Table S3. Posterior estimates of model parameters (median and 95% highest posterior density interval). For each parameter, the table also reports the effective sample size and convergence diagnostics: upper confidence interval (CI) of the Brooks-Gelman-Rubin (BGR) diagnostic and percentage of Monte Carlo error (MCE) to sample standard deviation (SSD).

Description	Parameter	Lower (2.5%)	Median	Upper (97.5%)	Effective sample size	BGR diagnostic (upper CI)	% MCE/ SSD
Vertical drift (altitude)	$\pi_1 = -\pi_2$	74	76	77	3315	1.01	1.74
	π_3	52	53	55	3509	1	1.69
Standard deviation (altitude)	$\sigma_1 = \sigma_2$	64	65	66	2527	1	2.10
	σ_3	71	72	74	2652	1	1.95
	σ_5	95	97	99	2621	1.01	1.96
Concentration (turning angle)	$\rho_1 = \rho_2 = \rho_5$	0.83	0.84	0.84	3874	1.01	1.63
	ρ_3	0.62	0.63	0.64	3552	1.01	1.69
	ρ_4	0.00	0.00	0.00	4286	1	1.53
Scale (step length)	$\alpha_1 = \alpha_2$	1058	1065	1071	1515	1	2.59
	α_3	385	390	395	1437	1	2.69
	α_4	22	23	24	1454	1.02	2.62
	α_5	654	663	672	2346	1	2.09
	$\beta_1 = \beta_2$	3.56	3.61	3.67	2360	1	2.07

Shape (step length)	β_3	1.87	1.90	1.92	3568	1.01	1.75
	β_4	0.90	0.93	0.96	1155	1.02	3.22
	β_5	1.80	1.83	1.87	2860	1	1.88
Mean (hierarchical slope position)	$\kappa_1 = \kappa_2 = \kappa_3$	0.326	0.327	0.328	942	1.03	3.29
	κ_4	0.375	0.378	0.380	3931	1.01	1.68
	κ_5	0.448	0.450	0.452	901	1.01	3.39
Standard deviation (hierarchical slope position)	$\omega_1 = \omega_2 = \omega_3$	0.049	0.050	0.050	1663	1.02	2.49
	ω_4	0.070	0.071	0.073	4045	1	1.58
	ω_5	0.052	0.053	0.054	3158	1.01	1.80
State proportions	δ_1	0.02	0.03	0.03	504	1.01	4.45
	δ_2	0.30	0.31	0.31	1421	1	2.74
	δ_3	0.37	0.37	0.38	691	1.03	3.82
	δ_4	0.09	0.09	0.10	523	1.05	4.47
	δ_5	0.20	0.20	0.21	430	1.05	4.86
	$\gamma_{1,1}$	0.754	0.785	0.815	2785	1	1.90
	$\gamma_{2,1}$	0.012	0.015	0.018	1481	1.01	2.68
	$\gamma_{3,1}$	0.001	0.002	0.003	1650	1	2.64
	$\gamma_{4,1}$	0.000	0.000	0.001	4657	1	1.47
	$\gamma_{5,1}$	0.000	0.000	0.001	2867	1	1.89
	$\gamma_{1,2}$	0.169	0.199	0.229	2414	1	2.08
	$\gamma_{2,2}$	0.714	0.723	0.732	4500	1	1.49
	$\gamma_{3,2}$	0.172	0.179	0.186	4091	1	1.56

Transition probabilities	$\gamma_{4,2}$	0.000	0.000	0.001	4500	1.01	1.49
	$\gamma_{5,2}$	0.058	0.064	0.070	3831	1	1.62
	$\gamma_{1,3}$	0.000	0.001	0.006	3571	1	1.67
	$\gamma_{2,3}$	0.214	0.223	0.231	4223	1	1.54
	$\gamma_{3,3}$	0.781	0.789	0.796	4153	1	1.55
	$\gamma_{4,3}$	0.029	0.035	0.042	3100	1.01	1.79
	$\gamma_{5,3}$	0.020	0.025	0.029	2982	1	1.84
	$\gamma_{1,4}$	0.000	0.001	0.003	4644	1.01	1.47
	$\gamma_{2,4}$	0.000	0.001	0.002	3772	1	1.64
	$\gamma_{3,4}$	0.010	0.012	0.014	3936	1.01	1.61
	$\gamma_{4,4}$	0.938	0.946	0.953	3647	1.02	1.65
	$\gamma_{5,4}$	0.016	0.019	0.022	3559	1	1.68
	$\gamma_{1,5}$	0.005	0.013	0.026	1897	1	2.37
	$\gamma_{2,5}$	0.034	0.038	0.042	2987	1.01	1.86
	$\gamma_{3,5}$	0.016	0.019	0.022	2668	1	1.98
	$\gamma_{4,5}$	0.014	0.018	0.024	2828	1.01	1.88
	$\gamma_{5,5}$	0.884	0.892	0.899	3598	1	1.67
Initial state probabilities	φ_1	0.005	0.019	0.041	1686	1	2.46
	φ_2	0.092	0.155	0.221	2946	1	1.85
	φ_3	0.378	0.447	0.514	3456	1.01	1.70
	φ_4	0.109	0.137	0.169	4029	1.01	1.58
	φ_5	0.198	0.238	0.286	3053	1.01	1.83

State-space modelling of the flight behaviour of a soaring bird provides new insights to migratory strategies

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