Snowcover Accumulation, Relocation and Management

by J. W. Pomeroy & D. M. Gray

published 1995 by the National Hydrology Research Institute, 11 Innovation Boulevard, Saskatoon, Saskatchewan, Canada S7N 3H5; 144 + xiii pp; price $25.00 Canadian; ISBN 0-660-15816-7

In this book, two Canadian snow hydrologists have brought together a wealth of practical knowledge of the snowcover which plays such an important role in their environment. Their aim is to explain why the snowcover can be deeper or denser in some places than in others, what happens when snow is intercepted on the leaves and branches of vegetation and what can be done to influence the build-up of snow. Useful empirical equations summarise the results of many years of research at the National Hydrology Research Institute (NHRI) and elsewhere. The emphasis is necessarily on an engineering approach, but the authors are well aware of the physics underlying the processes they describe. They suggest that, in the future, advances in physically-based modelling will allow accumulation and relocation to be described more rigorously, but in the meantime this book is an authoritative source of up-to-date information for all hydrologists working in cold regions.

The book begins with some interesting comments on how to calculate the snowcover water equivalent (SWE) over large areas. In theory, density profiles over the whole area are needed to calculate the SWE; in practice since snow density is related to depth, empirical equations relating SWE and mean snow depth can be derived. A useful summary of snowcover measurement techniques, with references to key papers, is followed by a chapter on spatial variability. Many of the effects of topography and vegetation on snowcover are obvious even to the casual observer — cornices on the lee side of sharp ridges, bare patches around the trunks of trees for example — but deriving equations to relate SWE to landscape parameters is no easy task. The factors influencing interception of snow are equally complex, but clarified by the authors' careful review of field data from forested areas.

Two chapters are devoted to the effects of wind on the snowcover, especially in the open prairie regions of Western Canada. Snow is transported along the surface in dunes or sastrugi, by saltation near the surface, and suspended in the atmosphere. During transport there can be considerable loss of mass by sublimation as well as by simple relocation of the snow in drifts. Physics-based blowing snow models are relatively well developed and have been used to model snow transport around buildings for example. However, as the authors rightly remark, in the natural environment, with complex surface topography and varying surface roughness, their use is limited by lack of data. The book ends with a survey of snow management and control practices designed to increase the water available to replenish soil moisture and maintain river discharge. Although the examples are draw from Canadian practice the techniques will be of interest to all engineers working in areas where snow is truly a "natural resource".

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Publications received by the Editor

2. *Floods and Reservoir Safety* (3rd edn) published 1996 for the Institution of Civil Engineers by Thomas Telford Publications Ltd, 1 Heron Quay, London E14 4JD, UK.


4. *Critical loads of acid deposition for UK freshwaters* published 1995 by the Institute of Terrestrial Ecology, Penicuik, EH26 0QB, UK.


7. *Study Guide to accompany Physical Geography of the Global Environment (2nd edn)* by J. J. de Blij & Peter O. Muller by Vernon Domingo. Published 1996 by John Wiley & Sons Ltd, Baffins Lane, Chichester, West Sussex PO19 1UD, UK.


16. *BAHC NEWS* no. 4, April 1996, published by the BAHC Core Project Office, Potsdam Institute for Climate Impact Research, PO Box 60 12 03, D-14412 Potsdam, Germany.

**Forthcoming papers**

The next issue of *Hydrological Sciences Journal* will be a Special Issue on Remote Sensing Applications to Hydrology. The following papers have been accepted for publication in that issue:

- Grant W. Petty & Witold F. Krajezewski Satellite estimation of precipitation over land
- Gert A. Schultz Remote sensing applications to hydrology: runoff
- A. Rango Space-borne remote sensing for snow hydrology applications
- W. P. Kostas & J. M. Norman Use of remote sensing for evapotranspiration monitoring over land surfaces
- T. J. Jackson, J. Schimugge & E. T. Engman Remote sensing applications to hydrology: soil moisture
- A. G. Dekker, Ž. Zamurović-Nenad, H. J. Hoogenboom & S. W. M. Peters Remote sensing, ecological water quality modelling and *in situ* measurements; a case study in shallow lakes
- A. M. J. Meijerink Remote sensing applications to hydrology: groundwater
- G. W. Kite & A. Pietroniro Remote sensing applications in hydrological modelling
- Michael F. Baumgartner & Gabriela M. Affl Remote sensing and geographic information systems
- Dorothy K. Hall Remote sensing applications to hydrology: imaging radar
- Jerry C. Ritchie Remote sensing applications to hydrology: air-borne laser altimeters
- Edwin T. Engman Remote sensing applications to hydrology: future impact

The following papers have also been accepted for publication in forthcoming issues of *Hydrological Sciences Journal*:

- F. A. K. Farquharson, D. T. Plinston & J. V. Sutcliffe Rainfall and runoff in Yemen
- C. S. De Silva & K. R. Rushton Interpretation of the behaviour of agrowell systems in Sri Lanka using radial flow models
- Xu Jiongxin Complex behaviour of suspended sediment grain size downstream from a reservoir: an example from the Hangiang River, China
- D. A. Hughes & V. Smaëthin Daily flow time series patching or extension: a spatial interpolation approach based on flow duration curves
- Gregory J. McCabe Effects of winter atmospheric circulation on temporal and spatial variability in annual streamflow in the western United States