Arctic December 1, 2025

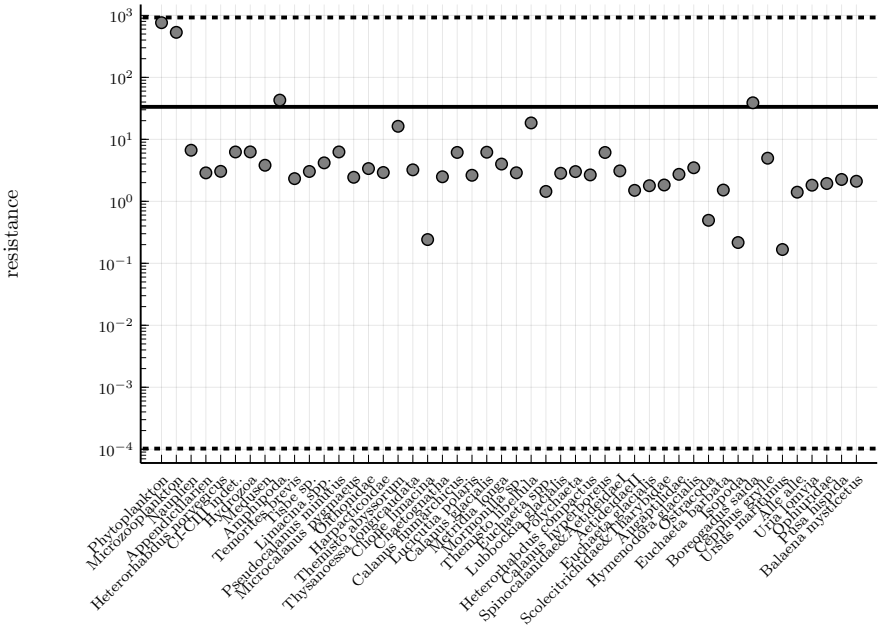

Figure 1: Minimal (dashed line bottom), maximal (dashed line top) end expected (solid line) value of resistance measure. Dots describe how resistant single species are within this range.

Interpretation: The abundance of most species is more easily manipulated than a random combination. This measure is based on the controllability Gramian.

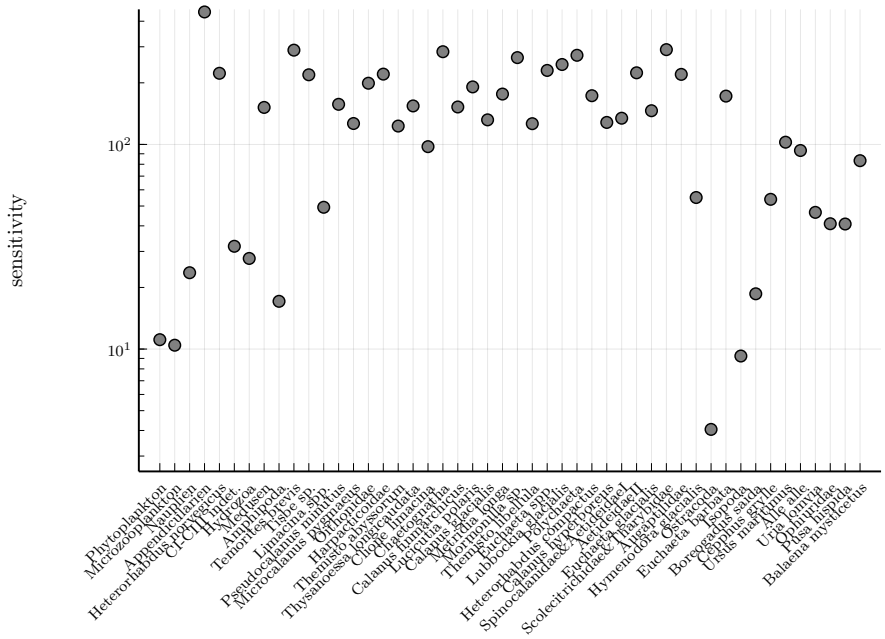

Figure 2: Sensitivity of each species.

Interpretation: Measure is based on the observability Gramian. It seems like the return time scales with turnover rate. When Phyto- or Mezoplankton is perturbed, the system returns fastest to the equilibrium. A pulse perturbation of Baleana mysticetus (lives above 100 years) yields a long return time.

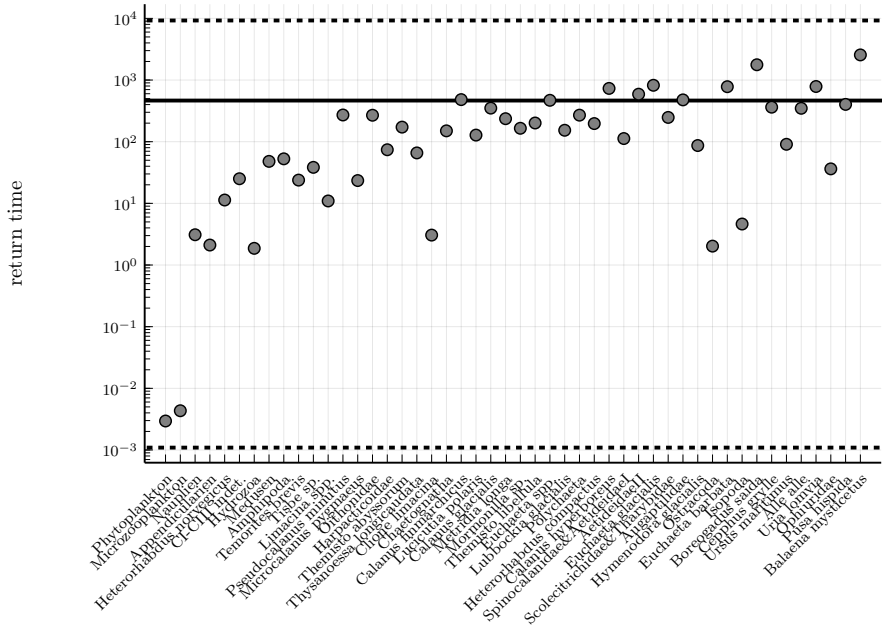

Figure 3: Minimal (dashed line bottom), maximal (dashed line top) end expected (solid line) value of return time measure. Dots describe the return time of the system within this range if only a single species is perturbed.

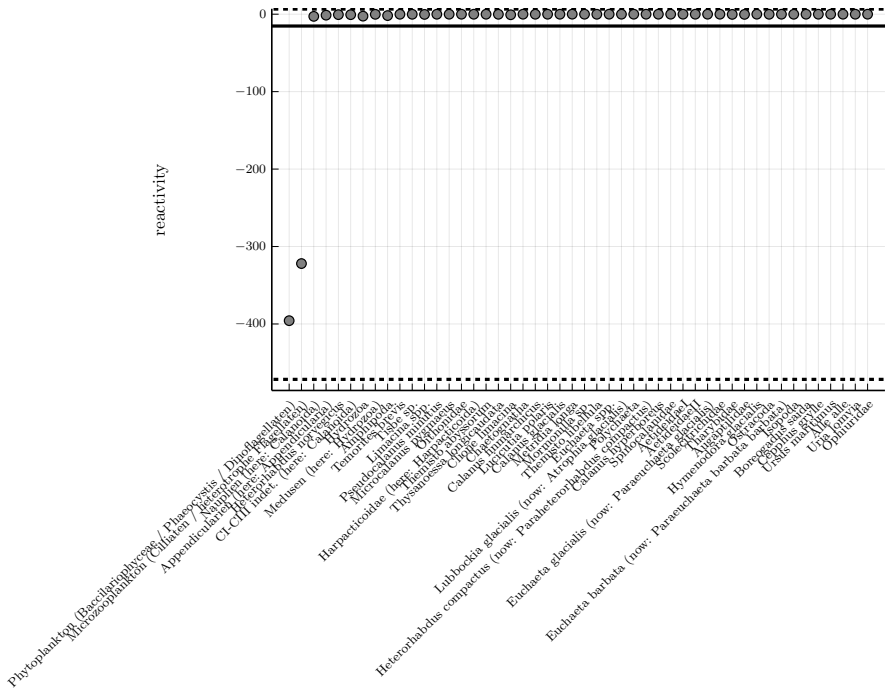

Figure 4: Need to work on this. There is obviously a bug in the code, as the dots should not lie outside the dashed bounds.

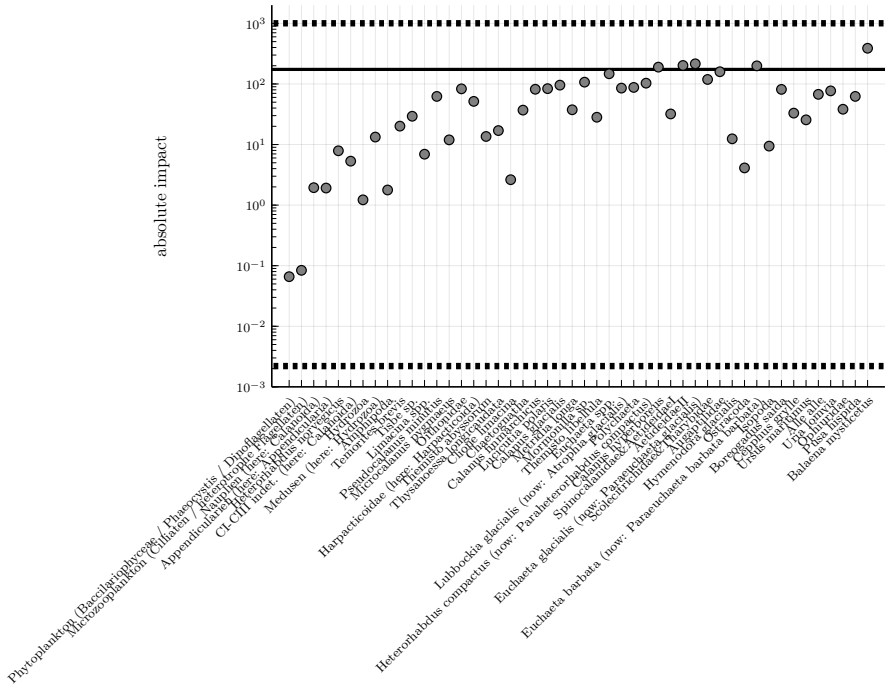

Figure 5: Need to work on this. There is obviously a bug in the code, as the dots should not lie outside the dashed bounds.

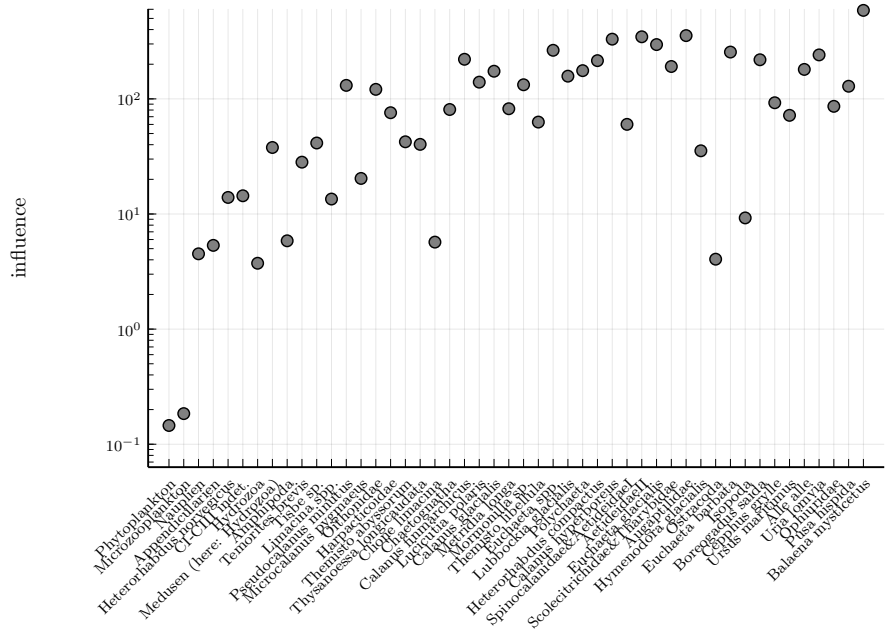

Figure 6: Influence of each species.