Oceanography of the Ross Sea

Edited by G. Spezie & G.M.R. Manzella
286 pages. Price $149.

This well produced hardbound volume covers the papers presented at the International Conference on the Oceanography of the Ross Sea, held in Lerici, Italy in 1997.

The Ross Sea is of great importance to Antarctica, as shipping lane for the bases of Victoria Land, as a tourism venue of increasing importance, as a potentially highly valuable fishery, as a region of high biodiversity with its varied ice types and the Ross Sea polynya and, as an excellent site for the study of climate trends in the region. The book is therefore timely.

It is unashamedly written for the academic marine science community. Readers are assumed to have a good background knowledge of physical oceanography, and attendant abbreviations, methods and terminologies. Many of the papers are presented in the framework of the CLIMA programme (Climatic Long-term Interaction for the Mass Balance in Antarctica). The book is divided into five sections, each with two or more papers. The first section (General Aspects) provides an excellent opening review on the thermohaline structure and the circulation of the Ross Sea, which sets the scene. Section Two covers the broader regional setting by providing four papers on the Southern Ocean and the Circumpolar Current. These papers generally provide new insights into this relatively little studied region of the Southern Ocean. Velocity fields determined by drifter buoys between New Zealand and South America provide some surprises! Both altimeter data and temperature profiling in two separate approaches, showed the importance of mesoscale (100-200 km) dynamics operating within the generally accepted frontal systems. The Ross Sea gyre is described in this section in terms of its thermohaline characteristics.

Section three (Water Masses and Dynamics of the Ross Sea Continental Shelf) then focuses on the Ross Sea itself and special attention is paid to the polynya with its clockwise gyre and waters moving mainly along the Ross Ice Shelf barrier and north-west along the Victoria Land coast before recirculating south-eastwards. There is a suggestion that the Ross Sea gyre is one of the "engines" of the Circumpolar Current with wind being the major forcing factor in the gyre circulation. Both local katabatic winds at Terra Nova Bay and regional katabatic winds blowing of the Ross Ice Shelf are implicated. The paper on the wintertime expansion and contraction of the polynya provides an excellent background for biological-oceanographers. At times the polynya is up to 5000 km² in area. The detailed observations made in the Terra Nova Bay area in 1911 by Scott's Northern Party provide for an interesting historical backdrop to the modern remote sensing studies. The fourth section of the book deals with Particle Fluxes and Organic Matter. The Ross Sea provides an excellent laboratory for studying ocean particle dynamics due to the absence of fluvial inputs, a simple and confined ocean circulation and abundant primary production and biogenic accumulation. Not unexpectedly, there is a three orders of magnitude variation between the maximum size (summer) and minimum size of the polynya. Modelling work shows how the physical effects of water column stability and density variability have a significant effect on sedimentation quantities and patterns. The role of the Ross Ice Shelf in the provision of both particles and in modifying the physical structure of the Ross Sea is discussed. There is one paper describing the impacts of the sedimentary regime on the macrobenthic communities of the bed of the Ross Sea. While the centre of the Ross Sea is subject to sediment focussing, the edge of the continental shelf is a zone of resuspension and winnowing by bottom currents. The data indicate that all size classes of organic particles at all depths were mostly detrital although the source of this material still needs quantification. The final section is comprised of two papers on Meteorological Processes, which cover local meteorology in the Terra Nova Bay area without providing any conclusions.

I have a few criticisms of the book. There is no index, papers are not all equal as some have discussions, some have conclusions some have both, and some have none, and the text could have done with some experienced English editing. Words such as "individuated", "evidentiate", "phenomenologically" are a bit irritating and there are also cases of the wrong use of words. Several papers provide only current data sets with no real synthesis, so, given the major impetus that the Italian Antarctic Programme and the US programme are planning for the Ross Sea, the book is therefore in danger of being out of date shortly.

In spite of these shortcomings this book is currently a very valuable compilation of data and provides a good basis for studies on the biological oceanography of the Ross Sea which are planned by Italy, the USA and New Zealand. The forthcoming Second International Symposium of the Oceanography of the Ross Sea, planned for 2001 will add new dimensions to this important part of the region. I look forward to seeing the results.

Clive Howard-Williams
BOOK REVIEW

Brief Reports
Ross Sea ecology: Italianartide Expeditions

edited by F.M. Faranda, L. Guglielmo & A. Ianova

Oceanographic work in the Ross Sea is generally thought of as a US activity but since 1987 the Italians have been making a significant and growing contribution. Taken together with the benthic studies in Terra Nova Bay and the extensive work on Antarctic fish this volume demonstrates just how great a contribution has been made by Italy to Antarctic marine studies in a relatively short period.

Organized into major groups covering physical oceanography and biogeochemistry, primary production, secondary production and benthos the papers both present some new data but more importantly present some new data and compare the Italian studies with the previous American work. There is still a great deal to learn about the Ross Sea and this volume provides a useful focus of what is known in various fields - and suggests what ought to be priorities for future research.

D.W.H. Walton