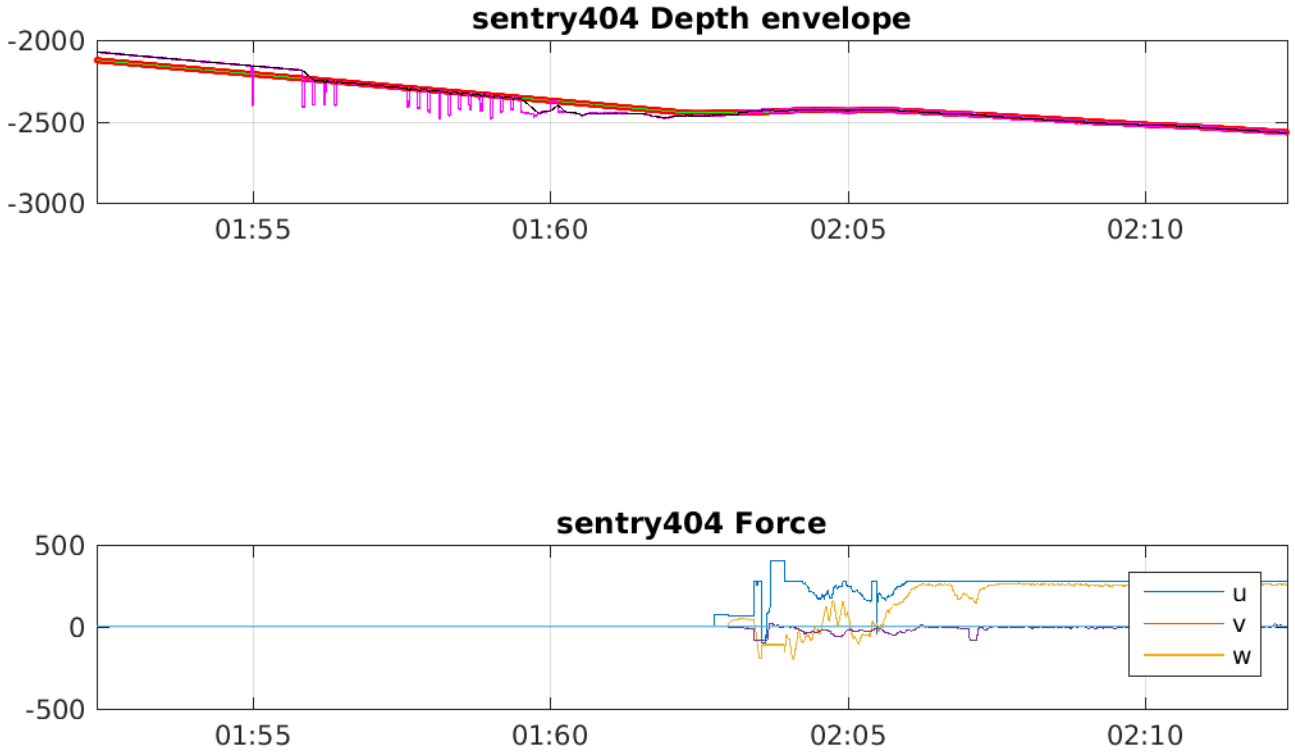


Figure 117: Bottom Approach for during dive 404.

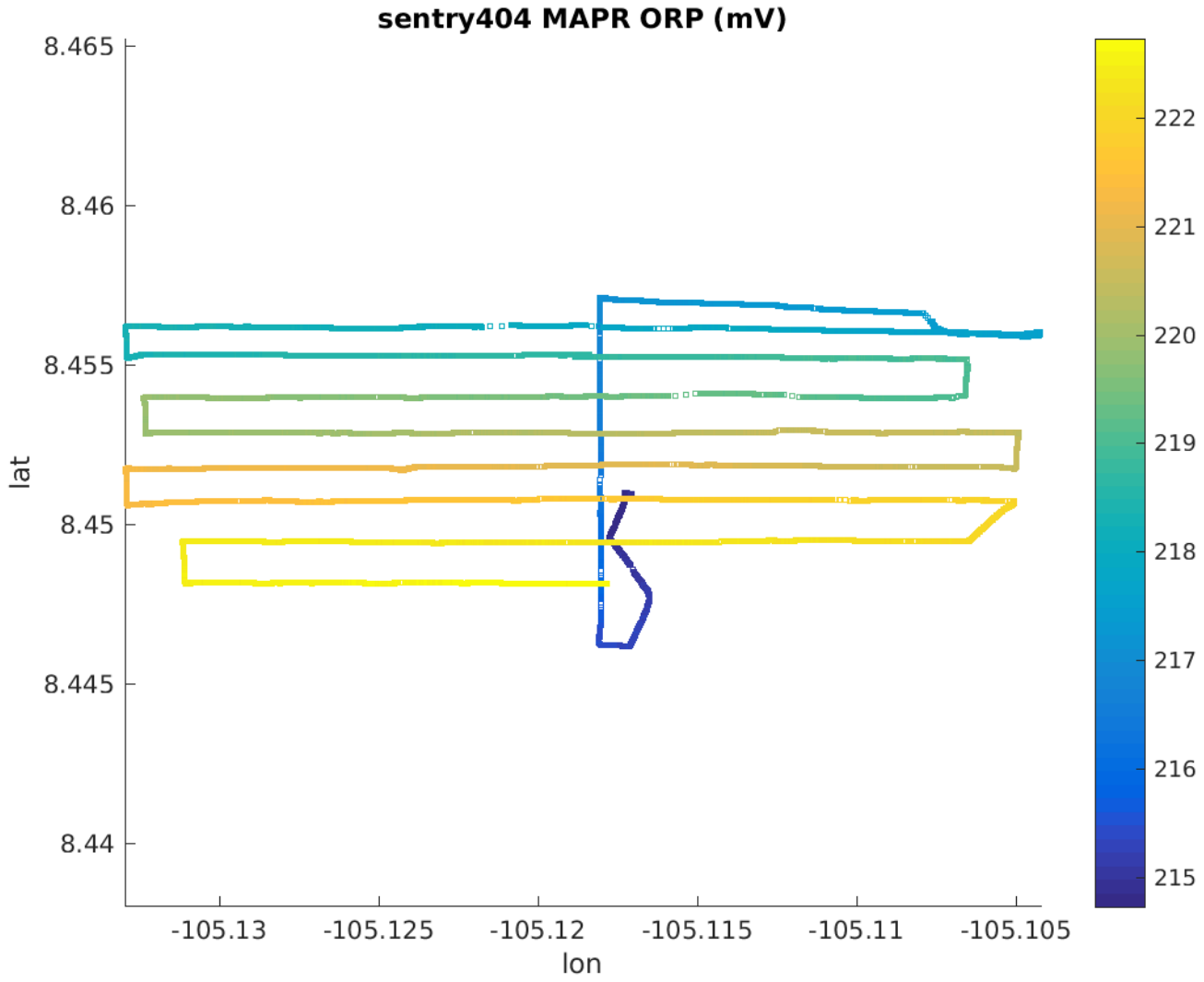


Figure 118: MAPR orp data during dive 404.

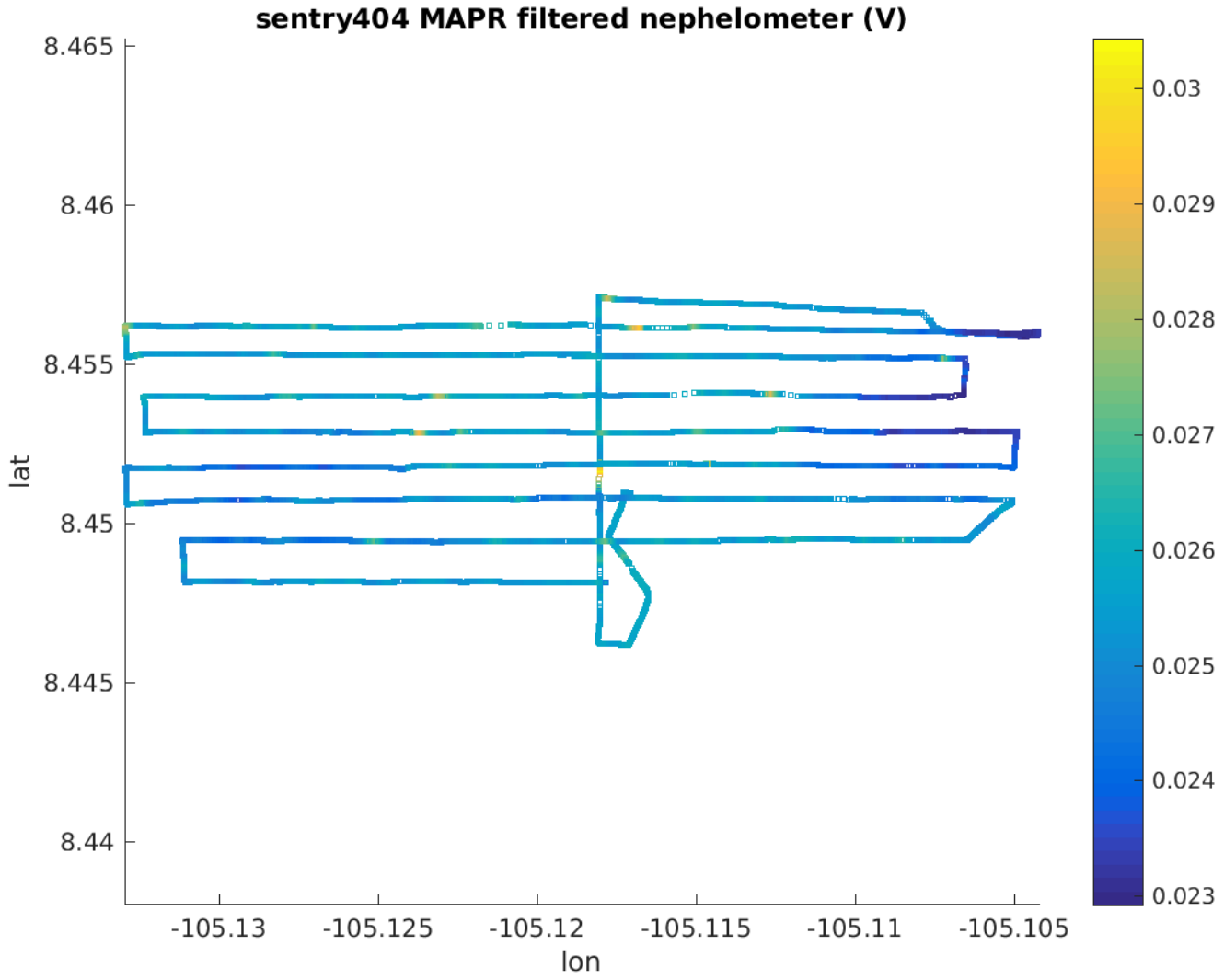


Figure 119: MAPR neph data during dive 404.

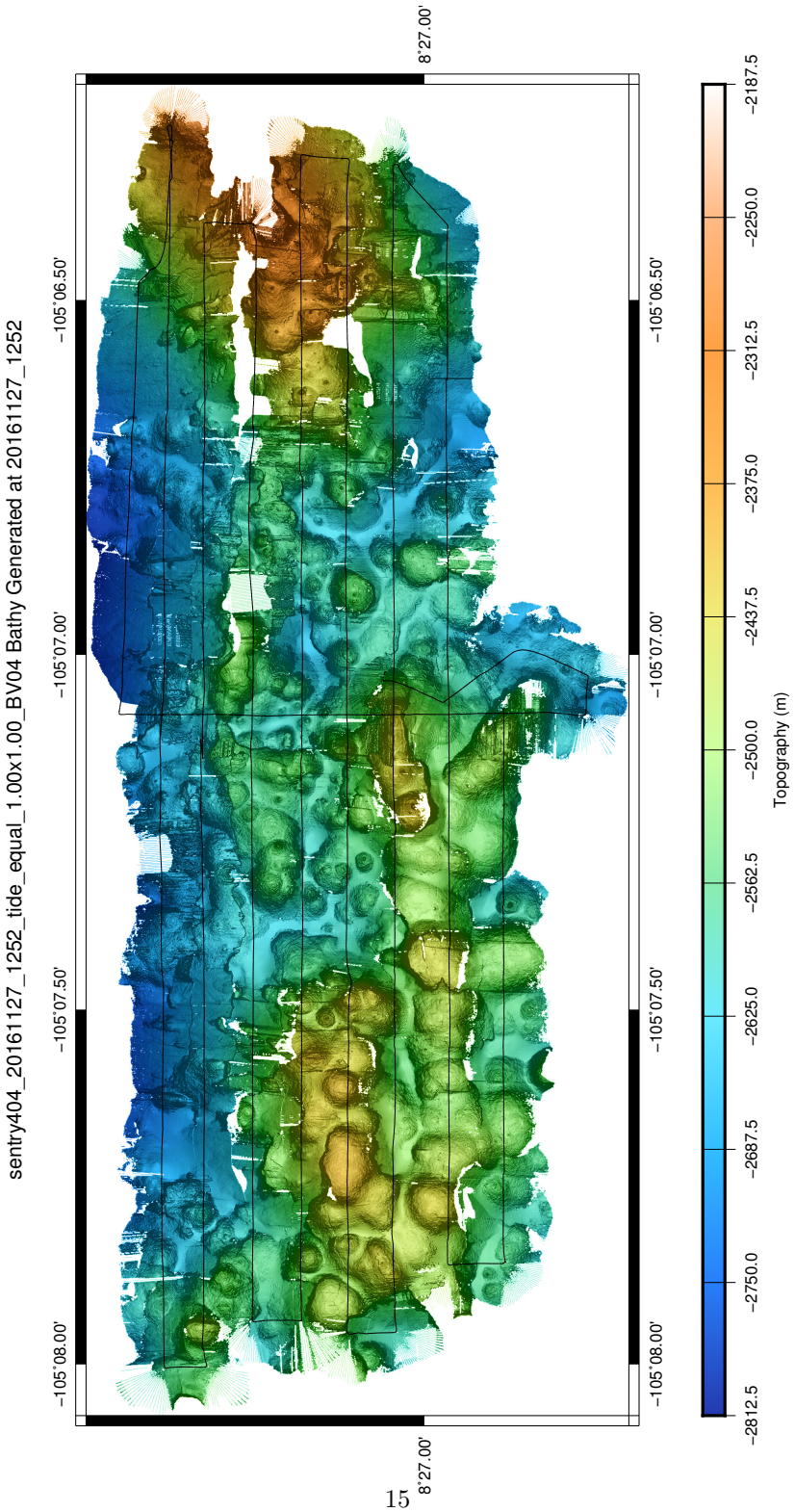


Figure 120: Processed multibeam data from dive 404 with navigation tracks.

Sentry 405 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately 1 to 3 ft for both launch and recovery and were not a factor in operations. Wind was 1 to 5 knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 20: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -105 -05

Launch Position: sentry405 launch position: 08 24.912'N 105 1.749'W

Narrative

Multibeam survey at Coral seamount. The mission included two multibeam surveys with an additional small camera survey line. The first multibeam survey covered most of the desired area, with the second multibeam survey running up the steep slope of the seamount. There was a 500 meter photo survey line at the shallowest elevation of the survey. A dredge was completed just north of the dive site. As systems worked well.

Issues

- None

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.23 sentry405 Summary

sentry405 Summary
Origin: 8.333333 -105.083333
Origin: 08 20.000'N 105 5.000'W
Launch: 2016/11/29 00:22:14
Survey start: 2016/11/29 01:44:21
Survey start: Lat:8.415925 Lon:-105.032190
Survey start: Lat:08 24.956'N Lon:105 1.931'W
Survey end: 2016/11/29 11:31:34
Survey end: Lat:8.418188 Lon:-105.011079
Survey end: Lat:08 25.091'N Lon:105 0.665'W
Ascent begins: 2016/11/29 11:31:34
On the surface: 2016/11/29 12:21:22
On deck: 2016/11/29 12:38:22
descent rate: 34.4 m/min
ascent rate: 51.2 m/min
survey time: 9.8 hours
deck-to-deck time 12.3 hours
Mean survey depth: 2785m
Mean survey height: 64m
distance travelled: 29.21km
average speed; 0.82m/s
average speed during photo runs: 0.53 m/s over 0.55 km
average speed during multibeam runs: 0.85 m/s over 28.66 km
total vertical during survey: 7935m
Battery energy at launch: 17.4 kwhr
Battery energy at survey end: 8.6 kwhr
Battery energy on deck: 8.3 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.24 sentry405 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161128_2239.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161128_2239.cfg
CTD	SBE 49	222		sbe49_20161128_2240.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161128_2239.cfg tim_20161128_2244.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

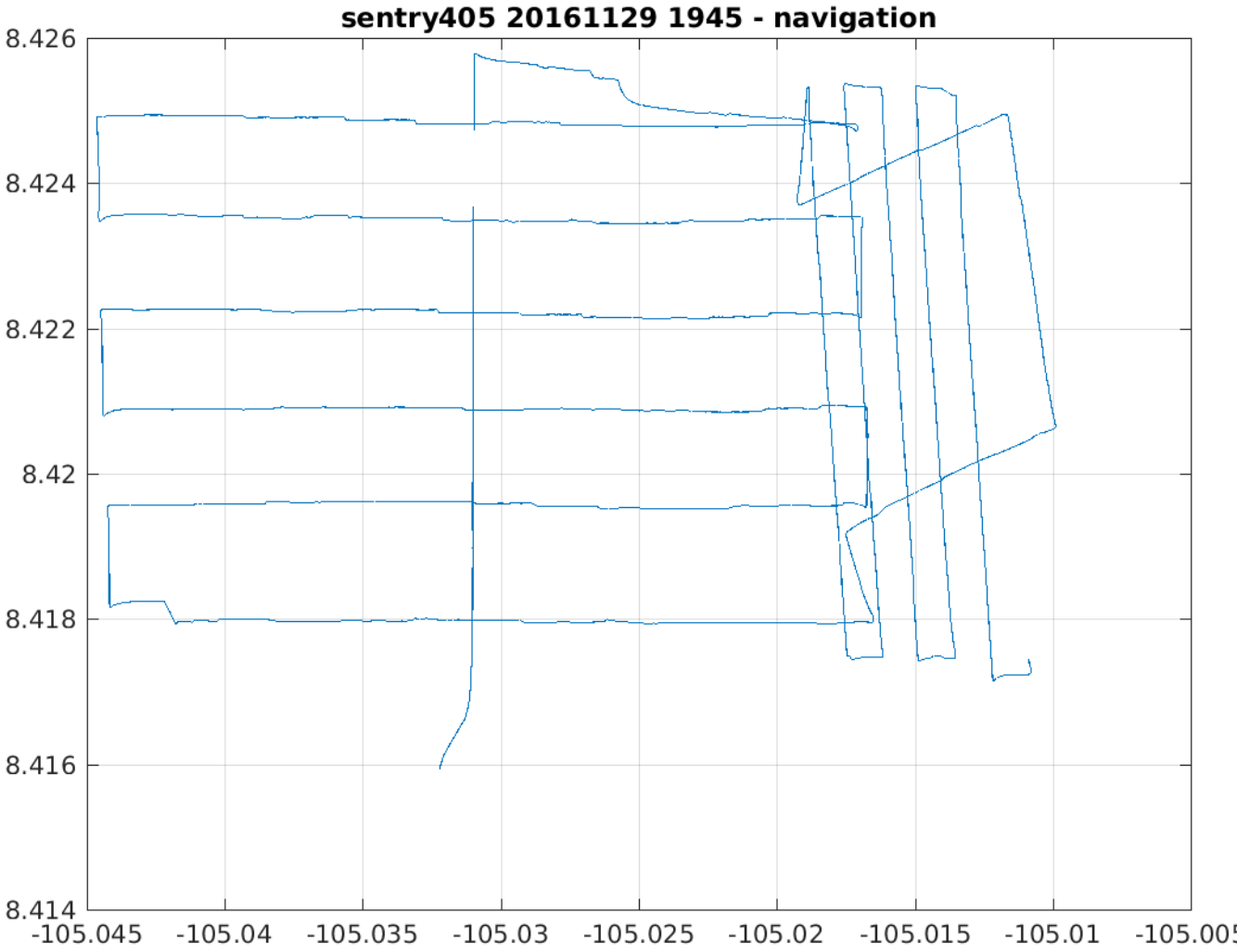


Figure 121: Latitude/Longitude plot of Sentry dive 405 based on post-processed navigation.

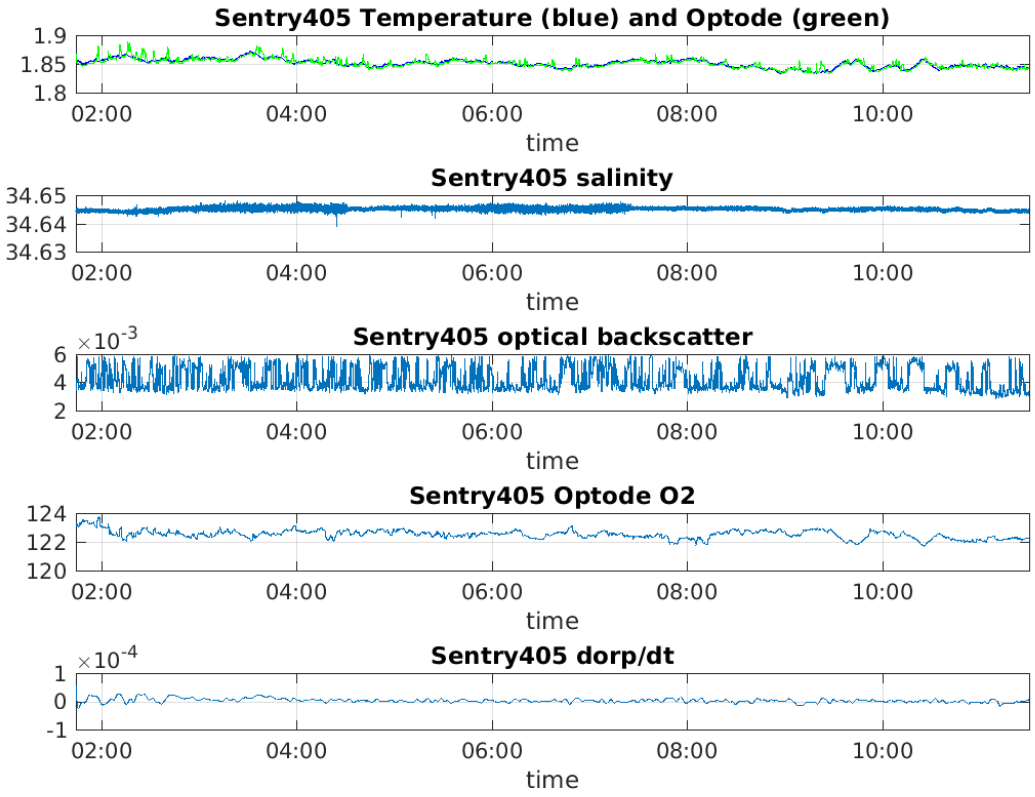


Figure 122: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

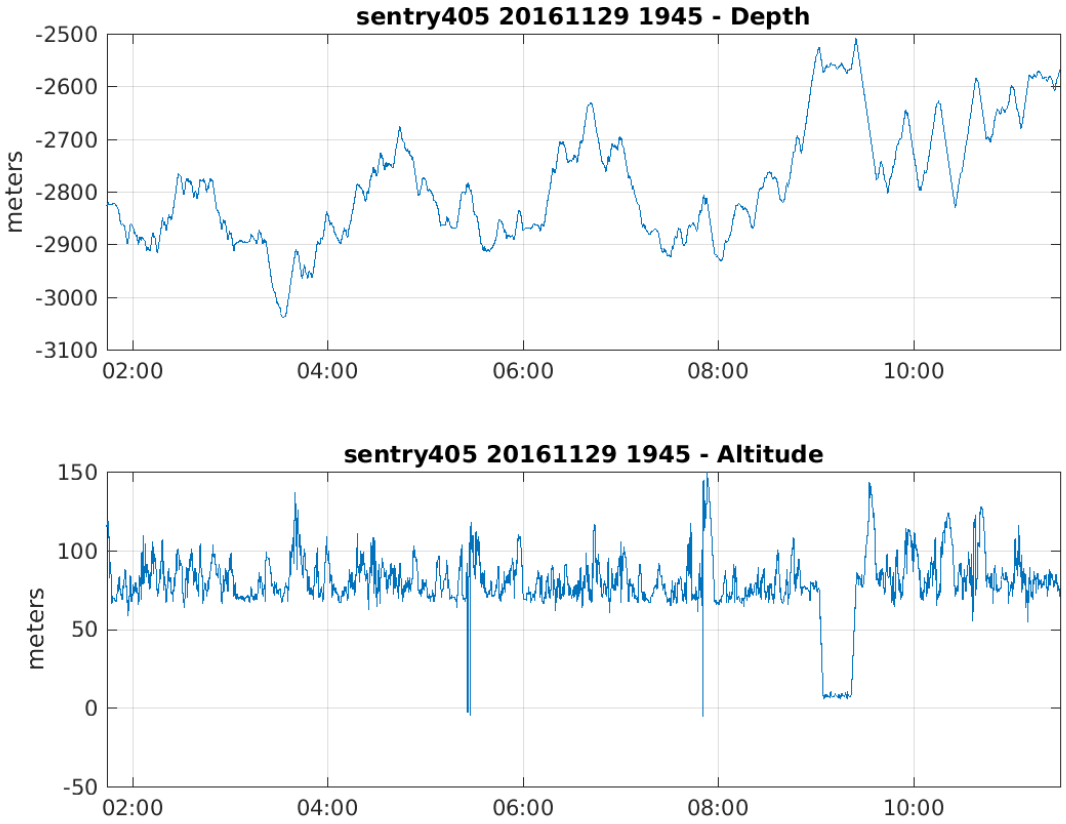


Figure 123: Depth and Altitude of Sentry during dive 405.

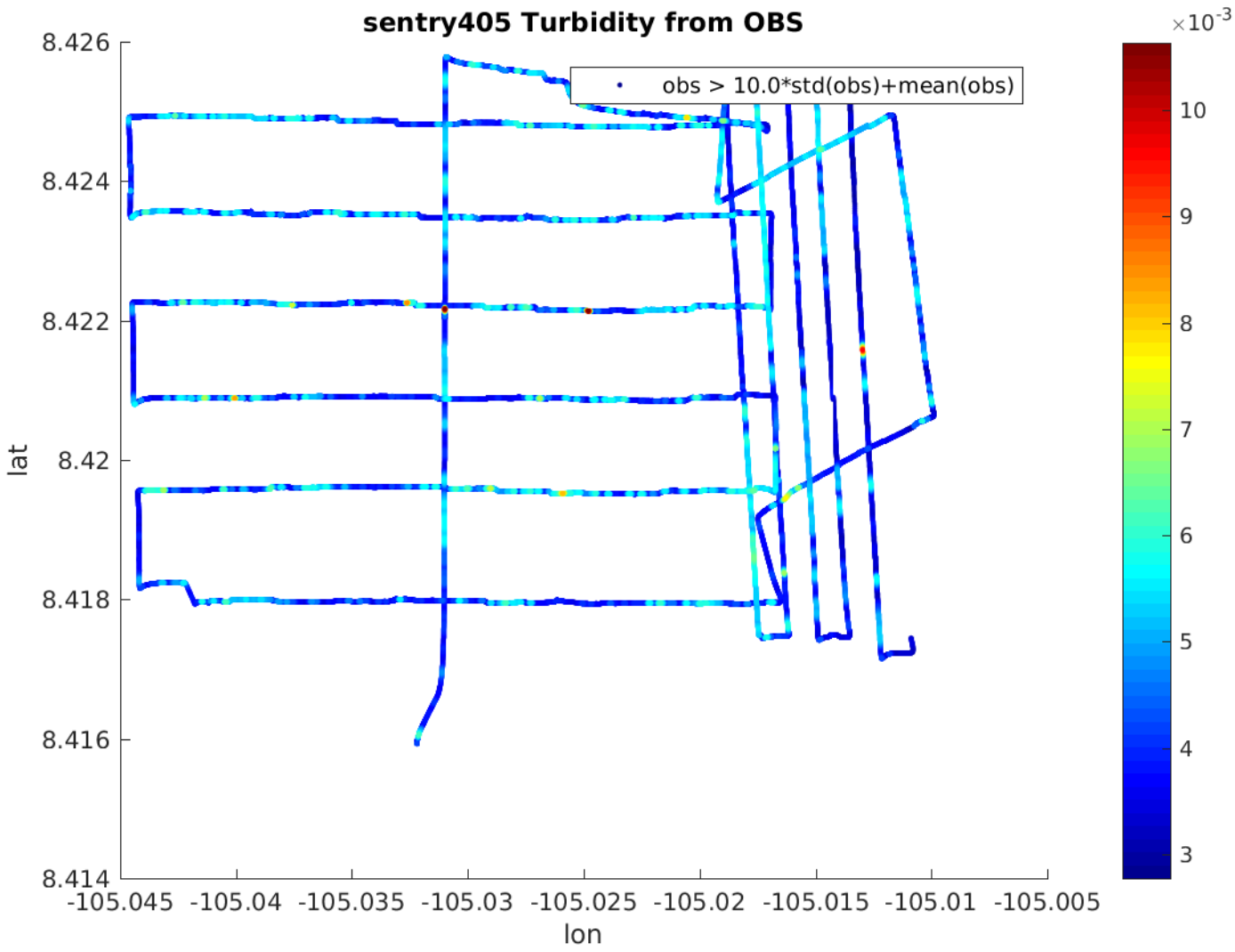


Figure 124: Optical backscatter on dive 405.

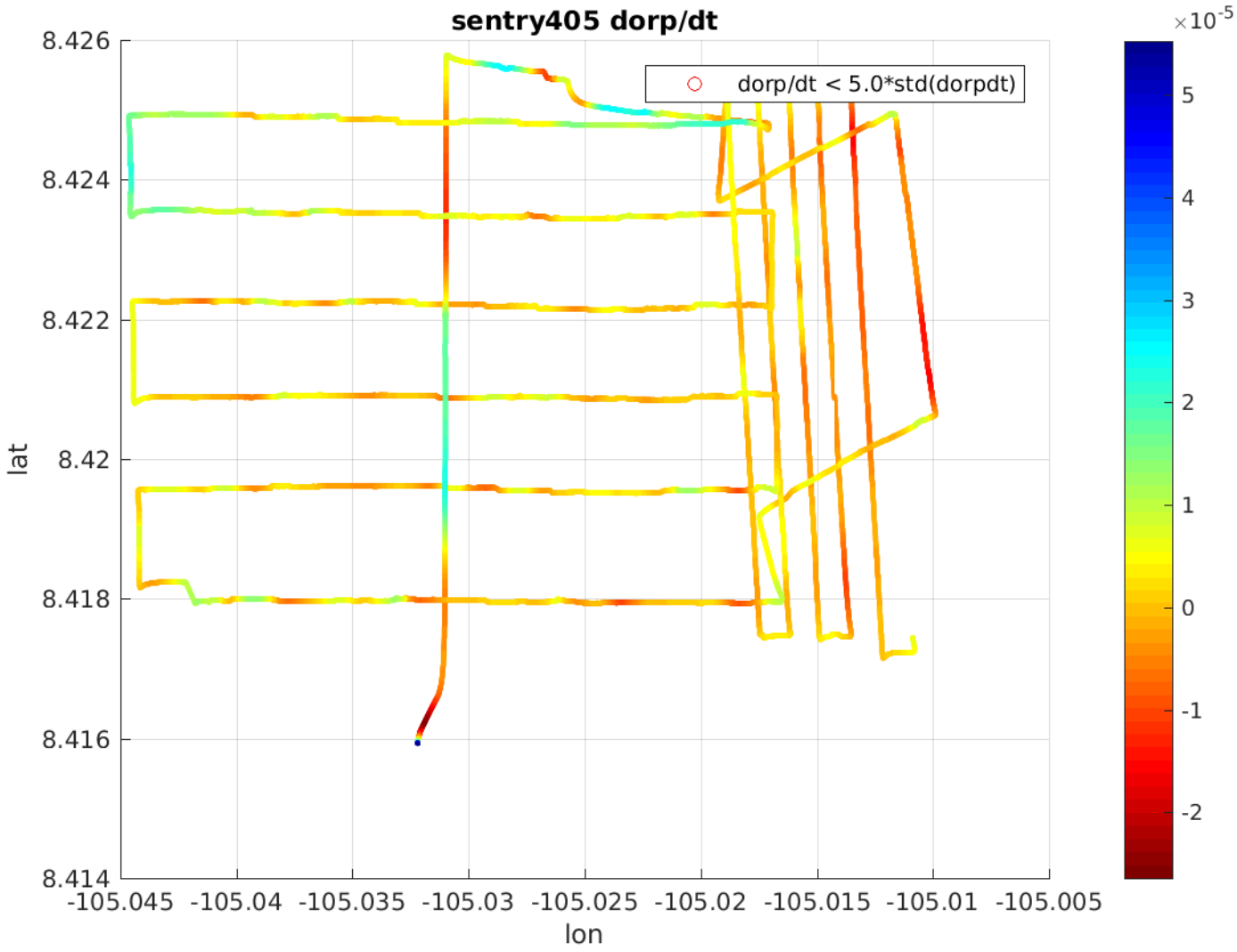


Figure 125: ORP sensor data during dive 405.

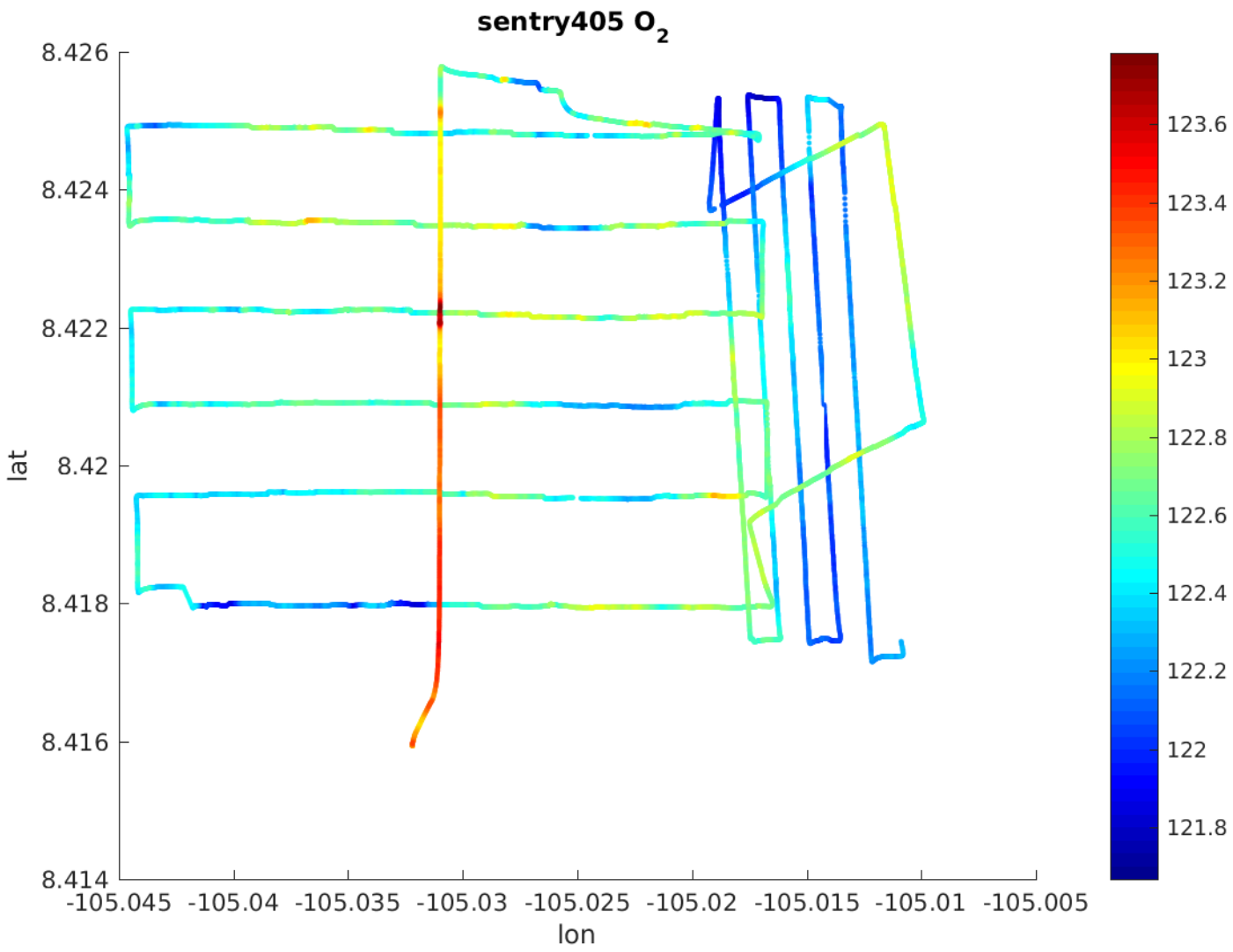


Figure 126: O2 sensor data during dive 405.

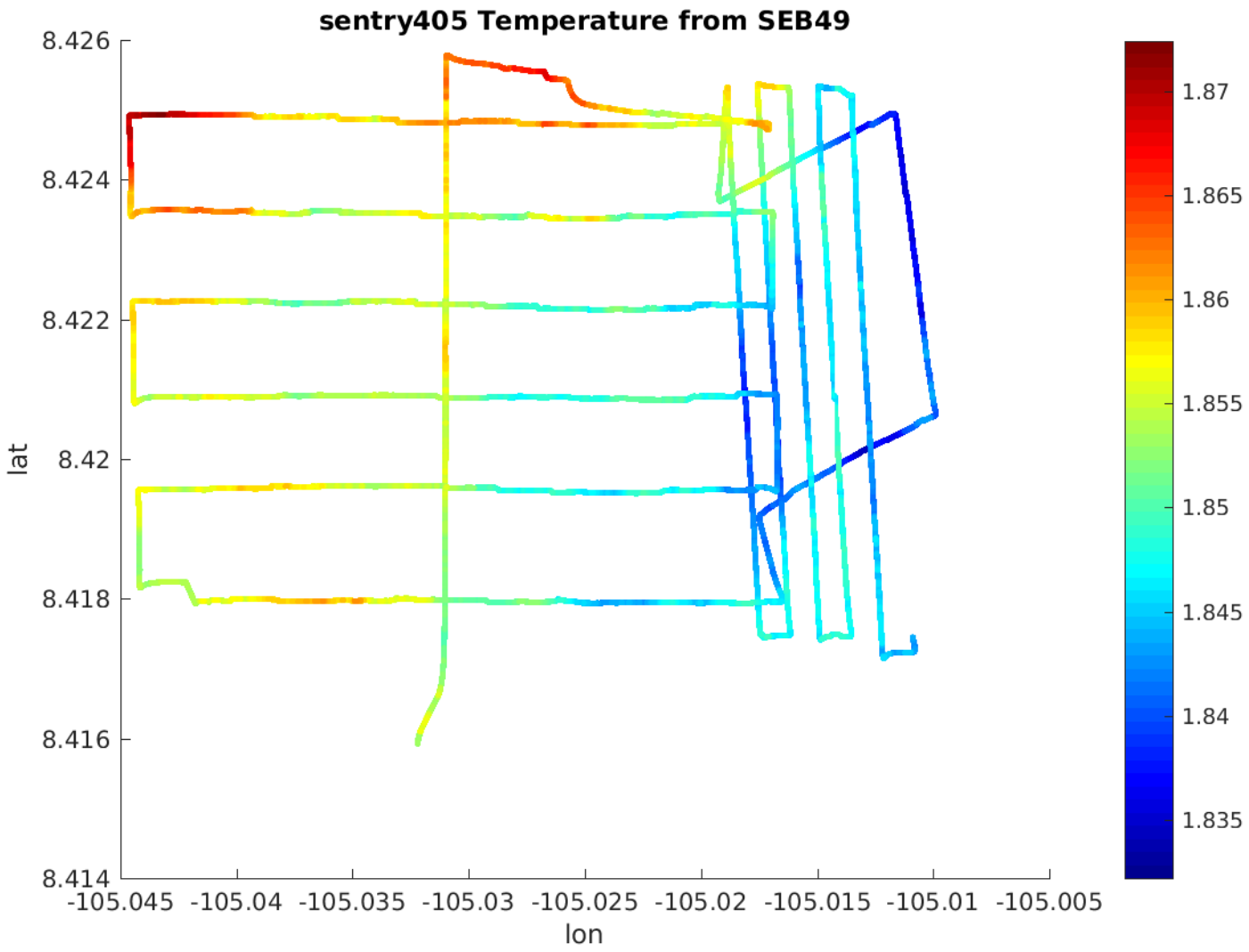


Figure 127: Temperature sensor data during dive 405.

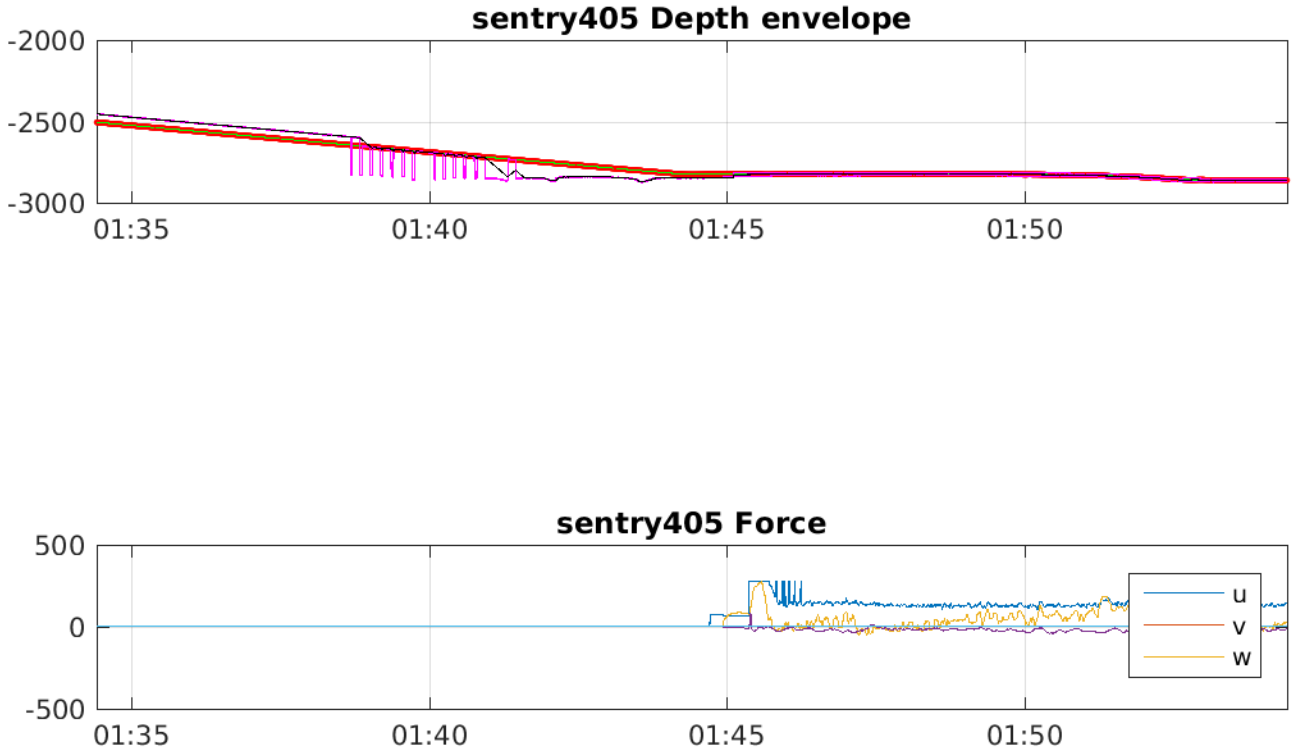


Figure 128: Bottom Approach for during dive 405.

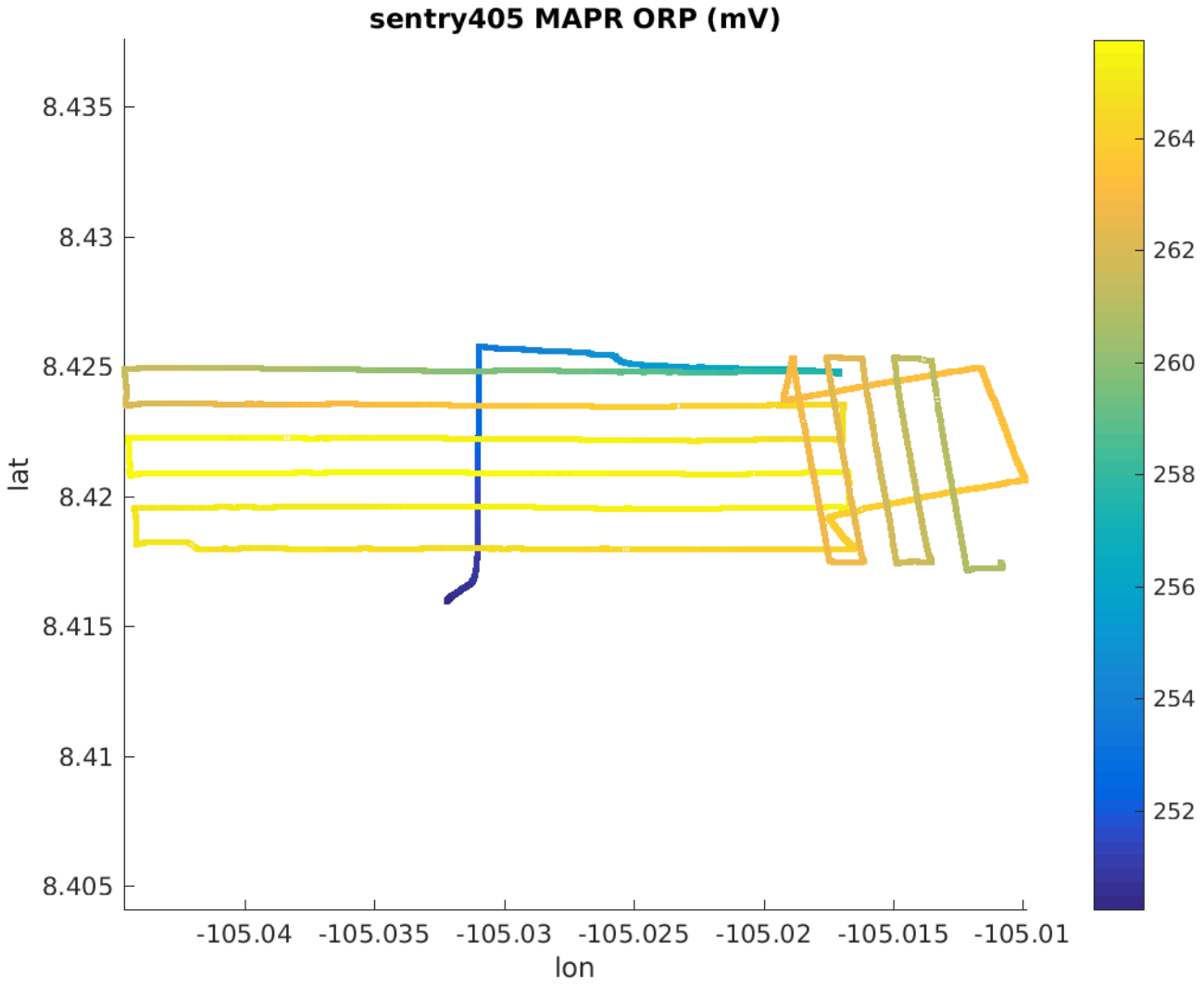


Figure 129: MAPR orp data during dive 405.

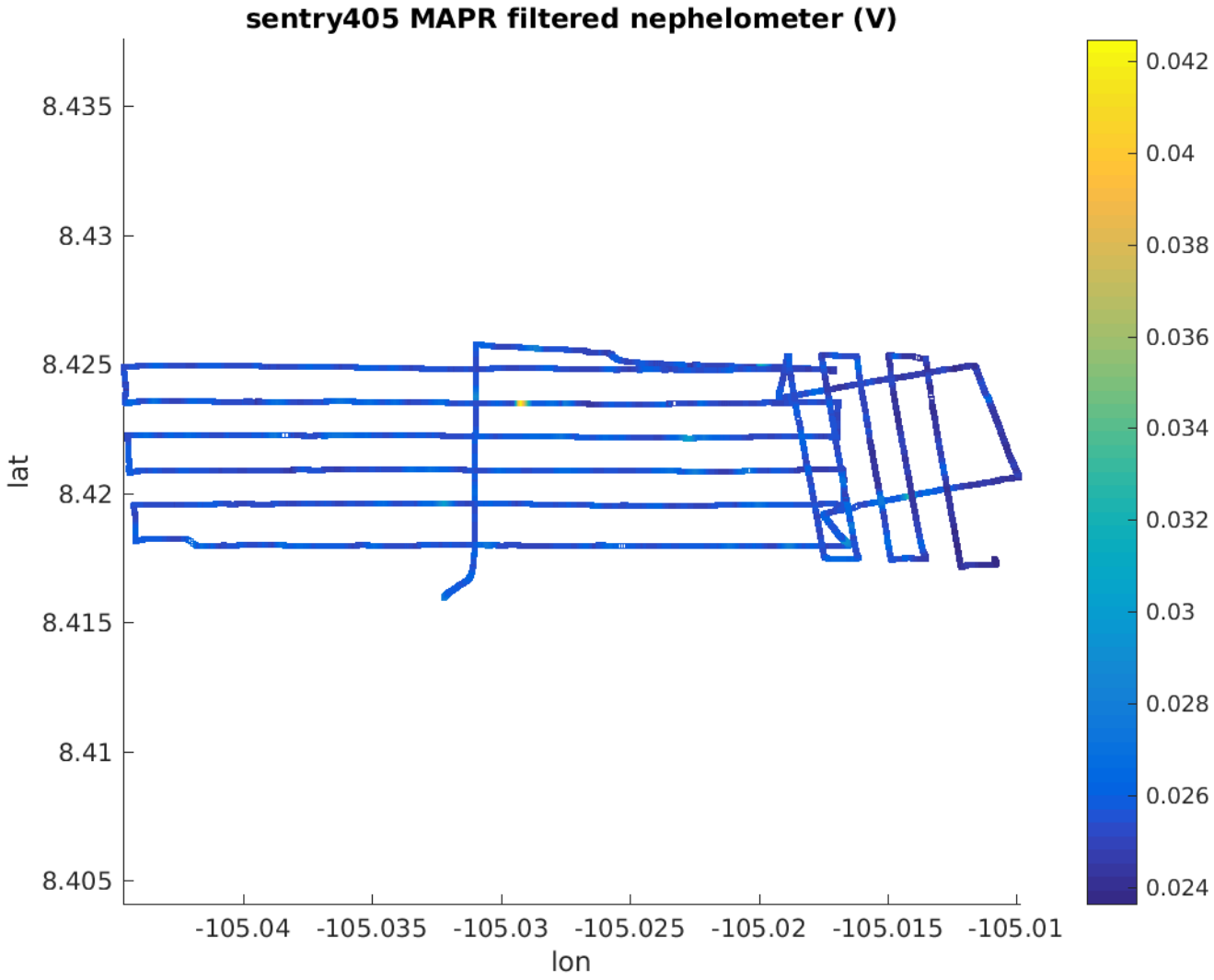


Figure 130: MAPR neph data during dive 405.

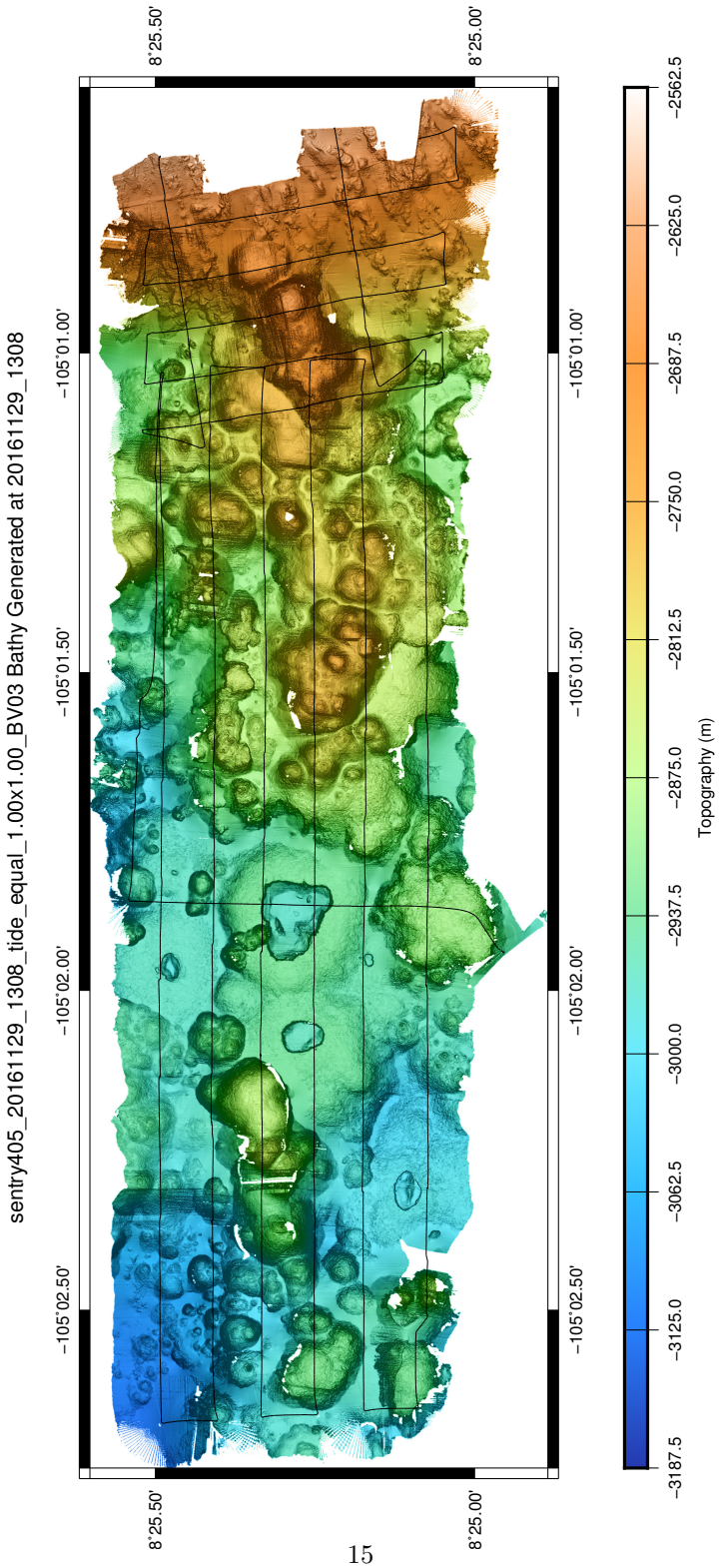


Figure 131: Processed multibeam data from dive 405 with navigation tracks.

Sentry 406 Dive Report
DRAFT

WHOI Sentry Operations Group
Sean Kelley, Dana Yoerger, Justin Fujii, Molly Curran, Ian Vaughn, Logan Driscoll

Sentry Expedition Leader: Sean Kelley

Chief Scientist/PI: Patricia Gregg, U. Illinois
CO-PI: Dan Fornari, WHOI
CO-PI: Michael Perfit, U. Florida

Summary

Weather: The seas were approximately 1 to 3 ft for both launch and recovery and were not a factor in operations. Wind was 1 to 5 knots.

Reason for end of dive: The dive was ended due to time constraints.

Vehicle Configuration

The science sensing suite for this dive was:

Table 21: Sentry Sensor Configuration

Sensor
APS 1540 Magnetometers (3)
Edgetech 4-24kHz SBP
Edgetech 120kHz/410kHz Sidescan sonar
Reson 7125 Multibeam Sonar
Seabird SBE49 CTD
Seapoint OBS
Anderaa optode model 4330
300kHz RDI DVL
Digital Still Camera
Blue View P900-90 Forward Looking Sonar
IXEA PHINS
Reson Sound Velocity Probe
NOAA PMEL MAPR
NOAA PMEL ORP Sensor

This dive was navigated using the DVL/INS system in real time. USBL provided post-dive corrections.

Important Positions

Dive Origin: 08 20 -104 -43

Launch Position: sentry406 launch position: 08 19.575'N 104 39.428'W

Narrative

Final Multibeam survey of the cruise at Beryl seamount. 10 hours of multibeam covering a slope on the southern side of the seamount. Overall the dive went well and without issues. A dredge was completed 2km north of the dive site during the first half of the sentry dive. Due to the dredge, navigation was lost for most of the survey. The second half of the survey captured an additional area north of the first survey.

Issues

- None

Chief Scientist Comments

The Chief scientist is requested to include any desired comments.

Dive Statistics

0.25 sentry406 Summary

sentry406 Summary
Origin: 8.333333 -104.716667
Origin: 08 20.000'N 104 43.000'W
Launch: 2016/11/30 00:33:33
Survey start: 2016/11/30 02:00:33
Survey start: Lat:8.327248 Lon:-104.661505
Survey start: Lat:08 19.635'N Lon:104 39.690'W
Survey end: 2016/11/30 11:30:39
Survey end: Lat:8.340945 Lon:-104.664559
Survey end: Lat:08 20.457'N Lon:104 39.874'W
Ascent begins: 2016/11/30 11:30:39
On the surface: 2016/11/30 12:26:54
On deck: 2016/11/30 12:40:00
descent rate: 34.5 m/min
ascent rate: 50.3 m/min
survey time: 9.5 hours
deck-to-deck time 12.1 hours
Mean survey depth: 2853m
Mean survey height: 66m
distance travelled: 27.37km
average speed; 0.79m/s
average speed during photo runs: 0.83 m/s over 0.30 km
average speed during multibeam runs: 0.82 m/s over 27.35 km
total vertical during survey: 8386m
Battery energy at launch: 19.3 kwhr
Battery energy at survey end: 10.3 kwhr
Battery energy on deck: 10.1 kwhr

Sensor Information

This is a recently added section with selected sensor metadata. This section will be expanded in coming months. Additional data is available in the sentryxxx/nav-sci/proc directory within the sentryxxx_config matlab structure as well as in ascii text logs in sentryxxx/metadata. At present metadata is not yet automatically collected on all sensors.

0.26 sentry406 Devices

Instrument	Model	Serial Num.	Comments	Config File
USBL	Sonardyne AvTrak2			avtrak_20161129_2050.cfg
DVL	RDI Navigator (300kHz)	727-2000-00J	CX: 1, WP: 0	dvl300_20161129_2050.cfg
CTD	SBE 49	222		sbe49_20161129_2051.cfg
SAIL	obs A/D orp A/D Timing	14 9	A: 5, G: 1.00, O: 0.0018 A: 3, G: 1.00, O: 0.002	a2d2-pods_20161129_2050.cfg tim_20161129_2055.cfg

Plots and Images

This section contains selected images of data products and plots of vehicle navigation and selected sensors.

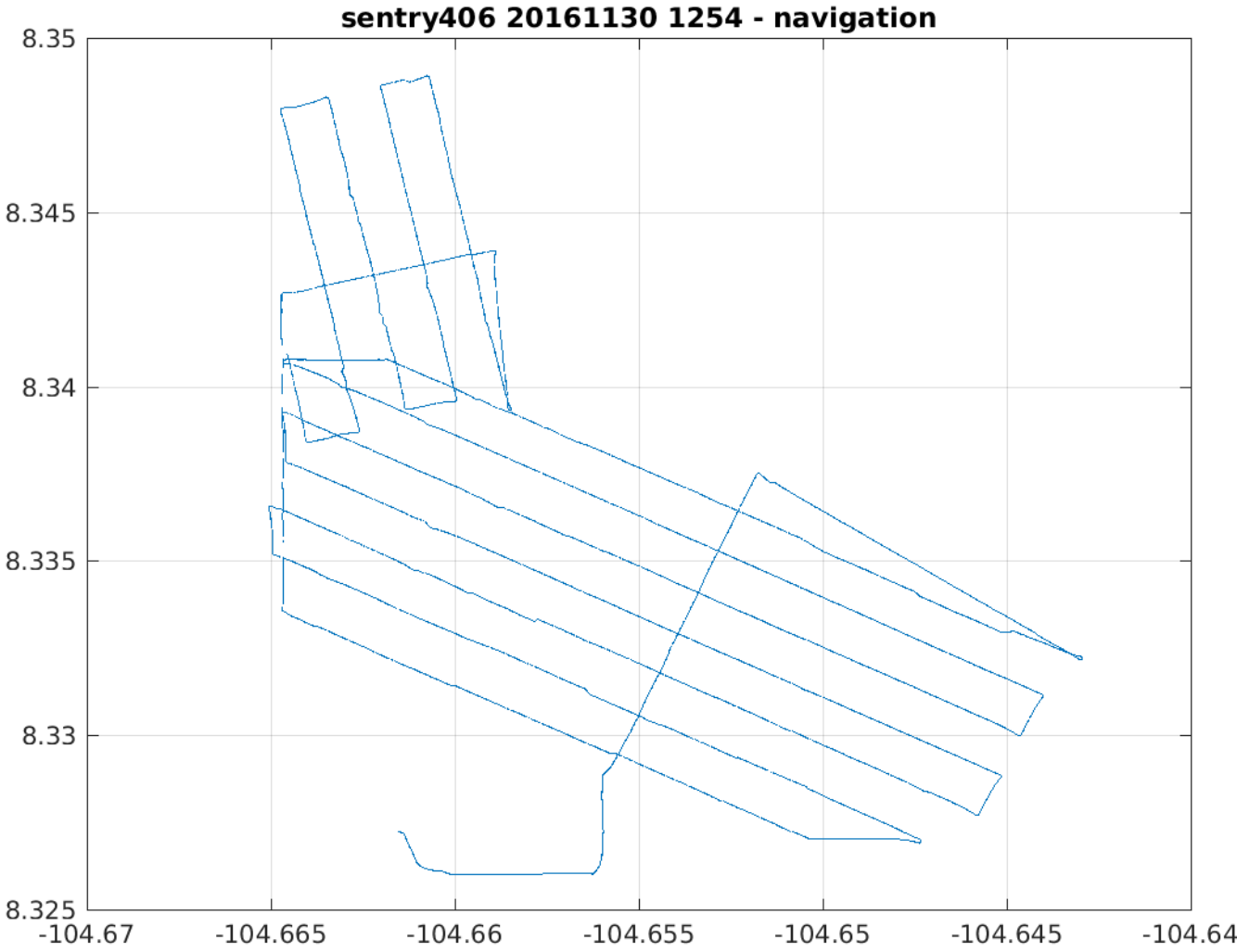


Figure 132: Latitude/Longitude plot of Sentry dive 406 based on post-processed navigation.

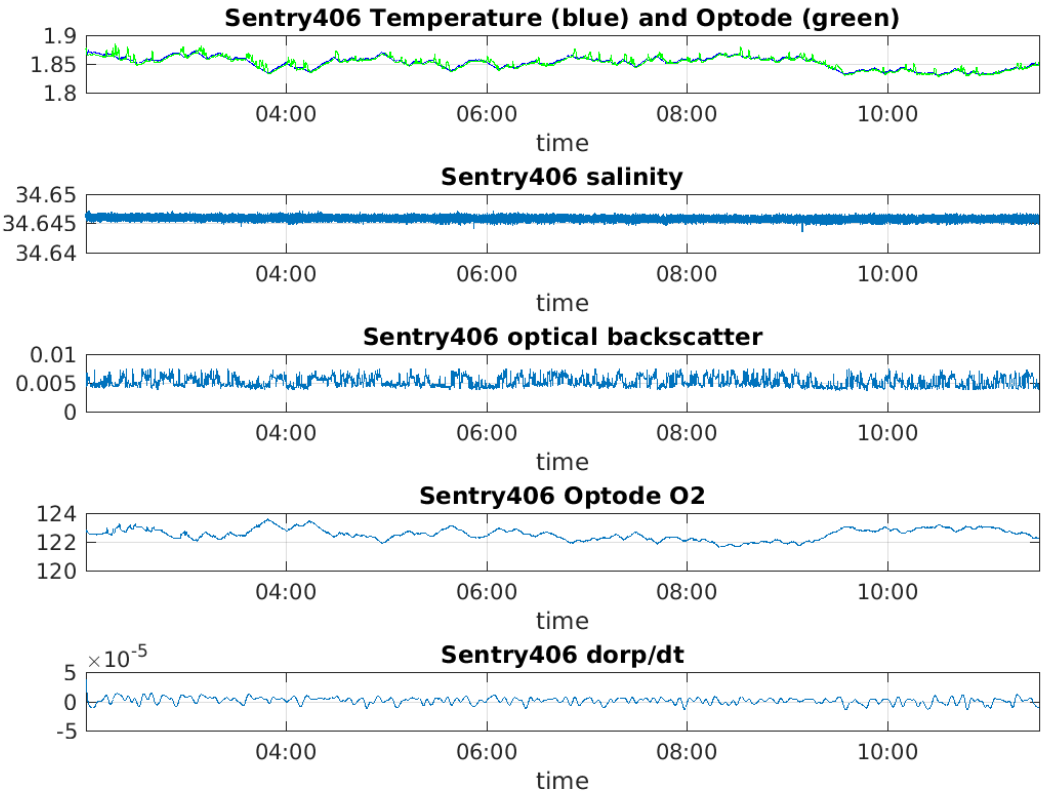


Figure 133: Time series plot of five of the basic sensors on Sentry, from top to bottom, temperature, salinity, optical backscatter, dissolved Oxygen, and ORP.

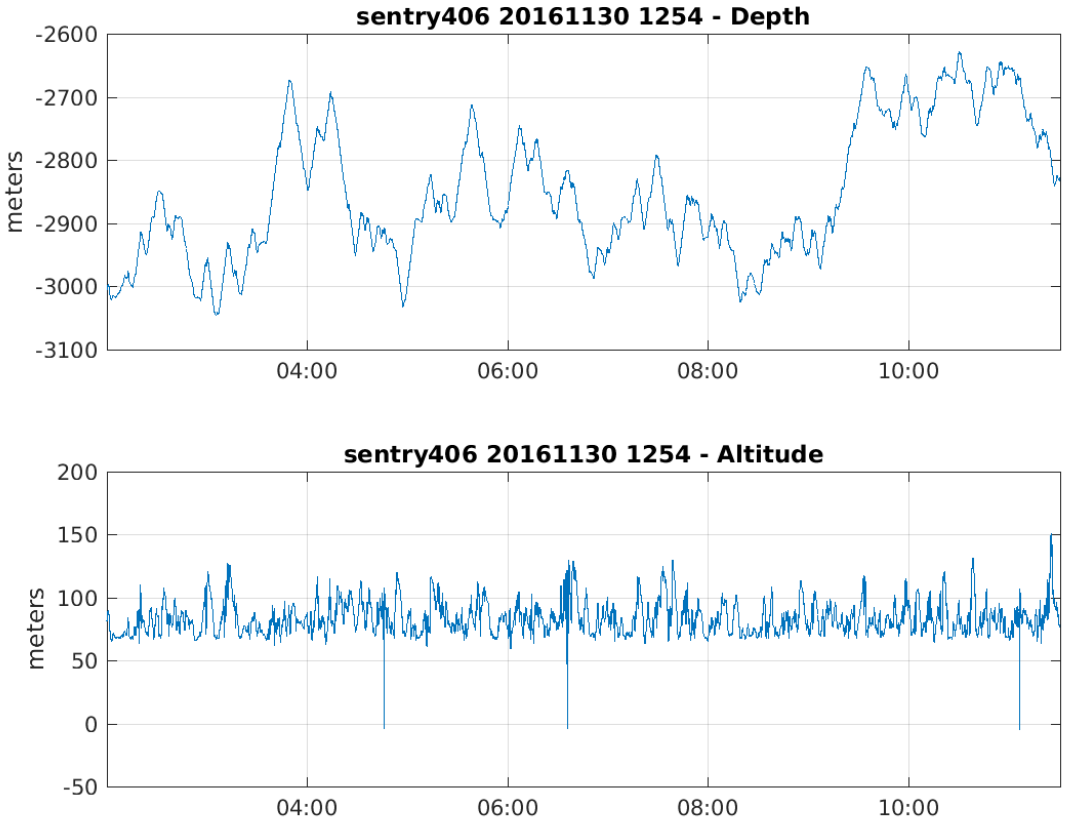


Figure 134: Depth and Altitude of Sentry during dive 406.

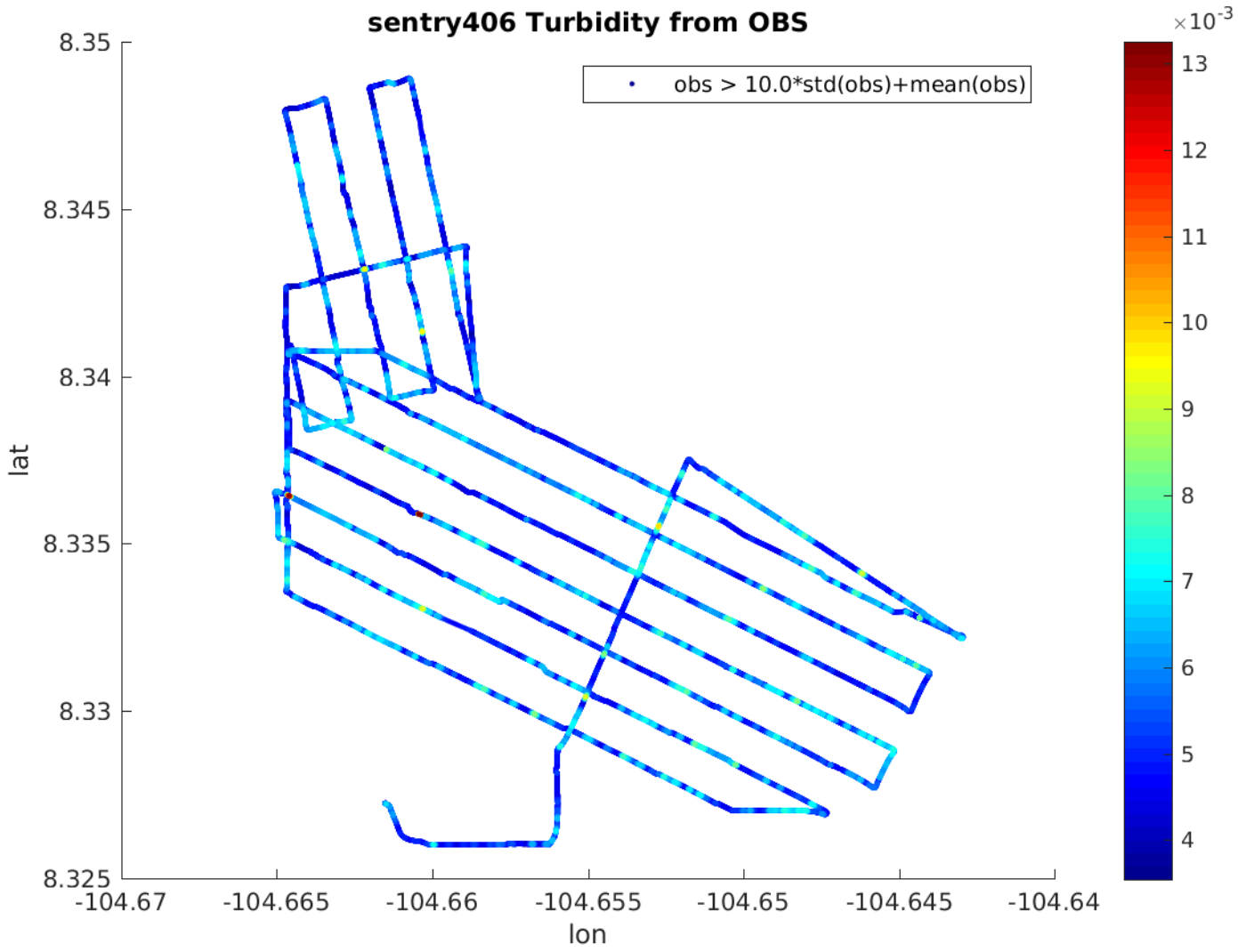


Figure 135: Optical backscatter on dive 406.

Figure 136: ORP sensor data during dive 406.

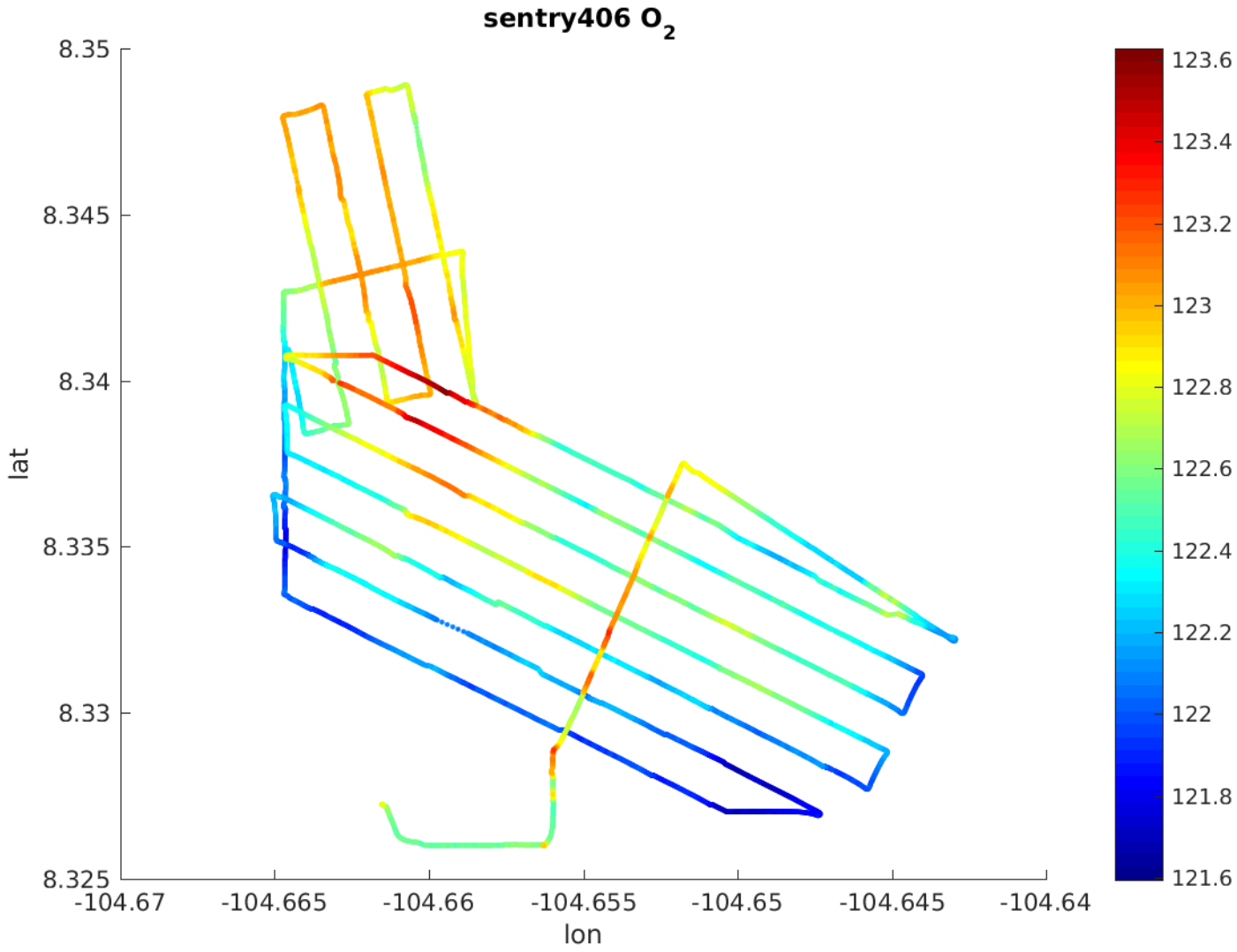


Figure 137: O2 sensor data during dive 406.

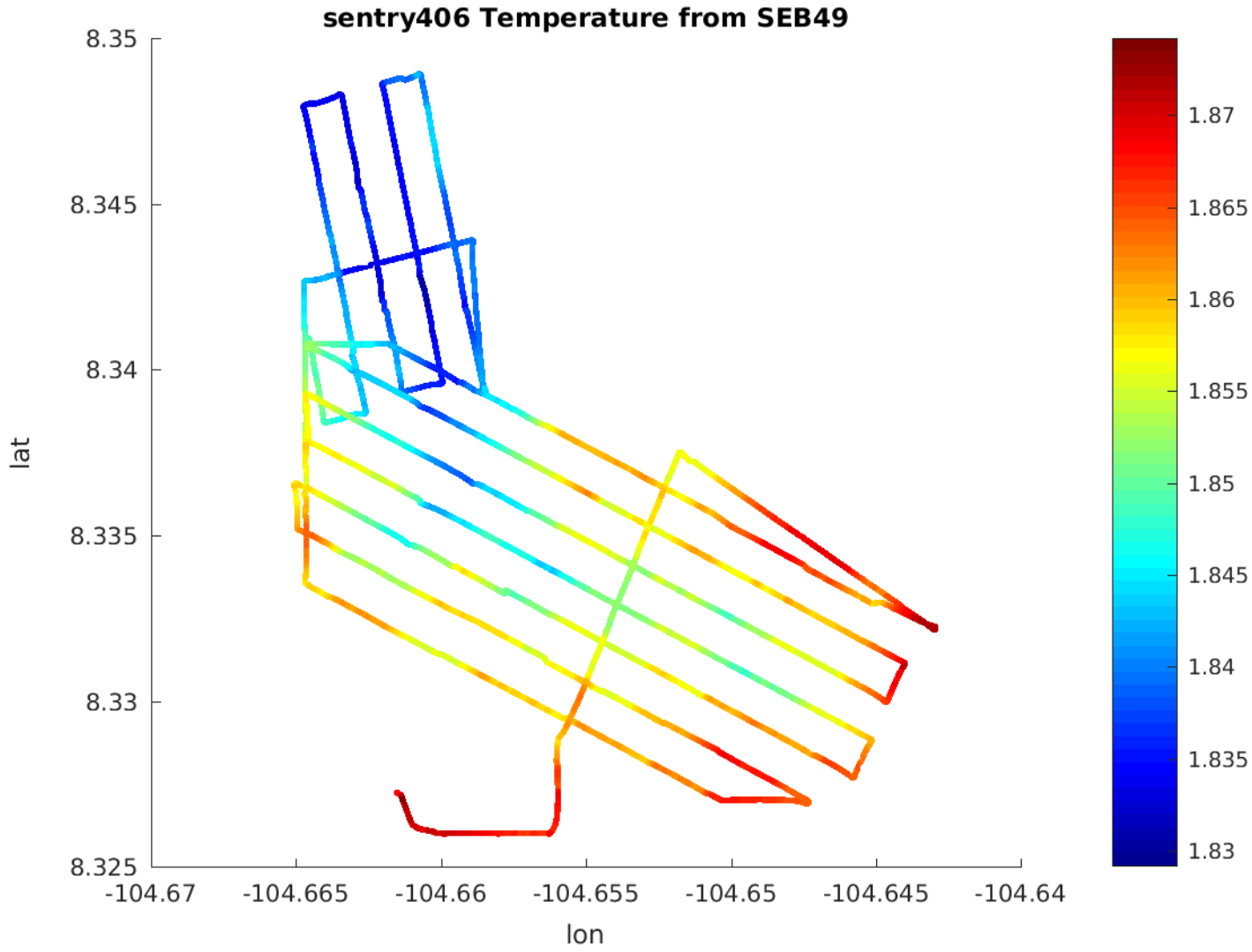


Figure 138: Temperature sensor data during dive 406.

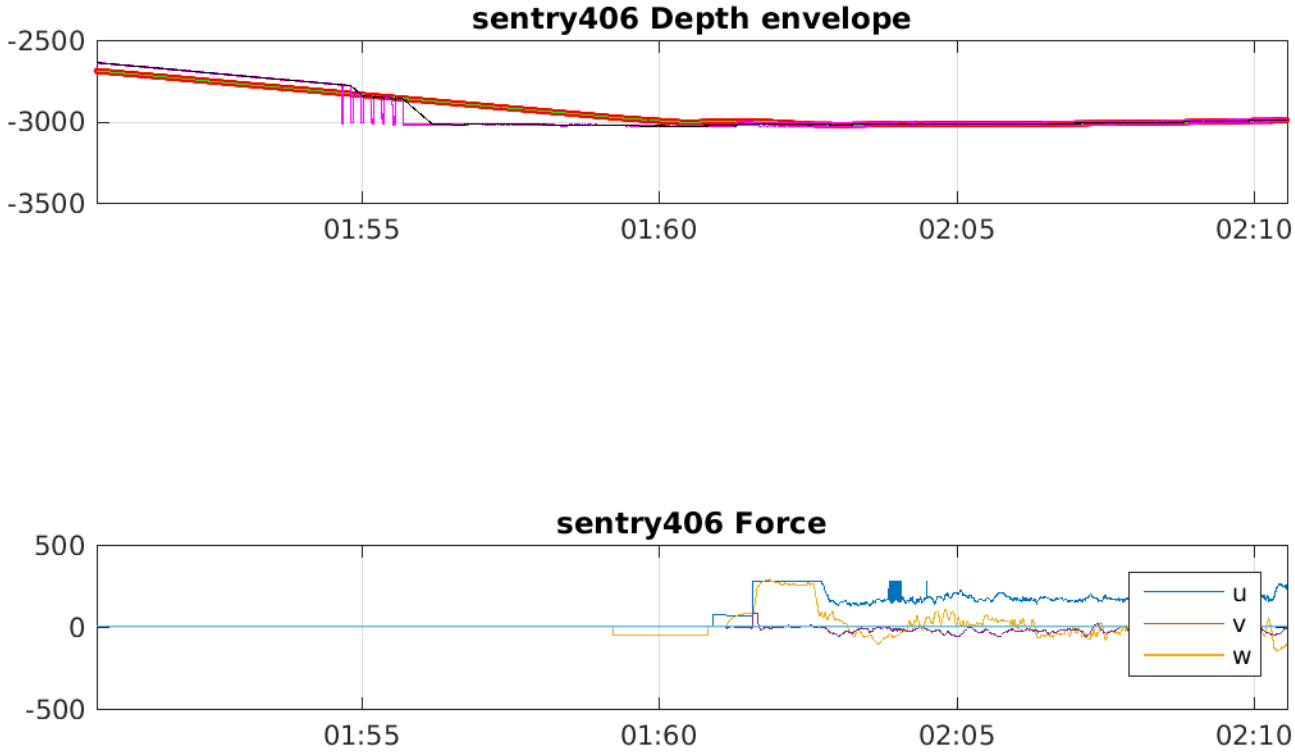


Figure 139: Bottom Approach for during dive 406.

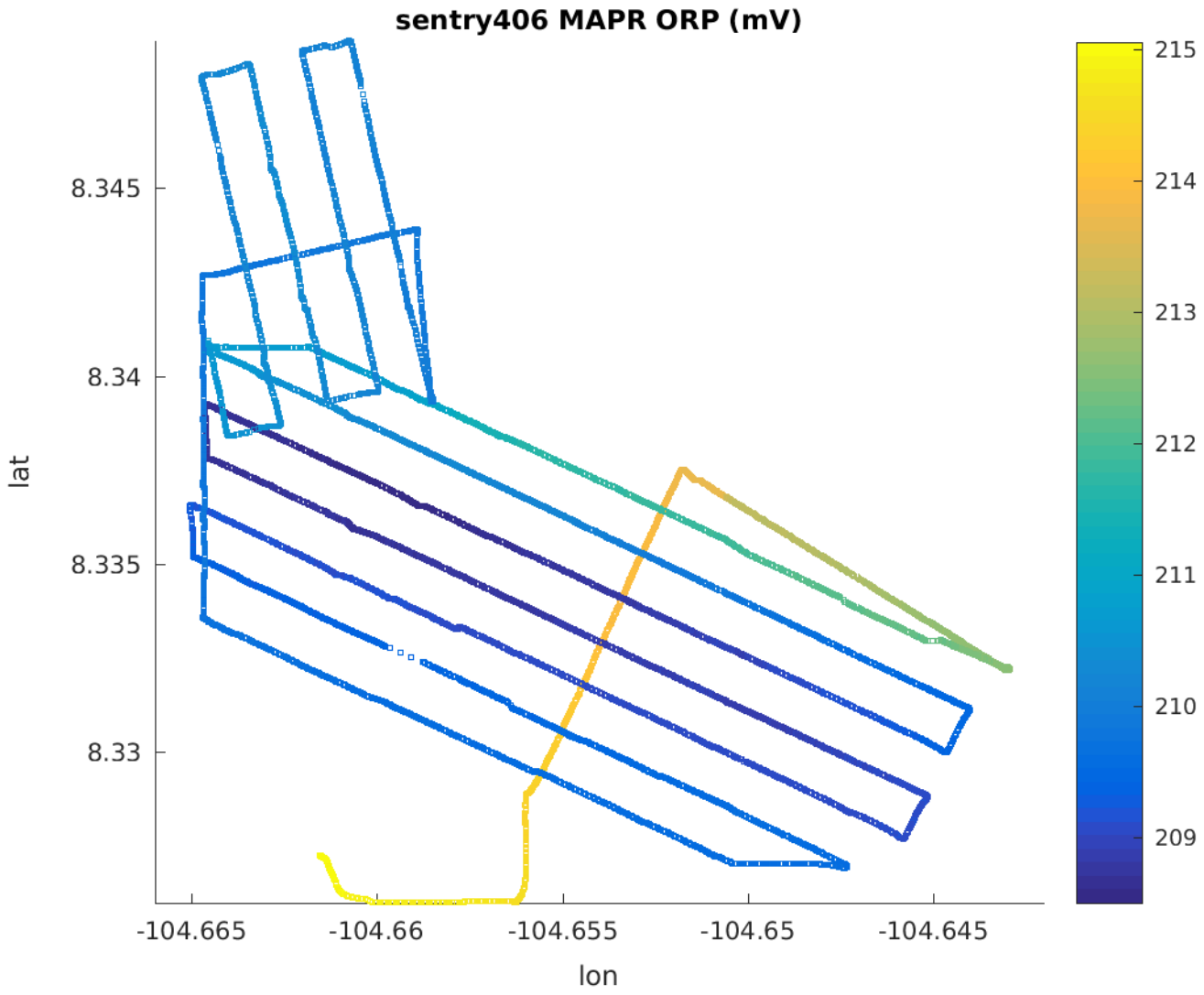


Figure 140: MAPR orp data during dive 406.

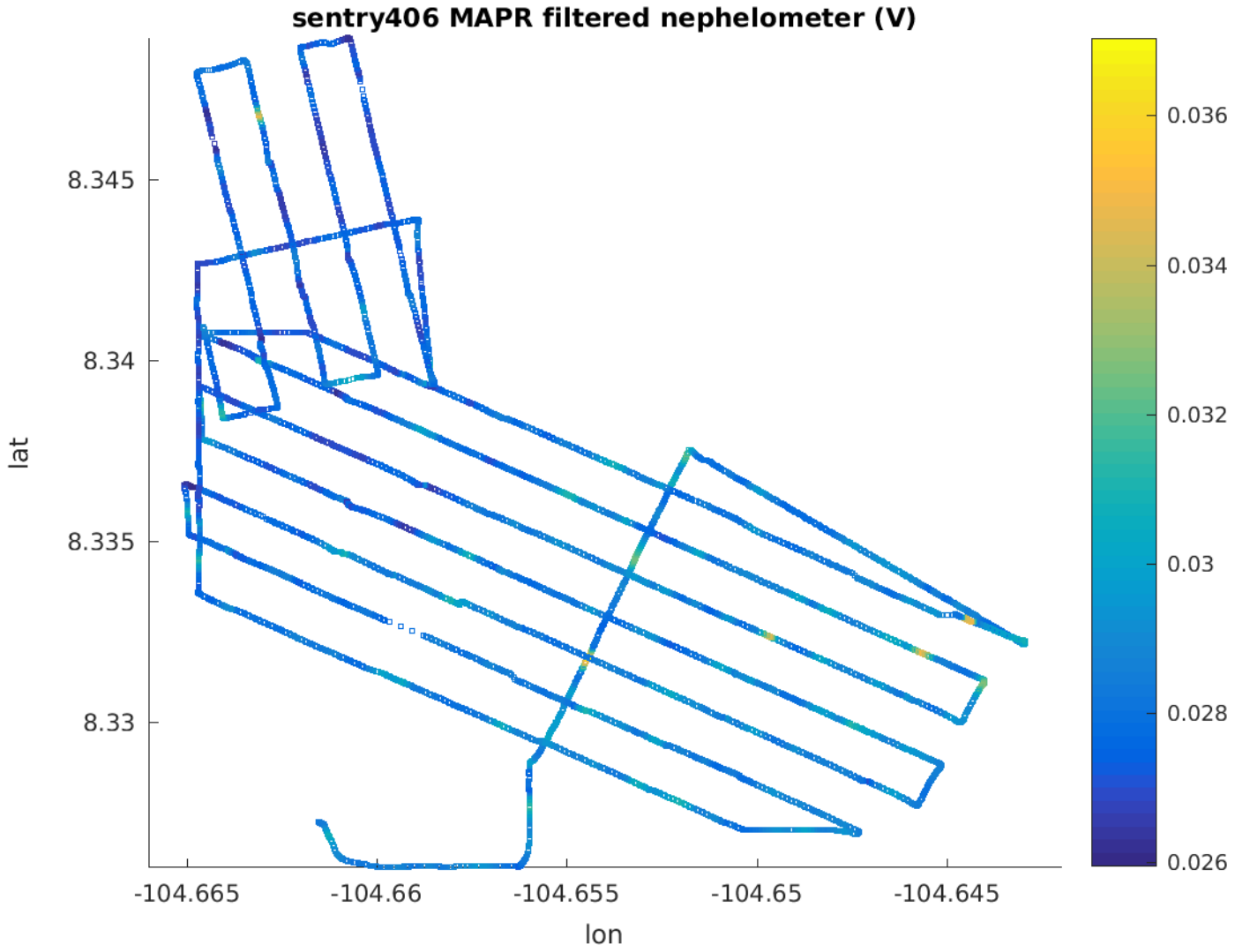


Figure 141: MAPR neph data during dive 406.

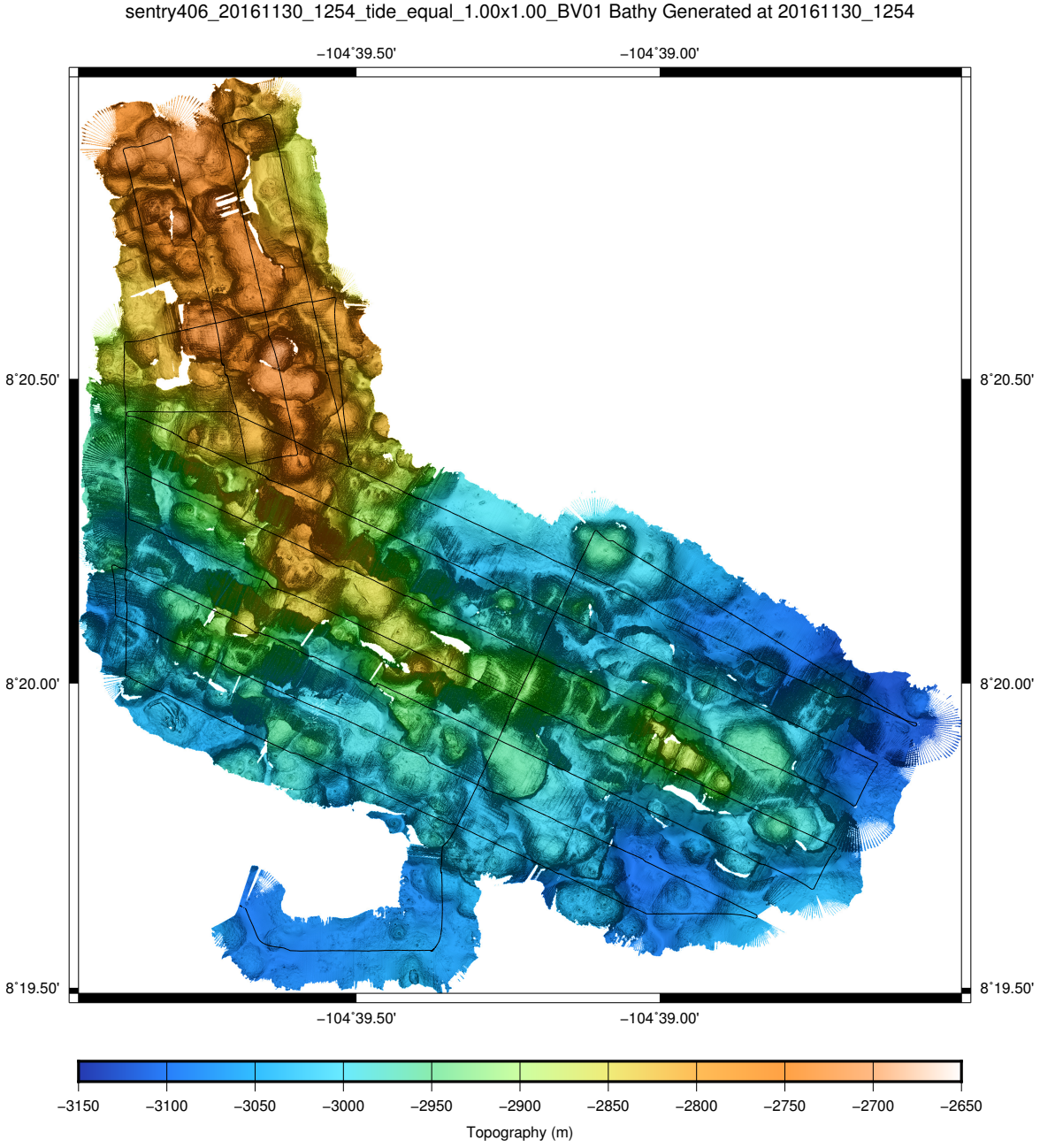


Figure 142: Processed multibeam data from dive 406 with navigation tracks.

CASIUS Calibration Report

Sonardyne SOUND IN DEPTH

Vessel: **Device No:** **Date/Time:** Sunday, October 23, 2016 0:39:19 AM

Settings:

Initial Estimates for BoxIn	
Transceiver depth offset	4.760m
Transceiver depth	4.760m
Antenna starboard offset	-3.410m
Antenna forward offset	-10.140m
Antenna height offset	27.470m

Error Estimates for BoxIn	
DGPS lags USBL	0.00s
Range measurement	0.2m
Range gate	1.0m
DGPS position	2.0m
Beacon position	30.0m
Beacon depth	5.0m
Sound velocity	15.0m/s
Transceiver depth	0.5m
Transceiver offset	1.0m

Transceiver & Beacon	
Transceiver Index	11
Beacon Name	AvT-813
Turn Around Time	320.0ms

Depth Aiding	
Boresight Angle Limit	22.0º
Depth Difference Limit	1.0m

Transceiver Attitude Calculation Inputs	
Angle Gate	2.0º
Known Heading Correction	n/a

Values Used During Data Collection	
Transceiver Pitch Correction	0.24º
Transceiver Roll Correction	0.05º
Transceiver Heading Correction	2.08º
Sound Velocity	1493.2m/s

Results:

Beacon BoxIn	Beacon Eastings	Beacon Northings	Beacon Depth	Sound Velocity	Transceiver Starboard Offset	Transceiver Forward Offset
Before	577789.90m	1087604.00m	2507.20m	1493.16m/s	-2.31m	-5.92m
Calculated	577790.03m	1087603.79m	2506.41m	1491.85m/s	-2.10m	-6.12m
Calculated Accuracy	0.03m	0.03m	0.16m	0.06m/s	0.03m	0.03m

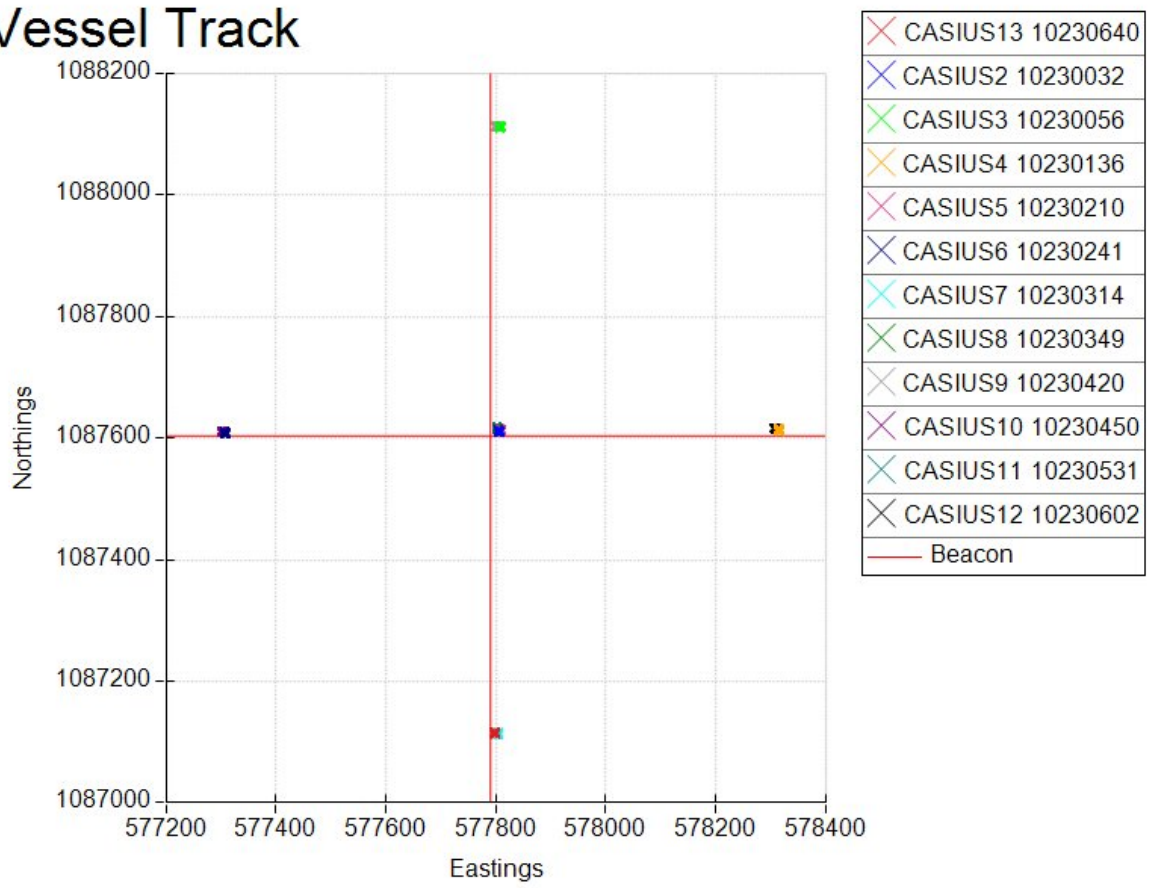
Transceiver Attitude	Pitch Correction	Roll Correction	Heading Correction
Before	0.24º	0.05º	2.08º
Calculated	**0.18º**	**-0.01º**	**2.09º**
Calculated Accuracy	0.00º	0.00º	0.02º

Statistics:

	Before CASIUS (distance)	After CASIUS (distance)	Before CASIUS (% depth)	After CASIUS (% depth)
39.4% Beacon Positions (1 sigma)	8.3m	7.9m	0.33	0.32
50.0% Beacon Positions (CEP)	9.9m	9.5m	0.40	0.38
63.2% Beacon Positions (1 Drms)	12.1m	11.1m	0.48	0.44
86.5% Beacon Positions (2 sigma)	15.9m	14.0m	0.63	0.56
98.2% Beacon Positions (2 Drms)	21.1m	18.6m	0.84	0.74

General:

	Beacon BoxIn	Transceiver Attitude
Number of Iterations	2	2
Number of Fixes Used	2387	2387
Number Depth Aided		0
Average weighted residuals	0.002	0.662

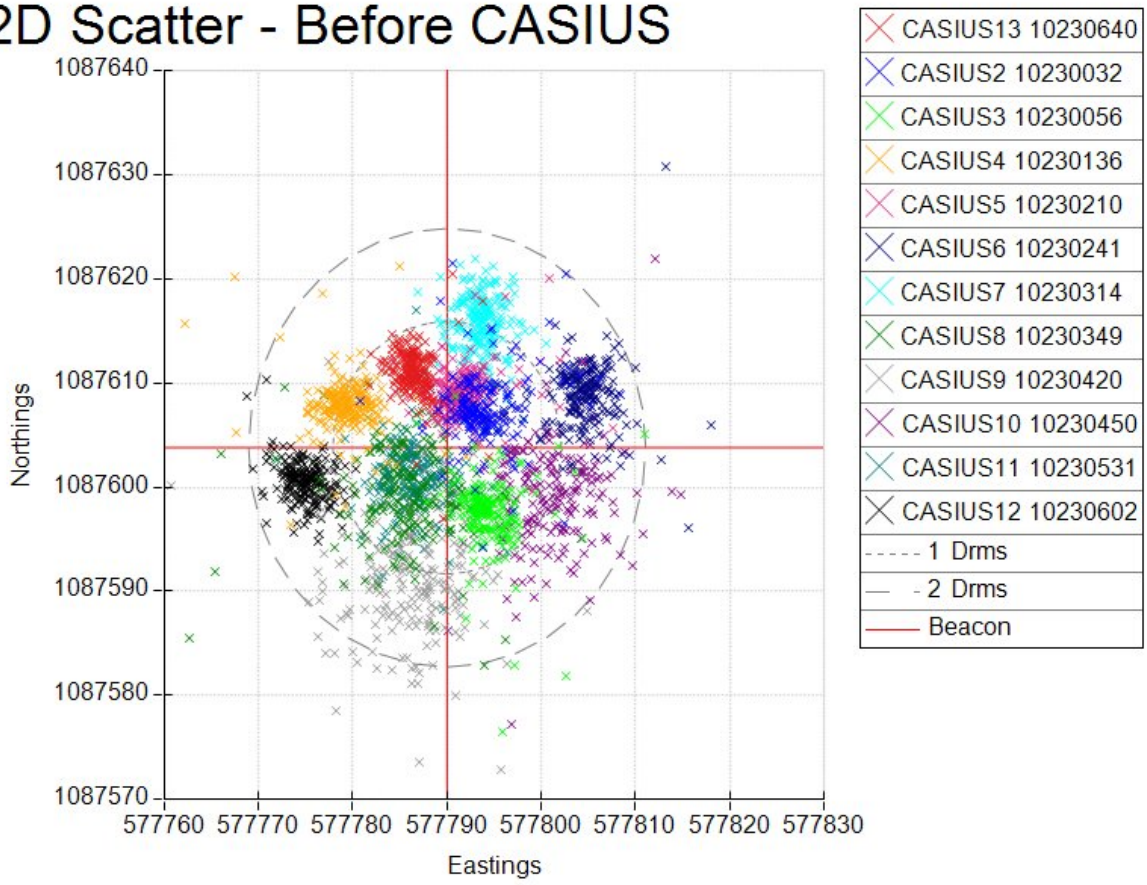


Data used:

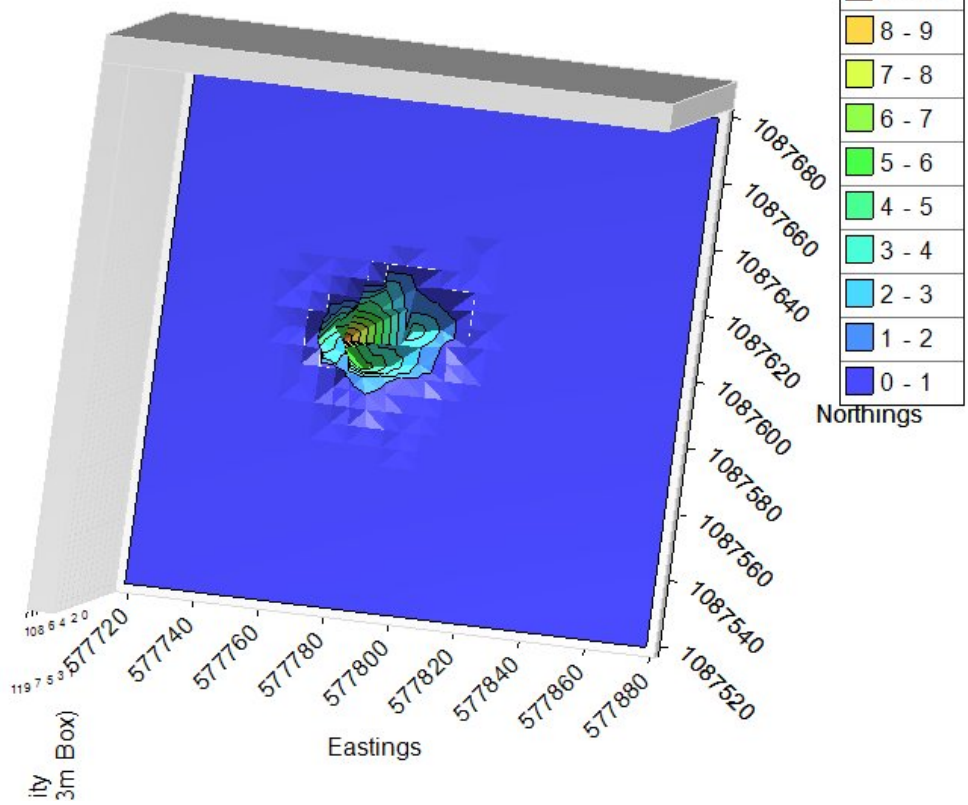
Name	Filename	Start	End	#Acoustic	#Position
CASIUS13 10230640	C:\Ranger Files\CASIUS\1023_0030\ CASIUS13 10230640.csv	10/23/2016 7:09:37 AM	10/23/2016 7:26:14 AM	200	1696
CASIUS2 10230032	C:\Ranger Files\CASIUS\1023_0030\CASIUS2 10230032.csv	10/23/2016 0:39:19 AM	10/23/2016 0:55:50 AM	199	1711
CASIUS3 10230056	C:\Ranger Files\CASIUS\1023_0030\CASIUS3 10230056.csv	10/23/2016 1:19:10 AM	10/23/2016 1:35:46 AM	200	1719
CASIUS4 10230136	C:\Ranger Files\CASIUS\1023_0030\CASIUS4 10230136.csv	10/23/2016 1:53:20 AM	10/23/2016 2:09:50 AM	199	1566
CASIUS5 10230210	C:\Ranger Files\CASIUS\1023_0030\CASIUS5 10230210.csv	10/23/2016 2:25:09 AM	10/23/2016 2:41:39 AM	199	1665
CASIUS6 10230241	C:\Ranger Files\CASIUS\1023_0030\CASIUS6 10230241.csv	10/23/2016 2:57:53 AM	10/23/2016 3:14:25 AM	199	1664
CASIUS7 10230314	C:\Ranger Files\CASIUS\1023_0030\CASIUS7 10230314.csv	10/23/2016 3:32:24 AM	10/23/2016 3:48:56 AM	199	1674
CASIUS8 10230349	C:\Ranger Files\CASIUS\1023_0030\CASIUS8 10230349.csv	10/23/2016 4:03:09 AM	10/23/2016 4:19:45 AM	200	1659
CASIUS9 10230420	C:\Ranger Files\CASIUS\1023_0030\CASIUS9 10230420.csv	10/23/2016 4:33:54 AM	10/23/2016 4:50:28 AM	200	1629
CASIUS10 10230450	C:\Ranger Files\CASIUS\1023_0030\ CASIUS10 10230450.csv	10/23/2016 5:14:33 AM	10/23/2016 5:31:03 AM	199	1709

Name	Filename	Start	End	#Acoustic	#Position
CASIUS11 10230531	C:\Ranger Files\CASIUS\1023_0030\ CASIUS11 10230531.csv	10/23/2016 5:45:46 AM	10/23/2016 6:02:26 AM	201	1690
CASIUS12 10230602	C:\Ranger Files\CASIUS\1023_0030\ CASIUS12 10230602.csv	10/23/2016 6:24:06 AM	10/23/2016 6:40:41 AM	200	1718

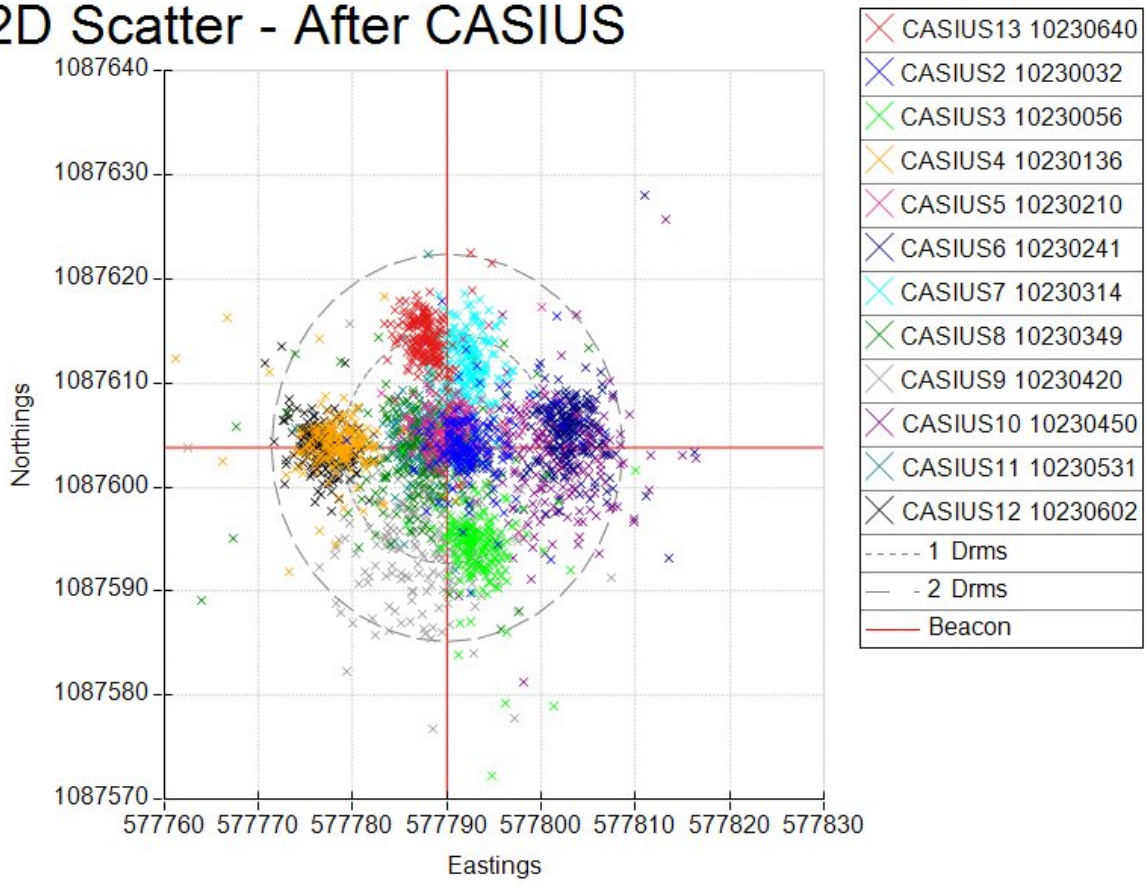
2D Scatter - Before CASIUS



3D Histogram - Before CASIUS



2D Scatter - After CASIUS



3D Histogram - After CASIUS