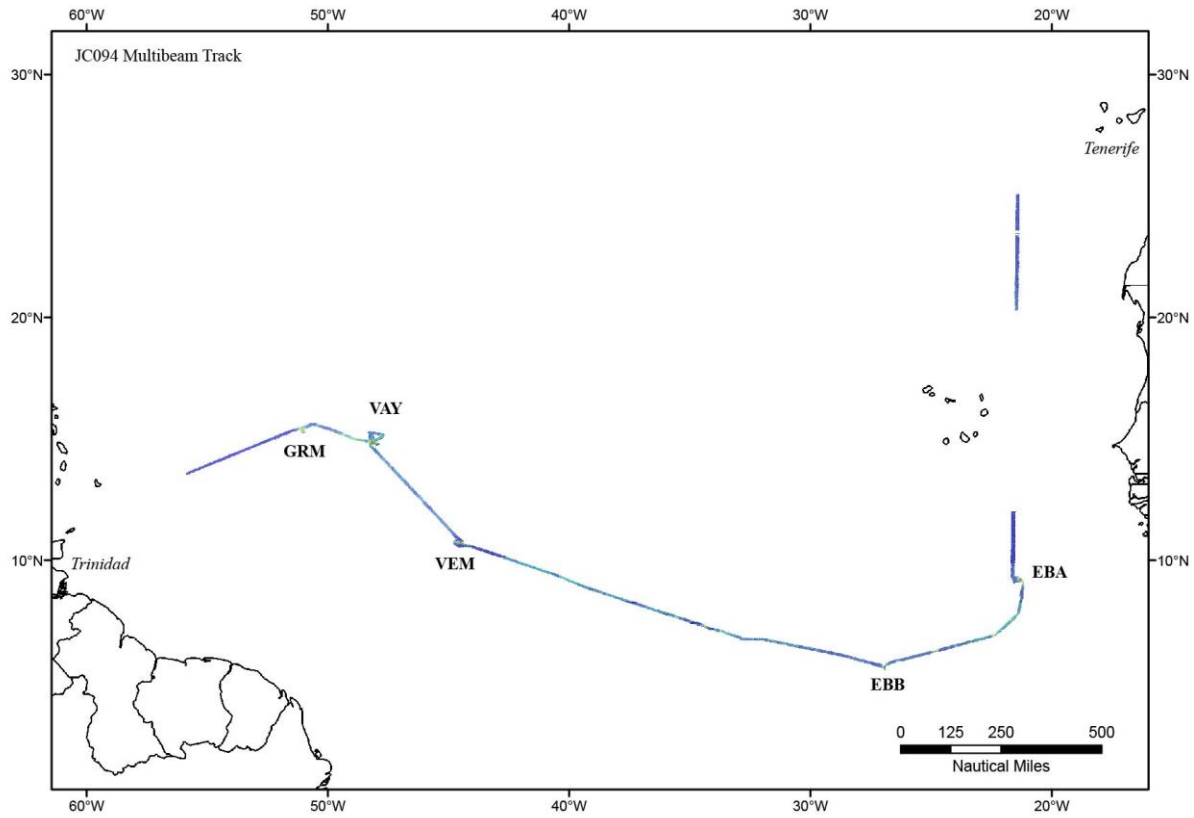
For 48 days from October-November 2013, the RRS James Cook sailed across the Atlantic for a palaeoceanographic study led by Dr. Laura Robinson from the University of Bristol. The expedition was the field-work component of a European Research Council funded project CACH 'Reconstructing abrupt Changes in Chemistry and Circulation of the Equatorial Atlantic Ocean: Implications for global Climate and deep-water Habitats'. The cruise included mapping, imaging and collecting cold-water corals using the remotely operated vehicle (ROV) ISIS as well as sediment coring and water sample collections. In addition to sample collection, 75,751 square kilometres of seafloor were mapped using the ship's hull-mounted EM-120 multibeam echosounder. Both the EM-120 raw .all files and 100-meter resolution ASCII grid files are provided in this data release.



Eleven areas were mapped during JC094, 5 areas of interest and 6 transits between sites. The 5 main sites are Carter Seamount (EBA), Knipovich Seamount (EBB), Vema Fracture Zone (VEM), Vayda Seamount (VAY) and Gramberg Seamount (GRM). The EM-120 is a full ocean-depth ranged sonar, with 191 beams and a 12 kHz operating frequency. Dependent on weather, the EM-120 can achieve a swath width of up to 5.5 times the water depth. During JC094, the swath width acquired was around 3.5-5 times the water depth and beam angles were kept around 60° - 70° port and starboard.

Multibeam was acquired during the entire cruise, except for while in the Tenerife, Canary Islands, and Barbados Economic Exclusive Zones (EEZs). Acquisition was performed using Kongsberg's Seafloor Information System (SIS) software. Line files were automatically broken every 30 minutes to avoid large file sizes. Occasionally, a line file would be manually increased at turn lines or at the start of a new survey. Parameters stayed consistent throughout the entirety of the cruise, with most settings being set to AUTO. At times, during rougher seas and faster vessel speeds, beam angles were brought in from the maximum of 70° port and starboard to 65° or 60° to achieve better data quality. Also, while surveying steeper slopes, beam steering was used to get better coverage up slope. Data quality was relatively high during Carter and Knipovich Seamounts and reduced slightly westward due to

rougher seas. Rarely did the EM-120 lose the seafloor for more than a couple pings. Approximately three times the SIS computer was restarted due to freezing, or slower computer speed.

Site locations were surveyed at a vessel speed of 6 kts and transit lines were surveyed at maximum speed (approximately 10 kts). The 5 site locations were created by planning one 6 – 8 hour initial line that would yield enough information to get a sense of the bathymetry to perform an ROV ISIS dive. The bathymetry was then systematically added in times of transit to new gear locations or when there was time due to gear turn-around or weather. 5 nearly complete feature bathymetric maps were acquired: Carter Seamount, Knipovich Seamount, part of the Vema Fracture Zone, Vayda Seamount and Gramberg Seamount.

Sound velocity was acquired using a sound velocity probe during CTD deployments, typically at a 4000 m site prior to reaching each of the 5 locations. These profiles were immediately uploaded into SIS and applied to the multibeam data. The sound velocity profiler did not work at the CTD006 cast site on the Vayda seamount, so a sound velocity profile was inferred and created using the temperature, salinity and depth information. Also, during the first transit to Carter Seamount, a current sound velocity profile was not available for use; therefore there are significant refraction errors in the multibeam data.

Processing of EM-120 data was performed using CARIS HIPS AND SIPS 8.1©. EM-120 lines were automatically placed on the JC094 drive and then manually copied to the processing computer. All lines had a zerotide.tid file applied. Site location processing occurred immediately at a primary cleaning level to be used for ROV planning and navigation maps. A secondary clean was performed on the data during transits after sites. Transit lines were cleaned when time was available but the level of cleaning is poorer than the 5 targeted locations. Eleven field sheets were created in CARIS. Basemaps were created (.csar files) at the best resolution to coverage ratio possible. In areas of shallower depths and slower vessel speeds, higher resolutions were obtained.

Basemaps with 100 meter resolution were exported as ASCII files. The ASCII grids are provided in this data release along with the raw .all files. Note that depths are provided as meters below sea-level as CARIS records depths as positive.

Location	*UTM Zone*	*Start Lat(DD)*	*Start Long(DD)*	*End Lat(DD)*	*End Long(DD)*	*Total Area (km^2)*	*Depth Range(m)*	*EM120 Lines*	*Grids*
TRS_1	27N	25.058N	21.409W	9.559N	21.635W	*12961*	*3300 - 5300*	*0000-0082*	100m
EBA *Carter*	27N	9.559N	21.635W	8.658N	21.243W	*2324*	*210 - 4600*	*0082-0139*	100m
TRS_2	26N	8.658N	21.243W	5.883N	26.403W	*8741*	*1290 - 4500*	*0139-0213*	100m
EBB *Knipovich*	26N	5.883N	26.403W	5.793N	27.635W	*2288*	*540 - 4500*	*0213-0250*	100m
TRS_3	25N-23N	5.793N	27.635W	10.505N	43.905W	*23995*	*1500 - 5500*	*0213-0439*	100m
VEM *Vema*	23N	10.505N	43.905W	11.134N	44.799W	*2815*	*525 - 5160*	*0439-0511*	100m
TRS_4	23N	11.134N	44.799W	14.551N	48.042W	*7595*	*2560 - 5285*	*0511-0566*	100m
VAY *Vayda*	22N	14.551N	48.042W	14.987N	48.838W	*4300*	*400 - 4200*	*0566-0654*	100m
TRS_5	22N	14.987N	48.838W	15.594N	50.636W	*2685*	*1700 - 4800*	*0654-0674*	100m
GRM *Gramberg*	22N	15.594N	50.636W	15.193N	51.878W	*2237*	*775 - 5500*	*0674-0708*	100m
TRS_6	21N	15.193N	51.878W	13.569N	55.867W	*5810*	*4050 - 5585*	*0708-0752*	100m

Table includes details per section of mapped seafloor. TRS stands for Transit line in-between sampling sites. In the data release the transit field sheets are split into parts (a, b, or c) to avoid large file sizes.