



ICED

Integrating Climate and Ecosystem Dynamics in the Southern Ocean

Rachel D. Cavanagh¹, Nadine M. Johnston, Eugene J. Murphy and Eileen Hofmann
¹British Antarctic Survey, Cambridge, UK
Email: rachel.cavanagh@bas.ac.uk
www.iced.ac.uk

Circumpolar ecosystem analyses

Integration of Southern Ocean science is required to understand circumpolar marine ecosystem operation and the effects of variability and change. This is key to predicting impacts of climate and harvesting, improving sustainable management, and elucidating the role of the Southern Ocean in the Earth System. To address these challenges the Integrating Climate and Ecosystem Dynamics in the Southern Ocean programme (ICED) is incorporating multidisciplinary research and analyses on ecosystems, biogeochemistry and climate at the circumpolar scale. ICED is a decade-long programme, starting out as "ICED-IPY" for the duration of the International Polar Year.

Objectives

- Understand how climate processes affect Southern Ocean ecosystem structure and dynamics
- Understand how ecosystem structure and dynamics affect Southern Ocean biogeochemical cycles
- Determine how ecosystem structure and dynamics should be incorporated into sustainable management of Southern Ocean living resources

To address these issues requires:

- Integrated circumpolar ecosystem analyses through data synthesis, fieldwork and modelling (Fig.1)
- Integration and coordination of international research effort

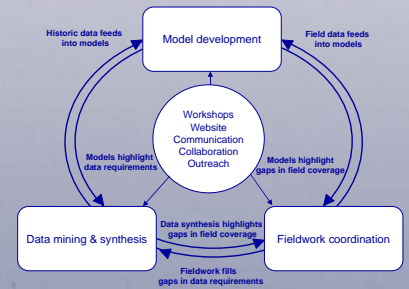


Fig. 1. Simplified representation of ICED activities illustrating links between modelling, data synthesis, and fieldwork



Fig. 2. Fieldwork locations for projects coordinated by ICED-IPY. The map is the first in a planned series of circumpolar fieldwork maps and is interactive when accessed via the ICED website. Map by Claire Tancell, BAS.

Key Activities

Model Development

Ecosystem modelling for the Southern Ocean is in its early stages, much of the work is restricted in geographic or trophic scope, and there are many questions regarding appropriate model structures that allow for integration of species-centric and trophic-centric approaches.

A primary goal of ICED is to facilitate development of the next generation of Southern Ocean ecosystem models to improve predictions of future ecosystem dynamics, including responses to variability and change.

Data Synthesis

Almost a century of Southern Ocean research has resulted in extensive data series that exist in a variety of locations and storage media. Together these data provide an invaluable resource that has yet to be fully catalogued and utilised.

ICED is beginning to collate and rationalise relevant datasets to investigate long-term, large-scale marine ecosystem functioning and change across the Southern Ocean. This will be carried out in conjunction with field and modelling activities.

Fieldwork Coordination

Through integration of Southern Ocean fieldwork, ICED will address gaps in coverage and knowledge identified by both data synthesis and modelling activities. The interactive fieldwork maps (Fig.2) are a starting point through which ICED is encouraging communication between groups working in different areas of the Southern Ocean.

These form the basis for the development of further coordinated fieldwork towards achieving the ICED objectives.

How to get involved in ICED

ICED is addressing the scientific challenges of integrating Southern Ocean ecosystem, climate and biogeochemical research at a circumpolar level, and the challenge of bringing together a multidisciplinary group of international scientists to ensure effective cooperation and communication. Since the initial planning workshop a comprehensive Science Plan and Implementation Strategy has been developed (currently under review); the first in a series of modelling workshops is about to take place; development of interactive fieldwork maps is underway; and a data rescue project has begun. ICED comprises scientists from over 20 countries and is expanding. If you would like to become involved in ICED, please contact the programme coordinator:

rachel.cavanagh@bas.ac.uk
or visit www.iced.ac.uk

