Ecosystem responses to changes in life-history parameters of key species in the Barents Sea

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Tuning large, complex ecosystem models is a tedious and never-ending process, and can easily turn into tuning-away instead of tuning towards a representative 'truth'. NoBa Atlantis is an end-to-end model that includes 53 species and functional groups, representative of the ecosystem of the Nordic and Barents Seas. In a sensitivity study we have analyzed the ecosystem response to perturbations in life history parameters of 9 key species across trophic levels, including recruitment, mortality, predator-prey preferences, consumption and growth, and identified the most sensitive life-history parameters.. . Analyses of the results shows that the 'bottom-up' effect is strong in the Barents Sea, with the modeled system being particularly sensitive to changes in the zooplankton parameters. It also shows a distinct difference between the response of top-predators compared to mid-trophic species such as herring and capelin. The structure of the ecosystem and how tightly the species are linked together plays an important role in determining the effects of perturbed life-history parameters. Last – one-at-a-time perturbations does not tell the 'whole' truth, as combinations of parameters often results in non-additive responses in the system, due to indirect species interactions . The importance of the different parameters in capturing the ecosystem dynamics will be discussed, and knowledge gaps identified.