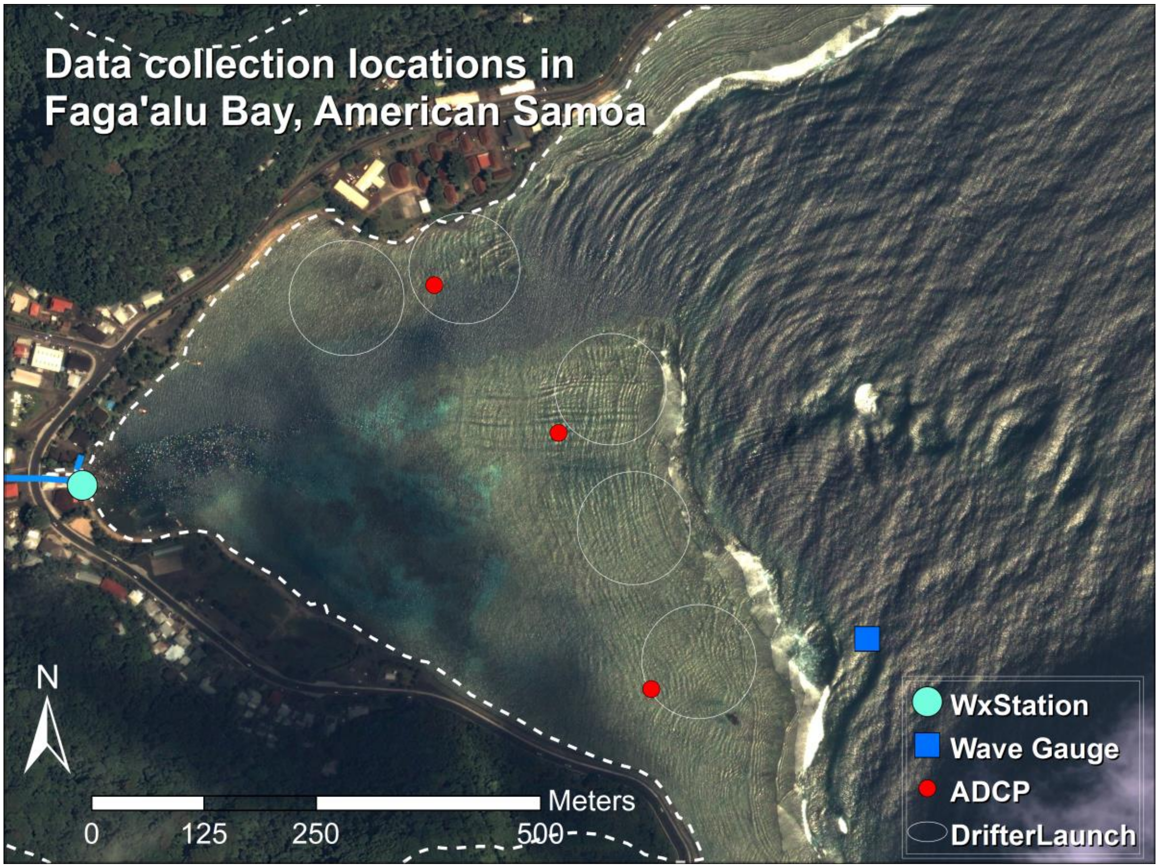

Figure 1. Data collection locations in Faga'alu Bay. Wind speed and direction was recorded at the weather station (WxStation), a Dobie wave gauge recorded wave height and period (Wave Gauge), three ADCP's were deployed for one week to measure current speed and direction, and five GPS-logging drifters were deployed from the same five launch zones (DrifterLaunch) for thirty separate deployments (January to March, 2014).

Figure 2. Image of the embayment on a typical, rain-free day. The darker areas of the bay are live coral, and the light areas are deeper pools with carbonate sand bottom.

Figure 3. Image of a flood plume (2/21/14) in the northern portion of the bay following a heavy precipitation event. Plumes usually persist for several hours, and rarely are seen after 24h due to the flushing of water through the deep channel and out to sea.

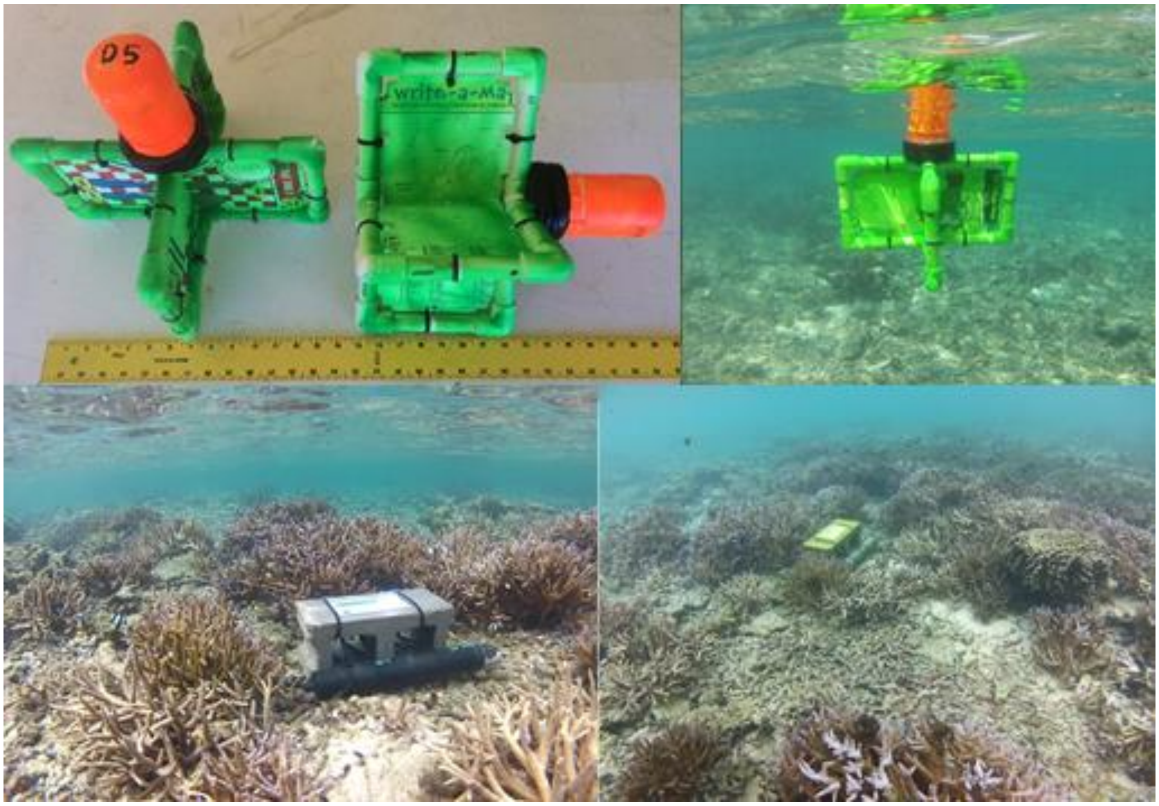

Figure 4. TOP: Images of the shallow-water drifters on land, and deployed in the field.
BOTTOM: Images of the acoustic current profilers deployed on the southern reef flat (AS1).

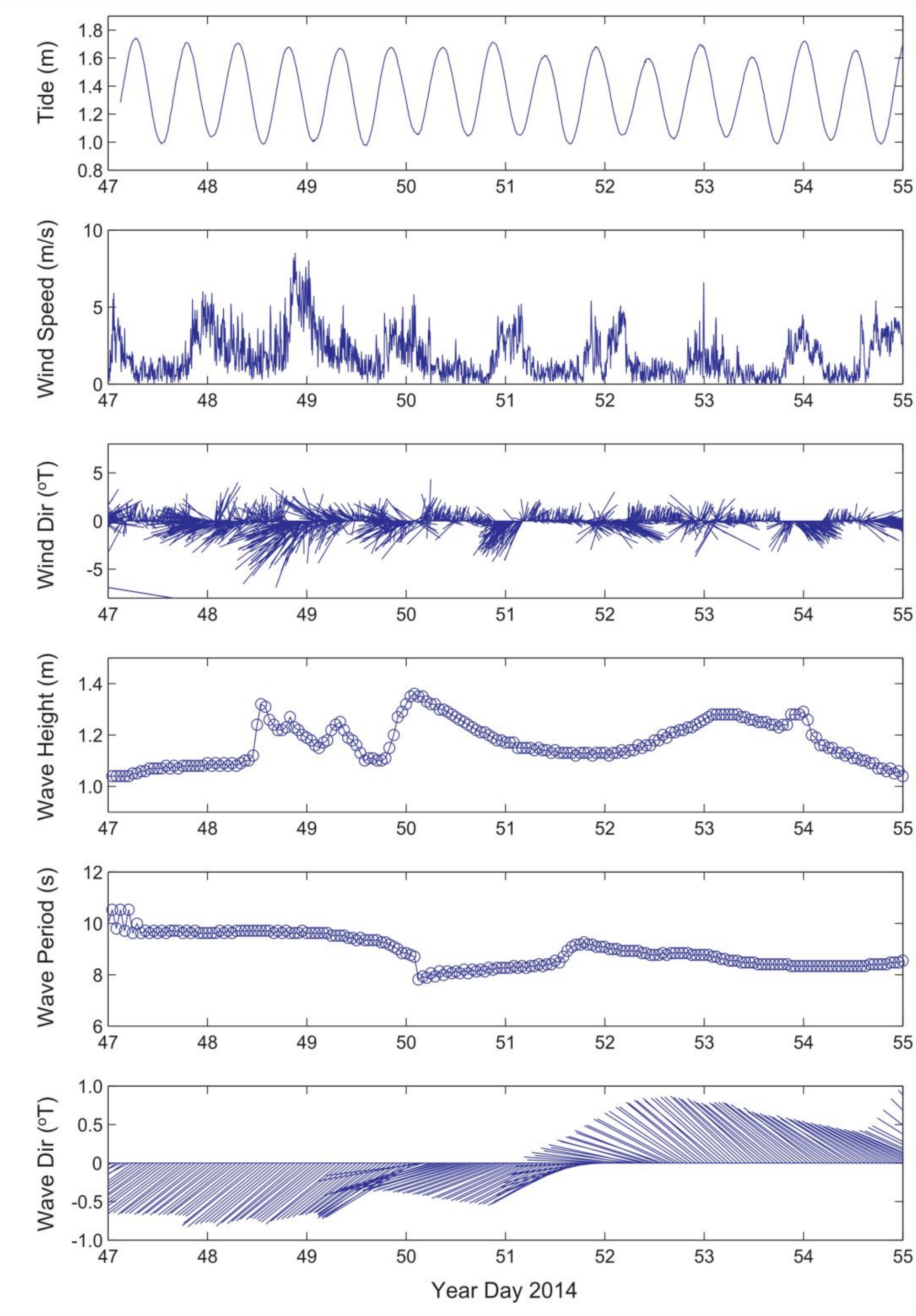

Figure 5. Time series of physical forcing: Tide stage, wind speed, wind direction from NDBC station NSTP6, wave height and direction from NOAA WW3. Day 47=16 Feb 2014, Day 54=23 Feb 2014.

Table 1. End member periods

End member	Julian Day	Gregorian Day (UTC)	Gregorian Day (Local)
Tide/Calm	50-51	2/19-2/20	2/18-2/19
Wind	47-49	2/16-2/18	2/15-2/17
Wave	52-55	2/21-2/24	2/20-2/23

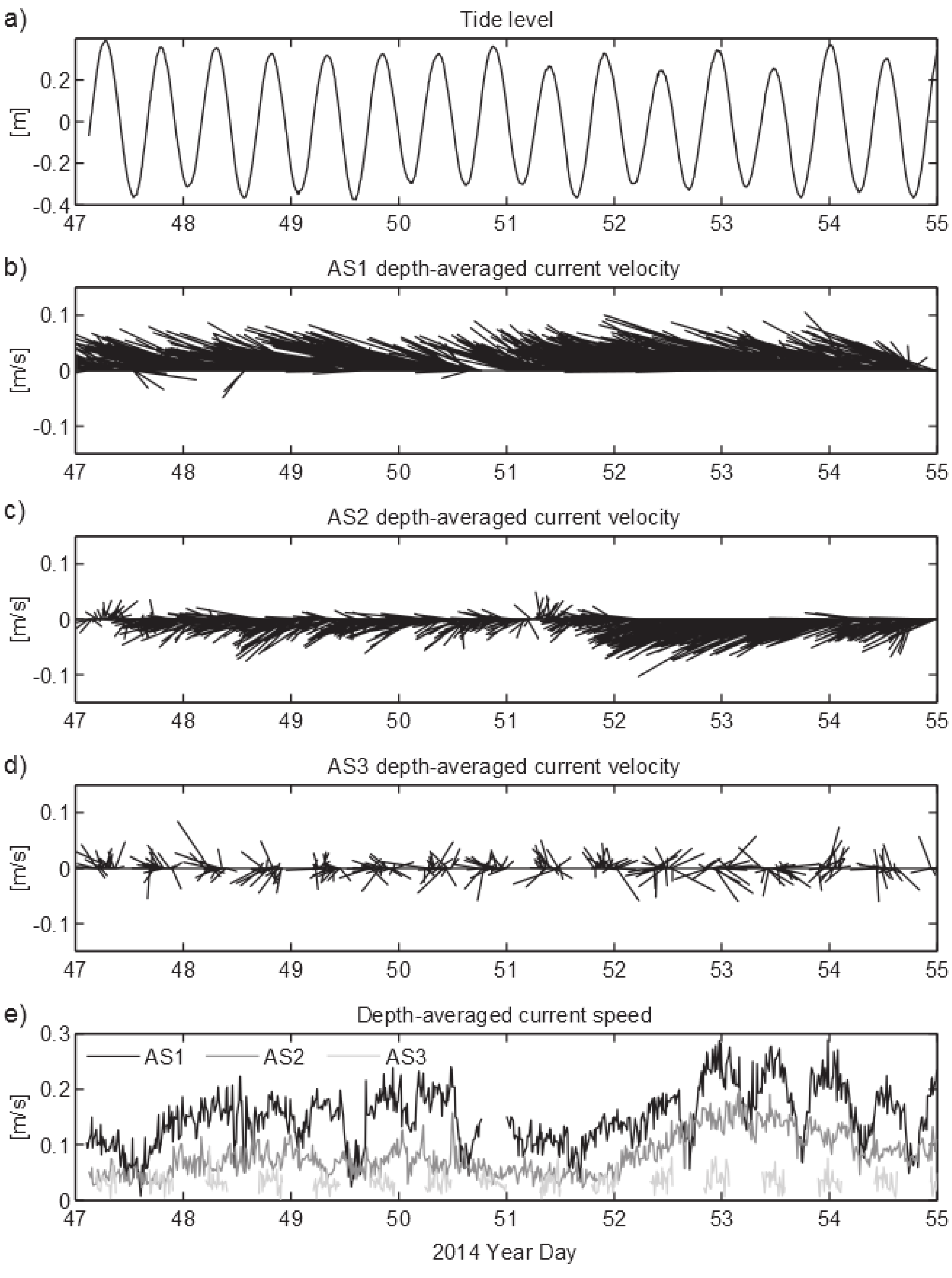

Figure 6. Time series of the resulting flow measured by the acoustic current profilers. Water depths at low tide were too shallow to measure flow data at AS3. Note the variations in current speeds both in space and time due to the different forcing conditions.

Table 2. Drifter deployment dates and conditions. Red numbered Deployments coincide with ADCP deployment

Deployment	Julian(local)	Date	Start Time	End Time	Tide Start	Tide End	Tide movement	Tide	Wind Speed Avg	Wind Direction Avg	Wind Gust Max	Wave Height (m)	Wave Period
1	19	01/19/2014	1300	1500	1.5	1.0	-0.6	falling	1.2	232.0	4.0	0-1	nan
2	20	01/20/2014	1615	1730	1.0	1.2	0.2	rising	2.4	194.0	7.0	1-2	nan
3	20	01/20/2014	1750	1900	1.2	1.9	0.7	rising	3.2	258.0	10.0	1-2	nan
4	32	02/01/2014	900	1100	3.7	2.6	-1.2	falling	5.3	96.0	11.0	0-1	nan
5	32	02/01/2014	1130	1300	2.2	0.9	-1.3	falling	5.7	100.0	13.0	0-1	nan
6	32	02/01/2014	1700	1900	1.5	3.2	1.7	rising	4.2	188.0	13.0	0-1	nan
7	39	02/08/2014	1415	1545	3.1	3.4	0.4	rising	5.2	140.0	18.0	2-4	nan
8	39	02/08/2014	1605	1800	3.3	2.5	-0.8	falling	6.0	144.0	20.0	2-4	nan
9	47	02/16/2014	1654	1846	2.4	3.2	0.9	rising	3.2	169.0	9.0	0-2	nan
10	48	02/17/2014	1245	1500	1.6	1.1	-0.5	falling	9.7	80.0	28.0	2-4	nan
11	48	02/17/2014	1530	1700	1.1	1.6	0.5	rising	5.9	101.0	20.0	2-4	nan
12	48	02/17/2014	1710	1840	1.6	2.6	0.9	rising	5.2	90.0	15.0	2-4	nan
13	49	02/18/2014	1245	1445	2.1	1.3	-0.8	falling	4.9	98.0	14.0	2-4	nan
14	49	02/18/2014	1445	1700	1.3	1.4	0.1	low	4.7	194.0	15.0	2-4	nan
15	50	02/19/2014	1205	1440	2.9	1.5	-1.4	falling	5.8	40.0	11.0	2-4	nan
16	50	02/19/2014	1445	1720	1.5	1.2	-0.3	falling	6.6	54.0	15.0	2-4	nan
17	51	02/20/2014	840	1045	2.5	3.2	0.6	rising	4.8	290.0	13.0	0-2	nan
18	51	02/20/2014	1100	1200	3.2	3.0	-0.2	falling	4.3	117.0	11.0	0-2	nan
19	51	02/20/2014	1210	1430	3.0	2.1	-1.0	falling	3.0	238.0	12.0	0-2	nan
20	51	02/20/2014	1500	1630	1.8	1.3	-0.6	falling	5.9	290.0	13.0	0-2	nan
21	52	02/21/2014	920	1040	2.4	3.0	0.6	rising	2.9	253.0	11.0	4-6	nan
22	52	02/21/2014	1040	1145	3.0	3.3	0.3	rising	3.8	111.0	11.0	4-6	nan
23	52	02/21/2014	1300	1400	3.2	3.0	-0.3	falling	3.0	193.0	16.0	4-6	nan
24	52	02/21/2014	1500	1550	2.4	1.9	-0.5	falling	3.7	152.0	11.0	4-6	nan

25	53	02/22/2014	1100	1215	2.7	3.2	0.5	rising	5.5	314.0	14.0	4-6	nan
26	53	02/22/2014	1220	1315	3.2	3.4	0.2	rising	6.3	302.0	12.0	4-6	nan
27	53	02/22/2014	1600	1700	2.4	1.9	-0.5	falling	4.2	311.0	10.0	4-6	nan
28	53	02/22/2014	1700	1845	1.9	1.2	-0.7	falling	2.0	242.0	10.0	4-6	nan
29	54	02/23/2014	1040	1210	2.0	2.9	0.9	rising	7.2	304.0	15.0	2-4	nan
30	54	02/23/2014	1210	1255	2.9	3.3	0.4	rising	5.3	260.0	11.0	2-4	nan

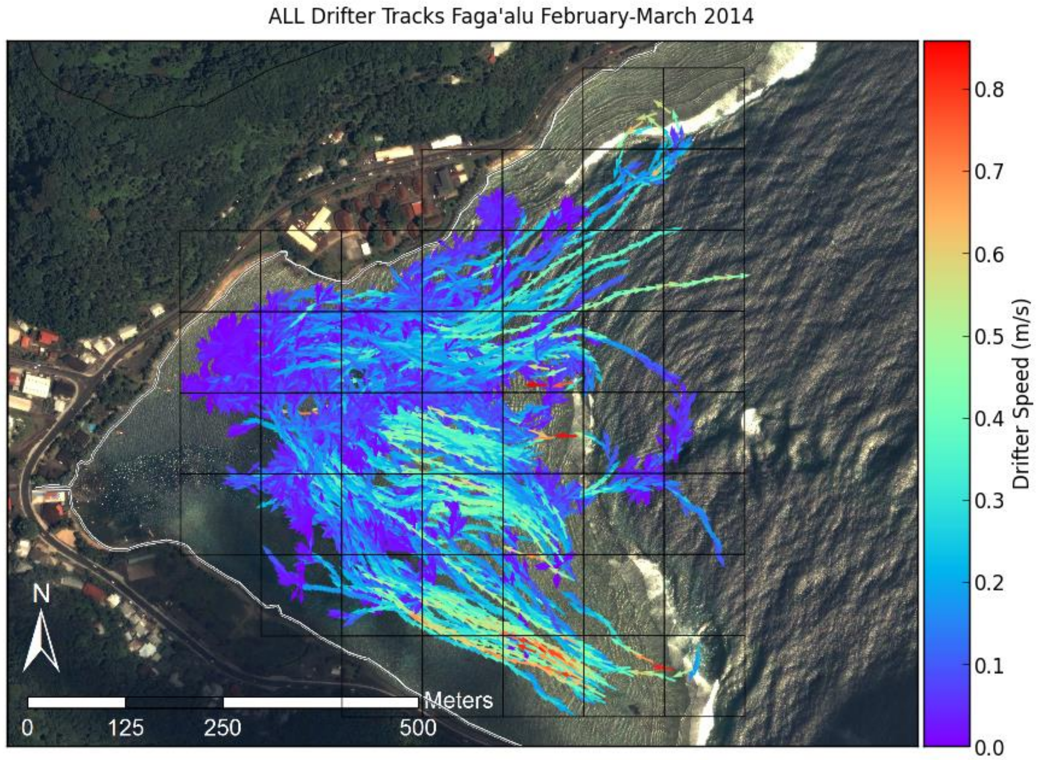

Figure 7. Map of all drifter tracks, colored by speed, recorded during the experiment.

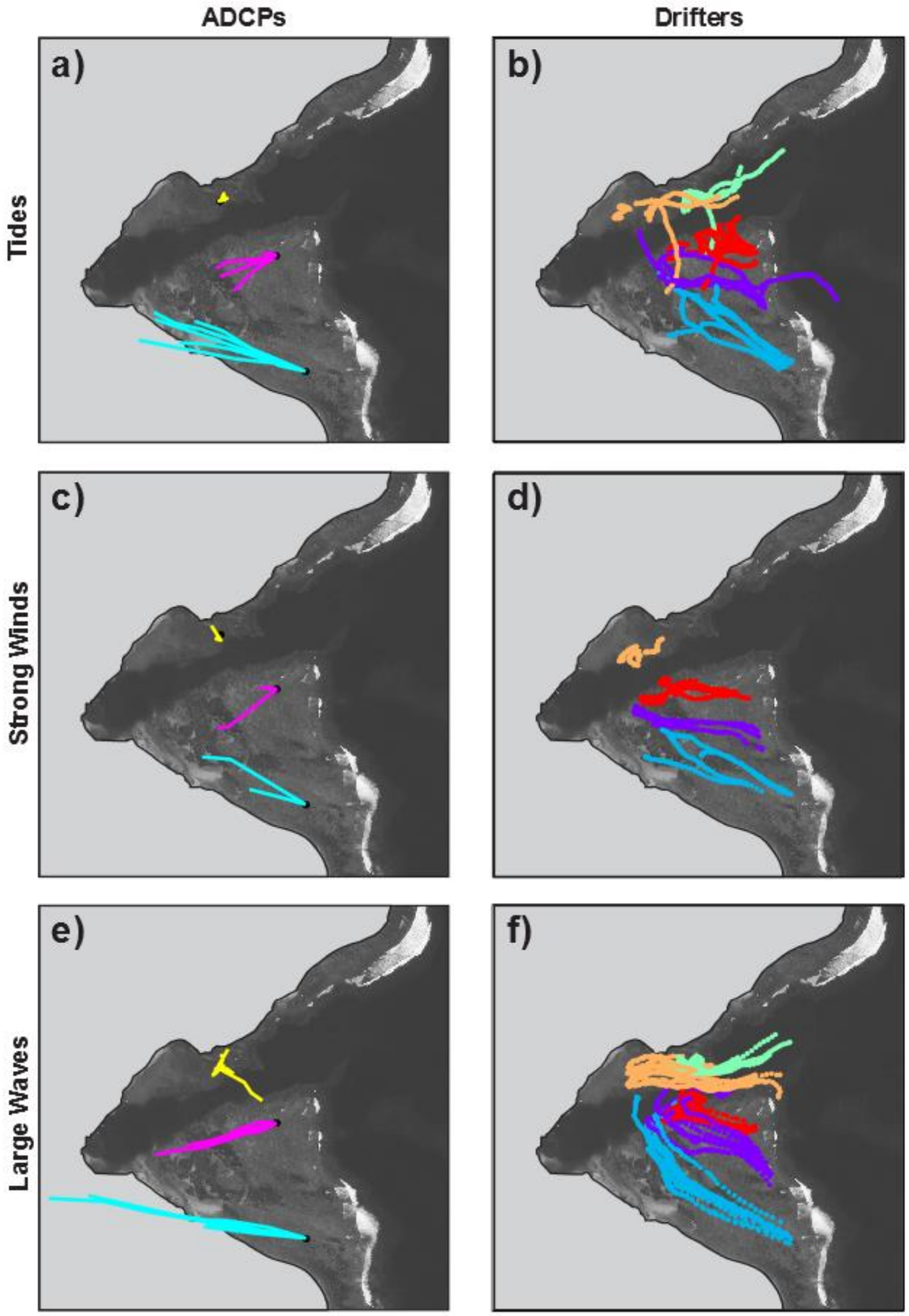

Figure 8. Progressive vectors calculated from ADCP data, compared to actual Lagrangian drifter tracks under different forcing conditions.

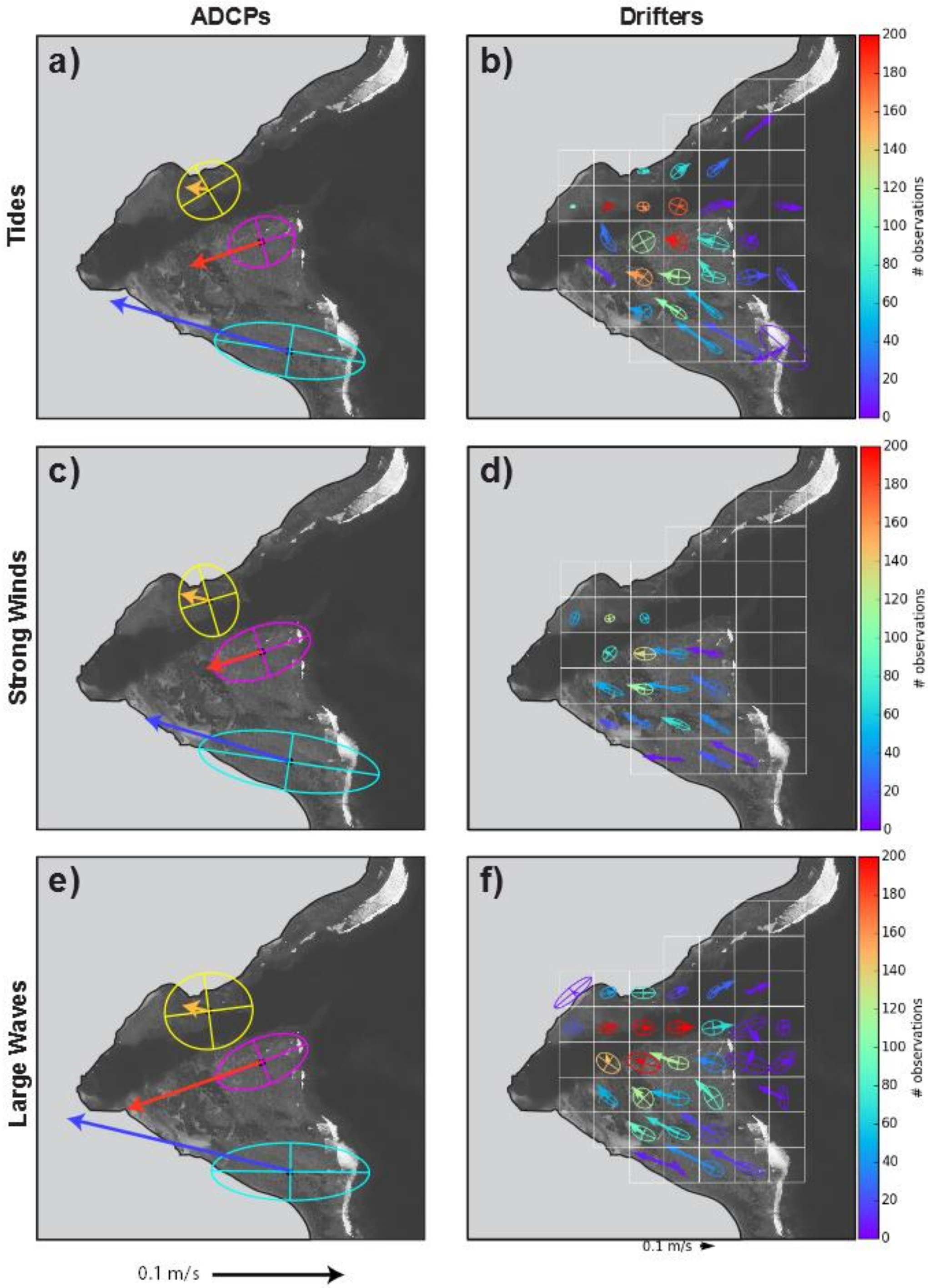

Figure 9. EOF's calculated from ADCP data, compared to EOF's calculated from spatially binned (100m x 100m grid cell) Lagrangian drifter data under different forcing conditions. Drifter EOF's are colored by number of observations to illustrate varying data density depending on grid cell.

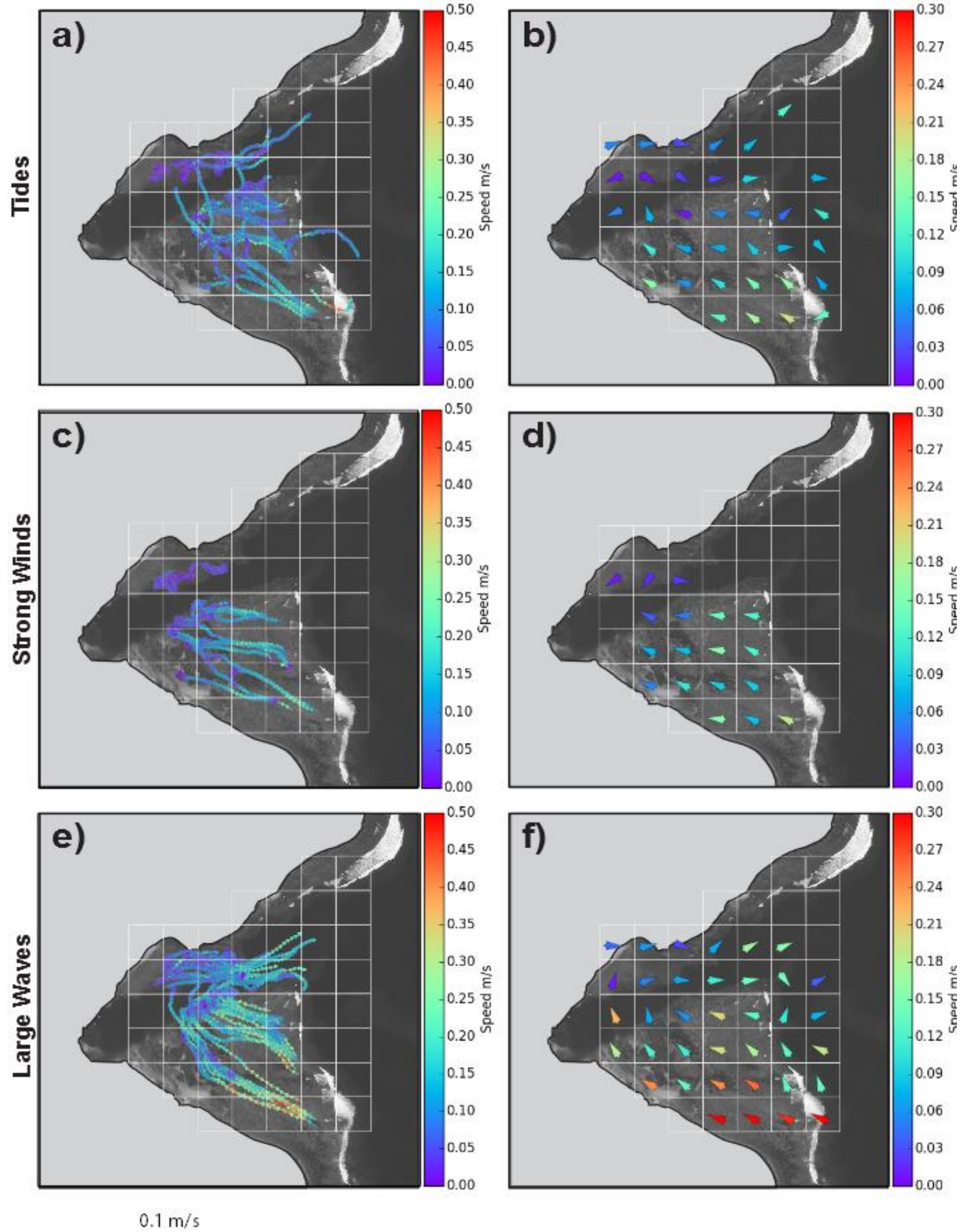

Figure 10. Drifter tracks and calculated mean velocity, colored by speed for different forcing conditions. Cells with no drifter observations are left empty.

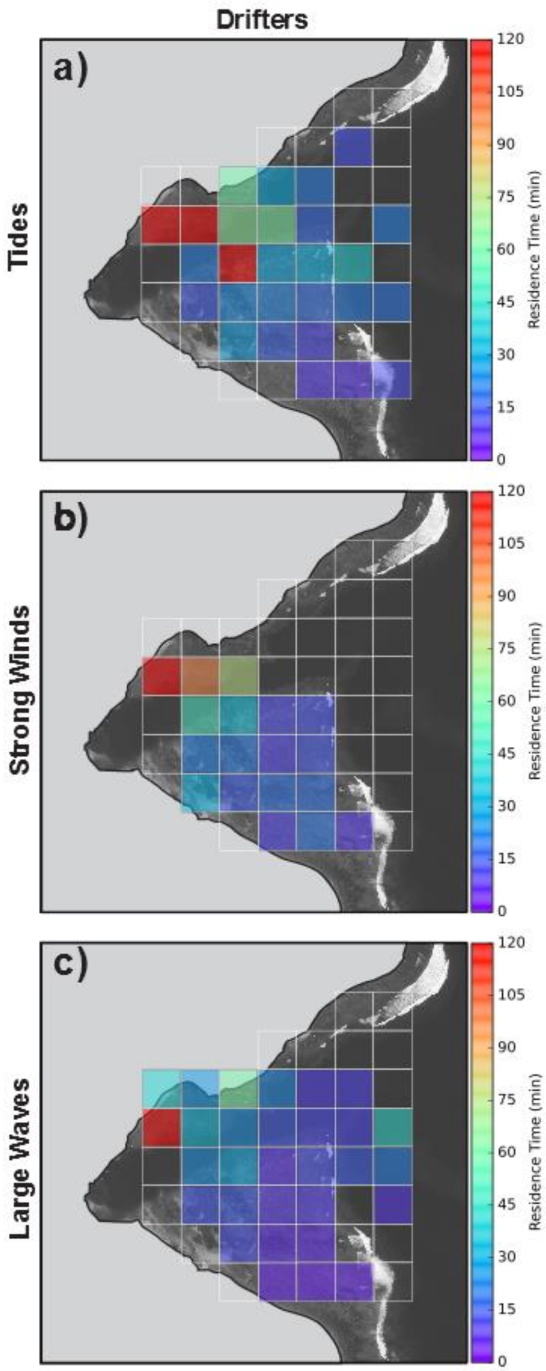

Figure 11. Residence time calculated from mean velocity of drifters under endmember conditions