Land-Ocean Systems in the Siberian Arctic
Dynamics and History

With 301 Figures, 6 in color and 85 Tables
Table of Contents

Section A: Modern Ocean and Sea-Ice Processes

Features of Seasonal and Interannual Variability of the Sea Level and Water Circulation in the Laptev Sea
V.K. Pavlov and P.V. Pavlov .................................................. 3

Numerical Modelling of Storm Surges in the Laptev Sea Based on the Finite Element Method
I. Ashik and A. Novakov ...................................................... 17

Large-Scale Variations of Sea Level in the Laptev Sea
G.N. Voinov and E.A. Zakharchuk ........................................ 25

Extreme Oscillations of the Sea Level in the Laptev Sea
I. Ashik, Y. Dvorkin and Y. Vanda ......................................... 37

Internal Waves in the Laptev Sea
E.A. Zakharchuk ............................................................... 43

The Composition of the Coarse Fraction of Aerosols in the Marine Boundary Layer over the Laptev, Kara and Barents Seas
V.P. Shevchenko, A.P. Lisitzin, R. Stein, V.V. Serova, A.B. Isaeva and N.V. Politova ...................................................... 53

New Data on Sea-Ice Albedo in the Laptev and Barents Seas
B.V. Ivanov ................................................................. 59

Possible Causes of Radioactive Contamination in the Laptev Sea
V.K. Pavlov, V.V. Stanovoy and A.I. Nikitin ............................. 65

Oceanographic Causes for Transarctic Ice Transport of River Discharge
I. Dmitrenko, P. Golovin, V. Gribanov and H. Kassens .................. 73

Step-Like Vertical Structure Formation Due to Turbulent Mixing of Initially Continuous Density Gradients
A. Zatsepin, S. Dikarev, S. Poyarkov, N. Sheremet, I. Dmitrenko, P. Golovin and H. Kassens .............................................. 93

Dissolved and Particulate Major and Trace Elements in Newly Formed Ice from the Laptev Sea (Transdrift III, October 1995)
J.A. Hölemann, M. Schirmacher and A. Prange .......................... 101
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particle Entrainment into Newly Forming Sea Ice – Freeze-Up Studies in October 1995</td>
<td>F. Lindemann, J.A. Hölemann, A. Korabiev and A. Zachek</td>
<td>113</td>
</tr>
<tr>
<td>Frazil Ice Formation during the Spring Flood and its Role in Transport of Sediments to the Ice Cover</td>
<td>P. Golovin, I. Dmitrenko, H. Kassens and J.A. Hölemann</td>
<td>125</td>
</tr>
<tr>
<td><strong>Section B: The Marine Ecosystem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pelagic-Benthic Coupling in the Laptev Sea Affected by Ice Cover</td>
<td>C. Grahl, A. Boetius and E.-M. Nöthig</td>
<td>143</td>
</tr>
<tr>
<td>Chlorophyll a Distribution in Water Column and Sea Ice during the Laptev Sea Freeze-Up Study in Autumn 1995</td>
<td>K. v. Juterzenka and K. Knickmeier</td>
<td>153</td>
</tr>
<tr>
<td>Composition, Abundance and Population Structure of Spring-Time Zooplankton in the Shelf-Zone of Laptev Sea</td>
<td>E.N. Abramova</td>
<td>161</td>
</tr>
<tr>
<td><em>Carepoctus solidus</em> sp.n., a New Species of Liparid Fish (Scorpaeniformes, Liparidae) from the Lower Bathyal of the Polar Basin</td>
<td>N.V. Chernova</td>
<td>181</td>
</tr>
<tr>
<td>Spring Stopover of Birds on the Laptev Sea Polynya</td>
<td>D.V. Solovieva</td>
<td>189</td>
</tr>
<tr>
<td><strong>Section C: Land-Ocean Interactions and Pathways</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major, Trace and Rare Earth Element Geochemistry of Suspended Particulate Material of East Siberian Rivers Draining to the Arctic Ocean</td>
<td>V. Rachold</td>
<td>199</td>
</tr>
<tr>
<td>Carbon Isotope Composition of Particulate Organic Material in East Siberian Rivers</td>
<td>V. Rachold and H.-W. Hubberten</td>
<td>223</td>
</tr>
<tr>
<td>Distribution of River Water and Suspended Sediment Loads in the Deltas of Rivers in the Basins of The Laptev and East-Siberian Seas</td>
<td>V.V. Ivanov and A.A. Piskun</td>
<td>239</td>
</tr>
<tr>
<td>Dissolved Oxygen, Silicon, Phosphorous and Suspended Matter Concentrations During the Spring Breakup of The Lena River</td>
<td>S.V. Pivovarov, J.A. Hölemann, H. Kassens, M. Antonow and I. Dmitrenko</td>
<td>251</td>
</tr>
</tbody>
</table>
Distribution Patterns of Heavy Minerals in Siberian Rivers, the Laptev Sea and the eastern Arctic Ocean: An Approach to Identify Sources, Transport and Pathways of Terrigenous Matter
*M. Behrends, E. Hoops and B. Peregovich* .................................................. 265

The Role of Coastal Retreat for Sedimentation in the Laptev Sea
*F.E. Are* ................................................................. 287

**Section D: Terrestrial Environment - Past and Present**

Seasonal Changes in Hydrology, Energy Balance and Chemistry in the Active Layers of Arctic Tundra Soils in Taymyr Peninsula, Russia
*J. Boike and P.P. Overduin* .................................................. 299

The Landscape and Geobotanical Characteristics of the Levinson-Lessing Lake Basin, Byrranga Mountains, Central Taimyr
*M.A. Anisimov and I.N. Pospelov* .................................................. 307

Studies of Methane Production and Emission in Relation to the Microrelief of a Polygonal Tundra in Northern Siberia
*V.A. Samarkin, A. Gundelwein and E.-M. Pfeiffer* ................................ 329

Carbon Dioxide and Methane Emissions at Arctic Tundra Sites in North Siberia
*M. Sommerkorn, A. Gundelwein, E.-M. Pfeiffer and M. Bölter* .............. 343

The Features of the Hydrological Regime of the Lake-River Systems of the Byrranga Mountains (by the Example of the Levinson-Lessing Lake)

Lead-210 Dating and Heavy Metal Concentration in Recent Sediments of Lama Lake (Norilsk Area, Siberia)
*B. Hagedorn, S. Harwart, M.M.R. van der Loeff and M. Melles* ............... 361

Late Weichselian to Holocene Diatom Succession in a Sediment Core from Lama Lake, Siberia and Presumed Ecological Implications
*U. Kienel* ........................................................................ 377

Climate and Vegetation History of the Taymyr Peninsula since Middle Weichselian Time - Palynological Evidence from Lake Sediments
*J. Hahne and M. Melles* ....................................................... 407

Laminated Sediments from Levinson-Lessing Lake, Northern Central Siberia - A 30,000 Year Record of Environmental History?
*T. Ebel, M. Melles and F. Niessen* ............................................. 425

High-Resolution Seismic Stratigraphy of Lake Sediments on the Taymyr Peninsula, Central Siberia
*F. Niessen, T. Ebel, C. Kopsch and G.B. Fedorov* ................................ 437
**Archaeological Survey in Central Taymyr**  
*V.V. Pitul'ko* .......................................................... 457

**Marine Pleistocene Deposits of the Taymyr Peninsula and their Age from ESR Dating**  
*D. Bolshiyanov and A. Molodkov* ......................................... 469

**Paleoclimatic Indicators from Permafrost Sequences in the Eastern Taymyr Lowland**  
*C. Siegert, A.Yu. Derevyagin, G.N. Shilova, W.-D. Hermichen and A. Hiller* ..................... 477

---

### Section E: Marine Depositional Environment - Past and Present

**Stable Oxygen Isotope Ratios in Benthic Carbonate Shells of Ostracoda, Foraminifera, and Bivalvia from Surface Sediments of the Laptev Sea, Summer 1993 and 1994**  
*H. Erlenkeuser and U. von Grafenstein* ........................................... 503

**Determination of Depositional Beryllium-10 Fluxes in the Area of the Laptev Sea and Beryllium-10 Concentrations in Water Samples of High Northern Latitudes**  
*C. Strobl, V. Schulz, S. Vogler, S. Baumann, H. Kassens, P.W. Kubik, M. Suter and A. Mangini* ............. 515

**Spatial Distribution of Diatom Surface Sediment Assemblages on the Laptev Sea Shelf (Russian Arctic)**  
*H. Cremer* ........................................................................ 533

**Diatoms from Surface Sediments of the Saint Anna Trough (Kara Sea)** ............................................. 553

**Distribution of Aquatic Palynomorphs in Surface Sediments from the Laptev Sea, Eastern Arctic Ocean**  
*M. Kunz-Pirrung* ................................................................. 561

**Distribution of Pollen and Spores in Surface Sediments of the Laptev Sea**  
*O.D. Naidina and H.A. Bauch* ..................................................... 577

**Clay Mineral Distribution in Surface Sediments of the Laptev Sea: Indicator for Sediment Provinces, Dynamics and Sources**  
*B.T. Rossak, H. Kassens, H. Lange and J. Thiede* ........................................ 587

**Planktic Foraminifera in Holocene Sediments from the Laptev Sea and the Central Arctic Ocean: Species Distribution and Paleobiogeographical Implication**  
*H.A. Bauch* ....................................................................... 601

**Holocene Diatom Stratigraphy and Paleoceanography of the Eurasian Arctic Seas**  
*Y. Polyakova* ................................................................. 615
Late Quaternary Organic Carbon and Biomarker Records from the Laptev Sea Continental Margin (Arctic Ocean): Implications for Organic Carbon Flux and Composition
R. Stein, K. Fahl, F. Niessen and M. Siebold ................................................................. 635

Late Pleistocene Paleoriver Channels on the Laptev Sea Shelf - Implications from Sub-Bottom Profiling
H.P. Kleiber and F. Niessen ................................................................................................. 657

Main Structural Elements of Eastern Russian Arctic Continental Margin Derived from Satellite Gravity and Multichannel Seismic Reflection Data
S.S. Drachev, G.L. Johnson, S.W. Laxon, D.C. McAdoo and H. Kassens ......................... 667

High Resolution Seismic Studies in the Laptev Sea Shelf: First Results and Future Needs
B. Kim, G. Grikurov and V. Soloviev .................................................................................. 683

Section F: Summary

Dynamics and History of the Laptev Sea and its Continental Hinterland: A Summary
J. Thiede, L. Timokhov, H.A. Bauch, D. Bolshivanov, I. Dmitrenko,
H. Eicken, K. Fahl, A. Gukov, J. Hölemann, H.W. Hubberten,
K. v. Juterzenka, H. Kassens, M. Melles, V. Petryashov, S. Pivovarov,
S. Priamikov, V. Rachold, M. Schmid, C. Siegert, M. Spindler, R. Stein
and Scientific Party ............................................................................................................ 695