

1/25/20

Local

1000

TG Thompson departing Cape Town
We have the following scientists aboard from
BLOS (and vicinity):

R. Behr
D. Duggan
B. Bowler
C. Fowler

S. Rauschenberg (working w/ Peter Morten)
Sydney Greenberg (Colby Senior)
Marcia Train (educator) at sea from Long
Island, Maine

We are set up to make the following
measurements:

UV system (w/ ac-9, by ~~transmitted~~ all glass,
bbl p, ocean floor), acid-base tit, PIC,
SS, T, SSS.

light microscope

Bow-mounted / Hyperstar [w/ ED sensor
on instrument mounted at bow]

OCP -

Temp control incubators on fantail

Air sampler (of 1 molar) to sample air with

0.1 μ m poly-carbonate filter to then do

bioassays

14 C - measurements

Plan

Plan is to do a zonal survey along Agulhas

current through PIC features, to form VPR

② Sample 2 PIC-rich: alders (deploying diver,
VPR, radial survey, ~~CT~~ survey, Carlson

experiments w/ ammonia (w/ NO₂, H₂S, CO₂)
+ Fe + E + S; control, dinitr. These will be

measured in cultures on deck. Final morphological plan

Other equipment brought: McGinty

Recorder: Cell - contained must also be CT

Morton: 1 molar clean, oxygenated water for Fe

while making 10% of salt for low Fe
work. TM can also aboard

Recd 1-25-20

400 Science meeting -

400 Dave send OCP man. Time burned a component on turn-on. Small of electrical stuff

26:20

400 Baluh com. worked on dry schedules and cruise planning. Very complicated!

000 Wind picking up. Close off belt. No Shake down

Have TO

400 Wagon - Reddy

1/27/20

2230 0030 GMT Ship went completely dark

No propulsion NADA

100 GMT power coming back up. Ship still stopped

We will have no RAR data for first count so assume floor may be off

$$I_2 = I_0 e^{kz}$$
$$\ln \frac{I_2}{I_0} = kz$$
$$\frac{\ln 0.11}{2m} = k$$
$$\frac{4.6}{2m} = k$$

Target light depths

Depth	Count
1	50
2	36.8
3	26.1
4	11.7
5	5
6	3.6
7	1.93
8	0.28

Winding 2 of 8 layers
measured floor
most on ledge

Bar

Depth	Count
1	50
2	36.8
3	26.1
4	11.7
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4 1-27-20

0400 G4 TMC NISKIN X deploy

0615 TMC NISKIN X Recovered

0627 SAS Turned on

0645 TMC NISKIN Recovered

0700 Test Tow TM fresh

0745 Recover TM fresh

VPR Tow

1700 VPR Recover due to deteriorating weather

2007 STN 2, CTD - 750m

-38.767 x 26.2328

CTD Recover

1-28-20

0325 Bruce and I figured out the bar 7. light

(we think) in CB1 cruise, stn 9041, we

measured at the following depths: 7. light depth

7 (m) 1.28 26.2328 with three depths

59.4 0.28 26.2328

39.2 1.93 5 ← we used to put fluor max

33.7 3.65 4 sample in the bag, even

21.7 11.7 3 though it should be in 11.

15.7 21.1 2

10.1 36.8 1

∴ We assume that our bags have these percentages
and note the two yellow cells in light data
calculator spreadsheet are not sampled.

1-27-20

In summary, for this trip where we have no
light data (since no casts near noon)

1) Calculate proper depths assuming 1% max

is at 1% (this is solid and can be referenced

to AAT publications by Poulton et al

2) Align bags 1, 2, 3, 4 & 6 (not 5) to actual

depths.

3) Put fluor max sample (nominal 1% depth) in

1.9% bag

4) Cover incubators at night!

1-28-20

0341 CTD Cast (Productivity cast)

Event 2020128-0341 - deploy

0410 first bottle trip at 750m

0450 last bottle trip at surface

0450 CTD recovered 2020128-0450

2138 CTD 4 Deployed

-38.8105 x 30.1489

Very strong current @ surface

high wire Angle

Ship in "drift mode" instead of DP

2248 CTD Recover

-38.8043 x 30.1561

STN 003-01

1/27/20

2305

VPR down

1/28

0400

SAS on 38.937 x 10.111

1/29

Time

VPR

0235 1/30

CTD productivity cast 5000
Event 202001300235
-39.1883 x 033.2991

0319

SAS on event 202001300319

1/30/20

1618 Preparing two samples for FF counts,
6.5 m and 50 m at Sta 5
Event 202001300235 cast
Lat - 39.18835 033.2991E
will filter 100-ml on 0.4 μ m polycarbonate,
Jumbo Slide #1 50.5 m Images MG002 - 50 MG042 all 400x
A-20 Slide #2 50 m Images 400x Images 045-076

0910 Finished w/ TM fish, filling barrels,
departing str deploying VPR but we
will leave station 5 for WPC (not B)
to save time. -39.28845 x 033.1400E

Conversation w/ Pete Martin re experiment #1
amendments

6871 11.2-11.6 lat Temp 19°C - 12°C
at 19°C Surface PO_4 was immeasurable
S, CH₄ 0.1
Fe 1.6
300 m NO_3 = 11 μ M
 PO_4 = 0.8 μ M
S, CH₄ = 4.6
Fe = 0.3 mM

AD B) $+NO_3$, S, CH₄ + Fe, S, CH₄ + Fe control SAMW
12 μ M 12 μ M 4 μ M 12 μ M + 1 μ M 0

2/1/20

0820 STN 006.01 CTD cast
-39.5677 034.9793

Event 202001310820

Took 2 samples for mic. counts
at 3m & 40m (fluor max)

No time to look at. Do tomorrow

2/1/20

0052 STN 007.01 CTD cast
-39.4752 034.1997
Event 202002010052
Eddy (or filament center)

0710 Moving ship N to periphery of eddy to
set things up for VPR tow back through
center

Microscopy of station 006.01
3m Images IMG-0077-114 all 400X

Note in images 105-114 a leptophyte w
holocarpus and leptocarpus

← Acanthion quaternaria

0080
0081
0082

2.7

2/1/20 STN 006.01 40m images 115-148 fluor max
Images 115-118 show a leptotrophic diene
with internal covalent, 119, 120 show other
diene with different exposures for bioregulation
(but moved stage from previous slides)

1056 Filling microscope samples in
007.01 100mL per sample
Jug 8 = 12.6m
Jug 4 = 57.8m

Microscope work up of CTD cast 007.01 12.6m
Begin img 0149.5PG - 0173.5PG. All bright field

57.8m Begin image img-0174.JPG
ending w/IMG-0209.JPG
1) Bright images
2) Blue oxidation
3) Green fluorescence

Have seen Acanthion quaternaria see p 8
Machosaurus

Syncephala odd type 1 (PSS Young
et al)

2349 STN 008.01 Event 202002012349
Prod cast -40.4995 034.2006

0605 Viewing microscope samples stn 008.01
at 8.7m
First picture IMG-0210.JPG - 0249.JPG

40m IMG-0250.JPG - IMG-0290.JPG

Saw Syncephala tubifera (Acanthion sp)

2/3/20

0748

Stn 9.01 Event 202002029.01
 5m water east on North boundary
 line

1220

STN 10 CTD

-39.4751 x 39.1997

1640

STN 11 CTD

-39.0015 x 34.2

2036

STN 12 CTD

-39.501 x 34.1995

0

2/3/20

0315

Micro viewing stn 12 (Agulhas Current)
 All 400x Vis. Bury, epibio, epi green
 12 m Very little material

Begin Image 0002.JPG - Image 044.JPG

Note Image 001 is green epi and 002 and 003 are blue epi excitation

Stn 12.01

54 m Also little material

Mostly E. Bury - blue cat eyes

Image 045 → 079.JPG

2/3/20

1030 cont CTD 013.01 event 202002031030

-39.4752 035.4670

1489 CTD 14 - 20200203.1489

-39.475 x 34.8335

1847 CTD 15 - 20200203.1847

-39.4748 x 34.2003

2241 CTD 16 20200203 2241

-39.4753 x 33.5653

2/4/20

0222 CTD 17 Prod cont 202002040222

-39.4749 x 032.9163

1010

Viewing microscope samples from stn 013.01
 As used beginning at 400x Bury, epibio, epi green, epi
 3.9m - blue than epi green

Prod beginning at Image 001.JPG - Image 049.JPG

17.7 m Stn 17.01 Prod beginning Image 050.JPG - Image 098.JPG

12 2/6/2020

Looking at old sample

Event 20200205-1000
250 ml filtered one 4 PC filter PR1.
all bat 400X

Plus IMG-0001.JPG - IMG 0049

Looking at Aerial samples: Slide #2 Surf only 400X
IMG-003 to IMG-064

1840 CTD 18.02 20200205.1840

Carbon sample & in

Feetura (Eddy) #2 - Elevated PC

2/6/20

0625 Looking at stn 18.02 - in microscope
Surface (-w) 100 ml filtered, mixed w Potassium
Tetra Borate

IMG-0065.JPG - #104 Very little in
sample

FL max (—X) 100 ml filtered w/ K borate
ruse

IMG-105.JPG - IMG - 141.JPG

Also little material on slide.

2/6/20

2302 STN 19.01 Event 20200206.2302
CTD S Eddy stn

2/7/20

0235 CTD 020.01 Eddy Interior South

Event 20200207.0235

Procl stn

0736 CTD 021.01 Middle of Eddy
Event 20200207.0736

0850 Drague deployed - 035° 53.0' 037° 37.8'

Looking at FFT samples

STN 20.01 Interior South stn filtered 250 ml
100X mag Bright field, brightfield, epifluorescence, epifluorescence
12m (img 8)

IMG-1001.JPG - IMG-1024.JPG

Going... some Eux and dunes... that's it

57.1m lots more material!

Pres 25 → 70

1201 CTD 022.01 Eddy Interior North
event 20200207.1201

1515 CTD ~~023~~ at Eddy Exterior North
scrubbed due to weather

Two competing Swells giving very unpredictable
rolls - dragline tension on wire

2/17/20

2130 CTD ct Eddy East

Surveyed 30 Knots

Confused 15 knot swell

going to Steer to Eddy interior

East and wait a bit.

Underway Sunde + XBT

The interior east CTD was cancelled due to sea state. Moving to Eddy center to the sampling there. Arrived at 0515 (0315 GMT). So far we've had one productivity cast in interior south, and no CTDs at Eddy north and east. Hope for eddy west CTD before heading for Durlan

CTD 23-01 Event 20200208.0344

Prod cast at Eddy center

CTD 24-01 Event 20200208.0803

Prod CTD cast at Interior East

2/8/20

Mr. Manning Stn 023-01 350m
all 4000 Bright field, Surf, epulidus & Epiorgan

Began Ing 0071 - 0101

48m Beam e Ing 0102 - 0136

60m 0137-193
floor may

1255 CTD Station 25 750m

-35.6799 X 36.6384
Chl rx X 60m

1400 CTD recovered

Headed for Durlan

10 Feb

0600 GMT

0700 GMT

Boarded Pilot

Docked Durlan

2/17/20

2130 CTD cast Eddy East

Seemed 30 knots

(Confused) 15 knot swell

Going to Steer to Eddy interior

Fast and wait a bit.

Underway Sample + XBT

2/18/20

0005 The interior east CTD was cancelled due to sea state. Moving to Eddy center to try sampling there. Arrived at 0515 (0315 GMT). So far we've had one productivity cast in interior south, and no CTDs at Eddy north and east. Hope for each west CTD before heading for Durlin

0314 CTD 23-01 Event 20200208.0314

Prod cast at Eddy center

0803 CTD 24-01 Event 20200208.0803

Prod CTD cast at Interior East

2/8/20

Nuc. measuring station 023-01 350m
all 400x Bright field, Surf, epulidus & Epsilon
12-8m Eddy center

Began mag 0071 - 0101

48m Beam e mag 0102 - 0136
away

60m 0137-193
flavor away

1255 CTD Station 25 750 m

-35.6799 X 36.6384
Chl max = 60m

1400 CTD recovered

Headed for Durlin

10 Feb

0600 GMT Boarded Pilot

0700 GMT Docked Durlin

2/13/20

6m
227 Viewed aerosol samples. All ~~at~~ at 400x magn. Nothing of any note - A few ~~invertebrates~~ pseudoscorpions. About nothing ~~sephimidae~~ ~~1-3~~ ~~1-3~~

1247 #7 Pic 4-6 Nothing very convincing
1313 #8 Pic 7-10 Nothing very convincing
1315 #9 Pic 11-15
1325 #10 Pic 16-22 Some of these are convincing ~~coralliths~~
1445 #11 Pic 23-36
1515 #12 Pic 37-46 Some whole corals present

2/16/20

Viewing Vol sample from 2/15/20 event 20200215 which had bb' = 2.5E-3 Vol of sample? 100mL
All pics 400x bright field, brief, epifluor, epigran event 20200215-2050
img 0001.jpg to 0036

Viewing Vol sample taken during passage through brown wind rows (looked like tracks, w/ rows aligned downwind)

Event 20200216.0509 Pic img 0037 to 0099

Pic 18 2032 23
Brief epifluor green on shale drive

1726 STN 26 CTD

2008 CTD 27 - Trip on Fly
-41.4962 x 30.9487
-41.5002 x 31.2148

2208 CTD 28.01 Productivity

-41.4999 x 31.4010

20507 CTD 29.01 Trip in fly

-41.4994 031.7499
Event 202002170507

20128 TM FISH

Event 202002160128

2/17/2020

0720 Viewing microscope samples. Tough viewing! Ship rocking!
STN 30.01 SURF bottle
250ml #8 Jug all 400X

lots of diatoms w/ fast lanes coccoids (still unident)
images 1-35

STN 28 Carboy control bottle #1 surface
images 36-81

STN 29.015m
~~Nothing~~ probably look 750m
nothing by accident. Surf water
was green. #82-88

0818 STN 30.01 Water Cnst
Event 20200217.0818
-41.50015 032.3139E

1058 STN 31.01 Tripinphy
Event 20200217.1058
-41.49998 032.6504

1337 STN 32.01
-41.5 x 32.9889
55' x 203

2/17/2020

1641 CTD 33 - TRIP ON FLY
-41.5001 x 33.3276

2004 CTD 34
-41.5013 x 33.6692 45' 90-4

Long discussion about whether or not to deploy
30-35 Knts WSW 15+ feet Swell

Track DAUPR off of Rosette frame - will not hook up for star to line #2

7/18/2020

Viewing microscope samples

STN 30.01 5m 250ml all at 400X

Brightfield, brief, epifluorescence, epigreen
We are not doing and rolling up here in
zero growth microscope depth beam!
Note, sample was partially dried so 100 wet w/FSW prior to count
img #90-141

mostly diatoms w/a few coccoids

000 Event 20200218.0500

#147 - 217 Lots of diatoms

Fast moving coccoid sp.

Non bioluminescent
A. stipitata

12-5m

2/19/20

0938 CTD # 041.01
-40.5021 033.0497
Event 20200219.0938

1105 Viewing microscopy Event 20200219.0339
Stn 39.01 10.2m 250mL
All 400x BF, BRF, Epi Blue, Epi Green
Pics 1-54
mostly dunes then coccas, 1 big Navicula sp.
one filamentous form

Stn 39.01 49m 250mL
Pics 55-116

Same chotoms. the first time the entire trip. *Navicula Navicula* *Fragillaria* sp.
Probably one pet. field, on average
few coccas still dunes, lots of *Navicula*
How much *Navicula* in these samples?

1211 CTD 42.1 The only

-40.5007 x 33.9038
bb' = 2.3 e-3

1409 CTD 43.1
-40.5 x 33.7022
bb' = 1.7 e-3

20 2/18/20

1751 CTD 35.01 Trip on Bay
-40.5007 x 31.2899
bb' = 4 e-4

2039 CTD 36.01 Trip on Bay
-40.5005 x 31.6831

2245 CTD 37.01
-40.5001 031.9335
Event 20200218.2245

2/19/20 0149 CTD 38.01 Trip in Bay cast
-40.5001 032.2260
Event 20200219.0149

0339 CTD #39 Full water cast
-40.5001 032.6202
Event 20200219.0339

bb' end time of deployment was 197C-3
but that was somewhat short-lived, falls
to 1.3 e-3

0745 CTD #40 Trip in Bay
-40.5009 032.8125
Event 20200219.0745
bb' = 1.5 e-3

02/20/2020

0837 CTD Stn 44.01 Event 20200220-0837
-39.5005 032.0444^{9E}

1128 CTD Stn 43.01 Event 20200220-1128
-39.4996 032.4172

V. Brown

1230 V. Brown Microscope slide from 176-187
Surface water 20200219-1230
150 ml filtered
Had rough 65' (2.30-3)
PC 117-213

Note 159-163 all at 100m was of
Acanthosoma (Amazing!)

Another Acanthosoma 176-187 (even more amazing)
and some specimens at 200X 188-192
Rout at 400X

1331 CTD 46 01

-39.5006 x 32.6682

55' ± 1.2e-3

2/20

1546 CTD 47.01

-39.5006 x 32.9017

1810 - CTD 48 - CASES INTERRUPTED
-39.5 x 33.10

Procell was over the rail when
Engine Room cancelled the cast - engine strikes
Clogged with Krill - we need to move!

steaming 1 mile to the east to try again

1820 - 1 mile east - now Steamer filling
with Jelly Fish - Salps?

-39.5 x 33.189

1851 Stn 48 - 2 miles East of intended

-39.5003 x 33.2046 - productivity

55' 1.5e3

2000 - Not productivity cast - TM scuttled
after CTD recovered - Rety @ stn 50

2052 CTD 49

-39.5002 x 33.3995

55' = 1.2e-3

2/21/20

1831 CTD 53 DEEP 5060m

-37.301 x 35.361

2/22 1243 CTD 54 East End of 1st tract

-36.3006 x 37.3003

1759 CTD 55 Trip on fly

-36.73004 136.9
event 20200222, 1759

2300 CTD 56 Prod cont

event 20200222, 2300
-36.13 x 036.7518

2/23/20

0405 Rodum and Rolling 6-8m seas
35-40KTS

1258 CTD 60.1 - 110 GPS

-36.17.99 x 36.8955

1606 CTD 61.1 Trip on fly

-36.2985 x 35.9658

2/20

2255 CTD 50.1 Productivity

-39.5005 x 33.6501

46' - 136 e-3

0238 CTD 51.1 Trip in FA
-39.5002 033.8337

0418 CTD 52.1
-39.5003 033.9997
event 20200221, 0418

0845 Viewing thru 50 sampler under microscope.

6m sample 150ml 400x

time - 0214 - 249

25m 50m 100m 400x

time 250 - 307

Full of Microbial Sarsia - Can see they are
active. Also Acetivibrio gyrobaculum
Also epiphytic large diatoms. Used 100x to
see culture CTD like 269-292 (100x of images
265-268) which were at 400x

2/23

2020 CTD 62 cancelled (East end of B-W line)

due to big swell and darkness

~~2/24~~

0030 Done microscopy given ship is on great course down wind and water yesterday was 6 m seas 35-40 kt winds and was impossible to work in the forward darkroom/zero gravity room/hammock! Note samples in fridge 36 h?

Lodging at stn 56 sampler and early sample (control) Eddy Interior East

14m went 20200222.2300 250ml, All 400x Region coccoids, Saw 2 diatoms only (took pres). Few diatoms. Saw *Leptotheca* diatom, mostly E but mages 1-36

40m glow max all 400x mages 37-79

slides for epi cube broke off. Will try to use leatherhorns to move. Used P. 66 was last before Dredge fell off! Will now use leatherhorns.

Again little in 70m sample. Coccoids, one diatom, one diatom. Amargosa deperipate!

0027 Corvey Sample - Saw some coccoids, diatoms, and *Leptotheca* Image 80-141

107-112 at 100X, 113-116 at 200X, 117-137-141 @ 100X,

2/24/20

0249 Stn 062.01
-35.3847 036.3815
Full water cast

0611 Stn 063.01 Trip in fly
-35.7343 036.3809

0850 Stn 064.01 Net by interior
-36.0738 036.3818

1044 Stn 065.01 Trip in fly
-36.1698 036.3776

1259 CTD 86 36.2939 X 36.3739 - Productus event 20200224.1259 Eddy center Conditions worsening - no TM cast now

Stations to # 67

1450 Arriving # 67 Wind coming around to SW dropping slightly - but still big swell 5-6 m

Going to wait @ station 67 for a bit - see if/when conditions improve. (Stn cancelled - see next p. 0455) 2/25/20 Now 67

2045 Moving on to Stn 68 - took VPP off of Rosette but still no go for cast - will re-evaluate @ 68 - only 6 miles - 12 miles from drifter after moving further from line so the longer we wait the further it will get.

2/25/20

0154 Dows microscope, ~~the~~ Fixed microscope holder w/ manual machine bolt.

STN 70 Edley Carter

150 ml - Jng 2 120 m. This bottle showed a very small but distinct subsurface peak in fluorescence. Odd given that the fluor may (supposedly) light was at 82 m!

First pre #142 - 208 off 400X

Mainly small coccos

Stn 70 Jng 8 16.6 m

250 ml Images 209-262 @ 400X

small coccos, occasional diatom

Stn 70 FL max 82 m - 150 ml

Images 263-315

Above more coccos & gammas than anything else downes, few diatoms

Overall fewer coccos and gammas than last visit to edley center on 3/7/20 (Stn 2301, P.14)

2/26

1801 Deer CTD # 72

-34.4252 x 38.0417

2200 CTD recovered - upw Per Deep Cst 3

28 2/24/20

2230 Arrive STN 68 - re-essays No go

2 miles from Difter per 2030

2/25/20

00001 Heaching for drifts. See states droppings

03006 Drifter aboard -36.683 36.1383

0455 CTD #67.01 Event 20200225.0455
Trip in fly -36.6838 036.3793

0650 CTD #68.01 water
Event 20200225.0650

0850 CTD #69.01 Trip in fly
-36.4420 036.3810
Event 20200225.0850

1044 CTD #70.01 Water (full)
-36.3032 036.3831
Event 20200225.1044

1852 CTD 71.01 - Edley South
-37.2171 x 36.379

2/29/20

1000

073.01

Deep Cast for Freons, O₂
DIC, Nutt, PIC, POC, BSi's
Coccolith counts

Lat - 27.4089 Lon 049.8218

Z = 5064 Event 30200229.1000

2/29/20

0816 UW to last ~~stn~~ (deep CTD) 73.01
 -27.58657 49.53324 $b_b' = 1.28e-4$

950 Aerosol Recover 27
 $(-27.41066, 49.81824)$

0954 V/W Sys Shutting down

1005 Running FSW

060-1005 Jct

SS' $1.78 e^{-3}$

1105 Running MTD - Dirty Cal

060-1059 Jct

Temp = 20.6°C

SS = $1.68 e^{-3}$

VSE darks

counts

DRY 168 169 165

WET 175 176 173