

Zooplankton and fish: revealing key processes in predator–prey dynamics in the Barents Sea

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The fluctuations in the biomasses of zooplankton and planktivorous fishes in the high-latitude Barents Sea are inversely correlated, suggesting strong top–down control. At the same time, zooplankton are likely to have bottom–up effects on the fish populations. To understand these dynamics better, we analysed time-series of copepods, krill, capelin length-at-age and capelin abundance-at-age using a Bayesian state-space approach. Hence, we quantified bottom–up and top–down effects at the same time, to find the parameter combinations that best describe the dynamics as a whole. Preliminary results suggest that high capelin biomass leads to low biomasses of copepods and krill. Low biomass of copepods leads to poor growth and hence delayed (size-dependent) maturation of capelin. Low biomass of krill leads to poor survival of capelin. By perturbing the model we subsequently assess how changes in the zooplankton affect the capelin population at different time-lags and *vice versa*, taking into account feedback effects. Results contribute to reveal the role of zooplankton in multi-species dynamics in the Barents Sea.

Keywords: Zooplankton, capelin, species interactions, time series, Bayesian state space analysis.

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