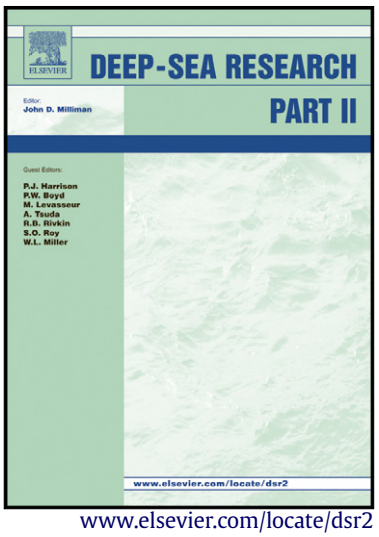

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When 1+1 can be >2: Uncertainties compound when simulating climate, fisheries and marine ecosystems.

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When 1+1 can be >2: uncertainties compound when simulating climate, fisheries and marine ecosystems.

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Abstract

Multi-disciplinary approaches that combine oceanographic, biogeochemical, ecosystem, fisheries population and socio-economic models are vital tools for modelling whole ecosystems. Interpreting the outputs from such complex models requires an appreciation of the many different types of modelling frameworks being used and their associated limitations and uncertainties. Both users and developers of particular model components will often have little involvement or understanding of other components within such modelling frameworks. Failure to recognise limitations and uncertainties associated with components and how these uncertainties might propagate throughout modelling frameworks can potentially result poor advice for resource management. Unfortunately, many of the current integrative frameworks do not propagate the uncertainties of their constituent parts. In this review, we outline the major components of a generic whole of ecosystem modelling framework incorporating the external pressures of climate and fishing. We discuss the limitations and uncertainties associated with each component of such a modelling system, along