PROCEEDINGS OF A WORKSHOP ON MAPPING AND ARCHIVING OF SEA ICE DATA - THE EXPANDING ROLE OF RADAR

Government Conference Centre
Ottawa, Canada, 2-4 May 2000

Sponsored by:

World Meteorological Organization
Canadian Ice Service
Canadian Ice Working Group

WMO/TD-No. 1027

2000

JCOMM Technical Report No. 7
NOTE

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariats of the Intergovernmental Oceanographic Commission (of UNESCO), and the World Meteorological Organization concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.
CONTENTS

Organizing Committee...........................................................................................................................................v
Opening Remarks, Mikhail Krasnoperov, WMO Secretariat ................................................................. vii
Introduction, Bruce Ramsay, Canadian Sea Ice Service ................................................................................ ix

Plenary Session

Evolution of Ice Services........................................................................................................................................ 1
Jan-Eric Lundqvist (for Klaus Strübing)

The Use of SAR in Operational Ice Services – Historical Highlights .................................................. 9
Don Montgomery

Linkages – Operational Sea Ice Monitoring and Climate Change........................................................... 23
David Barber

Session 1 – Current and Future Sensors

Radarsat-2 Program..............................................................................................................................................33
Luc Brulé

A U.S. Earth Imaging Radar Satellite Mission...............................................................................................45
Don Montgomery

Ice Applications of Sea Winds Quick Scat Data (abstract)..............................................................................57
David Long & Cheryl Bertoia

Session 2 – Sea Ice Monitoring

Sea Ice Incidents in Icelandic Waters and their Monitoring ...........................................................................59
Thor Jakobsson

Sea Ice Monitoring and Forecasting in China....................................................................................................65
Wu Huiding, et al.

The Greenland Case: Operational Sea Ice Monitoring based on Satellite Images – Experiences and Prospects ..............................................................................................................................................73
Henrik Andersen, et al.

Session 3 – Case Study 1 (old ice)

Radar Sea Ice Signatures – An Operational Primer .......................................................................................85
Roger De Abreu

Hands-on Case Study – Analysing Radarsat Imagery for Old Ice/First-year Ice Signatures ......................95
Don Isaacs

Session 4 – Case Study 2

Experiences with Visual SAR Image Interpretation for Floating Ice Support to Antarctic Marine Activities ..............................................................................................................................................115
Manuel Picasso, et al.
Comparison of Radarsat ScanSAR and CANICE 3 CAL-100 Imagery of Second-year and Multiyear Ice at the end of the Melt Season During a Transit of the Regime by the M.V. Arctic ................................................................. 121

Robert Gorman

Session 5 – Case Study 3 (marginal ice zone)

Radarsat Interpretation of Sea Ice in the Gulf of St Lawrence Marginal Ice Zone
Hands on Case Study in the Gulf of St Lawrence Marginal Ice Zone ........................................ 125

Laurie Weir

Session 6 – Case Study 4

Multi-sensor Operational Analysis of Temporal Phenomena in the Marginal Ice Zones of the Barents and Yellow Seas ................................................................. 145

Mary Ruth Keller, et al.

Sea Ice Analysis in the Japan Meteorological Agency ............................................................. 151

Takanori Matsumoto, et al.

Use of SAR Data for Ice Navigation Support in Russia .......................................................... 159

Vladimir G. Smirnov

Real-time Use of ERS-2 SAAR Data on Board GS “Neuwerk” in the Bay of Bothnia ................ 165

K. Strübing & R.O. Ramseier

Session 7 – Information Extraction & Data Fusion

Operational Evaluation of a Knowledge-based Sea Ice Classification System ..................... 173

Denise Gineris, et al.

Sea Ice Concentration Derived Using SSM/I 85.5-GHz Imagery ........................................... 179

Stefan Kern

An approach of Data Fusion for Extraction of Sea Ice Parameters (abstract) ......................... 185

Mohammed Shokr

Session 8 – Systems & Modelling

Assimilation of Radarsat Derived Ice Motion in a Simple Coupled Ice-ocean Model (abstract) .. 191

Mohamed Sayed, et al.

Toward the Integration of Microwave Remote Sensing and a Coupled Thermodynamic Snow-sea Ice Model ................................................................. 193

John Hanesiak

Session 9 – Data Archiving

Arctic Sea Ice Climatology for 1950-1994 Assessed on the Basis of WMO Project ‘Global Digital Sea Ice Data Bank’ ................................................................. 201

Vasily Smolyanitsky

Archiving and Accessing the Canadian Ice Service’s Digital Chart Dataset ........................... 207

Richard Chagnon

An Overview of Sea Ice Data Sets at NSIDC ......................................................................... 225

Florence Fetterer
The Canadian Cryospheric Information Network: A Preview .....................................................231
Joseph M. Piwowar & Ellsworth F. LeDrew

Poster Session 1

CRYSYS Program – Using the Cryosphere to Monitor Global Climate Change in Canada (abstract) .............................................................................................................. .......237
Tom Agnew

The North Water (NOW) Polynyas Study – The Role of Sea Ice in Polynya Processes (abstract) ........................................................................................................... ......239
David Barber, et al.

Towards Operational Use of Radarsat Data for Iceberg Detection ............................................241
Dean Flett & Matthew Arkett

Advanced SSM/I Products Using the 85-GHz Channels: Mapping Sea Ice for Ice Operations, Carbon Budget, and Shrimp Fisheries (abstract)....................................................245
Caren Garrity, et al.

Detecting Low Concentrations of Sea Ice and the Position of Icebergs Using Radarsat ScanSR Wide Data....................................................................................................247
R.S. Gill, et al.

Operational Enterprise Server Implementation: Maximizing Data Availability and Reliability for the Canadian Ice Service’s Production Environment............................................257
Peter Griffiths & A. Koonar

Directions for Technology Architecture in the Canadian Ice Service..........................................263
Awtar Koonar, et al.

Arctic Land Fast Ice Advisory and Warning System Project ......................................................269
Normand Michaud & Roger De Abreu

Development of a Time-series GIS Database of Sea Ice Type and Concentration from Radarsat-1 Data for the North Water .................................................................................277
C.J. Mundy & D.G. Barber

Mapping Sea Ice Properties with a Helicopter-borne Electromagnetic-induction and Video System................................................................................................................... .........279
I.K. Peterson, et al.

Poster Session 2

Texture Analysis of SAR Sea Ice Imagery Using MRFs .................................................................287
David Clausi

Towards a New WMO Definition for Stages of Sea Ice Ablation..................................................293
Roger De Abreu, et al.

Influence of Microstructure Upon the Microwave Backscattering Coefficient of Natural Sea Ice: Case Study .............................................................315
Michelle Johnston & N. Sinha

Time Series Analysis of SAR Sea Ice Backscatter ........................................................................329
Maria Lundin & Bertil Häkansson