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Collana	Lecture Notes in Physics, , 0075-8450 ; ; 533
Disciplina	620/.411
Soggetti	Thermodynamics Statistical physics Dynamical systems Engines Machinery Engineering Mechanics Mechanics, Applied Geophysics Complex Systems Engine Technology Engineering, general Theoretical and Applied Mechanics Geophysics/Geodesy
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Nota di contenuto	Some observations on the historical development of conduction heat transfer -- Numerical and experimental investigation on frosting of energy-recovery ventilator -- Melting of unfixed material inside an elliptical capsule -- Experimental study on the critical heat flux of ice accretion along a fine wire immersed in a cold air flow with water spray

-- The characteristics of frost growth on parallel plates -- Effect of ultrasonic waves on freezing of supercooled water -- Numerical modeling of dendritic ice crystals -- Measurement of temperature and velocity fields of freezing water using liquid crystal tracers -- Heat transfer enhancement of a direct contact melting process by oscillating motion -- Permeability of an aqueous solution in a state of partial solidification -- Lateral freezing of a porous medium saturated with an aqueous salt solution -- Spontaneous melting of ice in a  $\text{CaCl}_2$  solution -- An analytic solution prescribing the time-dependent formation of a solid crust inside a convectively cooled plane channel -- Melting heat-transfer characteristics of an inclined ice plate immersed in a hydrophobic liquid -- Plane flow of an ice sheet exhibiting strain-induced anisotropy -- A meso-macro model for the description of induced anisotropy of natural ice, including grain interaction -- Classical mixture models for polythermal ice -- Modelling the ice single-crystal viscoplastic behaviour -- Remarks on self-consistent modelling of polycrystalline ice -- Anisotropic isothermal ice-cap flow with the shallow ice approximation -- Orthotropic viscous model for ice -- Tertiary flow relations for compression and shear components in combined stress tests on ice -- An iterative solution procedure for shallow stokes flows. The shallow ice approximation revisited -- Nested high-resolution modelling of the greenland summit region -- Numerical age computation of the antarctic ice sheet for dating deep ice cores -- Three-dimensional isothermal boundary layer solutions of slow creeping ice flows based on the shallow ice approximation -- A comparison study between two visco-plastic sea-ice models -- Influence of ice accumulation distribution on ice sheet stability -- A computational procedure for instationary temperature-dependent snow creep -- Transformation of the snow crystal to a particle of ice -- Temperature and temperature gradient dependence of snow recrystallization in depth hoar snow -- On creep flow of snow and firn -- Relation of temperature gradient to heat transfer in snow -- Methods of similitude in granular avalanche flows -- Experimental study of gas hydrate formation in porous media -- Electroacoustic technique to study changes in the liquid phase state of frozen soils -- Permeability effects on winter-time natural convection in gravel embankments -- Barothermic effect and temperature regime of frozen soil -- Detecting alpine permafrost using electro-magnetic methods -- Climatic warming and permafrost -- The monitoring and prediction of permafrost temperature, distribution and geocryological processes within russia under global climate changes -- Thermally induced temporal strain variations in rock walls observed at subzero temperatures -- Soil microstructure and the thermodynamic behaviour of permafrost affected soils -- Heat transfer in heat storage arrangements under melting -- Microscale analysis of ice crystals made from aqueous solutions by scanning tunneling microscope -- Development study of a novel tower-style tank for simultaneous storing warm water and ice -- Latent heat storage in a fixed-bed packed with cross-linked polymer particles -- Development of an efficient static-type ice thermal energy storage vessel using a low concentration aqueous solution -- Heat storage for a bus petrol internal-combustion engine -- Heat pumps and heat pipes for applications in cold regions.

## Sommario/riassunto

This book consists of peer-reviewed articles and reviews presented as lectures at the Sixth International Symposium on Thermal Engineering and Sciences for Cold Regions in Darmstadt, Germany. It addresses all relevant aspects of thermal physics and engineering in cold regions, such as the Arctic regions. These environments present many unique

freezing and melting phenomena and the relevant heat and mass transfer processes are of basic importance with respect to both the technological applications and the natural context in which they occur. Intended for physicists, engineers, geoscientists, climatologists and cryologists alike, these proceedings cover topics such as: ice formation and decay, heat conduction with phase change, convection with freezing and melting, thermal properties at low temperature, frost heave and permafrost, climate impact in cold regions, thermal design of structures, bio-engineering in cold regions, and many more.

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