
Regional Observing Network for Climate and Environmental Monitoring (RONCEM)

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According to WMO data «more stringent requirements on observation networks and systems for monitoring climate, including the detection of climate change, has led to the development of special networks at global (e.g. the Global Climate Observing System – GCOS – Surface Network, GSN), national (e.g. Reference Climate Stations) and regional (e.g. Regional Basic Climatological Network) scales».

Global scale

- Global Atmosphere Watch
- Baseline Surface Radiation Network
- Climate Reference Network
- Global Terrestrial Network for Permafrost
- FluxNet

National scale

- National Ecological Observatory Network (USA)

Regional scale

- Savannah River Site (USA)

Background

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Climate observations at national and global scales are carried out by some reference climate stations of the Roshydromet. However, climate observations at regional scales - in particular in the Siberian region - are absent.

Thus, in order to clinch the matter of special networks at regional scale, it was proposed to develop a project of the **Regional Observing Network for Climate and Environmental Monitoring – RONCEM**.

A development of the RONCEM is supported by the SB RAS within the framework of **project No. 8 «Instrumentation, method and technical support of climate and environmental monitoring in the Siberian region»** since 2009.

Objectives

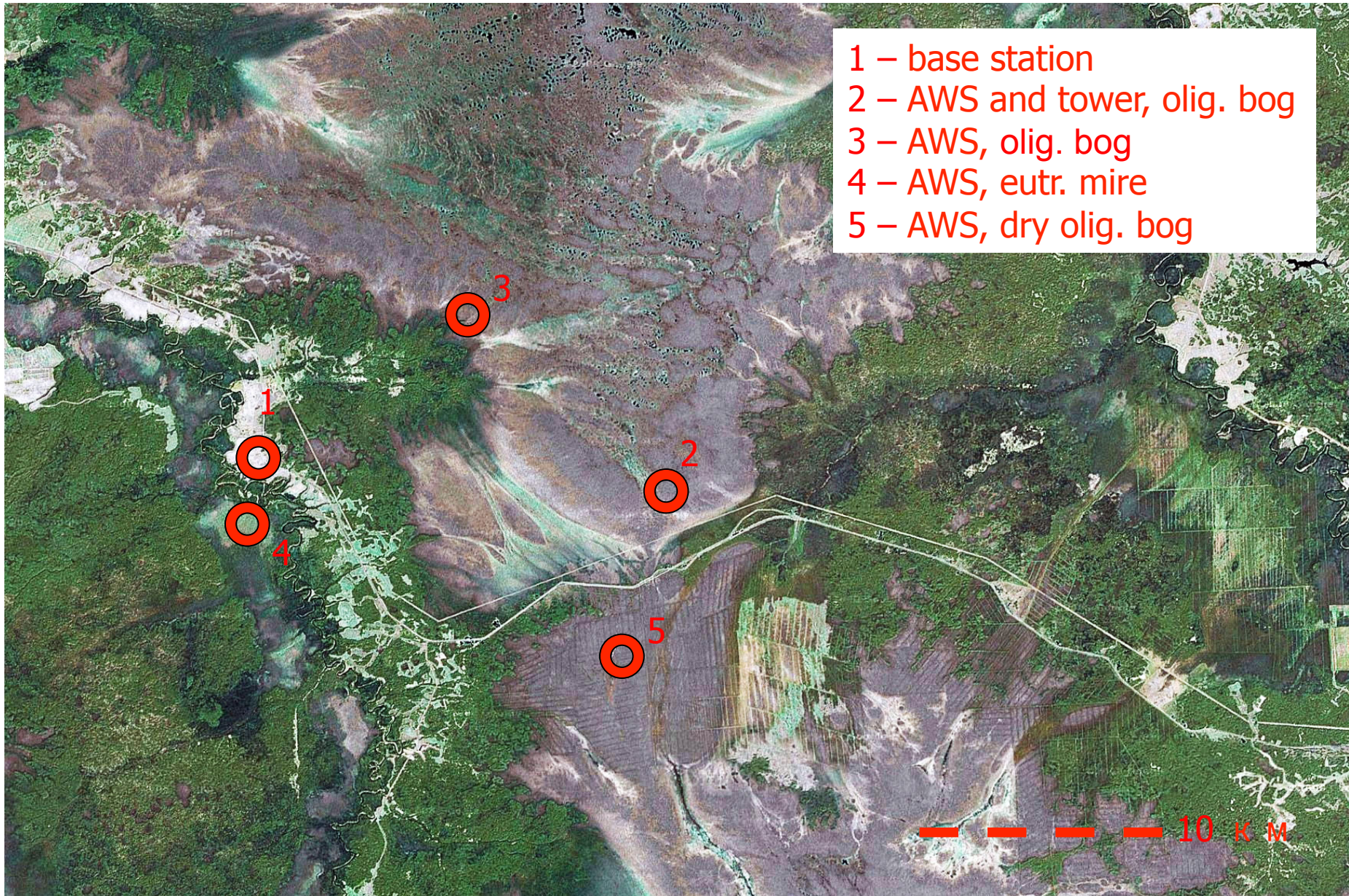
A general objective of the RONCEM is management and support of experimental research investigations for taking a new knowledge about climate and environment in the Siberian region, their changes and man's impact.

A specific objective of the RONCEM is complex monitoring climatic, environmental and ecosystem variables, featuring such regional phenomena as waterlogging, desertization, strong change of landscapes etc., and obtaining unique experimental data needful for analysis and modeling of regional climate and environment changes.

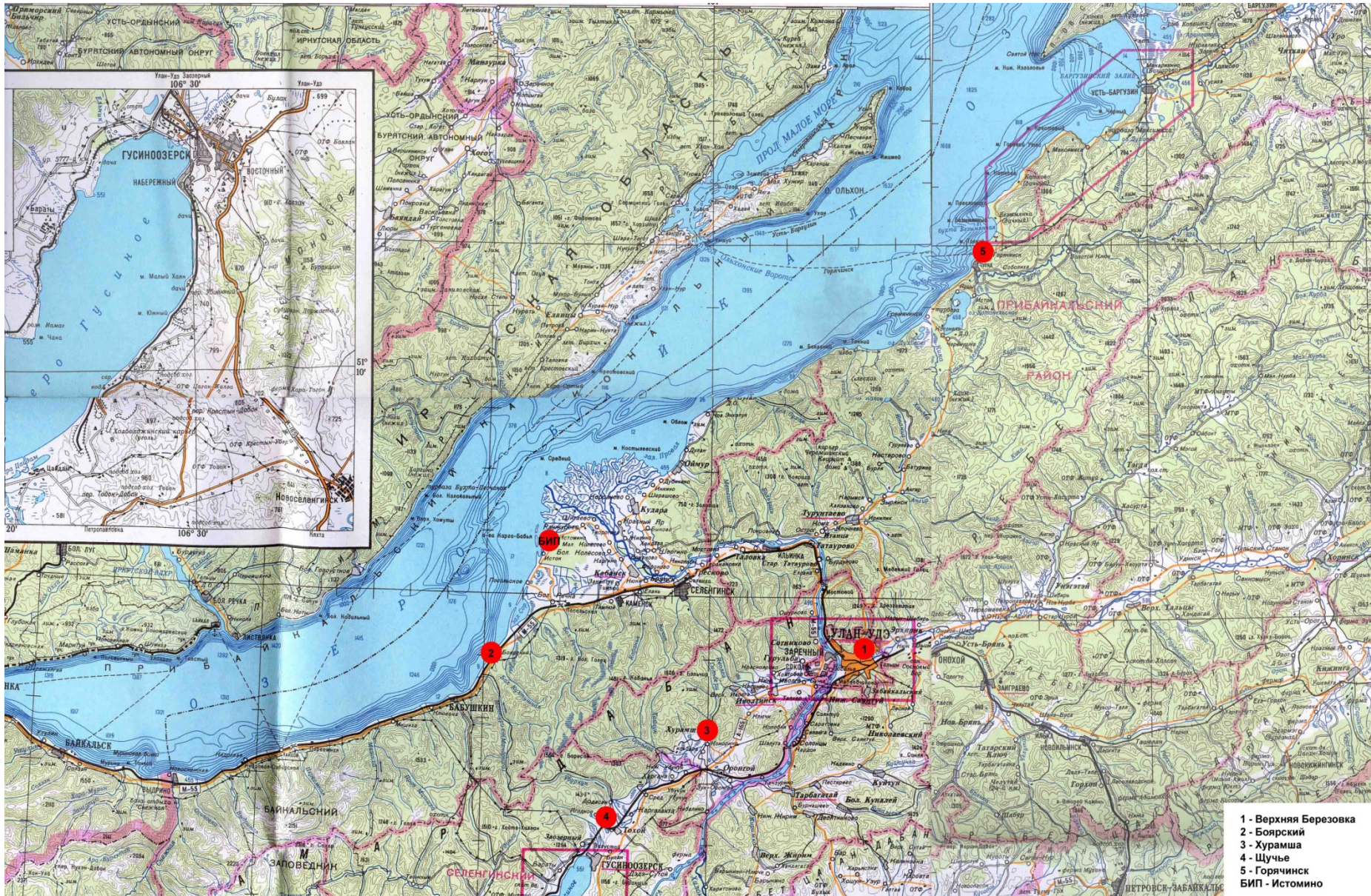
How many? Where?

To derive satisfactory climatological space-time averages for particular climate elements, and to have homogeneous, continuous and good quality measurement data, the RONCEM project provides for **more than 10 standard sites (or local observing systems) in the Siberian region having more than 40 automatic observational stations with high frequency data storage.**

Local observing system at Bakchar Bog



Local observing system at Baikal Lake



What?

Seeing that climate observations need to account for the full range of elements that describe the climate

Seeing that climate observations need to account for the full range of elements that describe the climate system – not just those that describe the atmosphere, but also terrestrial properties and attributes that control the physical, biological and chemical processes affecting climate, which are themselves affected by climate change, or serve as indicators of climate change (socalled Essential

- **Mandatory continuous ground-based meteorological**
 - **Surface atmosphere (p, T, RH, V, d)**
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 - **Snow depth**
 - **Water table depth (peatlands)**
 - **Precipitation**
 - **Snow depth**
 - **Water table depth (peatlands)**
 - **Vaporability**

- **Mandatory continuous flux and profile measurements**
 - **Eddy covariance (EC) fluxes (CO₂, H₂O, sensible and latent heat, momentum)**
 - **Soil CO₂ flux**
 - **Soil CH₄ flux**
 - **Soil heat flux**
 - **CO₂ and CH₄ profiles**
- **T, RH, V, d profiles**
 - **Mandatory ecological measurements**
 - **Phytome bioproductivity and biomass**
 - **Species composition**

- **Tropospheric aerosols (particle size and concentration, optical characteristics)**
 - **Spectral atmospheric transmission (AOT, H₂O column)**
 - **Atmospheric electricity and thunderstorm activity**
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Instrumentation and Configuration

- Automated weather stations (AWS) with 10-m mast at mature sites
- Automated weather stations with 4-m mast at satellite sites
- 10 or 30-m towers for profile and **flux** measurements using the three-dimensional sonic thermometer-anemometers (SAT), **the fast-response CO₂/H₂O analyzers, air inlets, CO₂ and CH₄ analyzers**
- Lightning detection system
- Base station, incl.
 - Multifunction Raman lidar
 - Aerosol lidar
 - Sun photometer
 - **Aerosol spectrometers**

Configuration of the standard site, incl. a base station, AWS and tower

Площадка для дистанционного зондирования атмосферы

Мачта для градиентных измерений

Площадка для стандартных метеорологических измерений

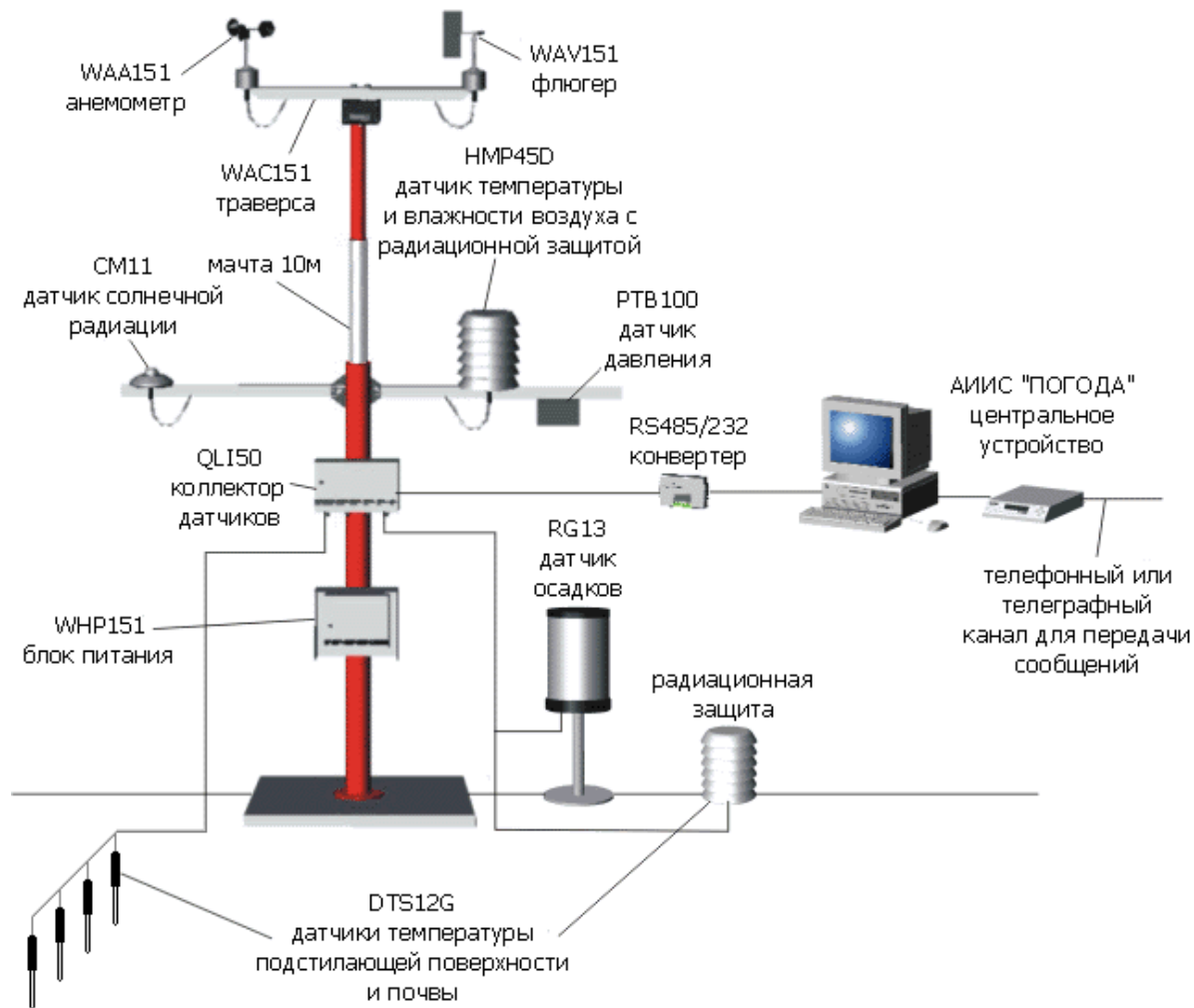
Павильон для размещения систем регистрации, связи и технического обеспечения

Площадка для аэрозольно-радиационных измерений

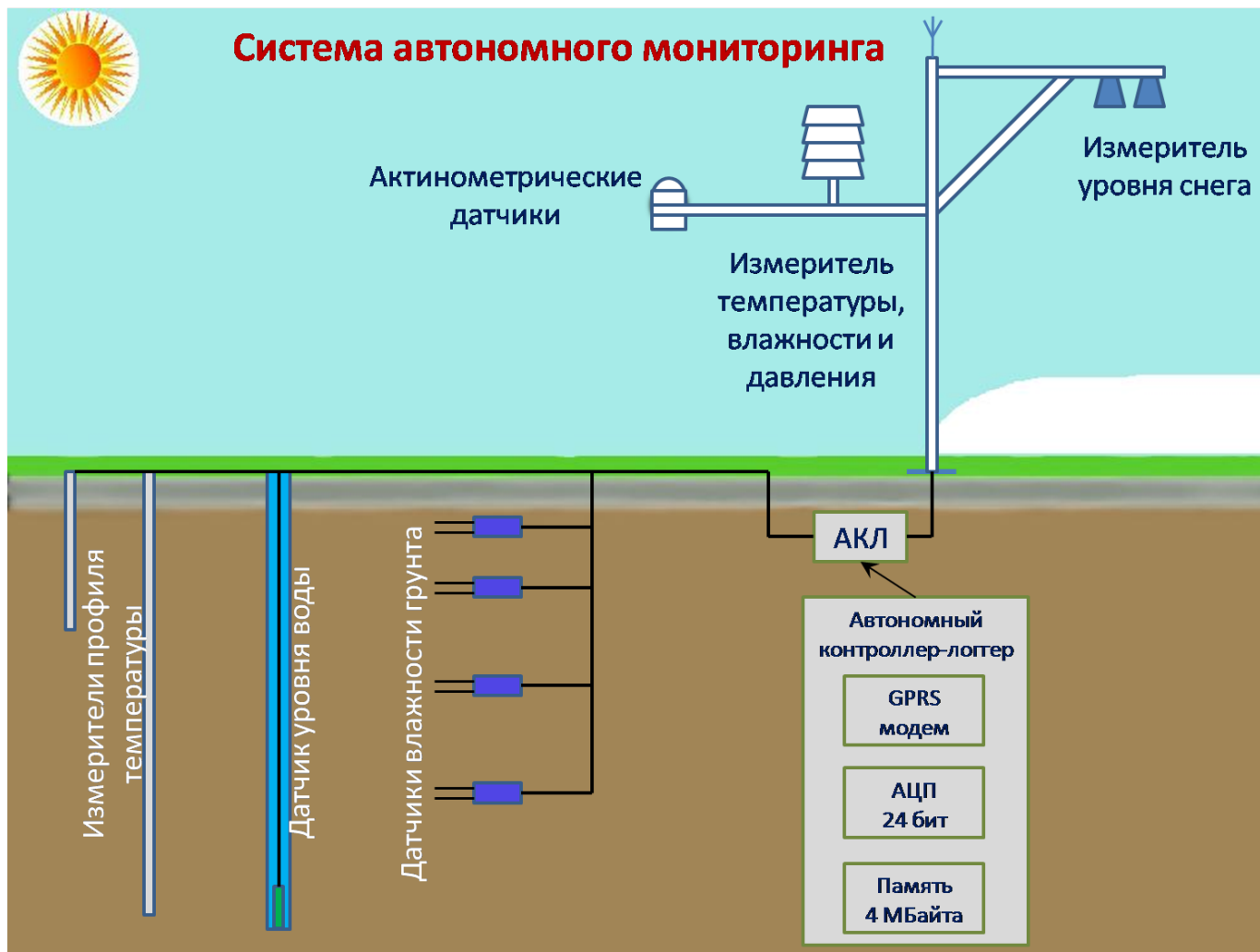
Площадка для экосистемных наблюдений



Automated weather stations with 10-m



mast

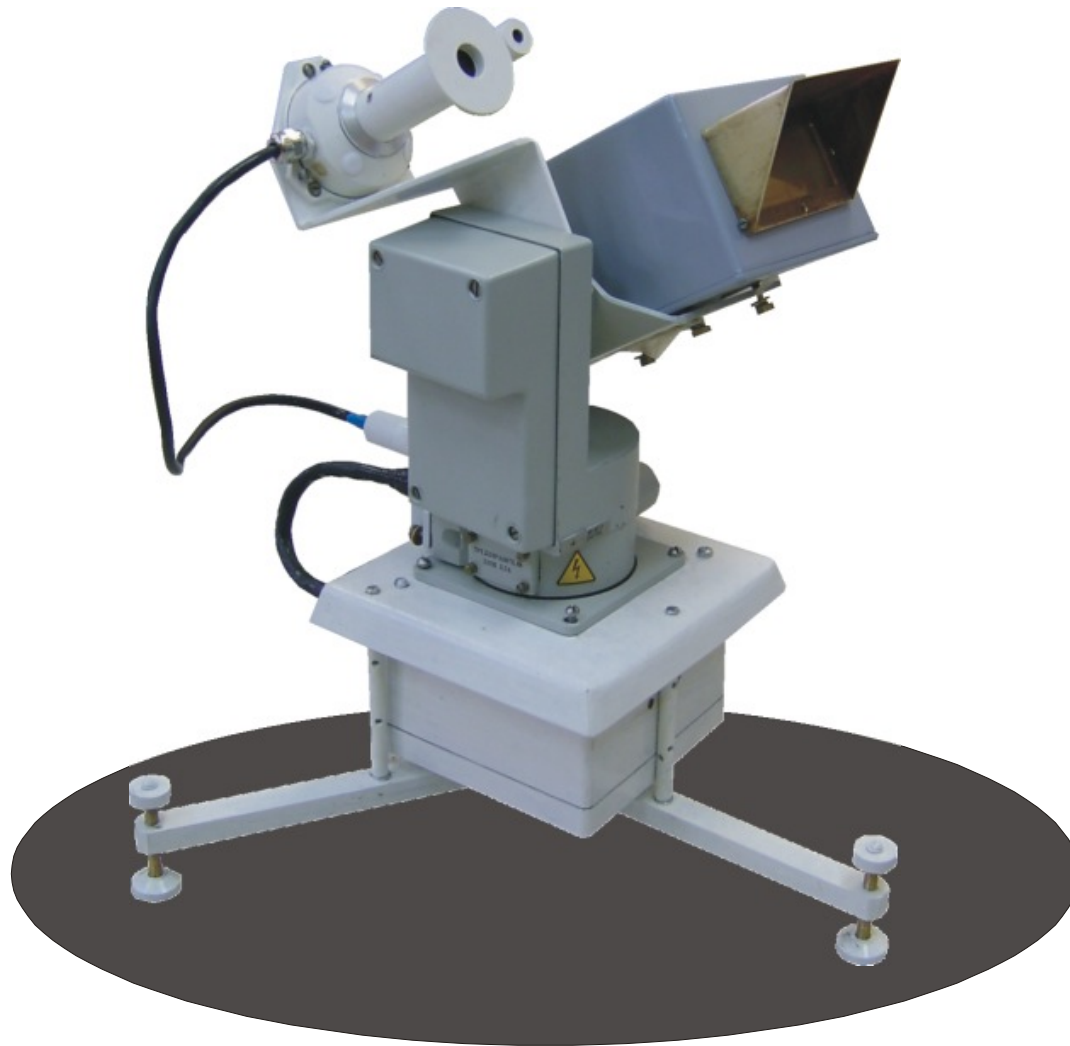


Aerosol lidar



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Sun photometer



Management

- **RONCEM director is Prof. Dr. M.V. Kabanov.**
- **Immediately a function of instrumentation, method ~~and technical~~ support is laid on the RONCEM**
- **RONCEM secretaries to the director are Dr. S.V. Smirnov and Dr. V.A. Korol`kov.**
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Participants

- **systems**
site of monitoring of climatic and ecological
- **Institute of Atmospheric Optics**
- **Physical Problems Department of BSC**
- **Baikal Institute of Nature Management**
- **Institute of Forest**
- **Cryology**
Institute of Natural Resources, Ecology and

Main problems

Money for development of the RONCEM project

- **Lack of experience and specialists**
- **Routine maintenance at sites**
- **sites**
- **Effective using data of measurements**

We are ready to collaborate!



Thank you!