# PEEX collaboration virtual-zoom-meeting

## SRCES (Scientific Research Center for Ecological Safety, Russian Academy of Sciences) & UHEL-INAR (University of Helsinki, Institute for Atmospheric and Earth System Research)

**17 June 2020, Wednesday**

## Summary and Discussions *(including zoom-chat)*

PEEX virtual meetings on research collaboration took place on 17 June 2020 (St.Petersburg / Helsinki) with 19 researchers from the Scientific Research Center for Ecological Safety (SRCES) and the UHEL-INAR, whom jointly attended the meeting.

SRCES colleagues delivered a series of presentations on main research task and activities of the SRCES, and studies focused on: mapping (based on satellite images processing) the levels of ecological safety, ecological risks and damages for different regions of Russia including the Arctic and sub-Arctic regions of Russia; mapping taiga ecosystems evapotranspiration based on EOS results and flux tower observations; long-term observations of remote-measured characteristics of Northern Europe ecosystems; monitoring and assessing the anthropogenic influence on soils; spectral response of plants on technogenic loadings, and others. UHEL – talks on main directions and activities of the PEEX Programme; studies on measuring ecosystem-atmosphere relations at SMEAR stations; approaches to multi-scale and –processes modelling with studies on Earth's system, climate, online integrated meteorology-chemistry-aerosols, and process-based fine scale modelling; observing forest ecosystems: links between climate change, biodiversity and human activities; and approaches to science-oriented university education at INAR.

**Discussion topics** included discussions on the PEEX large-scale research questions of the PEEX Science Plan.
in English - https://www.atm.helsinki.fi/peex/images/PEEX_Science_Plan.pdf
in Russian: https://www.atm.helsinki.fi/peex/images/PEEX_Science_Plan_rus.pdf
In particular, *Q-1: How could the land regions and processes that are especially sensitive to climate change be identified, and what are the best methods to analyze their responses? & Q-2: How fast will permafrost thaw proceed, and how will it affect ecosystem processes and ecosystem–atmosphere feedbacks, including hydrology and greenhouse gas fluxes?*

> The specific questions (proposed by SRCES): *Can dynamics of land surface temperature be universal characteristics of ecosystems changes? What is the reason of outrunning heating of the Kola Peninsula and Polar Ural and Novaya Zemlya Archipelago? Local climate changes or anthropogenic loading? Can satellite gravimetry to sense permafrost degradation? Can sulfur hexafluoride be a potential reason for temperature increase?*
> *(moderated by Victor/ Andrey/ Georgii/ Risto/ Jaana/ Alexander)*

In particular: *Q-10: How will human actions such as land-use changes, energy production, the use of natural resources, changes in energy efficiency and the use of renewable energy sources influence further environmental changes in the region?*

> The specific question (proposed by SRCES): *Can the monitoring of ecosystem response on technogenic loading from the new mining and metallurgical complex Terrafame (Finland) and old one in Nikel or Kovdor (Russia) to help predict environmental changes in that regions?*
> *(moderated by Victor/ Andrey/ Risto/ Alexander)*

In particular, *Q-12: In which ways are populated areas vulnerable to climate change? How can their vulnerability be reduced and their adaptive capacities improved? What responses can be identified to mitigate and adapt to climate change? & Q-15 How are intensive urbanization processes changing the local and regional climate and environment?*

> The specific question (proposed by SRCES): *Can the combination of infrared-thermal satellite monitoring and flux towers observations inside city and in suburbs to parry overheating of environment?*
> *(moderated by Victor/ Sergei/ Risto/ Alexander)*

Potential collaboration with the Finnish Meteorological Institute (several groups working with satellite data) and Univ Helsinki/ Forest Department Jaana (developing detection of satellite induced forests, indices for analysis of ecosystems functioning and productivity); model experiments with EC-Earth global scale model and linking to IPCC projects, regional scale analysis of modeling output, influence on marine /terrestrial ecosystems, land-use/ cover changes, Arctic amplification, focus on Northern Fennoscandia and NW Russia; open access to in-situ measurements at SMEAR stations; atmospheric chemical transport modelling for sulfur hexafluoride with Enviro-HIRLAM and use ETEX data for model verification.

For metallurgical and mining complexes, key components of impact (of interest) – environmental, atmospheric, aquatic, etc. forest ecosystem, direct impact on surface, temperature trends; SYKE institute, environmental agencies, monitoring aspects – potential for collaboration.
The urban measurements (and especially flux tower data) of interest (SMEAR-III) station – are important and needed; ecosystem observations near flux towers are also needed; improvement processing of SMEAR data for calculation of co-variations would be useful; archived data can be freely downloaded from SmartSMEAR; Leena Jarvi – main contact for SMEAR-III station; modeling component at urban scale modelling can be useful (for Helsinki and St.Peterburg metropolitan areas) with verification using in-situ and satellite data.

**Within the PEEX frameworks**, the UHEL-INAR and SRCES RAS are interested in joint proposals, joint publications, join co-supervision of students, etc. *(moderated by Alexander/ Katja/ Risto/ Victor/ Jaana)*

**Joining efforts on Calls for research proposals:**

- NW Russia + Nordic&Baltic countries, there is option with NordForsk funding: https://www.nordforsk.org/en/funding);
- South-East Finland – Russia CBC Programmes: https://www.sefrcbc.fi/projects;
- ERA.NET Plus with Russia (strengthening STI links between Russia and the European Research Area): http://www.eranet-rus.eu;
- Academy of Finland (http://www.aka.fi/en/funding) & Russian Foundation for Basic Research (http://www.rfbr.ru/rffi/eng) have also joint Calls on proposals;
- Belmont Forum Calls: https://www.belmontforum.org/opportunitie;
- Kolarctic Calls ---> https://kolarctic.info;
- SE Finland-Russia CBC 2014-2020 Call: https://www.sefrcbc.fi/last-call-for-the-call-6-consultations;
- PECC NEFCO Call: https://www.nefco.org/fund-mobilisation/funds-managed-by-nefco/pecc;
- Horizon-2020 specific calls when RU partners are possible to include (with Letters of Support from both sides)

**Calls for Univ science education**

- https://www.atm.helsinki.fi/peex/index.php/education - UHEL-INAR proposed courses;
- http://www.cimo.fi/programmes/firstplus - Finnish National Agency for Education Calls on students/teachers mobilities and intensive training courses;
- https://www.envriplus.eu/calls - possible individual proposals for visiting SMEAR-II (Hyytiala station, Finland; (https://www.atm.helsinki.fi/SMEAR/index.php);
- https://www.atm.helsinki.fi/peex/index.php/projects/174-modest-project - linking to Doctoral Training Centers activities;
- Centers of Excellence;
- Currently ongoing projects - FIRST+ PEEX-AC (with networking and research training courses), Erasmus+ MODEST - developing research courses for PhD students as part of the Doctoral Training Centers in Russia, Armenia, and Belarus; autumn 2020 Call for establishing Finnish Centers of Excellence – atmospheric sciences (topics: aerosols, ecosystems, remote sensing and in-situ observations, Arctic) with a possibility of international collaboration.

**Finally**, both SRCES and UHEL-INAR will continue monitor Calls and formulate outcome of this meeting discussions as possible joint proposals for national, bi-lateral and international projects. Moreover, UHEL will communicate with SRCES PhD student Georgii Nerobelov (concerning aspects of Enviro-HIRLAM modelling for sulfur hexafluoride, SF6; and ETEX experiment publications and data, which can be used for the model verification). In case, the SRCES will decide to attend the world conference on environmental safety (Nov 2020, Japan), the PEEX can contribute with PEEX related slides and PEEX Letter of Support.

**Suggestions for future meeting**: make testing of communication for virtual meeting in advance; and to have more science oriented presentations and discussions on the state-of-the-art research ongoing and completed.

All delivered oral presentations (slides, videos) for the virtual meeting are available at the PEEX website, including agendas and summaries of discussions with SRCES colleagues.

Looking forward for fruitful PEEX collaboration!

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