

# **Remote Sensing Of Ice And Snow**

Mark F. Meier

## **Remote Sensing Of Ice And Snow:**

Remote Sensing of Ice and Snow Dorothy Hall, 2012-12-06 Remote sensing using aircraft and satellites has helped to open up to intensified scientific scrutiny the cold and remote regions in which snow and ice are prevalent In this book the utility of remote sensing for identifying mapping and analyzing surface and subsurface properties of worldwide ice and snow features is described Emphasis is placed on the use of remote sensing for developing an improved understanding of the physical properties of ice and snow and understanding the interrelationships of cryospheric processes with atmospheric hydrospheric and oceanic processes Current and potential applications of remotely sensed data are also stressed At present all weather day and night observations of the polar regions can be obtained from sensors operating in different portions of the electromagnetic spectrum Because the approaches for analysis of remotely sensed data are not straightforward Chapter 1 serves to introduce the reader to some of the optical thermal and electrical properties of ice and snow as they pertain to remote sensing In Chapter 2 we briefly describe many of the sensors and platforms that are referred to in the rest of the book The remaining chapters deal with remote sensing of the seasonal snow cover lake and river ice permafrost glacier ice Remote Sensing of Snow and Ice W. Gareth Rees, 2005-08-12 Many advances in spaceborne and sea ice instrumentation remote sensing and data analysis have occurred in recent years but until now there has been no book that reflects these advances while delivering a uniform treatment of the remote sensing of frozen regions Remote Sensing of Snow and Ice identifies unifying themes and ideas in these fields and presents them in a single volume This book provides a comprehensive introduction to the remote sensing of the Earth's cryosphere Explaining why cryospheric observations are important and why remote sensing observations are essential it offers thorough surveys of the physical properties of ice and snow and of current and emerging remote sensing techniques Presenting a technical review of how the properties of snow and ice relate to remote sensing observations the book focuses on principles by which useful geophysical information becomes encoded into the electromagnetic radiation detected during the remote sensing process The author then discusses in detail the application of remote sensing methods to snow freshwater ice glaciers and icebergs The book concludes with a summary that examines what remote sensing has revealed about the cryosphere where major technical problems still exist and how these problems can be addressed **Remote Sensing of Snow and Ice** Mark F. Meier, 1979 Lists the methods in use for remote sensing of characteristics of snow and ice in seasonal snow cover glaciers and ice sheets ground ice lake and river ice and sea ice discusses methods for analysing such data Prospects and concerns for satellite remote sensing of snow and ice National Research Board Ad Hoc Panel on Remote Sensing of Snow and Ice, National Research Council Ad Hoc Panel on Remote Sensing of Snow and Ice Committee on Glaciology Polar Research Board Commission on Physical S ciences, Mathematics, and Resources, 1989 Remote Sensing of Snow and Ice Albert Rango, 1979 **Remote Sensing of** Ice & Snow: a One-week Short Course University of Alberta. Faculty of Extension, 1985 Advanced Concepts and

Techniques in the Study of Snow and Ice Resources H. S. Santeford, James LeRoy Smith, 1974 Organized by the Work Group on Snow and Ice the Work Group on Remote Sensing and the Work Group on Nuclear Techniques of the U.S. National Committee for the International Hydrological Decade Remote Sensing of Sea Ice and Icebergs Simon Haykin, Edward O. Lewis, R. Keith Raney, James R. Rossiter, 1994-10-28 Describes the latest remote sensing technologies used to detect ice hazards in the marine environment map surface currents sea state and surface winds study ice dynamics over ice transportation oil spill countermeasures climate changes and ice reconnaisance Includes such technologies as acoustic sensing ice thickness measurement passive microwave remote sensing ground wave and surface based radars REMOTE SENSING OF SNOW AND ICE Moira Steyn-Ross, 1984 Ice and Snow Algae Eric Marechal, Linda Nedbalová, 2022-04-05

Remote Sensing of Snow and Ice Using Nimbus-7 SMMR Data Over Finland M. T. Hallikainen, HELSINKI UNIV OF TECHNOLOGY ESPOO (Finland) RADIO LAB., 1982 Nimbus 7 SMMR data at 18 GHz and 37 GHz are applied to studies of snow covered sea ice and snow covered terrain in Finland First the dielectric properties of sea ice snow and frozen soils are reviewed Brightness temperatures are calculated using the radiative transfer model The theoretical results show that snow covered sea ice and snow covered terrain are practically identical systems. The only major difference is the presence of vegetation in the case of terrain Using horizontally polarized satellite data in five test areas of mixed surface types in Finland slopes of the change of TB 18 GHz TB 37 GHz vs water equivalent of dry snow are derived for pure surface types of forests boglands farm lands and lakes A new algorithm to mapping the water equivalent of dry snow is suggested The theoretical model is used to interpret the satellite data on snow covered sea ice Proceedings of the Symposium on Remote Sensing of Snow and Ice, Boulder, Colorado, May 1992 SYMPOSIUM ON REMOTE SENSING OF SNOW AND ICE.,1993 Satellite and Ground Passive Microwave Remote Sensing Studies of Ice and Snow on and Near Lake Superior Andrew Ness Remote Sensing of Environmental Changes in Cold Regions Jinyang Du, Jennifer D. Watts, Hui Pilant, 1996 Lu, Lingmei Jiang, Paolo Tarolli, 2019-11-14 This Special Issue gathers papers reporting recent advances in the remote sensing of cold regions It includes contributions presenting improvements in modeling microwave emissions from snow assessment of satellite based sea ice concentration products satellite monitoring of ice jam and glacier lake outburst floods satellite mapping of snow depth and soil freeze thaw states near nadir interferometric imaging of surface water bodies and remote sensing based assessment of high arctic lake environment and vegetation recovery from wildfire disturbances in Alaska A comprehensive review is presented to summarize the achievements challenges and opportunities of cold land remote sensing

**Remote Sensing of the Cryosphere** Marco Tedesco, 2014-11-26 The cryosphere that region of the world where water is temporarily or permanently frozen plays a crucial role on our planet Recent developments in remote sensing techniques and the acquisition of new data sets have resulted in significant advances in our understanding of all components of the cryosphere and its processes This book based on contributions from 40 leading experts offers a comprehensive and

authoritative overview of the methods techniques and recent advances in applications of remote sensing of the cryosphere Examples of the topics covered include snow extent depth grain size and impurities surface and subsurface melting glaciers accumulation over the Greenland and Antarctica ice sheets ice thickness and velocities gravimetric measurements from space sea lake and river ice frozen ground and permafrost fieldwork activities recent and future cryosphere oriented missions and experiments All figures are in color and provide an excellent visual accompaniment to the technical and scientific aspect of the book Readership Senior undergraduates Masters and PhD Students PostDocs and Researchers in cryosphere science and remote sensing Remote Sensing of the Cryosphere is the significant first volume in the new Cryosphere Science Series This new series comprises volumes that are at the cutting edge of new research or provide focussed interdisciplinary reviews of key aspects of the science Special Report - Corps of Engineers, U.S. Army, Cold Regions Research and Engineering Laboratory Cold Regions Research and Engineering Laboratory (U.S.),1972 USA CRREL Technical Publications Cold Regions Research and Engineering Laboratory (U.S.), 1972 Cost-Effective Earth Observation Missions Rainer Sandau, 2006-03-09 It is within the means of many nations to conduct or participate in cost effective Earth observation missions This study provides a definition of cost effective Earth observation missions and information about background material and organizational support It discusses cost drivers and provides advice on achieving cost effective missions and discusses training and education The conclusions and recommendations range from more general factors which drive the small satellite mission activities to visions of future cost effective Earth observation missions Complementary to large complex missions small satellite missions have specific advantages more frequent missions opportunities and therefore faster return of science and application data a larger variety of missions and greater diversification of potential users more rapid expansion of the technical and or scientific knowledge base greater involvement of local and small industry This volume will prove to be a useful source of information to governments space agencies academia and industry Encyclopedia of Snow, Ice and Glaciers Vijay P. Singh, Pratap Singh, Umesh K. Haritashya, 2011-07-01 The earth's cryosphere which includes snow glaciers ice caps ice sheets ice shelves sea ice river and lake ice and permafrost contains about 75% of the earth s fresh water It exists at almost all latitudes from the tropics to the poles and plays a vital role in controlling the global climate system It also provides direct visible evidence of the effect of climate change and therefore requires proper understanding of its complex dynamics. This encyclopedia mainly focuses on the various aspects of snow ice and glaciers but also covers other cryospheric branches and provides up to date information and basic concepts on relevant topics It includes alphabetically arranged and professionally written comprehensive and authoritative academic articles by well known international experts in individual fields The encyclopedia contains a broad spectrum of topics ranging from the atmospheric processes responsible for snow formation transformation of snow to ice and changes in their properties classification of ice and glaciers and their worldwide distribution glaciation and ice ages glacier

dynamics glacier surface and subsurface characteristics geomorphic processes and landscape formation hydrology and sedimentary systems permafrost degradation hazards caused by cryospheric changes and trends of glacier retreat on the global scale along with the impact of climate change This book can serve as a source of reference at the undergraduate and graduate level and help to better understand snow ice and glaciers It will also be an indispensable tool containing specialized literature for geologists geographers climatologists hydrologists and water resources engineers as well as for those who are engaged in the practice of agricultural and civil engineering earth sciences environmental sciences and engineering ecosystem management and other relevant subjects

Scientific and Technical Aerospace Reports, 1987

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