

## Environmental predictors of foraging and transit behaviour in flatback turtles *Natator depressus*

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*Endangered Species Research* 32: 333–349 (2017)

Table S1. Environmental variables used in boosted decision tree modelling. I = inshore domain, O = offshore domain, T = outward transit behaviour and F = foraging behaviour. Note: Where the last column is empty or where a particular model was not fitted for that variable, this was due to either insufficient variation across the modelling domain for that variable or collinearity with other variables.

Code	Description	Source	Models
Depth	Seabed Water Depth	GA's National Bathymetry (Whiteway, 2009)	T-I, F-I, T-O, F-O
Geofeature	Geomorphic Feature Types	GA (Heap and Harris, 2008)	T-I, F-I, T-O, F-O
Relief	Topographic Relief	GA (Huang et al., 2013)	
Slope	topographic slope gradient	GA (Huang et al., 2013)	T-I, F-I, T-O, F-O
Surf_area	True surface area	GA (Huang et al., 2013)	
Mud	Mud Content	GA (Li, 2013a)	T-I, F-I
Sand	Sand Content	GA (Li, 2013b)	T-I, F-I, T-O, F-O
Gravel	Gravel Content	GA (Li, 2013c)	T-I, F-I, T-O, F-O
Geomacs_pe	Percentage of time the Shields parameter exceeds 0.25	GA Geomacs (Huang et al., 2013)	
Geomacs_r	The integrated Shields parameter exceeding 0.25 divided by the integrated total Shields parameter	GA Geomacs (Huang et al., 2013)	T-I, F-I
Geomacs_ex	Percentage exceedance of the Geomacs output	GA Geomacs (Huang et al., 2010)	T-I, F-I
Geomacs_gm	Geomacs geometric mean	GA Geomacs (Huang et al., 2010)	T-I, F-I
Geomacs_rn	Interquartile range of the Geomacs output	GA Geomacs (Huang et al., 2010)	
Geomacs_ro	Ratio of the Geomacs outputs	GA Geomacs (Huang et al., 2010)	
Geomacs_tm	Geomacs trimmed mean	GA Geomacs (Huang et al., 2010)	
Chla	MODIS derived Chlorophyll a concentrations (mg/m <sup>3</sup> )	GA (Huang et al., 2013)	T-I, F-I, T-O, F-O
SST	MODIS derived Sea Surface Temperature (°C)	GA (Huang et al., 2013)	
CDOM	MODIS derived Coloured Dissolved Organic Matter concentrations (1/m)	GA (Huang et al., 2013)	F-O
K490	MODIS derived K490 parameter (Downwelling diffuse attenuation coefficient at 490 nm) (1/m)	GA (Huang et al., 2013)	
TSM	MODIS derived Total Suspended Materials (g/m <sup>3</sup> )	GA (Huang et al., 2013)	T-I, F-I, T-O, F-O
Ze0	MODIS derived Euphotic Depth (m)	GA (Huang et al., 2013)	
Zsd	MODIS derived secchi depth (m)	GA (Huang et al., 2013)	T-O, F-O

SV	Mean surface current velocity (m/s)	Bran 3.5	T-I, F-I, T-O, F-O
BV	Mean bottom current velocity (m/s)	Bran 3.5	T-I, T-O, F-O
Dist_tidal	Distance to the tidal front (km)		T-I, F-I, T-O, F-O
Tidal_valu	Tidal front modelling output		T-I, F-I

Figure S1. The number of daily positions from each data type for each day of the trip for each turtle

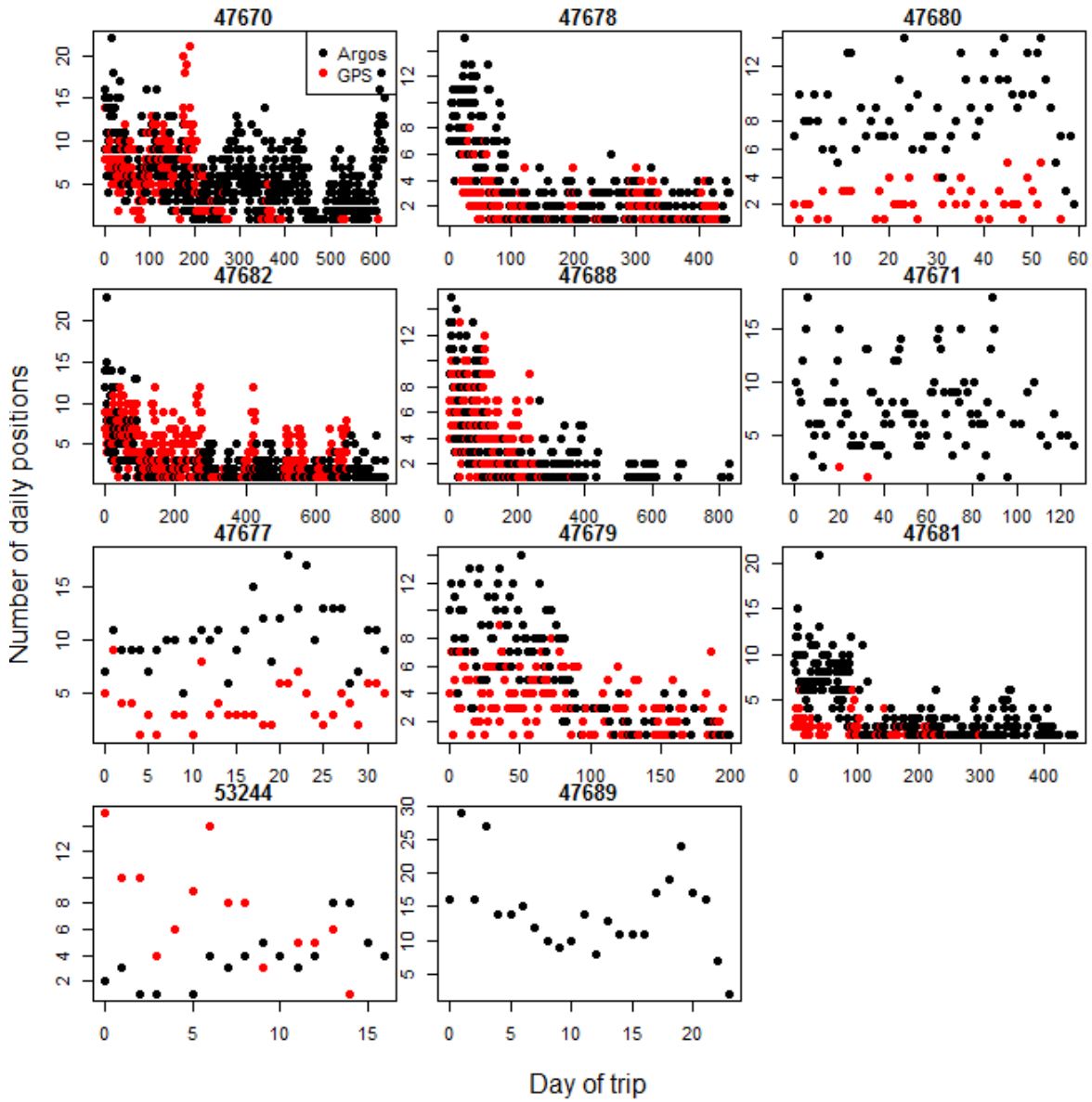


Figure S2. Tracks of flatback turtles colour-coded by behaviour and showing the inshore and offshore modelling domains used in the boosted decision tree modelling.

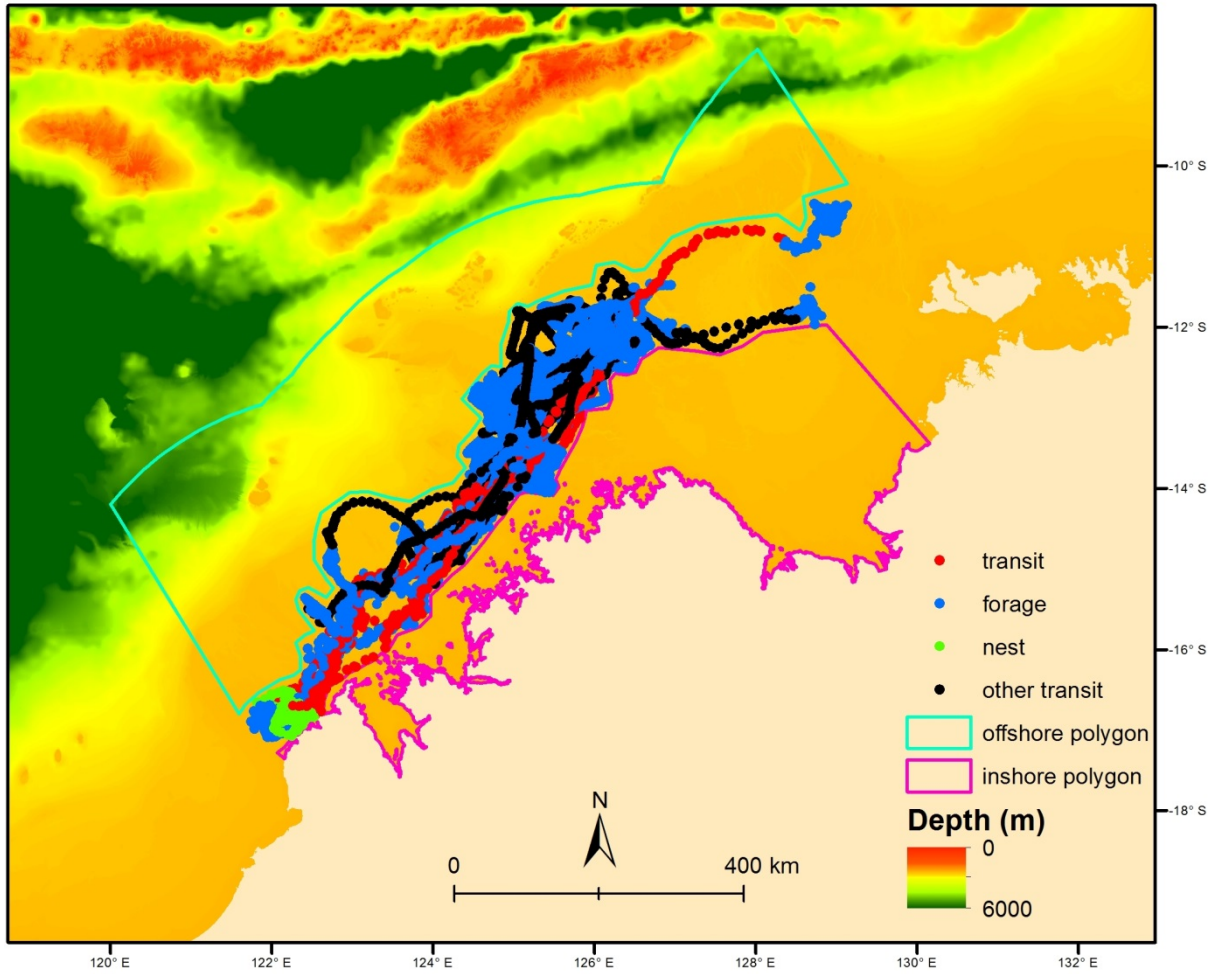


Figure S3. Tidal front shown in black (where  $\log(h/u^3) = 2.7$ ) and the turtle tracks (red).

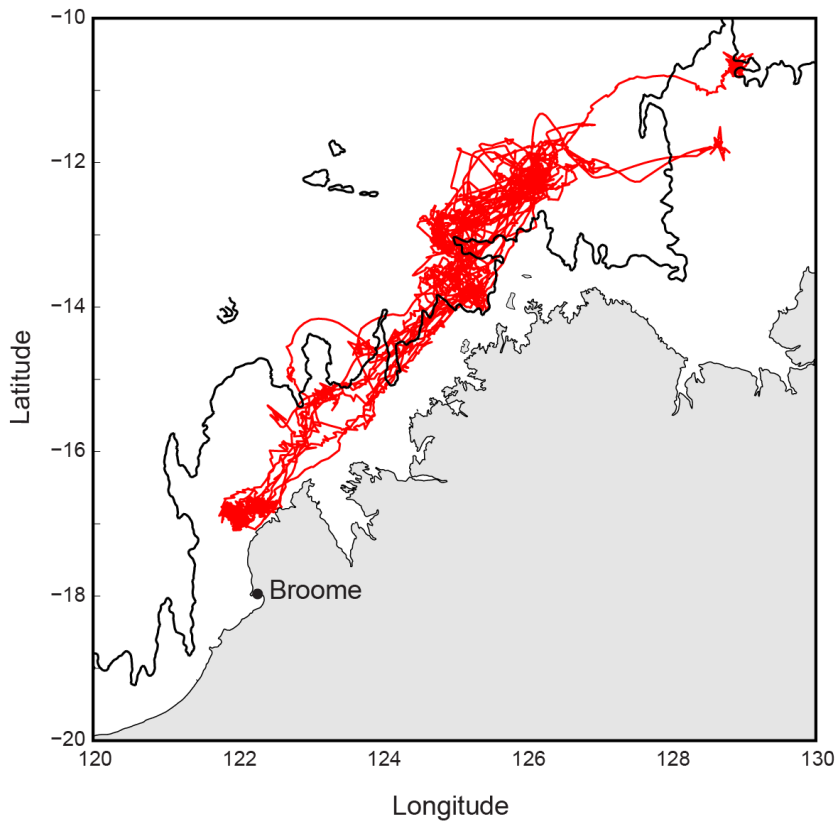


Figure S4. Histograms of data collected by the Mk10-AF tag deployed on turtle 53244 showing the proportion of dives whose maximum depth is within the specified depth ranges (a), time spent within the specified depth ranges (b), the proportion of dives within the specified dive duration ranges (c) and the proportion of dives within the specified dive temperature ranges (d).

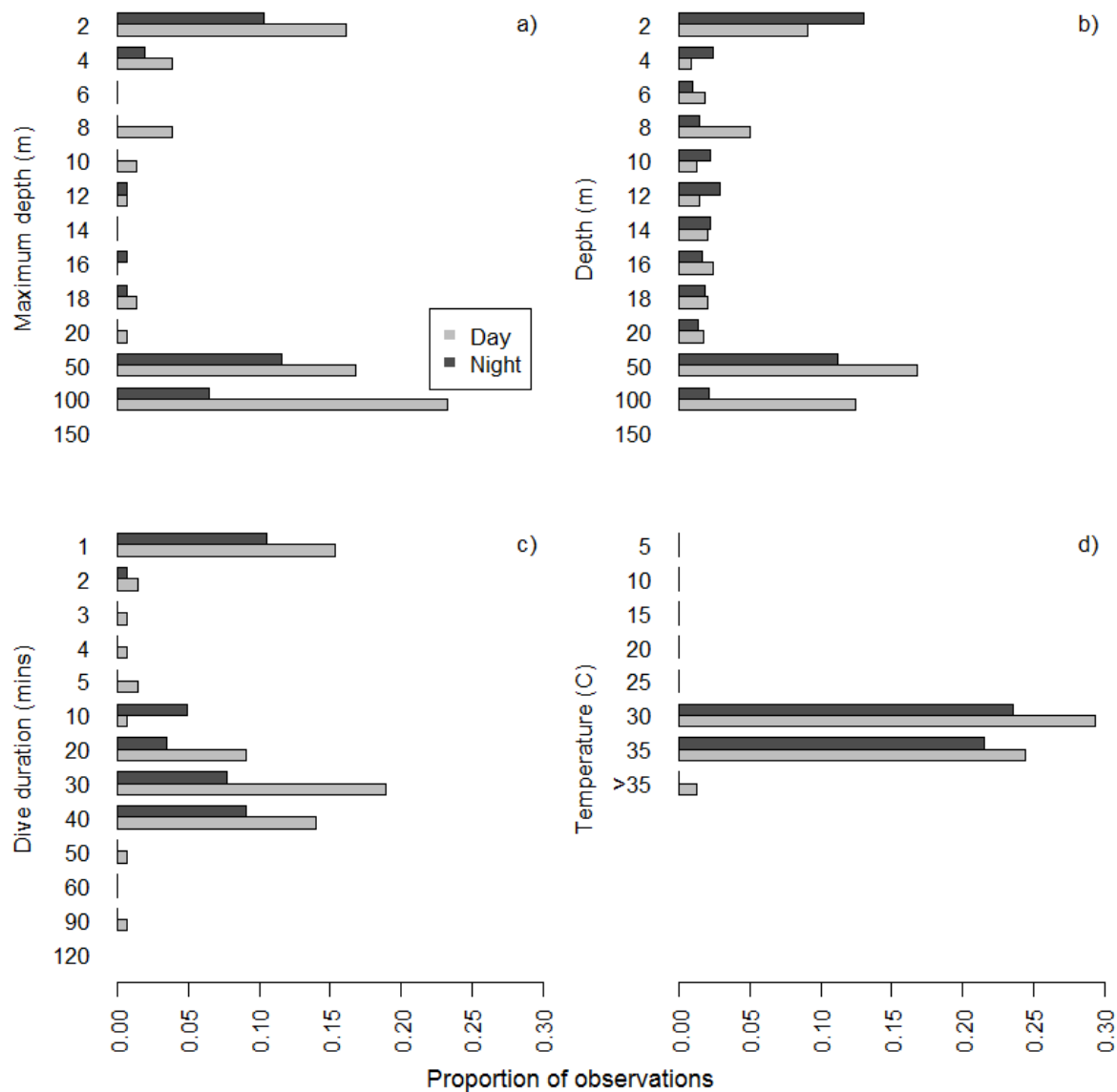


Figure S5. Latitude of turtles for each day of deployment. Year is marked with grey lines.

