

# Challenges and innovations in ecosystem modelling for the Indian Sector of the Southern Ocean

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Quantification and attribution of ecosystem change in the Southern Ocean is complex, costly, and often confusing. This is despite significant, recent advances in our understanding of ecosystem dynamics, of species' responses to environmental drivers, and of the spatial and temporal variability of Antarctic marine and sea ice ecosystems (Constable et al. 2014, Figure 1). But the Southern Ocean is large and challenging to observe – either directly or remotely. The really big unknowns for the ecosystems research community and for managers are: How do we reliably detect change on large scales? Are we likely to encounter big surprises in terms of future changes in Southern Ocean ecosystems? And how do we design robust management strategies for marine living resources in the face of climate change? We present a summary of the ecosystem modelling toolkit that has been developed at the ACE CRC, AAD and CSIRO and describe strategies and data requirements for expanding and applying this toolkit over the next five years. The outcomes of this work will be an assessment of past, current and future ecosystem states in the Indian Sector of the Southern Ocean, and contributions to the design of a cost-effective observing system to detect and attribute ecosystem change.

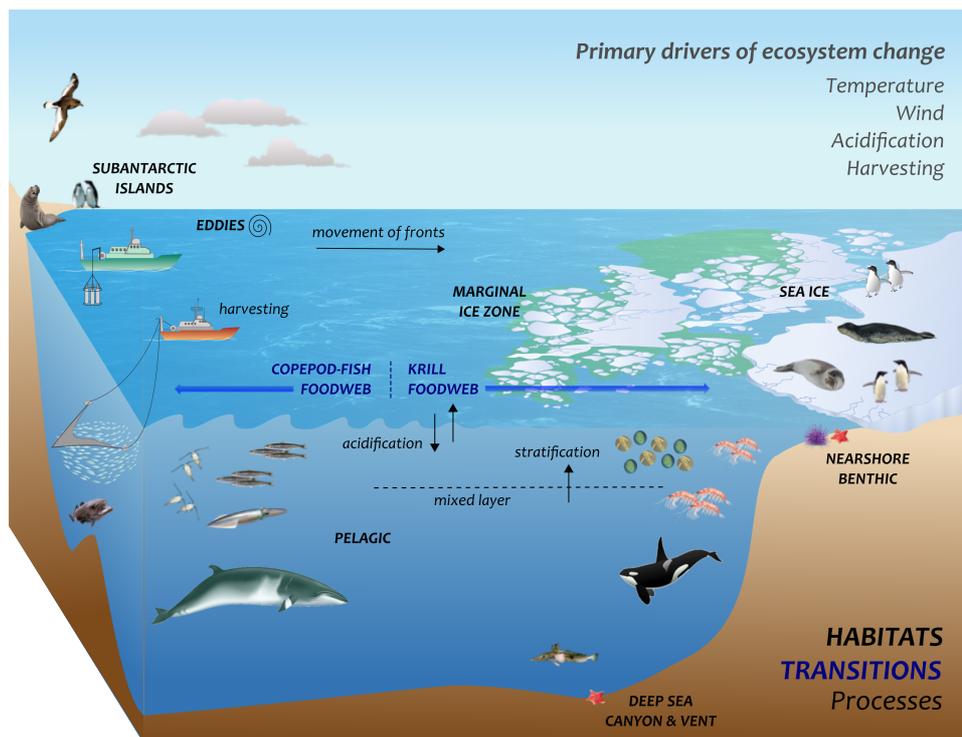


Figure 1. Primary drivers of ecosystem change in the Indian Sector of the Southern Ocean, to be represented in ecosystem models.

## References

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