

**Exploring parameter uncertainty and production in sub-Arctic and Arctic ecosystems**

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**Abstract**

Understanding ecosystem model parameter uncertainty has been a major roadblock in using ecosystem models as an operational tool for resource management. At the same time, the ability to understand and detect ecosystem shifts using ecosystem models has become an important step in developing adaptive management strategies. The Newfoundland and Labrador (NL) Shelf and Barents Sea are sub-Arctic/Arctic ecosystems with a comparable species composition. Despite the similarity of these two ecosystems, differences in environmental pressures and human activities have produced divergent ecological response patterns. Historically, once abundant groundfish stocks crashed in the early 1990s on the NL Shelf without recovery while shellfish resources increased and currently support important fisheries. In contrast, in the Barents Sea abundances of both shellfish and groundfish stocks are currently high. Here we explore the ecological differences between two sub-Arctic and Arctic ecosystems using mass-balance models cognizant of inherent parameter uncertainty to better understand the major drivers of the two ecosystems. The results indicate that key drivers, such as primary production, play an important role in determining the ecosystem status in sub-Arctic and Arctic ecosystems.

**Keywords:**

mass-balance models, Arctic ecosystems, uncertainty

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