Baseline energy-budget model for the marine copepod *Calanus finmarchicus*

Tjalling Jager[1], Ida Beathe Øverjordet[2], Karen Marie Hammer[2], Dag Altin[3], Anders J. Olsen[4], Trond Nordtug[2], Bjørn Henrik Hansen[2]

[1] DEBtox Research, De Bilt, The Netherlands
[2] SINTEF Materials and Chemistry, Marine Environmental Technology, Trondheim, Norway
[3] BioTrix, Trondheim, Norway
[4] Norwegian University of Science and Technology, Department of Biology, Trondheim, Norway

Poster, session: Polar ecotoxicology: hot issues in cold climates

Calanoid copepods form an important part of the marine zooplankton, and are exposed to stressors such as pollution resulting from oil and gas exploration. Mechanistic models are needed to interpret the effects of such stressors, and to predict the impact on the copepod life histories under realistic environmental conditions. Dynamic Energy Budget (DEB) models are well-suited for this task as they can provide an integrated framework covering all life-history traits over the entire life cycle of a species. Furthermore, these models are (relatively) simple, in principle not species specific, and easily linked to population models. Copepods, however, have several features in their life cycle which require further consideration in energy-budget models. Firstly, they develop through six naupliar stages, which deviate in morphology from the later six copepodite stages, and the first two stages do not feed. Secondly, copepods follow determinate growth, and stop growing after their final moult to adulthood. And thirdly, many copepods (especially those species from higher latitudes) build up a considerable lipid storage during the last few copepodite stages to survive adverse environmental conditions and to fuel the reproduction process. Before we can consider the effects of stressors on the life history, we need to develop a baseline model to capture these deviations from the standard DEB models. In this contribution, we report on our progress in modelling the growth, development and lipid storage in *Calanus finmarchicus*, a common species in the Northern Atlantic Ocean and expanding up into the Arctic. Once this model is established, it can serve as a platform to interpret the effects of toxicants and other stresses, and as a basis for extrapolating to other high-latitude copepod species.