

PERSONAL DATA
NATALIA E. SHAKHOVA

EDUCATION:

- 2010 **Doctor of Science**, Oceanography/Marine Geology, P.P. Shirshov Institute of Oceanology, Moscow, Russia;
- 1993 **Ph.D.** Geographical medicine, Pacific Geographical Institute, Far Eastern Branch of Russian Academy of Science (FEBRAS), Russia;
- 1982 **M.S.** Medicine and Epidemiology (graduated with High Honor), Vladivostok State Medical University, Russia;

APPOINTMENTS:

- 2004-present Research Associate Professor, Research Assistant Professor, Senior Scientist, Visiting Research Scholar, Visiting Scientist, International Arctic Research Center (IARC) University of Alaska Fairbanks (UAF), Fairbanks, USA;
- 2000-2004 Research Associate, Pacific Geographical Institute, FEBRAS, Russia;
- 1994-2000 Senior Scientist, Deputy Director of Analytical Research Company; Vladivostok, Russia;
- 1984-1994 Junior Research Scientist, Research Scientist, Laboratory of Medical Geography, Pacific Institute of Geography, FEBRAS, Vladivostok, Russia.

SYNERGISTIC ACTIVITIES:

- Coordination and organization of international methane/carbon studies to be accomplished in the pan-Arctic cruise onboard Sweden icebreaker ODEN in summer-2014;
- PI & Co-PI of NSF (since 2009), NOAA (since 2005), NOAA NUPR (since 2010), Russian NSF (since 2008) and FEBRAS-funded (since 2005) Arctic marine projects;
- Russia-US-Sweden Group Leader for methane studies along the Eurasian continental margin;
- Referee for Natural Environment Research Council (NERC, United Kingdom) proposals;
- Organization, management, and coordination of the International Siberian Shelf Study cruise-2008 nominated by NASA as the best IPY biogeochemical cruise
- Organization and management of the First International Polar Year Expedition in the Laptev Sea (March-April 2007);
- Organization and management of Second, Third, Fourth, Fifth, Sixth, Seventh, Eighth, and Ninth US-Russia cruises (2004-2012) in the Arctic Siberian seas;
- Organization and management of First, Second, and Third US-Russia Drilling Projects in the East Siberian Arctic Shelf (April 2011, March-April 2012, April 2013)
- Far-Eastern Branch of Russian Academy of Sciences (FEBRAS) Liaison at the IARC UAF (organization and coordination for joint Russia-US field campaigns, preparation of Memorandum of Understanding between UAF and FEBRAS in Russian and English, other documentation);
- Author and co-author for > 100 popular scientific publications including *Spiegel*, *Figaro*, *Independent*, *National Geographic*, *New York Times*, *TIMES*, *Science News*, *Science Daily*, *BBC news* and *Nature NEWS*.

COLLABORATORS:

Samantha Joy and Vladimir Samarkin (UGA, Atlanta, USA), Vladimir Romanovsky and Dmitry Nicolsky (GI UAF, Fairbanks, USA), Ira Leifer (UCSB, Santa Barbara, USA), Dave Hilton (SDSU SIO, La Jolla, USA), Gleb Panteleev (IARC UAF, Fairbanks, USA), Orjan Gustafsson (SU, Stockholm, Sweden), Tom Roeckman and Celia Sapat (UU, Utrecht, Netherlands), Don Porcelli (OU, Oxford, UK), Leif Anderson

(UG, Gothenburg, Sweden), (Eddy Carmack and Rob Macdonald (IOS, Sidney, Canada), Oleg Dudarev, Anatoly Salyuk, Vladimir Iosouпов, Irina Pipko, Svetlana Pugach, Victor Karnaukh & Denis Kosmach (POI FEBRAS, Vladivostok, Russia), Eugene Romankevich, Leopold Lobkovsky, Alexander Vetrov and Petr Makkaveev (P.P. Shirshov Institute of Oceanology, Moscow, Russia), Nikolai Romanivskii, Vladimir Tumskoy, Eugeny Chuvilin, and Andrey Koshurnikov (Moscow State University), Irina Repina (Institute of Atmospheric Physics).

DOCTOR SCIENCE OPPONENTS:

Prof. Eugene Romankevich (P.P. Shirshov Institute of Oceanology, Moscow, Russia)

Prof. Nicolai Romanovskii (Moscow State University, Moscow, Russia)

Prof. Alexander Ginzburg (A. Obukhov Institute of Atmospheric Physics, Moscow, Russia)

PROFESSIONAL ORGANISATIONS:

American Geophysical Union

AWARDS AND HONORS:

Guest Editor, *Biogeosciences*- Special Issue: “Land-shelf-basin interactions of the Siberian Arctic” (with O. Gustafsson, I. Semiletov, and L. Anderson), 2010-2011.

Reviewer: Biogeosciences, Limnology and Oceanography, Geophysical Research Letters, J. Geophysical Research, Marine Chemistry, Deep-Sea Research, Polar Research, Tellus.

Reviewer: NOAA, NASA, NERC, European Science Foundation.

Leninsky Student Award (Highest Honor in the Soviet Union), 1979-1982;

First author of seven papers recommended for publications by academicians G.S. Golytsin (Head, Climate Scientific Council, Russian Academy of Sciences), and V.I. Sergienko (Chairman, FEBRAS Headquarters) in the Transactions of Russian Academy of Sciences, 2005-2009.

First author of two chapters published in two books edited by vice-president of Russian Academy of Sciences academician N. P. Laverov, 2008.

First author of the WWF International Arctic Programme: Arctic Climate Feedbacks: Global Implications (Chapter “Methane Hydrate Feedbacks”), 2009.

First author of the “Trace gas emissions from sub-sea permafrost”, in: Climate Change and the Cryosphere: Snow, Water, Ice and Permafrost in the Arctic (SWIPA): An Arctic Council ‘Cryosphere Project’ in Cooperation with IASC, CliC and IPY, AMAP, Oslo, Norway, 2010/11.

Author of methane (carbon dioxide)-dedicated chapter to be published in book by PP. Shirshov Institute of Oceanology, Russian Academy of Sciences, which summarize most important *oceanographic results obtained over the last 50 years*, 2013.

SELECTED PUBLICATIONS (2004-2013) :

Chapters and papers in books (peer-reviewed)

1. **Shakhova N.** and I. Semiletov, 2012. Trace gas emissions from sub-sea permafrost. In: *Climate Change and the Cryosphere: Snow, Water, Ice and Permafrost in the Arctic (SWIPA): An Arctic Council ‘Cryosphere Project’ in Cooperation with IASC, CliC and IPY, A report of the Arctic Monitoring and Assessment Program (AMAP)*, 97-104
2. **Shakhova N.**, 2010. Methane as an under-estimated component of the Arctic marine carbon cycle, In: Yu. M. Pushcharovsky and 8 co-editors, *Geology and Geoecology of Eurasian continental margins*, vol. 2, Moscow, GEOS, p. 125-137.
3. **Shakhova N.E.**, and I.P. Semiletov, 2009. Methane Hydrate Feedbacks, In: Martin Sommerkorn & Susan Joy Hassol, eds., *Arctic Climate Feedbacks: Global Implications*, Published by WWF

International Arctic Programme August, 2009, ISBN: 978-2-88085-305-1, p. 81-92.

4. **Shakhova N.E.**, Sergienko V.I., Semiletov I.P., Salyuk A.N., Bel'cheva N.N., Kosmach D.A., 2008. On the role of the East Siberian Arctic Shelf in the modern methane cycle. In: N.P. Laverov et al., eds., *Environmental and Climate Changes and catastrophes, Vol. 6, A.M. Obukhov Institute of Atmospheric Physics Russian Academy of Sciences, Moscow*, p. 164-176
5. **Shakhova N.E.** and I.P. Semiletov, 2008. Characteristical features of carbon cycle in the shallow shelf of the eastern sector of Russian Arctic. In: N.P. Laverov et al., eds., *Environmental and Climate Changes and catastrophes, Vol.4, A.M. Obukhov Institute of Atmospheric Physics Russian Academy of Sciences, Moscow*, p. 167-181.
6. **Shakhova, N., I. Semiletov**, A. Salyuk, N. Belcheva, D. Kosmach, 2007. Methane anomalies on a shelf of the Arctic seas of Russia. In: V.A. Akulichev & V.P. Chelomin, eds., *Far Eastern Seas of Russia, Book 2, Nauka Press, Moscow*, p. 353-364.
7. Semiletov I.P., Dudarev O.V., Pipko I.I., Salyuk A.N., and **N.E. Shakhova**, 2007. Marine studies in the Arctic regions at the third millennium. In: V.A. Akulichev, ed., *Far Eastern Seas of Russia, Book 2, Nauka Press, Moscow*, p. 309-324.
8. Semiletov I. and **N. Shakhova**, 2013. Ocean gas balance (carbon dioxide and methane) and climate. In: E.A. Romankevich, ed., *Advances in modern oceanography, Book 2, Nauka Press, Moscow*, in press

Published Articles (peer-reviewed)

9. **Shakhova, N.**, Semiletov I., Leifer, I., , Sergienko, V., Salyuk, A., Kosmach, D., Chernikh D., Stubbs Ch., Nicolsky D., Tumskey V., and O. Gustafsson, 2013. Ebullition and storm-induced methane release from the East Siberian Arctic Shelf, *Nature Geosciences*, accepted
10. Semiletov, I.P., **Shakhova, N.E.**, Pipko, I.I., Pugach, S.P., Charkin, A.N., Dudarev, O.V., Kosmach, D.A., and S. Nishino, 2013. Space-time dynamics of carbon and environmental parameters related to carbon dioxide emissions in the Buor-Khaya Bay of the Laptev Sea, *Biogeosciences*, 10, 5977-5996, www.biogeosciences.net/10/5977/2013/doi:10.5194/bg-10-5977-2013.
11. Timmermans, M-L., Proshutinsky, A., Ashik, I., Beszczynska-Moeller, A., Carmack, E., Frolov I., Ingvaldsen, Itoh M., Jackson, J., Kawaguchi, J., Kikuchi, T., Krishfield, R., McLaughlin, F., Loeng, H., Nishino, S., Pickart, R., Rabe, B., Rudels, B., Semiletov, I., Schauer, U., **Shakhova, N.**, Shimada, K., Sokolov, V., Steele, M., Toole, J., . Weingartner, T., Williams, W., Woodgate, R., Yamamoto-Kawai, M., and S. Zimmermann, 2013. [The Ocean [in "State of the Climate in 2012"]], *Bulletin of the American Meteorological Society*, in press
12. Vonk, J., L. Sánchez-García, B. van Dongen, V. Alling, D. Kosmach, A. Charkin, I. Semiletov, O. V. Dudarev, **N. E. Shakhova**, P. Roos, T. I. Eglinton, A. Andersson and Ö. Gustafsson, 2012. Activation of old carbon by erosion of coastal and subsea permafrost in Arctic Siberia. *Nature*, doi:10.1038/nature11392
13. Nicolsky, D.J., V. E. Romanovsky, N. Romanovskii, A. L. Kholodov, **N. E. Shakhova** and I. Semiletov, 2012. Modeling sub-sea permafrost in the East Siberian Arctic Shelf: The Laptev Sea Region. *Journal of Geophysical Research*, doi:10.1029/2012JF002358
14. Proshutinsky, A., M.-L. Timmermans, I. Ashik, A. Beszczynska-Moeller, E. Carmack, I. Frolov, R. Ingvaldsen, M. Itoh, T. Kikuchi, R. Krishfield, F. McLaughlin, H. Loeng, S. Nishino, R. Puickart, B. Rabe, B. Rudels, I. Semiletov, U. Schauer, **N. Shakhova**, K. Shimada, V. Sokolov, M. Steele, J. Toole, T. Weingarther, W. Williams, R. Woodgate, M. Yamamoto-Kawai, and S. Zimmermann, 2012. [The Arctic] Ocean [in "State of the Climate in 2011"]], *Bulletin of the American Meteorological Society*, 93 (7), S142-S145
15. Semiletov I.P., **Shakhova N. E.**, Sergienko V.I., Pipko I.I., and O. Dudarev, 2012. On Carbon Transport and Fate in the East Siberian Arctic Land-Shelf-Atmosphere System, *Environment Research Letters*, 7, doi:10.1088/1748-9326/7/1/015201
16. Semiletov I.P., Pipko I.I., **Shakhova N.E.**, Dudarev O.V., Pugach S.P., Charkin A.N., McRoy

- C.P., Kosmach D., and Ö. Gustafsson, 2011. Carbon transport by the Lena River from its headwaters to the Arctic Ocean, with emphasis on fluvial input of terrestrial particulate organic carbon vs. carbon transport by coastal erosion, *Biogeosciences*, 8, 2407-2426.
17. Anderson, L.G., Björk, G., Jutterström, S., Pipko, I., **Shakhova, N.** Semiletov, I. and Wählström, I., 2011. East Siberian Sea, an Arctic region of very high biogeochemical activity, *Biogeosciences*, 8, 1745-1754, 2011, doi:10.5194/bg-8-1745-2011.
 18. **Shakhova N.**, Semiletov I., and O. Gustafsson (2010). Methane from the East Siberian Arctic Shelf/Response, *Science* 329, 1147-1148.
 19. **Shakhova N.**, Semiletov I., Salyuk A., Joussupov V., Kosmach D., and O. Gustafsson, 2010. Extensive methane venting to the atmosphere from sediments of the East Siberian Arctic Shelf, *Science* 327, 1246-1250
 20. **Shakhova N.**, Semiletov I., Leifer I., Rekant P., Salyuk A., and D. Kosmach, 2010. Geochemical and geophysical evidence of methane release from the inner East Siberian Shelf, *Journal Geophys. Res* 115, doi:10.1029/2009JC005602, 2010
 21. Nicolosky D., and **N. Shakhova**, 2010. Modeling sub-sea permafrost in the East-Siberian Arctic Shelf: the Dmitry Laptev Strait, *Env. Res. Lett.*, 5, doi:10.1088/1748-9326/5/1/015006, 2010
 22. Cooke M.P., van Dongen B., Talbot H., **Shakhova N.**, Guo L., Semiletov I., and O. Gustafsson, 2009. Bacteriohopanepolyol biomarker composition of organic matter exported to the Arctic Ocean by seven of the major Arctic rivers. *Organic Geochemistry*, doi: 10.1016/j.orggeochem.2009.07.14
 23. **Shakhova N.E.**, Alexeev V.A., and I. P. Semiletov, 2009. Accessing future increase in methane emission over the East-Siberian Shelf, *Transactions of Russian Academy of Sciences, Vol. 429 (4)*, (translated in English by Springer)
 24. **Shakhova N.E.**, Sergienko V.I., and I.P. Semiletov, 2009. Modern state of the role of the East Siberian Shelf in the methane cycle. *Herald of the Russian Academy of Sciences, Vol. 79, No. 6, pp. 507–518*, (translated in English by Springer).
 25. **Shakhova N.E.**, Nicolosky D., and I. P. Semiletov, 2009. On the current state of sub-sea permafrost in the East-Siberian Shelf testing of modeling results by observational data. *Transactions of Russian Academy of Sciences, Vol. 429 (5)*, (translated in English by Springer).
 26. **Shakhova N.E.**, Iossoupov V., Salyuk A., Kosmach D., and I. P. Semiletov, 2009. Anthropogenic factor and methane emission over the East Siberian Shelf. *Transactions of Russian Academy of Sciences, Vol. 429 (6)*, (translated in English by Springer).
 27. Iossoupov V., **Shakhova N.E.**, Salyuk A., Kosmach D., and I. P. Semiletov, 2009. Detection of methane ebullition in the shelf waters of the East Siberian Arctic. *Transactions of Russian Academy of Sciences, Vol. 429 (6)*, (translated in English by Springer).
 28. **Shakhova, N.**, I. Semiletov, A. Salyuk, N. Belcheva, D. Kosmach, and V.I. Sergienko, 2008. On the role of the East-Siberian Shelf in the modern methane cycle and global change, *Herald of the East-Siberian Branch of Russian Academy of Sciences*, No. 4.
 29. **Shakhova, N.** and I. Semiletov, 2007, Methane release and coastal environment in the East Siberian Arctic shelf, *Journal of Marine Systems*, 66 (1-4), 227-243.
 30. **Shakhova, N.**, I. Semiletov, A. Salyuk, N. Belcheva, and D. Kosmach, 2007, Anomalies of methane in air above the sea surface in the East-Siberian Arctic shelf, *Transactions of Russian Academy of Sciences*, 414 (6), (translated in English by Springer).
 31. **Shakhova, N.**, I. Semiletov, and N. Belcheva, 2007, The Great Siberian Rivers as a source of methane on the Russian Arctic shelf, *Transactions of Russian Academy of Sciences*, 414 (5), (translated in English by Springer).
 32. Semiletov, I., I.I. Pipko, I.A. Repina, and **N. Shakhova**, 2007, Carbonate dynamics and carbon dioxide fluxes across the atmosphere-ice-water interfaces in the Arctic Ocean Pacific sector of the Arctic, *Journal of Marine Systems*, 66 (1-4), 204-226.
 33. Belzil, C., C. S. Roesler, J. P. Christensen, **N. Shakhova**, and I. Semiletov, 2006, Fluorescence measured using the WETStar DOM fluorometer as a proxy for dissolved matter absorption.

34. **Shakhova, N.**, I. Semiletov, and G. Panteleev, 2005, The distribution of methane on the Siberian Arctic shelves: Implications for the marine methane cycle, *Geophysical Research Letters*, 32, L09601, doi:1029/2005GL022751
35. **Shakhova, N.E.**, I.P. Semiletov, and N. Bel'cheva, 2005, Methane in the Eastern Arctic seas. *Transactions of Russian Academy of Sciences*, 402 (4), 529-533 (translated into English).
36. Semiletov, I., **N. Shakhova**, and V. Romanovsky, 2004, Methane Climate Forcing and Methane Observations in the Siberian Arctic Land-Shelf System, *World Resource Review*, 16 (4), 503-541

Selected published Abstracts: (2010-2012)

37. Shakhova N., Semiletov I., Salyuk A., Iossouпов V., Kosmach D., Gustafsson O., and I. Leifer (2010). Methane venting to the atmosphere from sediments. [EGU](#) General Assembly 2010. Geophysical Research Abstracts. Vol.12. EGU2010-13027 (invited).
38. Semiletov I., Shakhova N., Pugach S., Pipko I., and O. Dudarev (2010). On the connection among components of carbon cycling and water mass parameters in the East Siberian Arctic Shelf: the first Quantitative Assessment, [EGU](#) General Assembly 2010. Geophysical Research Abstracts. Vol.12. EGU2010-13125 (poster)
39. Shakhova N., Semiletov I., Salyuk A., Yusupov V., Leifer I., and D. Kosmach (2010). Evidence of Vast Methane Release over the East Siberian Arctic Shelf. State of the Arctic Conference: At the Forefront of Global Change, Miami, 16-19 March, 2010 (poster)
40. Sergienko V., Shakhova N., Dudarev O., Gustafsson O., Anderson L., and I. Semiletov (2010). The joint Russia-US-Sweden studies in the East-Siberian Arctic Shelf during the last decade (1999-2009): an overview. [EGU](#) General Assembly 2010. Geophysical Research Abstracts. Vol.12. EGU2010-13677 (poster)
41. Semiletov I., Dudarev O., Pipko I., Charkin A., Pugach S., Shakhova N., and O. Gustafsson (2010). Transport and fate of terrestrial organic carbon in the East Siberian land-shelf system: riverine input vs coastal erosion. [EGU](#) General Assembly 2010. Geophysical Research Abstracts. Vol.12. EGU2010-13081 (poster)
42. Shakhova N., Semiletov I., Salyuk A., Yusupov V., Leifer I., and D. Kosmach (2010). Evidence of Vast Methane Release over the East Siberian Arctic Shelf. 2010 State of the Arctic Conference: At the Forefront of Global Change, Miami, 16-19 March, 2010 (poster)
43. Semiletov I., Dudarev O., Grigoriev M., Pipko I., and N. Shakhova (2010). On the Role of Missed Components of Carbon Cycling in the East Siberian Arctic Shelf. 2010 State of the Arctic Conference: At the Forefront of Global Change, Miami, 16-19 March, 2010 (poster)
44. Shakhova N.E, Semiletov I.P., Salyuk A.N., Kosmach D., and O. Gustafsson (2011) The East Siberian Arctic Shelf: monitoring is necessary to assess actual scale of annual methane emissions from seabed deposits. EOS, AGU Fall Meeting, GC41F-02, San-Francisco, CA.
45. Semiletov I., Shakhova N., Dudarev O. et al. (2011). First drilling in the Ust' Lensky Rift Zone, Laptev Sea: accomplishment and preliminary results. EOS, AGU Fall Meeting, GC51I-07, San Francisco, CA
46. Shakhova N., and I. Semiletov (2012). Methane release from the East-Siberian Arctic Shelf and its connection with permafrost and hydrate destabilization: First results and potential future developments. Geophysical Research Abstracts, Vol. 14, EGU2012-3877-1, 2012, EGU General Assembly 2012 (invited)
47. Semiletov I., Shakhova N., Romanovskii N., Nikolsky D., Dudarev O., Tumskey V., Kosmach D., Samarkin V., Chuvilin E., Charkin A. (2012). First drilling subsea permafrost in the southeastern Laptev Sea, the East Siberian Arctic Shelf: results and challenges. Geophysical Research Abstracts Vol.14,EGU2012-3913,2012, EGU General Assembly 2012 (poster)