Institute of Hydrology and Oceanology

(since 01.09.2019)

Russian State Hydrometeorological University

Hydrological Department (HD)

- ✓ **Water Engineering Surveys**
- ✓ **Engineering Hydrology**

3 Professors
17 Associate Professors

Oceanography Department (OD)

- ✓ **Applied Oceanography UNESCO-IOC and Integrated Coastal Zone Management Department**
- ✓ **Oceanology**

3 Professors
8 Associate Professors

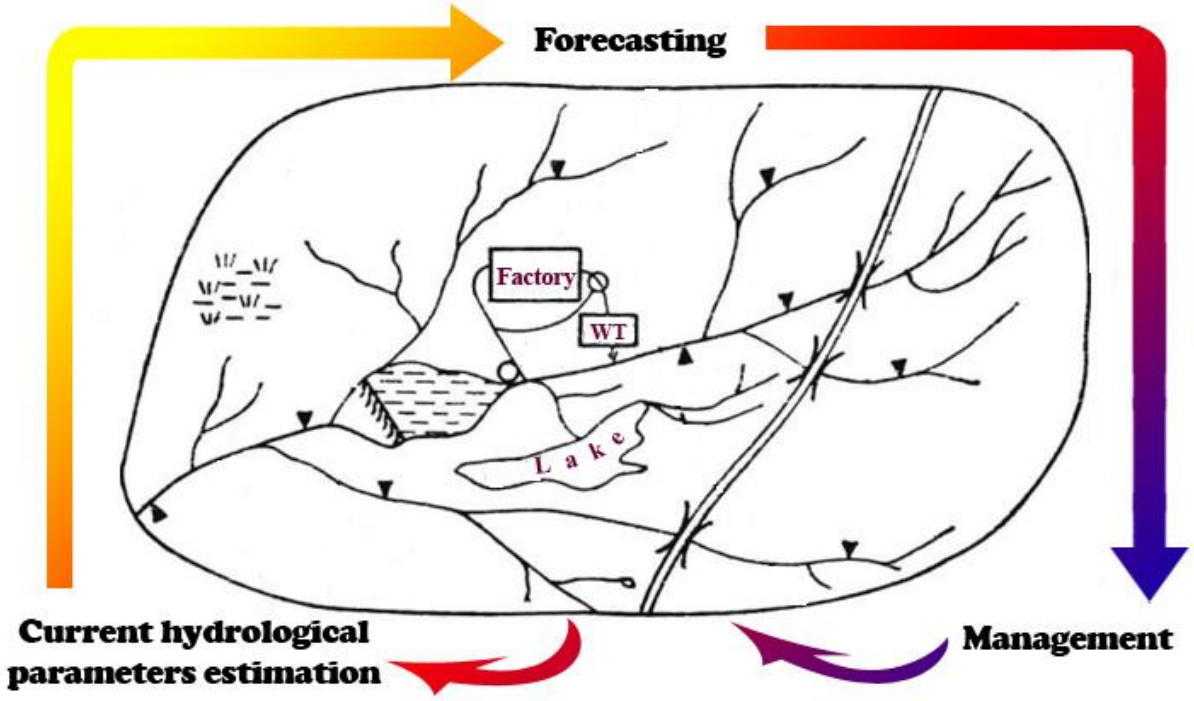
Director Dr. Tatjana Eremina

Hydrology studies a River Basin or an entire Water-Management Complex (WMC)

WMC includes a River Basin and Water Related Constructions situated here (Hydropower Plants, Water Reservoirs and etc.)

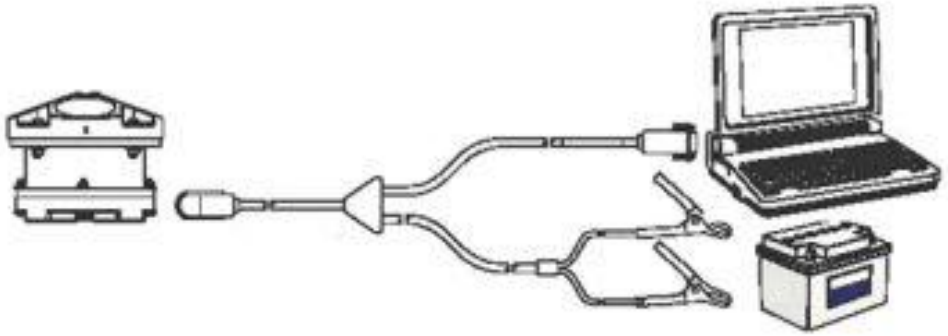
Current data on WMC allows forecasting its future condition

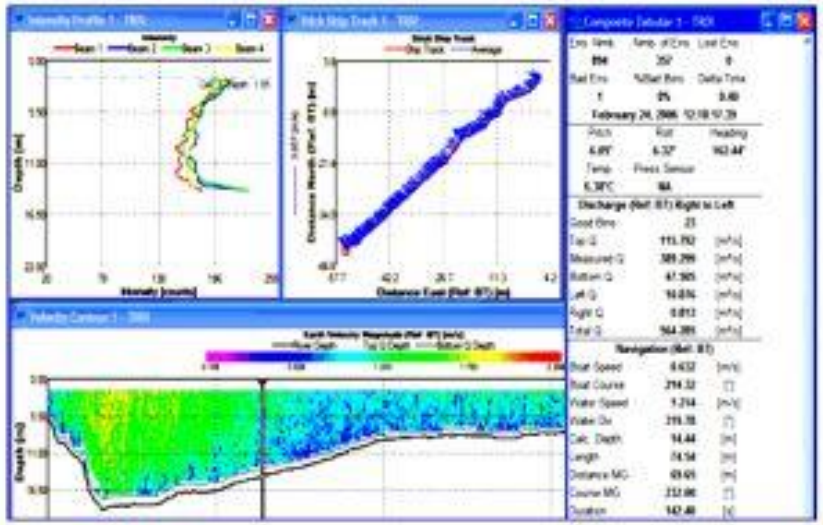
Estimating current hydrological characteristics of streamflow and their spatiotemporal distribution



Forecasting data allows managing WMC, for example: seasonal or multiyear runoff regulation

Water Engineering Surveys





Targeted Training Courses

Geodesy, Hydrogeology, Geophysics

Studying streamflow

Approaches for measuring flow parameters

Interrelation between a stream
and its underline surface

Measuring canal

Major Research Areas

Development of methods for
man-made impact assessment

Ecological and hydrogeological studies
in urban areas

The Model of the Oredezh River Field Training Practices Site

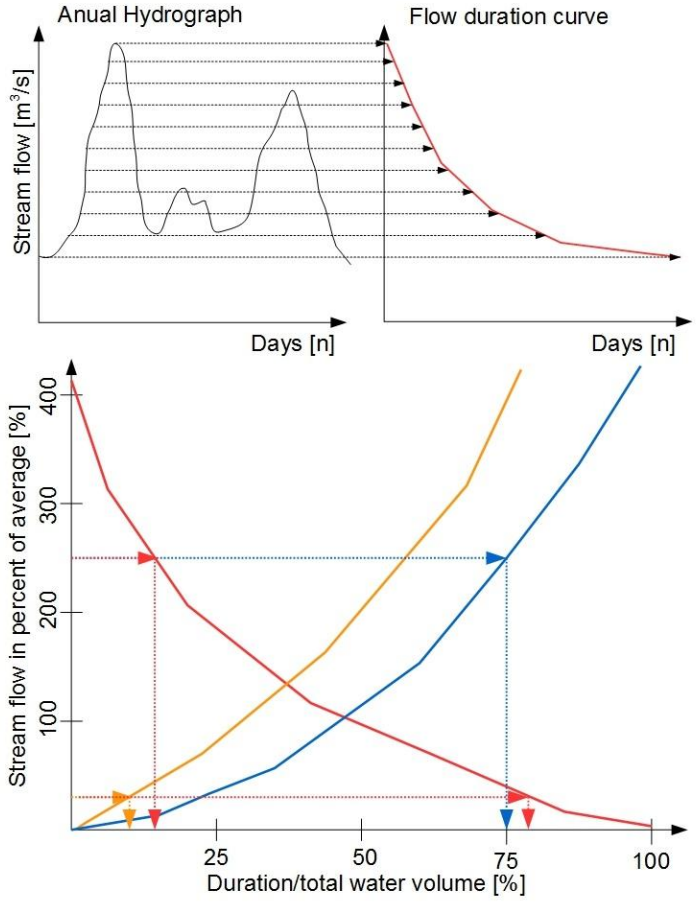
Field Training Practices on Hydrological Measurements play a crucial role during training future engineers of Hydrology:
Large River, Small River, Water Reservoir, Winter practice.

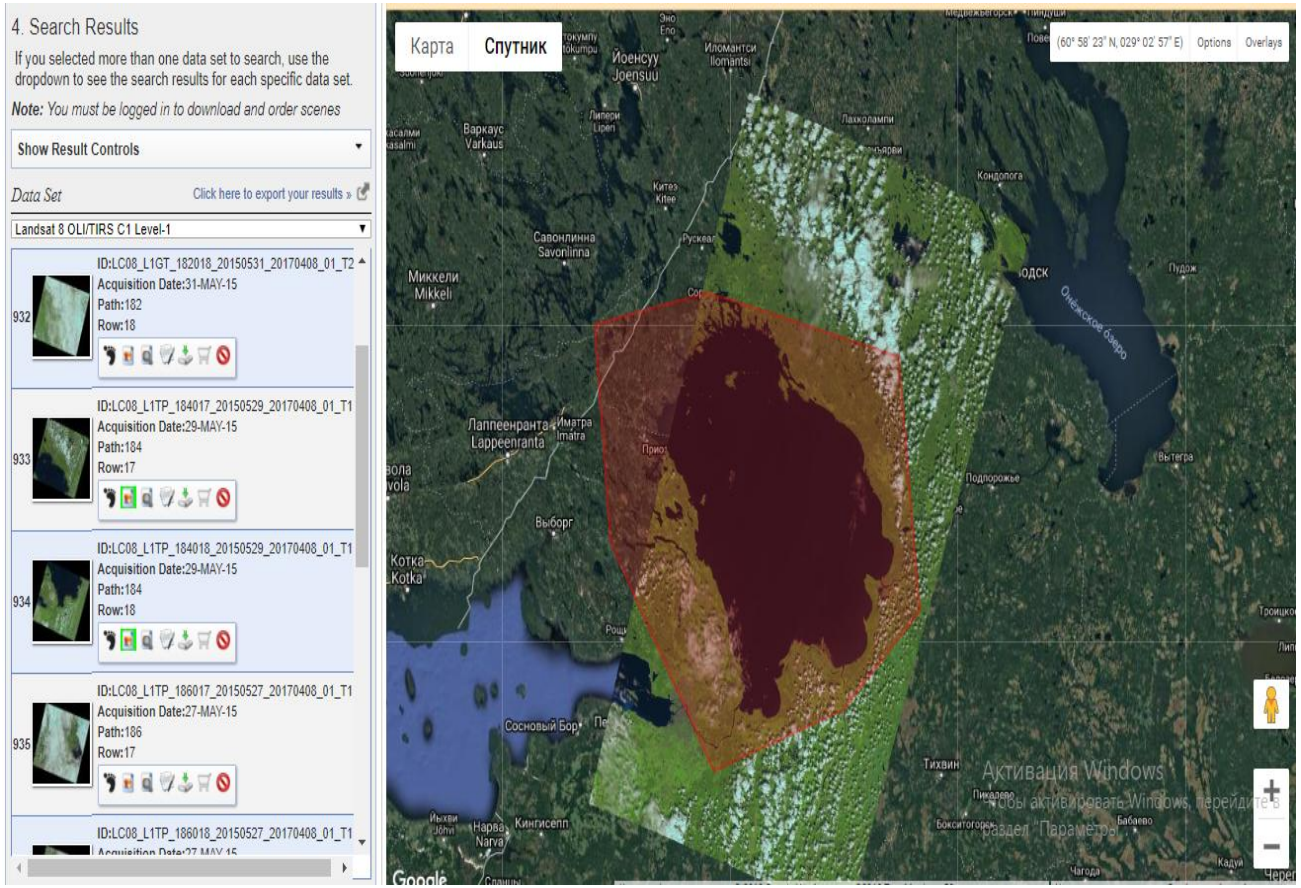
These training practices are aimed at helping students to gain practical skills needed for carrying out field works on large and small rivers, in summer and in winter.

Under ice measurements

The Oredezh River, Field Training Practices Site

Engineering Hydrology





Major Research Areas

1. Improvement current and development of new methods for calculating main hydrological characteristics, required for projects and construction.

2. Climate and human activities impact on water resources condition in economically developed regions.

3. Rational water use for sustainable ecosystems.

4. Hydrological regime and external water exchange in different genesis lakes.

Major Research Areas

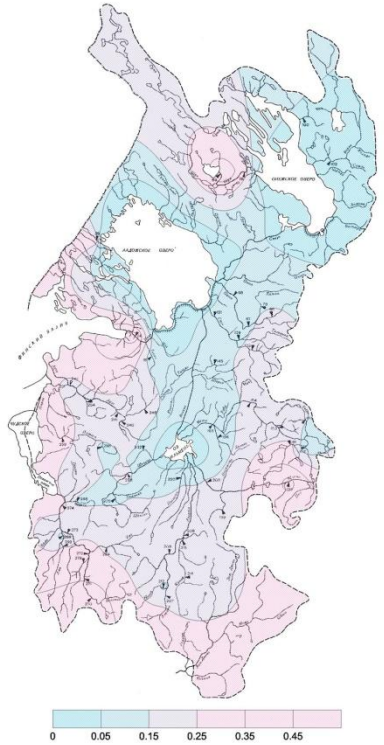
5. Estimating the effects of anthropogenic climate change, based on a stochastic model of river flow formation.

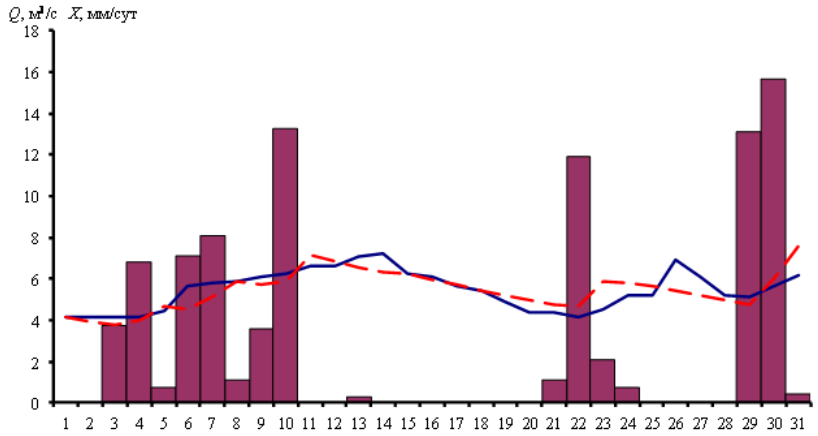
6. Estimating possible ecological and economic effects of unstable process of river flow formation.

7. Identification of the onset of bifurcation mechanisms of development, considered a hydro-ecological catastrophe loss of stability), based on analytical and numerical analysis of mathematical models.

8. Systematic modeling of deterministic and stochastic processes of water exchange in catchments.

9. Solving problems of optimal management (control) of the development of hydro-ecological processes.





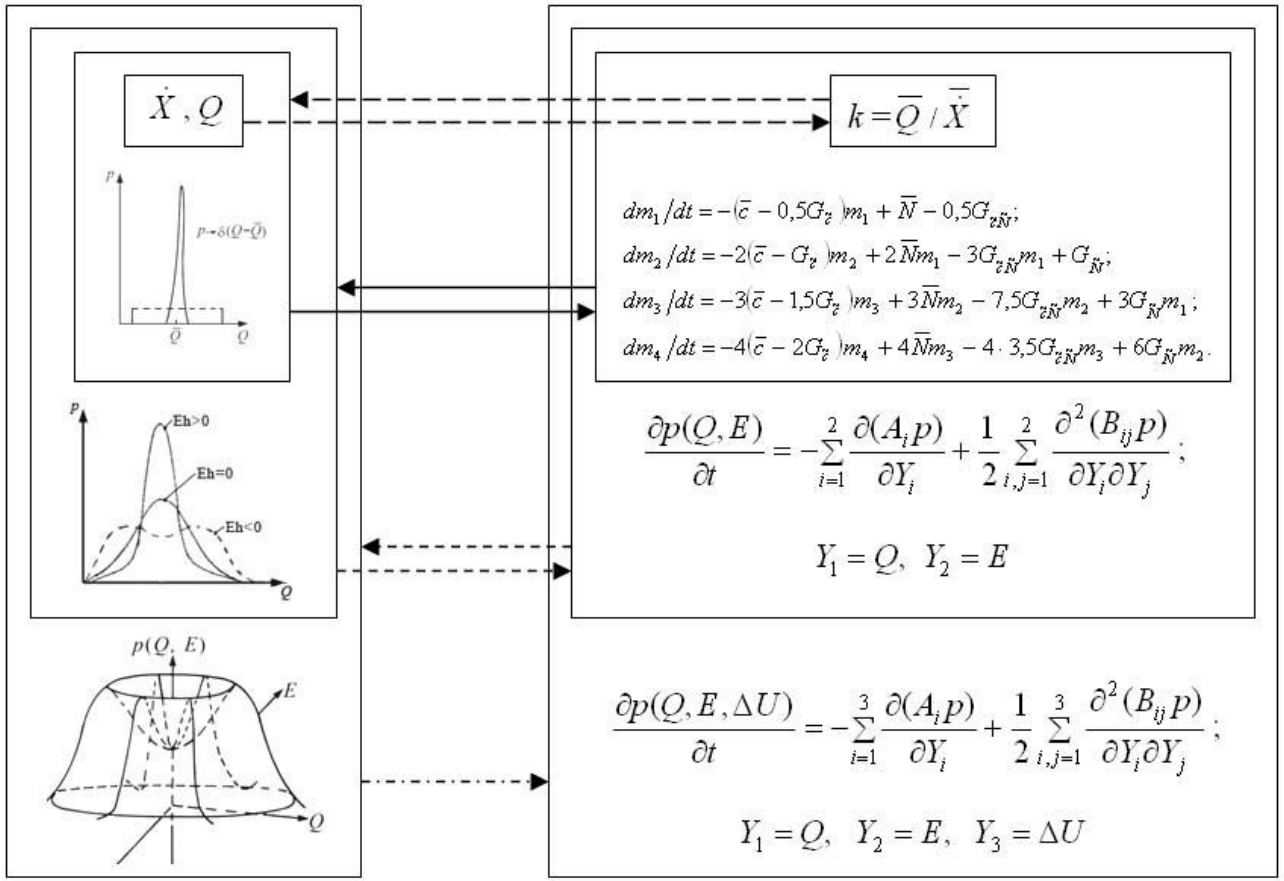
Scientific school Partially Infinite Hydrology

Enhanced methodology for short-term and long-term forecasting of catastrophic phenomena formation conditions, related to hydrological effects of long-term climate change scenarios, is aimed at assessment of both multi-year characteristics and change in the typical course of hydrometeorological elements.

This allows specific short-term scenario forecasting of possible catastrophic phenomena.

Perspective applications:

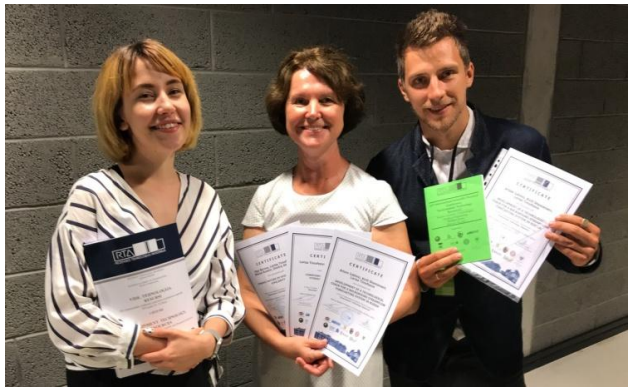
mapping forecasts of hydrological effects of climate change can be used as a means for evaluating economic effects of climate change (through targeted functions).



Use of Partially Infinite Modeling
for assessment of hydrological effects of climate change

International collaboration and academic mobility

WORLD METEOROLOGICAL ORGANIZATION



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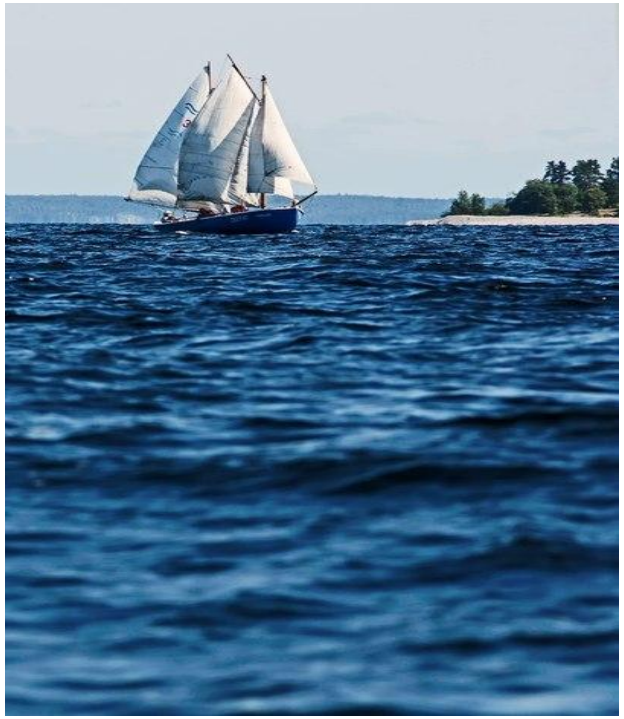
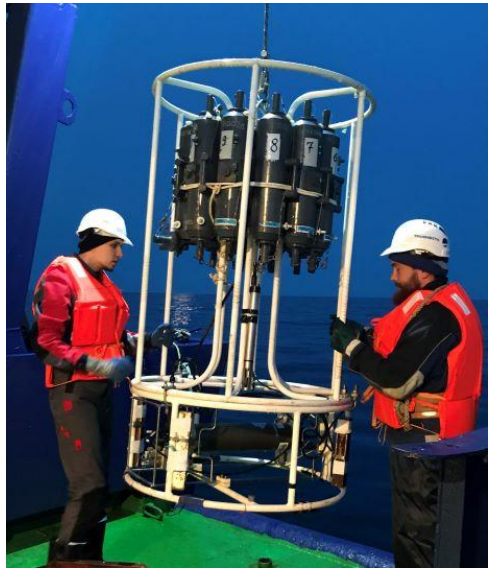
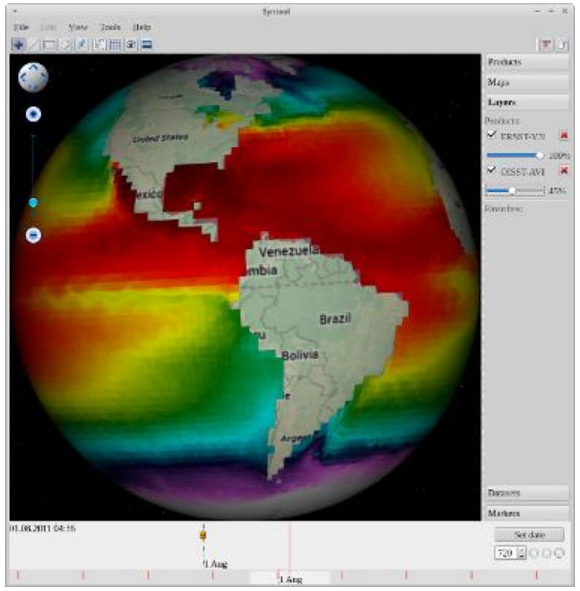
Oceanography Department (OD)

✓**Applied Oceanography UNESCO-IOC and Integrated Coastal Zone Management Department**

✓**Oceanology**







Collaboration with labs

SATELLITE OCEANOGRAPHY LABORATORY

Three Interdisciplinary Master's Programs

Operational Oceanography

Hydrodynamic operational models,
wave models and oil transportation
and transformation models

Data processing and assimilation

Remote sensing:
applications for operational systems

Oceanology

Fisheries Oceanography:
Marine forecasts,
oceanological support of fishing activities

Aquaculture

Pollution and protection of water bodies,
Marine ecology

Marine activities and integrated coastal zone management

Management of marine activities

Maritime policy

Strategic planning of social and
economic development of coastal zones

Marine and coastal resources

Protection of the coastal environment

Applied Hydrometeorology Qualification (degree) - Oceanology

Includes elective subjects related to fisheries and protection of natural waters

Marine activities and integrated coastal zone management

Operational oceanography (new)

Major Research Areas

1. Marine Monitoring (field trips).

2. Climate change.

3. Operational oceanography system (GULFOOS).

4. Marine ecosystem modeling using
   3D biogeochemical model for the Baltic Sea (SPBEM).

5. Biogeochemical modeling for investigation the bottom sediments.

6. Statistical modeling natural processes in the World Ocean:
   Study of Arctic sea ice cover in the present climate;
   study of ocean-atmosphere moisture exchange
   on a global scale and so on.

RSHU expeditions in the Baltic Sea

International collaboration and academic mobility

Erasmus+

Student mobility: for masters, 4-5 months,
University of Cadiz (Spain)

Students, Postgraduates and Teachers exchange
in the framework of the European Educational master's program
«Water and Coastal Management» (WACOMA)

Winter school at **Lammi Biological station**
(University of Helsinki)

UCA
Universidad de Cádiz

Erasmus Mundus Joint Master Degree
Water and Coastal Management
WACOMA

Thank you for listening