German Antarctic North Victoria Land Expedition 1988/1989

edited by **Detlef Damaske and Jürgen Fritsch**, published in Germany in 1993, ISBN 0341-6437, 436 pages.

Review by **Christopher G. Kendall**

This book consists of nineteen papers which report on the 5th German Antarctic Expedition to North Victoria Land in Antarctica which took place in the summer of 1988 and 1989. This expedition involved geological as well as geophysical work, this volume reports mainly on the geophysical research carried out by the Ganovex V expedition or research associated with it.

The principle objective of this expedition was to obtain information on the structure of the earth's crust at the transition zone between the Transantarctic Mountains and the Ross Sea in the vicinity of Terra Nova Bay. The expedition used both onshore and offshore seismic refraction geophysics, generating seismic signals with airguns and recording these with ocean-bottom seismic and on land with automatic recording stations. Marine gravity measurements were carried out concurrently with the seismic survey and onshore gravity work complemented the marine work. A helicopter-born aeromagnetic survey was conducted also.

The book starts with a short paper on environmental impact analysis of the German Gondwana Station and lists the various lichen species identified within the vicinity of Gondwana Station and describes the elemental and chemical concentrations in the snow, the chemical data for various soil and sediment samples, and their mineral composition. It is clear that the German expedition was extremely careful about their treatment of their camp site and was rigorous in their activities to prevent any pollution of the surrounding area.

The book goes on to cover such topics as the crustal investigations in the Transantarctic Mountains in the form of a summary paper setting out the objectives of the expedition. This is in turn followed by a paper on geophysical characteristics of the west Antarctic rift system. This is very much an overview paper describing the magnetic surveys, magnetic anomalies, bouger anomalies, refraction and reflection methods, the depth of the ice, velocity behavior of the ice and rocks, etc. Next is a paper on geomagnetic activity in North Victoria Land during the Ganovex V expedition in which the intensity of magnetic field was recorded at various stations in the vicinity of the camp. And then there is a paper on the layout, execution and data processing of the aeromagnetic survey in the Lower Rennick Glacier area, North Victoria Land. This is illustrated by photographs of the equipment, figures of the magnetometer recordings and a map showing the magnetic total intensity. Next is a paper by Damaske and Bosum describing the interpretation of the aeromagnetic anomalies above the Lower Rennick Glacier and the adjacent polar plateau, west of the USARP mountains. This is illustrated by colored maps and processed data on cross-sections. This is followed by a paper on precise onshore and offshore positioning with the global positioning system during Ganovex V expedition which lists the data obtained. Next is a paper on the Bouguer gravity map of the Mount Melbourne Quadrangle in North Victoria Land. Papers that follow describe ice thickness measurements using radar echo sounding in North Victoria Land; gravity measurements in Ross sea; structure and evolution of the crust at the Transantarctic mountains - Ross sea crustal transition, seismic study of the central basin of the Ross Sea in the Antarctica with illustrations of crustal sections and seismic sections for the various bottom stations in the center basin of the Ross sea. There are some six traverses which were made; the generalized crustal structure of the central basin in Ross Sea was based on the seismic and the gravity survey. The authors put together geologic models to explain the relationships that they saw between the seismic data and the gravity data. There is a paper on preliminary results of a 1989 seismic refraction survey in the Ross Sea in which seismic data are interpreted. Then

there is a paper on the high-ti and low-ti tholeiites of the Jurassic Ferrar Group in Antarctica. The authors have mapped the occurrence of these rocks and have collected samples for micro analysis investigating the alteration products of minerals, relating these basalts to other basalts in the Gondwana areas. Then there is a paper on the lakes of Litell Rocks of North Victoria Land and a discussion of the deglaciation of the area. It reports on the presence of algae grains in the lakes which now form columnar masses growing on anguler basaltic fragments. There is a paper on the subduction-related Mafic to Intermediate Plutonism of the Northwestern Wilson terrain in North Victoria Land and Oates Coast. Finally there is a paper on the structure of Oates Land and its implication to the structural style of Northern Victoria Land.

This book is not the sort of text that you would rush out and buy if you don't have a specific interest in Antarctica. As the title of the book suggests, the papers are reports for the expedition and are not a cerebral synthesis of the relationship of this data to world geology or world geophysics. The use of the book to readers will vary from discipline and interest. I would say that this book should be extremely useful to people who are planning to involve themselves with geology or geophysics of Antarctica, particularly in the vicinity of the area where the German expedition was conducted. The other use of the book would be to scientists or explorationists who need to work in the high latitude of the globe and conduct geophysical experiments. The authors have described in some detail how they carried out the various surveys that they made, referencing and describing some of the technology that they used. This may be of use to others who need to work on similar climates or locations. The book is written in English and the style of the papers are extremely understandable suggesting that the authors were native English speakers (no mean feat). The book has been thoroughly edited. The illustrations are extremely clear and all the photographs are sharply focused. This is a very professional book aimed at specialists and it is not a book that you would pick up to learn about the geology of Antarctica. However if you are already studying the geology of Antarctica and need more information about this particular area you may find this text helpful to you.