WMO WIGOS (Global Observing System) in adaptation to the conditions of Belarus

Dr. Maria Germenchuk
PR with WMO of Republic of Belarus

Minsk 2017

Contents:

* 1. Main goals of the NHMS of Belarus;
* 2. WIGOS an NHMS of Belarus;
* 3. Actual information needs in the field of hydrometeorological security, environmental and radiation safety in the Republic of Belarus;
* 4. Solutions;
* 5. Problems.

Statutory goals of the State National Hydrometeorological Service of the Republic of Belarus

* Monitoring, assessment and forecasting of weather;
* Hydrological observations, assessment and prediction of hydrological parameters;
* Agrometeorological observations, assessment and prediction of agrometeorological parameters;
* Climate services within the framework of GFCS;
* Control of radioactive contamination of the environment;
* Environmental and radiation monitoring.

Main goals of the NHMS of Belarus (1):

* Provision of hydrometeorological, ecological and radiation safety of the environment with optimal use of available resources by:
* improvement of the legal framework;
* institutional reforms of NGMS;
* modernization of observing networks;
* improvement of weather, water and environmental contamination forecasting new technologies, including radioactive monitoring;
* improvement of early response systems, including the creation of a "storm ring" system at the external borders of Belarus;

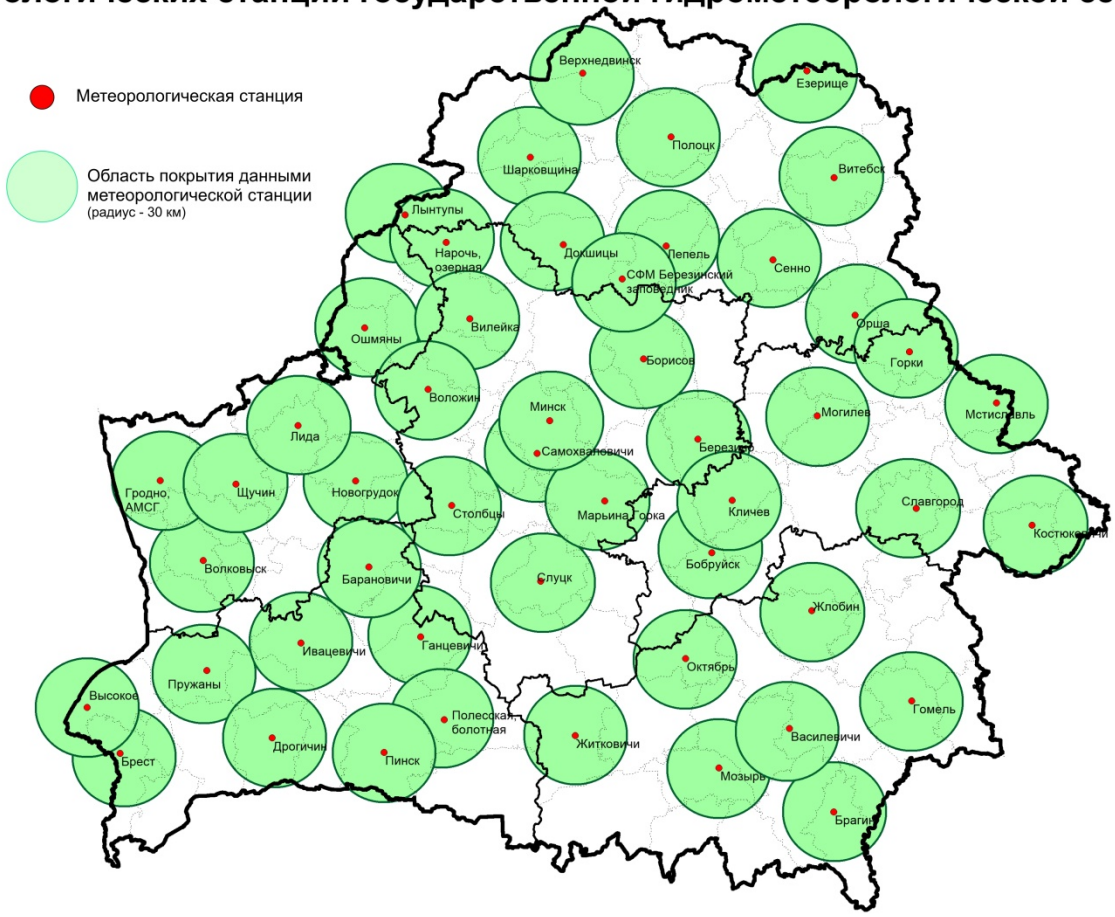
Main goals of the NHMS of Belarus (2):

* climate services within the framework of GFCS;
* automation of observing systems, integration of hydrometeorological, environmental and radioecological observations over the state and pollution of the environment in Belarus;
* effective service of hydrometeorological consumers. ecological and radiation-ecological information in accordance with the specific needs of each information group.

WIGOS and NHMS of Belarus (1)

* Existing situation: the network was crammed in the early to mid-20th century and met the needs of the former USSR, especially hydrology.
* Conclusion: the current one does not meet the current needs of users.
* Suggestions: it is necessary to expand the system of meteorological assessments to at least every municipal district (now are 51 points, but 117 are needed). It should be noted that the existing coverage of the country's territory by meteorological observations is in accordance with the recommendations of WMO.
* Goals: (1) Detail short-term, medium and long-term weather forecasts in a changing climate and (2) early warning of adverse and dangerous meteorological events.

Карта - схема покрытия территории Республики Беларусь наблюдениями метеорологических станций государственной гидрометеорологической сети



WIGOS an NHMS of Belarus (2)

* Hydrometeorology: a network of observations was formed to solve the problems of the 20th century and the forays of the former USSR. It need change for : (1) to study the changes in the water resources of Belarus in a changing climate and (2) earlier warning about unfavorable and dangerous hydrological phenomena.
* Agrometeorology: introduction of new types of forecasts: (1) running out changes in agroclimatic resources; (2) introduction of new technologies (satellite, radar) for "routine" prediction of agroclimatic parameters.

WIGOS an NHMS of Belarus (2)

New: according to the main WIGOS paradigm: (1) combining meteorological, hydro, environmental and radiation environmental monitoring networks that previously operated autonomously in the national hydrometeorological service of Belarus; (2) use of networks of other public networks of hydro, meteorological, environmental and radiation observations of partner organizations (3) initiation and creation of voluntary networks of hydro, meteorological, environmental and radiation observations.

Actual information needs in the field of hydrometeorological security, environmental and radiation safety in the Republic of Belarus

Methods for assessing information needs in the field of hydrometeorology, control of radioactive contamination and environmental monitoring:

* requests of government bodies (the President of the country, the Council of Ministers, ministries, courts, prosecutors, municipal authorities and so on);
* requests of economic entities (41% of Belarus' gross domestic product is generated by weather-dependent sectors);
* inquiries of individuals;
* expert assessments;
* questioning of individuals and economic entities, using on the Internet;
* analysis of international experience and best available practices and methods.

METEO:basic information needs

* Weather forecast: maximum spatial detail and the maximum lead time. Our numerical development capabilities allow us to calculate the parameters in increments of 3 km, the nearest goal is the forecast for 117 municipal areas, with an estimate of the probability of precipitation.
* Problem: insufficient dense network of surface observations.
* According to the WIGOS paradigm
* (1) to install new automatic stations for the simultaneous measurement of meteorological parameters and parameters of atmospheric air pollution,
* (2) equipping the existing atmospheric air monitoring stations and radiation monitoring stations with meteorological sensors operating according to the standard observation program, the relevant WMO recommendations.
* Today our reliable service gives forecasts for 1, 3 and 5 days. As a rule, this is enough for most consumers. However, there is a need for a forecast for the month, the growing season for agriculture, transport, energy services. Today, our service can not even give a satisfactory forecast with the help of the North-Asian Climate Center.

AGROMETEO: basic information needs

* Agrometeorological forecast: maximum spatial detail and maximum lead time for forecasting weather conditions (in winter - for spring months, in spring - for all summer, etc.).
* At present, we can offer a forecast of the yield of the main crops, including using satellite technologies.
* However, the main problem is the complexity of insuring damage from weather conditions.

HYDRO: basic information needs

* The assessment of the hydrological situation requires new approaches to the organization of observations and new observation technologies.
* Unfortunately, today the network does not fully meet the needs of the country, surveillance needs to be transferred to new automatic technologies. However, while the cost of manual labor is lower than automated observations, this process will not quickly go.
* From the point of view of WIGOS, we have already implemented in the practice of operational meteorological observations the use of data on temperature and precipitation, measured at hydrological posts. This organizational decision made it possible to increase the number of points where precipitation measurements are carried out from 51 to 138.
* In addition to receiving operational information on precipitation and temperature, this allowed (1) to expand the information base for assessing the success of the forecast and (2) to make a detailed map of the fire hazard forecast in ecosystems in the summer.

Ecological and radioactive monitoring: basic information needs

* Information on environmental and radiation monitoring is in demand by all information groups. However, priorities are
* (1) assessment of the current state around environmentally hazardous facilities
* (2) early warning of the threat of emergencies, especially at the Belarusian NPP and
* (3) assessment of environmental contamination in emergencies. Such assessments can be obtained only with sufficient meteorological and hydrological information.
* As a rule, the basic observing systems are not focused on hydrometeorological monitoring of radiation-hazardous objects, therefore, specialized systems are created. It is very important that such systems work according to standard observation programs and become subsystems of national hydrometeorological systems

Solutions:

* In framework WIGOS

The National Hydromet Service of Belarus plans to:

* (1) develop institutional activity;
* (2) improve the legal national base for hydrometeorological activities and environmental monitoring;
* (3) improve the service structure;
* (4) integrate observation and communication networks;
* (5) introduce new observation technologies and forecasting of "double" destination for hydrometeorological and radiation-ecological tasks simultaneously;
* (6) in order to improve competitiveness and strengthened the image of the national hydrometeorological service, the extension of targeted services on the one hand, and on the other hand, the provision of a "unique set of services": weather + climate + hydro + environmental + radiation information

Solutions:

* (7) expansion of observation networks through non-hydrometeorological national services, information cooperation with neighboring countries (Russia, Latvia, Lithuania, Ukraine, Latvia) both to ensure hydrometeorological and radiation-ecological safety.
* (8) the combination of networks of surface observations (meteorological, hydro and radiation-ecological) with meteorological radar systems (in Belarus 3 + the Baltrad system), satellite observing systems (EUMETSAT, BelKA, a group of Russian meteorological satellites) for operational observations and forecasting and evaluation of the success of forecasts .

Solutions:

* Development and implementation of the strategy until 2030 and medium-term programs for the development of the national hydrometeorological service, including on the basis of the WIGOS adapted to the specifics of Belarus;
* Introduction of the ISO 9000-2015 system into practice in full (at present the quality control and quality management systems in the National Hydrometeorological Service of Belarus are successfully implemented in aeronautical meteorology and radiation-ecological monitoring);
* Implementation of bilateral agreements with neighboring countries in the field of hydrometeorology, environmental monitoring, scientific work and training;

Solutions:

* Getting the maximum benefit from our previous association of separate departments for hydrometeorology and monitoring, reducing operating costs, creating a unified communication system, IT and metrological service, etc.
* Creation of a specialized national Internet METEOPORTAL of three-fold designation:
* (1) submission of authorized hydrometeorological and radiation-ecological information, including forecasts and storm warnings (2) creation of a cartographic database for storing GIS; information about the composition and designation of observational sites and observation results according to the M + C + H + E + R and
* (3) collection, processing and storage of information not of the national hydrometeorological network, voluntary observation networks and simply random
* (4) preparation of the justification for the World Bank project to improve the national hydrometeorological service

Problems

* The status of information of non-hydrometeorological and voluntary networks, their meteorological significance;
* Studying the experience of the creation and implementation of national plans of WIGOS in the countries of central and northern Europe;
* Assessment of the need for additional resources for the implementation of WIGOS;
* Implementation of a flexible quality monitoring system for non-hydrometeorological and voluntary networks;
* Participation in regional working groups of WIGOS (it is possible to create a group of experts on the basis of the Eurosian office WMO in Minsk)
* Need increase the human resources of the national hydrometeorological service
* Determination of priorities, targets for the achievement of VIGOS and monitoring of the achievement of goals.