



STATE OF THE ARCTIC

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**Federal Service for Hydrometeorology
and Environmental Monitoring**



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MAIN GEOPHYSICAL
OBSERVATORY**

Since 1849

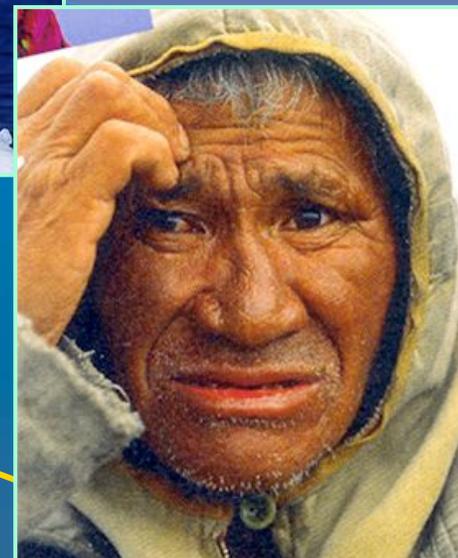
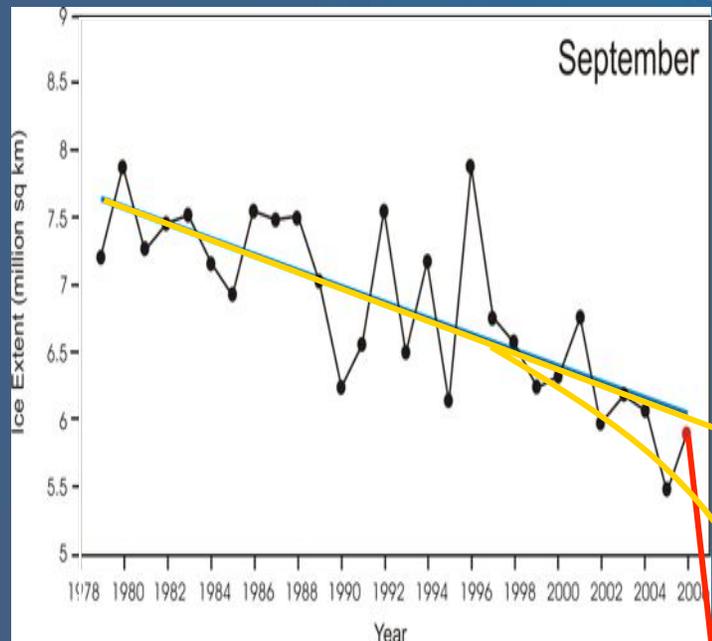


Russian research highlights for the Arctic

Vladimir Kattsov

Arctic change: mechanisms? projections? impacts?

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2009
2008
2007

2070?

4
3
2
1
0



?

Adapted from
J. Overland, 2007

1980 1990 2000 2010 2020 2030 2040 2050

Arctic science in Russia: observational highlights

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Modernization and reconstruction of surface networks and polar stations:

- part of Russian state observing system supervised by Roshydromet
- land stations generally from 1930s, but there are some much earlier
- now 52 land stations (vs. 110 couple of decades ago)
- 23 are a part of the bench-mark climate network of Russia
- 48 observed parameters

Federal Target Programme “World Ocean”, project “The opening up and making use of the Arctic”:

founding Russian research centre at Svalbard (Barentsburg)

Tiksi observatory to be opened this year

The second polar research vessel of high ice class founded in 2009:

(mostly in the Antarctic, but also in the Arctic
along with the “Akademik Fedorov”)

A concept of multi-target space system “Arktika” (meteo processes in the Arctic)

Arctic science in Russia: observational needs

Restoring the surface station network:

- continuing time series

- accounting for spatio-temporal variability (optimum distribution)

- applying of comprehensive models and maths to optimize (testing impact of observational sites)

Adding automatic stations incl. buoys:

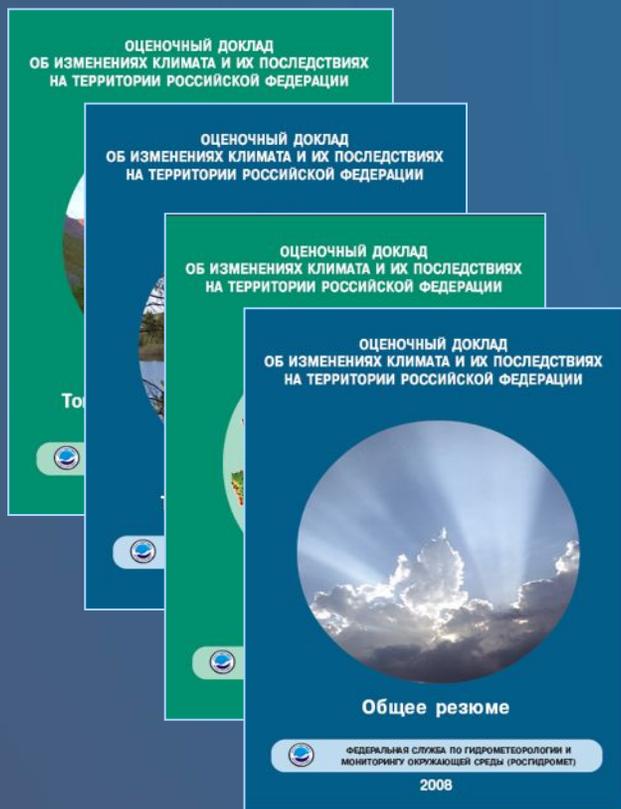
- increasing density where especially necessary

- increasing the number of measured parameters (precip., snow depth, visibility, etc.)

Special attention to the unification of methods, requirements, analyses

Arctic science in Russia: towards updated priorities

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Russia's First Climate Assessment Report (2008) ends up with a summary of climate research priorities

6th All-Russia

Meteorological Congress (14-16

October 2009) listed the Arctic and permafrost zone among top research priorities for the Russian science



Arctic science in Russia: towards updated priorities

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**Russian National
Weather and Climate
Research Programme**

(to be developed)

Climate Doctrine of the Russian Federation (17 December 2009) implies developing and realization of the corresponding national strategy and – on its basis – federal, regional and sectorial programmes and action plans.

Arctic science in Russia: towards updated priorities

Feedbacks (rate of warming):
Permafrost carbon?
Ice-free Arctic?
MOC slowdown (AOFWB)?
...



Near-term predictions (up to a decade):
Decadal scale variability vs. anthropogenic signal;
Attention to “slow” components of the climate system



Spatial scale (adaptation and risk management options)

Arctic science in Russia: towards updated priorities



Meaningful prediction/projection of the Arctic climate for the coming decades and beyond requires progress in several interconnected areas of research and observations including:

- ✓ Determining priorities of observational and modelling developments (e.g. dedicated ice thickness satellite missions, climate modelling allowing data assimilation, etc.) aimed at improving credibility of predictions and projections;
- ✓ Better understanding of the predictability of the Arctic climate on seasonal, interannual, decadal, and centennial time scales;
- ✓ Detection and attribution of the Arctic climate change (i.e. quantification of the interplay of its forced and unforced aspects) and evaluation of the ability of the state-of-the-art climate models to reproduce the observed Arctic climate behaviour as a part of the global climate system, with as full as possible accounting of ice-atmosphere-ocean processes, interactions and feedbacks.

Arctic science in Russia: towards updated priorities

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CMIP5

Model initialization and data assimilation

SHEBA-like campaigns – to better understand local processes

International Polar Decade

Arctic science in Russia: towards IPD

IPY 2007-2008 has showed the feasibility of addressing key environmental and social issues in the polar regions, but their nature requires a systematic and sustainable approach.

A long term approach, such as the IPD, will be a decisive step in this direction. It should address critical long term issues for developing and improving international cooperation in polar research and observations, including data and information management, and environmental prediction.

All these requirements are consistent with several major initiatives which form the composition of the IPY observing systems legacy:

- ✓ Sustaining Arctic Observing Networks (SAON),
- ✓ The Global Cryosphere Watch (GCW),
- ✓ Polar Climate Outlook Forum (PCOF)
- ✓ WWRP/THORPEX IPY
- ✓ ...
- ✓ ...

IPD could be considered as an umbrella under which the IPY legacy initiatives would be developed.