

## Guest Editorial

### Unlocking the past to understand the future

The value of historical data has finally been recognized in many fields of science as a crucial element in building our models to discover what the future might hold. Whilst some disciplines have been better organized than others, gathering data in World Data Centres and using agreed protocols to collect it, in other cases the datasets are more diffuse, less well curated, often analogue and in some cases apparently lost. Early data series generated during research in the Southern Ocean represent a valuable 'baseline' of physical and biological data, against which we can assess current and future dynamics of ecosystems under pressure from climate change. Such information can be used to underpin sustainable management strategies. Unfortunately, however, many of these historical datasets are inaccessible, existing in disparate locations and storage formats. The long term goal of the international programme Integrating Climate and Ecosystem Dynamics in the Southern Ocean (ICED, [www.iced.ac.uk](http://www.iced.ac.uk)) is to determine the major controls on the Southern Ocean ecosystems and the potential for feedbacks in the Earth System. To achieve this ICED needs to rescue as much historical data as possible and integrate it with model development.

Data from the *Discovery Investigations* form an unparalleled resource of Southern Ocean science, representing the first programme of sustained oceanographic research and exploration in Antarctica. The *Investigations*, which covered the entire Southern Ocean, collected data that has shaped our understanding of this ecosystem but are currently difficult to access. There are the published reports but, over time, the data and sample collections have become separated as the scientific groups have been re-organized and reshaped. Most of the data exists in analogue form only. Locating and assessing many of these has been an important first step in making them internationally available. ICED scientists have begun digitizing the disparate data elements into a single open access database that will enable future users to utilize the remarkable breadth of the *Discovery Investigations*. To date the distribution and abundance of 32 macrozooplankton taxa (including Antarctic krill) within the southwest Atlantic sector in relation to sea temperature and food availability has been analysed. These 'baseline' distributions have been used to model potential range shifts in response to recent climate warming. ICED is also aware of the need to provide better data synthesis for other pelagic and higher trophic level components. The Scientific Committee on Antarctic Research (SCAR) has also led coordinated efforts to synthesize benthic datasets, such as those detailed in their recent *Biogeographic Atlas of the Southern Ocean*.

The data rescue objectives of ICED cannot be achieved without substantial support not only from a wide range of stakeholders (such as the public, teaching and research communities, fisheries managers, policy makers and custodians of historical data collections) but also from funders with the vision to see that these historical data can be as important as any new data we collect today. And we need interested groups to help us catalogue, integrate and synthesize other long-term datasets as part of the international collaboration that underpins this approach. ICED is now compiling a list of priority datasets for digitization and invites data holders to contact ICED with summaries of relevant datasets that we will collate in an open access document. This can be used to seek funding and partners for data recovery projects, raise awareness of these often overlooked data resources and develop strategies to make data available. Making these data available for re-purposing is a minor cost compared to the investment in their original collection. Researchers and funders need to recognize these datasets for their scientific importance and value for money in future research.

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