

their efforts! The many references they make to diverse authors are a valuable aid and demonstrate their erudition: they have put at the disposal of geomorphologists a large part of recently acquired glaciological knowledge.

*Glaciers and landscape* by Sugden and John? A good synthesis and recommended reading!

ROBERT VIVIAN

GEOFFREY S. HOPE *and others, ed.* *The equatorial glaciers of New Guinea. Results of the 1971–1973 Australian universities' expeditions to Irian Jaya: survey, glaciology, meteorology, biology and palaeoenvironments*, edited by Geoffrey S. Hope, James A. Peterson, Uwe Radok, Ian Allison. Rotterdam, A. A. Balkema, 1976. xii, 244 p. Guilders 39.50.

DURING December 1971–March 1972; and January–February 1973 the Australian universities mounted two multidisciplinary expeditions to the Jaya (Carstenz) mountains of Irian Jaya in western New Guinea. The massif, which rises to 4 884 m, is the only area with ice fields in South-East Asia.

This book presents the scientific results of these investigations. Following a preface by U. Radok, there are 11 chapters and an index covering the general characteristics of the area and its exploration, topographic survey and mapping, glaciology, climate, cryobiology, limnology, vegetation, palaeoenvironmental history, fauna, and human occupation and usage of the area. The most detailed contributions, which reflect the primary goals of the expedition, are the two chapters on the extent and recent history of ice areas and glacier dynamics (I. Allison and J. A. Peterson) and those on climate and microclimate (I. Allison and J. Bennett), vegetation (G. S. Hope) and palaeoenvironments (G. S. Hope and J. A. Peterson).

The principal glaciological findings can be briefly summarized. The ice bodies, with a total area of about 7 km<sup>2</sup>, have been undergoing progressive retreat over the last 100 years or so. Model calculations suggest that this is due primarily to a warming of 0.6 deg per century. Ablation on the Carstenz and Meren Glaciers at the present time may be significantly influenced by the occurrence of black cryoalgae colonies. During the last glacial maximum about 20 000–17 000 B.P. the icefields covered approximately 900 km<sup>2</sup>. The mass-balance data may be rather biased since 1972 was an atypically dry year. Nevertheless, the climatic data make a useful contribution to our knowledge of the New Guinea mountain environment.

The contributions are well written and edited with very few typographic errors. The findings are fully documented and illustrated by 31 figures, 45 photographs and numerous tables. Three fold-out maps in an end-pocket show the general area on a scale of 1 : 250 000, delimiting ice bodies and the extent of the last major glaciation; the Carstenz area (1 : 20 000) based on survey and aerial photogrammetry; and an overlay for the latter showing ice front locations for 1913 to 1974. These maps bear the reference "Gunung Es" originally proposed for the book. The cross-section in figure 9.3 lacks a scale and some locations referred to in the text or figure captions could be more readily identified if symbols had been superimposed on the plates.

The results make a major contribution to our understanding of low-latitude ice bodies and their history. At present prices the volume is good value. It is a worthy tribute to those involved in its compilation and to the sponsors of the expeditions.

R. G. BARRY