

General Geocryology

E.D. Yershov, Cambridge University Press

Geocryology, or permafrost studies to give it its former name, is the study of frozen ground, including underground ice and snow accumulation. This book is a translation of a Russian work from the holder of the only chair of Geocryology in an eponymous department at Moscow State University. The standard of English in the text is extremely high - testimony to efforts of the team of technical and language experts. The book contains 19 chapters arranged in five parts plus an introduction.

The thermal, physical and chemical processes involved in freezing and thawing are described in both simple conceptual language and more complex numerical terms. For example the difference between soils that freeze with and without water migration depending on the initial moisture content and the rate of cooling. The nature of the processes transform the structure, density and strength of soils. The different types of cryogenic structures that may be expected in different soils under different conditions are simply and clearly explained. Illustrations at field scale help those faced with logging or mapping cryogenically deformed soils.

Part II deals with the structure and properties of frozen rocks and soils. For example, the usual limits on moisture content in unfrozen soils are lifted.

Part III deals with the effects of seasonal freeze - thawing and focuses on the effects this cycling has on the hydrogeological regime. Much of Britain will have been subject to such cycles either during or after the last glaciation so this Part has much to offer the practicing geotechnical specialist. The description of the physical processes offers a clear insight into the lateral and vertical distribution of structures and therefore strength, deformability and permeability that may be expected in periglacially disturbed soils and rocks.

Part IV provides a regional review of permafrost that focuses on the territories of the former Soviet Union. The chapter on methods of investigation deals mainly with regional scale mapping and characterisation but also highlights the role of geophysics in site scale studies.

Part V deals specifically with conservation of and development in permafrost regions. Issues to consider in constructing foundations are described in some detail. The consequences of ignoring these are illustrated with photographs of damaged buildings. The role of engineering geology forms the final chapter of the book. As well as the usual mapping and investigation techniques, there is a section dealing with forecasting changes in geocryological conditions as a result of the development.

Overall I found the book well written, useful and well laid out. I would recommend anyone engaged in ground engineering in permafrost affected regions - whether current or ancient - to have access to this work. For the practitioner it has enough, presumably painfully gained, pearls of wisdom to be of immediate use while to the academic and theoretician it goes into sufficient depth to provide a springboard for further research.

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