

**S1 Appendix.** Patterns of simulated isotope values of consumer for different scenarios of  $\lambda$  values remain valid for different Brownian trajectories of food sources signatures.

Trajectories of simulated consumer ( $\delta_c$ ) over time for the 4 scenarios of isotopic turnover rate ( $\lambda$  in  $\text{d}^{-1}$ ): low  $\lambda$  (red line, a), medium  $\lambda$  (blue line, b), high  $\lambda$  (green line, c), ontogenetic  $\lambda$  (orange line, d) and  $\omega = 0.008 \text{ d}^{-1}$  (equivalent to 4 diet-switches) from 10 first Brownian sources simulations among 100 simulations (e) for both food sources: source a (solid line) and source b (dashed line). Whatever the pair  $\{\delta_{s(a)} ; \delta_{s(b)}\}$  used in DMM forcing, the same patterns are observed in  $\delta_c$  for each given scenario of  $\{\omega ; \lambda\}$  in our *in-silico* experiment.

