

Preliminary program of the Russian-German Summer Field School for Young Scientists

**«Field research methods on elements of the carbon cycle in Polar Regions»**

18-29 of September 2016, Field station "Ladoga", Arctic and Antarctic Research Institute (AARI) and Saint Petersburg State University, Field station "Sablino"

**September, 18, Sunday**

Arriving the student group from Germany, transfer to the Ladoga station of AARI, Accommodation in the Ladoga station (p.Osinovets); ice-breaker for a Russian-German field summer school-seminar

**September, 19, Monday**

9:00 – 10:00 - gathering of participants in the lobby of the Ladoga station. Safety instructions during field work (Alexander Orlov - safety engineer, AARI)

10:00 – 14:00 – excursion to the Shlisselburg Fortress

14:00 - 15:00 - Lunch

15:00 -15:30 - Opening of school-seminar, welcoming speech from the leaders of the school-seminar (Dr.Irina Fedorova), the goals and objectives of the Summer School

15:30 - 16:30 - lecture "Carbon in polar soils: basics of soil morphology and soil classification» (Prof. Dr. E.-M. Pfeiffer)

16:30 - 17:30 - lecture "Field Methods in Soil Science" (Prof. Abakumov Evgeniy).

17:30 - 19:30 - field work on soil profiles in different microlandscapes (p.Osinovets - oz.Chernoe) (Dr. Sebastian Zubrzycki) : Soil profiling, soil sampling, determination of bulk density for further calculation of carbon stocks in the soil.

19:30 - 21:00 - dinner

21:00 - 22:00 - acquaintance party for participants, watching videos from polar expeditions (Fedorova Irina)

**September, 20, Tuesday**

8:00 - 8:30 - Breakfast

8:30 - 9:15 - Lecture "Methods of field measurement of the carbon cycle elements in the sea" (Novihin Andrei): Carbon in marine systems. Multiparameter probe measurements. Water sampling from the ship.

9:15 - 10:00 - lecture "Methods of water samples conservation for subsequent determination of dissolved carbon elements (DOC, CDOM, alkalinity, permanganate oxidation analysis)» (Dr. Birgit Heim, Dobrotina Elena).

10:00 - 13:00 - field measurements from boat on Lake Ladoga: water sampling and conservation, multiparameter probe measurements (2 groups: Group 1 - 10:00 - 11:30, 2nd group - 11:30 - 13:00)

13:00 - 14:00 - Lunch

14:00 - 15:30 - lecture "Carbon cycle in aquatic ecosystems" (Prof. Vasily Dmitriev): Key features of freshwater and marine ecosystems functioning. Similarities and differences. The carbon cycle in aquatic ecosystems. Specificity of the carbon cycle in Polar Regions aquatic ecosystems. Methods for assessing carbon cycle elements in aquatic ecosystems.

15:30 - 19:30 - field work on riv.Morye. Various methods of discharge measurements, hydrographic survey of the river, particulate and dissolved carbon geochemical flow formation.

19:30 - 20:30 - dinner

20:30 - 21:30 - evening program - presentation of Master educational programs and projects on the carbon study in the polar regions (Dr. Sebastian Zubrzuicki - project CarboPerm etc. and Master's programs of Hamburg University, Dr. Birgit Heim - AWI projects, Fedorova Irina - POMOR and CORELIS programs, Abakumov Evgeniy - Master's programs of Biological Faculty of St. Petersburg State University).

Interactive quiz "Carbon in our lives" (Skorospehova Tatiana)

### **September, 21, Wednesday**

8:00 - 8:30 - Breakfast

8:30 - 9:30 - Lecture "Methods of field measurement of carbon elements in terrestrial water objects" (Irina Fedorova, Chetverova Antonina, Skorosphehova Tatiana): Carbon in the permafrost zone.

Carbon in the permafrost zone active layer. Carbon geochemical transformation in the polar landscape. Black carbon and greenhouse gases.

Identification of carbon main sources in water bodies (lakes, rivers, sea) and the formation of carbon outflow. Carbon outflow in the Arctic Ocean. Field methods for evaluation of solid and liquid carbon outflow.

Carbon in the wetland catchments. Swamp waters sampling methods. The color of water.

9:30 - 10:30 - lecture "Fossil and buried carbon. Paleogeographic methods for the determination of solid carbon "(Grigoriy Fedorov).

10:30 - 14:00 - field measurements on water bodies (Black Lake and nearby bog)

14:00 - 15:00 - Lunch

15:00 - 18:00 - Excursion to the fortress Shlisselburg

18:00 - 19:30 - lecture "CDOM origin and cycle in the water systems of the polar regions and its role in the life of Arctic regions aquatic organisms» (Dr.Birgit Heim, Skorosphehova Tatiana).

19:30 - 20:00 - dinner

20:00 - 22:00 - laboratory work to determine carbon content in water samples (alkalinity, bicarbonates, permanganate oxidation, water color) (Dobrotina Elena, Novihin Andrei, Shumskaya Natalia)

### **September, 22, Thursday**

7:00 - 7:40 - Breakfast

9:00 - 11:00 - moving from the Ladoga station to AARI (St. Petersburg, Behring str., 38, subway station "Primorskaya").

11:00 - 11:30 - introduction in Otto Schmidt German-Russian Laboratory for Polar and Marine Research (OSL, AARI), coffee break.

11:30 - 12:30 - lecture "Measurement of CDOM and DOC on laboratory equipment. The use of satellite data for the analysis of carbon sinks in the Arctic Ocean» (Dr. Birgit Heim, Chetverova Antonina).

12:30 - 14:30 - Work on the instruments in OSL / lunch

12:30-13:30 Spectrophotometer (UV-Vis Specord 200) measurements (CDOM, color, chlorophyll "a") (Dr.B.Heim, Fedor Martynov)

13:30-14:30 Lunch break

14:30 – 17:00 – Work on the instruments in OSL

14:30-15:30 Measurement of total and dissolved carbon on the TOC instrument (Cheverova A, Shumskaya N)

Sample preparation for analysis of carbon and nitrogen on VARIO EL III Analyzer, C / N evaluation in a solid phase (Novihin A)

15:30-16:30 Sample preparation for analysis of carbon and nitrogen on VARIO EL III Analyzer, C / N evaluation in a solid phase (Novihin A)

Measurement of total and dissolved carbon on the TOC instrument (Cheverova A, Shumskaya N)

16:30 - 18:00 - lecture "Formation of carbon isotopes in different environments. Features of the polar regions isotopic composition"(Ekaykin Alexei). Excursion in the Laboratory of climate change and the environment (LYCOS, AARI), introduction in the instruments for determination of the isotopic composition of water and carbonates (Kozachek Anna).

**September, 23, Friday**

10:00 – 13:00 - AARI presentation, lectures of high-level scientists of AARI (Dr.Makshtas, Dr.S.Verkulich, Dr.A.Klepikov); Russian-German scientific projects on Polar and Mariner Research presentation (Dr. I.Fedorova, Prof. L.Timokhov, Dr.G.Fedorov, Dr.A.Makarov).

13:00 – 14:00 - lunch

14:00 – 17:00 - Excursion to the Museum of Arctic and Antarctic ([http://www.polarmuseum.ru/index\\_eng.html](http://www.polarmuseum.ru/index_eng.html)).

**September, 24, Saturday**

City tour in St. Petersburg

**September, 25, Sunday**

Visit to Pushkin town (Tsarskoe selo) and Lyceum Museum

(<http://www.museumpushkin.ru/eng/memorial-museum-lyceum.html>)

**September, 26, Monday**

10:00 – 12:00 SPbSU presentation, visit to the main building;

12:00 – 14:00 - visit to the Institute of Earth Sciences (SPbSU) and presentation of POMOR and CORELIS master programs;

14:00 – 15:00 – lunch

15:00 – 18:00 - round table discussion with students on Polar studies: student will show their scientific results and present their field practices and expedition including to the Arctic; a discussion about possibility of joint investigation and future scientific goals and approaches raising.

**September, 27, Tuesday**

9:00 – 11:00 - transfer to the Sablino field station of SPbSU;

11:00 – 14:00 - geological, biological, hydrological and geomorphological field excursions with Universities lecturers' supervision;

14:00-15:00 - lunch

15:00 – 18:00 - waterfalls and caves visiting in Sablino (<http://www.sablino.net/index.php> )

**September, 28, Wednesday**

10:00 – 12:00 - visit to Biological faculty of SPbSU; lecture on Polar soils particularities (Prof. E.Abakumov and Prof. D.Vlasov) – experience of Russian scientists;

12:00 – 13:00 - visit of a geochemical laboratory.

13:00-14:00 – lunch

14:00 – 17:00 - visit of the Central Soil Museum of V.V.Docuchaev (<http://xn----dtbaibdbjqd4avhbm3d3d0h.xn--p1ai/>)

**September, 29, Thursday**

Departure, transfer to Germany.

**Teachers and technical support personnel of a school-seminar:**

1. Fedorova Irina - Ph.D., head of the German-Russian Laboratory for Polar and Marine Research. Schmidt (OSHL) AARI, Associate Professor, Department of Land Hydrology Institute of Earth Sciences, St. Petersburg State University - Head of School-Seminar
2. Vasily Dmitriev - D.Sc., Professor of the Department of Land Hydrology Institute of Earth Sciences, St. Petersburg State University
3. Abakumov Evgeniy - Doctor of Biology, Professor, Department of Ecology Biological Faculty of St. Petersburg State University
4. Fedorov Grigorii - Ph.D., Associate Professor of geomorphology of the Institute of Earth Sciences, St. Petersburg State University, leading researcher The Department of Geography of the polar regions AARI
5. Dobrotina Elena D. - Ph.D., researcher OSHL AARI
6. Birgit Heim - Ph.D., scientist at Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Germany, Potsdam
7. Sebastian Zubrzycki - Ph.D., scientist at Institute of Soil Science, Universität Hamburg, Germany, Hamburg
8. Ekaykin Alexey A. - Ph.D., leading researcher The Department of Geography of the polar regions AARI, assistant professor of physical geography and evolution of the Institute of Earth Sciences, St. Petersburg State University
9. Chetverova Antonina Alexandrovna - assistant of the department of land hydrology of the Institute of Earth Sciences, St. Petersburg State University, researcher OSHL AARI
10. Skorospehova Tatiana - engineer of the Department of Geography of the polar regions AARI
11. Prof. Dr. Eva-Maria Pfeiffer, Head of Institute of Soil Science, Universität Hamburg, Germany, Hamburg
12. Novihin Andrew E. - Gregorian, the acting Head of the Department of Chemistry Laboratory of Oceanology Ocean AARI
13. Shumskaya Natalia K. - junior researcher Division of Oceanology AARI ocean chemistry lab
14. Fyodor Martynov - NS OSHL AARI
15. E. Roman Vlasenkov - acting Head of the staff training department, AARI, researcher in OSL AARI
16. Berezina Elena - member of the Communications Department, AARI

17. Novokhatskiy Evgeny - deputy administrator of "Ladoga" station
18. Vlasov D. - Doctor of Biology, Professor, Department of Ecology Biological Faculty of St. Petersburg State University
19. Mashtas Alexander - Ph.D., leading researcher The Department of Ocean and Atmosphere Interaction, AARI
20. Klepikov Alexander - Ph.D., leading researcher The Department of Oceanology, AARI
21. Makarov Alexander - Ph.D., assistant of geomorphology department of the Institute of Earth Sciences, St. Petersburg State University; leading researcher The Department of Geography of the polar regions AARI
22. Verkulich Sergey – D.Sc., chief of The Department of Geography of the polar regions AARI
23. Tompkhov Leonid - D.Sc., leader scientists of The Department of Oceanology, AARI