

Foraging behavior of juvenile loggerhead sea turtles in the open ocean: from Lévy exploration to area-restricted search

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Marine Ecology Progress Series 595: 203–215 (2018)

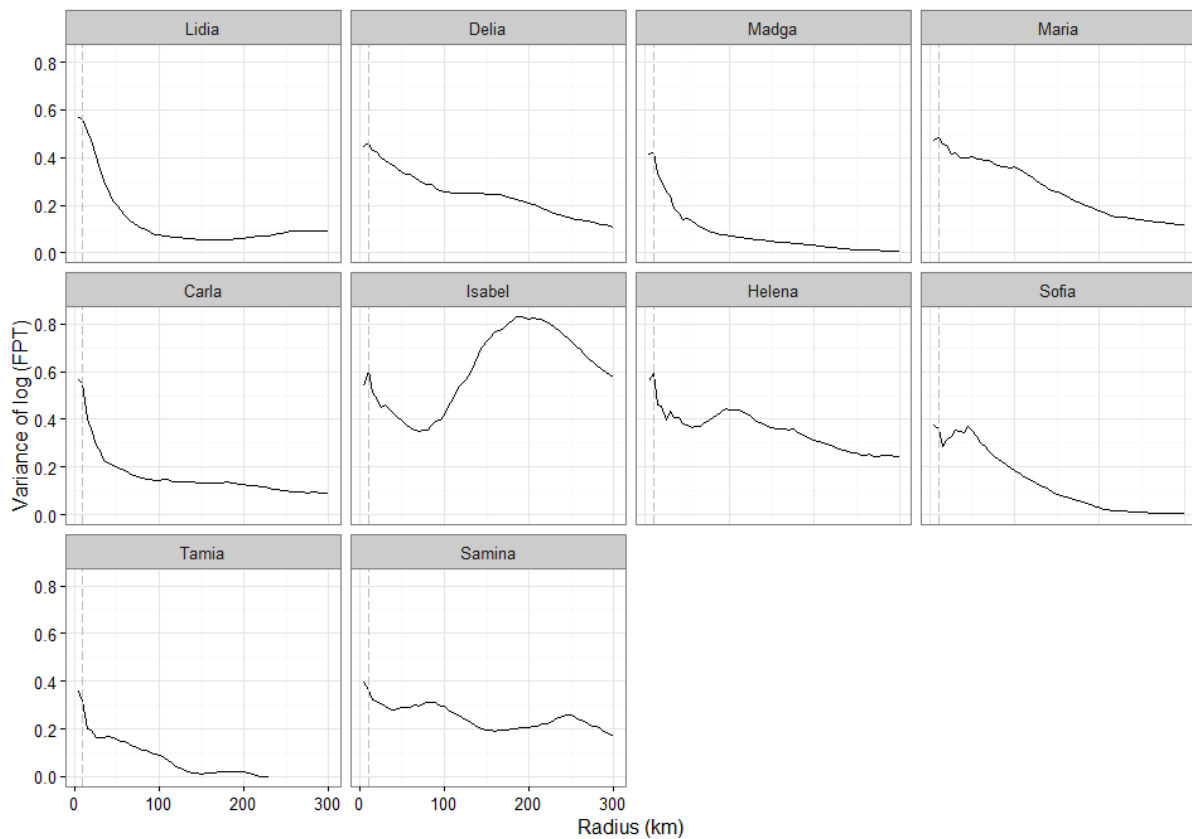


Fig. S1. Variance of log-transformed first passage time (FPT) as a function of radius for 10 juvenile loggerhead sea turtles tracked off Madeira in 1998-1999. Turtle ID is given at the top of each panel. For most individuals, the peak in variance occurred at the radius of 10 km, nested within a broader radius of 50 - 200 km. Vertical dashed line highlights the 10-km radius variance.

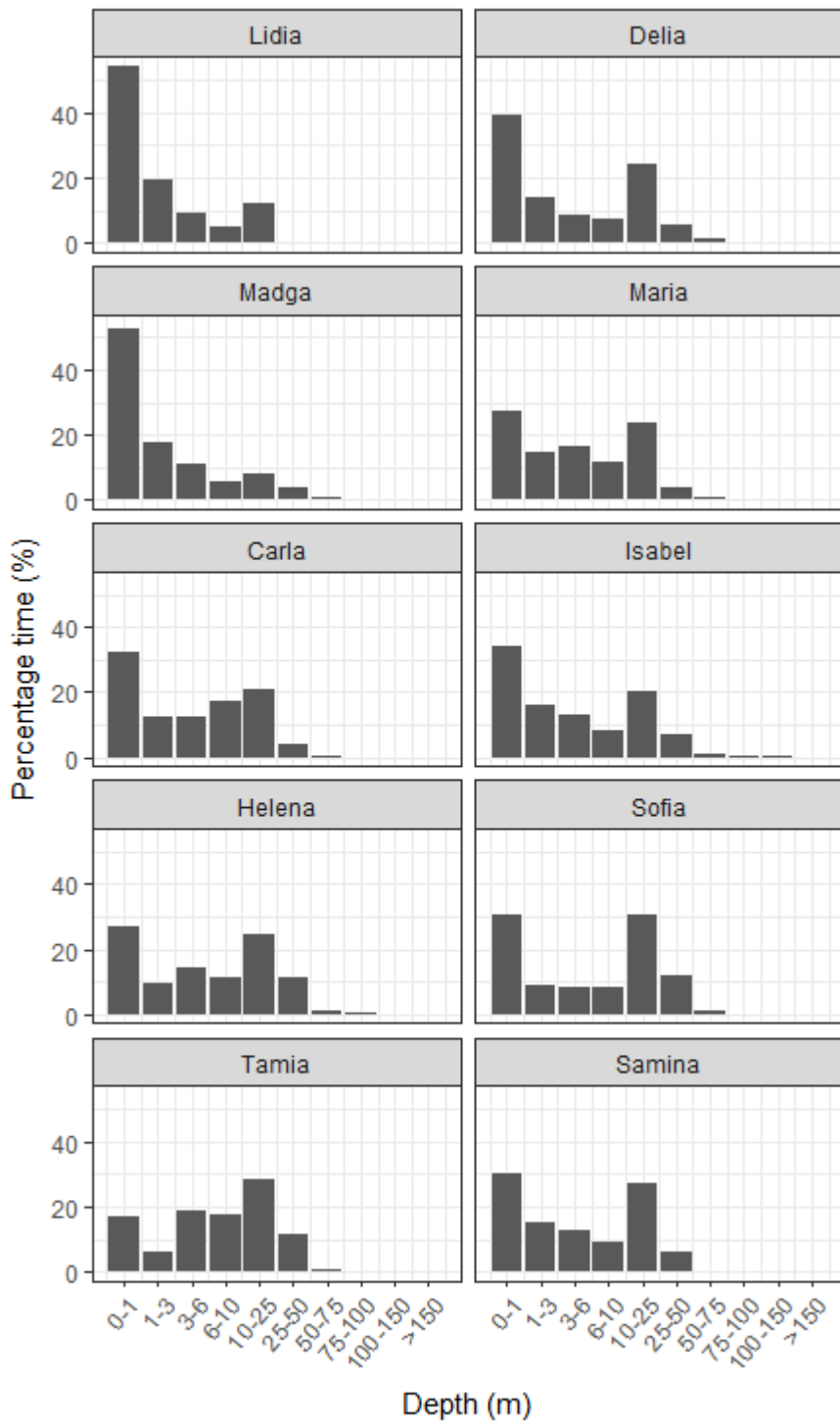


Fig. S2. Percentage time spent at depth by juvenile loggerhead turtles off Madeira in 1998-1999. Turtle ID is given at the top of each panel.

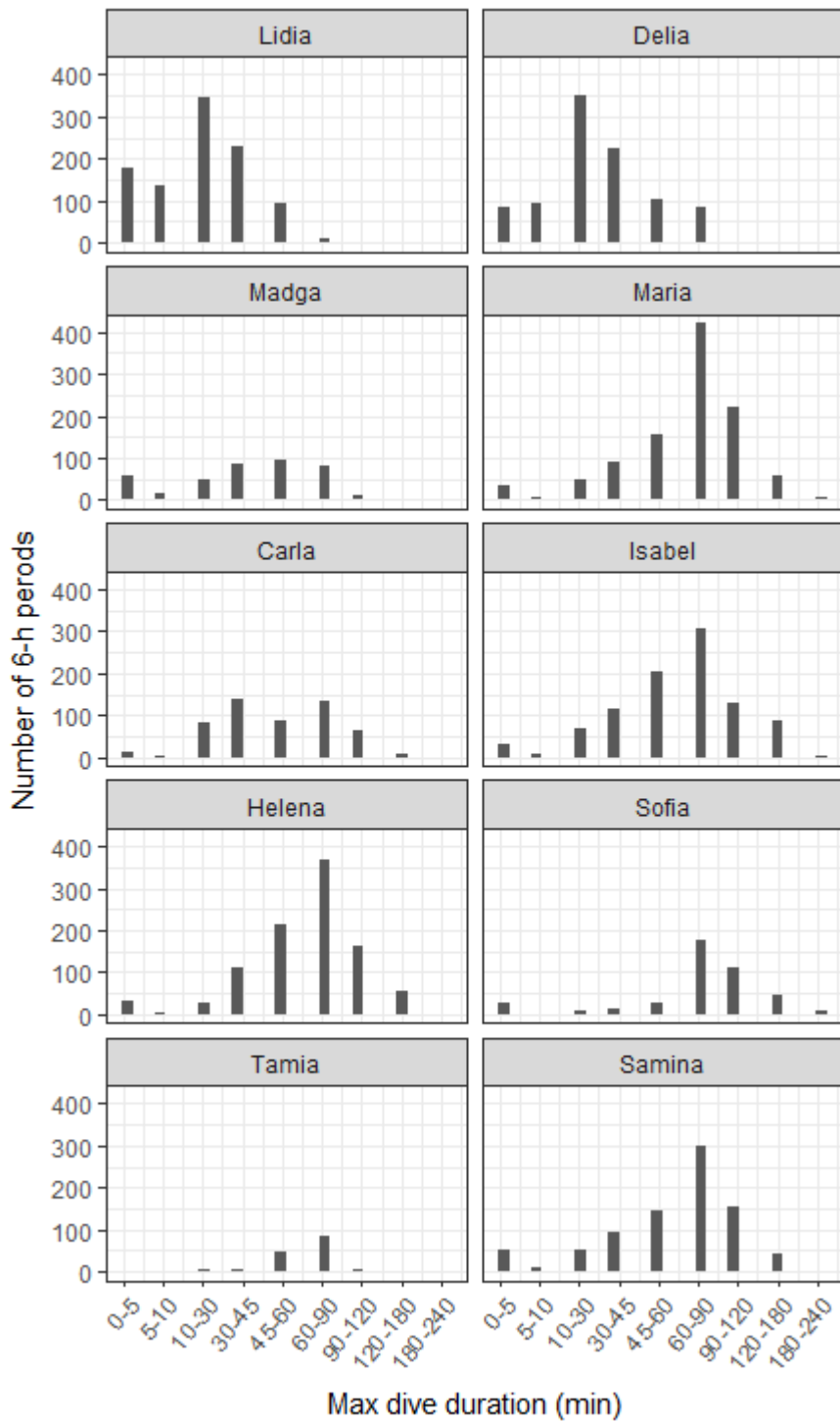


Fig. S3. Maximum dive duration per 6-h period in juvenile loggerhead sea turtles off Madeira in 1998-1999. Turtle ID is given at the top of each panel.

Table S1. Power law exponent (μ), Akaike's information criterion (AIC) and AIC weights (W_i) of two contrasted models: power law and exponential model for the move step distributions of 10 loggerhead sea turtles. Models were fitted to each individual turtle (using a linear model) and for all individual pooled (using a mixed effect linear model). Rows in bold highlight the individuals that showed a support of the Power law model.

Name	μ	Power law			Exponential		
		AIC	W_i	R^2	AIC	W_i	R^2
Lidia	3.2	14	0.4	0.84	13	0.6	0.87
Delia	2.4	19	0.3	0.69	17	0.7	0.75
Magda	1.9	12	1.0	0.85	21	0.0	0.58
Maria	1.8	6	1.0	0.92	14	0.0	0.80
Carla	1.9	14	0.3	0.84	12	0.7	0.87
Isabel	1.7	12	1.0	0.86	19	0.0	0.71
Helena	1.6	4	1.0	0.92	14	0.0	0.73
Sofia	1.5	8	0.9	0.84	12	0.1	0.71
Tamia	1.7	5	0.9	0.91	9	0.1	0.87
Samina	2.9	18	0.0	0.83	12	1.0	0.92
All turtles (mixed model)	1.9	128	1.0	0.80	179	0.0	0.65

Table S2. Estimated coefficients (β) and corresponding standard errors (SE), z values and significance levels (P), describing how the probability of performing a deep or long dive by a sea turtle was affected by time of the day (Diel), moon illumination (Moon), first passage time (FPT) and turtle's carapace size (Size), sea surface temperature (SST) and wind speed (Wind).

Depth or duration	Term	β	SE	z	P
> 60 m	Intercept	-3.803	0.651	-5.8	< 0.001
	Diel (dawn)	0.133	0.149	0.9	0.372
	Diel (day)	1.147	0.131	8.8	< 0.001
	Diel (dusk)	1.031	0.132	7.8	< 0.001
	Moon	0.059	0.043	1.4	0.170
	FPT	-0.182	0.049	-3.7	< 0.001
	Size	-0.199	0.639	-0.3	0.755
> 80 m	Intercept	-4.865	0.783	-6.2	< 0.001
	Diel (dawn)	0.070	0.213	0.3	0.744
	Diel (day)	1.142	0.181	6.3	< 0.001
	Diel (dusk)	0.899	0.186	4.8	< 0.001
	Moon	0.092	0.059	1.5	0.122
	FPT	-0.186	0.070	-2.7	< 0.001
	Size	-0.339	0.772	-0.4	0.661
120 - 180 min	Intercept	-5.049	0.979	-5.2	< 0.001
	SST	-0.365	0.073	-5.0	< 0.001
	Wind	-0.164	0.065	-2.5	0.011
	FPT	-0.010	0.057	-0.2	0.857
	Size	-0.256	0.941	-0.3	0.786
> 180 min	Intercept	-12.284	3.545	-3.5	0.001
	SST	-3.079	0.698	-4.4	< 0.001
	Wind	0.233	0.212	1.1	0.272
	FPT	-0.083	0.250	-0.3	0.740
	Size	0.501	1.827	0.3	0.784

Table S3. Summary records of dives that lasted more than three hours (180 - 240 minutes) in juvenile loggerhead sea turtles off Madeira in 1998-1999.

Name	Date	Period	Number of dives	Bottom depth (m)	Max dive depth (m)	SST (°C)	Latitude (°N)	Longitude (°W)	FPT (h)
Maria	09.03.1999	Night	2	1109	10 - 20	18.01	29.012	-12.659	16.4
Maria	17.03.1999	Night	1	42	6 - 10	16.9	28.189	-12.094	34.2
Maria	17.03.1999	Dawn	1	43	6 - 10	16.68	28.182	-12.121	30.5
Maria	18.03.1999	Night	2	45	6 - 10	16.18	28.172	-12.333	21.1
Maria	19.03.1999	Night	1	54	6 - 10	16.36	28.238	-12.503	31.7
Maria	19.03.1999	Dawn	1	56	6 - 10	16.36	28.255	-12.541	34.4
Maria	27.04.1999	Night	1	49	10 - 20	15.9	27.146	-13.508	25.5
Maria	28.04.1999	Night	1	58	6 - 10	15.94	27.019	-13.540	33.4
Maria	28.04.1999	Dawn	1	58	6 - 10	15.94	26.987	-13.548	33.0
Isabel	28.03.1999	Night	1	2885	20 - 30	16.31	22.187	-18.581	63.0
Isabel	30.03.1999	Dawn	1	3618	10 - 20	16.63	22.485	-19.342	35.1
Sofia	02.01.1999	Day	1	3754	20 - 30	17.77	38.929	-23.400	61.7
Sofia	02.01.1999	Dusk	1	3665	20 - 30	17.77	38.913	-23.391	61.4
Sofia	03.01.1999	Night	1	3624	10 - 20	17.7	38.897	-23.383	60.8
Sofia	03.01.1999	Dawn	1	3639	20 - 30	17.71	38.881	-23.374	58.1
Sofia	03.01.1999	Day	1	3624	20 - 30	17.72	38.894	-23.381	60.6
Sofia	03.01.1999	Dusk	1	3615	20 - 30	17.72	38.898	-23.372	60.6
Sofia	04.01.1999	Dawn	2	3611	10 - 20	17.69	38.904	-23.361	60.3
Sofia	04.01.1999	Day	1	3643	10 - 20	17.69	38.877	-23.280	44.2
Sofia	08.01.1999	Dawn	2	4038	10 - 20	17.4	38.499	-23.133	74.3