



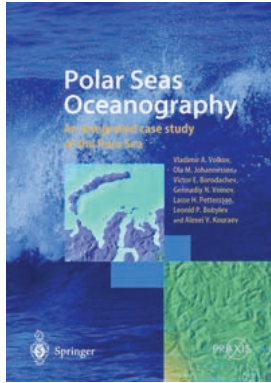
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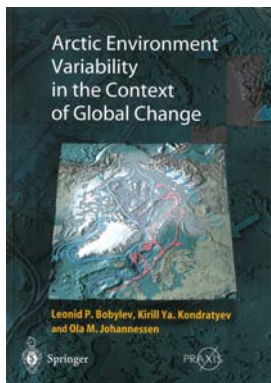
Polar Series no. 1
ISBN: 3-540-42969-7
pp. 450, (2002).

Polar Seas Oceanography - an integrated case study of the Kara Sea

by Vladimir A. Volkov, Ola M. Johannessen, Victor E. Borodachev, Gennadiy N. Voinov, Lasse H. Pettersson, Leonid P. Bobylev and Alexei V. Kouraev

The Kara Sea of the Russian Arctic, with its unique oceanographic regime, is a site of major scientific and commercial importance. Global climate change, transport and spread of radionuclides and other pollutants, and the exploration and exploitation of its rich natural resources are all important issues. Here, for the first time, is a comprehensive study of this Polar sea, based on in situ data, satellite remote sensing and numerical sea modelling. It includes the results of much previously-unpublished research carried out over the past decade, and an analysis of the results of many studies carried out during the last century.

The book describes the oceanographic regime, including river discharge, study of water dynamics, the transport of pollutants and results of numerical model simulations. One issue specifically addressed is the shrinking of the sea ice because, as a marginal sea of the Arctic Ocean, the Kara Sea is expected to provide an early warning of the enhanced high latitude impact of global climate change processes.



Polar Series no. 2
ISBN: 3-540-43458-5
pp. 471, (2003).

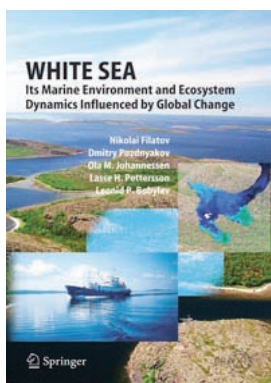
Arctic Environment Variability in the Context of Global Change

by Leonid P. Bobylev, Kirill Ya. Kondratyev and Ola M. Johannessen

The Arctic constitutes a unique environment with a major role in the dynamics and evolution of the Earth system. State-of-the-art coupled global climate models predict enhanced "greenhouse warming" in the Arctic, including a nearly ice-free Arctic Ocean during the summer, towards the end of this century. Potential impacts of the future Arctic warming and shrinking ice cover are:

- Significant effects on the energy balances and atmospheric and oceanic circulation in the high latitudes;
- Changes in the pathways and spreading of the melt water in the North Atlantic, thereby affecting the thermohaline circulation;
- Broad changes in the marine ecosystem and increased uptake of CO₂
- Increased trans-Arctic transportation, including the Northern Sea Route, an easier offshore oil and gas production.

Arctic Environment variability in the context of Global Change is a study of environmental dynamics in the Arctic. The problems of Arctic climate change – the atmosphere composition and pollution, the atmosphere-ice-ocean interaction and circulation, the marine ecosystems and the land surface processes - are reviewed.



Polar Series no. 3
ISBN: 3-540-20541-1
pp. 472, (2005).

White Sea: Its Marine Environment and Ecosystem Dynamics Influenced by Global Change

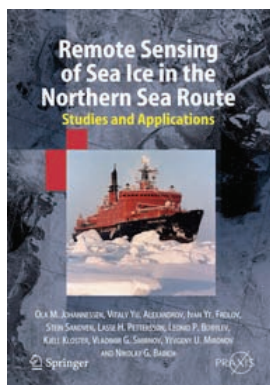
by Nikolai Filatov, Dmitry Pozdnyakov, Ola M. Johannessen, Lasse H. Pettersson & Leonid P. Bobylev

The book brings together the results of a wide range of environmental, ecological and socioeconomic studies based on extensive data analysis and numerical modelling simulations. It provides a quantitative assessment of the vulnerability of the White Sea marine ecosystems, including scenarios for future anthropogenic and climate change forcing. Amongst the subjects explored in depth are:

- extensive historical marine and riverine data records
- an examination of the White Sea ecosystem profile
- the application of satellite Earth observation investigations into changes in regional physical oceanography and marine ecology
- challenges of data assimilation in ocean and ecosystem modelling
- the extent of the present state-of-the-art and future developments in the region
- socio-economic impact of ecological changes
- an integrated assessment of the state of the ecology, vulnerability and sustainability of the White Sea

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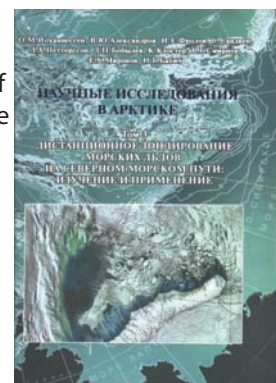
Remote Sensing of Sea Ice in the Northern Sea Route: Studies and Applications

by Ola M. Johannessen, Vitaly Yu. Alexandrov, Ivan Ye. Frolov, Stein Sandven, Lasse H. Pettersson, Leonid P. Bobylev, Kjell Kloster, Vladimir G. Smirnov, Yevgeny U. Mironov and Nikolay G. Babich

The Northern Sea Route is the assembly of sailing routes in the Russian Arctic between the Barents Sea in the west and Bering Strait in the east, and is the shortest transit sailing route linking northwestern Europe and northeastern Asia. In winter the entire route is ice-covered, and even during the summer months parts can be ice-covered, significantly hampering navigation.

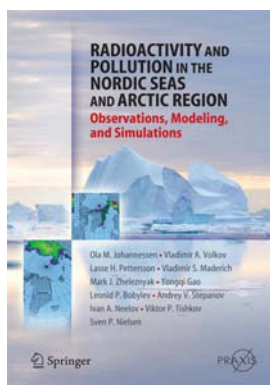
Sea ice monitoring and forecasting services, organized under the Russian Hydrometeorological Service, are important for ice navigation. Satellite data are at present the most important part of the input data to these services. Since 1991, a number of campaigns have been carried out to demonstrate how the use of Synthetic Aperture Radar (SAR) images can improve the ice information available on board the fleet of icebreakers which support safe and cost-effective ship transportation. The main project, "ICEWATCH - Real-time sea ice monitoring of the Northern Sea Route using Satellite Radar technology", was the first joint project in Earth Observation between European and Russian Space Agencies.

Remote Sensing of Sea Ice in the Northern Sea Route: Studies and Applications describes the use of satellite remote sensing data for sea ice monitoring in the Northern Sea Route. Also published in Russian by Nauka Publisher, St. Petersburg.



Polar Series no. 4
ISBN: 3-540-24448-4
pp. 472, (2007).

ISBN: 978-5-02-025285-1
pp. 512, (2008) in Russian.



Radioactivity and pollution in the Nordic Seas and Arctic region - Observations, modeling, and simulations

by Ola M. Johannessen, Vladimir A. Volkov, Lasse H. Pettersson, Vladimir S. Maderich, Mark J. Zheleznyak, Yongqi Gao, Leonid P. Bobylev, Andrey V. Stepanov, Ivan A. Neelov, Viktor P. Tishkov and Sven P. Nielsen

The Arctic Ocean, and the coastal zone of the Russian Arctic, have been exposed to radioactivity from both atmospheric fallout and other European and Russian sources. A Generic Model System was created, providing a new tool for assessing the potential spread of radioactivity in the Arctic Ocean and the Nordic Seas, enabling subsequent simulation and risk assessment of potential impacts.

This book provides a comprehensive description of radionuclear sources in the Arctic and potential pathways of radioactive pollution transport from land-based sources, along rivers and into and within the Arctic Ocean and the Nordic Seas. In addition it

- discusses simulation studies of current radioactivity from known sources such as the European Sellafield and LeHague, atmospheric fallout and Siberian rivers;
- includes a detailed analysis of the sources and levels of radioactivity in the Kara Sea region and its current and potential future impact on the Arctic Ocean, Barents, Greenland and Norwegian Seas;
- describes for the first time hypothetical release scenarios for radionuclides using atmospheric forcing scenarios, including global warming, consistent with a CO₂ doubling.

Other books published by the Nansen Centers;

Limnology and Remote Sensing - a contemporary approach

by Kirill Ya. Kondratyev, Nikolai N. Filatov, Ola M. Johannessen, Vladimir V. Melentyev, Dmitry V. Pozdnyakov, Sergey V. Ryanzhin, Elena V. Shalina and A.I. Tikhomirov

The problem of global water resources has become a severe limitation for the future development of civilisation. In many countries, especially those with rapidly growing populations, resources of drinking water are close to being exhausted. An urgent task, therefore, is to study and assess various components of global water resources, and freshwater takes are one of the most important components. Limnological studies are hence of growing significance.

In this book, the authors discuss contemporary limnological problems of local, regional and global scale. There is particular emphasis on the application of remote sensing techniques to monitor lake dynamics, thermodynamics, biodynamics and water quality. An interactive approach has been used to consider various processes from the viewpoints of both numerical modelling and observations.

For illustrative purposes, in-situ and remote sensing data are presented in relation to both the takes of Northwestern Russian and the American Great Lakes, and a comparative analysis carried out. The role of Geographic Information Systems is discussed and emphasised. The book is intended for a broad readership of those involved in limnological studies. Praxis-Springer, pp. 406, (1999), ISBN: 978-1-85233-112-2.

High Latitude Climate and Remote Sensing by Kirill Ya. Kondratyev, Ola M. Johannessen and Vladimir V. Melentyev, Wiley Praxis Series in Remote Sensing, pp. 200, (1996), ISBN: 0-471-96093-4.

Colour of Inland and Coastal Waters by Dmitry V. Pozdnyakov & Hartmut Grassl, Praxis-Springer, pp. 170, (2003), ISBN: 3-540-00200-6.

Polar Series no. 5
ISBN: 978-3-540-24232-1
pp. 408, (2010).

