A statistical regression approach to estimate zooplankton mortality rates

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Knowledge about zooplankton mortality rates is essential in order to understand variation in top-down control, as well as potential responses of zooplankton populations to environmental change. Estimating mortality rates in oceanic zooplankton populations is however challenged by the difficulty in separating recruitment and mortality from advection. The vertical life table (VLT) approach is commonly advocated for its robustness to advection, but it is known to be sensitive to spatiotemporal trends in recruitment. We describe a statistical regression approach (SRA) for zooplankton mortality estimation which takes into account both the effects of advection and spatiotemporal trends in recruitment. Constructing a synthetic dataset of a zooplankton population subject to known mortality rates, we find that the SRA performs better than the VLT when stage-specific abundances are influenced by trends in recruitment. We apply the SRA on long-term observation data (1959-1993) of *Calanus finmarchicus* copepodites from the Norwegian Sea–Barents Sea area. The estimated mortality rates are relatively low (0.03–0.07 d^{-1}), but indicate increased mortality at the later stages (CIV–CV), possibly reflecting higher predation pressure on these stages.

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