COST Origins field training school
Early Earth & Life – Archaean/Palaeoproterozoic of Karelia, Russia

Purpose: The COST Origins (http://life-origins.com) working group on Early Earth and Life is holding a field training school to study ancient rocks of Archaean/Palaeoproterozoic times to investigate surface processes and biological activity in the Earth distant past. The emphasis will be on the rock record of Fennoscandia and, specifically, the lake Onego area of Karelia, Russia, that has preserved important aspects of Archaean/Palaeoproterozoic Earth history. The field school will be a mix of seminars to be held in St. Petersburg and Petrozavodsk and field investigations of well-preserved rock successions in Karelia. The event is aimed at doctoral students and early career scientists in fields relevant to astrobiology and early Earth studies.

Organizers: Alexander Slabunov, Pavel Medvedev (KRC, Petrozavodsk, Russia), Anton Kuznetsov (IPGG, St. Petersburg, Russia), Axel Hofmann (University of Johannesburg, South Africa), Emmanuelle Javaux (University of Liege, Belgium)

Co-organizers/lecturers : Daniele Pinti (GEOTOP, Montreal, Canada), Herve Martin (Blaise Pascal University of Clermont-Ferrand, France), Aivo Lepland (Geological Survey of Norway)

Venues: Institute of Precambrian Geology and Geochronology (IPGG, St. Petersburg); Institute of Geology, Karelian Research Centre (KRC, Petrozavodsk); Student training camp in Lake Onego area (Medvezhyegorsk)

Duration and timing: 11 days, 21-31 August 2017

Registration/costs: Please send an email to Axel Hofmann (ahofmann@uj.ac.za; with cc to ej.javaux@ulg.ac.be) if you would like to participate. Costs are Euro 750 and payment needs to be done by 31 May 2017 at the latest. We will provide you with an invoice in early May. While the trip is mainly meant for the training of students and early career researchers, a small number of places are available for interested scientists to participate.

Bursary: Bursaries are available for 15 PhD students and postdocs (<8 years after PhD) from COST countries (http://www.cost.eu/about_cost/cost_countries) and participating Russian institutions (IPGG, KRC). Deadline for applications is the 1st May 2017.

Bursary application: Students and postdocs applying for support need to complete the application form below and send to Emmanuelle Javaux (ej.javaux@ulg.ac.be). Applicants will be notified of the selection in early May.

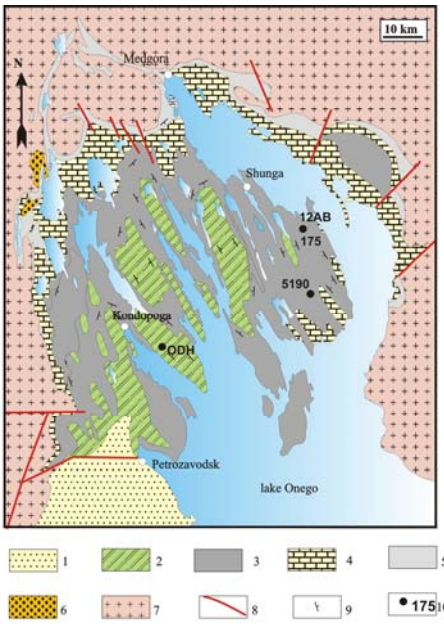
General info: The field school starts and ends in St. Petersburg. Participants will need to arrange for their own transport to and from St. Petersburg. The costs will include accommodation, transport in the field (by small bus/minibus), train travel (4-bed sleeper cabin) between St. Petersburg and Petrozavodsk, and most meals. Accommodation will be in hostels in dormitories. A maximum number of 28 participants is envisaged. The field school organizers will issue letters of invitation for visa application.

Detailed Itinerary

Mon 21 Aug: Arrival in St Petersburg; welcome function in the evening (18:00, venue to be announced). Overnight in St. Petersburg.

Tue 22 Aug: Lectures on Early Earth processes and early life (IPGG, St. Petersburg). Overnight in St. Petersburg.

Wed 23 Aug: Lectures on Early Earth processes and early life (continued, IPGG, St. Petersburg). Overnight train to Petrozavodsk.



Geological sketch-map of the Onegian synclinore 1-6: regional stratigraphic units of Lower Proterozoic 1-Vepsian: arkosic and quartz sandstone, "red beds" 2-Kalevian: greywacke sandstone and siltstone 3-Ludikovian: C_{org}-rich siltstone (shungite rock), basalt, tuff 4-Upper Yatulian (Onegian): stromatolite dolostone, "red beds" 5-Lower Yatulian (Segozerian): quartz sandstone, "red beds", basalt 6-sariolian: quartz gritstone, conglomerate 7-Archaean basement: gneiss, granite 8-Fault 9-Dip and strike 10- drill holes.

Thu 24 Aug: Travel to the northern shore of Lake Onego. Lectures on the Archaean/Proterozoic geology of Karelia. Overnight in Medvezhyegorsk.

Fri 25 Aug: Medvezhyegorsk -Tolvuja-Medvezhyegorsk: Zaonega sites (shungite). Lectures on Shungite formation/significance and Palaeoproterozoic surface processes. Overnight in Medvezhyegorsk.

Sat 26 Aug: Medvezhyegorsk -Segozero-Medvezhyegorsk: Palaeoproterozoic glacial deposits and beds. Lower Tulomozero red beds, putative varves/diamictites. Overnight in Medvezhyegorsk.

Sun 27 Aug: Medvezhyegorsk -Petrozavodsk: Lomagundi-Jatuli event. Stromatolites and microfossils Tulomozero carbonates, evaporites, stromatolites; Medvezhyegorsk Fm volcanic and sediments, Sumian volcanics, diamictites. Overnight in Petrozavodsk.

Mon 28 Aug: Petrozavodsk – Hirvas: Archean greenstone belts (Mesoarchean greenstone belt succession at Koikary), Palaeoproterozoic: Sumian volcanic rocks, Sarioli conglomerates and their relations, relics of volcano edifice. AR/PR contacts. Visit town of Kondopoga (carbon-bearing rocks with bouma cycles, MISS and bitumen clasts at the Nigozero quarry). Overnight in Petrozavodsk.

Tue 29 Aug: Paleoproterozoic succession in the Onego basin around Petrozavodsk: Suisari volcanics, red beds at the top of the succession (quartz sandstones of Shoksha Fm). Overnight in Petrozavodsk.

Wed 30 Aug: Visit Institute of Geology and Museum, Karelian Research Centre of Russian Academy of Sciences ; reflections of trip. Overnight train to St Petersburg.

Thu 31 Aug: Arrival in St Petersburg. Welcome function/breakfast and end of field school.

Venues/ accommodation

In St. Petersburg:

- Institute of Precambrian Geology and Geochronology (http://www.ipgg.ru/eng/index.php)
- Hostel Peter & Wolf (http://en.hostel1.peterwolf.ru)


Institute of Precambrian Geology and Geochronology (left). View of River Neva from near the IPGG (right).

In Petrozavodsk:

- Institute of Geology, Karelian Research Centre (http://ig.krc.karelia.ru/index.php?plang=e)
- Hostel For you (http://foryouhostel.ru/en/o-nas)

In Medvezhyegorsk:

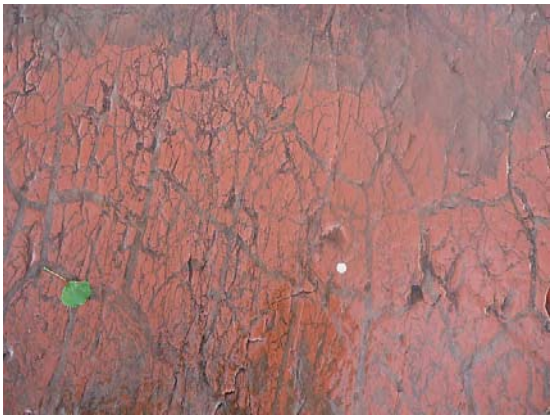
- Malaya Medveghka (http://medveghka.ru/ru)


Centre of Petrozavodsk (left). Cabin at Malaya Medveghka (right).

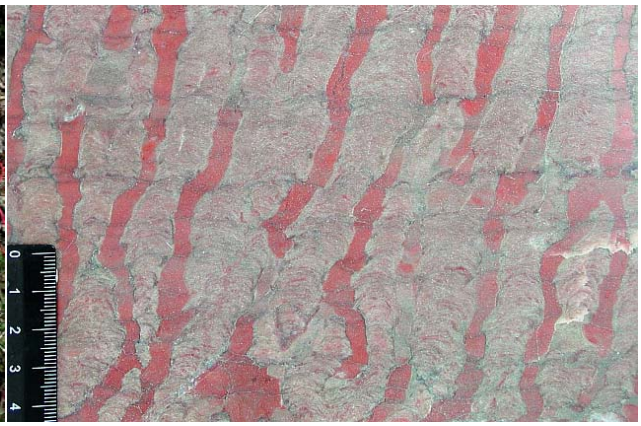
Some aspects of the geology of the Lake Onego area

The geological record of Karelia comprises world-famous volcano-sedimentary successions that have provided key data for the understanding of surface processes on the early Earth. The Archaean greenstone successions have recorded very different physico-chemical conditions of the ancient Earth surface, and are the prime target for the study of the co-evolution of the atmosphere, hydrosphere, and biosphere. Palaeoproterozoic successions in Karelia host a well-preserved record of diversified life and contain proxies for one of the Earth major revolutions in surface conditions - the Great Oxidation Event. Nowhere else in Europe can such a diverse and well-preserved assemblage of rocks be investigated in the field.


Entrance of an old mine adit in Shunga village (left). Sample of Shungite (anthraxolite, pyrobitumen; right)

Dropstones in Sariolian tillites at river Luzhma (left). Desiccation cracks on bedding surface of the red-bed siltstone at the Gormozerka Stream mouth (right).

Closely spaced stromatolite columns (Nuclephyton) on the bedding surface of dolostone (left). Polished slab of red dolostone with longitudinal view of branching columnar stromatolites (Parallelophyton; right).