Table S1. Statistical comparison of selected variables for the December 2008 and March 2009 storms.

Site [1]	Variable (units)	Storm [2]	Time Span (hours) [3]	Total [4]	Median	*p* [5]	IQR [6]	*p* [7]	Max	Min	*n*	MD [8]
MLA	30-min rainfall (mm)	D	192	306	0.00	.000	0.00-0.25	.024	19.0	0.00	385	0
		M	192	116	0.00		0.00-0.00		19.8	0.00	385	0
		D	24	183	0.64	.024	0.06-6.0	.091	19.0	0.00	48	0
		M	24	93.7	0.25		0.00-2.5		19.8	0.00	49	0
ALO	30-min rainfall (mm)	D	192	143	0.00	.001	0.00-0.00	.145	12.7	0.00	385	0
		M	192	66	0.00		0.00-0.00		17.3	0.00	385	0
		D	24	100	0.51	.091	0.00-3.0	.494	12.7	0.00	48	0
		M	24	57.9	0.00		0.00-1.14		17.3	0.00	49	0
MPDC	streamflow ($m^3 s^{-1}$)	D	192	2.8×10^6	1.1	.349	0.37-4.1	.000	65	0.06	385	0
		M	192	1.3×10^6	0.76		0.65-1.0		70	0.37	385	0
		D	24	1.5×10^6	8.6	.000	6.0-18	.001	65	3.2	48	0
		M	24	0.8×10^6	4.8		2.3-9.1		70	0.68	49	0
HNL	Δ water level (m) [9]	D	192	—	0.044	.000	0.024-0.068	.000	0.157	-0.086	385	0
		M	192	—	-0.003		-0.028-0.022		0.092	-0.082	385	0
		D	24	—	0.079	.000	0.049-0.132	.000	0.157	0.014	48	0
		M	24	—	0.025		0.001-0.046		0.092	-0.020	49	0
	air temperature (°C)	D	192	—	24.0	.000	23.2-25.1	.000	27.6	20.9	379	6
		M	192	—	22.2		20.7-23.3		27.0	16.0	385	0
		D	24	—	23.2	.000	22.3-23.8	.000	25.2	21.3	48	0
		M	24	—	19.8		18.5-20.8		22.3	17.6	49	0
	wind speed ($m s^{-1}$)	D	192	—	1.8	.236	1.0-2.9	.244	8.2	0.10	379	6
		M	192	—	1.8		0.90-3.1		9.1	0.10	383	2

Table S1. Statistical comparison of selected variables for the December 2008 and March 2009 storms.

Site [1]	Variable (units)	Storm [2]	Time Span (hours) [3]	Total [4]	Median	*p* [5]	IQR [6]	*p* [7]	Max	Min	*n*	MD [8]
		D	24	—	3.6	.163	2.8-4.9	.041	8.2	0.2	48	0
		M	24	—	3.1		1.4-4.5		9.1	0.1	49	0
	wind direction (°T)	D	192	—	121	.001	94-155	.000	358	5	379	6
		M	192	—	180		72-245		359	2	383	2
		D	24	—	143	.000	121-172	.000	288	96	48	0
		M	24	—	232		192-250		359	3	49	0
	atmos pressure (mb)	D	192	—	1013.3	.000	1012.0-1015.5	.000	1018.3	1005.5	379	6
		M	192	—	1014.5		1011.1-1016.1		1019.3	1006.9	385	0
		D	24	—	1010.6	.007	1008.7-1013.1	.000	1014.2	1005.5	48	0
		M	24	—	1009.2		1008.3-1010.1		1011.1	1007.0	49	0
NS01	temperature (°C)	D	192	—	24.779	.000	24.367-25.164	.000	26.468	22.066	339	46
		M	192	—	24.308		23.474-24.503		25.437	18.542	384	1
		D	24	—	22.685	.000	22.460-24.551	.000	25.296	22.267	48	0
		M	24	—	22.471		19.462-24.370		24.536	18.542	49	0
	salinity	D	192	—	30.283	.000	24.516-32.414	.000	34.485	1.664	339	46
		M	192	—	32.423		30.311-33.360		34.358	1.893	384	1
		D	24	—	3.428	.099	2.272-24.406	.200	34.484	1.664	48	0
		M	24		24.478		2.910-31.112		32.535	1.893	49	0
	chlorophyll (μg L^{-1})	D	192	—	1.6	.000	0.85-2.2	.000	48*	0.46	339	46
		M	192	—	2.0		1.4-3.1		9.7	0.84	384	1
		D	24	—	2.2	.000	1.9-2.3	.000	3.1	1.3	48	0
		M	24	—	1.7		1.6-1.9		2.5	1.1	49	0

Table S1. Statistical comparison of selected variables for the December 2008 and March 2009 storms.

Site [1]	Variable (units)	Storm [2]	Time Span (hours) [3]	Total [4]	Median	*p* [5]	IQR [6]	*p* [7]	Max	Min	*n*	MD [8]
	turbidity (NTU)	D	192	—	4.1	.000	1.8-18	.000	24*	0.81	339	46
		M	192	—	1.7		1.4- 3.4		24*	0.79	384	1
		D	24	—	24*	—	11-24*	.000	24*	1.4	48	0
		M	24	—	24*		2.6-24*		24*	1.2	49	0
NS02	temperature (°C)	D	192	—	24.649	.000	24.294-25.093	.000	26.134	22.318	331	54
		M	192	—	24.176		23.650-24.347		24.881	18.765	384	1
		D	24	—	23.297	.000	22.687-24.689	.000	25.471	22.318	41	7
		M	24	—	22.231		19.632-24.022		24.253	18.765	49	0
	salinity	D	192	—	30.575	.000	27.160-32.447	.000	34.271	2.183	331	54
		M	192	—	33.335		31.223-33.885		34.623	4.057	384	1
		D	24	—	11.267	.051	4.272-27.938	.129	34.144	2.183	41	7
		M	24	—	24.738		7.519-31.492		33.099	4.057	49	0
	chlorophyll (μg L^{-1})	D	192	—	0.85	.000	0.59-1.9	.000	6.5	0.34	331	54
		M	192	—	2.2		1.2-4.1		8.6	0.50	384	1
		D	24	—	1.7	.000	1.6-2.3	.000	3.8	0.84	41	7
		M	24	—	1.4		1.2-1.8		2.3	0.82	49	0
	turbidity (NTU)	D	192	—	2.7	.000	1.2-6.1	.000	24*	0.54	331	54
		M	192	—	1.1		0.91-2.4		24*	0.61	384	1
		D	24	—	24*	—	9.4-24*	.000	24*	0.74	41	7
		M	24	—	17		3.4-24*		24*	0.73	49	0
WQB-AW	temperature (°C)	D	192	—	24.913	.000	24.799-25.071	.000	25.455	24.530	384	1
		M	192	—	23.585		23.395-23.867		24.548	22.365	379	6

Table S1. Statistical comparison of selected variables for the December 2008 and March 2009 storms.

Site [1]	Variable (units)	Storm [2]	Time Span (hours) [3]	Total [4]	Median	*p* [5]	IQR [6]	*p* [7]	Max	Min	*n*	MD [8]
		D	24	—	24.868	.000	24.764-25.077	.000	25.268	24.530	48	0
		M	24	—	23.197		22.994-23.322		23.479	22.365	49	0
	salinity	D	192	—	34.533	.054	34.059-34.846	.001	35.051	30.499	384	1
		M	192	—	34.686		34.414-34.855		35.039	28.232	379	6
		D	24	—	32.772	.231	31.731-34.907	.008	35.048	30.499	48	0
		M	24	—	33.807		32.665-34.722		35.007	28.232	49	0
	DO concentration (μM)	D	192	—	217	.000	213-220	.000	232	198	384	1
		M	192	—	205		201-210		228	179	379	6
		D	24	—	222	.000	218-224	.000	226	214	48	0
		M	24	—	211		209-216		221	199	49	0
	DO saturation (%)	D	192	—	102	.000	100-104	.000	109	94.2	384	1
		M	192	—	94.3		92.4-97.2		107	82.5	379	6
		D	24	—	103	.000	103-104	.000	105	102	48	0
		M	24	—	96.4		95.4-98.3		101	89.1	49	0
	chlorophyll (μg L^{-1})	D	192	—	0.46	.000	0.35-0.60	.000	1.7	0.15	384	1
		M	192	—	0.39		0.27-0.53		15	-0.29	379	6
		D	24	—	0.59	.059	0.43-0.69	.000	1.0	0.32	48	0
		M	24	—	0.46		0.41-0.62		1.3	0.28	49	0
	turbidity (NTU)	D	192	—	0.38	.000	0.07-1.4	.000	22	-0.16	384	1
		M	192	—	0.07		0.01-0.33		200*	-0.70	379	6
		D	24	—	4.8	.000	1.3-8.3	.002	22	0.13	48	0
		M	24	—	1.4		0.12-4.0		15	-0.42	49	0

Table S1. Statistical comparison of selected variables for the December 2008 and March 2009 storms.

Site [1]	Variable (units)	Storm [2]	Time Span (hours) [3]	Total [4]	Median	*p* [5]	IQR [6]	*p* [7]	Max	Min	*n*	MD [8]
WQB-KN	temperature (°C)	D	192	—	24.973	.000	24.875-25.125	.000	25.487	24.696	385	0
		M	192	—	23.580		23.356-23.844		24.478	22.862	375	10
		D	24	—	25.020	.000	24.917-25.145	.000	25.294	24.737	48	0
		M	24	—	23.199		23.148-23.290		23.356	22.907	49	0
	salinity	D	192	—	34.685	.003	34.485-34.868	.000	35.060	32.431	385	0
		M	192	—	34.862		34.585-34.952		35.071	33.422	375	10
		D	24	—	34.031	.197	33.620-34.963	.008	35.057	32.431	48	0
		M	24	—	34.490		34.156-34.855		35.007	33.538	49	0
	DO concentration (μM)	D	192	—	200	.000	198-203	.000	214	184	385	0
		M	192	—	202		199-206		226	175	375	10
		D	24	—	204	.897	200-207	.009	214	199	48	0
		M	24	—	202		202-205		209	200	49	0
	DO saturation (%)	D	192	—	94.9	.000	93.3-96.1	.000	100	86.8	385	0
		M	192	—	93.3		91.6-95.2		105	81.0	375	10
		D	24	—	96.0	.000	95.1-97.3	.000	100	94.3	48	0
		M	24	—	92.8		92.4-93.9		95.7	91.8	49	0
	chlorophyll (μg L^{-1})	D	192	—	0.51	.000	0.37-0.67	.000	1.7	0.15	385	0
		M	192	—	0.39		0.25-0.52		1.0	-0.02	375	10
		D	24	—	0.51	.007	0.42-0.60	.001	0.68	0.39	48	0
		M	24	—	0.45		0.26-0.52		0.72	0.16	49	0
	turbidity (NTU)	D	192	—	0.34	.000	0.14-0.78	.000	6.6	-0.05	385	0
		M	192	—	0.11		0.03-0.24		1.8	-0.06	375	10

Table S1. Statistical comparison of selected variables for the December 2008 and March 2009 storms.

Site [1]	Variable (units)	Storm [2]	Time Span (hours) [3]	Total [4]	Median	*p* [5]	IQR [6]	*p* [7]	Max	Min	*n*	MD [8]
		D	24	—	1.9	.000	1.2-4.0	.000	6.6	0.21	48	0
		M	24	—	0.43		0.07-1.1		1.8	-0.05	49	0
KNO	12-m temperature (°C)	D	192	—	25.0	.000	24.9-25.2	.000	25.5	24.7	369	16
		M	192	—	23.6		23.5-23.6		23.9	23.3	385	0
		D	24	—	25.3	.000	25.2-25.3	.000	25.4	25.1	48	0
		M	24	—	23.5		23.4-23.5		23.5	23.3	49	0
	spectral $H_{1/3}$ (m) [10]	D	192	—	1.0	.000	0.84-1.6	.000	2.9	0.68	369	16
		M	192	—	0.54		0.43-0.70		1.5	0.28	385	0
		D	24	—	1.9	.000	1.7-2.4	.000	2.9	1.4	48	0
		M	24	—	1.2		0.80-1.2		1.5	0.45	49	0
	peak wave period (s)	D	192	—	6.6	.000	5.6-7.5	.000	9.3	3.2	369	16
		M	192	—	12.9		10.6-13.8		17.4	3.4	385	0
		D	24	—	7.8	.000	7.3-7.8	.000	8.5	6.0	48	0
		M	24	—	5.5		5.2-6.0		16	3.4	49	0
	dominant wave dir (°T)	D	192	—	183	.000	180-185	.000	192	169	369	16
		M	192	—	189		184-193		209	174	385	0
		D	24	—	182	.000	181-186	.000	192	176	48	0
		M	24	—	194		192-196		209	184	49	0
	12-m current (m s^{-1})	D	192	—	0.21	.000	0.18-0.29	.000	0.64	0.13	369	16
		M	192	—	0.15		0.13-0.18		0.27	0.10	385	0
		D	24	—	0.41	.000	0.38-0.51	.000	0.64	0.32	48	0
		M	24	—	0.19		0.16-0.21		0.27	0.13	49	0

Table S1. Statistical comparison of selected variables for the December 2008 and March 2009 storms.

Site [1]	Variable (units)	Storm [2]	Time Span (hours) [3]	Total [4]	Median	*p* [5]	IQR [6]	*p* [7]	Max	Min	*n*	MD [8]
	acoustic scatter (#)	D	192	—	57	.000	56-64	.000	80	53	369	16
		M	192	—	53		51-55		62	48	385	0
		D	24	—	74	.000	70-76	.000	80	64	48	0
		M	24	—	56		53-59		62	51	49	0

Notes

1 NWS Hydronet rain gauges: MLA = Mānoa-Lyon Arboretum, ALO = Aloha Tower
USGS stream gauge: MPDC = Mānoa-Pālolo Drainage Canal at Mōʻiliʻili (#16247100)
NOS tide gage and meteorological station: HNL = Honolulu (#1612340)
UHM Nearshore Sensor (NS) installations: NS01 (Waikīkī Yacht Club, Ala Wai Canal), NS02 (Hawaiʻi Yacht Club, Ala Wai Canal)
UHM Water Quality Buoys (WQB): WQB-AW = Ala Wai, WQB-KN = Kilo Nalu
UHM Kilo Nalu Observatory (KNO)

2 D = December 10–18, 2008; M = March 13–21, 2009

3 192 hours (8 days); 24 hours (elapsed time from 0 to 24 hours with no 0.00 for Storm D)

4 Total rainfall (mm) or total runoff (m^3)

5 Nonparametric Mann-Whitney *U* comparison of the location parameter (the central, middle or most typical, i.e., mean, median, or mode) of the two storms; $\alpha = 0.05$ (2 tailed), i.e., $p \leq 0.05$ considered significantly different

6 Interquartile range—50% of the data fall within this range; an extreme (but not necessarily erroneous) value is considered to be $3 \times$ IQR

7 Nonparametric Kolmogorov-Smirnov *Z* comparison of cumulative distribution function between the two storms; $\alpha = 0.05$ (2 tailed), i.e., $p \leq 0.05$ considered significantly different

8 MD = missing data (excluded list-wise)

9 Δ = predicted—actual water level

10 $H_{1/3}$ = spectral significant wave height, i.e., the average of the highest ⅓ of the waves

* Full scale