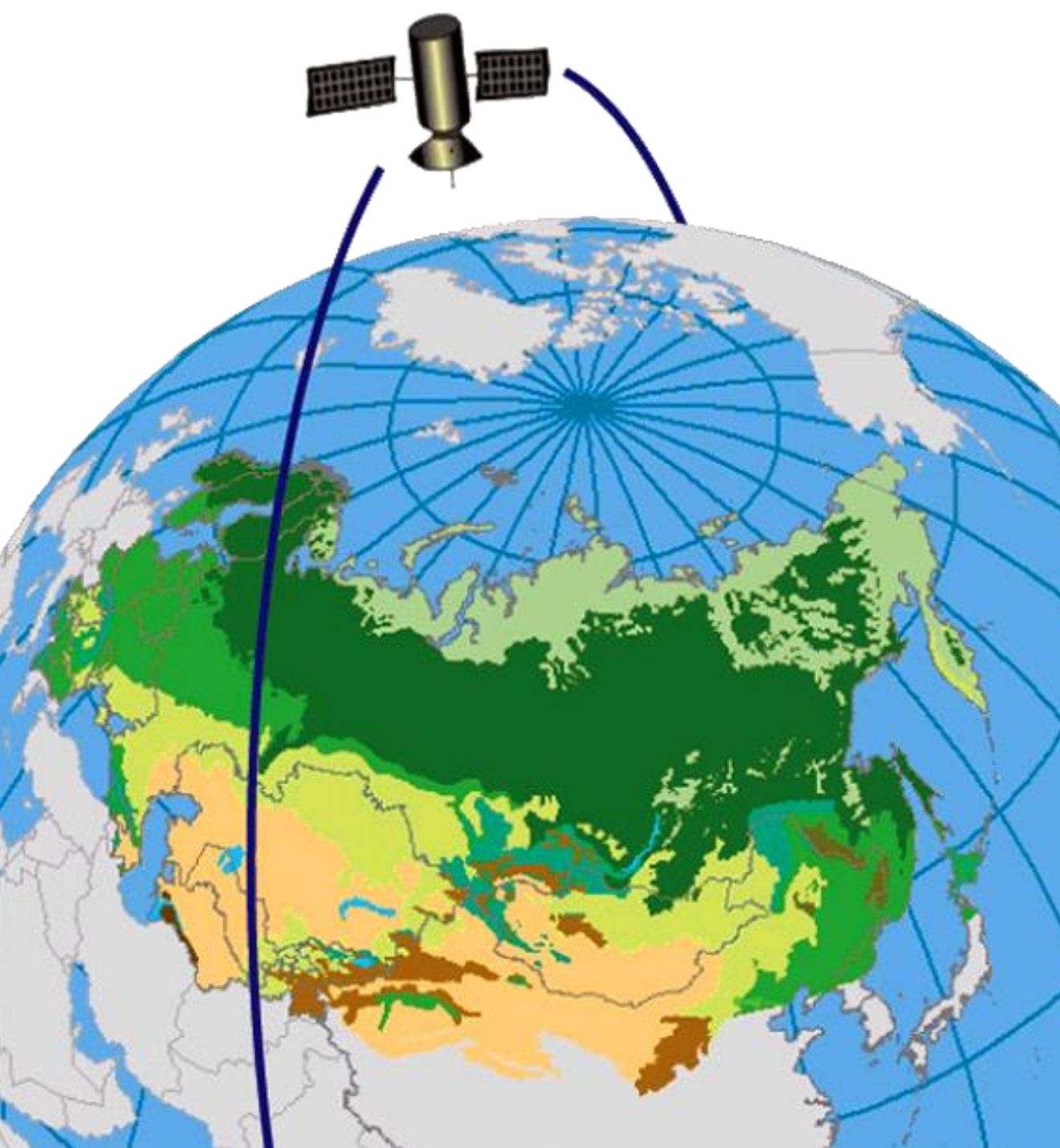




# **Northern Eurasia Earth Science Partnership Initiative (NEESPI) Status: An update of the recent activities and near-term plans**

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The  
NEESPI  
Study  
Area

<http://neespi.org>

**NEESPI is an interdisciplinary program of internationally-supported Earth systems and science research that addresses large-scale and long-term manifestations of climate and environmental change.**

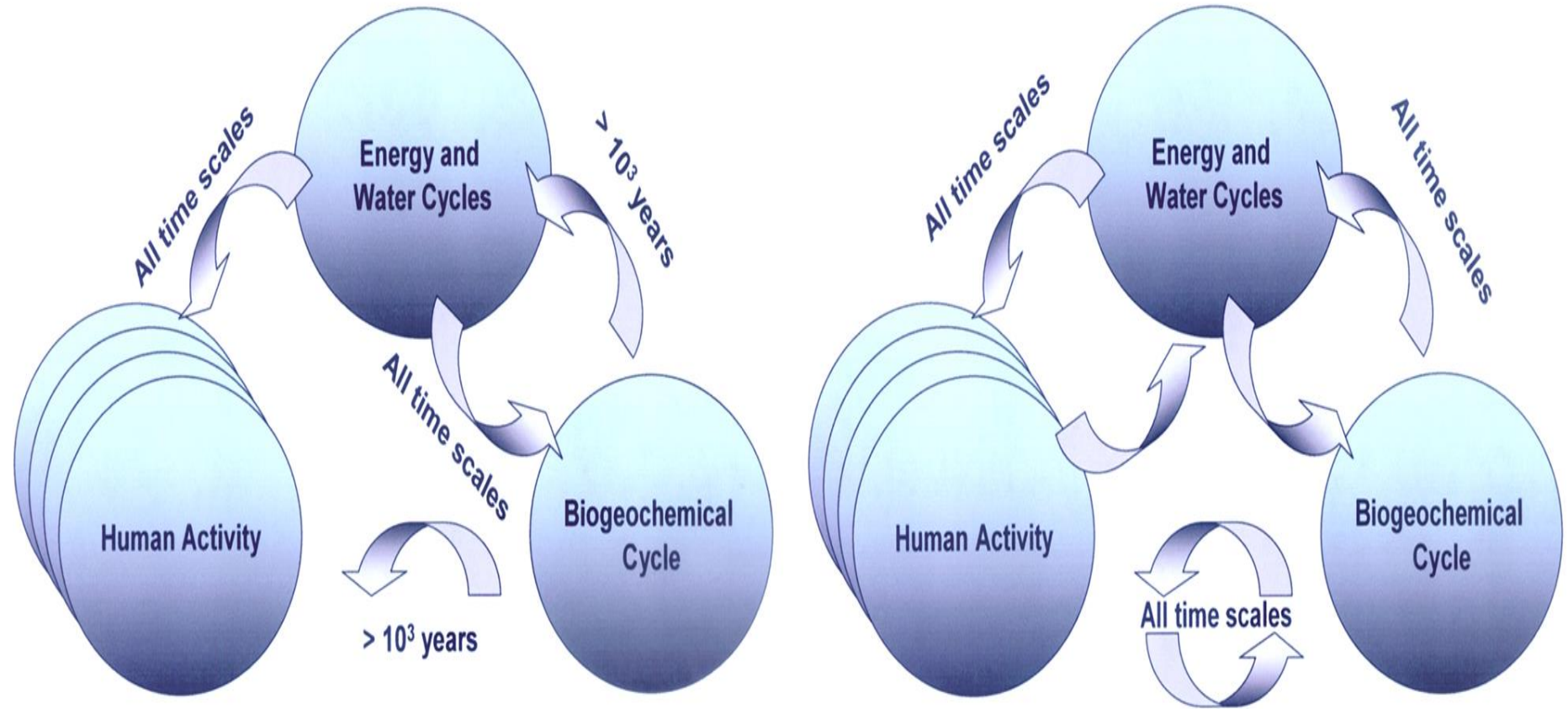
**NEESPI Study Area includes: Former Soviet Union, Northern China, Mongolia, Fennoscandia, & Eastern Europe**

**NEESPI duration ~ 10-12 years (started in 2004)**

# NEESPI Background

- Eight 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.
- NEESPI Science Plan includes elements of WCRP, IGBP, IHDP и DIVERSITAS.

# Pre-industrial and present interactions in the Earth Global System



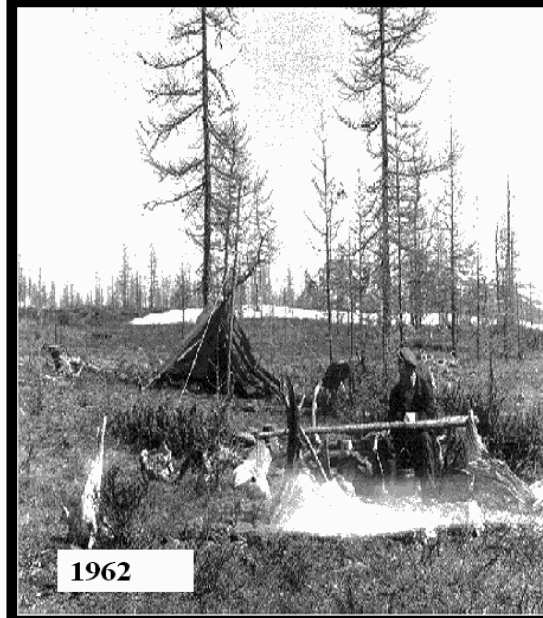
- **NEESPI ideological concept:** Studying any one of these cycles or activities often requires analyses of its interaction with the other two and of the transitional (non-equilibrium) character of these interactions.



# First phase foci of NEESPI were **monitoring and analyses** of climatic changes, biogeochemical cycles, land use, and land cover



**300-m tall flux tower in Siberia**



**1962**



**1997**

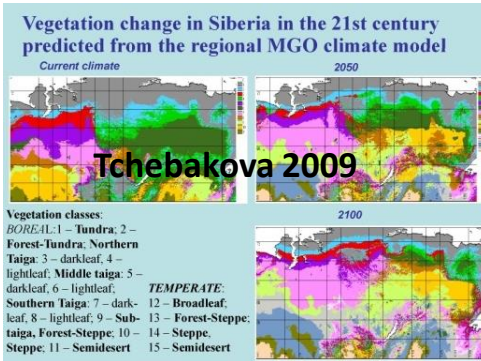
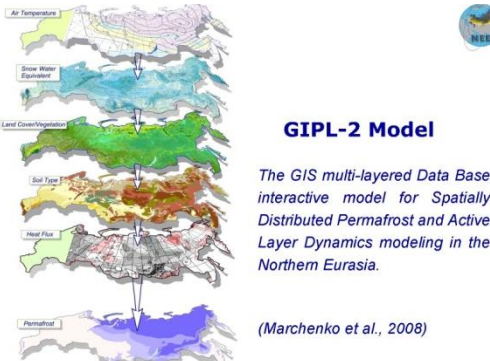
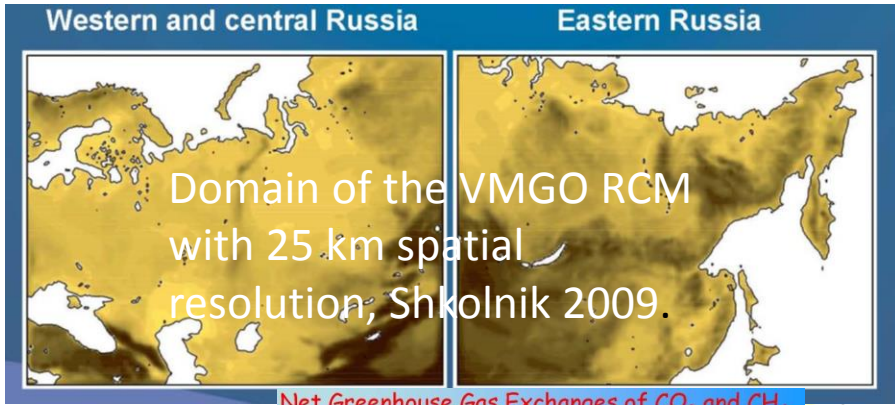


**Aral Sea retreat**



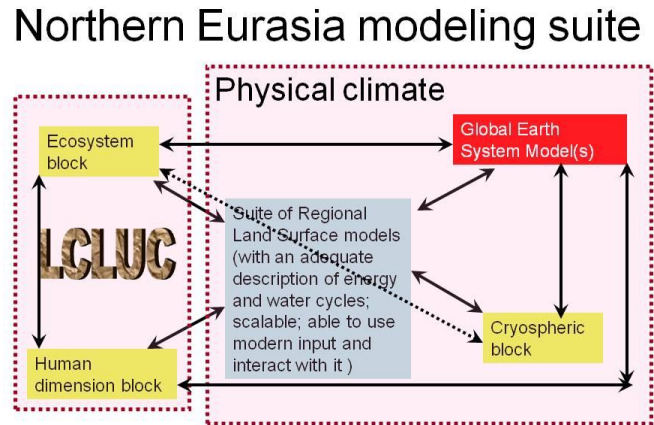
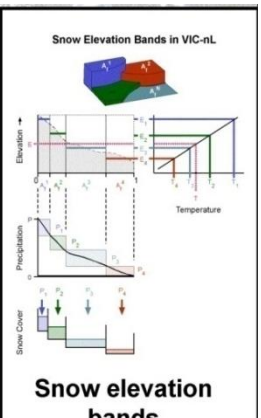
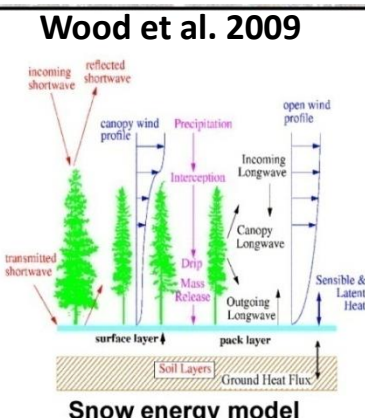
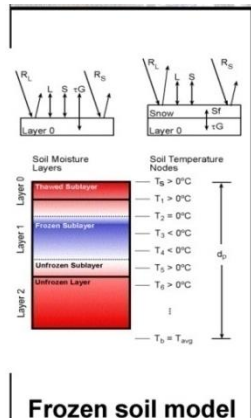
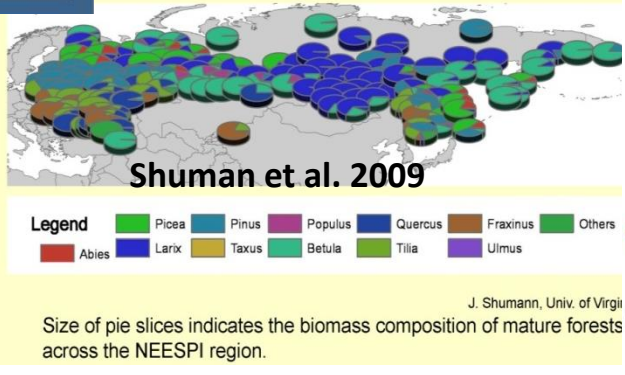
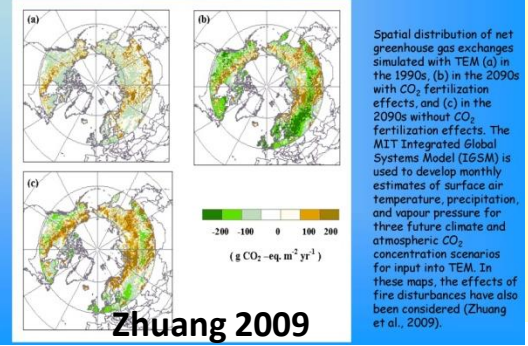


# After the NEESPI Workshop in August 2007 at the Aspen Global Change Institute, a new course was accepted towards strengthening of the NEESPI research focus on **scenarios... i.e., focus on modeling...**



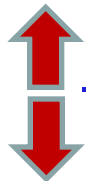
## Net Greenhouse Gas Exchanges of CO<sub>2</sub> and CH<sub>4</sub>

Efforts are made to blend modern RCMs with vegetation, carbon flux, permafrost, hydrological, and dust production models within a North Eurasia modeling suite and link it to the MIT Earth System model.



# New development

- Multi-national efforts have mostly infilled the data gap over the region. Additionally, we are waiting for the GPM products that are of critical importance for the NEESPI domain.
- Models are merging:
  - In the past, we had **GCM=> RCM=>HM=>Impacts**
  - Now: **RCMs and Models of the surface block: Hydrological models (HM), Biospheric models, Cryospheric models, and Socio-economic models began interacting among themselves.**
- Integration studies are in progress and new research proposals are in waiting.
  - Bring together all what is known (**synthesis**)
  - **New knowledge:** Explain and project the processes in context of the Earth System change (**integration**)





# NEESPI Data Distribution

- **NEESPI keeps promoting the data exchange among the NEESPI participants *via* the existing NEESPI Science and Data Support Centers in Russia, China, and the United States. The results of this data exchange materialized in a new set of publications and conference presentations that are currently using these data.**
- **A stellar addition to the NEESPI data distribution Services since 2010, became a new Data Analysis and Exploring System for Hydrology of the NEESPI domain developed by the Water Systems Analysis Group at University of New Hampshire – Durham (<http://neespi.sr.unh.edu/maps/>). An unrestricted web-based access to the System makes it a useful tool for any hydrological assessment within Northern Eurasia.**

# NEESPI Science Team Coordination

- First 4 years NEESPI had a Science Steering Panel that included the lead NEESPI PIs and met once a year.
- Since 2009, it was decided, that the present breed of the NEESPI researchers does no longer need a significant level of “steering”. They use the *NEESPI Science Plan*, the follow up NEESPI documents (in particular, *the materials of the NEESPI Workshop in August 2007 at the Aspen Global Change Institute*), an extensive archive of NEESPI publications (more than 1,160 of them), and presentations at the past NEESPI meetings and Open Science Sessions (all available at the same NEESPI web site). These materials and regularly scheduled meetings (5+ per year) provide a nearly unlimited source of ideas that strengthen the linkages within the NEESPI community.
- NEESPI web site (<http://neespi.org>) with timely announcements about the Conferences and other Activities in the NEESPI domain remains the major means of communication within the research community.
- The Topical Focus Research, Regional Research, and Data Centers provide topical support and data assistance to the NEESPI scientists.

# ***NEESPI Success Metrics***

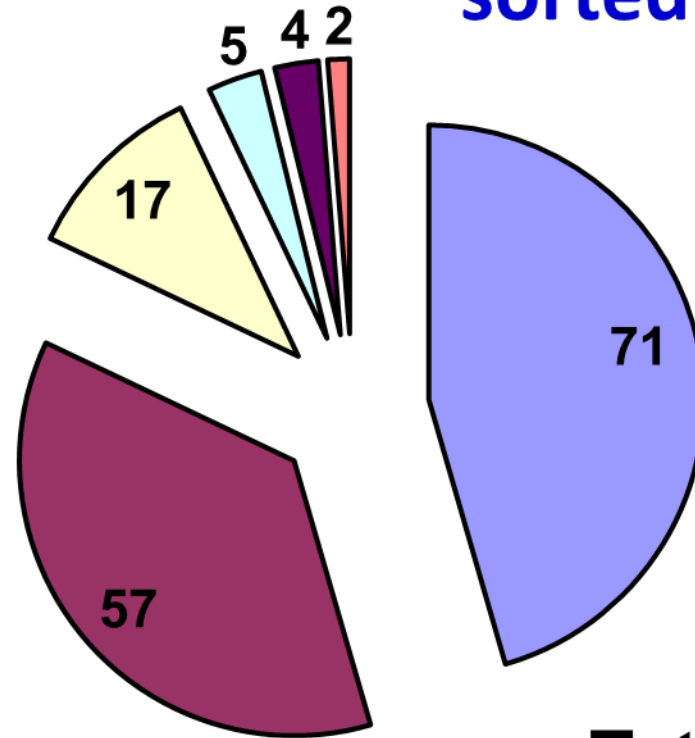
- NEESPI Project achievements are published and summarized in overview articles and books
- **Bridging, infilling the holes in the regional research activities**
- Preparation of a new breed of early career scientists who defended their PhD theses while working on North Eurasia and Arctic studies
- **Advances in building of the North Eurasian Modeling Suite**



# NEESPI Statistics

- Throughout its duration, NEESPI served and is serving as an umbrella for **156 individual research projects (always with an international 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.
- In 2013, we anticipate a new generation of NEESPI projects funded in Russia (Ministry of Education and Science, RAS), the United States (NSF, NASA), China, and Europe.

# Completed and ongoing NEESPI Projects by country (or group of countries), April 2013 sorted by funding source



**Total 156 Projects**

■ All US Agencies

■ All EU Agencies

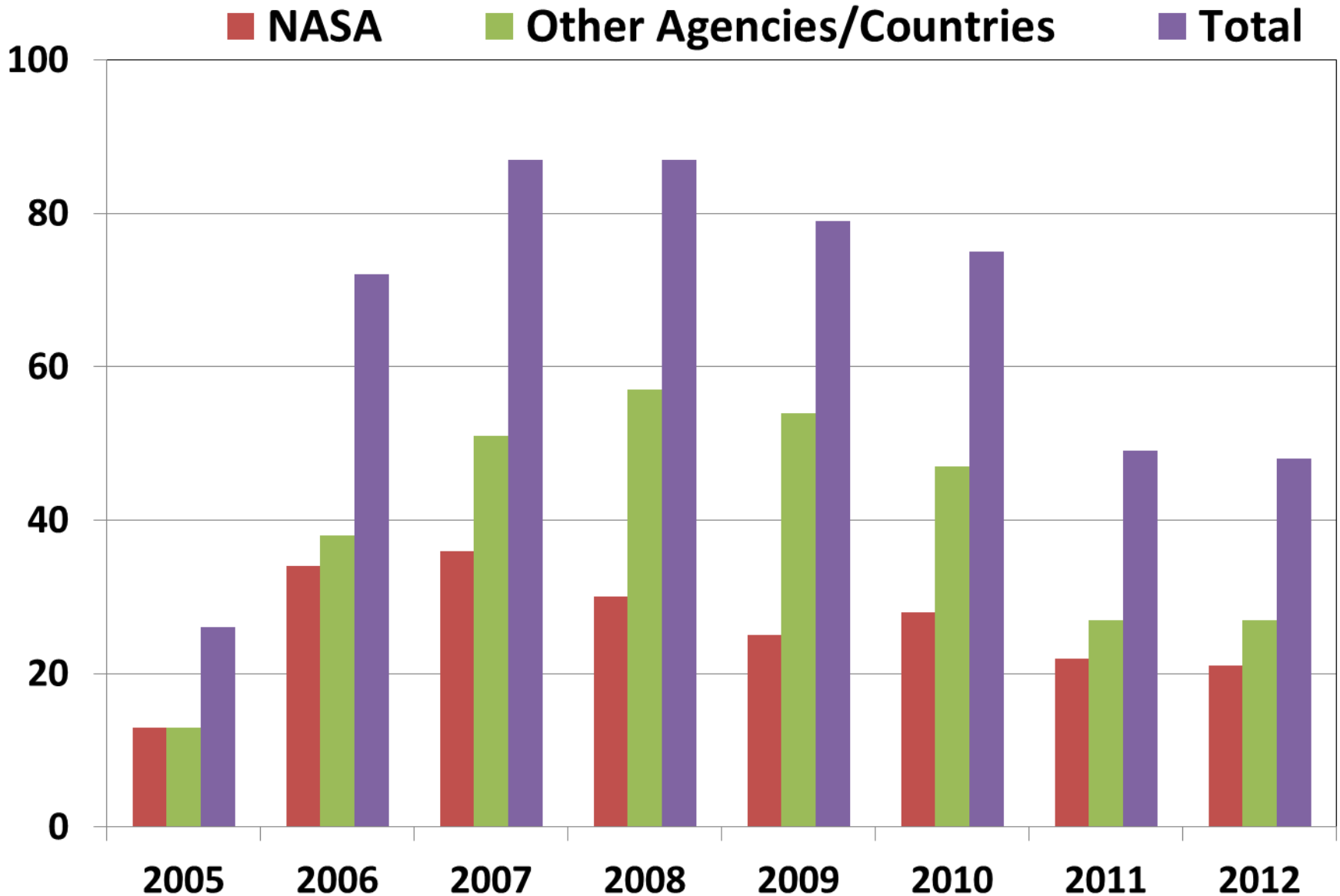
■ All Chinese Agencies

■ All Russian Agencies

■ All Japanese Agencies

■ Canada

# Active NEESPI Projects per year





# NEESPI Outreach, <http://neespi.org>

- After the First NEESPII Science Team Meeting (IIASA, Laxenburg, Austria, February 2006), ~**30** dedicated NEESPI Workshops were organized and **18** NEESPI Open Science Sessions at the International Meetings were convened.
- **Two or more** Early Career Scientists Summer Schools per year were organized in the past three years (since 2009).
- During the Mega-Project life, more than **1160** papers and **31** books were published or are in press; their list is regularly updated at [http://neespi.org/science/NEESPI\\_publications.pdf](http://neespi.org/science/NEESPI_publications.pdf). In particular, since 2010, about **465** peer-reviewed papers and/or book chapters were published or are in press.
- More than **75 PhD students** defended their theses while working within the NEESPI framework.

# Books and thematic journal Issues in 2012/13

## Published:

- The 4<sup>th</sup> (the third ERL) *Environ. Res. Lett.* NEESPI focus issue was **published** and is available on line. This Special Issue has 25 manuscripts (<http://iopscience.iop.org/1748-9326/focus/NEESPI3>)
- Groisman, P.Ya. and V.I. Lyalko (eds.) 2012: "**Earth System Change over Eastern Europe**" "Akademperiodyka" Publ. House, Kiev, Ukraine, 487 pp. (in English; May 2012).
- Groisman, P.Ya., A. Reissell, and M. Kaukolehto (eds.) 2012: **Proc. of the NEESPI Regional Science Team Meeting devoted to the High Latitudes**, Univ. Helsinki Press, Helsinki, Finland ~ 153 pp. **REPORT SERIES IN AEROSOL SCIENCE No. 130** (<http://www.atm.helsinki.fi/FAAR/reportseries/rs-130.pdf>)
- Groisman P.Ya. and G. Gutman (eds.), 2013: "**Environmental Changes in Siberia: Regional Changes and their Global Consequences**", Springer Publishing House, Amsterdam, The Netherlands (Published on September 2, 2012).

## In press:

- Chen, J., S. Wan, J. Qi, G. Henebry, M Kappas, and G. Sun (eds.), 2013: "**Dryland East Asia: Land Dynamics Amid Social and Climate Change**" Beijing: Higher Education Press & Berlin: De Gruyter (in press).

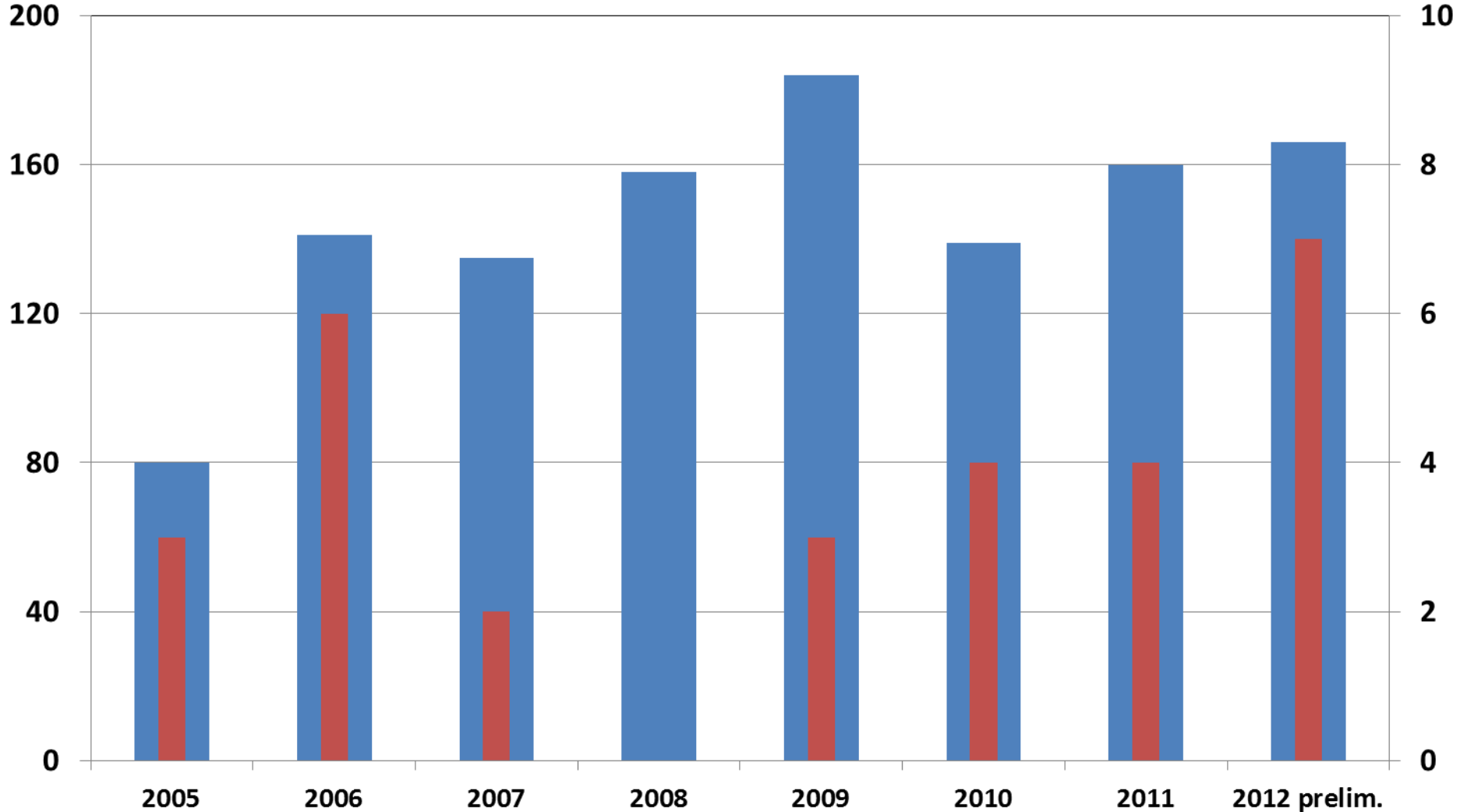
# NEESPI publications by year

■ Peer-reviewed publications

■ Books

Papers

Books





# NEESPI Meetings, Workshops, Sessions in the past 15 months prior to April 2013

- **December 5-9, 2011, San-Francisco, USA.** NEESPI Session at the Fall Annual AGU Meeting. One oral and two poster sessions
- **February 7-8, 2012, St. Petersburg, Russia.** NEESPI Regional Workshop: “Hydrological consequences of changes in climate and land cover across Northern Eurasia”
- **April 22-27, 2012, Vienna Austria.** European Geosciences Union Annual Assembly. Three oral and one poster Sessions
- **May 20-25, 2012, Makuhari Messe, Japan.** Japanese Geoscience Union Annual Meeting. Three special NEESPI/MAIRS Multidisciplinary oral and poster Sessions
- **June 18-22, 2012, Yoshkar-Ola, Russia.** Regional Conference: “Impacts of extreme weather on natural, socio-economic, and land-use systems”
- **June 24 - July 2, 2012, Irkutsk, Russia.** Summer Scientific and Educational Event “*ENVIROMIS*” and the APN Workshop on extreme events in Eurasia.
- **December 3-7, 2012, San Francisco, USA,** NEESPI Session at the Fall Annual AGU Meeting. Two oral and two poster sessions.

**Session at the Biogeosciences Section at the  
Annual EGU Assembly (Vienna, Austria):  
BG5.2 “Environmental, socio-economic and  
climatic change in Northern Eurasia and their  
feedbacks to the Global Earth System”, April 2013**

- We invited the biogeochemical cycles, surface energy budget, cryosphere, water cycle, and climate and ecosystem interactions in Northern Eurasia. Presentations with strong human dimension, which in addition to impact studies of environmental change, include feedback studies of societal and land use change on regional and global environment and climate, and techniques to address the associated problems have been strongly encouraged.
- At three sessions we shall have 29 oral and poster presentations.
- *Presentations by the early career scientists were particularly welcome.* As a result, **9 of 12 oral presentations at BG5.2 Session** will be delivered by early career scientists.
- The foci of this Session will be the studies of the carbon cycle, and cryosphere – atmosphere interactions in the Northern Eurasia

# Future NEESPI activities in 2013:

- **April 7-12, 2013, Vienna Austria.** European Geosciences Union Annual Assembly. Open Science NEESPI Session, BG5.2
- **May 19-24, 2013, Makuhari Messe, Chiba-City, Japan** Japanese Geoscience Union Annual Meeting. Open NEESPI International Session, A-CC03
- **July 2013, Haelar, China,** Summer School on Climate Change in Temperate Grasslands in Mongolia Plateau (*if sufficient funding will be available*)
- **August 25-Sept. 5, 2013, Petrozavodsk, Russia,** Summer Scientific and Educational Event “**CITES**”
- **December 2013, San Francisco, USA,** Open NEESPI Session at the Annual Fall AGU Meeting



# Further NEESPI Activities in 2013:

- **Next *Environ. Res. Lett.* Special NEESPI Issue, ~70 confirmed *future* contributors.** Deadline: June 15, 2013. Guest Editors: Amber Soja and Pavel Groisman
- **Additionally, NEESPI scientists will participate in the following meetings:**
  - **BALTEX 7<sup>th</sup> Study Conference** June 10-14, 2013, Borgholm, Sweden
  - **International Symposium on Global Change Research 2013: Coupled Natural and Human Systems.** June 18-20, 2013, Nanjing, China
  - **IAHS- IAPSO – IASPEI “Knowledge for the future”, Assembly,** July 22-26, 2013, Gothenburg, Sweden
  - **IGU Kyoto Regional Conference,** August 4-9, 2013, Kyoto, Japan
  - **Conference MOUNTAINHAZARDS 2013,** September 16-18, 2013, Bishkek, Kyrgyzstan
  - **International ZOTTO workshop,** September 16-22, 2013, Krasnoyarsk, Russia, and
  - **The 16<sup>th</sup> IBFRA Conference,** October 7-10, 2013, Edmonton, Alberta, Canada.

# International Collaboration

- **Achievements:**

- Large investments in collaborative international Earth Science studies in China and Russia
- International Laboratories
- the US-Russia Climate Science Subgroup, part of the Science and Technology Working Group under the Bilateral Presidential Commission

- **Impediments:**

- Governmental induced restrictions on collaboration (travel support for guest scientists, NASA collaboration with Chinese Institutions)
- Visa hardships (fees, waiting time)

# Future Plans

- Focus on Modeling (i.e., on scenarios)
- Integrative studies (Siberia, Eastern Europe, *Central Asia*, Dry East Asia)
- Data and Research Results Dissemination
- Outreach focused on early career scientists
- **Strengthen links with BALTEX and MAIRS**
- **Large NEESPI Conference in 2015 that will summarize the 12 years of NEESPI studies and launch the preparation of the following-up NEESPI overview book**
- **Scientific ideas for the post- NEESPI period**

# **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?**

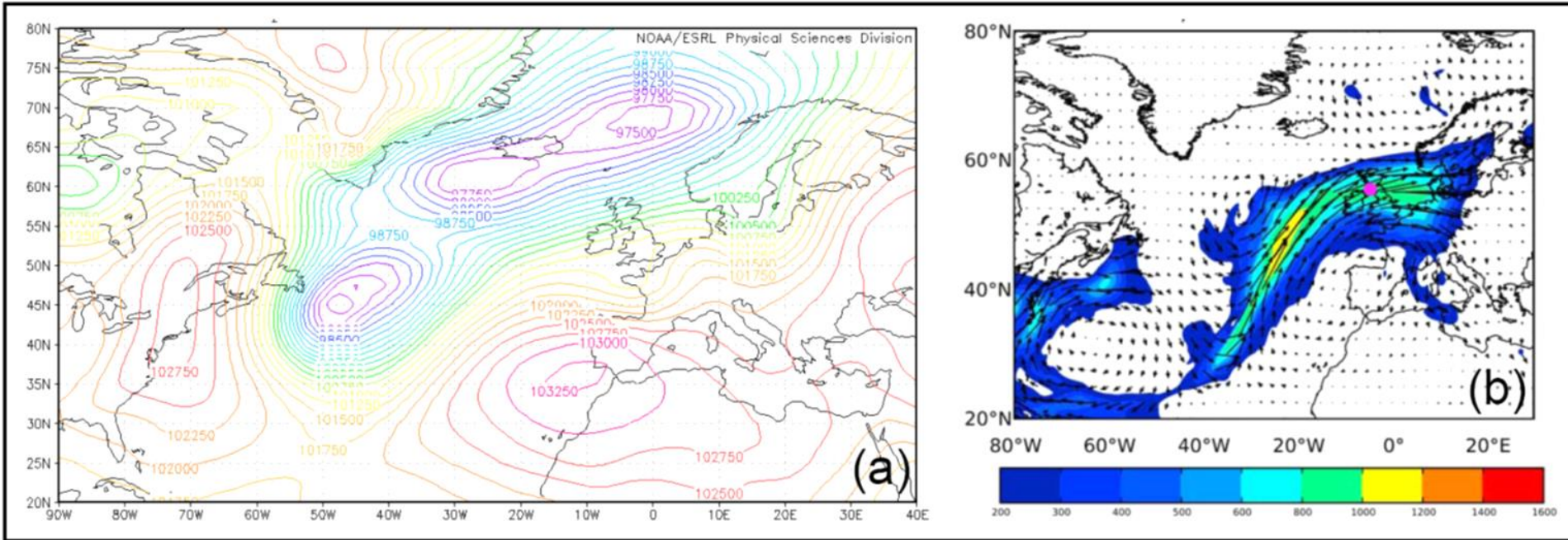


**Need to develop the new set of science questions for regional projects that succeed NEESPI (post-NEESPI)**

**a. Mechanisms of extremes in changing climate and environment**



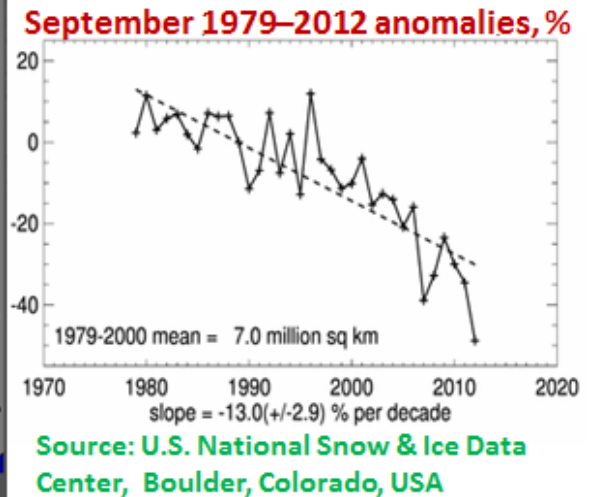
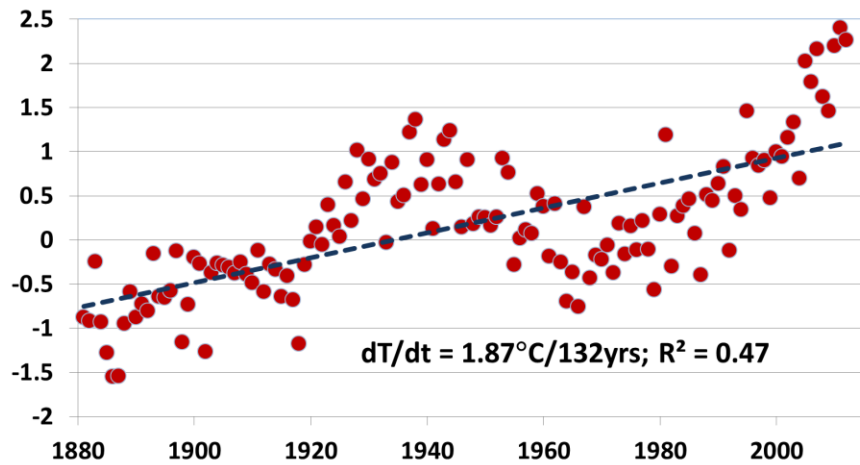
# Atmospheric rivers



- *Mean sea level pressure (Pa) for 12:00 UTC 10.12.1994 (a) and vertically integrated atmospheric water transport (kg/m s) for the same time (b) computed by Lavers et al. 2012.*

# Need to develop the new set of science questions for regional projects that succeed NEESPI (post-NEESPI)

- a. Mechanisms of extremes in changing climate and environment
- b. Global impact of the Arctic warming



**(Left)** Annual surface air temperature anomalies area-averaged over the 60°N - 90°N latitudinal zone .. **(Center)** Northern Hemisphere sea ice extent as of mid-September 2012 .( **(Right)** September sea ice extent anomalies, %.



**Need to develop the new set of science questions for regional projects that succeed NEESPI (post-NEESPI)**

- a. Mechanisms of extremes in changing climate and environment**
- b. Global impact of the Arctic warming**
- c. Changing carbon cycle and land cover due to a. & b.**
- d. Global food security due to a., b., & c.**
- e. Societal feedbacks to detrimental changes (adaptation & mitigation)**

**FOR MORE INFORMATION SEE THE NEESPI WEB SITE:**

***<http://neespi.org>***



(COURTESY PHC)



**Side Note:**  
*“NEESPI” is pronounced  
approximately like the  
Russian phrase for  
“Don’t sleep”*

# **Northern Eurasia Earth Science Partnership Initiative**

谢谢!

Thank you!

Спасибо!