

Mon-21-008

**National Hydrometeorological Service in Ukraine - 100 Years of System Monitoring (1921-2021)**

*V. I. Osadchyi (Ukrainian Hydrometeorological Institute, Kyiv), V. K. Khilchevskiy (Taras Shevchenko National University of Kyiv), \*V. O. Manukalo (Ukrainian Hydrometeorological Institute, Kyiv)*

**SUMMARY**

November 19, 2021, marks the 100th anniversary of the National Hydrometeorological Service of Ukraine. This article presents results of studies devoted to the history of formation and development of multifaceted activities of the Hydrometeorological Service, its importance in ensuring the sustainable socio-economic development of the country. The main attention is focused on consideration of the period that began from 1991 - the year of the proclamation of the state independence of Ukraine and the beginning of formation of the National Hydrometeorological Service. In 1999, the Law of Ukraine "On Hydrometeorological Activity" was adopted, in which the term "National Hydrometeorological Service" appeared firstly. A number of legal acts in the field of hydrometeorological activities were adopted by the Ukrainian Government, modern methods and technologies for conducting meteorological and hydrological observations and forecasting were introduced. In the difficult economic conditions, the Hydrometeorological Service managed to ensure the development in many areas of activities, to maintain, and in some areas, to expand observation networks, to introduce new types of hydrometeorological products and services for end - users. All these measures allowed the Hydrometeorological Service to gain the respect of others hydrometeorological services of Europe and the World Meteorological Organization.



**XV International Scientific Conference "Monitoring of Geological Processes and Ecological Condition of the Environment"**

17–19 November 2021, Kyiv, Ukraine

## Introduction

Data of hydrometeorological services are necessary for assessing a current and expected state of the atmosphere and hydrosphere of the Earth (Convention, 1947). Measurements on networks of hydrometeorological services made it possible to establish a fact of global climate changes and to begin developing recommendations for adapting society to these changes. In 2021, the Hydrometeorological Service of Ukraine will celebrate 100 years. During 1921-2021 it passed a difficult path, at each of periods of which it was necessary to solve new tasks that arose in accordance with time requirements: from the creation of observations networks and programs in 1920-1930 to the development of the National Hydrometeorological Service in the independent Ukraine. The history of the Hydrometeorological Service was considered in publications (Lipinskyi, 2015; Khilchevskiy, Osadchyi, 2016; Manukalo et al., 2019). In particular, authors of the article (Khilchevskiy, Osadchyi, 2016) for the first time substantiates the selection of several periods in its history. *The purpose of this article* is to consider activities of the Hydrometeorological Service of Ukraine since 1991, period of the Ukraine's independence.

## Method of investigation

The article has been prepared on results of the study which was carried out by authors on basis of analysis of Ukrainian publications, as well as their own long-term personal experience.

## Results

### ***1. From the history of the Hydrometeorological Service of Ukraine***

On November 19, 1921, the Government of the former Ukrainian Socialist Soviet Republic adopted a decree "On the meteorological service in Ukraine." In 1929 the Government of the former USSR adopted a decree "On the unification of the hydrological and meteorological services of the USSR". The USSR Hydrometeorological Committee united all hydrological and meteorological services available on the territory of the USSR. In 1929, the Hydrometeorological Committee was created under the Council of People's Commissars of the Ukrainian Socialist Soviet Republic (Table 1).

### ***2. National Hydrometeorological Service in the years of independence of Ukraine***

On August 24, 1991 Ukraine was proclaimed the sovereign state. On November 27, 1991, the Ukrainian Government issued the resolution "On the establishment of the State Committee of Ukraine for Hydrometeorology". The following task of the Committee was determined: "... providing the population, republican and local authorities and management with hydrological, meteorological and other information, forecasting the state of weather, water content of water bodies, pollution of the atmosphere and the natural environment ...". Mr M.P. Skrypnyk was nominated as the Chairman of the Committee. In February 1993 he was replaced by Mr V.M. Lipinskyi, who was also appointed the Permanent Representative of Ukraine to the World Meteorological Organization (WMO). Since 1999, a number of administrative reforms took place, as a result of which the Hydrometeorological Service fell under the jurisdiction of the Ministry of Ecology and Natural Resources (1999-2005), the Ministry for Emergencies and Protection of Population from Consequences of the Chernobyl Disaster (2005-2010). At the end of 2011, within the framework of the next reform the Department of Hydrometeorology was created in the central office of the Ministry of Emergencies without a status of a legal entity. In 2012, this department was already the part of the State Emergency Service of Ukraine.

#### ***2.1. Development of the regulatory framework***

Development of the Hydrometeorological Service took place in difficult conditions: there was no legal basis for its activities; technological equipment significantly lagged behind equipment of services in developed European countries; there was no production of hydrometeorological equipment in Ukraine; there was only one scientific organization - the Ukrainian Scientific Research Hydrometeorological Institute; the budget funding did not cover costs necessary for maintenance and



development of the Service; a number of social issues hindered strengthening of personnel potential.

**Table 1** Periods in the history of the Hydrometeorological Service of Ukraine, 1921-2021 (source: Khilchevskiy, Osadchyi, 2016)

Period	Years	Characteristics of the period
First	before 1920	lack of a unified networks of systematic hydrometeorological observations on the territory of Ukraine
Second	1921-1941	establishment of the Ukrainian Hydrometeorological Service as part of the Hydrometeorological Service of the former USSR.
Third	1941-1945	hydrometeorological support of the Red Army's military operations during World War II as part of military unit of the Red Army
Fourth	1946-1991	Developing and expanding types of observation and forecasts , establishing networks and programs of environmental monitoring. under an auspice of the Hydrometeorological Service of the former USSR
Fifth	1991-2011	activities of the National Hydrometeorological Service in independent Ukraine as a separate governmental body
Sixth	від 2011	the Hydrometeorological Service without a status of a legal entity in the Ministry of Emergencies, since 2012- the State Emergencies Service

To overcome these problems in 1993 measures to stabilize and maintain the functioning of the Hydrometeorological Service in conditions of insufficient financial and logistical support were developed. In 1994, the Concept for development of the Hydrometeorological Service for the period up to 2005 was developed and approved. In 1999, the Verkhovna Rada adopted the Law "On Hydrometeorological Activity", in which: the term "hydrometeorological service" appeared; principles of state policy in the field of hydrometeorological activities were fixed; definition of the state system of hydrometeorological observations was given. A national base of regulatory documents was developed - national and industry standards, guidelines and methodological recommendations.

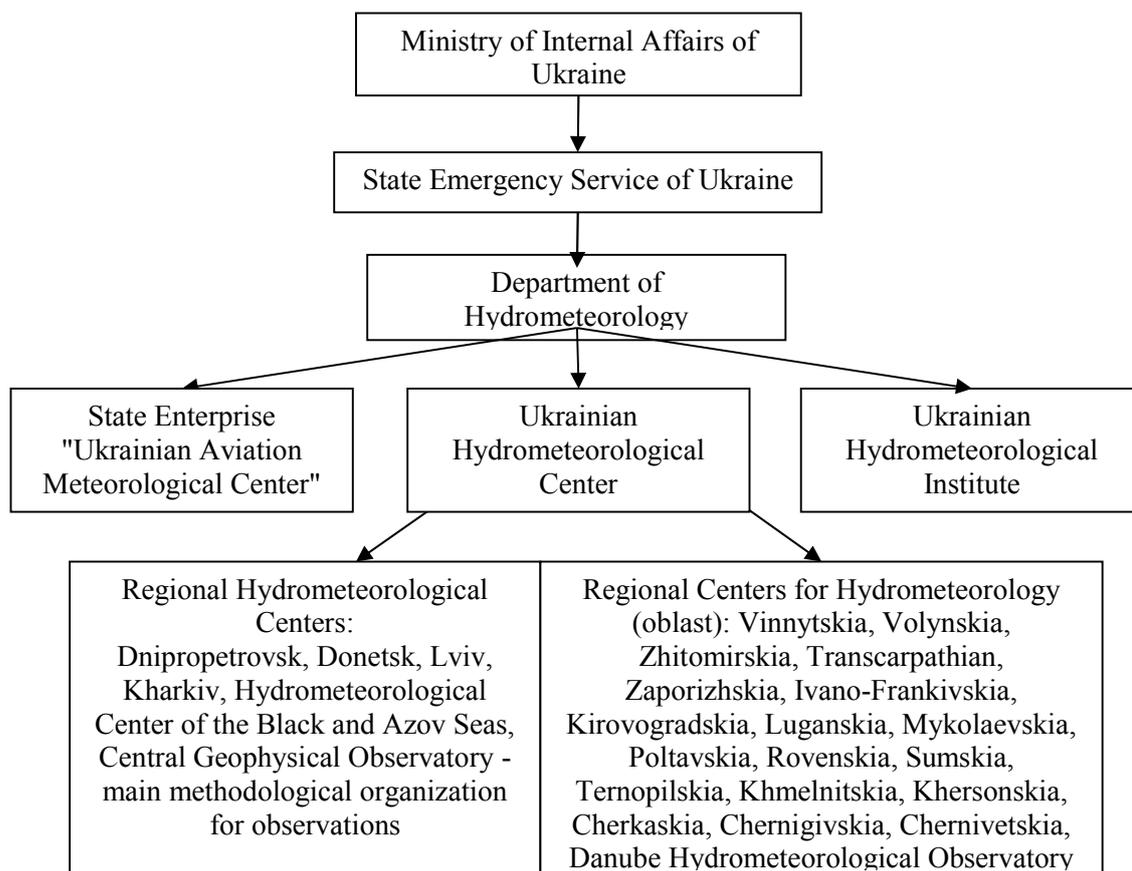
## 2.2. Scientific and technical development and international activities

In formulating the policy of scientific and technical development the following issues were taken into account: needs in new technologies; available researches and production potential of institutions and enterprises of Ukraine. To create a branch of hydrometeorological instrument making, the State Program "Meteorology" was developed (adopted by the Government in 1996 and extended for another five years in 2001). This made it possible to start a re-equipment of the Service with domestic equipment: automated meteorological stations; complexes of radio sounding of the atmosphere; meters of air temperature, atmospheric pressure, cloud base, precipitation intensity; equipment for instruments calibration; automated hydrological posts; a number of instruments for environmental pollution monitoring. The Service was also equipped with technologies of foreign production. The powerful computer was purchased for the Ukrainian Hydrometeorological Center. The first Doppler weather radar was installed in the Ukrainian Aviation Meteorological Center. To strengthen national researches on climate change, the Climate Program of Ukraine was adopted in 1997. Important scientific results were obtained during the implementation of the Program: factors influencing a formation and fluctuation of climate system in Ukraine were studied; preliminary scenarios of possible changes of regional climate for the next 20 and 50 years were developed. Results of the Program were published in the monograph "Climate of Ukraine" (2003). Since 2003, the cooperation between the Hydrometeorological Institute and the EUMETSAT Consortium in the area of using data of polar-orbiting and geostationary meteorological satellites has begun. Since 2007, after the acquisition of a powerful supercomputer, using mesoscale numerical weather forecast models and



models for forecasting wind-wave processes in the Black and Azov Seas has been begun. The Hydrometeorological Service has also paid great attention to international activities, especially the participation in WMO programs and projects. Ukraine has been a founding and member of this international organization since 1948. The Hydrometeorological Service has fulfilled country's obligations on the international exchange of meteorological data. A number of Ukrainian stations are part of the Global Climate Observing System. Ukrainian participants have worked actively in the all WMO technical commissions. Particular attention has paid to participation in WMO regional projects aimed at the development of hydrometeorological services from Eastern and South-Eastern Europe.

### 2.3. Current structure of the Hydrometeorological Service of Ukraine



**Figure** Structure of hydrometeorological organizations as of January, 2021 (source: Osadchy et al., 2021).

The structure of the Hydrometeorological Service is presented in the Figure. Since 2011 the leading role of the Ukrainian Hydrometeorological Center has significantly increased. This Centre manages on operational issues other 25 organizations with status of a legal entity - the planning and control of implementation of plans and programs of observations and forecasting. Director of the Center M.I. Kulbida was appointed the Permanent Representative of Ukraine to WMO. The Ukrainian Hydrometeorological Institute (director V.I. Osadchy) is the only one scientific organization tasked with providing scientific support to all areas of hydrometeorological activities. About 4200 employees work in the Hydrometeorological Service. In 2014, Russia annexed the Crimean peninsula, also provoked hostilities in the East of Ukraine. In connection with which part of the Ukrainian territory is currently uncontrolled by the Ukrainian authorities. As a result, a number of organizations and



observation stations which located in the occupied territories are not under control of the State Emergency Service. This also influenced the quantitative composition of observation network; for example, from 187 meteorological stations after 2014, 162 meteorological stations remained under management of the State Emergency Service (Table 2).

**Table 2** The structure of the observation network of hydrometeorological organizations of the State Emergency Service of Ukraine as of 2016 and 2021

Observation points	Number, units	
	2016	2021
Hydrometeorological observations		
Meteorological stations	162	162
Aviation meteorological stations	22	22
Aerological stations	7	6
Weather radar stations	5	4
Stream gauge on rivers	341	328
Stream gauge on lakes	59	59
Stream gauge on seas	10	13
Monitoring of environmental pollution		
Atmospheric air	129	129
Surface water	201	-*
Sea waters	56	-*

Note: \* - since 2018, a new procedure for water quality monitoring has been approved

## Conclusions

Assessing results of activities of the national Hydrometeorological Service over years the independence of Ukraine it should be say that Service managed not only to withstand in the most difficult in the economic sense of the 1990s, but also to ensure the development in many areas of activity. Nowadays, the world's hydrometeorological services are intensively applying the advanced achievements of science and technologies. This direction of activity has a high top priority for the Hydrometeorological Service of Ukraine too. Obviously that a successful implementation of this ambition goal requires significant investments in the modernization of the Hydrometeorological Service and the education of the highly qualified personnel. The issues of obtaining domestic and foreign investments is currently being considered by the State Emergency Service, the Ukrainian Hydrometeorological Center and the Ukrainian Hydrometeorological Institute.

## References

Convention of the World Meteorological Organization [1947] URL: <https://cils.ui.ac.id/wp-content/uploads/2019/09/Convention-of-the-World-Meteorological-Organization.pdf>

Khilchevskiy, V.K., Osadchyi, V.I. [2016] The National Hydrometeorological Service in Ukraine is 95 years old: the chronology of changes. *Scientific works of the Ukrainian Hydrometeorological Institute*, 269, 173-183. (in Ukrainian).

Lipinskiy V.M. (Ed.) [2015] Hydrometeorological Service of Ukraine. Kyiv. Stal, 292 p. (in Ukrainian).

Manukalo, V.O., Kulbida, M.I., Ivanov, B.O. [2019] Improving the hydrometeorological service of users based on application of modern information technologies. *Ukrainian Hydrometeorological Journal*, 23, 14-24. (in Ukrainian).

Osadchyi, V.I., Khilchevskiy, V.K., Manukalo, V.O. [2021] National hydrometeorological service in Ukraine - century of system observations and forecasts (1921-2021). *Ukrainian Geographical Journal*, 3, 3-11. (in Ukrainian).

