

Deriving Causal Drivers of Population Dynamics on Different Time Scales

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The dynamics of marine populations are usually forced by biotic and abiotic factors occurring at different intensity levels and time scales. Deriving the time frame within which each factor has a causal influence is important for predicting population trajectories.

This paper (i) presents a methodology for establishing causal link between population dynamics and bi-otic/abiotic factors, and (ii) establishes the time frame within which the factors have significant influence on the population dynamics. We present results on application of the methodology to data from the Barents Sea, involving the short/medium/long term prediction of the population dynamics of Barents Sea capelin (*Mallotus villosus*).

Finally, we describe a general modeling framework within which the methodology may be used to improve population dynamic models by conditioning to different datasets with appropriate causal influence on different time scales.

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