

Supplementary Material

Supplemental Table 1. Suite of sensors operated by the NOAA Ship *Okeanos Explorer* during CAPSTONE.

Sensor	Description	Data collection
Multibeam Echo Sounder	EM 302 (30 kHz)	Continuously except during ROV dives
Single beam fisheries echo sounder	EK60: 18 kHz, 38 kHz, 70 kHz, 200 kHz, 333 kHz	Concurrent with EM302 operations During ROV dives
Sub-bottom profiler	3.5 kHz Sub-bottom profiler	Concurrent with EM302 operations
Oceanographic profilers	CTD: SeaBird SBE 911 / XBTs	XBTs every 3-6 hours during mapping operations
Meteorological sensors	Wind, air temperature, humidity, SST, surface salinity, PAR	Continuously during all operations
ROV / Camera Sled video	2 Insite Pacific Zeus Plus HD cameras (details)	During ROV dives
ROV environmental sensors	CTD: SeaBird SBE19 Dissolved Oxygen: ORP sensor: Temperature probe	During ROV dives
ROV video metadata	Real time Event log Real time Seascribe annotations Video annotations post dive	During ROV dives

Supplementary Table 2. CAPSTONE ROV dive effort shown by region, feature, and depth, showing effort by number of total annotations, number of dives, hours of bottom time, and seafloor imaged. Percent unidentifiable taxa by number of annotations at each taxonomic level depicted.

	# annotations	# of dives	bottom time (# hours)	Estimated Seafloor imaged (Km)	#unidentifiable at Species level	#unidentifiable at Genus level	#unidentifiable at Family level
Total	90,079	168	891.48	29.386225	71,182	34765	11531
Geographic Region:							
Hawaiian Islands	53,575	74	391.4	13.682625	41,385	19,409	4,953
Marianas	13,073	40	216.4	7.69395	10,776	5,611	2,467
Western Pacific Plate	5,785	12	62	2.04875	4,702	1,780	585
American Samoa	2,443	13	64.9	1.5015	1,948	840	434
Southern Central Pacific	15,200	29	156.7	4.01775	12,371	7,116	3,092
Geologic Feature:							
Island	7,606	16	92.9	3.21695	5,791	3,168	1,580
Atoll	5,045	13	69.4	2.011625	3,772	1,648	782
Bank	17,190	18	107.1	3.78565	13,556	6,415	1,853
Guyot	27,466	48	157.7	8.001675	22,129	10,273	2,890
Conical Seamount	17,001	31	163.2	5.0952	13,457	6,516	1,692
Ridge Seamount	12,981	21	108.1	3.511475	10,239	5,548	2,069
Inactive vent	582	4	21.8	0.86075	539	340	130
Vent	1,482	7	46.4	1.19075	1,053	524	341
Abyssal	705	10	39.8	1.2705	628	310	182
Depth:							
0-250	359	14	5.7	0.15675	311	181	153
250-500	12,371	32	149.5	4.62	9,300	4,884	2,218
500-750	4,447	27	57.3	1.5785	3,187	1,507	859
750-1000	3,762	18	38.1	1.08625	2,624	1,698	903
1000-1500	10,654	33	112.1	3.465	8,422	4,481	1541
1500-2000	26,482	53	179	5.918	20,990	9,476	2,470
2000-2500	6,451	56	213.1	6.400625	5,579	2,157	326
2500-3000	3,248	22	68.6	2.2165	2,799	1,444	539
3000-3500	940	11	33.5	1.14675	799	396	145
3500-4000	1,082	10	34.3	1.122	954	455	154
4000-4500	476	6	22.8	0.8525	429	197	119
4500-5000	332	5	18.8	0.39875	280	169	107
5000-5500	0	1	0.4	0.011	0	0	0
5500-6000	172	4	14.9	0.4345	154	95	52

Supplemental Table 3. CAPSTONE ROV dive effort shown by region and feature, categorized by each depth bin, showing effort by time (number of hours).

REGION	Time in Depth (hours)													
	0-250	250-500	500-750	750-1000	1000-1500	1500-2000	2000-2500	2500-3000	3000-3500	3500-4000	4000-4500	4500-5000	5000-5500	5500-6000
HAWAII	0	31	7	8	50	108	136	41	13	10	8	3	0	0
MARIANAS	5	75	16	7	7	17	17	13	15	18	13	13	0	11
WESTERN PACIFIC	0	4	4	5	17	12	18	6	3	0	0	0	0	0
AMERICAN SAMOA	0	18	13	4	5	2	13	8	3	7	0	0	0	0
SOUTH CENTRAL PACIFIC	0	21	17	14	34	40	30	0	0	0	2	3	0	4
FEATURE														
ISLAND	0	59	17	3	1	6	10	0	0	0	2	0	0	0
ATOLL	0	22	11	8	17	2	8	7	0	0	0	0	0	0
BANK	0	27	11	1	11	34	21	5	2	0	0	3	0	0
GUYOT	0	0	0	5	41	88	91	20	7	0	0	0	0	0
CONICAL SEAMOUNT	0	16	3	3	28	39	34	12	7	26	0	0	0	0
RIDGE SEAMOUNT	0	8	8	10	7	10	44	13	10	0	2	3	0	0
INACTIVE VENT	0	0	0	0	0	0	6	12	0	6	0	0	0	0
VENT	5	18	8	9	7	0	0	0	7	2	4	0	0	0
ABYSSAL	0	0	0	0	0	0	0	0	0	0	14	13	0	15

Supplemental Table 4: CAPSTONE ROV dive effort shown by region and feature, categorized by each depth bin, showing effort by number of ROV dives.

REGION	Number of Dives													
	0-250	250-500	500-750	750-1000	1000-1500	1500-2000	2000-2500	2500-3000	3000-3500	3500-4000	4000-4500	4500-5000	5000-5500	5500-6000
HAWAII	0	6	6	5	18	30	34	12	4	2	2	1	0	0
MARIANAS	7	13	7	1	1	5	6	3	3	5	3	3	1	3
WESTERN PACIFIC	0	2	3	2	4	5	5	2	1	0	0	0	0	0
AMERICAN SAMOA	0	4	4	2	1	1	3	3	2	2	0	0	0	0
SOUTH CENTRAL PACIFIC	0	6	6	6	9	10	8	0	0	0	1	1	0	1
FEATURE														
ISLAND	1	12	8	1	1	1	2	0	0	0	1	0	0	0
ATOLL	0	5	4	3	5	1	2	2	0	0	0	0	0	0
BANK	1	5	5	1	3	9	5	1	1	0	0	1	0	0
GUYOT	0	0	0	2	12	26	25	7	2	0	0	0	0	0
CONICAL SEAMOUNT	0	2	1	2	6	9	9	3	2	6	0	0	0	0
RIDGE SEAMOUNT	0	2	3	2	3	3	10	4	3	0	1	1	0	0
INACTIVE VENT	0	0	0	0	0	0	1	2	0	1	0	0	0	0
VENT	1	3	1	2	1	0	0	0	1	1	1	0	0	0
ABYSSAL	0	0	0	0	0	0	0	0	0	1	3	3	1	4

Supplemental Table 5: CAPSTONE ROV dive effort shown by region and feature, categorized by each depth bin, showing effort by estimated area imaged (m²).

REGION	Estimated Area Imaged (m ²)													
	0- 250	250-500	500-750	750-1000	1000-1500	1500-2000	2000-2500	2500-3000	3000-3500	3500-4000	4000-4500	4500-5000	5000-5500	5500-6000
HAWAII	0	119,250	31,000	19,500	164,250	328,250	389,875	120,500	39,000	21,500	37,750	0	0	0
MARIANAS	12,750	197,500	42,000	27,750	20,250	86,250	48,000	50,250	53,000	66,750	34,000	30,750	1,000	31,000
WESTERN PACIFIC	0	13,750	11,250	11,250	50,500	28,750	56,000	18,250	4,250	0	0	0	0	0
AMERICAN SAMOA	0	34,750	30,500	6,500	8,250	8,500	18,500	12,500	8,000	13,750	0	0	0	0
SOUTH CENTRAL PACIFIC	250	55,250	29,250	33,750	71,750	86,250	69,500	0	0	0	5,750	5,500	0	8,500
FEATURE														
ISLAND	4,500	201,500	38,250	5,500	2,000	12,250	19,500	0	0	0	9,250	0	0	0
ATOLL	0	59,000	29,250	20,250	41,500	8,500	16,000	14,000	0	0	0	0	0	0
BANK	2,750	77,500	28,500	0	39,000	107,000	56,000	17,500	8,500	0	8,250	0	0	0
GUYOT	0	0	0	12,000	106,750	289,500	269,625	56,250	21,250	0	0	0	0	0
CONICAL SEAMOUNT	250	27,500	15,000	10,750	81,250	97,250	82,750	22,000	33,000	71,000	0	0	0	0
RIDGE	0	21,250	12,750	22,500	24,250	23,500	125,250	49,750	29,250	0	5,750	5,500	0	0
SEAMOUNT														
INACTIVE VENT	0	0	0	0	0	0	12,750	42,000	0	23,500	0	0	0	0
VENT	6,500	33,250	19,750	27,750	20,250	0	0	0	12,250	5,250	11,750	0	0	0
ABYSSAL	0	0	0	0	0	0	0	0	0	2,250	42,500	30,750	1,000	39,500

Supplemental Table 6: Top ten most abundant families by region

Western Pacific			South Central Pacific			Marianas Islands			Hawaiian Islands			American Samoa		
Family	Total #	% of total for region	Family	Total #	% of total for region	Family	Total #	% of total for region	Family	Total #	% of total for region	Family	Total #	% of total for region
Primnoidae	4353	21.06%	Primnoidae	6367	17.59%	Cynoglossidae	10215	17.05%	Isididae	33672	19.81%	Dendrophylliidae	5508	39.30%
Sclerophyllidae	3527	17.06%	Plexauridae	5758	15.90%	Stylasteridae	8592	14.34%	Chrysogorgiidae	26351	15.50%	Antipathidae	3655	26.08%
Acanthogorgiidae	2273	11.00%	Euryalidae	3398	9.39%	Dendrophylliidae	6192	10.33%	Coralliidae	19997	11.77%	Nephtidae	1660	11.85%
Coralliidae	2103	10.17%	Chrysogorgiidae	2426	6.70%	Chrysogorgiidae	3373	5.63%	Primnoidae	16989	10.00%	Chrysogorgiidae	642	4.58%
Chrysogorgiidae	1098	5.31%	Euplectellidae	2022	5.59%	Isididae	3368	5.62%	Alcyoniidae	6011	3.54%	Schizopathidae	293	2.09%
Cladopathidae	1021	4.94%	Isididae	1890	5.22%	Parisidae	2914	4.86%	Pheronematidae	5221	3.07%	Euplectellidae	272	1.94%
Stylasteridae	975	4.72%	Poecilasmaidae	1184	3.27%	Plexauridae	2483	4.14%	Acanthogorgiidae	4609	2.71%	Epigonidae	181	1.29%
Isididae	849	4.11%	Ophiacanthidae	1069	2.95%	Primnoidae	2296	3.83%	Schizopathidae	4471	2.63%	Amphianthidae	157	1.12%
Uncinateridae	505	2.44%	Coralliidae	1000	2.76%	Gorgoniidae	2250	3.76%	Euplectellidae	4449	2.62%	Isididae	137	0.98%
Schizopathidae	454	2.20%	Antipathidae	900	2.49%	Vulcanellidae	2214	3.69%	Euryalidae	4164	2.45%	Myxillidae	104	0.74%

Supplementary Figure 1. CAPSTONE ROV dive sites organized by region (Marianas, Western Pacific, Hawaiian Islands, South-Central Pacific, American Samoa). Marine Protected Areas boundaries are indicated by polygons. Dive site markers are color coded by feature type.

