Northern Eurasia Earth Science Partnership Initiative (NEESPI)

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(input from Pasha Groisman)

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

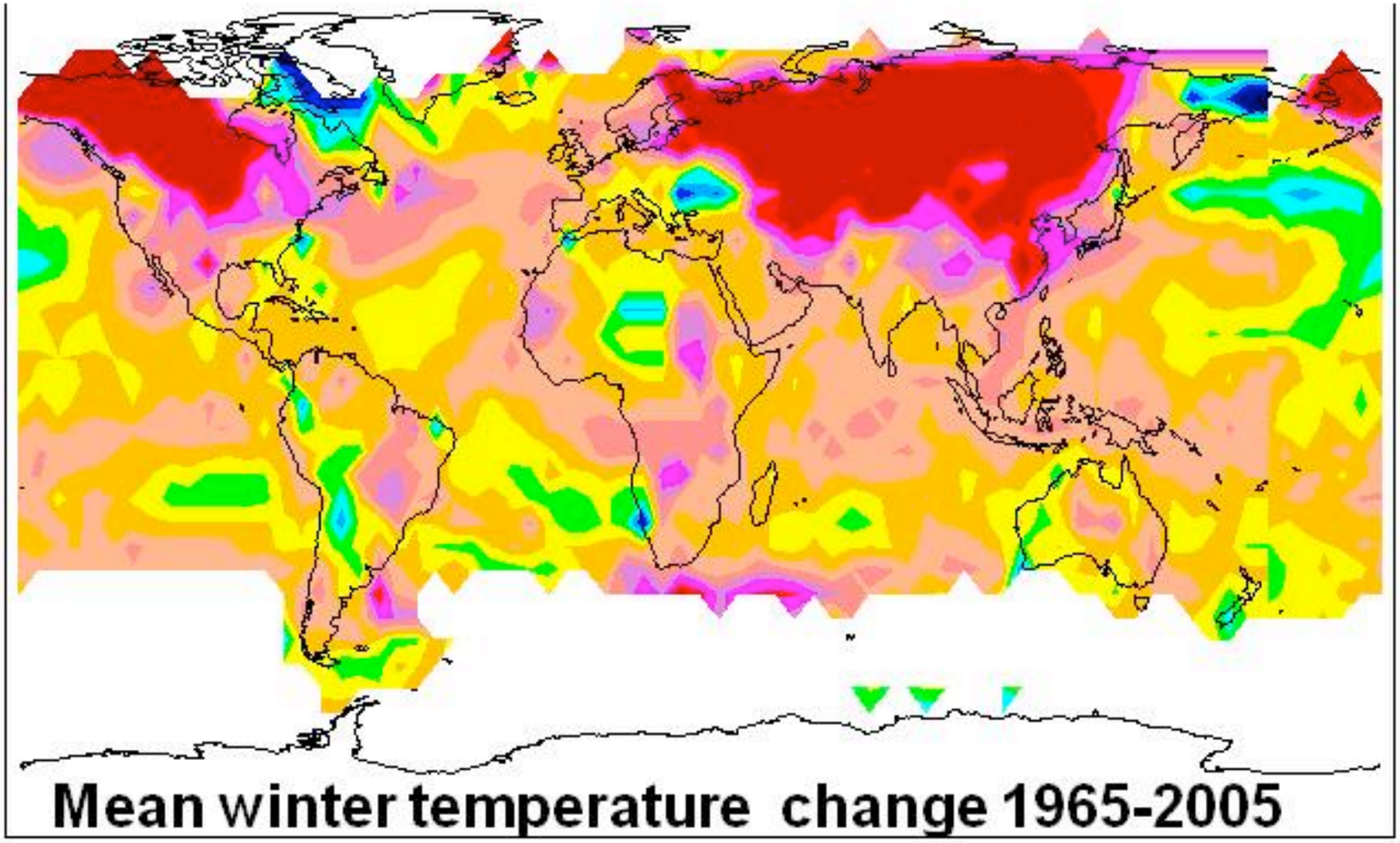
NEESPI duration ~ 10 years

Life on the edge: "Most of Northern Eurasia does not receive a sufficient amount of heat and in the regions where there is enough heat there is a significant deficit of water".

Rationale for NEESPI

- Strong climatic, environmental, and social changes
- Strong interactions between ecosystem - atmosphere - hydrosphere - cryosphere and human systems
- strong feedbacks to global energy, water, and carbon cycles in the region and beyond
- Strong societal impacts and feedbacks
- Lack of tools to address science questions

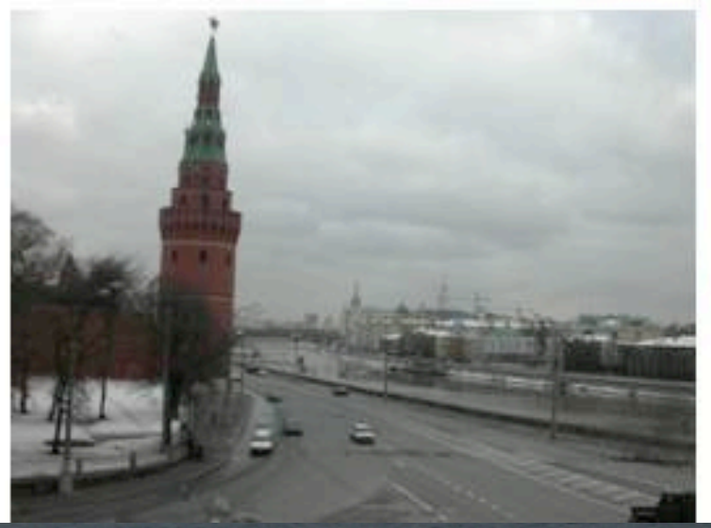
NORTHERN EURASIA IS IMPORTANT BECAUSE:



Mean winter temperature change 1965-2005

Large climatic & environmental trends have been occurring in the region and these changes will have global impacts and feedbacks.

The region contains at least two major growing geopolitical powers.



NEESPI Science Plan Major focus areas

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1. Focus on transitions zones that are most vulnerable to external and internal changes:

- Coastal zones
- Tundra-forest
- Forest-steppe
- Steppe-desert
- Mountains

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2. Focus on feedbacks that make the projection of the future changes uncertain:

- Biogeochemical feedbacks
- Biogeophysical feedbacks
- Human influences

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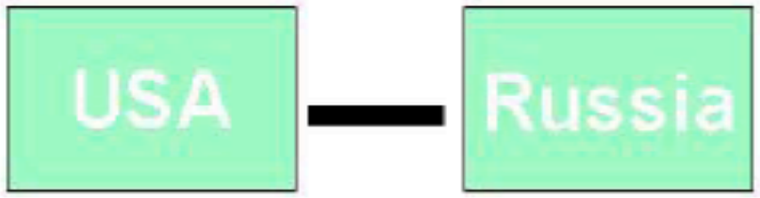
NEESPI Research priorities focus on:
(a) the processes that directly feedback on the Earth System
(b) the processes of major societal importance

NEESPI AND ITS PAST

NEESPI and the actions to develop its Science Plan were initially promoted by Russian and US scientists (2003-2004).



Since early 2005, the NEESPI community has worked to make NEESPI inter-agency and international.

A central Science question:
"How do terrestrial ecosystems dynamics in Northern Eurasia interact with and alter the biosphere, atmosphere, cryosphere, and hydrosphere of the Earth?"

The NEESPI Science Plan (available on http://neespi.org) has elements that address concerns of WCRP, IGBP, IHDP, and DIVERSITAS Programs

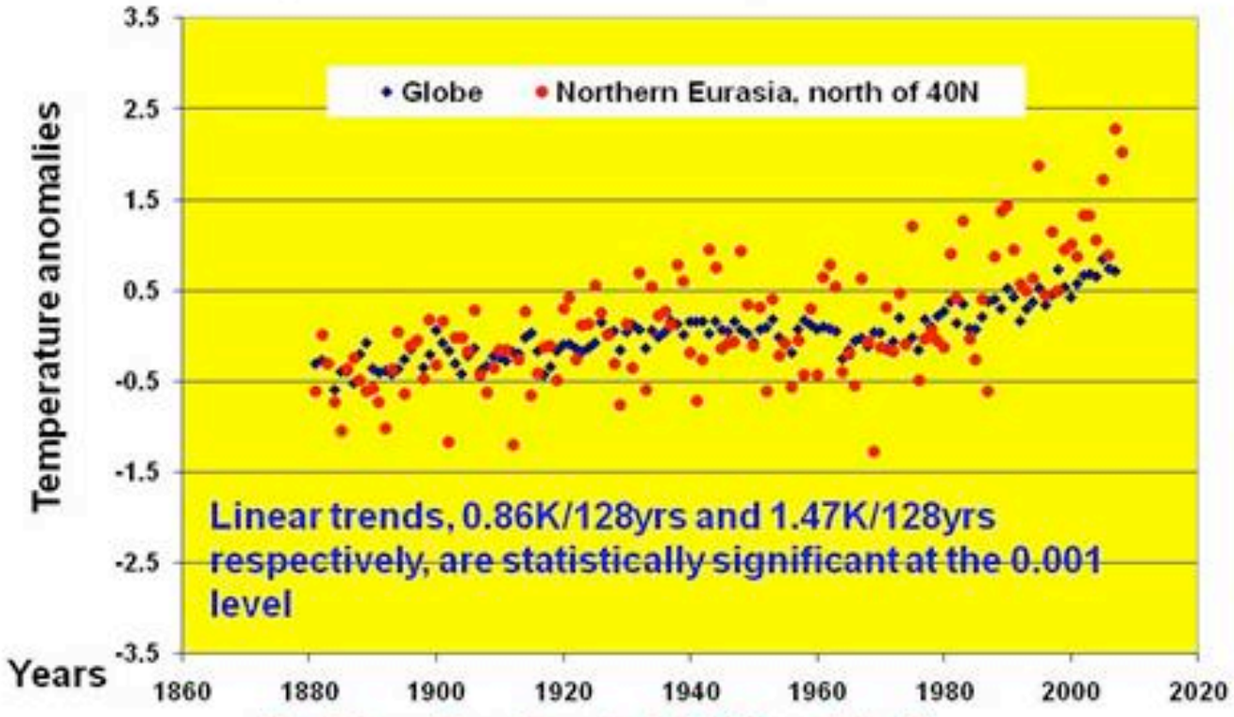
About half of the NEESPI projects are integrative, large-scale, and involve modeling, focusing on:

- Biogeochemical cycles
- Hydrology
- Cryosphere
- Land-use / land-cover
- Atmospheric aerosols/pollution
- Biodiversity
- Human dimensions

Contemporary Climatic Changes in Northern Eurasia

- Changes are accelerating, particularly in Siberia
- upward trend in temperature anomalies in NEA outpace global trends

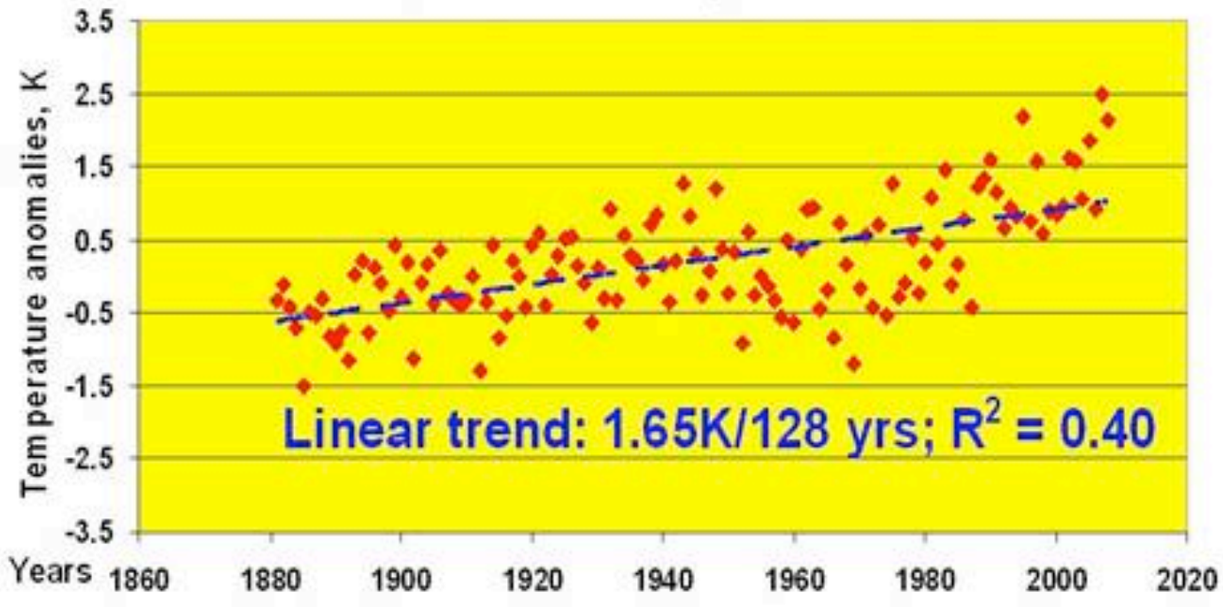
Global (latitudinal zone from 60°S to 90°N) and Northern Eurasia (north of 40° N) surface air temperature anomalies, 1881-2008



(Archive of Lugina et al. 2007 updated).

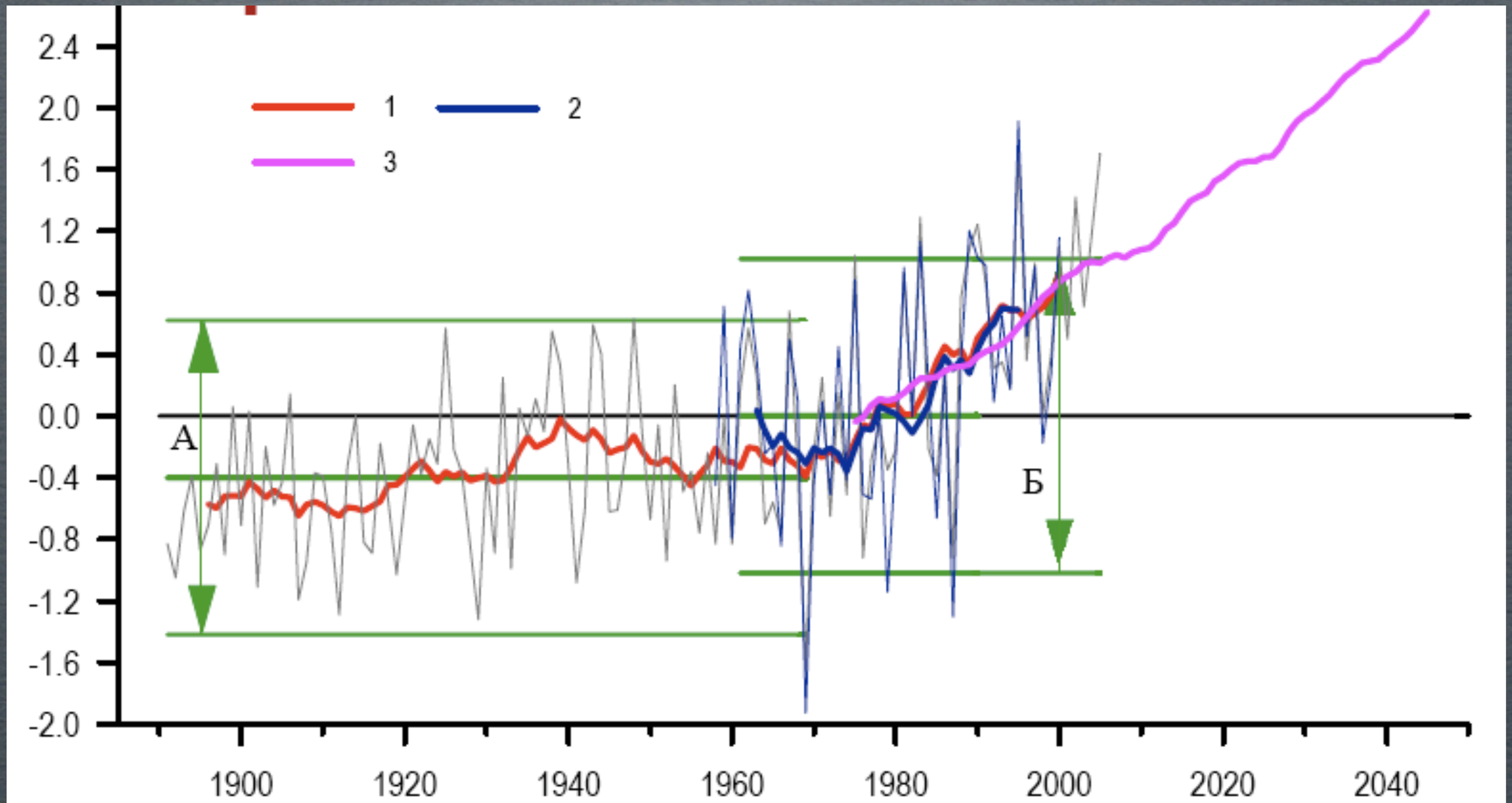
Northern Asia, north of 40°N. 1881-2008.

Surface air temperature anomalies from the 1951-1975 reference period



During the past twenty years, all anomalies were above 0.5K and eight of them were above 1.5K. Year 2007 showed a record anomaly of 2.5K.

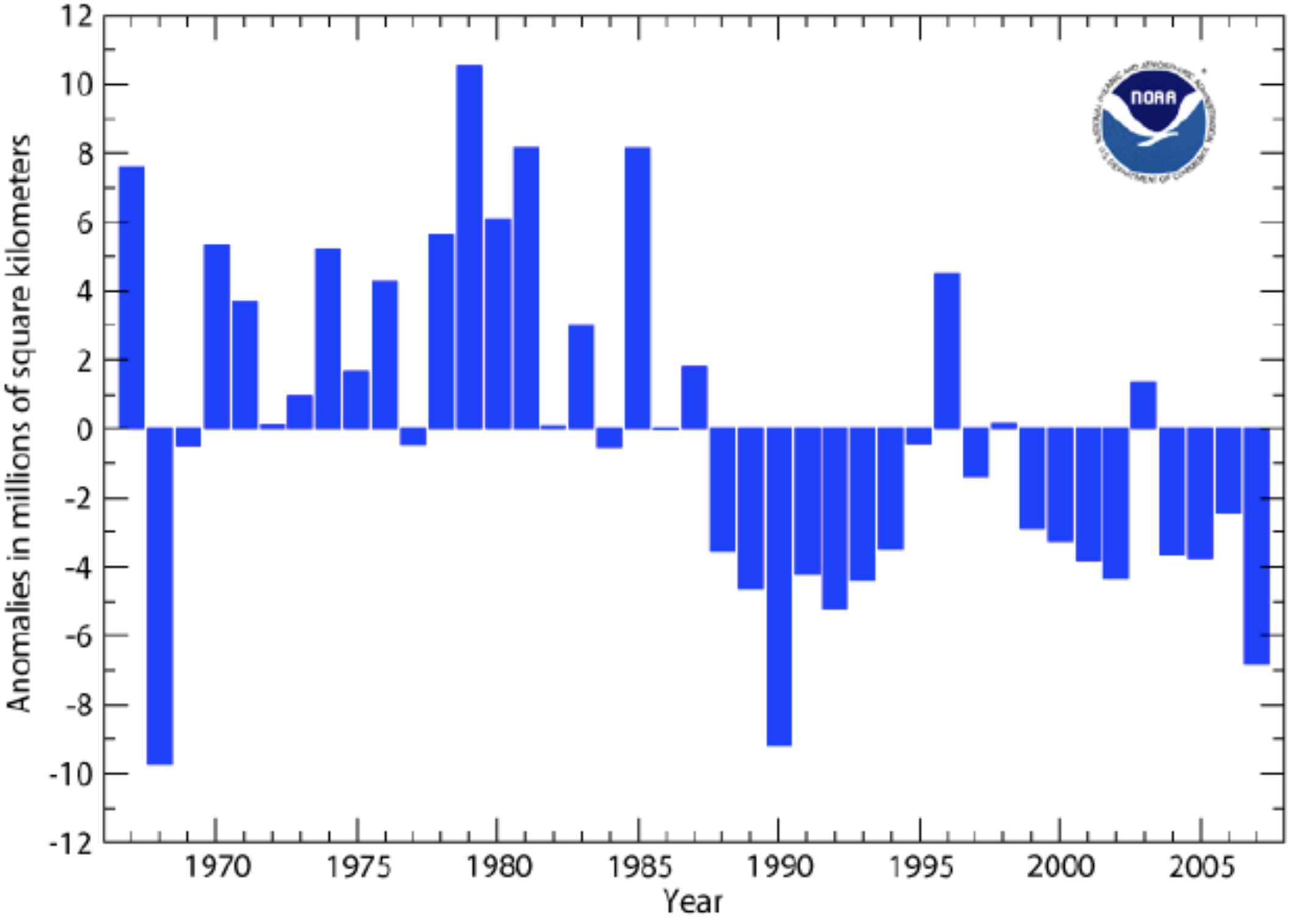
Observed and projected air temperature anomalies over Russia



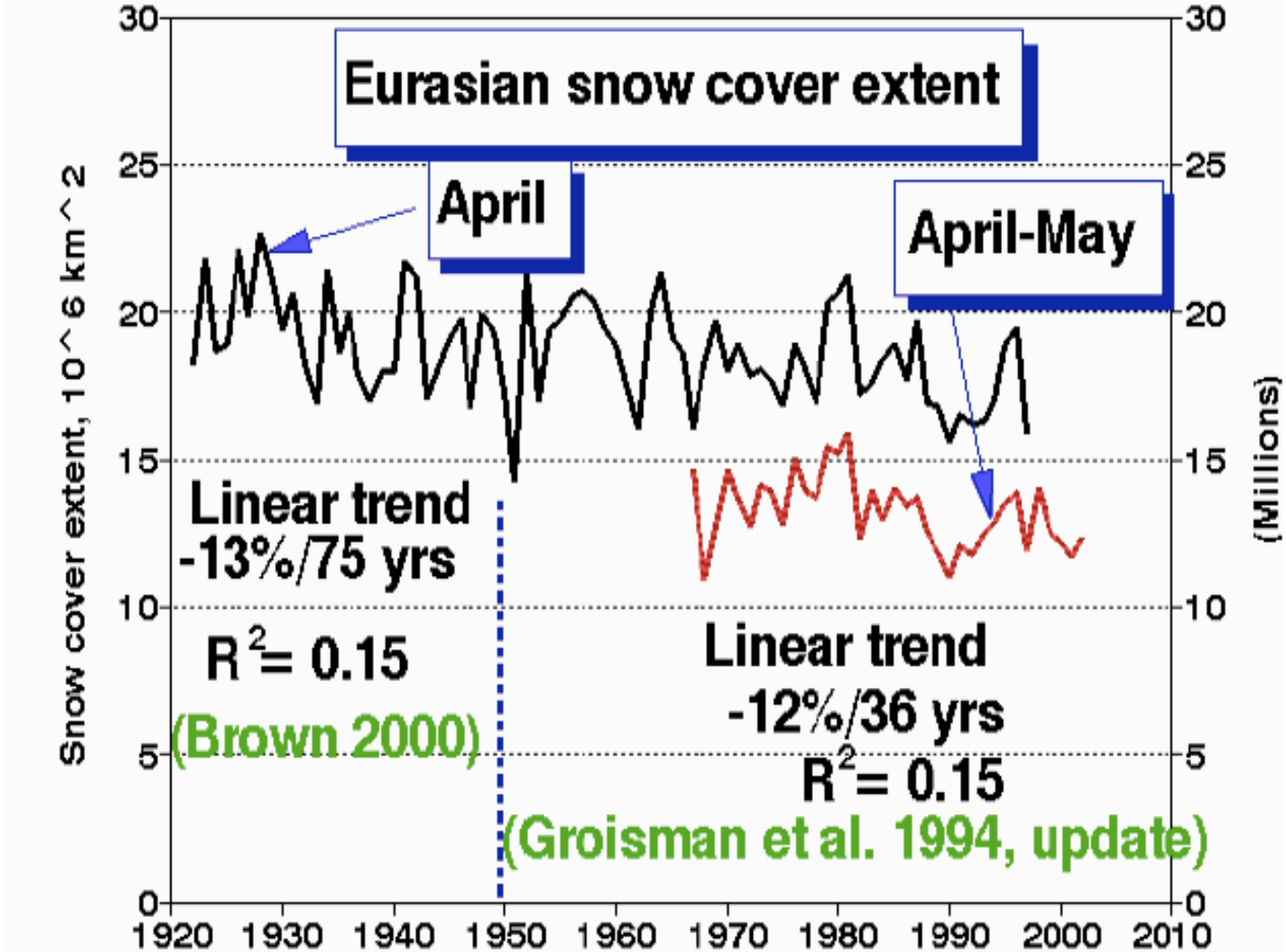
(1) station data, (2) reanalyzed (ERA-40) data, and (3) simulated /projected by 17-member ensemble of the latest IPCC Global Climate Models in a "business as usual" scenario (Meleshko et al. 2007) .

Northern Hemisphere Snow Cover Anomalies

Spring (1967-2007)



Spring snow cover over Eurasia



with implications for crop available water

Measures of success for this meeting
(NEESPI perspective)

- Synthesize our current state of knowledge and modeling capabilities
- Integration of NEESPI regional studies
- Integration of land surface models in the NEESPI domain
- Identification of missing research topics critical for achievement of the NEESPI objectives and thus for global change research
- Outreach:
- Summary article (most probably to EOS)
- Post-meeting training session
- NATO ARW Proceedings

The Northern Eurasia Earth Science Partnership Initiative (NEESPI): Science Applied to Societal Needs

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