Supplementary material for the manuscript:

**Do beluga whales truly migrate? Testing a key trait of the classical migration syndrome**

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**Supplementary Material 1:** Hidden Markov model parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Model  | Initial parameters | Parameter estimates | Transition probabilities | Initial distribution |
|  | Step mean (sd) | Angle concentration | Step mean (sd) | Angle concentration | ARS-ARS | ARS-Transit | Transit-ARS | Transit-Transit | ARS | Transit |
|  | ARS | Transit | ARS | Transit | ARS | Transit | ARS | Transit |  |  |  |  |  |  |
| m1 | 1.00 (2.00) | 5.00 (3.00) | 1.00 | 13.00 | 2.09 (1.37) | 4.39 (1.15) | 1.22 | 10.97 | 0.901 | 0.099 | 0.068 | 0.932 | 0.877 | 0.123 |
| m2 | 2.09 (1.37) | 4.39 (1.15) | 1.22 | 10.97 | 2.09 (1.37) | 4.39 (1.15) | 1.22 | 10.97 | 0.901 | 0.099 | 0.068 | 0.932 | 0.877 | 0.123 |
| m3 | 0.9 (3.00) | 2.39 (3.00) | 0.10 | 6.97 | 2.09 (1.37) | 4.39 (1.15) | 1.22 | 10.97 | 0.901 | 0.099 | 0.068 | 0.932 | 0.877 | 0.123 |
| m4 | 4.09 (3.00) | 6.39 (3.00) | 5.22 | 14.97 | 2.09 (1.37) | 4.39 (1.15) | 1.22 | 10.97 | 0.901 | 0.099 | 0.068 | 0.932 | 0.877 | 0.123 |
| m5 | 0.002(6.00) | 13.22(6.00) | 1.00 | 13.00 | 0.006(1.97) | 3.28(2.00) | 0.57 | 2.37 | 0.009 | 0.991 | 0.000 | 1.000 | 0.000 | 1.000 |

**Table 1:** Candidate HMMs with different initial parameters. m1-m4 all resulted in identical parameter estimates, transition probabilities, and initial distribution, so m1 was selected.