To Carla Hehner-Rivard
on whom great personal stress was imposed in this endeavour.
Her selfless devotion, her arduous coordinating effort in dealing with the often re-ordered digital data base of the atlas’ illustrations and text,
her protracted correspondence in obtaining permissions for close to 1000 illustrations,
and her endless patience with her husband’s importunities,
contributed immeasurably to the book’s realization.
Preface

The media now broadcast loss of life and property damage caused by a variety of geologic hazards and geologic terrains worldwide on a near-daily frequency and in near-real-time.

Themes

This Atlas and Glossary is the result of the author’s lifetime vocation, practice and research worldwide on the application of vertical air photography and Earth Observation satellite images to geomorphology. His teaching experience and consulting for civil engineers led him to increasingly emphasize the links between specific geounits and their inherent geologic hazards. The idea of producing an atlas documenting these links was inspired by the activities of the International Decade for Natural Disaster Reduction, and he began work on the book in 1998.

The integrity of any structure has to rely on the ground on which it stands. There is a general awareness that such common hazards as rock falls, rock slides, and floods are associated with certain geologic formations, structures, and topographic situations. However, this knowledge is not as widespread as a dozen other destructive hazards that threaten human life and property, and are functionally associated with particular geologic processes and formations. These relationships have been established by distilling a selection of geounits as agents of, or susceptible to, specific geohazards, from a comprehensive photogeologic classification and photographic archive that was developed during the author’s training and consultancy work.

Objectives

The Atlas and Glossary is a portfolio approach that aims to provide an accessible source of concise information for earth science professionals and students who need to understand the hazards that are associated with specific geological units and geostructures that are mappable using airphotos and satellite images.

All the material is presented as integrated data sets whose texts and figures of worldwide coverage characterizing a geounit and its geohazards, are a convenient synthesis of information providing a rapid insight for the user from frequently widely scattered sources.

The Illustrations

The Atlas and Glossary includes 995 satellite images, vertical airphotos, air perspective views, ground photos and line-art figures that depict and document the classified geounits in their varied photogeologic appearances in diverse biophysical environments on a planet that is too easily thought of as small. Eighty-nine countries are represented.
Characterization of Geounits

The descriptions of geounit data sets are concise syntheses of current geoscience knowledge.

A geounit, as an agent of a geohazard or its susceptibility to other geohazards is discussed in relation to a set of fifteen hazard types detectable on air photos and images under the heading geohazard relations.

Photogeologic Interpretation

The Classification provides a set of descriptor codes for the identification of photogeologic units. Interpretations delineate and annotate geounits on the majority of the satellite images and airphotos.

Stereo Viewing

The Presentation section of the Introduction explains the inclusion of a CD-ROM to provide stereo viewing of airphoto figures in the Atlas.

Copyright

Every effort was made to obtain permission to reproduce copyright material throughout this book. The illustrations are all drawn from an archive of over 400 files. Because some date back more than four decades, the provenance of some has been lost and their source is listed as unattributed. If any proper acknowledgment has not been made, this oversight will be corrected in subsequent editions of the Atlas and Glossary.
Acknowledgments

Preparation of a book, especially a first edition, needs the help and expertise of many people.

First among those to whom we are most greatly indebted is Nicholas W. E. Lee. This civil engineer and life-long friend who long presided a photographic survey company, actively promoted the application airphoto interpretation to site selection in civil engineering projects. Nicholas strongly encouraged and supported the author at critical moments in his career. He saw to it that his early experience was developed within international projects.

We are particularly grateful to the staff of the Earth Science Information Centre of Natural Resources Canada in Ottawa, especially Penny Minter and Irène Kumar of the Map Library, for their unstinting and prompt response to endless requests.

The National Air Photo Library generously permitted the reproduction of numerous stereo and other airphotos, and its staff constantly responded to urgent requests for information.

Dr. Stéphane Péloquin, consultant in remote sensing for mineral exploration and a specialist in the development of computer programs for applied earth science made contributions in the methodical formulations that were used for some of the processing of digital data.

The initial scanning and processing of the mass of illustrations was performed by Sophie Gaudreau, Micheline Léger and Carl Garneau under the supervision of Martin Trépanier who organized this phase of the book production at Groupe BGJLR Inc. in Québec City.

At Springer-Verlag, Dr. Christian Witschel, Executive-Editor Geosciences recognized the merit of our concept of an airphoto and satellite image based atlas relating specific geounits to specific geohazards and made the commitment to see it published. Agata Oelschläger efficiently and with indulgence coordinated the production process. Armin Stasch of Stasch Verlagsservice reconciled our layout and presentation ideals with publishing realities.

Lastly, the true source of this atlas are the students of Civil Engineering Courses 303 and 439 in the Civil Engineering Department, McGill University. Their successive classes over the years constituted a persistent challenge to the author to continually refine the content of the sets of pedagogic data, collected, organized and re-organized, for a more effective characterization and presentation of the environmentally varied appearance of given photogeologic units. These cumulative data sets became the basis of the Atlas.
Author and Contributors

Mr. Rivard takes responsibility for the full content of the book, any mistakes, omissions or errors are his. He performed the photogeological interpretations and wrote the comments of the figures of the Part IV atlas.

Dr. Q. Hugh J. Gwyn did the initial copy-editing and vetting of the texts of Part I, Part II, Part III and the 160 geounit characterizations of the Glossary sections of the data sets of Part IV. His continued support and technical expertise contributed greatly to the final publication.

Major contributions were made by Carla Hehner-Rivard in the overall production control and coordination, figure/text matching and editing, adaptation of line art, image enhancement and picture quality control.
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