

THE FACULTY OF METEOROLOGY AND ITS CURRENT CHALLENGES

Russian State Hydrometeorological University
(RSHU)
Saint-Petersburg

GENERAL INFORMATION

The Russian State Hydrometeorological University is the world's oldest hydrometeorological university it was founded in 1930, and the only one of its kind in Russia



The university has more than 350 teachers and researchers, including 60 doctors and professors and 200 PhDs, 5000 students



It is the leading Russian University of higher education in the field of applied hydrometeorology



It is the only university in Europe to be accredited as a regional meteorological training center by the World Meteorological Organization



The university chairs the Educational and Methodological Council of Russian universities in the field of Applied Hydrometeorology



The program Applied Hydrometeorology (level: Bachelor Degree) of our University has Certificate of the International Accreditation for five years



DEPARTMENTS OF FACULTY

Meteorological
forecasts
Department

Department of
meteorology,
climatology and
atmospheric
protection

Department of
experimental physics
of the atmosphere

LEVELS AND DIRECTIONS OF TRAINING



Bachelor's Degree, 4 years of study

- Hydrometeorology
- Applied hydrometeorology

Master's degree, 2 years of study

- Applied hydrometeorology
 - (Profiles: Applied meteorology)
 - Modeling of the atmospheric processes)

Postgraduate study, 3 years of study

- Earth science:
 - Meteorology, Climatology, Agrometeorology

BACHELOR'S DEGREE

Special disciplines for different profiles of the meteorologists training

Polar meteorology and climatology

- Features of cyclogenesis in Arctic region
- Forecast of the weather and climatological features in the Arctic
- Modeling of the climatological changes in the Arctic
- Modeling of the atmospheric composition in the Arctic polar regions
- Meteorological flight support
- Particularities of the aviation forecast in polar latitudes
- Synoptic meteorology in polar regions

Applied meteorology

- Geoinformation systems
- Synoptic meteorology
- Space meteorology
- Numerical methods in atmospheric models
- Physics of atmospheric acoustics
- Assimilation of hydrometeorological data and etc.

Hydrometeorological information-measuring systems

- Geoinformation systems
- Remote sensing of the atmosphere
- The basics of meteorological radar equipment and etc.

Aviation meteorology (in English too)

- Aviation basics
- Aviation meteorology
- Meteorological flight support and etc.

AVIATION METEOROLOGY SPECIAL GROUP

Some of the subjects are taught in English

The defense of the final qualifying work is conducted in English
Members of the State attestation commission:
representatives and heads of European meteorological services, satellite agencies, research and production companies

Practice:
abroad
international events in Russia (such as the 2014 Olympics in Sochi and the 2019 Universiade in Krasnoyarsk).

MASTER'S DEGREE

Special disciplines

- Aviation meteorology
- Modeling of the atmospheric processes
- Meteorological forecasting
- Satellite climatology
- Climatology
- Bio-meteorology
- Cloud physics
- Information-measurement systems in hydrometeorology

CURRENT CALLS

Social and economic
development of the
Arctic zone of
Russian Federation

Modeling is the basis
of modern scientific
and technological
progress

Remote training

THE ARCTIC

In the Arctic, it is necessary to solve such problems as:

Local and transarctic aviation meteorological support

Meteorological support for navigation on the Northern Sea Route

Meteorological support of hydrocarbon production on the Arctic shelf

Monitoring of Arctic pollution in the conditions of intensification of shipping, aerial flights, industrial development of the Arctic shelf

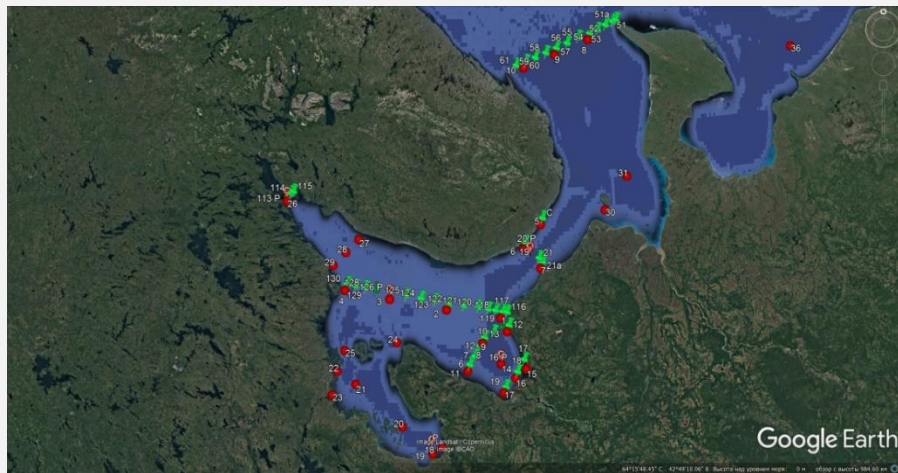
Forecast and estimates of the climatic changes effects in the Arctic zone of the Russian Federation occurring under the influence of natural and anthropogenic factors in the medium and long term

Investigation and development of recommendations for human adaptation to extreme meteorological conditions

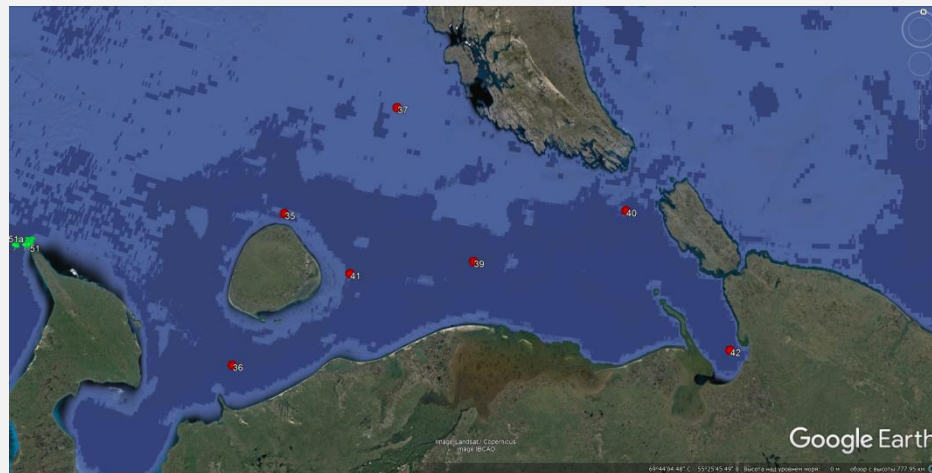
NEW PROFILE: POLAR METEOROLOGY AND CLIMATOLOGY (BACHELOR'S LEVEL)

- Methods and tools environmental monitoring of the Arctic Basin
- Man's adaptation to critical meteorological conditions
- Automatic meteorological stations in the Arctic region
- Polar enhancement in the context of global warming
- Satellite observations of the dangerous weather events
- Features of the atmospheric circulation of the Arctic and Antarctic
- Features of aviation weather forecasts of the polar latitudes
- Modeling of the atmospheric composition of the polar regions
- Climate of the polar regions
- The precipitation regime in the Arctic
- Forecast of weather and climate features of the Arctic
- Applied climatology of the Arctic regions
- Synoptic meteorology of the polar regions
- Assessment of climate resources in the Arctic region

TRANSARCTICA-2019 EXPEDITION ON THE RESEARCH VESSEL "PROFESSOR MOLCHANOV»FACULTY



White Sea



Barents Sea

TRANSARCTICA-2019 EXPEDITION ON THE RESEARCH VESSEL "PROFESSOR MOLCHANOV»FACULTY



PRACTICE ON THE METEOROLOGICAL FACULTY



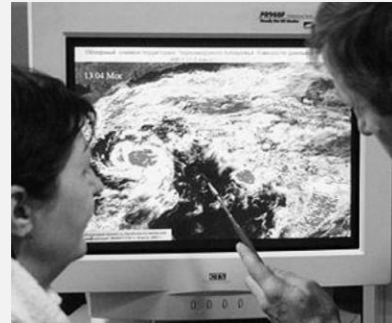
PRACTICE IN DAIMISCHE



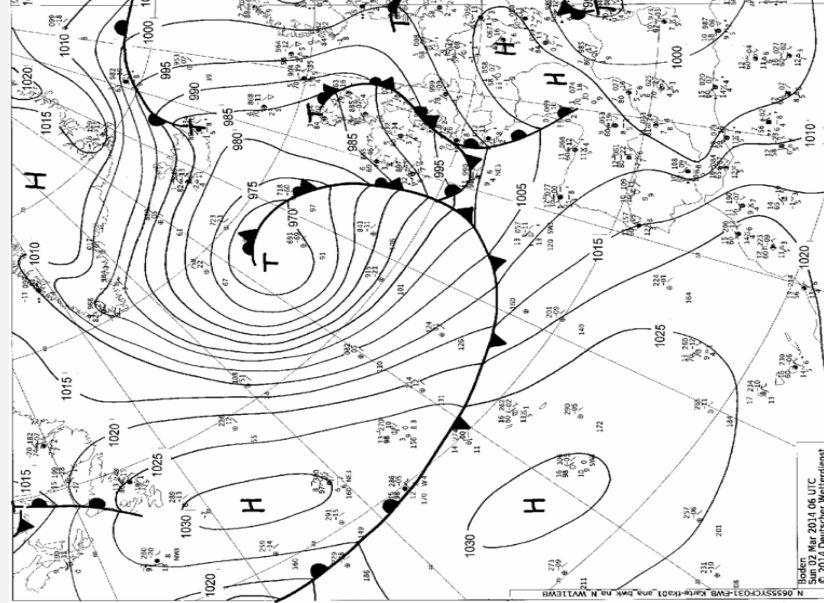
PRACTICE ON ISLAND OF VALAAM



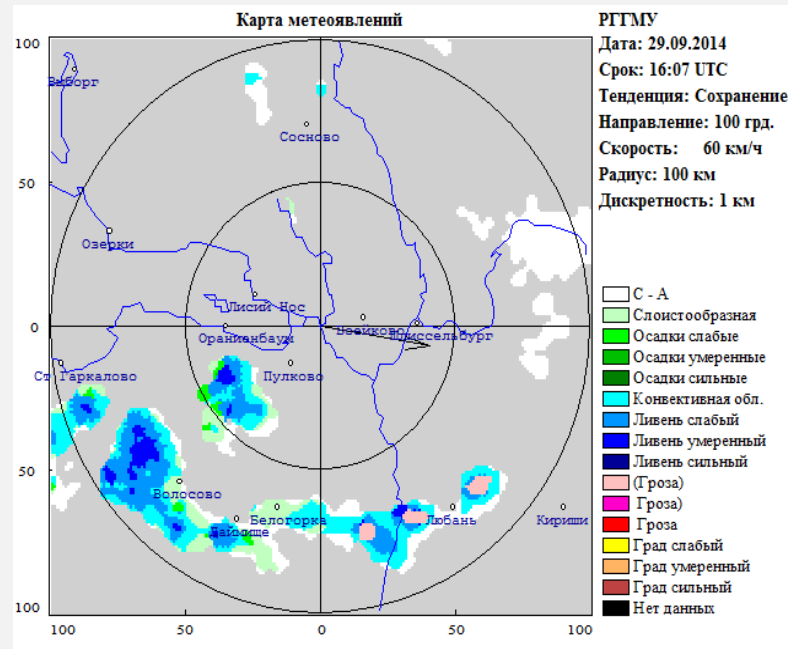
PRACTICE IN AIRPORT PULKOVO, HYDROMETEOROLOGICAL DIVISIONS AND ETC.



EDUCATIONAL BUREAU OF WEATHER FORECASTS



METEOROLOGICAL RADAR COMPLEX «METEOR-METEOCELL»



NEW PROFILE: MODELING OF THE ATMOSPHERIC COMPOSITION (MASTER'S LEVEL)

- Interaction of physical and chemical processes in the Arctic
- Numerical simulation of impurity transport in the earth's atmosphere (to study Arctic too)
- Modeling of the natural processes
- Physics of the atmospheric acoustics
- Atmospheric chemistry
- Long term forecasts
- Solar-terrestrial relationships
- Polar mesoscale cyclones: modeling and forecast - to reduce the risks of the effects of extreme weather phenomena
- Statistical analysis of processes and fields
- Polar mesoscale cyclones: modeling and forecast
- Additional chapters of atmospheric physics for the Arctic region
- Climatology

REMOTE TRAINING

- Zoom-platform for conducting online classes
- Moodle-distance learning system



INTERNATIONAL TRAINING



SUMMER SCHOOL

NIZHNY NOVGOROD STATE UNIVERSITY

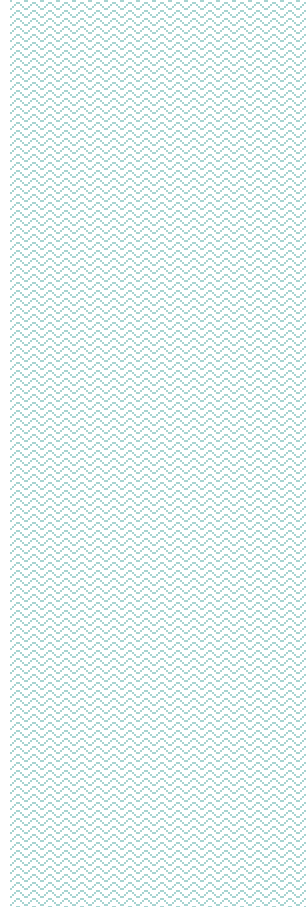


LEARNING THROUGH RESEARCH

The students training based on the programs is allowing:
to provide expedition activities by specialists for the implementation of large-scale, regional and complex scientific projects including within the framework of international cooperation(in the Arctic too)

CLIMATE RESEARCH STUDIES

- Climatic changes in temperature and precipitation
- Climatic variations of cyclonic regimes
- Regional features of global warming
- Variability of meteorological parameters due to natural and anthropogenic factors



WRF MESOSCALE MODELING

- Adaptation to different geographical regions
- Selection of the best configurations
- Modification of parameterization schemes
- Assimilation of observation data (to improve forecast quality)
- Application for:
 - severe weather forecasting;
 - studies of regularities and satellite data assimilation in polar cyclones;
 - modeling polar and tropical cyclones.

DYNAMICAL AND PHOTOCHEMICAL PROCESSES MODELLING THE EARTH'S ATMOSPHERE

- Gravity wave propagation and mean-flow coupling in the mesosphere
- Climatology of planetary waves in ionospheric F-region perturbations using TEC of GPS
- Diagnostic and modeling of stratosphere-troposphere coupling: impacts on the thermal structure, composition, and weather regimes
- Sudden stratospheric warming: precursors, internal dynamics and effects in the troposphere
- Wave processes and non-linear interactions in the stratosphere-troposphere
- Perturbations of the near-Earth's space environment caused by atmospheric waves propagating from lower layers

ECONOMIC METEOROLOGY

- Influence of hydrometeorological conditions on production processes and socio-economic activities: → the problem of quantifying the impact of weather and climate factors on the efficiency of economic activity
- Adoption of operational and strategic management decisions using hydrometeorological information: → the problem of accounting for uncertainty of weather and climate environment
- Development of management models for accounting of hydrometeorological risks (regular and catastrophic): → the problem of optimal adaptation to weather-climatic factors
- Evaluation of economic benefits of hydrometeorological information

REGIONAL CLIMATE CHANGE ASSESSMENTS

Develop a common methodology for identification of contemporary regional climate change and estimation of its future projections taking into account zonal and local features of climatic characteristics of different geographical regions

DEVELOP

regional climate database (with quality and homogeneity assessment) for climate modeling, filling observational gaps, short records extension to a specified long-term period

ESTIMATE

type of statistical model for perennial fluctuations and its parameters for each meteorological station in focus

GENERALIZE

derived indices of non-stationary statistical models of time-series and identification of areas with the most significant manifestation of modern climate change

SELECT

the most suitable physico-mathematical climate model on a basis of in-situ observations vs. results of historical experiments (from CMIP5 project)

CALCULATE

future climate projections (RCP scenarios) taking into account the climate modeling output correction according to model errors and local peculiarities of climatic characteristics

UNIVERSITY GRADUATES WORK

- Pulkovo International Airport
- Sheremetyevo International airport
- Airports of Russian Federation
- The Russian Hydrometeorological Center
- World Meteorological Organization (WMO)
- Meteorological organizations: Great Britain, Kenya, China, etc.

THANKS FOR YOUR ATTENTION!