Core-Climax Coordination Meeting Towards a Global Archive of Historical In Situ Snow Data
ECMWF, Shinfield Park, RG2 9AX, Reading, United Kingdom 17-19 November, 2014

DATA HOLDINGS AT ROSHYDROMET

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RUSSIAN RESEARCH INSTITUTE FOR HYDROMETEOROLOGICAL INFORMATION – WORLD DATA CENTER (RIHMI-WDC)

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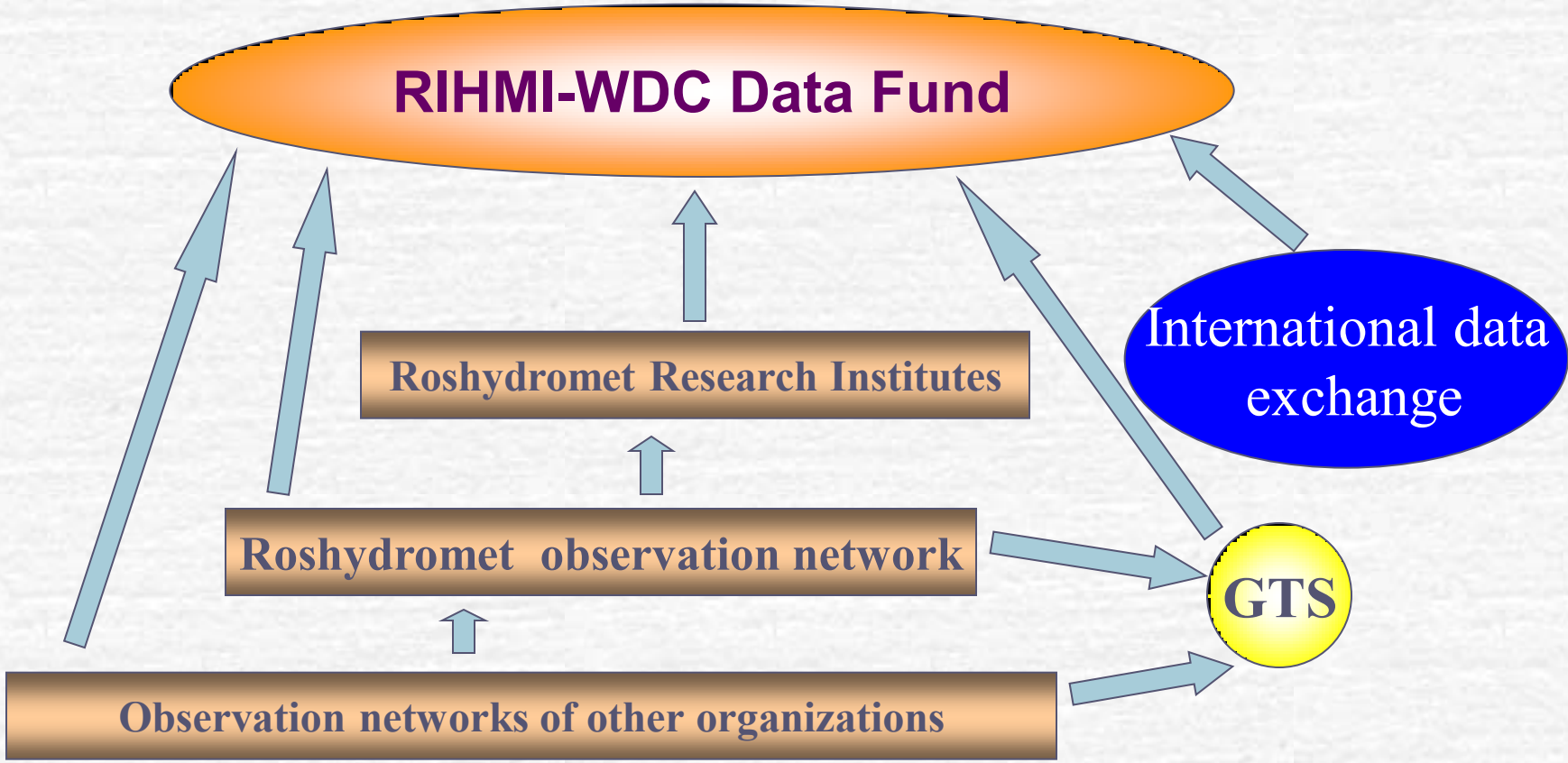
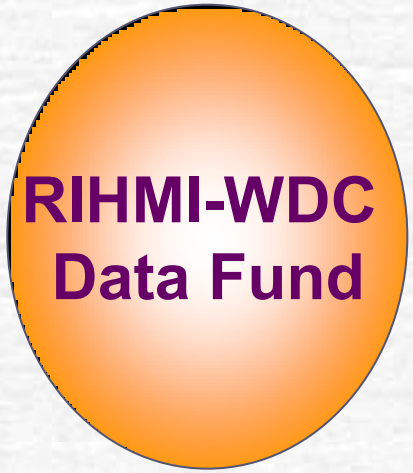
Main sources of RIHMI-WDC Data Fund acquisition: where do we get information from



Main types of hydrometeorological information available from RIHMI-WDC Data Fund

Climatological Data:

- Meteorology
- Aerology
- Hydrology
- Marine meteorology
- Oceanography
- Agrometeorology

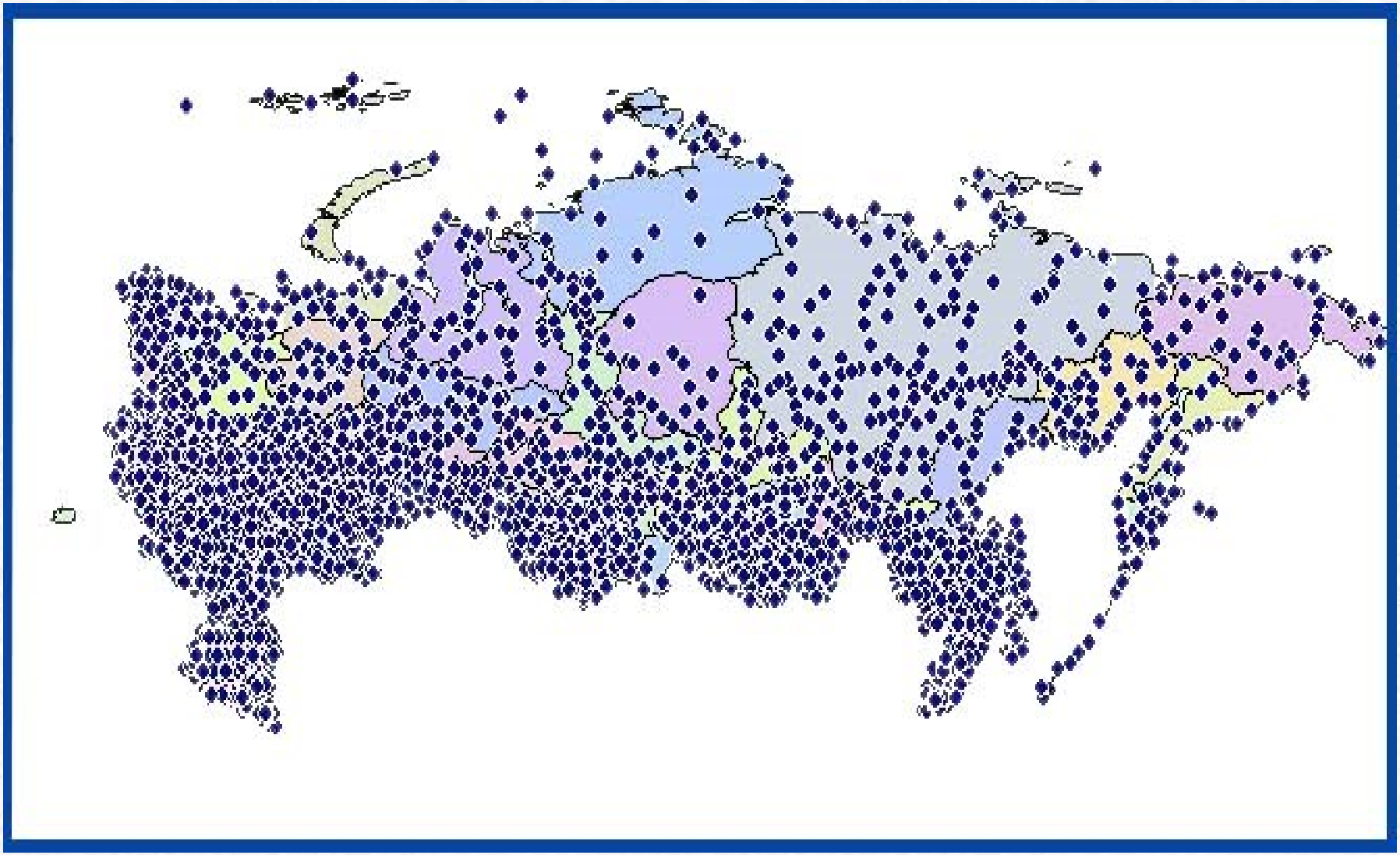


On-line data flow
(GTS Schedule):

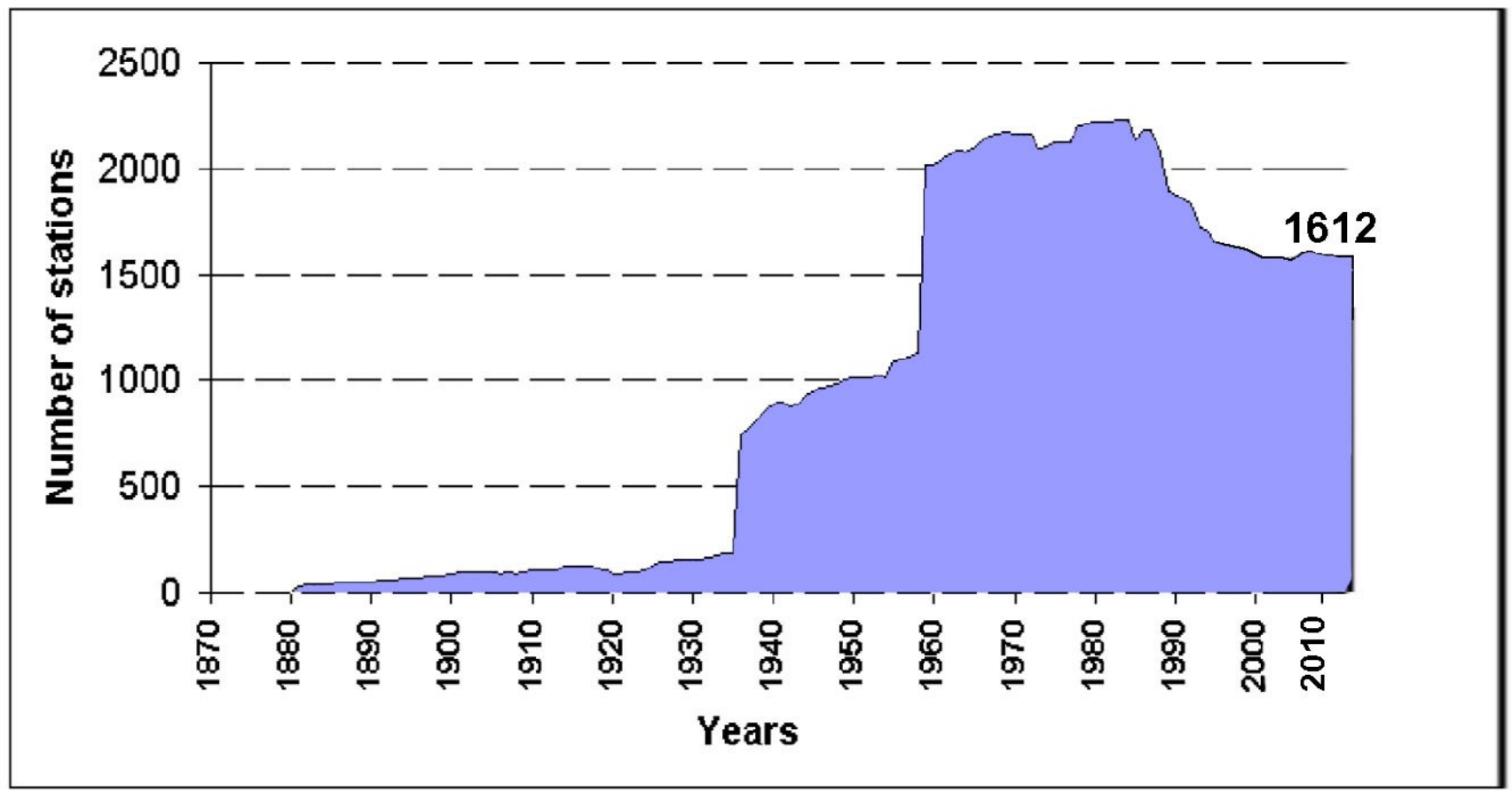
- Meteorology
- Aerology
- Marine meteorology
- Oceanography


2 356 000

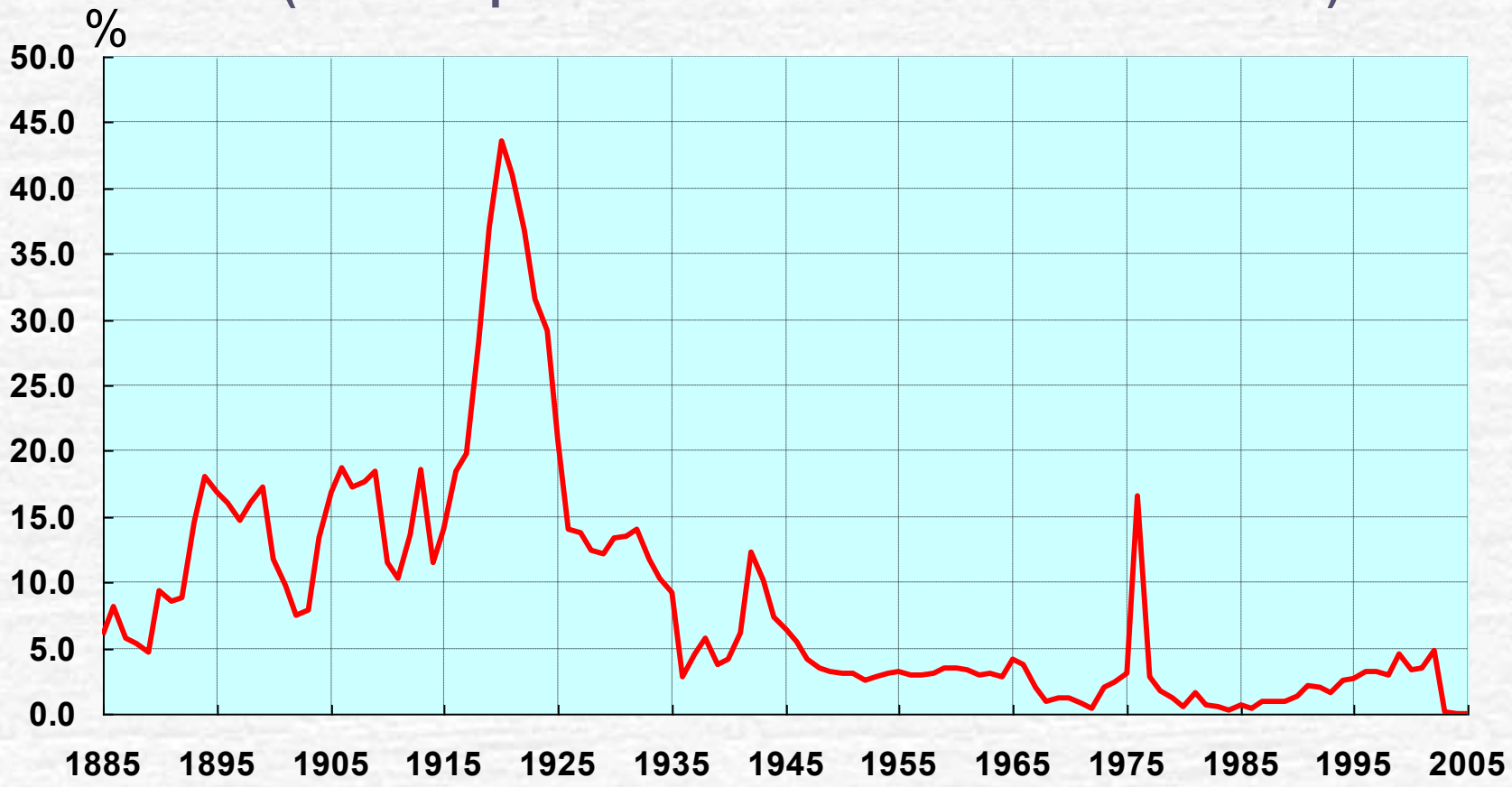
Meteorological stations in Russia



Meteorological stations



The missing data in standard meteorological observations (On computer-readable media in RIHMI-WDC)



Historical in situ snow cover observations

•Regular snow observations have been conducted at Russian meteorological stations since 1882.

•Daily snow observations at meteorological stations include snow depth measurements, determination of the amount of snow covering the area around a meteorological station and determination of the snow cover characteristics.

• The daily snow depth was calculated by averaging the readings on the three rods, rounded to the nearest whole cm.

• The snow cover extent over the near station territory and the snow cover characteristics are visually determined **at morning observations (at 06.00 UTC)**.

•The amount of snow covering the visible area around a meteorological station is estimated on a scale of one to ten (10–100%; or zero in the absence of snow). That is not the case before August 1959 – there were only two values

•The history of methodic changes is rich! This is a source of inhomogeneities!

Historical in situ snow cover observations

- In addition to daily snow observations, snow course surveys are performed at meteorological stations. The course length is 2000 or 1000 m in the field and 500 m in the forest. The snow cover depth is measured every ten meters in the forest and every 20 m in the field. Snow density at the 1000 and 500 m courses is measured every 100 m and at the 2000 m course, every 200 m.

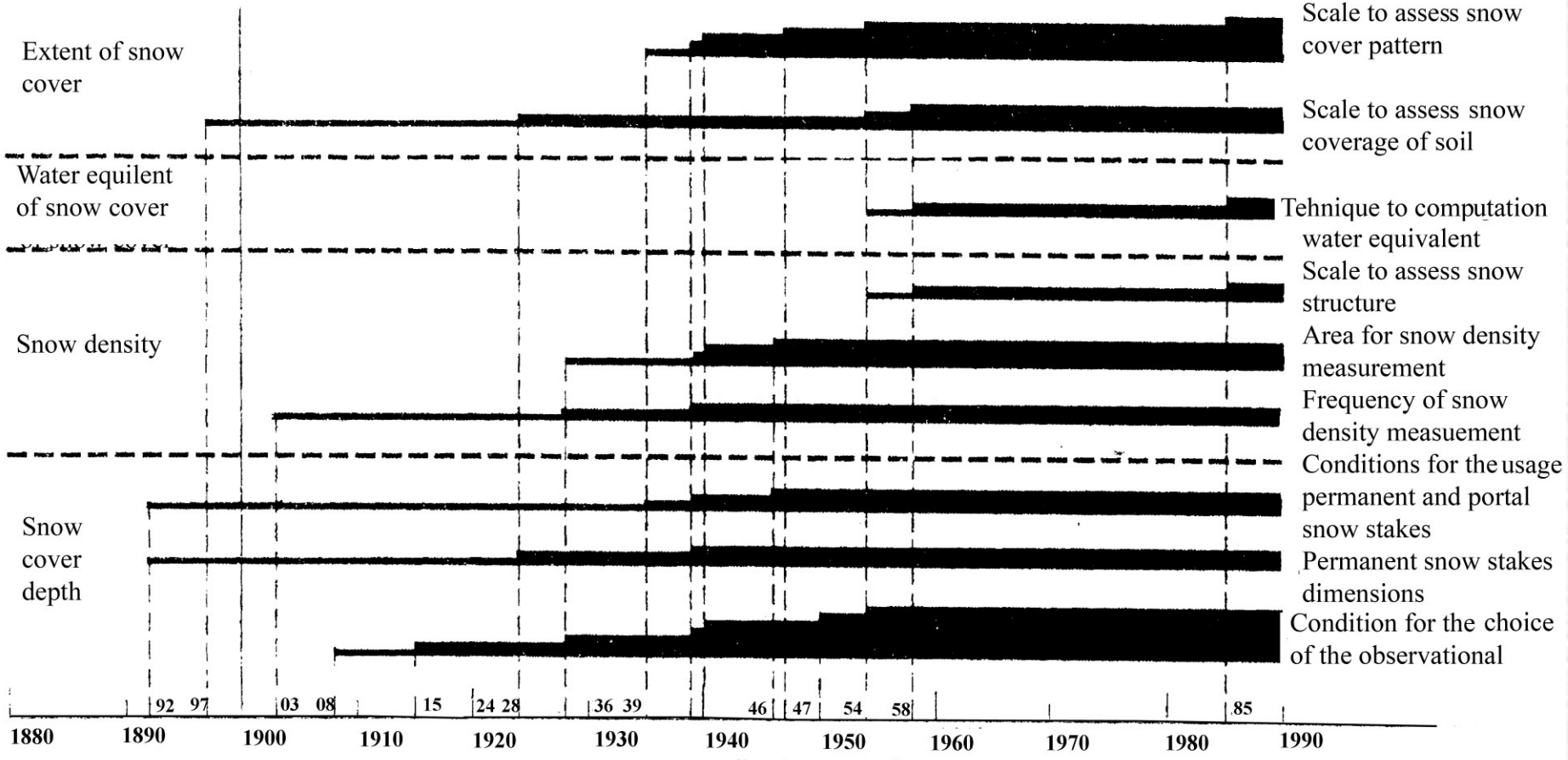
- Snow course surveys determine snow depth and density, snow water equivalent, ice crust and saturated snow thickness, the amount of snow and ice crust covering the course, and the state of the underlying ground.

- **Snow surveys are conducted every ten days,** when no less than half the visible area around the station is covered with snow.

- **In spring, before and during snowmelt, measurements are made every five days. In the forest, until 20th January, measurements are made once a month, on the 20th.**

- Measurements of snow density and snow water equivalent have been made from snow course surveys since 1930.

Dates of changes in techniques of measuring snow cover characteristics



Origin of snow data inhomogeneity in Russia

Snow cover depth:

- Different condition for the choice of the observation place (number and type)
- Different snow measuring rods (number and type)

Snow density:

- Different conditions for snow density measurement (place, frequency)

Snow water equivalent :

- Different technique to computation

Extent of snow cover around the station:

- Different measurement procedures

Creation of specialized high-quality data sets (steps, requirements, outcomes):

- 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.

Baseline Climatological Data Sets

http://www.meteo.ru/climate/

Two main baseline snow data sets:

1. **Data Set "Snow Cover Characteristics From Russian Meteorological Stations and from some meteorological station Over The Former USSR Territory" – 600 station**

2. **Data Set "Route snow surveys" – 517 Russian meteorological station (The data set contains data for 1966 – 2013)**

The contents and format of data set of snow cover characteristics for stations site observations

Field number	Field contents	Notes
1	WMO index of station	
2	Year	
3	Month	
4	Day	
5	Snow depth	In cm
6	Extent of snow cover around the station	In numbers on ten-number scale, see Table 2 on next slides
7	Q- Complementary flag of snow depth	See Table 3 on next slides

Table 2

Extent of snow cover around the station

Observation period	Extent of snow cover around the station	Value Q
Before July 1959	50% and less than 50% of the area around the station	0
	More than 50% of the area around the station	1
From August 1959 up to the present day	Extent of snow cover around the station is estimated from ten-number scale. For example, the lack of snow is 0, 20% of the area around the station covered with snow is 2, 50% of the area around the station covered with snow is 5, etc.	From 0 to 10

Table 3

Complementary flag of snow depth

SITUATION	FLAG
Value of snow depth is correct	0
Continuous snow melting	1
Snow cover absent at site, however there is snow in the neighbor vicinity and a state of it is specified.	2
Snow cover is less than 0.5 cm	3
Observations were not made or value is rejected	9

The format of data set of snow cover state characteristics

N	Field contents
1	Index WMO
2	Latitude
3	Longitude
4	Year
5	Month
6	Day
7	Route (Path) type 1 - field environment; 2 - forest environment; 3 – ravine (canions)
8	Extent of snow cover over route surroundings (0 -10)
9	Extent of snow cover along a route (0-10)
10	Extent of crust along a route (0-10)

N	Field contents
11	Snow cover depth average (sm)
12	Snow cover depth maximum (sm)
13	Snow cover depth minimum (sm)
14	Snow density (g/sm^A3)
15	Thickness of crust layer (mm)
16	Thickness of water-inundated snow cover (sm)
17	Thickness of pure water (sm)
18	Water equivalent of snow cover (mm)
19	General water amount (mm)
20	Snow covering type
21	Snow cover type

The data set contains data for 1966 - 2013.

Concluding remarks

- Rich history of snow observations over the territory of fUSSR
- Along this history, numerous changes of methodic leading to inhomogeneities
- Snow observations provide both quantitative and qualitative characteristics: qualitative characteristics are especially difficult to be homogenized, unified, compared, etc.
- This is also the case for quantitative characteristics
- We need to be careful in our plans to have unified snow database!

ВНИИГМИ-МЦД

THANK YOU!