4th PEEX MEETING IN ST.PETERSBURG, RUSSIA

MEMO

Time : 4-6.March.2014
Local Host : The headquarters of the Russian Geographical Society
Place: Grivtsova Pereulok, 10, Saint Petersburg, 190000, Russian Federation
http://int.rgo.ru/contacts/
Minutes : Hanna Lappalainen, Tuukka Petäjä, Joni Kujansuu, Markku Kulmala
Univ.Helsinki

APPENDIX-1 Participant List
APPENDIX-2 Agenda

1. AIM OF THE WORKSHOP

Aim of the workshop (see presentation by Kulmala) was

• Science Plan - Final remarks before editing
• Infra Implementation Plan - Input from WGs
  – wg-1 in-situ, chair T. Petäjä
  – wg-2 satellites, chair G. de Leeuw
  – wg-3 modelling, chair A. Baklanov
  – wg-4 PEEX marine component, chair T. Vihma
  – wg-5 PEEX integration, chair A. Shvidenko
• to discuss joint papers - Nature/Science, ACP, BG, Ecology and society, The Environmentalist
• to introduce and discuss on joint funding - JPI, Russia-China-EU joint calls + other countries

This memo is a summary of discussion and presentations during the workshop.

2. SCIENCE PLAN

It was addressed that the PEEX Science Plan (SP) is a White paper / a Background document needed for writing the PEEX research funding applications, for the initiation of new PEEX projects, for the infrastructure fundraising and for establishing PEEX relevant education activities. PEEX SP is identifying the PEEX initiative at the large scale: (i) large scale research questions and (ii) the key topics relevant to Arctic boreal regions (see presentation by Lappalainen).

Project Office will edit the final version of the Science Plan including the remarks and comments of the Working groups:

• WG-2: Satellite WG listed the satellite data relevant / available needed to meet the PEEX research questions.
• WG-4: Marine part; Timo Vihma (FMI) and Dmitry Pozdnyakov will provide small new text chapters especially on marine observations and ecosystems next week.
• WG-5: addressed three topics here: (i) the need of clear strategy of future socio-economic research (objectives, theoretical basis for interdisciplinary research and well defined methods) and (ii) operationalization of key concepts for interdisciplinary research (society, social systems, environment etc.) and (iii) stronger coordination of the Social Section of PEEX.
• WGs 1 and 3 focused on the implementation plan of the PEEX observation network and the modelling platform.
The final version will be printed in June 2014 and after that will follow the English to Russian / Chinese translations. The translated SPs will be published in autumn 2014.

3. INFRA IMPLEMENTATION PLAN

The main components (in-situ; modelling platform, satellites) of the Infra Implementation Plan outline (v 0.1) was introduced by Petäjä, Baklanov and de Leeuw. Presentations on the observational activities relevant to PEEX were given by Arshinov, Makshtas, Kujansuu and Zaitseva.

WG-1 in-situ addressed: Updated station descriptions (PEEX Stations Catalogue) for existing in-situ stations is the first step towards coordinated PEEX observation network. The first action will be to combine Nina Zaitseva’s list + the existing PEEX list (excel metadata list) + the Roshydromet list and to outline a PEEX stations catalogue. The PEEX catalogue includes also identification of station type with the a web-based integrative list\map-tool. Code of Contact - coordination: Tuukka Petäjä tuukka.petaja@helsinki.fi, Hanna Lappalainen hanna.k.lappalainen@helsinki.fi.

WG-3 Satellites addressed the satellite information needed to meet the PEEX research questions, see the list below. Satellite observing systems inventory in implementation plan (List of EO data sources and products + Land and atmosphere observing systems) are already included in the first draft of Infra Implementation Plan document. Code of Contact - coordination: Gerrit de Leeuw Gerrit.Leeuw@fmi.fi, Valery Bondur Bondur_new_new<office@aerocosmos.info>

SATELLITES - LIST - How to meet the PEEX research questions?

Q-1: Key Topic shifting of vegetation Zone
- multi-scale land monitoring using optical coarse time series data and VHR systems
- Time series analysis to track vegetation penology trends
- Multi-variate analyses to derive proxies for vegetation shift magnitudes
- Using current and historic data for mapping tree cover change in the high lats
- Baseline mapping of the tree line and temporal monitoring

Q-2: Permafrost
- Provide indications from RS (ESA DUE Permafrost project)

Q-3: Ecosystem structural changes in the future
- RS can provide baseline (reference) information on the current state of the ecosystem
- Use RS to train models
- Parameters: time series of: NDVI, Albedo, LST, ...

Q-4: Atmospheric Composition and Chemistry
- Rethrieve burnt area information, fire detection
- Freeze thaw detection
- Smoke and forest fire released trace gases and aerosols
- Bloom dispersion monitoring, radiation in clouds
- Near real time monitoring of atmosph. composition, clouds, trace gases, land dynamics, radiation intensity

Q-5 Urban air quality, megacities and changing APL
- Aerosol monitoring (CALYPSO)
- Atmospheric composition & trace gas monitoring

Q-7: Arctic Ocean in the climate system
- Sea ice mapping and tracking
- Snow water equivalent, Albedo, ...

Q-8: Arctic maritime environments
Pan-Eurasian Experiment (PEEX)  
PEEX-4meeting in St.Petersburg, Russia, 4-6.March.2014
MEMO

- Ocean color (MERIS, MODIS, S-3)
- Ocean biomass mapping

Q.9: Lakes and large scale river systems in Siberian Region  
- Biomass and biomass change mapping (fire, deforestation)
- Lake change mapping
- Water quality mapping (oil spills, sedimentation, ...)

Q.10: Anthropogenic Impact  
- Calibration of land use models (land cover, land cover change)

Q.11: Environmental impact:  
- Use of historic satellite data and long time series to observe land dynamics

Q.12: Natural hazards:  
- Forest fire detection (valiability, spatial, temporal)  
- Vulnerability and risk mapping  
- Flood Mapping  
- Air quality mapping (provision of maps, detecting anomalies)

Q.13: (see Q.1)  
Q.14: Improving the understanding of biogenic aerosol formation and feedback  
- Trace gases concentration monitoring as proxies of aerosol formation processes

Q.15: How intensive urbanization processes are changing climate  
- Detection of night time lights (NASA Night time lights product)  
- Indication of urbanization
- Urban heat island detection (LST)
- Cloud cover & precipitation mapping

Interaction and Integration: EO can provide a „big picture“

In-situ: cal/val activities; Data policy; Regionalization by involving the spatial component by EO
Modelling: Spatial component integration; Cal/val activities

WG-3 Modelling addressed: PEEX Network/ hierarchy of models is needed. The PEEX-Modelling Platform approach has a 2-level strategy: a) following existing projects/activities & b) what is needed and future funding opportunities. Code of Contact - coordination: A. Mahura ama@DMI.DK, A. Baklanov abaklanov@wmo.int

Preliminary list of Modelling teams/institutions:
• UK (vegetation, atmosphere, biosphere, chemistry, aerosol, etc.)/ global scale);
• NL (meteorology, chemistry, land-atmosphere interactions, etc./ meso-scale);
• NO NILU (inverse modelling of GHG/ multi-scale, FLEXPART)
• IT (chemistry-aerosols, coupling meteo&chem, ABL parametrizations,
• NO, NERSC (multi-scale modelling, geostatistics, GIS mapping, ABL
• RU, SCERT (data, understanding processes based on modeling and observations in Siberia, virtual research environment
• China, IAPh CAS (global/regional scale, climate, air quality, ACTM,
• China, IG (global/regional scale, ESM, ecosystems
• RU, ISS RAS (ecosystem modelling, dynamics of forest
• RU, IP RAS (atmospheric electricity, ABL, modelling,
• EST, (processes, biogenic emissions,
• FIN, UHel (ABL, turbulence, chemistry, aerosols, modeling,
• FIN, FMI (climate research modelling, ocean+atmosphere (aerosols/cloud/radiation, carbon cycle

Data policy topic was discussed and introduced as a part of the implementation plan (see presentation by Asmi).

4. JOINT PAPERS

It was discussed that all the main topics of the research / research infrastructure introduced in the PEEX Science Plan are aimed to be published also in scientific journals such as NATURE/SCIENCE, ACP, BG, ECOLOGY AND SOCIETY, THE ENVIRONMENTALIST.

5. JOINT FUNDING

PEEX first funding opportunities, applications and grants were introduced and discussed.

• Russian funding. V. Bondur introduced the Russian funding opportunities. It was addressed that the main interest of the Russian funding organizations is on the solution orientated research not on a basic research. For example natural hazards is one of the hot topics at the moment (see presentation by Bondur).
• EU- JPI-Climate GREENSCAPE proposal (see presentation by Vesala). GREENSCAPE consortium will submit the 2-Phase proposal by the end of March. This specific EU-JPI-Climate call is co-designed directly with the PEEX Science Plan. Member countries of the consortium are: Finland, UK, Sweden, Belgium, Norway, Sweden + Russian cluster (17 institutes). The applied funding of the European consortium is 2,2 MEuro. Russian cluster funding is based on the (i) in-kind contribution and (ii) funds to be applied from the Russian funding organization.
• EU-Horizon2020 MarieCurie PEEX proposal, see presentation by Lauri. PEEX consortium will submit a proposal for the EU Call opening Sep 2014.
• a 2 year funding is provided by The Finnish Technology Agency for the “Beautiful Beijing” the air quality project, see presentation by Järvi
• Nordforsk has granted PEEX to organize six CRAICC – PEEX Workshops in 2014-2015 (see presentation by Lappalainen):
  - Short-living climate forcers in the Arctic and Eurasia(PI Petäjä, Univ. Helsinki)
  - Carbon exchange in the soil-vegetation-atmosphere system(PIs Bäck, Laurila Univ. Helsinki, FMI)
  - Climate change for Arctic seas and shipping( PI Mahura, DMI)
  - Estimating and monitoring anthropogenic emission in the Arctic by using remote sensing (PI Bobylev, Nansen)
  - Climatology of the high-latitude planetary boundary layer (PI Esau, Nansen)
  - Turbulent exchange across strongly heterogeneous interface (PI Vesala, Zilitinkewich Univ.Helsinki, FMI)

The CRAICC-PEEX WSs will be organized in the connection of the large events/conferences and will be announced in the PEEX and CRAICC websites. The first WSs will take place autumn 2014. Further information will be available soon.
• Negotiations on the China (MOST) – Finland (OKM) bilateral funding possibility is under way. The funding would be allocated to initiate (i) the training programme and (ii) the first PEEX research activities in China.

6. PEEX RELEVANT RESEARCH AND COLLABORATION

The one of the main PEEX collaborators are IIASA (see presentation by Shvidenko) and Future Earth (see presentation by Greenslade) which activities were presented in the PEEX-4 meeting. Furthermore new research topics (ethnodiversity, Stable Boundary Layers ) relevant to PEEX were introduced by Juha Janhunen Univ. Helsinki and Bert Holstlag Wageningen University.

Elisabeth Larson (NASA) introduced the Arctic Boreal Vulnerability Experiment (ABoVE). NASA’s Terrestrial Ecology Program is in the process of planning a major field campaign called the Arctic Boreal Vulnerability Experiment (ABoVE). ABoVE will take place in Alaska and western Canada during the next 5 to 8 years. ABoVE has similar components and research aims together with PEEX which provides a good basis for future collaboration.

7. FIRST PEEX EDUCATION ACTIVITIES

The first PEEX (i) “PEEX COURSES BY CONTRIBUTING INSTITUTES” and (ii) “PEEX BENCHMARKED COURSES” ) - courses have been published in the PEEX webpage (http://www.atm.helsinki.fi/peex/index.php/education), see presentations by Ruuskanen and Regaerand. For further information on PEEX courses contact Taina Ruuskanen taina.ruuskanen@helsinki.fi.

*) Courses by contributing institutes (i) are posted by the organizers and act channel to share expertise within the PEEX contributing institutes.

**) Benchmarked courses (ii) category are aimed at harmonizing the PEEX observation platform and procedures from measurements to data processing.

China education activities were presented by Yong Xue, CAS.

8. NEXT STEPS

PEEX Science Plan:
- Editorial process in spring 2014 coordinated by the PEEX Project Office
- The latest version of SP is available from PEEX intranet (http://www.atm.helsinki.fi/peex/). All comments should be sent to hanna.k.lappalainen@helsinki.fi

PEEX Session in EGU:
- Orals Monday, 28 Apr 13:30–15:00, Room B11, (AS4.4/BG5.5/CL4.7/SSS.0.14 Programmes)
- Posters Monday, 28 Apr 17:30–19:00

PEEX Session in the next iLEAPS Conference:
- 4th iLEAPS Science Conference “Terrestrial ecosystems, atmosphere, and people in the Earth system” 12-16 May 2014 in Nanjing, China(http://www.i leaps.org/?q=node/87)

CRAICC-PEEX Pilot Workshops
- to be organized in 2014-2015; Further information available soon in PEEX / CRAICC websites

PEEX in the Arctic Science Summit Week (ASSW) and Arctic Observing Summit (AOS) 2014, Helsinki
- M. Kulmala will introduce PEEX on Wed. 9 April at 15:15 in SESSION: Science coordination towards an Arctic Observing System (place: room <TBD>, Physicum, Kumpula Campus, Helsinki)

Funding applications
- EU-MarieCurie-ITN PEEX proposal will be submitted for the EU-call opening in September 2014. Coordinator M. Kulmala, Univ. Helsinki.

Infrastructure – Implementation Plan - WGs Next steps
- Infra-WGs of In-situ / Satellites / Modelling continue their work towards the next version of the Infrastructure Implementation Plan. If you like to contribute the WG-work, please contact the WG-coordinators / code of contacts
  - In-situ: tuukka.petaja@helsinki.fi, hanna.k.lappalainen@helsinki.fi
  - Satellites Gerrit.Leeuw@fmi.fi
  - Modelling: ama@dmi.dk, abaklanov@wmo.int

Next meeting
- PEEX Science Conference will be organized in Helsinki in February – March 2015. The exact dates will be announced as soon as possible.
APPENDIX-1 PARTICIPANT LIST

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<td>Zapadinsky Evgeni</td>
<td>University of Helsinki</td>
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<td>115</td>
<td>Zaytseva Nina</td>
<td>Department of Earth Sciences, Russian Academy of Sciences</td>
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<td>Zheng Xunhua</td>
<td>Institute of Atmospheric Physics, Chinese Academy of Sciences</td>
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<td>117</td>
<td>Zilitinkevich Sergei</td>
<td>Finnish Meteorological Institute / University of Helsinki</td>
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<td>Zinchenko Alexander</td>
<td>Main Geophysical Observatory (MGO)</td>
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<td>119</td>
<td>Regerand Tatiana</td>
<td>Northern water problems Institute, RAS, Petrozavodsk</td>
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<td>Samulenkov Dmitry</td>
<td>St.Petersburg State University</td>
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<td>Shvidenko Anatoly</td>
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<td>Telnova Irina</td>
<td>Aerocosmos</td>
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APPENDIX-2: PEEX-4- AGENDA

**TUESDAY 4. March**

- Arrival of the meeting participants to *St. Petersburg*
  
- 16:30 "Aerosols in Arctic " bilateral meeting, Olga Popovicheva (specific meeting, by invitation only)
- 17:00 Preliminary Phase Committee Meeting (specific meeting, by invitation only)

- 18:00- PEEX-4 workshop - Registration

- 19:00 Ice Breaker Party

**WEDNESDAY 5. March**

- 08:00 PEEX-4 workshop - Registration

- 09:00 Opening of 4th PEEX workshop
  
  - Rector of the Russian State Hydrometeorological University in St. Petersburg Prof. Lev Karlin
  
  - First Vice-President of the Russian Geographical Society Prof. Nikolay Kasimov

**SESSION: PEEX INTIATIVE STATUS OVERVIEW**

- 09:20 Aim of the workshop, Markku Kulmala, Univ. Helsinki
- 09:40 Ability to launch Russian partnership projects to PEEX initiative in the frame of Federal special-purpose program “Research and development of science and technology priority areas in Russia in 2014-2020” V.G.Bondur, ISR "AEROCOSMOS", Russia
- 10:00 Research objectives and goals of Russian partnership projects complementary to PEEX initiative. V.G.Bondur, ISR "AEROCOSMOS", Russia
- 10:20 PEEX-China future prospects, Jiahua Zhang, Center for Earth Observation and Digital Earth, CAS
- 10:40 PEEX Science Plan, implementation structure, Hanna Lappalainen, Univ. Helsinki
- 11:00 PEEX Infrastructure and observation networks status overview, Tuukka Petäjä, Univ. Helsinki
- 11:20 PEEX Modelling Platform, Alexander Baklanov, WMO

**SESSION: INTRODUCTION OF NEW PEEX RELEVANT RESEARCH AND RESEARCH INFRASCTRURES**

- 11:40 PEEX Satellites, Gerrit de Leeuw, Finnish Meteorological Institute
- 12:00 Lunch

**SYSTEMS**

- 13:00 Biogeochemical systems in the Arctic-boreal context, *Martin Heimann*, Max Planck Institute for Biogeochemistry, Jena

**LAND ECOSYSTEMS**
13:20 Upper-Volga region "scientific cluster" in the PEEX project, Evgeny Mareev, Institute of Applied Physics, RAS

**MARINE**
13:40 Changing climate system in the marine Arctic, Timo Vihma Finnish Met institute
14:00 Remote sensing of the Arctic Ocean and atmosphere, Leonid Bobylev, Nansen Environmental and Remote Sensing Center

**ANTHROPOGENIC**
14:20 Black Carbon from Diesel Sources in the Russian Arctic, Vladimir S. Malyshev, Energy and transport department MSTU
14:40 Introduction to PEEX JPI-CLIMATE research plan and proposal, Timo Vesala, Univ. Helsinki

15:00 coffee break
15:20 Beautiful Beijing research plan, Leena Järvi Univ. Helsinki

**SESSION: PEEX INFRASTRUCTURE - DATA POLICY**
15:40 Commonalities and integration of European Environmental Research Infrastructures, Ari Asmi Univ.Helsinki
16:00 Russian data policy, NN
16:20 Current status and future prospects of the TOMSK station, Mikhail Arshinov, V.E. Zuev Institute of Atmospheric Optics
16:40 AARI observation networks, Alexander Makshtas, RUSHYDROMET
17:00 PEEX- China observation networks, Joni Kujansuu, Univ. Helsinki
17:20 New aircraft laboratory, Nina Zaytseva, Department of Earth Sciences, RAS (behalf of Yury Borisov Central Aerological Observatory)
PEEX stations network – existing stations in the Siberian region, Nina Zaytseva, Department of Earth Sciences, RAS

**SESSION: Working Groups**
17:40 **Working Groups** - PEEX observation network - conceptual design
wg-1 in-situ, chair T. Petäjä
wg-2 satellites, chair G. de Leeuw
wg-3 modelling, chair A. Baklanov
wg-4 PEEX marine component, chair NN
wg-5 PEEX integration, chair A. Shvidenko
18:30 closing
19:00 Joint dinner

**THURSDAY 6. March**

**SESSION: PEEX INTERNATIONAL ACTIVITIES AND COLLABORATION**
09:00 Socio-ecology-economic research activities in the PEEX region – status and needs, A. Shvidenko IIASA
09:20 The direct and indirect impact of climate change on ethnodiversity, Juha Janhunen University of Helsinki
09:40 ARCTIC- BOREAL Vulnerability Experiment, Elisabeth Larson NASA
10:20 Stable Boundary Layers and Diurnal Cycles - Challenges for Weather and Climate Models, B. Holstlag
Wageningen University
10:40 Future Earth, Diana Greenslade, The International Council for Science (ICSU)

11:00 SESSION: PEEX Education
11:00 PEEX labeled education and training, Taina Ruuskanen, Univ. Helsinki, Tatjana Regaerand, KarRC of RAS
11:20 China education activities, Yong Xue, CAS
11:40 EU Marie Curie ITN PEEX proposal, Antti Lauri, Univ. Helsinki

12:00 lunch

SESSION: Working Groups
13:00 Working Groups
14:30 Reporting of WGs and discussion
15:30 coffee break
16:00 GENERAL ISSUES
   - PEEX Science Plan
   - PEEX Sessions in EGU, iLEAPS conference – abstracts
   - CRAICC-PEEX Pilot Workshops
   - Funding applications
   - WGs Next steps
   - Next meeting
17:00 Closing of the Workshop

Organizing committee
Director of Atmospheric Sciences Division, Prof. Markku Kulmala, Univ. Helsinki
Prof. Sergej Zilitinkevich, Finnish Meteorological Institute
Rector of the Russian State Hydrometeorological University in St. Petersburg Prof. Lev Karlin
First Vice-President of the Russian Geographical Society Prof. Nikolay Kasimov
PEEX Executive Officer Dr. Hanna Lappalainen, Univ. Helsinki /Finnish Meteorological Inst.
PEEX Science Director Prof. Tuukka Petäjä Univ. Helsinki
PEEX Project Officer Dr. Joni Kujansuu
iLEAPS IPO Project Manager Alla Borisova, Univ. Helsinki
Project Assistant Leevi Viisanen, Univ. Helsinki
Dr. Alexey Isaev, RSHU
Ms. Irina Telnova, RSHU