Заведующий кафедрой

общего землеведения и гидрометеорологии

факультета географии и геоинформатики БГУ

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Ю.А. Гледко

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**Вопросы**

**к зачету по учебной дисциплине**

**«Hydrological Forecasts and Alarm Systems» /**

**«Система гидрологических прогнозов и оповещений»**

**(магистратура англоязычная)**

1. Subject and objectives of the course, connections with other disciplines. Brief historical background. The importance of hydrological forecasts for various sectors of the economy.
2. Organization of hydrological forecasts and information service. Classification of hydrological forecasts. Types of hydrological forecasts. Patterns of hydrological processes and forecasting methods.
3. Principles of statistical assessment of the effectiveness of the methodology and the justification of hydrological forecasts. Forecast release forms.
4. Purpose and content of hydrological information. Information network of stations and posts, composition of observations, transmission of information. Alarm sistems.
5. Short-term forecasts of flows and water levels based on patterns of water movement in the riverbed. Theoretical foundations of the movement of releases, floods and floods.
6. Method of corresponding water levels (flows) for short-term forecast.
7. Methods for short-term forecasting in non-inflow and low-inflow sections of rivers.
8. Methods for short-term forecasting in tributary sections of rivers.
9. Short-term forecasts of water levels and flows based on approximate equations for the transformation of flood waves (general provisions).
10. Linear transformation models for non-supply areas (Muskingum method)
11. Linear transformation models for non-supply sections (Kalinin-Milyukov method, approach curve method).
12. Linear transformation models for inflow sections.
13. Nonlinear models of flood wave transformation. Calculation (short-term forecast) of flow rates and water levels in regulated sections of rivers.
14. Flow forecasts based on data on the stock (volume) of water in the riverbed network of the basin and the influx of water into the river network. General provisions. Theoretical background of the method.
15. Determination of water reserves in the channel network.
16. Flow forecasts based on data on riverbed reserves and water inflow into the river network.
17. Forecasts of water levels and flows using trend methods and decline curves.
18. Mathematical models of runoff formation and their use in hydrological forecasts. General information.
19. Forecasts of spring flood elements of lowland rivers. General patterns and factors in the formation of spring runoff. Determination of water reserves in snow cover and ice crust. Precipitation during the flood period. Total losses of spring runoff.
20. General characteristics of methods for forecasting spring runoff of lowland rivers. Calculation using the water balance equation. Physico-statistical water balance method. Statistical methods.
21. Short-term forecasts of discharges and levels of rainfall floods (general provisions). Patterns of formation of rain runoff. Genesis of rain floods. Genetic formula of the drain.
22. Graphic-analytical methods for short-term forecasting of rain flood runoff.
23. Rainfall forecasts based on total inflow into the river network and precipitation.
24. Loss of rainwater due to surface absorption.
25. Losses of rainwater due to surface and soil retention. Pool humidification characteristics.
26. Long-term forecast of maximum discharges (levels) of spring floods.
27. Long-term forecasts of flood hydrographs taking into account spatiotemporal runoff unevenness.
28. Long-term forecast of river flow and water inflow into the reservoir during the low-water period. The main components of low-water flow of lowland rivers. Long-term forecast of low-water flow based on the patterns of depletion of water reserves in river basins.
29. Short-term forecasts of ice phenomena on rivers, lakes and reservoirs (types of forecasts, prerequisites for methods).
30. Short-term forecast of the timing of the appearance of floating ice.
31. Short-term forecast of sludge density and ice drift. Forecast for the onset of freezing on rivers.
32. Calculation and short-term forecast of ice cover thickness. Forecast of a decrease in the thickness and strength of the ice cover.
33. Forecast of opening of rivers, lakes and reservoirs.
34. Conditions for the formation of ice jams. Short-term forecast of maximum congestion levels. Forecast of maximum water levels.
35. Long-term forecasts of ice phenomena based on taking into account the characteristics of atmospheric processes. Physical background of the methods used.
36. Methods based on taking into account the patterns of atmospheric processes. Forecasts of ice appearance on rivers and river break-up.

Доцент А.А. Новик