

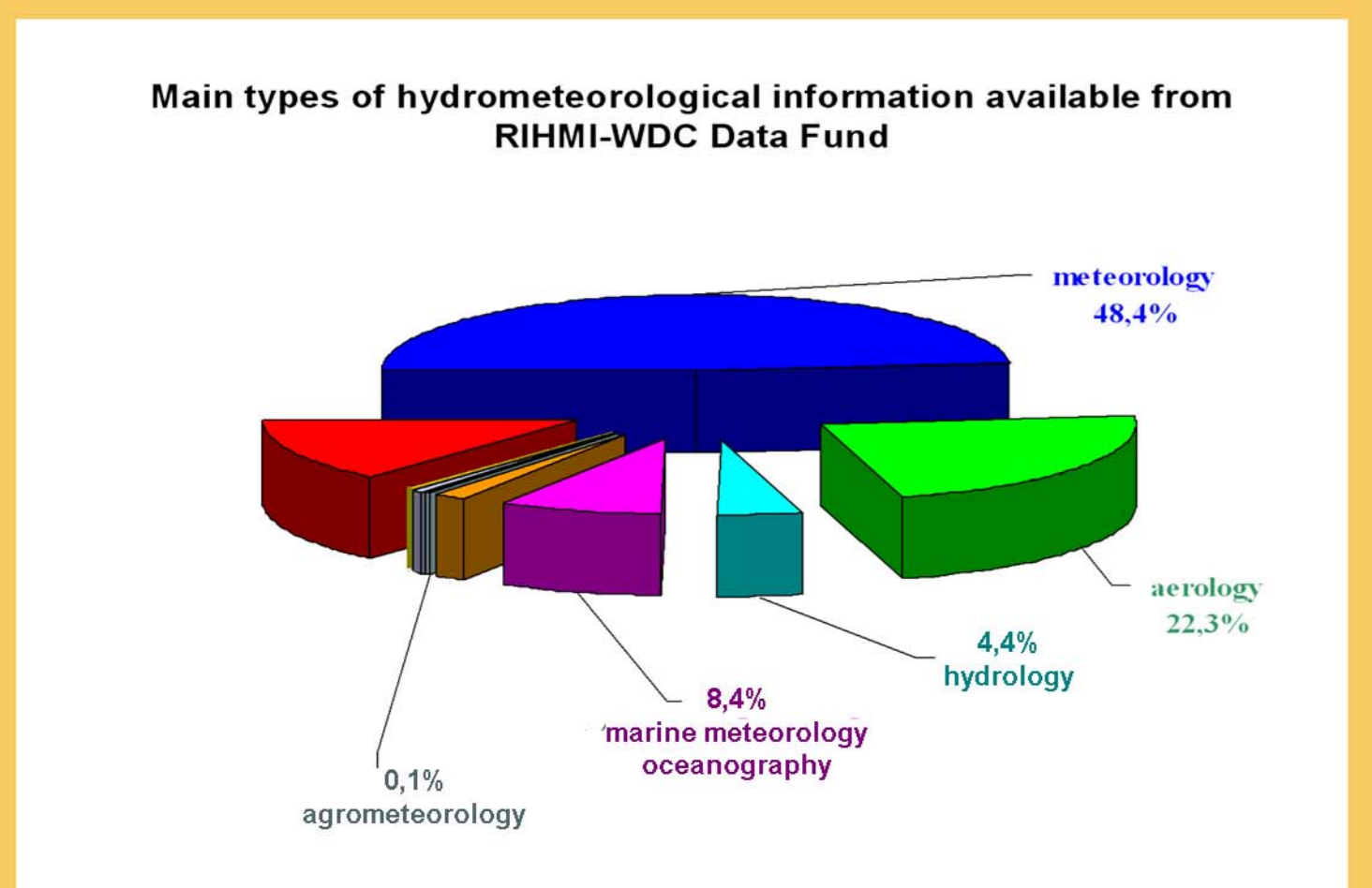
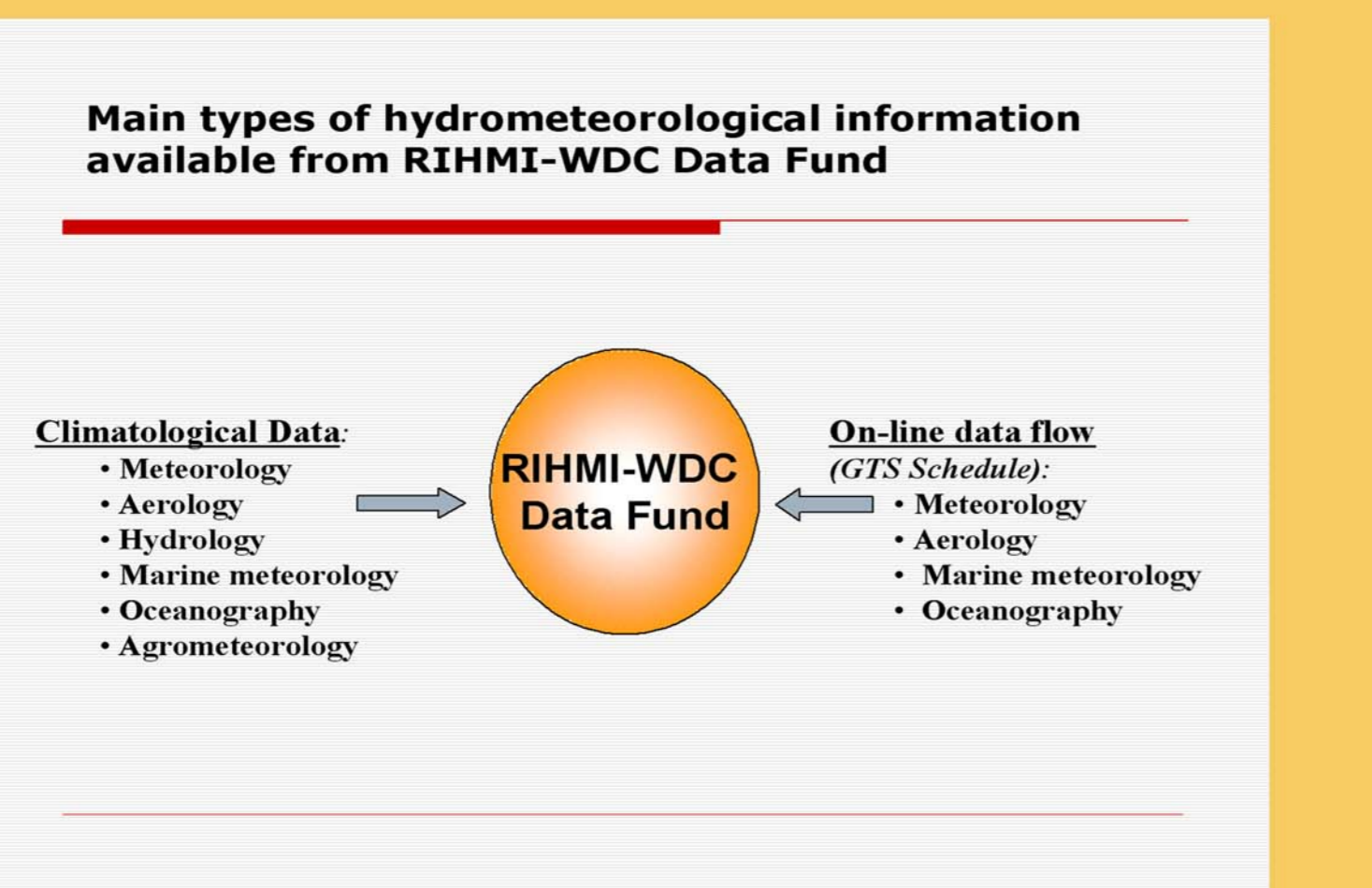
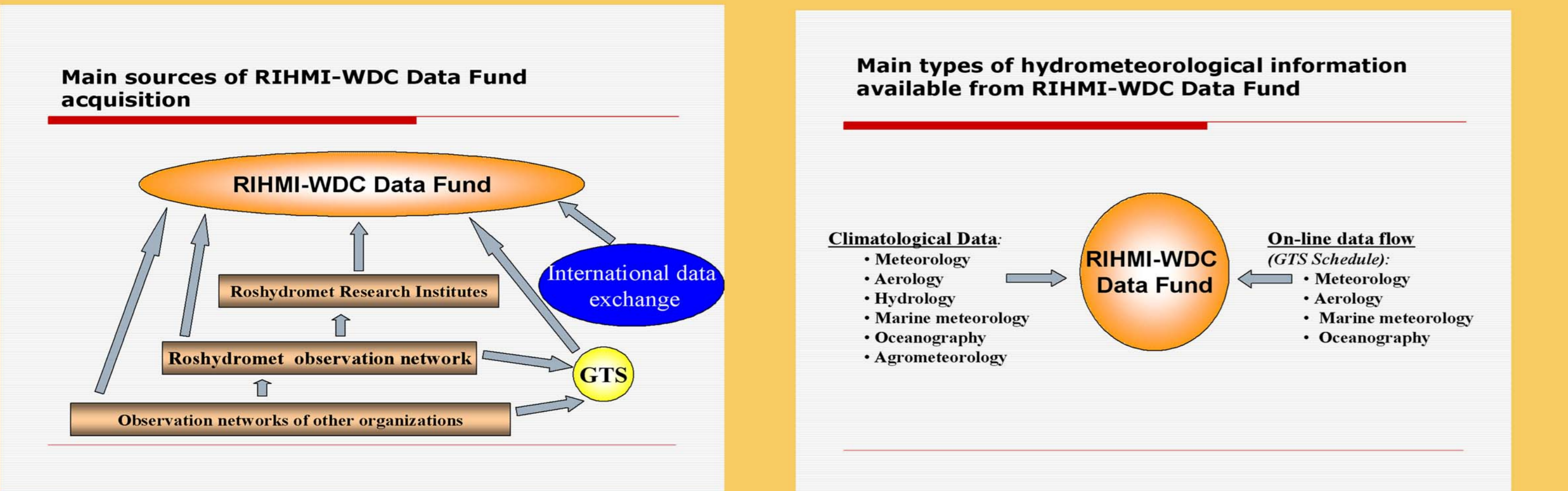
Russian baseline temperature data sets for changes in Northern Eurasia temperature study

V.N.Razuvaev and O.N.Bulygina

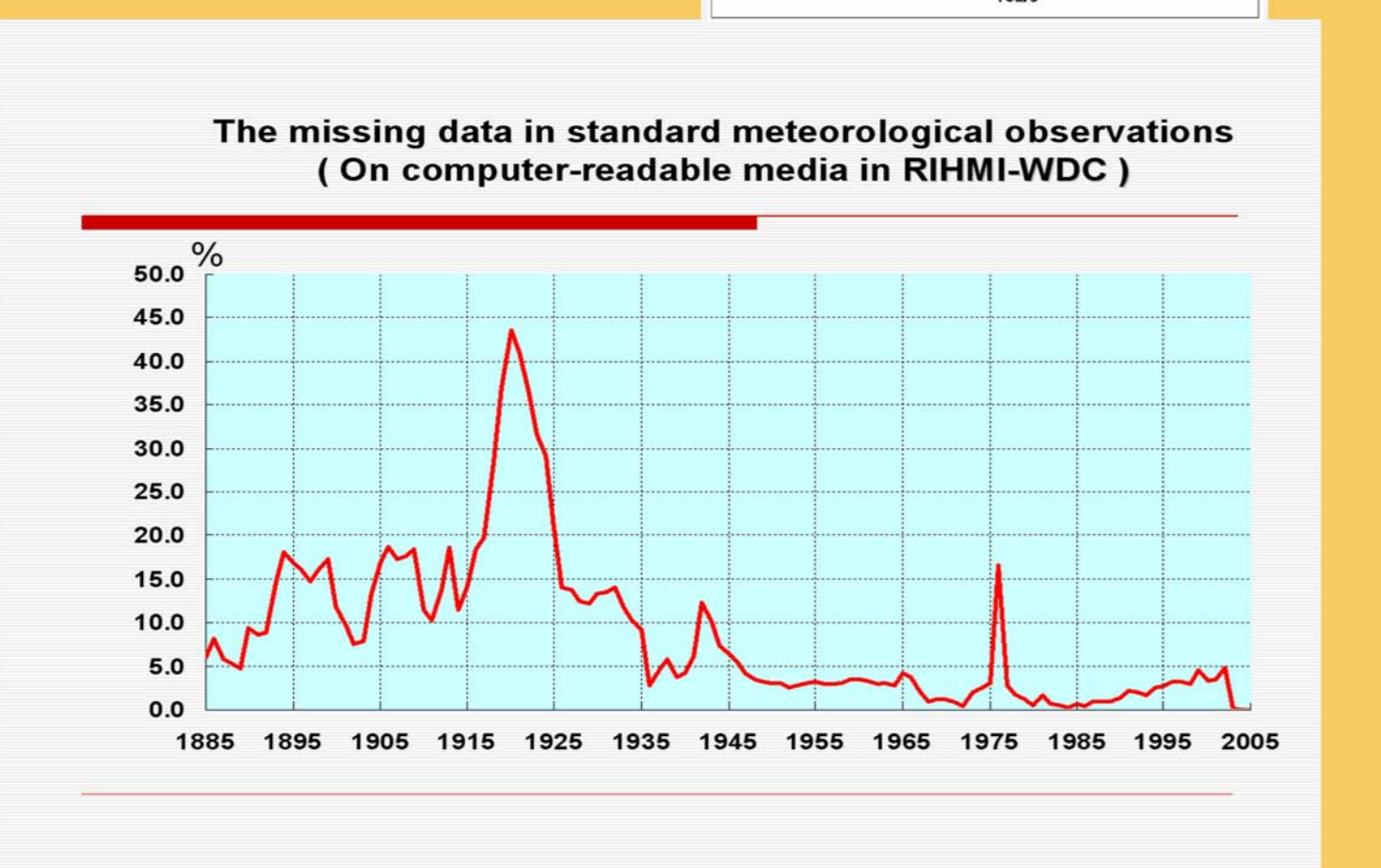
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State Data Fund as a main source for Russian baseline meteorological data sets



- ### Main problems
1. Search of missing data and filling in gaps in State Fund Databases of standard meteorological observations.
 2. Creation of appropriate metadata sets (stations history, physics-geographic description, etc.).
 3. Search and digitizing of non-standard meteorological observations data (meteorological expeditionary data, weather data from old tables forms, snow observations in mountains, etc.).
 4. Creation of specialized high-quality data sets.



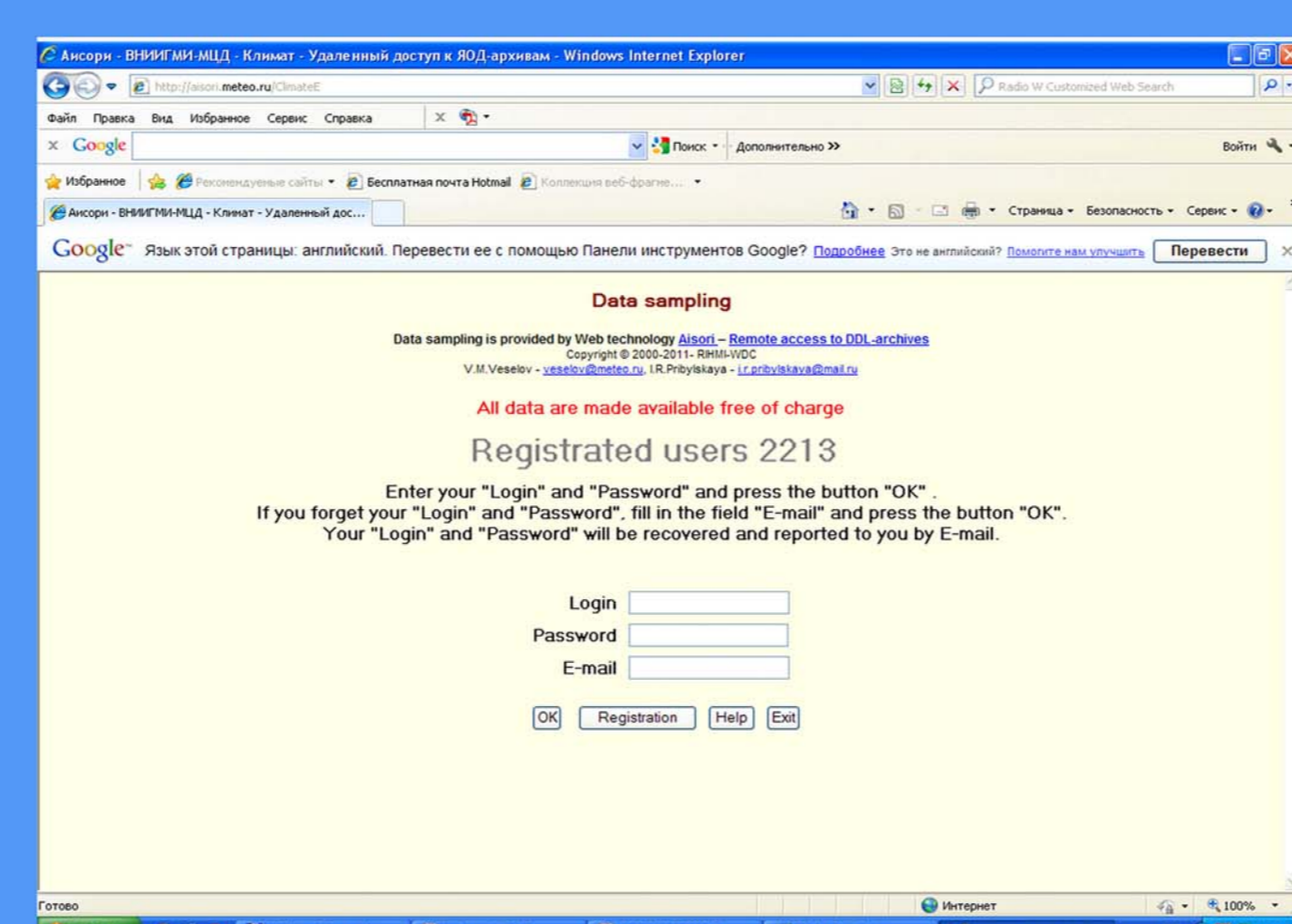
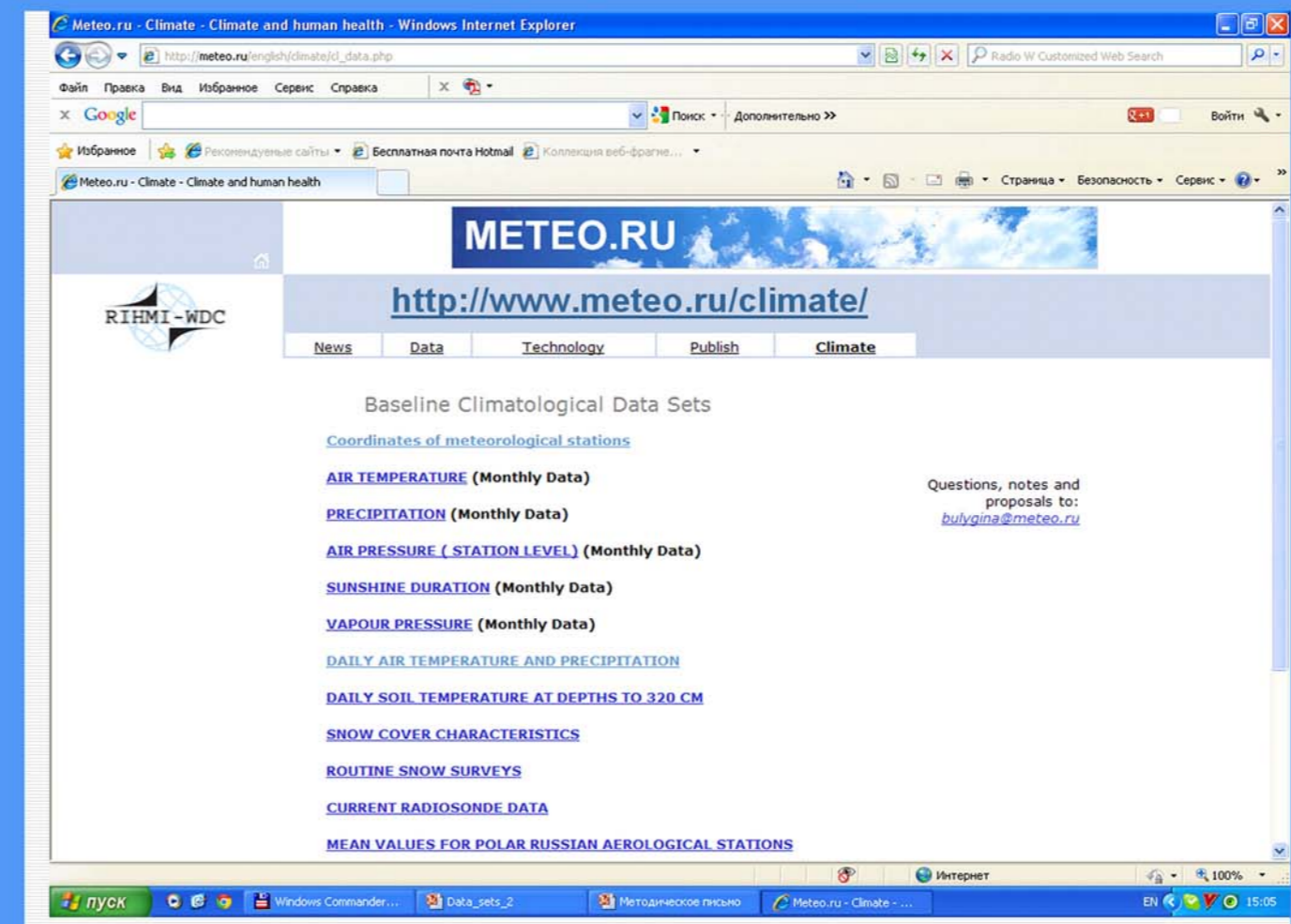
- ### Origin of data inhomogeneity in Russia
- Change in the observation procedure
 - Change in meteorological data processing procedures
 - Instrumental change
 - Displacement of meteorological stations

Meteorological observations in Russia (Change in the observation procedure and change in meteorological data processing procedures)

Years	Times/day	Format
1891 - 1935	Three (7, 13, 21 Local Time)	A
1936 - 1965	Four (1, 7, 13, 19 LT)	B
1966 - 1976	Eight (3, 6, 9... Moscow Time)	C
1977 - 1984	Eight (3, 6, 9... Moscow Time)	D
1985 - 1992	Eight (3, 6, 9... Moscow Time)	E
1993 - now	Eight (3, 6, 9... Greenwich Time)	E

Russian baseline datasets for climatological studies

- ### Creation of specialized high-quality data sets:
- Creation of long-time series of meteorological observations on computer-readable media
 - Data rescue and filling in gaps in databases
 - Formation of metadata sets;
 - Elimination of inhomogeneity in meteorological data series that is caused by the change in observation and processing procedures, instrumental change, etc.
 - Ensuring the opportunity of regular update of data sets with current information.



Record format in data files (MEAN MONTHLY AIR TEMPERATURE DATA SET)

Field number	Position	Field length	Field name	Notes
1	1-5	5	WMO index of station	Fixed for the file
2	7-10	4	Year	
3	12-16	5	Air temperature in January	In °C, accurate within 0.1°C
4	19-22	5	Air temperature in February	
5	24-28	5	Air temperature in March	
6	29	1	Blank	
7	30-34	5	Air temperature in April	
8	35-39	5	Air temperature in May	
9	40-44	5	Air temperature in June	
10	45-49	5	Air temperature in July	
11	50-54	5	Air temperature in August	
12	55-59	5	Air temperature in September	
13	60-64	5	Air temperature in October	
14	65-69	5	Air temperature in November	
15	70-74	5	Air temperature in December	
16	75-78	4	Line end character	

DESCRIPTION OF DAILY AIR TEMPERATURE AND PRECIPITATION DATA SET FROM RUSSIAN METEOROLOGICAL STATIONS OVER THE FORMER USSR TERRITORY (ITTR)

1. Introduction

The first version of the data set was initially created within the framework of the international cooperation between RIHMI-WDC (Russia) and CDIAC (USA) and was published as NDP-040 [1].

The initial version of the data set was created from the list of 223 stations over the former USSR whose data were published in *The USSR Meteorological Monthly* (Part 1: Daily).

The list of Russian stations is prepared based on (a) the List of Roshydromet stations that are included in the Global Climate Observation Network (the List was approved by 31 March 2004) and (b) the List of Roshydromet benchmark meteorological stations that is prepared by V.I. Kodatskiy, Head of Department at Voeikov Main Geophysical Observatory.

O.N. Bulygina, V.M. Veselov, V.N. Razuvaev and T.M. Aleksandrova

DATASET DESCRIPTION OF HOURLY METEOROLOGICAL VARIABLES OBSERVED AT THE RUSSIAN METEOROLOGICAL NETWORK

1. Introduction

The data set was compiled using the machine-readable media stored in the National State Hydrometeorological Archive of the Russian Federation.

The list of stations includes (a) the Roshydromet stations from the Global Climate Observation Network (their List was approved by the Head of Roshydromet on 25 March 2004) and (b) the Roshydromet benchmark meteorological stations prepared by V.I. Kodatskiy, Head of Department at Voeikov Main Geophysical Observatory. This list and related metadata can be found in file "Information on Meteorological Stations" on the same web site.

The dataset is regularly updated and the errors detected are corrected. The information about these corrections is available in file "Detected and corrected errors" on the same web site.

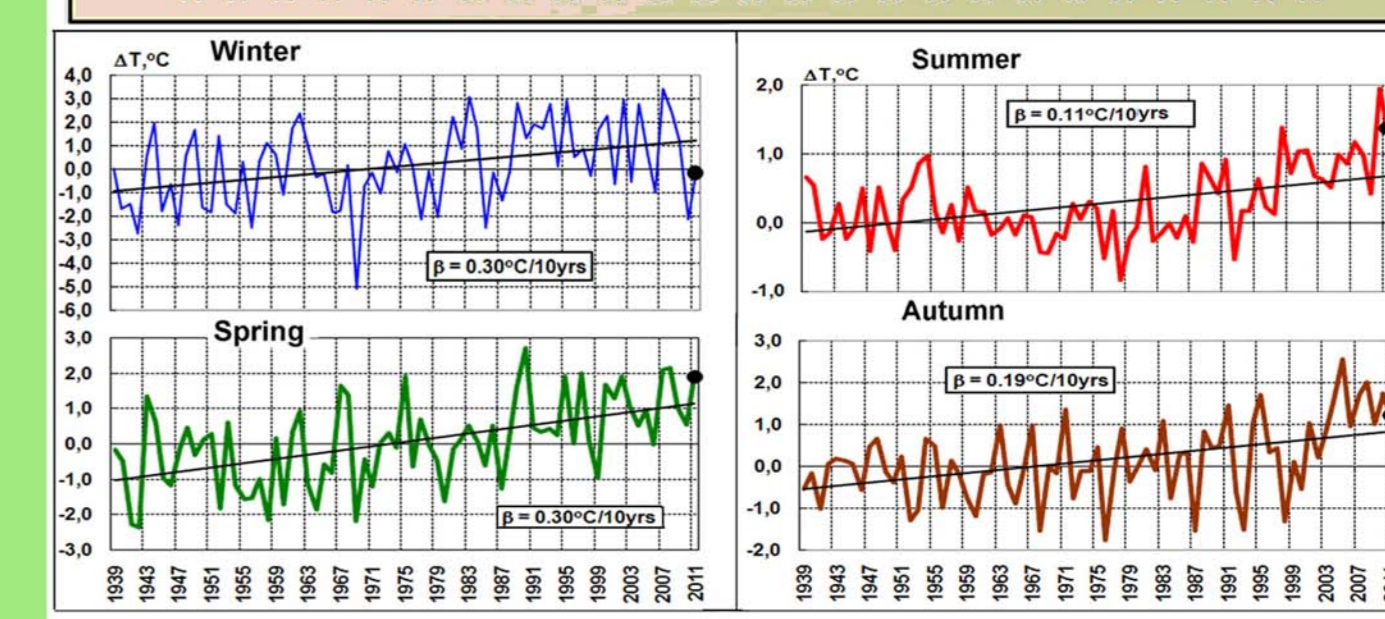
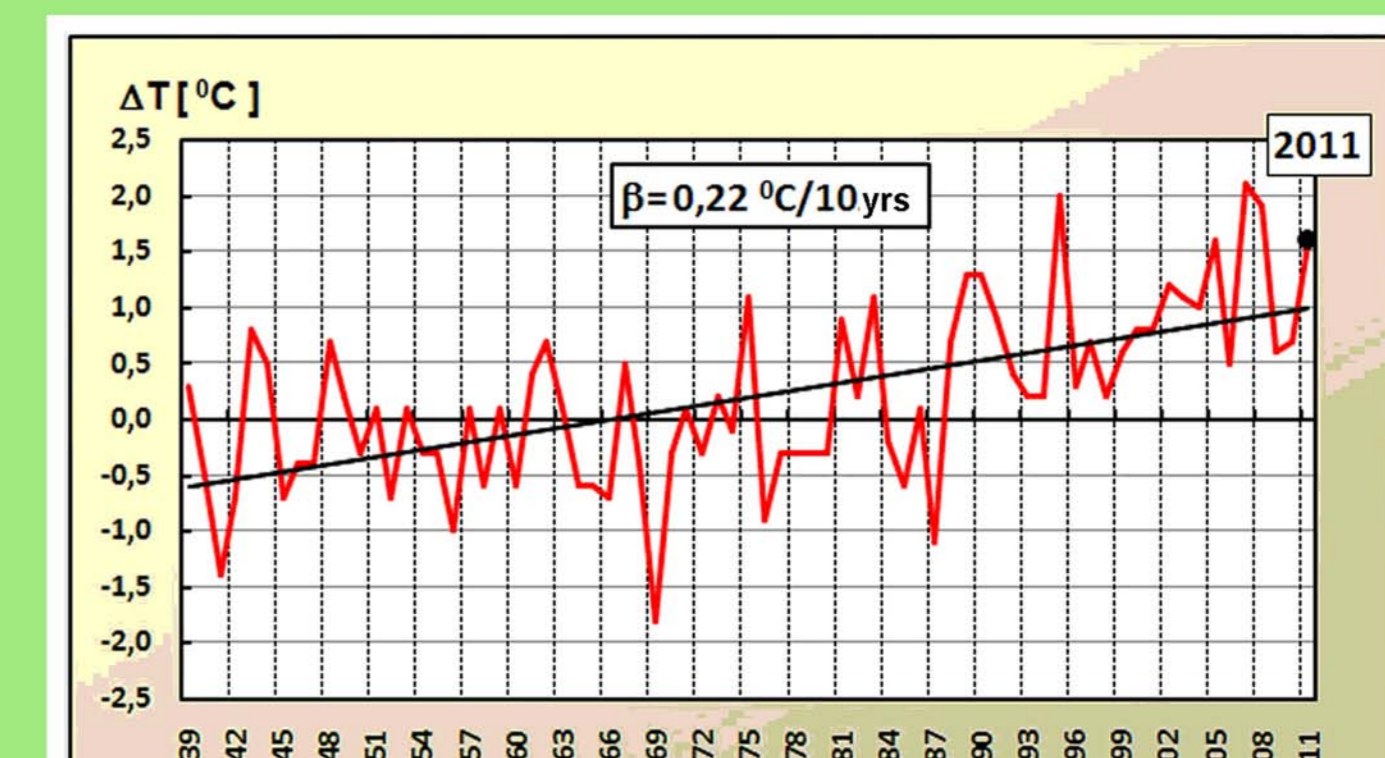
Any comments and recommendations concerning this data set can be forwarded to RIHMI-WDC, namely to:

Vyacheslav N. Razuvaev, Head of Climatology Department, email: razuvaev@meteo.ru or Olga N. Bulygina, Leading Researcher of Climatology Department, email: bulygina@meteo.ru

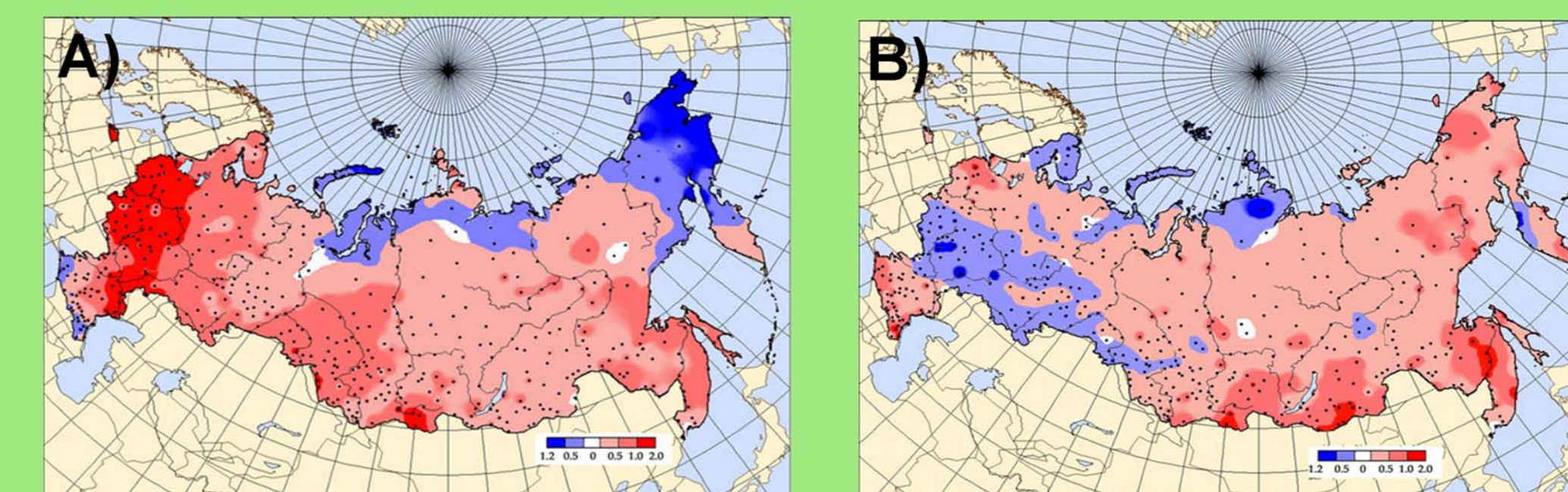
Record format in data files

Field number	Position	Field length	Field name	Notes
1	1-5	5	WMO index of station	Fixed for the file
2	6	1	Blank	
3	7-10	4	Year	
4	11	1	Blank	
5	12-13	2	Month	
6	14	1	Blank	
7	15-16	2	Day	
8	17	1	Blank	
9	18	1	TTLAG - group quality flag for air temperature indices	See Table 2
10	19	1	Blank	
11	20-24	5	TMIN - minimum daily air temperature	In °C, accurate within 0.1°C
12	25	1	Blank	
13	26	1	QTMIN - quality flag for TMIN	See Table 3
14	27	1	Blank	
15	28-32	5	TMEAN - mean daily air temperature	In °C, accurate within 0.1°C
16	33	1	Blank	
17	34	1	QTMEAN - quality flag for TMEAN	See Table 3
18	35	1	Blank	
19	36-40	5	TMAX - maximum daily air temperature	In °C, accurate within 0.1°C
20	41	1	Blank	
21	42	1	QTMAX - quality flag for TMAX	See Table 3
22	43	1	Blank	
23	44-48	5	R - daily total precipitation	In mm, accurate within 0.1 mm
24	49	1	Blank	
25	50	1	CR - additional flag for R	See Table 4
26	51	1	Blank	
27	52	1	QR - quality flag for R	See Table 3
28	53-54	2	Line end character "n"	

Temperature variations over the Northern Eurasia area (subdaily, daily and monthly data)



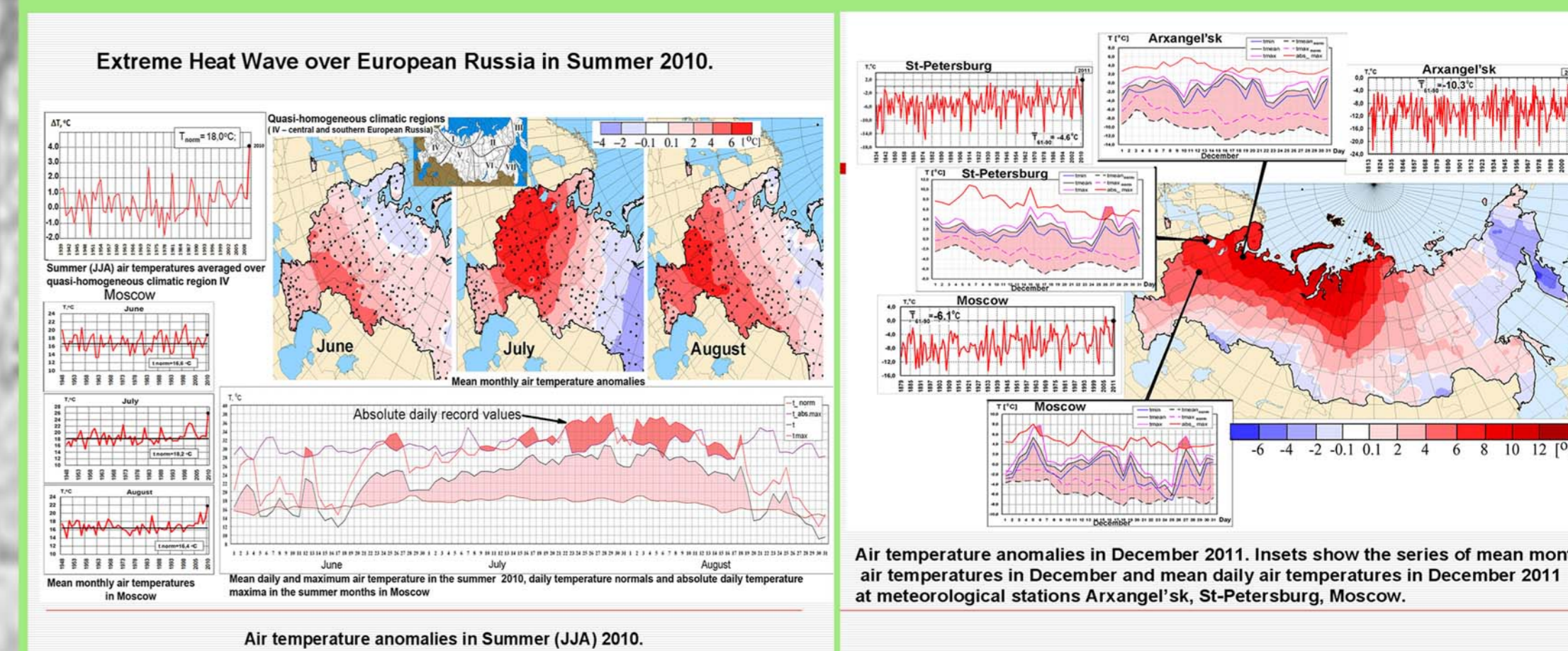
Anomalies of mean annual and seasonal air temperatures averaged over the Russian territory for the period 1939-2011 (base period: 1961-1990)



Linear trend coefficient (days/10 years; 1%-5% significance level) in the time series of days with anomalously high air temperatures. Time period 1951-2006. A) Summer (June-August). B) Winter (December-February).

(Bulygina O.N., Razuvaev V.N., Korshunova N.N., Groisman, P. Ya., 2007: Climate variations and changes in extreme climate events in Russia., Environ. Res. Lett. 2 N4 (October-December 2007)045020, 7 pp.)

Monitoring



Extreme Heat Wave over European Russia in Summer 2010. Air temperature anomalies in Summer (JJA) 2010. Air temperature anomalies in December 2011. Insets show the series of mean monthly air temperatures in December and mean daily air temperatures in December 2011 at meteorological stations Arxangel'sk, St-Petersburg, Moscow.