

A Standardized, Large-Scale Ecosystem Assessment for the Southern Ocean and the Underpinning Role of Biodiversity Data

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Abstract

Assessments of change in ecosystems and their drivers are central for meeting the challenge of conserving biodiversity in the long term. Such assessments support national and international agencies to implement management actions that sustain natural systems and maintain the delivery of ecosystem services. Change in marine systems may arise directly from human activities (e.g., fisheries), indirectly from local or global activities (cascading effects through food webs from fisheries or changing environments from climate change and/or ocean acidification), or from naturally varying processes. A particular challenge for managers is to understand the likely impacts of future climate change on ecosystems, and to consider what actions might be needed (climate change mitigation and adaptation) to continue to meet conservation requirements into the future. For large regions such as the Southern Ocean, which have the attention of many management or policy-oriented bodies, a standardized process is needed to harmonize the scientific information on the status and trends in ecosystems used by the different bodies. That process also needs to ensure the information is available in a timely manner.

The Marine Ecosystem Assessment for the Southern Ocean ([MEASO](#)) is the first circumpolar interdisciplinary assessment of Southern Ocean ecosystem status and trends. It is a core activity of the program Integrating Climate and Ecosystem Dynamics in the Southern Ocean ([ICED](#)) (a regional program of Integrated Marine Biosphere Research), and co-sponsored by the Scientific Committee on Antarctic Research ([SCAR](#)). MEASO is a spatially-structured circumpolar ecosystem assessment that has drawn on a broad range of data, including biodiversity data. It has been a 5-year inclusive international activity, modelled on a working group of the Intergovernmental Panel on Climate Change, providing a forward-looking assessment of status and trends in Southern Ocean ecosystems. To date, it has involved over 200 scientists from across the Antarctic and Southern Ocean scientific community (18 countries, >50% identifying as women, >40% early career),

contributing to 25 research articles published in a special research topic in Frontiers journals*¹.

This presentation will describe the MEASO process and highlight over-arching findings and key messages for Southern Ocean ecosystems. It will highlight the underpinning importance of biodiversity data and standards, and will provide an overview of priorities for improving future assessments and policy-relevant advice, including those that relate to data standards and [FAIR principles](#) (the Findability, Accessibility, Interoperability, and Reuse of digital assets).

Keywords

Antarctic biodiversity, MEASO, climate change, policy-making

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Conflicts of interest

The authors have declared that no competing interests exist.

Endnotes

*1 <https://www.frontiersin.org/research-topics/10606/marine-ecosystem-assessment-for-the-southern-ocean-meeting-the-challenge-for-conserving-earth-ecosystems-in-the-long-term>