Project
'Study of subglacial lake Vostok, Antarctica'

Research Activities planned in 2001 (by Russian institutions involved)

1. **ARCTIC and ANTARCTIC RESEARCH INSTITUTE, Roshydromet (CONVENER)**
   Glaciological studies, modeling, equipment development
   - Analysis of structure and contents of accreted ice; modeling the lake water accretion process
   - Dating of the glacier ice between 3310 and 3538 from air-hydrate-growth data obtained on the Vostok ice core
   - Investigation of hydrate-water-gas (e.g., N_2, O_2, CH_4) equilibria based on thermodynamic modeling and accreted ice data
   - Development of general 2-D model of water circulation within the lake (thermohydrodynamics)
   - Continuation of development of non-contaminating technique and technology for lake entry and lake water sampling (stage III: Assembling and first tests of the equipment in St. Petersburg) (IN COLLABORATION WITH ST. PETERSBURG MINING INSTITUTE)

2. **POLAR MARINE GEOLOGICAL RESEARCH EXPEDITION**
   Seismic and radio-echo sounding
   - Analysis of seismic and radio-echo sounding data obtained for the lake Vostok (middle transsect) during 45 RAE expedition (mapping)
   - Analysis of radio-echo sounding data obtained for the lake Vostok (South-East coast) during 45 RAE expedition (mapping)

3. **INSTITUTE of MICROBIOLOGY, RAS**
   Classical [morphological] microbiology studies
   - Analysis of abundance and morphological diversity of microbes within accreted ice (by fluorescent and electronic scanning microscopy)
   - Analysis of metabolic activity of microbes within accreted ice as compared to those recovered from glacier ice

4. **PETERSBURG NUCLEAR PHYSICS INSTITUTE, RAS**
   Molecular microbiology studies
   - PCR detection and identification of archaea and bacteria (cyanobacteria separately) within accreted ice (>3546 m) (mainly 16S rDNA PCR/sequencing approach)
   - PCR detection and identification of fungi within accreted ice (>3546 m) (mainly ITS/LSU rDNA PCR/sequencing approach)

5. **ALL-RUSSIA RESEARCH INSTITUTE for GEOLOGY and MINERAL RESOURCES of THE WORLD OCEAN**
   Geological studies
   - Analysis of seismic sounding data (seismic mapping)
   - Analysis of [mineral] inclusions within accreted ice

6. **KAZAN STATE UNIVERSITY**
   Mathematical modeling
   - Simulation of thermodynamic conditions at the ice-lake water interface and dating the bottom section (3310-3538 m) of glacier ice based on heat-transfer and ice-flow models

Expedition Activities planned in 2001-02 (Vostok station)

1. **RUSSIAN ANTARCTIC EXPEDITION**
   Seismic and Radio-echo sounding (IN COLLABORATION WITH POLAR MARINE GEOLOGICAL RESEARCH EXPEDITION and ST. PETERSBURG MINING INSTITUTE)
   - Aboveground radio-echo sounding of lake Vostok (Northern coast) get finished during 46-47 RAE expeditions
   - Seismic 'reflecting' waves sounding of lake Vostok (Southern region) (glacier ice, lake water and lake sediments) during 46-47 RAE expeditions

2. **ST. PETERSBURG MINING INSTITUTE**
   Ice coring/borehole survey
   - Geophysical survey of the deep borehole 5G-1 at Vostok (diameter, inclination, fluid pressure and temperature measurements)
   - Continuation of ice coring in the deep borehole 5G-1 (3623-3673 m)

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