The system of hydrometeorological services in Turkmenistan

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About the system of hydrometeorological services in Turkmenistan

The activities of the Service for Hydrometeorology of the Ministry of Agriculture and Environmental Protection of Turkmenistan are based on the provisions of the Law of Turkmenistan "On Hydrometeorological Activities", which implements the state policy in the field of hydrometeorology and ensures that the needs of the sectors of the national economy, the defense complex and the population of Turkmenistan for information on actual and expected changes hydrometeorological conditions and their negative consequences.

The main tasks of Turkmenhydromet are:

- provision of ministries, departments, public organizations and the population with hydrometeorological information, as well as information on solar activity;
- making forecasts of hydrometeorological phenomena, water content, favorable periods of sowing agricultural crops, taking into account the state of the environment, providing state and public organizations with these data;
- ensuring, in accordance with the concluded interstate agreements, interaction in the field of hydrometeorology and the implementation of scientific and technical cooperation: regular exchange of hydrometeorological information, including in case of natural disasters, a unified methodology of hydrometeorological observations, an agreed technology for collecting and disseminating hydrometeorological information;
- ensuring consistent work in the network;
- fulfillment of international obligations and interactions with the World Meteorological Organization;

- systematic observations of the state of the atmosphere, ionosphere, surface waters (water bodies), crops and pasture vegetation;
- implementation of hydrometeorological support and delivery of the necessary information to ministries, departments, public organizations and the population;
- bringing to them operational information, including information about natural and dangerous hydrometeorological phenomena;
- conducting methodological guidance of network departments for production and information work

b) issues, on a contractual basis, specialized information prepared on the basis of hydrometeorological observations carried out at stations located near the planned agricultural and industrial construction sites;

- maintaining the state hydrometeorological fund;
- compilation and preparation for printing of applied scientific, agroclimatic reference books and yearbooks;

The meteorological network of Turkmengidromet monitors the characteristics of the composition and development of processes in the atmosphere and includes the measurement of meteorological quantities, determines the main characteristics of the most important atmospheric phenomena.

There is a global and regional climate exchange under the international code. Information from meteorological stations is sent to the meteorological forecasting department and the meteorological data department, where all information is processed, analyzed using the "Miss Persona" program for further use in the form of accumulation and generalization of objective data on the meteorological regime of the region.

The Service for Hydrometeorology, in addition to the main elements of the water regime, determines the turbidity of water and the discharge of suspended sediments at 11 river hydrological stations and posts. The data gives an idea of the actual state of turbidity of rivers and are used for the needs of the national economy, in the design of drinking and industrial water supply, irrigation systems. At the request of interested organizations, certificates with water turbidity data are issued.

Turkmengidromet purchased instruments for determining water turbidity KLL-Q, Cheker-2 (manufactured by Seba Hydrometrie), which are necessary for further monitoring of water turbidity.

Monitoring the level of pollution of atmospheric air, soil, surface waters of the land and marine environment, atmospheric precipitation, snow cover, including radioactive contamination within the competence of the Ministry of Environmental Protection, Laboratory of Physical and Chemical Methods of Analysis.

Overview of the current observational system

There are more than 100 hydrometeorological stations and weather monitoring posts in Turkmenistan.

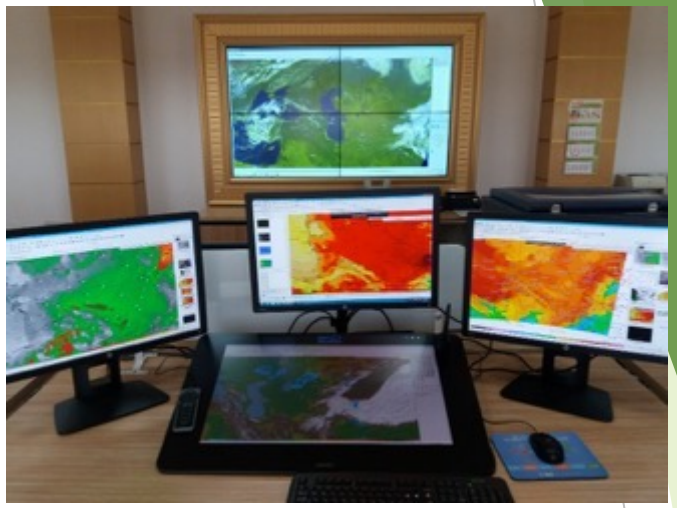
Marine observations are carried out at 8 stations and posts located on the eastern coast of the Caspian Sea. Daily monitoring of air and water temperature, direction, speed and gust of wind, direction and height of waves, direction of swell, visibility, weather phenomena, sea level at the time of observation, minimum and maximum sea level over the past day, ice formation in winter is carried out ... Forecasts are made for 6 stations on the eastern coast of the Caspian Sea. At the end of the year, a reference book is issued in the form of a yearbook on marine observations, for further use by design and economic organizations.

The forecast department carries out round-the-clock work on the analysis and preparation of weather forecasts. A daily bulletin is issued, which provides a forecast for 5 velayats (regions) and the city of Ashgabat for the next 3 days, which includes hydrological and actual weather information, and if necessary, storm warnings are indicated separately. In addition to the hydrometeorological bulletin, the notification of storm warnings is transmitted to the services according to the list approved by the leadership of Turkmenhydromet by fax, mail, telephone. A forecast is also made for a week, for a month, and additional certificates for a specific item are prepared separately upon request. There is a web site on which information products are partly placed. At present, Turkmenhydromet uses calculated data from global and regional models for forecasts in operational practice.

The systematic registration and analysis of information on adverse and dangerous hydrometeorological phenomena observed during the year on the territory of Turkmenistan.

All types of training sessions have a positive effect on improving the operational progress of the Hydrometeorological Service. After completing training seminars within the framework of the professional development program for specialists. the accuracy of short-term and long-term forecasts has increased. The level of accuracy of forecasts based on the established by IBL COSMO makes it possible to more accurately draw up storm warnings about especially dangerous phenomena, in this regard, the circle of users of hydrometeorological information has expanded.

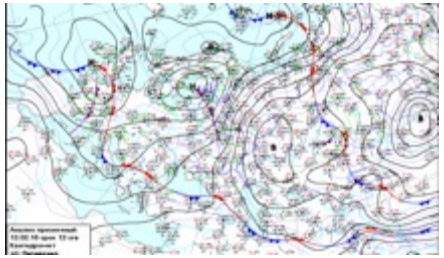
In connection with the orographic conditions and the sharply continental climate of our country, a more accurate prediction using numerical methods is needed to improve the available models.



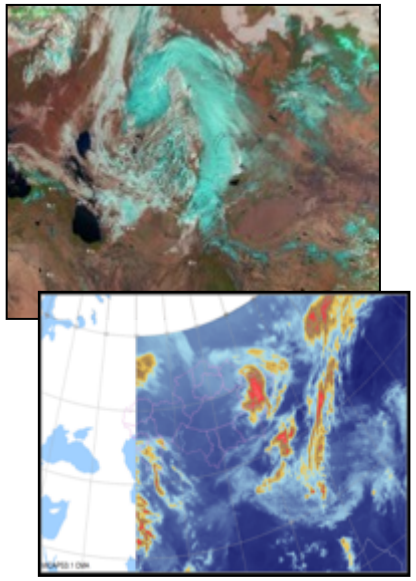
When developing long-term and medium-range forecasts, data from global weather forecasting models are used - the ECMWF model (the global model of the European Center) and the American GFS (Global Forecast System), which exist in the public domain and calculate changes in atmospheric phenomena.

Observations:

- Meteorological stations

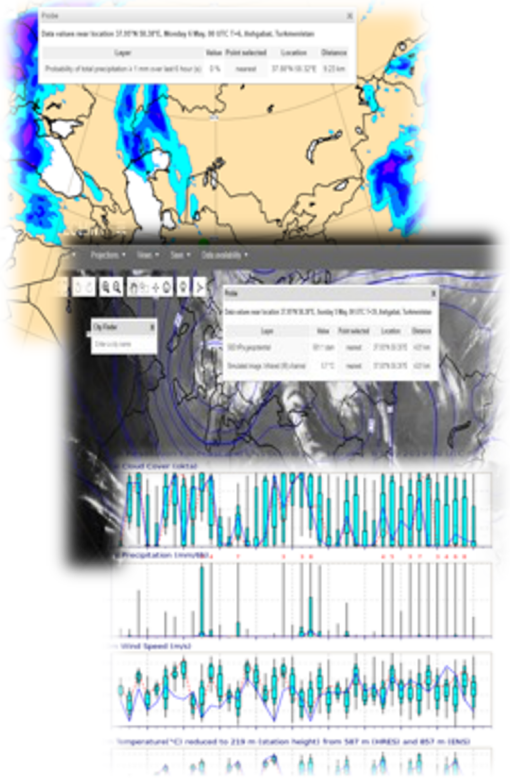


Synoptic maps:

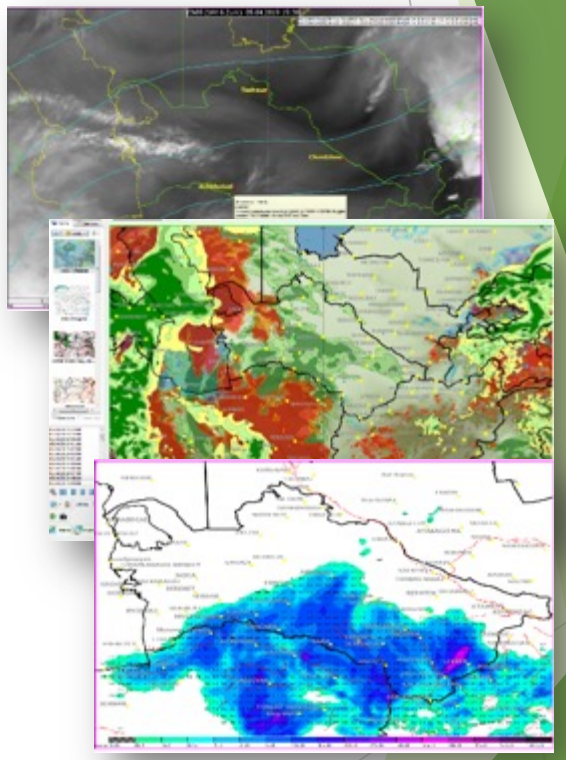


Satellite information:

Eumetsat (Europe)



ECMWF Predictive Products (Europe):



Predictive products of numerical prediction of the COSMO model

Hydrological observations

The objectives of Turkmengidromet include the study and accounting of available water resources, forecasting the state of water bodies, providing the main sectors of the economy with information on the regime of waters in the form of yearbooks and reference books necessary for the effective use of water resources. To solve this problem, the service carries out hydrological monitoring at 33 hydrological stations and posts that conduct standard types of observations during the main observation periods.

Long-term runoff forecasts for the month, season (for the growing and non-growing periods) are made for the rivers of Turkmenistan. Decadal and daily runoff forecasts are made. During the period of spring floods and rainfall floods, 5-day forecasts of water levels (discharges) are made with daily updating. In cold, severe winters, forecasts are made of the timing of the onset of ice phenomena, ice thickness, and the formation of ice jams. In addition to daily bulletins, ten-day and monthly bulletins are issued, which provide a brief overview of the development of hydrological processes for the respective periods.

The main consumer of hydrological information is the State Committee for Water Resources of Turkmenistan. The Service for Hydrometeorology has close interaction with the organizations of this ministry and provides, in accordance with their requirements, hydrological information, i.e. factual data, hydrological forecasts and warnings about hazardous phenomena. As part of the modernization, a gradual re-equipment of the hydrometeorological stations of Turkmengidromet is being carried out, which provides for the widespread introduction of automation of the process of measuring, processing and issuing information to various sectors of the national economy. A significant step in the technical re-equipment of the Hydrometeorological Center of Turkmengidromet is the commissioning of a supercomputer.

- On the basis of bilateral agreements with the Russian Federation, the republics of Kazakhstan, Uzbekistan and Tajikistan, there is a regular exchange of operational hydrological data and forecasts. There is no data exchange in the field of hydrometeorology with the neighboring countries of the Islamic Republic of Afghanistan and the Islamic Republic of Iran.
- Turkmengidromet cooperates with the World Bank, the Regional Environmental Center of Central Asia and with the project of the German Society for International Cooperation "GIZ", joint activities in the Commonwealth of the Caspian States (CASPCOM). Within the framework of these projects, familiarization and training on the use of various modern models (hydrological, agrometeorological, climatic), software, development of a methodology for forecasting river flow are being carried out.
- **Recommendations for Strengthening Cooperation**

- The need for closer regional cooperation.
- Creation of common regional information platforms.
- Educational and scientific events, increasing human resources.
- Complete automation of the Central Asian hydrological network is required to use new tools and apply modern forecasting methods.


Thank you