

**Table S2:** Posterior mean estimates for diffusion model parameters used in the study. 95% HPD intervals are listed in parentheses, if applicable. Bayes factors for marginal likelihood are listed relative to the fixed rate continuous diffusion model. Marginal likelihood estimation was performed by path sampling and stepping stone methods, the results of which were confirmed by two independent runs of 30 million steps for each diffusion model. Results for the first chain are shown.

Model	In P(model   data) -Path Sampling	Bayes Factor -Path Sampling	In P(model   data) -Stepping Stone	Bayes Factor -Stepping Stone	TMRCAs Mean Age	TMRCAs Mean Latitude	TMRCAs Mean Longitude	Mean Diffusion Rate (km/yr)
Continuous	-3952.01	0	-3945.77	0	466.63 (192.31, 802.88)	3.96 (-6.60, 15.12)	9.881 (-15.94, 35.07)	19.19 (10.16, 28.22)
Cauchy	-3734.66	217.35	-3729.34	216.42	733.11 (287.47, 1278.62)	4.32 (-9.03, 14.28)	10.50 (-12.53, 34.54)	10.57 (4.86, 17.38)
Lognormal	-3824.14	127.86	-3816.37	129.40	1114.44 (334.91, 2030.73)	4.01 (-10.04, 15.61)	8.85 (-17.33, 34.30)	6.56 (2.33, 11.66)
Gamma	-3823.13	128.88	-3811.03	134.73	879.70 (322.97, 1492.30)	3.89 (-9.08, 15.79)	10.63 (-14.27, 33.59)	8.152 (3.82, 13.73)