





The NEESPI Study Area: http://neespi.org

NEESPI Concept

We are living in the epoch of large changes in:

- Climate
- Environment
- Human Activites

ALL THESE CHANGES NOW HAVE BECOME INTERTWINED AND AFFECT EACH OTHER \implies THEY HAVE TO BE STUDIED **IN A SYNERGETIC MANNER.**

NEESPI SUCCESS METRICS

- Project achievements are to be published and summarized in peer-reviewed articles and books
- Infilling gaps in the regional research activities
- Preparation of a new breed of early career scientists who defended their PhD theses while working on the Northern **Eurasia and Arctic studies**
- Advances in building of the North Eurasian Modeling Suite

Background

• Ten years ago NEESPI was established to address large-scale and long-term manifestations of climate and environmental change in Northern Eurasia (http://neespi.org). This web site contains the NEESPI history, presentations at the NEESPI past conferences, the **NEESPI Science Plan** (260 pp.) and its **Executive Summary** (18 pp.; also dubbed in 2007 as a refereed publication in the Special NEESPI issue of "Global and Planetary Change").

- The NEESPI domain is shown in the map above.
- NEESPI Science Plan includes elements of WCRP, IGBP, IHDP и DIVERSITAS.

During the past 10 years, NEESPI has been an interdisciplinary program of internationally-supported Earth systems and science research that addresses large-scale and long-term manifestations of climate and environmental change.

NEESPI Study Area includes: Former Soviet Union, Northern China, Mongolia, Fennoscandia, and Eastern Europe.

NEESPI duration ~ 10–12 years (started in 2004)





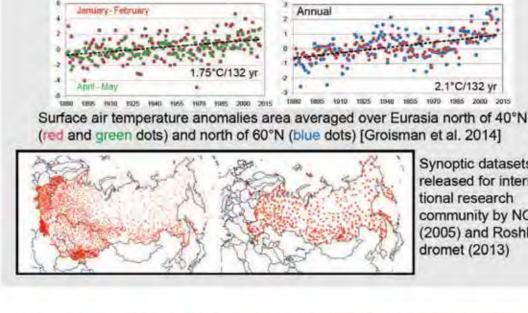




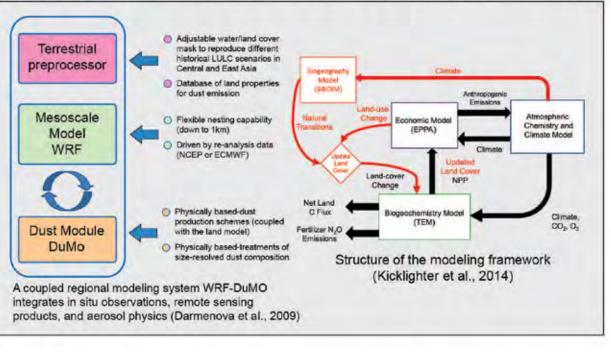
For more information see the NEESPI WEB Site: http://neespi.org

NEESPI Steps and Statistics

The first phase of NEESPI projects has focused on documenting, monitoring and analyses of climatic changes, biogeochemical cycles, land use, and land cover changes over Northern Eurasia



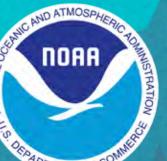
The second NEESPI phase (launched circa 2007) put forward environmental modeling with the major focus on blending regional climate, vegetation, carbon flux, permafrost, hydrological, and dust production models within a Northern Eurasia modeling suite to be linked to (embedded in) the state of the art Earth System models



From the Northern Eurasia Earth Science Partnership Initiative (NEESPI) towards the Northern Eurasia Future Intitiative (NEFI) Pavel Groisman, UCAR Project Scientist at NOAA National Centers for Environment Information, Asheville, North Carolina, USA;

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<u>NEESPI's facilitating role has been in promoting international large-scale regiona</u> <u>studies and framing the diverse individual projects into a 3-phase balanced</u>

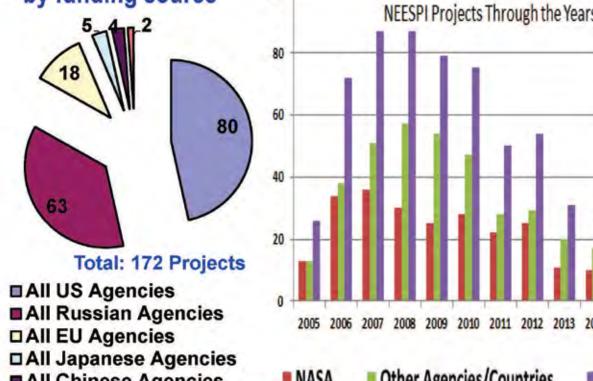
The latest (present phase 3) NEESPI research foci consist of integrated assessments and projections and include a synergy of the knowledge gained from the analyses of the regional observational databases and from the

development of and experimentation with regional Earth system modeling tools. In particular, in the last 3 years, four review books summarized knowledge of the regional Earth System status and dynamics. Two more overview books are in preparation and one more is planned



- **NEESPI Statistics**
- Throughout its duration, NEESPI served and is serving as an umbrella for 172 individual research projects (always with an internationa participation) with an annual budget close to 15 million US dollars (cf., the next Figure, where international NEESPI projects are grouped by the major national funding source).
- More than 750 scientists from more than 200 institutions of 30 countries worked or are working under the Initiative umbrella
- More than 80 PhD students defended their theses while working within the NEESPI framework

NEESPI Implementation **NEESPI Projects by country** (or group of countries), sorted by funding source

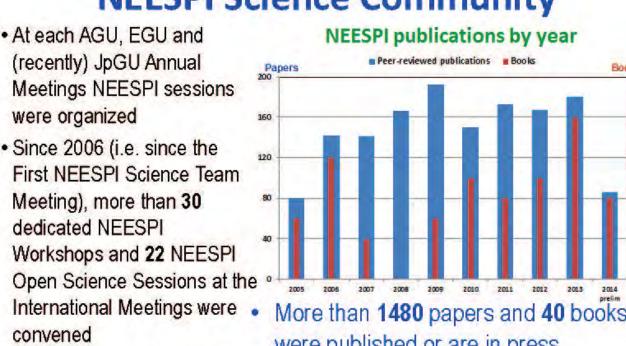


Other Agencies/Countries

December 2014

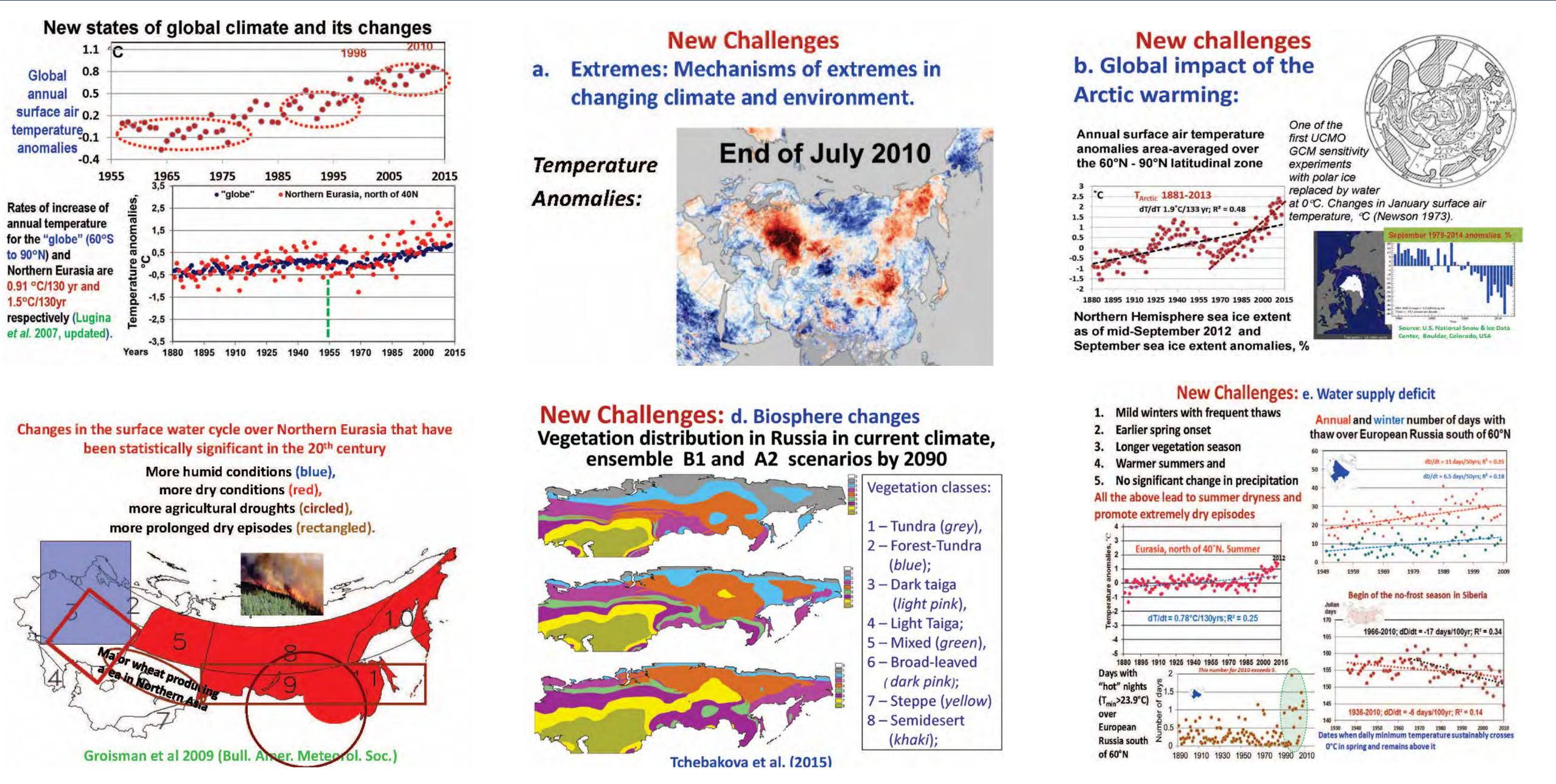
NEESPI Science Community

- At each AGU, EGU and (recently) JpGU Annual Meetings NEESPI sessions were organized
- Since 2006 (i.e. since the First NEESPI Science Team Meeting), more than 30 Workshops and 22 NEESPI
- Open Science Sessions at the
- Two or more Early Career Scientists Summer Schools



were published or are in press Since 2010 759 peer-reviewed papers nd book chapters were publishe the past 7 years (since 2009) http://neespi.org/science/NEESPI publications.po

0.91 °C/130 yr and 1.5°C/130yr



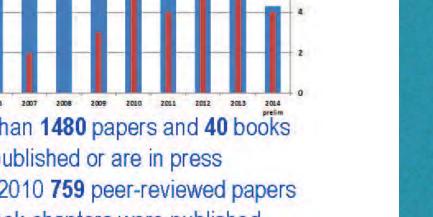
Transition from NEESPI to NEFI

Future Earth: New global platform for sustainability research

- Sustainable Developmer
- NEESPI =>"Northern Eurasia's Future" Initiative (NEFI)

- security)
- strategic planning)

- Group



New Challenges

Rio de Janeiro, Brazil (14 June, 2014) — An alliance of international partners from global science, research funding and UN bodies, launched a bold new 10-year initiative on global environmental change research for sustainability at the Forum on Science and Technology and Innovation for

 Future Earth – research for global sustainability, will provide a cutting-edge platform to coordinate scientific research which is designed and produced in partnership with governments business and, more broadly, society,

Goal: Interdisciplinary solution-oriented approach that will allow effective policy-making in environment management and control MAIRS => Future Asia: BALTEX => Baltic Future:

Latest Discussion: http://www.eli.org/events/end-sustainabilit

Continuation of the Research Foci list

Group 2 Pressure on agriculture and pastoral production (growing supply demand, changes in land use; food

. Changes in infrastructure (roads; new routes; construction codes; air, water, and soil pollution;

3. Societal actions to mitigate negative and benefit from positive consequences of environmental changes Assessment / Quantification of the role of Northern Eurasia in the global Earth and Socioeconomic systems

10. Using newly available advanced research tools (a) Observations (e.g., GPM) (b) Models (e.g., new ESMs)

Major NEESPI Science question remains intact:

 How do Northern Eurasia's terrestrial ecosystems dynamics interact with and alter the biosphere, atmosphere, and hydrosphere of the Earth?

But it is the time to expand this academic curiosity question "how?" to another, more practical:

 What will the changes in this ecosystems dynamics and interactions mean for the societal well-being, activities, health, and strategic planning?

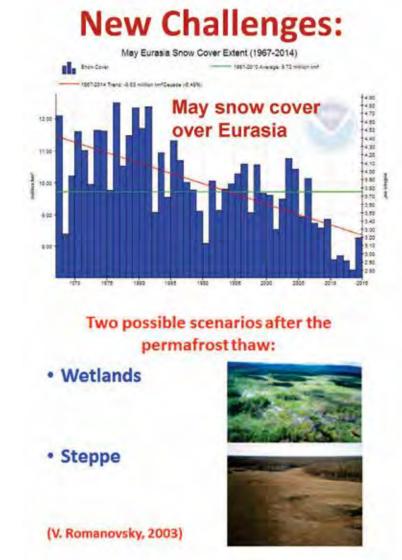
NEESPI research realm has changed:

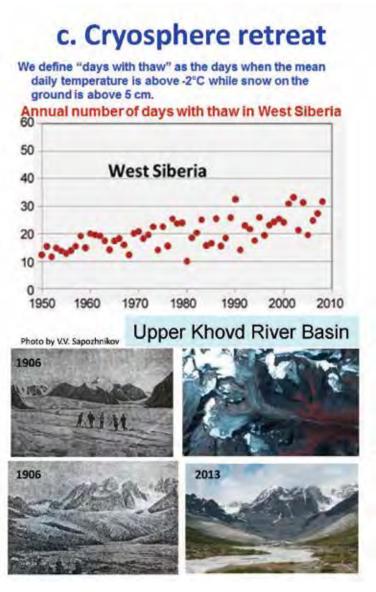
- We have increased knowledge and we received new tools (observations and models) to describe our new results
- We can now apply these results to directly support decision making activities that address urgent societal needs.

Therefore, at the next step:

- The NEESPI successor will need to incorporate socio-economic studies aiming on linking the achievements of climate and environmental analyses with the requirements for the regional infrastructure and societal well-being.
- The above will become a core of new Northern Eurasia Future Initiative (NEFI). It is expecting that NEFI will bridge climate and environmental studies with socio-economic consequences of the observed changes, providing the synergy between them and quantifying feedbacks between observed and projected regiona climate and environmental changes and their socio-economic impacts on the Earth System.

Group 1





New foci: **Transformation of** nvironment by man our need to survive in this environmen

TWO FACES OF THE ARCTIC

Courtesy of Prof. Nikolay Shiklomanov, George Washington University, DC, USA



Ten Research Foci emerged in discussions within the NEESPI community during the past 12 months making the following list:

- 1. Increasing frequency and intensity of extremes (intense rains, floods, droughts, and wild fires)
- 2. Global change and, in particular, warming of the Arctic
- 3. Retreat of the cryosphere: snow cover, sea and ground ice
- 4. Biosphere changes (ecosystem shifts; changes in the carbon cycle; land cover, desertification and dust storms)
- 5. Changes in the terrestrial water cycle; quantity and quality of wate supply available for societal needs)

Future plans

- Development/refining and release of the NEFI Science Program
- 2. Existing NEESPI Projects (27 of them) will receive the second (NEFI) affiliation **Continuous research efforts will be supported** by new proposals to funding Agencies **NEESPI/NEFI outreach efforts (summer** schools, workshops, open science sessions, special journal issues and books) will continue Preparation of the overview NEESPI Book

NEFI Challenge

How to provide in Northern Eurasia a sustainable societal development (economy well-being, activities, health, and strategic planning) in changing climate, ecosystems, and...societies?



Northern Eurasia Earth Science Partnership Initiative => Northern Eurasia's Future Initiativ