

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P20 Event #: 67168 Ship: Tully UTC Date (dd mmm yyyy): 18 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials													Comments		
			Target Pressure	Confirmed	Size	13C	15	15N	Dark	32Si	Part	d Si	NH4	urea	nuts	phyto	ONAr		O2	
			✓ Pressure	✓	CHL	15NO3	NH4	urea	Blank		Si								17O	
1		431	5	✓																
2		432	OXY MAX	✓ 40													xx	xx		
3																	xx	xx		
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17		433	0.1%	✓ 80	x	x	x	x		x	x	x	x	x	x	x				
18		434	1%	✓ 65	x	x	x	x		x	x	x	x	x	x					
19		435	15%	✓ 25	x	x	x			x	x	x	x	x	x	x				
20		436	30%	✓ 15	x	x	x	x		x	x	x	x	x	xxx					
21		437	55%	✓ 7	x						x						x			
22		438	55%	✓ 7		x	x	x		x		x	x	x	x					
23		439	100%	✓ 2	x				x		x									
24		440	100%	✓ 2		x	x	x		x		x	x	x	x					

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): H. M. +

Bottom Depth: 3964 m
Transmisso Cleaned: ☒ Y ☐ N

Time	UTC	Local
Start	1033	0333
Bottom	1036	
End	1047	

Positional Information
Start
Lat: 49 ° 34.03 N
Lon: 138 ° 39.97 W

Bottom
Lat: 49 ° 34.00 N
Lon: 138 ° 39.98 W

End
Lat: 49 ° 34.00 N
Lon: 138 ° 39.97 W

Extra comments:
Productivity cast
OUT-OF-ORDER
17, 18, 2, 19, 20, 21, 22, 1, 23, 24

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P20 Event #: 69 Ship: Tully UTC Date (dd mmm/yyyy): 18 09 2018

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments				
			Target	Confirmed	Nut-F	Sal	TM F	TM UF	Ligs										
			Pressure	✓ Pressure															
1	1	441	300		299		x	x	x	x									
2	2	442	200		199		x		x	x									
3	3	443	150		149		x		x x	x x									
4	4	444	100		99		x		x	x									
5	5	445	75		68		x		x	x									
6	6	446	50		49		x		x	x									
7	7	447	40		39		x x		x	x	x x x x								
8	8	448	25		24		x		x	x									
9	9	449	10		9		x		x	x									
10	10																		
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			

Profile type:
ROS TRM X-Niskin other?
Watchkeeper(s): JR

Bottom Depth: 3964 m
Transmisso Cleaned: Y / N

Time	UTC	Local
Start	1213	0513
Bottom		
End	1230	

Positional Information

Lat:	49 ° 34.00	N
Lon:	138 ° 39.99	W

▼

Lat:	49 ° 33.93	N
Lon:	138 ° 40.01	W

▼

Lat:	49 ° 33.98	N
Lon:	138 ° 40.01	W

Extra comments:
TMR Shallow

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P20 Event #: 70 Ship: Tully UTC Date (dd mmm yyyy): 18 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials																	Comments
			Target Pressure	Confirmed ✓ Pressure	OXY	Sal	Nut-F	Nut-C	DIC	CW TOC		Gels	Gases	SAGs	DNA	EEA	Cr					
					HW 1/3	HW 1/4	JS	YS	HR 1/5	D		CW	YS	CW	ALL	ST	ST					
1		450	Bot-10	✓	4023	x		x	x	x	x		x		x	x	x	x				
2		451	3500	✓		x	xx	x	x	xx								x				
3		452	3500	✓		xx	x	x	x	x	x		x									
4		453	3000	✓		x	x	x	x	x	x		x		x	x	x	x				
5		454	2500	✓		x	x	x	x	x	x		x					x				
6		455	2000	✓		x	xx	x	x	x	x		x		x	x	x	x				
7		456	1500	✓		x	x	xx	xx	x	x		x		x	x		x				
8		457	1250	✓		xx	x	x	x	x	x		x		x	x		x				
9		458	1000	✓		x	x	x	x	x	x		x		x	x	x	x				
10		459	800	✓		x		x	x	x	x		x		x	x		x				
11		460	600	✓		x		x	x	x	x		x		x	x		x				
12		461	400	✓		x		x	x	x	x		x		x	x		x				
13		462	300	✓		x		x		x	x		x		x	x		x				
14		463	250	✓		xx		x		x	x		x					x				
15		464	200	✓		x		x		x	x		x		x	x	x	x				
16		465	175	✓		x		x		x	x		x									
17		466	150	✓		x		xx		x	x		x		x	x	x	x				
18		467	125	✓		x		x		x	x		x									
19		468	100	✓		xx		x		x	x		x		x	x	x	x				
20		469	75	✓		x		x		x	x		x									
21		470	50	✓		x		x		x	x		x		x	x	x	x				
22		471	25	✓		x		x		x	x		x		x	x		x				
23		472	10	✓	10	x		x		x	x		x		x	x	x	x				
24		473	5	✓		x	x	x		x	x		x	xx				x				

Profile type: ROS TRM X-Niskin other?

Watchkeeper(s): ifm +

Bottom Depth: 3964 m

Transmisso Cleaned: Y N

Time	UTC	Local
Start	1237	0537
Bottom	1345	
End	1513	

Positional Information

Lat: 49 ° 34.07 N

Lon: 138 ° 39.88 W

Lat: 49 ° 34.10 N

Lon: 138 ° 39.68 W

Lat: 49 ° 34.02 N

Lon: 138 ° 39.38 W

Extra comments:

Deep cast

Will also have loops for Oxy x2

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P20 Event #: 71 Ship: Tully UTC Date (dd mmm yyyy): 18 09 2018

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments	
			Target Pressure	Confirmed ✓ Pressure	Nut-C	Nut-F	Sal	TM F	TM UF							
1	1	474	2000	2000	x	x	x	x	x							
2	2	475	1800	1799	x	x	x	x	x							
3	3	476	1600	1600	x	x	x	x	x							
4	4	477	1400	1398	x	x	x	x	x							
5	5	478	1200	1200	x	x	x	xx	xx							
6	6	479	1100	1100	xx	xx		x	x							
7	7	480	1000	998	x	x		x	x							
8	8	481	800	798	x	x		x	x							
9	9	482	600	600	x	x		x	x							
10	10	483	400	400	x	x		x	x							
11	11	484	250	250		x		x	x							
12	12	485	130	129		x		x	x							
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																

Profile type:
ROS TMR X-Niskin other?
Watchkeeper(s): JZ RT

Bottom Depth: 3964 m
Transmisso Cleaned: Y / N

Time	UTC	Local
Start	1554	0854
Bottom	1636	
End	1726	

Positional Information

Lat:	49° 33.99	N
Lon:	138° 39.95	W

▼

Lat:	49° 33.98	N
Lon:	138° 39.98	W

▼

Lat:	49° 33.96	N
Lon:	138° 39.83	W

Extra comments:
TMR Deep

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P20 Event #: 72 Ship: Tully UTC Date (dd mmm yyyy): 10 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments			
			Target Pressure	Confirmed ✓ Pressure	DMS	DMSP	DMSP	Nut-Fr	Chl	HPLC		Phyto	HAB	UVic		EEA		
						t		d										
1		486	500	✓	500										x			
2		487	300	✓		x			x									
3		488	250	✓					x					x				
4		489	200	✓		x	x	x	x									
5		490	150	✓		x	x	x	x x					x				
6		491	100	✓		x			x	x								
7		492	75	✓		x			x	x x								
8		493	60	✓	-				x	x	x x							Fluo 8.303e-061
9		494	50	✓	-	x			x	x	x x			x				Fluo 1.026
10		495	40	✓	-	x			x	x	x x							Fluo 1.202
11		496	30	✓	-	x	x	x	x	x	x x							Fluo 1.001
12		497	25	✓		x			x	x								
13		498	20	✓		x x	x x	x x	x	x				x				
14		499	15	✓	-	x			x	x	x x							Fluo 7.361
15		500	10	✓		x			x	x x				x				
16		501	5	✓		x	x	x	x					x				
17		502	5	✓	-					x	x x		x x	x				Fluo 4.00
18		503	0	✓		x	x	x	x	x								
19																		
20																		
21																		
22																		
23																		
24																		

Profile type:
ROS TRM X-Niskin other?
Watchkeeper(s): H.m +

Bottom Depth: 3965 m
Transmissio Cleaned: (Y) I N

Time	UTC	Local
Start	1736	1036
Bottom	1744	
End	1806	

Positional Information

Lat:	49 ° 33.97	N
Lon:	138 ° 39.95	W

Start

Bottom

End

Lat: 49 ° 33.98 N
Lon: 138 ° 39.84 W

Lat: 49 ° 33.97 N
Lon: 138 ° 39.69 W

Extra comments:
DMS & Uvic cast
Phyto: L&F

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P21 Event #: 73 Ship: Tully UTC Date (dd mmm yyyy): 18 09 18

Niskin #	Firing #	Sample #	Rosette Operation			Samples Taken / Sampler's Initials										Comments			
			Target Pressure	Confirmed ☒ Pressure		Nut-F	Sal	Chl	HPLC	Gases									
1		504	5	☒	5	x	x	x x	x x	x x									
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			

Profile type: ☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): MG

Bottom Depth: 3958 m
Transmisso Cleaned: ☒ Y / ☐ N

Time	UTC	Local
Start	2248	1549
Bottom	2323	
End	2358	

Positional Information
Start
Lat: 49 ° 37.94 N
Lon: 139 ° 39.89 W

Bottom
Lat: 49 ° 37.76 N
Lon: 139 ° 39.89 W

End
Lat: 49 ° 37.75 N
Lon: 139 ° 39.91 W

Extra comments:
Plus loops for 1x Sal, 2x Chl

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P22 Event #: 74 Ship: Tully UTC Date (dd mmm yyyy): 19 09 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments			
			Target Pressure	Confirmed ✓ Pressure	CHL	HPLC	Nut	Sal	Oxy	Gels	Gases	TOC						
1		505	Bot-10	✓	3997				x	x		x					PAR OFF	
2		506	3500	✓	3500			x	x	x		x						
3		507	3000	✓	3000			xx	x	x		x						
4		508	2500	✓	2500			x	x	x		x						
5		509	2000	✓	2001			x	x	x		x						
6		510	1750	✓	1750			x	x	x		x						
7		511	1500	✓	1500				x	x		x						
8		512	1250	✓					x	x		x						
9		513	1000	✓					x	x		x						
10		514	800	✓					x	x		x						
11		515	600	✓					x	x		x						
12		516	400	✓					x	x		x						
13		517	300	✓					xx	x		x						
14		518	250	✓					x	x		x						
15		519	200	✓					x	x		x						
16		520	175	✓					x	x		x						
17		521	150	✓					xx	x		x						
18		522	125	✓					x	x		x						
19		523	100	✓					x	x		x						
20		524	75	✓					x	x		x						
21		525	50	✓					x	x		x						
22		526	25	✓					x	x		x						
23		527	10	✓					x	x		x						
24		528	5	✓		xx	xx	x	x	x	xx	x						

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): MG/HM

Bottom Depth: 3895 m
Transmisso Cleaned: ☒ Y / ☐ N

Time	UTC	Local
Start	0448	2148
Bottom	0556	
End	0724	

Positional Information

Lat:	49 ° 42.02	N
Lon:	140 ° 39.94	W

Start

Bottom

End

Lat: 49 ° 41.96 N
Lon: 140 ° 40.02 W

Lat: 49 ° 41.96 N
Lon: 140 ° 39.96 W

Extra comments:
TOC & Gels cast

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P23 Event #: 75 Ship: Tully UTC Date (dd:mmm:yyyy): 19 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments			
			Target Pressure	Confirmed ✓ Pressure	Nut-F	Sal	Chl	HPLC		Phyto	HAB							
1		529	5	✓ 5	x	x	x x	x x		x x	x							
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		

Profile type:
ROS TRM X-Niskin other?
Watchkeeper(s): HM+

Bottom Depth: 4050 m
Transmisso Cleaned: Y N

Time	UTC	Local
Start	1157	0457
Bottom	1231	
End	1302	

Positional Information

Lat:	49 ° 46 00	N
Lon:	141 ° 39 92	W

▼

Lat:	49 ° 45.97	N
Lon:	141 ° 39.93	W

▼

Lat:	49 ° 45.96	N
Lon:	141 ° 39 95	W

Extra comments:
Phyto: L&F
Plus loops for 1x Sal, 2x Chl

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P24 Event #: 76 Ship: Tully UTC Date (dd:mmm:yyyy): 19 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments			
			Target Pressure	Confirmed ✓ Pressure	CHL	HPLC	Nut	Sal	Oxy	Gels	Gases	TOC						
					JW	JW	WB	YS/TV	MG/TV	CW/YS		D						
1		530	Bot-10	✓ 4047					x	x		x						
2		531	3500	✓ 3503				xx	x	x		x						
3		532	3000	✓ 3001				x	x	x		x						
4		533	2500	✓ 2501				x	x	x		x						
5		534	2000	✓ 2000				x	x	x		x						
6		535	1750	✓ 1750				x	x	x		x						
7		536	1500	✓ 1500					x	x		x						
8		537	1250	✓ 1250					x	x		x						
9		538	1000	✓ 1000					x	x		x						
10		539	800	✓ 801					x	x		x						
11		540	600	✓ 600					x	x		x						
12		541	400	✓ 401					x	x		x						
13		542	300	✓ 300					x	x		x						
14		543	250	✓ 250					x	x		x						
15		544	200	✓ 200					xx	x		x						
16		545	175	✓ 175					x	x		x						
17		546	150	✓ 150					x	x		x						
18		547	125	✓ 125					x	x		x						
19		548	100	✓ 100					xx	x		x						
20		549	75	✓ 75					x	x		x						
21		550	50	✓ 50					x	x		x						
22		551	25	✓ 25					x	x		x						
23		552	10	✓ 10					x	x		x						
24		553	5	✓ 5				xx	xx	x	x	xx	x					

Profile type:
ROS TRM X-Niskin other?
Watchkeeper(s): H4 + M.G

Bottom Depth: 3986 m
Transmisso Cleaned: (Y) / N

Time	UTC	Local
Start	1716	1010
Bottom	1827	
End	2008	

Positional Information

Lat:	49 ° 50 . 25	N
Lon:	142 ° 40 . 12	W

Start

▼

Lat:	49 ° 49 . 98	N
Lon:	142 ° 39 . 64	W

Bottom

▼

Lat:	49 ° 49 . 80	N
Lon:	142 ° 39 . 40	W

End

Extra comments:
TOC & Gels cast

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P25 Event #: 77 Ship: Tuily UTC Date (dd mmm yyyy): 20 09 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials						Comments									
			Target Pressure	Confirmed ☒ Pressure	Nut-F	Sal	Chl	HPLC	Gases	UBC										
1		554	5	☒	5	x	x	xx	xx	xx										
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				
21																				
22																				
23																				
24																				

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): MGBottom Depth: 4143 m
Transmisso Cleaned: ☒ Y / ☐ N

Time	UTC	Local
Start	0034	1704
Bottom	0037	
End	0110	

Positional Information
Start
Lat: 50 ° 00.03 N
Lon: 143 ° 36.40 WBottom
Lat: 50 ° 00.02 N
Lon: 143 ° 36.45 WEnd
Lat: 50 ° 00.01 N
Lon: 143 ° 36.45 WExtra comments:
Plus loops for 1x Sal, 2x Chl

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P35 Event #: 79 Ship: Tully UTC Date (dd:mmm:yyyy): 20 09 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments
			Target Pressure	Confirmed ✓ Pressure	Nut-F	Sal	Chl	HPLC							
1		555	5	✓ 5	x	x	x x	x x							
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															

Profile type: ☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): MG

Bottom Depth: 4150 m
Transmisso Cleaned: ☒ Y ☐ N

Time	UTC	Local
Start	0404	2104
Bottom	0438	
End	0513	

Positional Information

Lat:	50 ° 00.03	N
Lon:	144 ° 18.27	W

▼

Lat:	50 ° 00.08	N
Lon:	144 ° 18.31	W

▼

Lat:	50 ° 00.12	N
Lon:	144 ° 18.32	W

Extra comments:

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040

Station: P26

Event #: 80

Ship: Tully

UTC Date (dd/mm/yyyy): 20 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments
			Target Pressure	Confirmed Pressure	UBC		EEA	FISH			Noble gases				
1		556	3000	✓ 3000			x								
2		557	2000	✓				x							
3		558	2000	✓		x									
4		559	2000	✓		x									
5		560	2000	✓		x									
6		561	2000	✓						x					
7		562	1000	✓		x									
8		563	1000	✓		x									
9		564	1000	✓		x									
10		565	1000	✓			x	x							
11		566	500	✓			x	x							
12		567	500	✓		x									
13		568	500	✓		x									
14		569	500	✓		x									
15		570	500	✓						x					
16		571	300	✓						x					
17		572	200	✓						x					
18		573	100	✓						x					
19		574	100	✓			x								
20		575	10	✓		x									
21		576	10	✓		x									
22		577	10	✓		x									
23		578	10	✓			x	x							
24															

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
 Watchkeeper(s): HM +

Bottom Depth: 425 m
 Transmisso Cleaned: ☒ Y ☐ N

Time	UTC	Local
Start	0809	0108
Bottom	0901	
End	0958	

Positional Information
 Start
 Lat: 50 ° 00 .09 N
 Lon: 145 ° 00 .14 W

Bottom
 Lat: 50 ° 00 26 N
 Lon: 145 ° 00 31 W

End
 Lat: 50 ° 00 42 N
 Lon: 145 ° 00 49 W

Extra comments:
 UBC, Sachia & Roberta cast

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P26 Event #: 83 Ship: Tully UTC Date (dd mmm yyyy): 20 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments
			Target Pressure	Confirmed ✓ Pressure	YS										
1		579	25	✓ 25	x										
2		580	25	✓	x										
3		581	25	✓	x										
4		582	25	✓	x										
5		583	25	✓	x										
6		584	25	✓	x										
7		585	25	✓	x										
8		586	25	✓	x										
9		587	25	✓	x										
10		588	25	✓	x										
11		589	25	✓	x										
12		590	25	✓	x										
13		591	25	✓	x										
14		592	25	✓	x										
15		593	25	✓	x										
16		594	25	✓	x										
17		595	25	✓	x										
18		596	25	✓	x										
19		597	25	✓	x										
20		598	25	✓	x										
21		599	25	✓	x										
22		600	25	✓	x										
23		601	25	✓	x										
24		602	25	✓	x										

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): Hm4

Bottom Depth:	4251 m
Transmisso Cleaned:	☒ Y ☐ N

Time	UTC	Local
Start	1105	0405
Bottom	1108	
End	1113	

Positional Information	
Start	Lat: 50 ° 00 . 00 N Lon: 145 ° 00 . 01 W

Bottom	Lat: 50 ° 00 . 02 N Lon: 144 ° 59 . 98 W
--------	---

End	Lat: 50 ° 00 . 01 N Lon: 145 ° 00 . 01 W
-----	---

Extra comments:
1st cast for Yuanji

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P26 Event #: 84 Ship: Tully UTC Date (dd mmm yyyy): 20 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials												Comments
			Target Pressure	Confirmed ✓ Pressure	YS												
1		603	25	✓ 25	x												
2		604	25	✓	x												
3		605	25	✓	x												
4		606	25	✓	x												
5		607	25	✓	x												
6		608	25	✓	x												
7		609	25	✓	x												
8		610	25	✓	x												
9		611	25	✓	x												
10		612	25	✓	x												
11		613	25	✓	x												
12		614	25	✓	x												
13		615	25	✓	x												
14		616	25	✓	x												
15		617	25	✓	x												
16		618	25	✓	x												
17		619	25	✓	x												
18		620	25	✓	x												
19		621	25	✓	x												
20		622	25	✓	x												
21		623	25	✓	x												
22		624	25	✓	x												
23		625	25	✓	x												
24		626	25	✓	x												

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): HM+

Bottom Depth: 4250 m
Transmisso Cleaned: ☒ Y ☐ N

Time	UTC	Local
Start	1142	0442
Bottom	1145	
End	1150	

Positional Information

Lat:	50 ° 00 . 17	N
Lon:	144 ° 59 . 70	W

▼

Lat:	50 ° 00 14	N
Lon:	144 ° 59 72	W

▼

Lat:	50 ° 00 . 19	N
Lon:	144 ° 59 . 67	W

Extra comments:
2nd cast for Yuanji

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P26 Event #: 85 Ship: Tully UTC Date (dd:mmm:yyyy): 20 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials														Comments
			Target Pressure	Confirmed ✓ Pressure	OXY	Sal	Nut-F	Nut-C	DIC	TOC	Cr	Gels	Gases	SAGs					
					H.M.L.	ET AL	ET AL	ET AL	MR/JV	D	YS	CW	YS	SS	JS+				
1		627	Bot-10	✓ 43.5	x		x	x	x	x	x	x		x	x				
2		628	4000	✓ 1002	x	xx	x	x	xx	x	x	x		x	x				
3		629	3500	✓	xx	x	xx	xx	x	x	x	x							
4		630	3000	✓	x	xx	x	x	x	x	x	x		x	x				
5		631	2500	✓	x	x	x	x	x	x	x	x							
6		632	2000	✓	x	x	x	x	x	x	x	x		x	x				
7		633	1500	✓	x	x	x	x	x	x	x	x		x	x				
8		634	1250	✓	xx	x	x	x	x	x		x		x	x				
9		635	1000	✓	x	x	x	x	x	x	x	x		x	x				
10		636	800	✓	x		x	x	x	x	x	x		x	x				
11		637	600	✓	x		x	x	x	x	x	x		x	x				
12		638	400	✓	x		x	x	x	x	x	x		x	x				
13		639	300	✓	x		x		x	x	x	x		x	x				
14		640	250	✓	xx		x		x	x	x	x							
15		641	200	✓	x		x		x	x	x	x		x	x				
16		642	175	✓	x		x		x	x		x							
17		643	150	✓	x		x		x	x	x	x		x	x				
18		644	125	✓ 125	x		xx		x	x		x							
19		645	100	✓	x		x		x	x	x	x		x	x				
20		646	75	✓	xx		x		x	x		x							
21		647	50	✓	x		x		x	x	x	x		x	x				
22		648	25	✓	x		x		x	x	x	x		x	x				
23		649	10	✓	x		x		x	x	x	x		x	x				
24		650	5	✓	x	x	x		x	x	x	x	xx						

Profile type:
(ROS) TRM X-Niskin other?

Watchkeeper(s): H.M.L.

Bottom Depth: 4250 m

Transmisso Cleaned: (Y) / N

Time	UTC	Local
Start	1223	0523
Bottom	1336	
End	1510	

Positional Information

Lat: 50 ° 00 . 00 N

Lon: 145 ° 00 01 W

Lat: 50 ° 00 . 09 N

Lon: 145 ° 00 . 11 W

Lat: 49 ° 59 . 95 N

Lon: 145 ° 00 17 W

Extra comments:

Deep cast

Will also have loops for Oxy x2

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: P26 Event #: 88 Ship: Tully UTC Date (dd mmm yyyy): 20 09 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments
			Target Pressure	Confirmed ✓ Pressure	Nut-F	Sal	TM F	TM UF	Ligs						
1		651	300	300	x	x	x								
2		652	200	200	x		xx								
3		653	150	150	x		x								
4		654	100	100	x		x		xx						
5		655	75	75	x		x		xx						
6		656	50	50	x		x		xx						
7		657	40	40	x		x		xx						
8		658	25	25	xx		x		xx						
9		659	10	10	x		x		xx						
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															

Profile type:
ROS TRM X-Niskin other?
Watchkeeper(s): HG

Bottom Depth: 4251 m
Transmisso Cleaned: (Y) / N

Time	UTC	Local
Start	2052	1352
Bottom	2059	
End	2108	

Positional Information

Lat:	50 ° 00.07	N
Lon:	145 ° 00.00	W

▼

Lat:	°	N
Lon:	°	W

▼

Lat:	50 ° 00.11	N
Lon:	144 ° 59.96	W

Extra comments:
TMR Shallow

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID:

2018-040

Station:

P26

Event #: 89

Ship: Tully

UTC Date (dd mmm yyyy): 20 09 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials													Comments
			Target Pressure	Confirmed Pressure	DMS	DMSP	DMSP	Nut-Fr	Chl	HPLC	Phyto	UVic	DA	bugs	HAB	ONAr	Rit DO	
				✓	MR	MA	MA	MR	MR	MR	MR	TV	MR	TV	MR	Rit	UVic	
1		663	300	✓	300	x			x									
2		664	250	✓	250				x			x						
3		665	200	✓	200	x	x	x	x									
4		666	150	✓	150	x	x	x	x			x						
5		667	100	✓	101	x			x	x								
6		668	100	✓	100									x				
7		669	75	✓	75	x			x	x								
8		670	60	✓	60				x	x	xx							Fluo 0.793
9		671	50	✓	50									x				
10		672	50	✓	50	x			x	x	xx	x						Fluo 1.087
11		673	40	✓	40	x			x	xx	xx							Fluo 1.038
12		674	30	✓	30	x	x	x	x	x	xx							Fluo 1.441
13		675	25	✓	25	x			x	xx								
14		676	20	✓	20	xx	xx	xx	x	x		x						Fluo 0.891
15		677	15	✓	15	x			xx	x	xx							
16		678	10		10	x			x	x		x						
17		679	5	✓	5				x	x	xx	xxx	x		x			Fluo 0.464
18		680	5	✓	5									x				
19		681	5	✓	5	x	x	x				x						
20		682	5	✓	5											xx	xx	
21		683	0		2	x	x	x	x	x								
22		684	Oxy MAX	✓	50											xx	xx	
23																		
24																		

Profile type: ☒ ROS ☐ TRM ☐ X-Niskin ☐ other?

Watchkeeper(s): MG

Bottom Depth: 4251 m

Transmissio Cleaned: ☒ Y ☐ N

Time	UTC	Local
Start	2122	1422
Bottom	2128	
End	2151	

Positional Information

Start

Lat: 50 ° 00.04 N

Lon: 144 ° 59.97 W

Bottom

Lat: 50 ° 00.05 N

Lon: 144 ° 59.98 W

End

Lat: 50 ° 00.07 N

Lon: 144 ° 59.97 W

Extra comments:

DMS cast

OUT-OF-ORDER!

Phyto: L&F&G

OXY SAMPLES FROM LOOP-DVC

GWT 679

Phyto

P26

5 m

2018-040

Bot 17

<http://www.pac.dfo-mpo.gc.ca/sci/osap/projects/waterproperties/>

NOT SAMPLED

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-F1 Event #: 90 Ship: Tully UTC Date (dd-mm-yyyy): 21-09-18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments			
			Target Pressure	Confirmed Pressure			Chl	HPLC	²³⁴ Th					ONAr	DO Uvic			
1		697	335	✓	335					x								4351 IN FILE HEADER
2		698	200	✓	200					x								
3		699	150	✓	150					x								
4		700	125	✓	126					x								
5		701	100	✓	100					x								
6		702	75	✓	75					x								
7		703	75	✓	75			xx	NN									
8		704	50	✓	50					x								
9		705	50	✓	50			x	NN									
10		706	20	✓	20					x								
11		707	20	✓	20			x	NNn									
12		708	5	✓	5			x	xx									1.148
13		709	5	✓	5								xx	xx				
14		710	45 Oxy Max	✓	45								xx	xx				
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		

Version: 25 Nov 2011

Transmissometer Test Report 11-16-11

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): MG

Bottom Depth: 4188 m
Transmisso Cleaned: ☒ Y ☐ N

Time	UTC	Local
Start	0039	1739
Bottom	0046	
End	0104	

Positional Information
Start
Lat: 49 ° 57.65 N
Lon: 144 ° 42.25 W

Bottom
Lat: 49 ° 57.65 N
Lon: 144 ° 42.22 W

End
Lat: 49 ° 57.66 N
Lon: 144 ° 42.22 W

Extra comments:
EXPORTS - corner with Float
Thorium+ cast, OUT OF ORDER
n = 25 mm filter
N = NASA HPLC on 47mm filter

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-F1 Event #: 92 Ship: Tully UTC Date (dd/mm/yyyy): 21 SEP 2018

Cruise ID: 2018-040			Station: EX-F1		Event: 1													Comments			
Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials													pH	PIC	POC	
			Target Pressure	Confirmed Pressure	OXY	Sal	Nut-F	Nut-C	DIC	TOC	TOC	Gels	DOC	CDOM	Gases						
				✓		MR/AL	MG	RA/MG	TV	D	S	D	S	S	MBJ	S	S	S			
1		711	2000	✓	2000	x	xx	x N	x N	x		x		x	x		x	x	x		
2		712	1500	✓	1500	xx	x	x N	x N	xx		x		xx	x		x	x	x		
3		713	1000	✓	1000	x	x	x N	x N	x		x		x	x		x	x	xx		
4		714	800	✓	799	x	x	xxNN	xxNN	x		xx		x	x		x	x	x		
5		715	400	✓	400	x		x N	x N	x		x		x	x		x	xx	x		
6		716	300	✓	300	xx		x N			x	x	x	x	x						
7		717	250	✓	250	x		xxNN		x	x	x	x	x	x		x	x	x		
8		718	200	✓	250	x		x N			x	x	x	x	x	xx				oops Bot 19 is 8	
9		719	175	✓	175	x		x N			x	x	x	x	x	xx					
10		720	150	✓	150	xx		x N			x	x	x	x	xx	xx					
11		721	125	✓	125	x		x N			x	x	x	x	x	xx					
12		722	100	✓	100	x		x N		x	x	x	x	x	x	xx	x	x	x		
13		723	75	✓	75	x		x N			x	x	x	x	x	xx					
14		724	50	✓	50	x		x N		x	x	x	x	x	x	xx	x	x	x		
15		725	25	✓	25	x		x N		x	x	x	x	x	x	xx	x	x	x		
16		726	10	✓	10	x		x N		x	x	x	x	x	x	xx	x	x	x		
17		727	5	✓	5	xx	x	x N			x	x	x	x	x	xx					
18		728	0	✓	2.2							x		x	x					B 713 POC	
19		718	200	✓	200															EX-F1	
20																				1000 m	
21																				2018-040	
22																				Bot 3	
23																					
24																					

Profile type:
 ROS TRM X-Niskin other?
 Watchkeeper(s): MR/MG

Bottom Depth: 4186 m
 Transmisso Cleaned: (Y) N

Time	UTC	Local
Start	0140	1840
Bottom	0215	
End	0309	

Positional Information

Lat:	49° 57.66	N
Lon:	144° 42.18	W

Start

Lat:	49° 57.70	N
Lon:	144° 42.34	W

Bottom

Lat:	49° 57.69	N
Lon:	144° 42.54	W

End

Extra comments:
 EXPORTS BioFloat Corner
 Chemistry cast
 D = Dennis, S = Sophie
 N = NASA nutrients

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: PA-012 Event #: 93 Ship: Tully UTC Date (dd mmm yyyy): 21 09 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials												Comments
			Target Pressure	Confirmed ☒ Pressure	ONAr UW	Oxy UW											
1		729	10	☒	11	x x	x x										
2		730	5	☒	5	x x	x x										
3		731	0	☒	2.8	x x	x x										
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21																	
22																	
23																	
24																	

Version: 25 Nov 2011

Transmissometer to be used with 11.5 m depth

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): MG

Bottom Depth: 4228 m
Transmisso Cleaned: ☒ Y ☐ N

Time	UTC	Local
Start	0510	2210
Bottom	0519	
End	0531	

Positional Information
Start
Lat: 50 ° 01.76 N
Lon: 144 ° 52.79 W

Bottom
Lat: 50 ° 01.76 N
Lon: 144 ° 52.86 W

End
Lat: 50 ° 01.75 N
Lon: 144 ° 52.91 W

Extra comments:
Mooring calibration cast
CTD to 500 m

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-C Event #: 94 Ship: Tully UTC Date (dd mmm yyyy): 21 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials													Comments
			Target	Confirmed	Size	13C	15	15N	Dark	32Si	Part	d Si	NH4	urea	nuts	phyto	ONAr	
			Pressure	✓ Pressure	CHL	15NO3	NH4	urea	Blank		Si							
1		732	5	✓ 5													xx	xx
2		733	OXY MAX	✓ 47													xx	xx
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11		734	0.1%	✓ 80	x						x							
12		735	1%	✓ 50	x						x							
13		736	15%	✓ 25	x						x							
14		737	30%	✓ 15	x						x							
15		738	55%	✓ 5	x						x							
16		739	100%	✓ 2	x						x							
17		740	0.1%	✓ 80		x	x	x		x		x	x	x	x	x	x	
18		741	1%	✓ 50		x	x	x		x		x	x	x	x	x	x	
19		742	15%	✓ 25		x	x	x		x		x	x	x	x	x	x	
20		743	30%	✓ 15		x	x	x		x		x	x	x	x	x	x	
21		744	55%	✓ 5												x	x	x
22		745	55%	✓ 5		x	x	x		x		x	x	x	x			
23		746	100%	✓ 2					x								x	x
24		747	100%	✓ 2		x	x	x		x		x	x	x	xxx			

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
 Watchkeeper(s): H M +

Bottom Depth: 4123 m
 Transmisso Cleaned: ☒ Y ☐ N

Time	UTC	Local
Start	1207	0507
Bottom	1210	
End	1221	

Positional Information

Lat:	50 ° 17 38	N
Lon:	144 ° 21 94	W

Bottom

Lat:	50 ° 17 36	N
Lon:	144 ° 21 97	W

End

Lat:	50 ° 17 35	N
Lon:	144 ° 22 05	W

Extra comments:
 Productivity cast
 OUT-OF-ORDER
 EXPORTS CENTRE

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-C Event #: 95 Ship: Tully UTC Date (dd:mmm:yyyy): 21 SEP 2018

Niskin #	Firing #	Sample #	Rosette Operation			Samples Taken / Sampler's Initials										Comments
			Target Pressure	Confirmed	Pressure	Nut-F	Sal	TM F								
1		748	300		300	x	x	xx								
2		749	250		250	x	x	xx								
3		750	200		200	x	x	xx								
4		751	80 150		100	x		xx								
5		752	80 100		80	x		xxxx								
6		753	80 60		60	x		xx								
7		754	80 50		50	x		xx								
8		755	80 40		40	x		xx								
9		756	80 30		30	x		xx								
10		757	80 20		20	xx		xx								
11		758	20		310	x		xx								
12		759	10		310	x		xx								
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																

Profile type:
ROS ☒ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): Jay Cullen

Bottom Depth: 4128 m
Transmisso Cleaned: Y / N

Time	UTC	Local
Start	14:05	7:05
Bottom	14:12	
End	14:22	

Positional Information

Lat:	50	°	18.45	N
Lon:	144	°	22.26	W

Bottom

Lat:	50	°	18.47	N
Lon:	144	°	22.22	W

End

Lat:	50	°	18.52	N
Lon:	144	°	22.22	W

Extra comments:
TMR Shallow

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-C Event #: 96 Ship: Tully UTC Date (dd mmm yyyy): 21 Sep 2018

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments				
			Target Pressure	Confirmed ✓ Pressure	OXY		Nut-F	DIC	pH	Gases		TOC DH	TOC SJ	DOC SJ					CDOM SJ
1		760	300	✓	300	x		x	x	x			x	x	x	x	x	x	
2		761	250	✓									x	xx	x	x	x	x	
3		762	250	✓		x		x	xx	x									
4		763	200	✓									x	x	x	x	x	x	
5		764	200	✓		xx		x	x	x	xx								
6		765	175	✓									x	x	xx	x	x	x	
7		766	175	✓		x		xx	x	xx	xx								
8		767	150	✓									x	x	x	x	x	x	
9		768	150	✓		x		x	x	x	xx								
10		769	125	✓									x	x	x	x	x	x	
11		770	125	✓		x		x	x	x	xx								
12		771	100	✓									x	x	x	x	x	x	
13		772	100	✓		x		x	x	x	xx								
14		773	75	✓									x	x	x	x	x	x	
15		774	75	✓		xx		x	x	x	xx								
16		775	50	✓									x	x	x	x	x	x	
17		776	50	✓		x		x	x	x	xx								
18		777	25	✓									x	x	x	xx	x	x	x
19		778	25	✓		x		x	x	x	xx								
20		779	10	✓									x	x	x	x	x	x	
21		780	10	✓		x		x	x	x	xx								
22		781	5	✓									x	x	x	x	x	x	
23		782	5	✓		x		x	x	x	xx								
24		783	0	✓										x	x	x			

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
 Watchkeeper(s): Hm

Bottom Depth: 4127 m
 Transmisso Cleaned: Y / N

Time	UTC	Local
Start	15 52	08 52
Bottom	15 57	
End	16 14	

Positional Information

Lat:	50 ° 18.49 N
Lon:	144 ° 22.46 W

▼

Lat:	50 ° 19.47 N
Lon:	144 ° 22.51 W

▼

Lat:	50 ° 18.41 N
Lon:	144 ° 22.67 W

Extra comments:
 EXPORTS central station
 Chemistry cast
 DH = Dennis,
 SJ = Sophie&Andrea

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-C Event #: 99 Ship: Tully UTC Date (dd|mmm|yyyy): 21 | 09 | 2018

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials												Comments	
			Target Pressure	Confirmed √ Pressure	²³⁴Th													
1		784	500				x											
2		785	330				x											
3		786	205				x											
4		787	155				x											
5		788	105				x											
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		

Profile type: ROS TRM X-Niskin other?
Watchkeeper(s): (HM) YS

Bottom Depth: 4143 m
Transmisso Cleaned: Y / N

Time	UTC	Local
Start	17:14	10:14
Bottom	17:37	10:37
End	21:12	14:12

Positional Information
Start Lat: 50 ° 17.91 N
Lon: 144 ° 25.62 W

Bottom Lat: 50 ° 17.96 N
Lon: 144 ° 25.69 W

End Lat: 50 ° 18.42 N
Lon: 144 ° 25.71 W

Extra comments:
Large Volume Pumps (x 5)

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-C Event #: 100 Ship: Tully UTC Date (dd mmm yyyy): 21 09 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments	
			Target Pressure	Confirmed ✓ Pressure	DMS	DMSD	DMSF	Nut-Fr	Chl	HPLC	HPLC	UVic				
						t	d			IOS	NASA					
1		789	300	✓ 300	x			x								
2		790	200	✓ 201	x	x	x	x								796
3		791	150	✓ 151	x	x	x	x								NUT-F
4		792	100	✓ 100	x			x	x	XX	NN					EX-C
5		793	75	✓ 75	x			x	x							50 m
6		794	70	✓ 70				x	x	XX						2018-040
7		795	50	✓ 50	x			x			ND					Bot 8
8		796	50	✓ 50				x	xx	XX	NA					no water
9		797	40	✓ 40	x			x	x							left to
10		798	35	✓ 35				x	x	XX						Sample this
11		799	30	✓ 30	x	x	x	x	x							
12		800	25	✓ 25	x			xx	x	XX	NN					
13		801	20	✓ 20	xx	xx	xx	x	x							
14		802	15	✓ 15	x			x	x	XX	N					
15		803	15	✓ 15				x	xx	xx	n					
16		804	10	✓ 10	x			x	x	XX						
17		805	5	✓ 5	x	x	x	x								
18		806	5	✓ 5					x	XX	n					
19		807	0	✓ 27	x	x	x	x	x							
20																
21																
22																
23																
24																

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): MG

Bottom Depth: 4142 m
Transmissio Cleaned: ☒ Y ☐ N

Time	UTC	Local
Start	2155	1455
Bottom	2201	
End	2222	

Positional Information

Lat:	50 ° 18.35	N
Lon:	144 ° 24.95	W

▼

Lat:	50 ° 18.33	N
Lon:	144 ° 24.94	W

▼

Lat:	50 ° 18.28	N
Lon:	144 ° 24.85	W

Extra comments:
DMS & Uvic & HPLC cast
x = 25 mm filters
n = nasa 25 mm filters

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-C

Event #: 102

Ship: Tully

UTC Date (dd mmm yyyy): 21 09 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials							Comments									
			Target Pressure	Confirmed Pressure		EDNA	ERNA	ESAG		²³⁴ Th											
1		808	500	✓ 500		x	x	x													
2		809	500	✓ 500		x	x	x													
3		810	335	✓ 336						x											
4		811	300	✓ 300		x	x	x													
5		812	300	✓ 300		x	x	x													
6		813	200	✓ 200						x											
7		814	150	✓ 150						x											
8		815	125	✓ 125						x											
9		816	100	✓ 100		x	x	x													
10		817	100	✓ 100		x	x	x													
11		818	100	✓ 100						x											
12		819	75	✓ 75						x											
13		820	50	✓ 50						x											
14		821	20	✓ 20						x											
15		822	5	✓ 5		x	x	x													
16		823	5	✓ 5		x	x	x													
17																					
18																					
19																					
20																					
21																					
22																					
23																					
24																					

Profile type:
ROS TRM X-Niskin other?
Watchkeeper(s): MG

Bottom Depth: 4140 m
Transmisso Cleaned: Y / N

Time	UTC	Local
Start	2321	1621
Bottom	2330	
End	2351	

Positional Information

Start	Lat: 50 ° 18.19	N
	Lon: 144 ° 24.69	W

Bottom

Lat: 50 ° 18.17	N
Lon: 144 ° 24.69	W

End

Lat: 50 ° 18.15	N
Lon: 144 ° 24.66	W

Extra comments:
EXPORTS - centre
Thorium & Sachia's cast

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-C Event #: 104 Ship: Tully UTC Date (dd mmm yyyy): 22 SEP 2018

Niskin #		Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments		
				Target Pressure	Confirmed ✓ Pressure	Nut-C	Nut-F	Sal	TM F	TM UF								
1			824	4000		4000	x	x	x	xx								
2			825	3000		3000	x	x	x	xx								
3			826	2000		2000	x	x	x	xx								
4			827	1800		1800	xx	xx	x	xx								
5			828	1600		1600	x	x	x	xx								
6			829	1400		1400	x	x	x	xx								
7			830	1200		1200	x	x		xx								
8			831	1100		1100	x	x		xx								
9			832	1000		1000	x	x		xx								
10			833	800		800	x	x		xx								
11			834	600		600	x	x		xx								
12			835	400		400	x	x		xx								
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		

Version: 25 Nov 2011

Transmissometer to be cleaned before each cast, do not use if not clean

Profile type:
 ROS ☒ TRM ☐ X-Niskin ☐ other?
 Watchkeeper(s): JL

Bottom Depth: 4132 m
 Transmisso Cleaned: Y / N

Time	UTC	Local
Start	0145	1845
Bottom	0253	
End	0447	

Positional Information

Lat:	50° 17.89	N
Lon:	144° 23.78	W

▼

Lat:	50° 17.99	N
Lon:	144° 23.95	W

▼

Lat:	50° 18.43	N
Lon:	144° 24.47	W

Extra comments:
 TMR Deep

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040

Station: EX-W

Event #: 105

Ship: Tully

UTC Date (dd mmm/yyyy): 22 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments
			Target Pressure	Confirmed ✓ Pressure	²³⁴ Th		HPLC	HPLC	CHL	Nut-F	ONAr	Oxy			
							IOS	NASA				UVic			
1		836	335	✓ 335	x										
2		837	200	✓	x										
3		838	150	✓	x										
4		839	125	✓	x										
5		840	100	✓	x										
6		841	75	✓	x										
7		842	75	✓				nn	x	x					
8		843	50	✓	x										
9		844	50	✓				nn	x	x					
10		845	20	✓	x										
11		846	20	✓				nn	x	x					
12		847	5	✓			XX	NN	x	x					
13		848	5	✓							xx	xx			
14		849	Oxy Max	✓ 45							xx	xx			
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): H M +

Bottom Depth: 4211 m
Transmissio Cleaned: ☒ Y / ☐ N

	UTC	Local
Start	13 38	06 38
Bottom	13 40	
End	13 54	

Positional Information
Start
Lat: 50 ° 22 .84 N
Lon: 144 ° 38 59 W

Bottom
Lat: 50 ° 22 86 N
Lon: 144 ° 38 58 W

End
Lat: 50 ° 22 .87 N
Lon: 144 ° 38 .57 W

Extra comments:
EX-West corner
Thorium, HPLC, ONAr
OUT-OF-ORDER
1,2,3,4,5,6,7,8,9,14,10,11,12,13

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-W Event #: 106 Ship: Tully UTC Date (dd mmm yyyy): 22 Sep 2018

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments
			Target Pressure	Confirmed ✓ Pressure		Nut-F	Sal	TM F	TM UF	Ligs					
1		850	300	300		x	x	x							
2		851	250	249		x	x	x							
3		852	200	200		x	x	x							
4		853	150	149		x		x							
5		854	100	100		x		x x							
6		855	80	80		x		x							
7		856	60	60		x		x							
8		857	50	50		x x		x							
9		858	40	40		x		x							
10		859	30	30		x		x							
11		860	20	20		x		x							
12		861	10	10		x		x							
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															

Profile type:
ROS ☒ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): JC/AT

Bottom Depth: 4211 m
Transmisso Cleaned: Y / N

Time	UTC	Local
Start	1407	
Bottom	1415	
End	1424	

Positional Information
Start
Lat: 50° 22.87 N
Lon: 144° 38.59 W

Bottom
Lat: 50° 22.88 N
Lon: 144° 38.59 W

End
Lat: 50° 22.88 N
Lon: 144° 38.62 W

Extra comments:
TMR Shallow

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-W Event #: 108 Ship: Tully UTC Date (dd mmm/yyyy): 22 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments						
			Target Pressure	Confirmed ✓ Pressure	OXY		Nut-F		pH	Gases		TOC DH	TOC SJ	DOC SJ	CDOM SJ	PIC SJ	POC SJ	Gels			
1		862	300	✓	300	x		x		x			x	x	x	x	x	x			
2		863	250	✓									x	x	x	x	x	x			
3		864	250	✓		x x		x		x											
4		865	200	✓									x	x	x	x	x	x			
5		866	200	✓		x		x		x	x x										
6		867	175	✓									x	x	x	x	x	x			
7		868	175	✓		x		x		x	x x										
8		869	150	✓									x	x	x	x	x	x			
9		870	150	✓		x		x		x	x x										
10		871	125	✓									x	x	x	x x	x	x	x		
11		872	125	✓		x		x		x	x x										
12		873	100	✓									x	x x	x	x	x	x			
13		874	100	✓		x		x		x	x x										
14		875	75	✓									x	x	x	x	x	x			
15		876	75	✓		x		x x		x	x x										
16		877	50	✓									x	x	x	x	x	x			
17		878	50	✓		x		x		x x	x x										
18		879	25	✓									x	x	x x	x	x	x	x		
19		880	25	✓		x		x		x	x x										
20		881	10	✓									x	x	x	x	x	x			
21		882	10	✓		x x		x		x	x x										
22		883	5	✓									x	x	x	x	x	x			
23		884	5	✓		x		x		x	x x										
24		885	0											x	x	x					

Profile type: ROS TRM X-Niskin other?
Watchkeeper(s): 11M+

Bottom Depth: 4202 m
Transmisso Cleaned: (Y) / N

Time	UTC	Local
Start	15 11	08 11
Bottom	15 17	
End	15 33	

Positional Information
Start
Lat: 50 ° 22 . 88 N
Lon: 144 ° 38 . 61 W

Bottom
Lat: 50 ° 22 . 86 N
Lon: 144 ° 38 . 60 W

End
Lat: 50 ° 22 . 78 N
Lon: 144 ° 38 . 59 W

Extra comments:
EXPORTS West corner
Chemistry cast
DH = Dennis,
SJ = Sophie&Andrea

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040

Station: EX-N

Event #: 109

Ship: Tully

UTC Date (dd mmm yyyy): 22 09 18

Niskin #		Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Ship: Tully		UTC Date (dd m	
				Target Pressure	Confirmed Pressure	²³⁴ Th		HPLC IOS	HPLC NASA	CHL	Nut-F	ONAr	Oxy UVic					Comments	
1			886	335	✓ 336	x													
2			887	200	✓ 200	x													
3			888	150	✓ 150	x													
4			889	125	✓ 125	x													
5			890	100	✓ 100	x													
6			891	75	✓ 75	x													
7			892	75	✓ 75														
8			893	50	✓ 50	x			nn	x	x								
9			894	50	✓ 50														
10			895	20	✓ 20	x			nn	x	x								
11			896	20	✓ 20														
12			897	5	✓ 5			xx	NN	x	x								
13			898	5	✓ 5														
14			899	Oxy Max	✓ 40							xx	xx						
15												xx	xx						
16																		loop OxyS - UVic	
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			

Version: 25 Nov 2011

Transmissometer to be cleaned before each cast, do not use Ammonia products

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
 Watchkeeper(s): MG

Bottom Depth: 4054 m
 Transmisso Cleaned: ☒ Y / ☐ N

Time	UTC	Local
Start	1947	1247
Bottom	1953	
End	2011	

Positional Information

Lat:	50° 36.80	N
Lon:	144° 03.89	W

Start

Lat:	50° 36.86	N
Lon:	144° 03.87	W

Bottom

Lat:	50° 36.81	N
Lon:	144° 03.88	W

End

Extra comments:
 EX-North corner
 Thorium, HPLC, ONAr
 OUT-OF-ORDER

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-N Event #: 111 Ship: Tully UTC Date (dd mmm yyyy): 22 Sep 2018

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments
			Target Pressure	Confirmed ☒ Pressure		Nut-F	Sal	TM F	TM UF	Ligs					
1		900	300	300		x	x	x							
2		901	250	249		x	x	x							
3		902	200	200		x	x	x							
4		903	150	150		x		x							
5		904	100	100		x		x x							
6		905	80	80		x x		x							
7		906	60	60		x		x							
8		907	50	50		x		x							
9		908	40	40		x		x							
10		909	30	30		x		x							
11		910	20	20		x		x							
12		911	10	10		x		x							
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															

Profile type:
ROS ☒ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): JC

Bottom Depth: 4054 m
Transmisso Cleaned: Y / N

Time	UTC	Local
Start	2044	
Bottom	2050	
End	2058	

Positional Information

Lat:	50 ° 36.78	N
Lon:	144 ° 04.01	W

▼

Lat:	50 ° 36.79	N
Lon:	144 ° 04.03	W

▼

Lat:	50 ° 36.76	N
Lon:	144 ° 04.08	W

Extra comments:
TMR Shallow

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-N Event #: 112 Ship: Tully UTC Date (dd mmm yyyy): 22 09 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments				
			Target Pressure	Confirmed Pressure	OXY		Nut-F		pH	Gases		TOC DH	TOC SJ	DOC SJ	CDOM SJ	PIC SJ	POC SJ	Gels	
1		912	300	✓ 300	x		x		x			x	x	x	x	x	x	x	
2		913	250	✓ 250								x	x	x	x	x	x	x	
3		914	250	✓ 250	xx		x		x										
4		915	200	✓ 200								x	x	x	x	x	x	x	
5		916	200	✓ 200	x		x		x	xx									
6		917	175	✓ 175								x	x	x	x	x	x	x	
7		918	175	✓ 175	x		x		x	xx									
8		919	150	✓ 150								x	x	x	x	x	x	x	
9		920	150	✓ 150	x		x		x	xx									
10		921	125	✓ 125								x	x	x	xx	x	x	x	
11		922	125	✓ 125	x		x		x	xx									
12		923	100	✓ 100								x	xx	x	x	x	x	x	
13		924	100	✓ 100	x		x		x	xx									
14		925	75	✓ 75								x	x	x	x	x	x	x	
15		926	75	✓ 75	x		xx		x	xx									
16		927	50	✓ 50								x	x	x	x	x	x	x	
17		928	50	✓ 50	x		x		xx	xx									
18		929	25	✓ 25								x	x	xx	x	x	x	x	
19		930	25	✓ 24	x		x		x	xx									
20		931	10	✓ 10								x	x	x	x	x	x	x	
21		932	10	✓ 10	xx		x		x	xx									
22		933	5	✓ 5								x	x	x	x	x	x	x	
23		934	5	✓ 5	x		x		x	xx									
24		935	0	✓ 1.9									x	x	x				

Profile type:
ROS TRM X-Niskin other?
Watchkeeper(s): MG

Bottom Depth: 4055 m
Transmisso Cleaned: Y N

Time	UTC	Local
Start	2124	1424
Bottom	2130	
End	2149	

Positional Information

Lat:	50 ° 36.78	N
Lon:	144 ° 03.98	W

Bottom

Lat:	50 ° 36.79	N
Lon:	144 ° 03.98	W

End

Lat:	50 ° 36.83	N
Lon:	144 ° 03.94	W

Extra comments:
EXPORTS North corner
Chemistry cast
DH = Dennis,
SJ = Sophie&Andrea

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: EX-E Event #: 114 Ship: Tully UTC Date (dd mmm yyyy): 23 09 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments				
			Target	Confirmed	²³⁴ Th		HPLC	HPLC	CHL	Nut-F	ONAr	Oxy							
			Pressure	✓ Pressure								UVic							
1		936	335	✓	335	x													
2		937	200	✓	200	x													
3		938	150	✓	150	x													
4		939	125	✓	125	x													
5		940	100	✓	100	x													
6		941	75	✓	75	x													
7		942	75	✓	75				nn	x	x								
8		943	50	✓	50	x													
9		944	50	✓	50				nn	x	x								
10		945	20	✓	20	x													
11		946	20	✓	20				nn	x	x								
12		947	5	✓	5			XX	NN	x	x								
13		948	5	✓	5							xx	xx						
14		949	⁴⁶ Oxy Max	✓	46							xx	xx					Loop Oxy Uvic	
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			

Profile type:
ROS TRM X-Niskin other?
Watchkeeper(s): MG

Bottom Depth: 4100 m
Transmisso Cleaned: Y / N

Time	UTC	Local
Start	0109	1809
Bottom	0115	
End	0134	

Positional Information

Lat:	50 °	10.82	N
Lon:	144 °	08.78	W

Bottom

Lat:	50 °	10.81	N
Lon:	144 °	08.74	W

End

Lat:	50 °	10.75	N
Lon:	144 °	08.66	W

Extra comments:
EX-East corner
Thorium, HPLC, ONAr
OUT-OF-ORDER

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC .

Cruise ID: 2018-040

Station: EX-E

Event #: 116

Ship: Tully

UTC Date (dd mmm yyyy): 23 09 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments						
			Target Pressure	Confirmed Pressure	OXY		Nut-F		pH	Gases		TOC DH	TOC SJ	DOC SJ	CDOM SJ	PIC SJ	POC SJ	Gels			
1		950	300	✓ 300	x		x		x			x	x	x	x	x	x				
2		951	250	✓ 250								x	x	x	x	x	x				
3		952	250	✓ 251	xx		x		x							x	x				
4		953	200	✓ 200								x	x	x	x	x	x				
5		954	200	✓ 200	x		x		x	xx											
6		955	175	✓ 175								x	x	x	x	x	x				
7		956	175	✓ 175	x		x		x	xx											
8		957	150	✓ 150								x	x	x	x	x	x				
9		958	150	✓ 150	x		x		x	xx											
10		959	125	✓ 125								x	x	x	xx	x	x				
11		960	125	✓ 125	x		x		x	xx											
12		961	100	✓ 100								x	xx	x	x	x	x				
13		962	100	✓ 100	x		x		x	xx											
14		963	75	✓ 75								x	x	x	x	x	x				
15		964	75	✓ 75	x		xx		x	xx											
16		965	50	✓ 51								x	x	x	x	x	x				
17		966	50	✓ 51	x		x		xx	xx											
18		967	25	✓ 25								x	x	xx	x	x	x				
19		968	25	✓ 25	x		x		x	xx											
20		969	10	✓ 10								x	x	x	x	x	x				
21		970	10	✓ 11	xx		x		x	xx											
22		971	5	✓ 5								x	x	x	x	x	x				
23		972	5	✓ 5	x		x		x	xx											
24		973	0	✓ 3.6									x	x	x						

Version: 25 Nov 2011

Transmissometer to be cleaned before each use

Profile type:
 ROS TRM X-Niskin other?
 Watchkeeper(s): MG

Bottom Depth: 4163 m
 Transmisso Cleaned: Y / N

Time	UTC	Local
Start	0214	1914
Bottom	0220	
End	0239	

Positional Information

Lat: 50 ° 10.73	N
Lon: 144 ° 08.50	W

Lat: 50 ° 10.69 N
 Lon: 144 ° 08.48 W

Lat: 50 ° 10.58 N
 Lon: 144 ° 08.34 W

Extra comments:
 EXPORTS East corner
 Chemistry cast
 DH = Dennis,
 SJ = Sophie&Andrea

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID:

2018-040

Station:

P4

Event #:

122

Ship:

Tully

UTC Date (dd mmm yyyy):

26 9 18

Cruise ID: 2018-040			Station: 14		Event: 1												Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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			Target Pressure	Confirmed ✓ Pressure	Oxy	Nut-F	Nut-C	Sal	CHL	HPLC																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
1	1	974	Bot-10	✓	1323	x	x	x																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										</

Profile type:
☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): <u>HR +</u>

Bottom Depth:	<u>1312</u> m
Transmisso Cleaned:	☒ Y ☐ N

Time	UTC	Local
Start	<u>1401</u>	<u>0701</u>
Bottom	<u>1425</u>	
End	<u>1505</u>	

Positional Information	
Start	Lat: <u>48</u> ° <u>30.93</u> N
	Lon: <u>126</u> ° <u>39.89</u> W

Bottom	Lat: <u>48</u> ° <u>38.92</u> N
	Lon: <u>126</u> ° <u>39.97</u> W

End	Lat: <u>48</u> ° <u>38.83</u> N
	Lon: <u>126</u> ° <u>39.80</u> W

Extra comments:

P4 return

OUT OF ORDER
1, 21, 2, 3, 4 → 20

Cruise ID: 2018-040 Station: JF2 Event #: 124 Ship: Tully UTC Date (dd mmm yyyy): 27 9 18

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials												Comments	
			Target Pressure	Confirmed ✓ Pressure		YS												
1		995	20	✓	20		x											
2		996	20	✓			x											
3		997	20	✓			x											
4		998	20	✓			x											
5		999	20	✓			x											
6		1000	20	✓			x											
7		1001	20	✓			x											
8		1002	20	✓			x											
9		1003	20	✓			x											
10		1004	20	✓			x											
11		1005	20	✓			x											
12		1006	20	✓			x											
13		1007	20	✓			x											
14		1008	20	✓			x											
15		1009	20	✓			x											
16		1010	20	✓			x											
17		1011	20	✓			x											
18		1012	20	✓			x											
19		1013	20	✓			x											
20		1014	20	✓			x											
21		1015	20	✓			x											NO TRIP
22		1016	20	✓			x											
23		1017	20	✓			x											
24		1018	20	✓			x											

Profile type: ☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): HMF

Bottom Depth: 105 m
Transmisso Cleaned: (Y) / N

Time	UTC	Local
Start	06 34	23
Bottom	06 37	
End	06 42	

Positional Information
Start
Lat: 48 ° 18 - 06 N
Lon: 124 ° 00 . 04 W

Bottom
Lat: 48 ° 18 06 N
Lon: 124 ° 00 08 W

End
Lat: 48 ° 18 08 N
Lon: 124 ° 00 18 W

Extra comments:
Water for Yuanji Sun
#21 NO TRIP

Water Properties Group

Sampling Log

Institute of Ocean Sciences, Ocean Sciences Division, Sidney, BC

Cruise ID: 2018-040 Station: JF2 Event #: 126 Ship: Tully UTC Date (dd mmm yyyy): 27 9 17

Niskin #	Firing #	Sample #	Rosette Operation		Samples Taken / Sampler's Initials										Comments
			Target Pressure	Confirmed ✓ Pressure	YS										
1		1019	160	✓	160	x									
2		1020	160	✓		x									
3		1021	160	✓		x									
4		1022	160	✓		x									
5		1023	160	✓		x									
6		1024	160	✓		x									
7		1025	160	✓		x									
8		1026	160	✓		x									
9		1027	160	✓		x									
10		1028	160	✓		x									
11		1029	160	✓		x									
12		1030	160	✓		x									
13		1031	160	✓		x									
14		1032	160	✓		x									
15		1033	160	✓		x									
16		1034	160	✓		x									
17		1035	160	✓		x									
18		1036	160	✓		x									
19		1037	160	✓		x									
20		1038	160	✓		x									
21		1039	160	✓		x									NO TRIP
22		1040	160	✓		x									
23		1041	160	✓		x									
24		1042	160	✓		x									

Profile type: ☒ ROS ☐ TRM ☐ X-Niskin ☐ other?
Watchkeeper(s): H M +

Bottom Depth: 185 m
Transmisso Cleaned: ☒ Y ☐ N

Time	UTC	Local
Start	0716	0016
Bottom	0719	
End	0727	

Positional Information
Start
Lat: 48 ° 18 - 14 N
Lon: 124 ° 00 - 42 W

Bottom
Lat: 48 ° 18 - 15 N
Lon: 124 ° 00 - 44 W

End
Lat: 48 ° 19 - N
Lon: 124 ° 00 - W

Extra comments:
Water for Yuanji Sun
FIXED # 21 BUT
STILL NO TRIP