

International Ocean Discovery Program Expedition 391 Scientific Prospectus Addendum

**Walvis Ridge Hotspot: drilling Walvis Ridge, Southeast
Atlantic Ocean, to test models of ridge-hotspot interaction,
isotopic zonation, and the hotspot reference frame**

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Introduction

This addendum to the International Ocean Discovery Program Expedition 391 *Scientific Prospectus* (Walvis Ridge Hotspot; Sager et al., 2020) incorporates minor coordinate changes to Proposed Sites CT-5A, CT-6A, TT-3A, TT-4A, TT-5A, VB-7A, VB-8A, VB-10A, VB-11A, VB-13A, and VB-14A. The revised site coordinates are documented in Proposal 890-Add2, which is available at http://iodp.tamu.edu/scienceops/expeditions/walvis_ridge_hotspot.html.

In addition, because of adjustments to the R/V *JOIDES Resolution* operations schedule caused by the COVID-19 pandemic, the expedition was postponed by a year. At the time of publication of this addendum, the expedition is scheduled to start in Cape Town,

South Africa, on 6 December 2021 and end in Cape Town, South Africa, on 5 February 2022.

For a detailed description of the geologic background, scientific objectives, drilling and coring strategy, logging strategy, sample and data sharing strategy, and proposed sites, see Tables **T1** and **T2** in this report and the Expedition 391 *Scientific Prospectus* (Sager et al., 2020).

Reference

Sager, W., Hoernle, K., and Petronotis, K., 2020. *Expedition 391 Scientific Prospectus: Walvis Ridge Hotspot*. International Ocean Discovery Program. <https://doi.org/10.14379/iodp.sp.391.2020>

Table T1. Operations plan and time estimates for primary sites, Expedition 391. EPSP = Environmental Protection and Safety Panel, RCB = rotary core barrel, FMS = Formation MicroScanner, FFF = free-fall funnel.

Proposed site	Location (latitude, longitude)	Seafloor depth (mbrf)	Description of operations	Transit (days)	Coring, drilling (days)	Logging (days)
Cape Town			Begin Expedition	5.0	port call days	
Transit ~784 nmi to VB-12A at 10.5 knots				3.1		
VB-12A	25.433078° S	3667	Hole A: RCB core to 393 mbsf; Log with triple combo & FMS-sonic	0	5.1	1.0
EPSP approval	6.956190° E		(sediment thickness: 293 m, basement penetration: 100 m)			
to 650 mbsf						
Subtotal days on site: 6.1						
Transit ~215 nmi to FR-1B at 10.5 knots				0.9		
FR-1B	21.866100° S	3259	Hole A: Deploy FFF; RCB core to 421 mbsf; Log with triple combo & FMS-sonic	0	9.8	1.0
EPSP approval	6.590600° E		(sediment thickness: 171 m, basement penetration: 250 m)			
to 521 mbsf						
Subtotal days on site: 10.9						
Transit ~183 nmi to VB-14A at 10.5 knots				0.7		
VB-14A	24.595881° S	3046	Hole A: RCB core to 410 mbsf; Log with triple combo & FMS-sonic	0	4.7	1.0
EPSP approval	5.121919° E		(sediment thickness: 310 m, basement penetration: 100 m)			
to 650 mbsf						
Subtotal days on site: 5.7						
Transit ~395 nmi to TT-04A at 10.5 knots				1.6		
TT-4A	30.166925° S	3465	Hole A: RCB core to 252 mbsf; Log with triple combo & FMS-sonic	0	4.4	0.9
EPSP approval	1.177510° E		(sediment thickness: 152 m, basement penetration: 100 m)			
to 550 mbsf						
Subtotal days on site: 5.3						
Transit ~149 nmi to CT-04A at 10.5 knots				0.6		
CT-4A	32.131000° S	4436	Hole A: Deploy FFF; RCB core to 528 mbsf; Log with triple combo & FMS-sonic	0	11.2	1.2
EPSP approval	0.592700° W		(sediment thickness: 278 m, basement penetration: 250 m)			
to 650 mbsf						
Subtotal days on site: 12.4						
Transit ~182 nmi to GT-04A at 10.5 knots				0.7		
GT-4A	31.344400° S	2370	Hole A: RCB core to 402 mbsf; Log with triple combo & FMS-sonic	0	4.9	1.0
EPSP approval	2.847000° E		(sediment thickness: 302 m, basement penetration: 100 m)			
to 652 mbsf						
Subtotal days on site: 5.9						
Transit ~803 nmi to Cape Town at 10.5 knots				3.2		
Cape Town			End Expedition	10.7	40.1	6.1

Port call days:	5.0	Total operating days:	57.0
Total days on site:	46.2	Total expedition days:	62.0

Table T2. Time estimates for alternate sites, Expedition 391. EPSP = Environmental Protection and Safety Panel, FFF = free-fall funnel, RCB = rotary core barrel, FMS = Formation MicroScanner. (Continued on next two pages.)

Proposed site	Location (latitude, longitude)	Seafloor depth (mbrf)	Description of operations	Coring, drilling (days)	Logging (days)
CT-1B	32.491200° S	1945	Hole A: Deploy FFF; RCB core to 577 mbsf; Log with triple combo & FMS-sonic	8.8	1.1
EPSP approval to 613 mbsf	0.141900° W		(sediment thickness: 327 m, basement penetration: 250 m)		
			Subtotal days on site: 9.9		
CT-5A	32.328059° S	3806	Hole A: Deploy FFF; RCB core to 417 mbsf; Log with triple combo & FMS-sonic	9.6	1
EPSP approval to 550 mbsf	0.643115° W		(sediment thickness: 167 m, basement penetration: 250 m)		
			Subtotal days on site: 10.6		
CT-6A	32.418908° S	2768	Hole A: Deploy FFF; RCB core to 447 mbsf; Log with triple combo & FMS-sonic	8.9	1
EPSP approval to 550 mbsf	0.579560° W		(sediment thickness: 197 m, basement penetration: 250 m)		
			Subtotal days on site: 9.9		
FR-2B	21.707300° S	3019	Hole A: Deploy FFF; RCB core to 693 mbsf; Log with triple combo & FMS-sonic	11.4	1.2
EPSP approval to 812 mbsf	6.762000° E		(sediment thickness: 443 m, basement penetration: 250 m)		
			Subtotal days on site: 12.6		
GT-5A	31.467100° S	4901	Hole A: RCB core to 362 mbsf; Log with triple combo & FMS-sonic	5.5	1.1
EPSP approval to 612 mbsf	3.072000° E		(sediment thickness: 262 m, basement penetration: 100 m)		
			Subtotal days on site: 6.6		
TT-1A	30.380800° S	1875	Hole A: RCB core to 272 mbsf; Log with triple combo & FMS-sonic	3.7	0.8
EPSP approval to 498 mbsf	1.089400° E		(sediment thickness: 162 m, basement penetration: 100 m)		
			Subtotal days on site: 4.5		
TT-2A	30.246700° S	2367	Hole A: RCB core to 489 mbsf; Log with triple combo & FMS-sonic	5.1	1.1
EPSP approval to 739 mbsf	0.839200° E		(sediment thickness: 389 m, basement penetration: 100 m)		
			Subtotal days on site: 6.2		
TT-3A	30.368460° S	1882	Hole A: RCB core to 235 mbsf; Log with triple combo & FMS-sonic	3.6	0.8
EPSP approval to 550 mbsf	1.085519° E		(sediment thickness: 135 m, basement penetration: 100 m)		
			Subtotal days on site: 4.4		
TT-5A	30.606835° S	2843	Hole A: RCB core to 244 mbsf; Log with triple combo & FMS-sonic	4.0	0.9
EPSP approval to 550 mbsf	0.976147° E		(sediment thickness: 144 m, basement penetration: 100 m)		
			Subtotal days on site: 4.9		
VB-1B	23.417600° S	2842	Hole A: RCB core to 222 mbsf; Log with triple combo & FMS-sonic	4.0	0.8
EPSP approval to 485 mbsf	4.907800° E		(sediment thickness: 122 m, basement penetration: 100 m)		
			Subtotal days on site: 4.8		

Table T2 (continued). (Continued on next page.)

Proposed site	Location (latitude, longitude)	Seafloor depth (mbrf)	Description of operations	Coring, drilling (days)	Logging (days)
VB-2B	23.281200° S	2829	Hole A: RCB core to 226 mbsf; Log with triple combo & FMS-sonic	3.5	0.8
EPSP approval to 812 mbsf	5.057300° E		(sediment thickness: 126 m, basement penetration: 100 m)		
			Subtotal days on site: 4.3		
VB-3B	24.602700° S	4061	Hole A: RCB core to 293 mbsf; Log with triple combo & FMS-sonic	4.5	1.0
EPSP approval to 543 mbsf	4.667600° E		(sediment thickness: 193 m, basement penetration: 100 m)		
			Subtotal days on site: 5.5		
VB-4B	24.584800° S	3970	Hole A: RCB core to 399 mbsf; Log with triple combo & FMS-sonic	5.9	1
EPSP approval to 631 mbsf	4.660900° E		(sediment thickness: 299 m, basement penetration: 100 m)		
			Subtotal days on site: 6.9		
VB-5A	23.371900° S	2820	Hole A: RCB core to 265 mbsf; Log with triple combo & FMS-sonic	3.7	0.9
EPSP approval to 515 mbsf	4.957900° E		(sediment thickness: 165 m, basement penetration: 100 m)		
			Subtotal days on site: 4.6		
VB-6A	23.176700° S	2621	Hole A: RCB core to 552 mbsf; Log with triple combo & FMS-sonic	5.4	1.1
EPSP approval to 813 mbsf	5.170300° E		(sediment thickness: 452 m, basement penetration: 100 m)		
			Subtotal days on site: 6.5		
VB-7A	26.295785° S	1898	Hole A: RCB core to 408 mbsf; Log with triple combo & FMS-sonic	3.9	0.9
EPSP approval to 650 mbsf	4.973920° E		(sediment thickness: 308 m, basement penetration: 100 m)		
			Subtotal days on site: 4.8		
VB-8A	26.269156° S	2077	Hole A: RCB core to 371 mbsf; Log with triple combo & FMS-sonic	3.9	0.9
EPSP approval to 650 mbsf	4.958304° E		(sediment thickness: 271 m, basement penetration: 100 m)		
			Subtotal days on site: 4.8		
VB-9A	26.194484° S	2154	Hole A: RCB core to 384 mbsf; Log with triple combo & FMS-sonic	4.0	0.9
EPSP approval to 650 mbsf	5.108462° E		(sediment thickness: 284 m, basement penetration: 100 m)		
			Subtotal days on site: 4.9		
VB-10A	26.007816° S	2897	Hole A: RCB core to 502 mbsf; Log with triple combo & FMS-sonic	5.2	1.1
EPSP approval to 750 mbsf	4.812774° E		(sediment thickness: 402 m, basement penetration: 100 m)		
			Subtotal days on site: 6.3		
VB-11A	26.125066° S	2618	Hole A: RCB core to 280 mbsf; Log with triple combo & FMS-sonic	3.8	0.9
EPSP approval to 550 mbsf	4.998272° E		(sediment thickness: 180 m, basement penetration: 100 m)		
			Subtotal days on site: 4.7		

Table T2 (continued).

Proposed site	Location (latitude, longitude)	Seafloor depth (mbrf)	Description of operations	Coring, drilling (days)	Logging (days)
VB-13A	25.202772° S	3954	Hole A: RCB core to 233 mbsf; Log with triple combo & FMS-sonic	4.1	0.8
EPSP approval to 500 mbsf	7.496033° E		(sediment thickness: 133 m, basement penetration: 100 m)		
			Subtotal days on site: 4.9		
VB-15A	23.827388° S	2006	Hole A: RCB core to 447 mbsf; Log with triple combo & FMS-sonic	4.3	1.0
EPSP approval to 700 mbsf	5.570439° E		(sediment thickness: 347 m, basement penetration: 100 m)		
			Subtotal days on site: 5.3		